Pike County Multi-Jurisdictional All Hazards Mitigation Plan Update

Pike County, Illinois

Draft

Participants:

Pike County
Barry, City of
Baylis, Village of
Baylis Fire Department
Fairmount Township
Griggsville, City of
Illini Community Hospital
McGee Creek Drainage & Levee District
New Canton, Town of
Pearl, Village of
Pikeland Community Unit School District #10
Pittsfield, City of
Pittsfield Township
Sny Island Levee Drainage District
Spring Creek Fire Protection District
Valley City Drainage & Levee District

May 2023

The five year update of this Plan must be completed on or before (date).

PIKE COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

PIKE COUNTY, ILLINOIS

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Researched and written for the Pike County Multi-Jurisdictional
All Hazards Mitigation Planning Committee
by American Environmental Corporation

American
Environmental

1.0 INTRODUCTION

Each year natural hazards (i.e., severe thunderstorms, tornadoes, severe winter storms, flooding, etc.) cause damage to property and threaten the lives and health of the residents of Pike County. Since 1965, Pike County has been included in 19 major federally-declared disasters. **Figure I-1** identifies each declaration including the year the disaster was declared and the type of natural hazard that triggered the declaration. The natural hazard(s) recognized as contributing to the declaration for Pike County is identified in bold.

Figure I-1
Federal Disaster Declarations: Pike County

Declaration #	Year	Natural Hazard(s) Covered by Declaration
194	1965	tornadoes; severe storms; **flooding**
262	1969	**flooding**
276	1969	heavy rains; **flooding**
373	1973	severe storms; **flooding**
438	1974	severe storms; **flooding**
583	1979	severe storms; **flooding**
674	1982	severe storms; tornadoes; **flooding**
735	1985	severe storms; **flooding**
997	1993	severe storms; **flooding**
1053	1995	severe storms; **flooding**
1368	2001	**flooding**
1416	2002	severe storms; tornadoes; **flooding**
1469	2003	severe storms; tornadoes; **flooding**
1771	2008	severe storms; **flooding**
1935	2010	severe storms; **flooding**
1960	2011	**severe winter storm; snowstorm**
4116	2013	severe storms; straight-line winds; **flooding**
4461	2019	severe storms; **flooding**
4489	2020	**COVID-19 pandemic**

In the last 10 years alone (2013 – 2022), there have been 57 heavy rain events, 32 thunderstorms with damaging winds, 29 riverine flood events, 27 excessive heat events, 24 extreme cold events, 23 flash flood events, 17 severe winter storms, 10 severe storms with hail one inch in diameter or greater, 6 tornadoes, and 1 drought verified in the County.

While natural hazards cannot be avoided, their impacts can be reduced through effective hazard mitigation planning. This prevention-related concept of emergency management often receives the least amount of attention, yet it is one of the most important steps in creating a hazard-resistant community.

What is hazard mitigation planning?

Hazard mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and man-made hazards. This process helps the County and participating jurisdictions reduce their risk from these hazards by identifying vulnerabilities and developing mitigation actions to lessen and sometimes even eliminate the effects of a hazard. The results of this process are documented in an all hazards mitigation plan.

Why update an all hazards mitigation plan?

By updating and adopting an all hazards mitigation plan, participating jurisdictions become eligible to apply for and receive federal hazard mitigation funds to implement mitigation actions identified in the plan. These funds can help provide local government entities with the opportunity to complete mitigation projects and activities that would not otherwise be financially possible.

The federal hazard mitigation funds are made available through the Disaster Mitigation Act of 2000, an amendment to the Robert T. Stafford Disaster Relief and Emergency Assistance Act, which provides federal aid for mitigation projects, but only if the local government entity has a Federal Emergency Management Agency (FEMA) approved hazard mitigation plan.

How is this plan different from other emergency plans?

An all hazards mitigation plan is aimed at identifying projects and activities that can be conducted prior to a natural or man-made disaster, unlike other emergency plans which provide direction on how to respond to a disaster after it occurs. This is the second time that Pike County has updated its hazard mitigation plan since the previous plan was prepared in 2010. This update describes in detail the actions that can be taken to help reduce or eliminate damages caused by specific types of natural and man-made hazards.

1.1 PARTICIPATING JURISDICTIONS

Recognizing the benefits of having an all hazards mitigation plan, the Pike County Board authorized the update of the Pike County Multi-Jurisdictional All Hazards Mitigation Plan (hereto referred to as the Plan). The County then invited all the local government entities within Pike County to participate. **Figure I-2** identifies the participating jurisdictions represented in the Plan update who sought Plan approval.

Figure I-2
Participating Jurisdictions Represented in the Plan

- Barry, City of
- Baylis, Village of
- Baylis Fire Department
- Fairmount Township
- Griggsville, City of
- Illini Community Hospital
- McGee Creek Drainage & Levee District
- New Canton, Town of
- Pearl, Village of
- Pikeland Community Unit School District #10
- Pittsfield, City of
- Pittsfield Township
- Sny Island Levee Drainage District
- Spring Creek Fire Protection District
- Valley City Drainage & Levee District

While all of the municipalities within the County were invited and encourage to participate in the Plan update, Detroit, El Dara, Florence, Hull, Kinderhook, Milton, Nebo, New Salem, Perry, Pleasant Hill, Time and Valley City chose not to engage in the process and therefore are not included as participating jurisdictions in the Plan update. This is due in part to their size and staffing limitations. Eleven of the twelve municipalities are small in size, with populations of less than 400 individuals. Five of the municipalities have populations less than 100 individuals, with the smallest municipality having an estimated population of 17 individuals.

1.2 COUNTY PROFILE

Pike County is located along the Mississippi River border in west-central Illinois and covers approximately 831 square miles. Located at the end of this section, **Figure I-3** provides a location map of the County and the participating municipalities while **Figures I-4** identifies the boundaries of the census tracts located in the County. **Figures I-5, I-6, I-7,** and **I-8,** also located at the end of this section, identify the boundaries of the Pike County townships, school districts, fire protection districts, and drainage & levee districts. A campus map was unavailable for Illini Community Hospital.

The County is bounded to the north by Adams and Brown Counties, to the east by Morgan County, to the south by Green and Calhoun Counties, and to the west by the Mississippi River. The Missouri counties of Marion, Ralls, and Pike are adjacent to Pike Count across the River. The City of Pittsfield is the county seat. The topography consists of nearly level to very steep uplands that are dissected by both large and small tributaries of the Mississippi River. Well defined valleys with broad flood plains and numerous stream terraces are along the major streams and rivers.

The County is situated in the northern part of the Central Mississippi Valley Wooded Slopes in the Till Plains Section of the Central Lowland Province. Upland soils are mostly Wisconsin Loess underlain by glacial drift. The Mississippi River watershed encompasses the western two-thirds of the County while the Illinois River watershed encompasses the eastern third.

Agriculture is the primary industry in Pike County. According to the 2017 Census of Agriculture, there were 956 farms in Pike County occupying approximately 84.0% (447,007 acres) of the total land area in the County. In comparison, there were 970 farms occupying 77.4% (411,446 acres) of the total land area in the County in 2012. The major crops include corn and soybeans while the major livestock includes hogs and cattle. The County ranks 4th in the State for livestock cash receipts and 25th in the State for crop cash receipts.

The largest employment sectors in Pike County are health care/social assistance, manufacturing, and retail trade according to the Illinois Department of Commerce and Economic Opportunity. Leading employers include Pikeland Community Unit School District #10, Illini Community Hospital, and the Illinois Department of Corrections.

Figure I-9, located at the end of this section, provides demographic and socio-economic data for the County and participating townships and municipalities. Four of the six municipalities and one of the two townships meet the definition of an Economically Disadvantaged Rural Community (EDRC). FEMA defines an EDRC as a community of 3,000 or fewer individuals whose residents have an average per capita annual income not exceeding 80 percent of the U.S. per capita income based on best available data.

Figure I-10, also located at the end of this section, provides additional demographic information by census tract along with the CDC/ATSDR Social Vulnerability Index (SVI) and overall level of vulnerability. The SVI is a database that uses U.S. Census Bureau American Community Survey data to rank census tracts and counties on 16 social factors within four themes: Socioeconomic Status, Household Characteristics, Racial & Ethnic Minority Status, and Housing Type & Transportation. The goal of the SVI is to help emergency response planners and public health officials identify, map, and plan support for communities that will most likely need support before, during, and after a public health emergency.

The rankings generated by the SVI describe a county's or census tract's relative vulnerability among all other U.S. counties and census tracts. The SVI data used in this document is based on 2010 census tract information. Rankings are based on percentiles ranging from 0 to 1, with higher values indicating greater vulnerability. Each ranking is assigned to one of four levels of vulnerability: Low (0 – 0.2499), Low to Medium (0.2500 – 0.4999), Medium to High (0.5000 – 0.7499), and High (0.7500 – 1). A community with an SVI of 0.6000 or greater is considered an underserved and/or disadvantaged community. In Pike County the only communities to meet this definition would be Pittsfield and a portion of Pittsfield Township.

Figures I-11, I-12, and **I-13** provide basic demographic information about the size and populations served by the participating school districts, fire protection districts and drainage and levee districts.

Figure I-11
Demographic Data by Participating School District

Participating District	Number of Schools in District	Estimated Population Served	Area Served (Sq. Miles) (2020)	Communities / Unincorp. Areas Served in the County
Pikeland Community Unit School District (CUSD) #10	3	8,400	326	Pittsfield, New Salem, Baylis, Summer Hill, New Hartford, Detroit, Florence, Milton , Pearl, Nebo

Source: Capability Assessment Worksheets – School Districts.

Figure I-12
Demographic Data by Participating Fire Protection District

Participating District	Number of Fire Stations	Estimated Population Served	Area Served (Sq. Miles) (2020)	Communities / Unincorp. Areas Served in the County
Baylis Fire Department	1	600	40	Baylis
Spring Creek Fire Protection District	1	1,500	90	Nebo, Pearl

Source: Capability Assessment Worksheets – Fire Protection Districts.

Figure I-13
Demographic Data by Participating Drainage & Levee District

Participating District	Estimated Population Served	Area Served (Acres)	Communities / Unincorp. Areas Served in Mason County
McGee Creek Drainage & Levee District	10	10,349	---
Sny Island Levee Drainage District	1,200	116,000	Hull, Rockport, Pleasant Hill
Valley city Drainage & Levee District	5	4,476	---

Source: Capability Assessment Worksheets – Drainage & Levee Districts.

1.3 LAND USE AND DEVELOPMENT TRENDS

Population growth and economic development are two major factors that trigger changes in land use. Pike County is almost entirely rural with a population that has seen a decrease between 1900 and 2010 from 31,595 to 16,430. Between 2010 and 2020 the population decreased by 6.5% from 16,430 to 14,739. During that same time period, four of the participating municipalities experienced population decreases, while two, Barry and Griggsville, increased slightly.

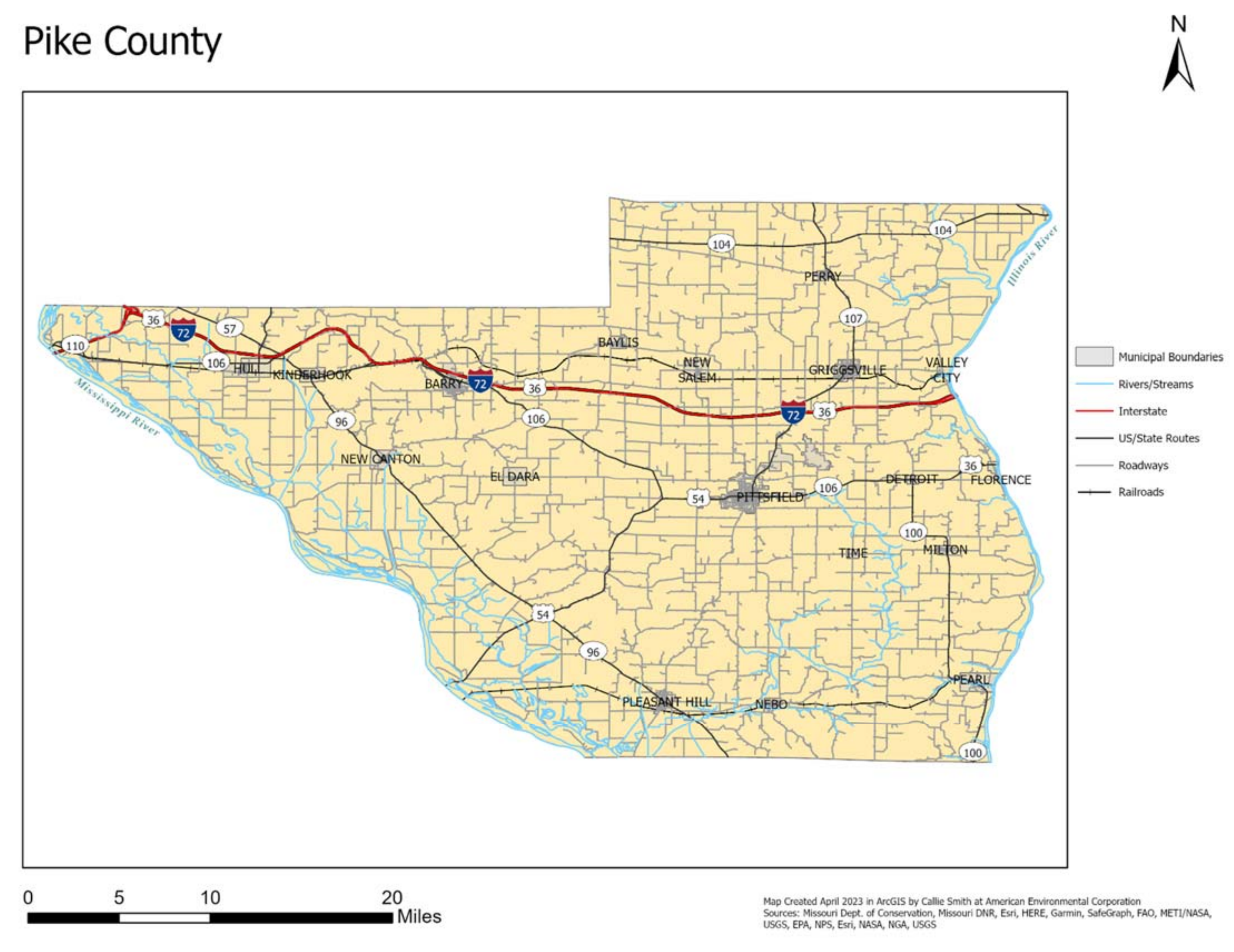
Land use in Pike County is primarily agricultural. As discussed in the previous section, approximately 84.0% of the land within the County is used for farming practices. Agriculture is and will continue to be a primary industry within the County and a mainstay of the County's economy.

According to Greg Wyatt, Pike County Zoning Administrator, and Ed Knight, Pittsfield Economic and Community Development Director, there were ***no substantial changes in development within the County or any of the participating jurisdictions that have occurred in hazard prone areas that would increase or decrease their overall vulnerability since the previous Plan was approved***. Northeast of Pittsfield, along U.S. Route 54, just north of Interstate-74, a 40-acre solar farm was installed adjacent to the Maschhoffs Griggsville Grain Elevator for use at that facility.

Looking forward, approximately 58 acres owned by Pittsfield was recently added to the Pittsfield Industrial Park for future economic development. Additionally, a 54 mega-watt wind farm, Panther Creek, is scheduled to begin construction in 2023 west of Pittsfield according to the Pike County Zoning Administrator.

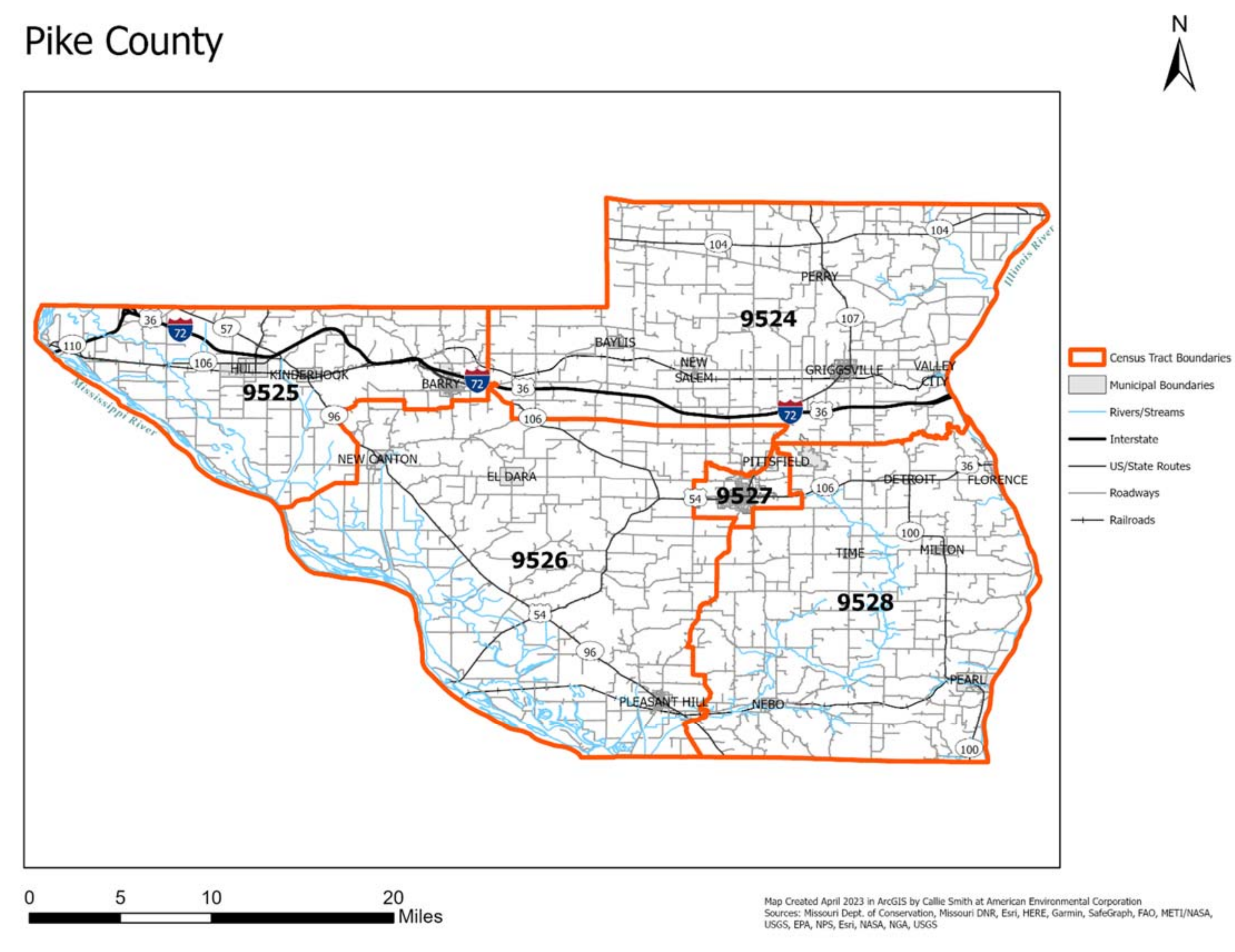
There are no other large-scale economic development initiatives underway in the County. Substantial changes in land use (from forested and agricultural land to residential, commercial, and industrial) are not anticipated within the County in the immediate future. No sizeable increases in commercial or industrial developments are expected within the next five years.

Figure I-3
Location Map



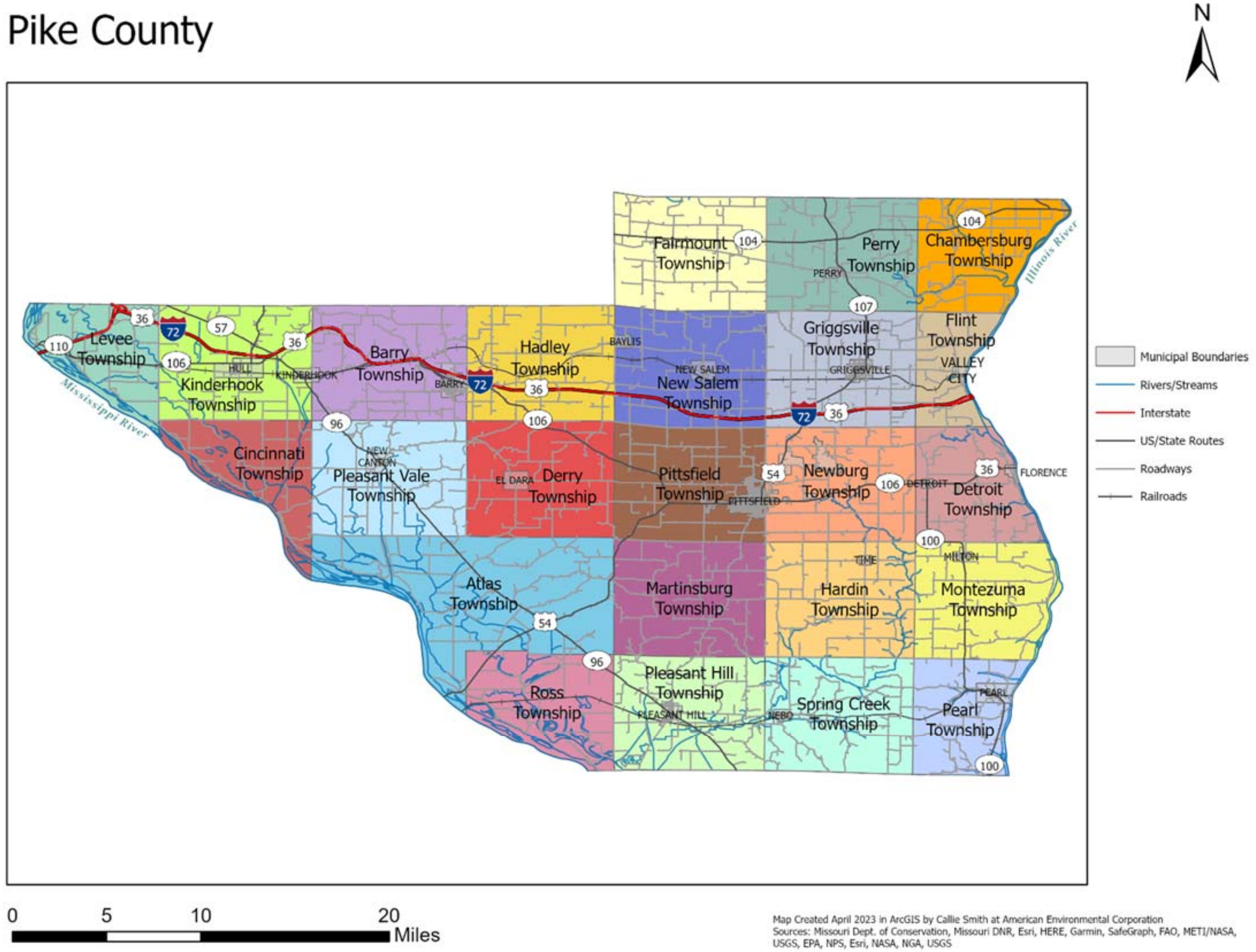
Map Created April 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Figure I-4
Pike County 2010 Census Tract Map



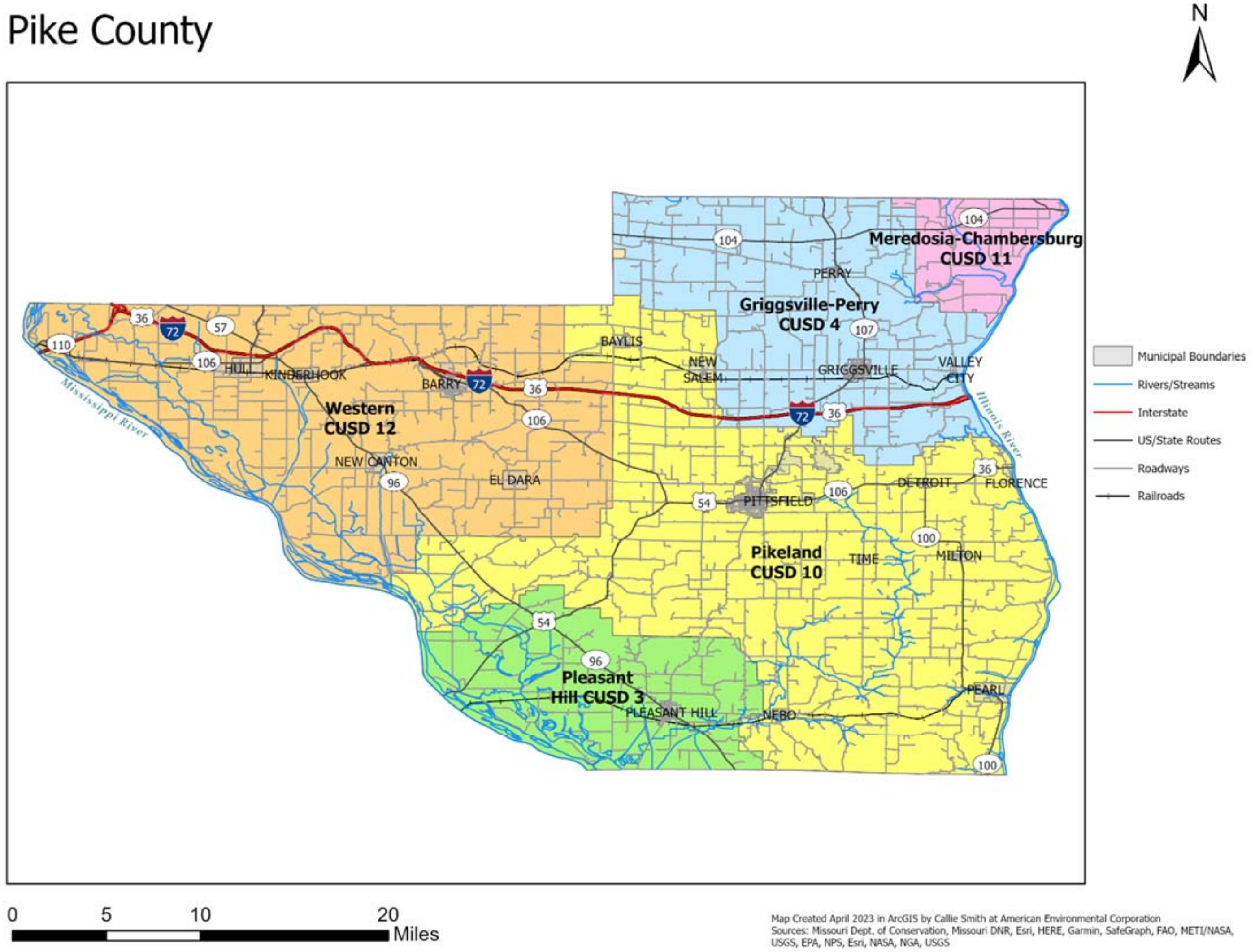
Map Created April 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Figure I-5
Township Boundary Map



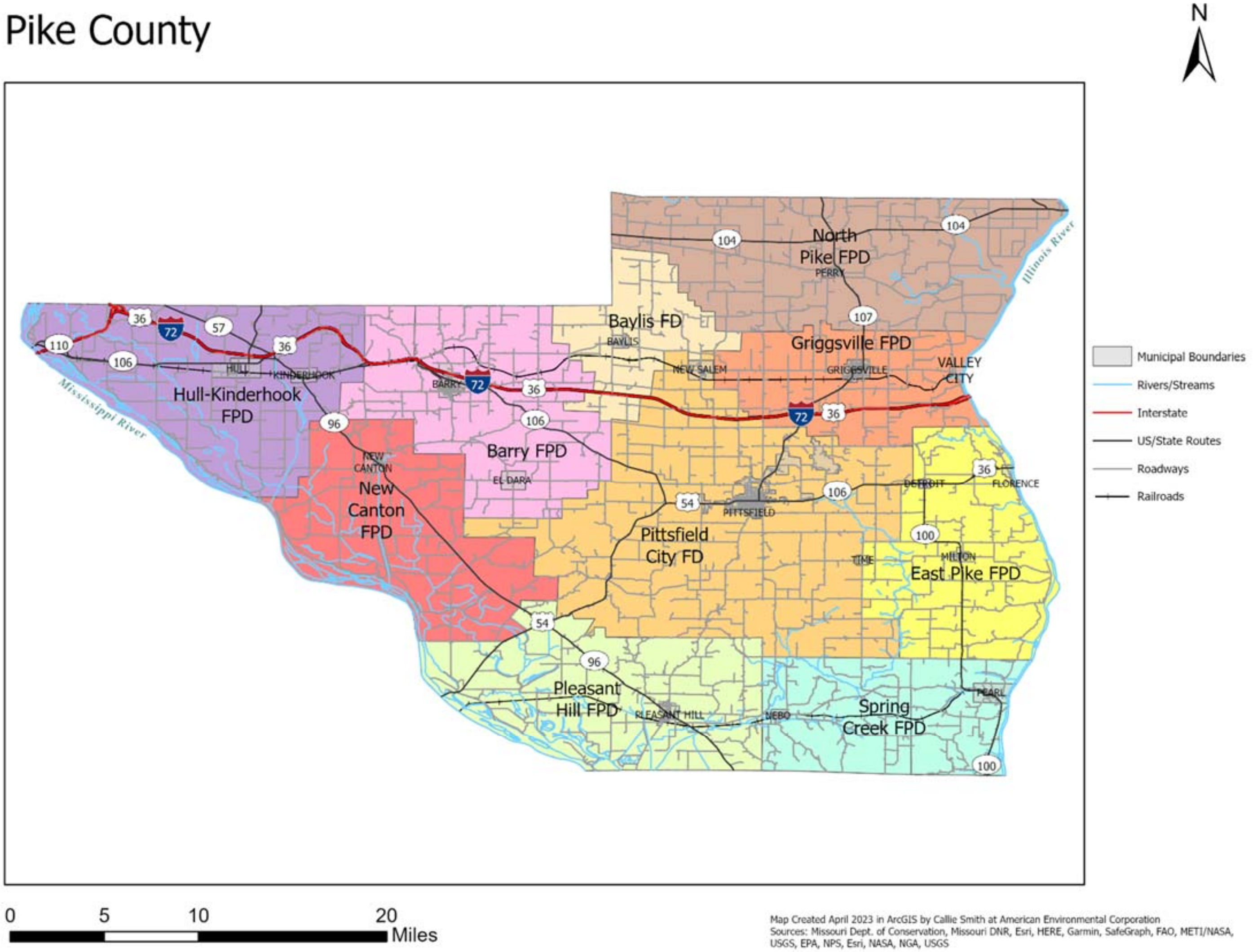
Map Created April 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Figure I-6
School District Boundary Map



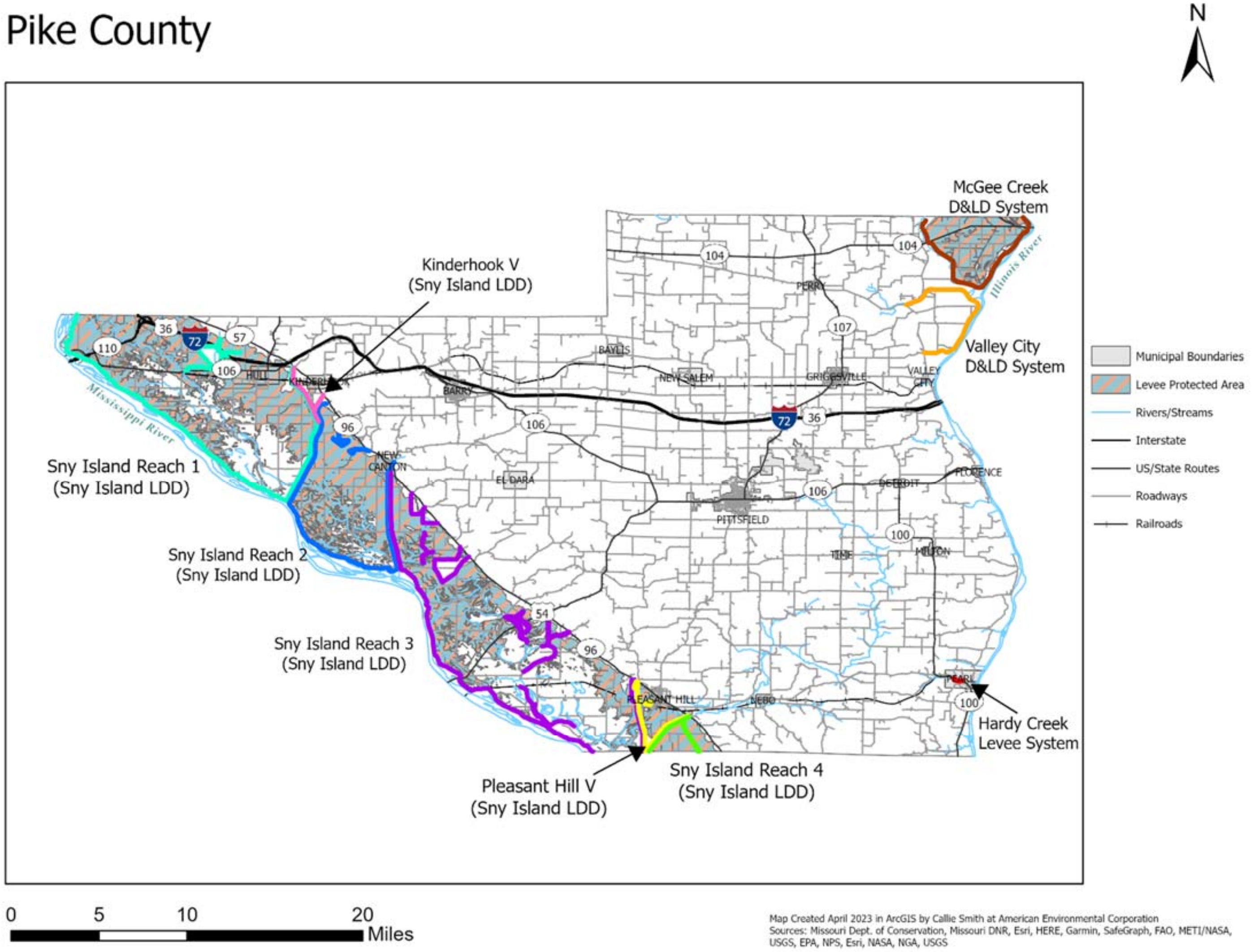
Map Created April 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Figure I-7
Fire Protection District Boundary Map



Map Created April 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Figure I-8
Drainage & Levee District Boundary Map



Map Created April 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Figure I-9
2016-2020 Demographic Data by Participating Jurisdiction

Participating Jurisdiction	**Population**	**Projected Population (2030)**	**Total Area (Sq. Miles) (2020)**	**Number of Housing Units**	**Percent Race**								**Income**			**Total Assessed Value of Housing Units† (2020)**
					White (alone)	Black or African American (alone)	Asian (alone)	Hispanic or Latino (of any race)	American Indian & Alaska Native (alone)	Native Hawaiian & Other Pacific Islander (alone)	Some other Race (alone)	Two or more Races	% of People whose Income is below the Poverty Line	Per Capita Income	Economically Disadvantaged Rural Community*	
Pike County (Total)	15,571	13,693	831.352	7,999	96.5%	0.9%	0.3%	1.3%	0.1%	0.7%	0.2%	1.3%	14.2%	$26,185	---	$86,499,879
Pike County (Unincorp.)	4,473	3,934	813.460	2,726	96.4%	0.3%	0.6%	0.3%	0.0%	2.4%	0.5%	1.5%	5.4%	---	---	$18,459,935
Barry	1,698	1,493	1.432	718	98.5%	0.0%	0.4%	0.4%	0.0%	0.0%	0.0%	1.1%	18.2%	$21,451	Yes	$8,470,772
Baylis	126	111	0.471	94	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%	$30,269	No	$570,372
Griggsville	1,454	1,279	1.106	637	95.8%	0.0%	0.1%	6.1%	0.0%	0.0%	0.3%	3.8%	19.0%	$23,813	Yes	$6,494,308
New Canton	257	226	0.881	157	96.1%	0.0%	1.2%	0.4%	1.2%	0.0%	0.0%	1.6%	26.1%	$17,423	Yes	$1,342,197
Pearl	98	86	1.505	62	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.2%	$14,721	Yes	$442,760
Pittsfield	4,215	3,707	4.782	2,006	96.1%	2.7%	0.2%	1.4%	0.0%	0.0%	0.0%	0.5%	12.1%	$25,590	No	$36,680,326
Fairmount Township	363	319	37.603	182	70.5%	0.0%	0.0%	0.0%	0.0%	29.5%	0.0%	0.0%	3.7%	$26,577	Yes	$517,364
Pittsfield Township	4,147	3,647	37.793	2,001	96.1%	2.7%	0.2%	1.4%	0.0%	0.0%	0.4%	0.5%	10.4%	$26,382	No	$32,797,274
Illinois	12,770,631	12,790,000	55,513.18	5,373,385	61.3%	14.0%	5.4%	17.1%	0.1%	0.02%	0.2%	1.9%	14.2%	$37,306	---	---
US	329,569,308	---	3,533,038	138,432,751	69.8%	12.5%	5.6%	18.0%	0.8%	0.2%	5.1%	5.1%	12.8%	$35,384	---	---

* For the purposes of FEMA's Hazard Mitigation Assistance grant programs, an Economically Disadvantaged Rural Community (EDRC) is defined as a community of 3,000 or fewer individuals whose residents have an average per capita annual income not exceeding 80 percent of the US per capita income based on best available data.

† Total assessed value includes all residential housing units and associated buildings (including farm homes and garages associated with the main residence.) The assessed value of a residence in Pike County is approximately one-third of the market value.

Sources: Pike County Clerk.
Illinois Department Public Health, Population Projections – Illinois, Chicago and Illinois Counties by Age and Sex: July 1, 2015 to July 1, 2030 (2019 Edition).
U. S. Census Bureau, American Community Survey, 5-Year Data Profile.

Figure I-10
2016-2020 Demographic Data by Census Tract

Census Tract	**Incorporated Municipalities Located in Census Tract**	**Population (2016-2020)**	**Total Area (Sq. Miles) (2010)**	**Number of Housing Units (2016-2020)**	**Percent Race**								**Income**	**Social Vulnerability Index**	
					White (alone)	Black or African American (alone)	Asian (alone)	Hispanic or Latino (of any race)	American Indian & Alaska Native (alone)	Native Hawaiian & Other Pacific Islander (alone)	Some other Race (alone)	Two or more Races	% of People whose Income is below the Poverty Line	Overall SVI Ranking	Level of Vulnerability
9524	Baylis, Griggsville, New Salem, Perry, Valley City	3,302	232.564	1,737	93.6%	0.2%	0.1%	2.8%	0.0%	3.2%	0.4%	2.4%	14.1%	0.5873	Medium-High
9525	Barry, Hull, Kinderhook	2,757	126.916	1,279	98.3%	0.0%	0.3%	0.8%	0.0%	0.0%	0.1%	1.3%	12.4%	0.5864	Medium-High
9526	El Dara, New Canton, Pleasant Hill	3,094	266.539	1,686	98.2%	0.2%	0.5%	0.3%	0.1%	0.0%	0.0%	1.1%	16.1%	0.3425	Low-Medium
9527	Pittsfield	4,337	11.577	2,098	95.9%	2.6%	0.6%	1.4%	0.0%	0.0%	0.4%	0.5%	12.1%	0.6547	Medium-High
9528	Detroit, Florence, Milton, Nebo, Pearl, Time	2,081	211.288	1,199	97.2%	0.6%	0.0%	1.0%	1.0%	0.0%	0.0%	1.2%	17.9%	0.2864	Low-Medium
Pike County	---	15,571	848.884	7,999	96.5%	0.9%	0.3%	1.3%	0.1%	0.7%	0.2%	1.3%	14.2%	0.3679	Low-Medium

Sources: CDC/ATSDR Social Vulnerability Index.
U.S. Census Bureau, American Community Survey, 5-Year Data Profile.

2.0 PLANNING PROCESS

The Pike County Multi-Jurisdictional All Hazards Mitigation Plan (the Plan) was updated through the Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee (Planning Committee). The Plan was prepared to comply with the Disaster Mitigation Act of 2000 and incorporates the nine recommended tasks for developing or updating a local hazard mitigation plan as outlined in Federal Emergency Management Agency's (FEMA) *Local Mitigation Planning Handbook*. **Figure PP-1** provides a brief description of the process utilized to prepare this Plan.

Figure PP-1
Description of Planning Process

Tasks	**Description**
Task One: Organize the Committee	The Planning Committee was formed with broad representation and specific expertise to assist the County and the Consultant in updating the Plan.
Task Two: Public Involvement	Early and ongoing public involvement activities were conducted throughout the Plan's development to ensure the public was given every opportunity to participate and provide input.
Task Three: Coordination	Agencies and organizations were contacted to identify plans and activities currently being implemented that impact or might potentially impact hazard mitigation activities.
Task Four: Risk Assessment & Vulnerability Analyses	The Consultant identified and profiled the natural and man-made hazards that have impacted the County and conducted vulnerability analyses to evaluate the risk to each participating jurisdiction.
Task Five: Goal Setting	After reviewing existing plans and completing the risk assessment, the Consultant assisted the Planning Committee in updating the goals and objectives for the Plan.
Task Six: Mitigation Strategy & Activities	The participating jurisdictions were asked to identify mitigation actions that had been started and/or completed since the original Plan was adopted. In addition, they were also asked to identify any new mitigation actions based on the results of the risk assessment. The new mitigation actions were then analyzed, categorized, and prioritized.
Task Seven: Draft Plan	The draft Plan update summarized the results of Tasks One through Six. In addition, it described the responsibilities to monitor, evaluate and update the Plan. The draft Plan update was reviewed by the participants and a public forum was held to give the public an additional opportunity to provide input. Comments received were incorporated into the draft Plan update and submitted to the Illinois Emergency Management Agency (IEMA) and FEMA for review and approval.
Task Eight: Finalize Plan & Adoption	Comments received from IEMA and FEMA were incorporated into the final Plan update. The final Plan update was then submitted to the County and participating jurisdictions for adoption. The Plan will be reviewed periodically and updated again in five years.

The Plan update and development was led at the staff level by Joshua Martin, the Pike County Emergency Management Agency (EMA) Director. American Environmental Corp. (AEC) an environmental consulting firm, with experience in hazard mitigation, risk assessment and public involvement, was employed to guide the County and participating jurisdictions through the planning process.

Participation in the planning process, especially by the County and local government representatives, was crucial to the development of the Plan update. To ensure that all participating jurisdictions took part in the planning process, participation requirements were established. Each participating jurisdiction agreed to satisfy the following requirements in order to be included in the Plan update. All of the participating jurisdictions met the participation requirements.

- Attend at least one Planning Committee meeting.
- Complete a capability assessment identifying existing capabilities and resources (i.e., plans, policies, ordinances studies, reports, maps, etc.) available to accomplish hazard mitigation.
- Identify/submit a list of critical infrastructure and facilities.
- Review the risk assessment and provide additional information on events and damages when available.
- Participate in the update of the mitigation goals and project prioritization methodology.
- Provide information on any mitigation actions started and/or completed since the adoption of the previous Plan.
- Identify and submit a list of new mitigation actions.
- Review and comment on the draft Plan update.
- Formally adopt the Plan update.
- Where applicable, incorporate the Plan update into existing planning efforts.
- Participate in the Plan update maintenance.

2.1 PLANNING COMMITTEE

As previously mentioned, at the start of the planning process, the Pike County Multi-Jurisdictional All Mitigation Planning Committee was formed to update the hazard mitigation plan. The Planning Committee included representatives from each participating jurisdiction, as well as agriculture, education, emergency services, healthcare, and social services.

Figure PP-2 details the entities represented on the Planning Committee and the individuals who attended on their behalf. The Planning Committee was chaired by the Pike County EMA.

Additional technical expertise was provided by the staff at the Illinois Emergency Management Agency and the Illinois Department of Natural Resources Office of Water Resources.

Mission Statement

Over the course of the first two meetings, the Planning Committee developed a mission statement that described their objectives for the Plan update.

The mission of the Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee is to develop a mitigation plan that documents the risks associated with the natural and man-made hazards that impact the County and identifies projects and activities to reduce the negative effects of these hazards on citizens, existing structures, critical facilities and infrastructure systems."

Figure PP-2
Pike County Planning Committee Member Attendance Record

Representing	Name	Title	6/15/2021	9/1/2021	12/2/2021	5/11/2023
American Environmental Corporation	Bostwick, Andrea	EMS Manager	X	X	X	
American Environmental Corporation	Krug, Zachary	EMS Specialist	X	X		
American Red Cross	Stonecypher, J.D.	Disaster Program Specialist	X			
Barry Fire Protection District	Conkright, Devin	Assistant Chief			X	
Baylis Fire Department	Lewis, Tom	Chief	X	X	X	
Baylis, Village of	Lewis, Tom	Trustee	X	X	X	
Fairmount Township	Risley, Kevin	Road Commissioner	X		X	
Griggsville, City of	Goewey, Kent	Mayor	X			
Illini Community Hospital	Helkey, Melissa	Emergency Preparedness Coordinator	X	X	X	
McGee Creek Drainage & Levee District	DeSpain, Brenda	Treasurer	X		X	
Mental Health Centers of Western Illinois	Wilson, Katie	Executive Director	X			
New Canton, Town of	Perrine, Adam	Mayor	X			
Pearl Township	Brangenburg, Scott	Road Commissioner	X			
Pearl, Village of	Gilbert, Charlie	Board Member	X	X		
Pike County - Board	Lewis, Tom	Board Member	X	X	X	
Pike County - Board	Sheppard, Jim	Chairman			X	
Pike County - EMA	Martin, Joshua	Director	X	X	X	
Pike County - Health Department	Bargmann, Sharon	Director of Nursing	X			
Pike County - Health Department	Halpin, Nancy	Communicable Disease Coordinator	X			
Pike County - Highway Department	DeSpain, Brenda	Administrative Assistant	X		X	
Pike County - Highway Department	Johnson, Chris	County Engineer	X			
Pikeland CUSD #10	Ruebush, Angie	Assistant Superintendent	X	X		
Pike-Scott Farm Bureau	Roderick, Blake	Executive Director		X	X	
Pittsfield City Fire Department	Grimsley, Bill	Firefighter			X	
Pittsfield City Fire Department	White, Jason	Chief	X			
Pittsfield Township	Hobbs, Kirby	Road Commissioner			X	
Pittsfield, City of	Grimsley, Bill	Alderman			X	
Sny Island Levee Drainage District	Reed, Mike	Superintendent			X	
Spring Creek Fire Protection District	Martin, Joshua	Fire Chief	X	X	X	
Valley City Drainage & Levee District	DeSpain, Brenda	Treasurer	X		X	

Planning Committee Meetings

The Planning Committee met four times between June 2021 and Mary 2023. **Figure PP-2** identifies the representatives by jurisdiction present at each meeting. **Appendices A** and **B** contain copies of the attendance sheets and meeting minutes for each meeting. The purpose of each meeting, including the topics discussed, is provided below.

First Planning Committee Meeting – June 15, 2021

The purpose of this meeting was to explain the planning process to the Planning Committee members and give them a brief overview of the planning process including what mitigation is, what a hazards mitigation plan is and why the Plan needs to be updated. A discussion regarding the hazards to be included in the Plan update was conducted and an electronic survey was sent out following the meeting asking Committee members whether landslides and/or dam failures should be included in the Plan update. Based on the results received, the Committee chose to include landslides in the update. The Committee did not feel dam failures posed a significant impact on the County and therefore decided not to include them in the update.

Information needed from each participant was discussed and representatives for the County and the participating jurisdictions were asked to complete the forms entitled "Capability Assessment Worksheet," "Critical Facilities & Infrastructure," "Identification of Severe Weather Shelters" and "Drinking Water Supply Worksheet" distributed electronically and return them at the next meeting.

Committee members were then asked to identify any recent or historic natural or man-made hazard events that have impacted the County and participants. A "Hazard Events Questionnaire" was distributed during the meeting to solicit information on hazard events. Community participation was also discussed. The County and participating jurisdictions were asked to make information available on the planning process at their offices and in the communities. A "Citizen Questionnaire," was also distributed electronically to Committee Members prior to the meeting for distribution to their constituents to gauge the public's perception about the hazards that impact the County.

Finally, drafts of a mission statement and updated mitigation goals were presented for review. Online surveys were prepared and distributed to the Planning Committee members following the meeting to solicit feedback on the draft mission statement and mitigation goals prior to the 2nd meeting.

Due to the continuation of the COVID-19 pandemic the first meeting of the Planning Committee was conducted virtually and via teleconference to ensure the safety of all participants.

Second Planning Committee Meeting – September 1, 2021

At the second Planning Committee meeting portions of the updated natural and man-made hazard risk assessment section were presented for review. The Planning Committee then reviewed and discussed the draft mission statement and updated mitigation goals. Based on the responses received to the online surveys, no revisions were made to the mission station while modifications were made to Goal 2 and grammatical corrections were made to Goals 4 and 6. The results of the surveys were discussed. Following the meeting, an email was sent out to solicit any additional changes or additions. Based on the feedback provided, no additional revisions were recommended.

Next, mitigation actions were defined, and examples were discussed. Committee members were asked to identify any mitigation projects and activities their jurisdictions had started and/or completed since the original Plan was completed in 2010. Ideas for new potential mitigation projects and activities were presented. Representatives for the County and the participating jurisdictions were asked to complete the forms entitled "Existing Mitigation Project/Activity Status" and "New Hazard Mitigation Projects" and return them at the next meeting.

Due to the continuation of the COVID-19 pandemic the second meeting of the Planning Committee was conducted virtually and via teleconference to ensure the safety of all participants.

Third Planning Committee Meeting – December 2, 2021

Following a brief review of the results of the preliminary risk assessment discussed at the second meeting, the Planning Committee members participated in an exercise to calculate the Risk Priority Index (RPI) for the County and participating jurisdictions. The RPI can assist participants in determining which hazards present the highest risks and therefore which ones to focus on when formulating mitigation projects and activities.

The Planning Committee members then discussed vulnerable community assets and completed the form entitled "Critical Facilities Vulnerability Survey" which will be used in the vulnerability analyses.

Next, an explanation of what a mitigation action prioritization methodology is and how it fits into the Mitigation Strategy was provided. The Planning Committee reviewed the updated mitigation project prioritization methodology and approved it with no changes. Finally, a discussion on how the mitigation projects and activities identified by the participating jurisdictions will be presented in the Plan update was provided. Participants were encouraged to provide their mitigation project lists prior to the 4th meeting when draft lists will be distributed for review.

Due to an increase in regional COVID-19 numbers, the third meeting of Planning Committee was conducted as a hybrid meeting, allowing both in-person and virtual/teleconference participation.

The fourth planning committee scheduled for March 17, 2022 was postponed to allow the participating jurisdictions additional time to work through the required forms and reach out to additional jurisdictions in the hopes of encouraging them to participate. A new outreach strategy was formulated, and the fourth meeting was substituted for in-person and virtual/teleconference meetings with current and potential plan participants in August and September of 2022 in an effort to obtain the information needed to complete the Plan update, including lists of mitigation projects and activities. Once all of the mitigation project lists were obtained, the draft jurisdiction-specific mitigation action tables were prepared. The lists identified and prioritized the new and existing mitigation projects and activities and were provided to the entire Planning Committee electronically. Members were given the opportunity to add additional projects and activities to their tables prior to the public forum.

Fourth Planning Committee Meeting – May 11, 2023

At this Planning Committee the draft Plan update was presented for review and comment. The public was provided an opportunity to ask questions and provide comments, both verbally and in writing. In addition, the comment period and adoption process were discussed as well as the plan maintenance and update requirements. The Plan update will be monitored and evaluated on an annual basis by a Plan Maintenance Subcommittee which will be made up of the participating jurisdictions and key members of the Planning Committee. The Plan must be reviewed, revised, and resubmitted to IEMA and FEMA at least once every five years.

2.2 PUBLIC INVOLVEMENT

To engage the public in the planning process, a comprehensive public involvement strategy was developed. The strategy was structured to engage the public, including underserved communities and vulnerable populations, in a two-way dialogue, encouraging the exchange of information throughout the planning process. A mix of public involvement techniques and practices were utilized to:

- ➢ disseminate information;
- ➢ identify additional useful information about natural hazard occurrences and impacts;
- ➢ assure that interested residents would be involved throughout the Plan update's development; and
- ➢ cultivate ownership of the Plan update, thus increasing the likelihood of adoption by the participating jurisdictions.

The dialogue with the public followed proven risk communication principles to help assure clarity and avoid overstating or understating the impacts posed by the natural and man-made hazards identified in the Plan update. The following public involvement techniques and practices were applied to give the public an opportunity to access information and participate in the dialogue at their level of interest and availability.

Citizen Questionnaire

A citizen questionnaire was developed to gather facts and gauge public perceptions about natural hazards that affect Pike County. The questionnaire was distributed electronically to the Planning Committee members who were encouraged to make it available to their residents and the general public. A copy of the questionnaire and social media posts related to the questionnaire are contained in **Appendix C**.

Questionnaires completed provided useful information to decision makers as they determine how best to disseminate information on natural hazards and safeguard the public. Additionally, these responses identify the types of projects and activities the public is most likely to support. The following provides a summary of the results.

- ❖ Respondents felt that severe summer storms and severe winter storms were the most frequently encountered natural hazard in Pike County. However, compiled weather records indicate that flood event, in fact, occur mor frequently than severe winter storms.
- ❖ The most effective means of communication identified by respondents to disseminate information about natural hazards were the Internet, followed by social media, mailings, television, and radio. Newspapers and fact sheet/brochures disseminated via fire departments/law enforcement/local government also received support among respondents.
- ❖ In terms of the most needed mitigation projects and activities, the following five categories received the strongest support:
  - ➢ retrofit critical infrastructure (86%);
  - ➢ install/maintain sirens and other alert systems (71%);
  - ➢ flood or drainage protection (71%);
  - ➢ maintain power during storms by burying power lines, trimming trees and/or purchasing backup generators (71%); and
  - ➢ identify residents with special needs in order to provide assistance during a natural hazard event (71%).

FAQ Fact Sheet

A "Frequently Asked Questions" fact sheet was disseminated to help explain what an all hazards mitigation plan is and briefly described the planning process. The fact sheet was made available at each participating jurisdiction. A copy of the fact sheet is contained in **Appendix D**.

News Releases & Social Media Posts

News releases were prepared and submitted to the Pike Press and posted to the Pike County EMA's Facebook page prior to each Planning Committee meeting. The releases announced the purpose of the meetings and how the public could become involved in the Plan update's development. Copies of the news releases, Facebook posts, and any news articles can be found in **Appendix E**.

Planning Committee Meetings

All of the meetings conducted by the Planning Committee were open to the public and publicized in advance to encourage public participation. At the end of each meeting, time was set aside for public comment. In addition, Committee members were available throughout the planning process to talk with residents and local government officials and were responsible for relaying any concerns and questions voiced by the public to the Planning Committee. Interested individuals from the public who attended the Planning Committee meetings were provided handout materials and encouraged though not required to provide their names and/or sign the attendance sheets. Copies of the attendance sheets are included in **Appendix A**.

Public Forum

The final meeting of the Planning Committee, held on May 11, 2023 was conducted as an open-house public forum. The open-house format was chosen for this forum instead of a hearing to provide greater flexibility for residents who wished to participate. Residents were able to come and go at any time during the forum, reducing conflicts with business, family, and social obligations.

In conjunction the public forum, the draft Plan update was made available for review and comment on the Pike County website. A two-page handout summarizing the planning process and a link to a comment survey that could be used to provide feedback on the draft Plan update were also posted on the website.

At the forum, residents could review a draft of the Plan update; meet with representatives from the County, the participating jurisdictions, and the Consultant; ask any questions; and provide verbal and/or written comments on the draft Plan update. Individuals attending the public forum were provided with a two-page handout summarizing the planning process and a comment sheet that could be used to provide feedback on the draft Plan update. **Appendices F** and **G** contain copies of these materials.

Public Comment Period

After the public forum, the draft Plan update was made available for public review and comment through May 25, 2023 at the Pike County Clerk's Office and on the County's website. A two-page handout summarizing the planning process and a link to a comment survey that could be used to provide feedback on the draft Plan update were also posted on the website. **Appendix G** contains a copy of the online comment survey. Residents were encouraged to submit their comments electronically, by mail or through representatives of the Planning Committee.

Results of Public Involvement

The public involvement strategy implemented during the planning process created a dialogue among participants and interested residents, which resulted in many benefits, a few of which are highlighted below.

- *Acquired additional information about natural hazards*. Verifiable hazard event and damage information was obtained from participants that presents a clearer assessment of the extent and magnitude of natural hazards that have impacted the County.
- *Obtained critical facilities damage information*. Data collection surveys soliciting information about critical facilities damaged by natural hazards were used to supplement information obtained from government databases. This information was vital to the preparation of the vulnerability analysis.
- *Increased awareness of the impacts associated with natural hazard events within the County*. Understanding how mitigation actions can reduce risk to life and property helped generate ***over 70 new mitigation projects and activities*** at the local level that had not been previously identified in any other planning process.

2.3 PARTICIPATION OPPORTUNITIES FOR INTERESTED PARTIES

Businesses, schools, not-for-profit organizations, neighboring communities, and other interested parties were provided multiple opportunities to participate in the planning process. Electronic communications combined with direct, person-to-person contacts were used to identify anyone who might have an interest or possess information which could be helpful in updating the Plan.

Agricultural Community

Representatives from the agricultural community were invited to serve on the Planning Committee through the Pike-Scott Farm Bureau. The Farm Bureau Executive Director served as a technical partner on the Planning Committee and provided input into the planning process.

Business Community

Representatives from the business community were invited to serve on the Planning Committee through the Pike County Chamber of Commerce. While the Chamber chose not to serve as a technical partner on the Planning Committee, it did receive all of the electronic communications including surveys, meeting announcements, and meeting handouts to provide to its membership.

Education

While the school districts serving Pike County were invited to serve on the Planning Committee and provide input into the planning process, only Pikeland Community Unit School District #10 participated and chose to be included as a participating jurisdiction in the Plan update.

Healthcare

Input was sought from the healthcare community. Representatives from the Pike County Health Department, Illini Community Hospital, and the Mental Health Centers of Western Illinois attended the Planning Committee meetings and provided input into the planning process, Illini Community Hospital chose to be included as a participating jurisdiction in the Plan update.

Social Service Agencies

The American Red Cross served as a technical partner on the Planning Committee and provided input into the planning process.

Levee & Drainage Districts

The three drainage and levee districts serving Pike County, McGee Creek Drainage & Levee District (D&LD), Sny Island Levee Drainage District, and Valley City D&LD, were invited to serve on the Planning Committee. All three participated and chose to be included as participating jurisdictions in the Plan update.

Other Organizations

The fire departments/fire protection districts and townships in Pike County were contacted and invited to participate in the Plan update. Representatives from the Barry Fire Protection District (FPD), Baylis Fire Department, Pittsfield City Fire Department, Spring Creek Fire FPD, Fairmount Township, Pearl Township, and Pittsfield Township served on the Planning Committee and provided input into the planning process. Baylis Fire Department, Spring Creek FPD, Fairmount Township, and Pittsfield Township chose to be included as participating jurisdictions in the Plan update.

Neighboring Communities

A memo was sent to EMA/ESDA coordinators in the neighboring counties inviting them to participate in the mitigation planning process. The counties contacted included Adams, Brown, Morgan, Green, and Calhoun in Illinois and Pike, Marion, and Ralls in Missouri. **Appendix H** contains a copy of the invitation memo.

2.4 IDENTIFICATION OF EXISTING CAPABILITIES

Each participating jurisdiction has a unique set of capabilities and resources available to accomplish hazard mitigation and reduce long-term vulnerabilities to hazard events. In order to identify these existing capabilities and resources, a Capability Assessment was conducted. The Capability Assessment helps determine the ability of the participating jurisdictions to implement the Mitigation Strategy and to identify potential opportunities for establishing or enhancing specific mitigation policies, program, or projects. It is important to try and establish which goals and actions are feasible based on an understanding of the organizational capacity of those entities tasked with their implementation. This assessment is designed to provide a general overview of the key capabilities in place for each participating jurisdiction along with their potential effect of loss reduction.

In order to catalog the existing capabilities of each participant, Capability Assessment Worksheets were distributed electronically to each of the participating jurisdictions following the first Planning Committee meeting on June 15, 2021. The worksheets requested information on four primary types of capabilities: planning and regulatory; administrative and technical; financial; and education and outreach. The following provides a brief description of each capability type.

Planning & Regulatory Capabilities: Planning and regulatory capabilities are based on the implementation of existing plans, policies, codes, ordinances, resolutions, local laws, and programs that prevent or reduce the impacts of hazards and guide and manage growth and development.

Administrative & Technical Capabilities: Administrative and technical capabilities are based on the available staff and personnel resources as well as their related skills and tools that can be used to develop and implement mitigation actions, policies, and programs.

Financial Capabilities: Financial capabilities include those resources a jurisdiction has access to or is eligible to use to implement mitigation actions, polices, and programs.

Education & Outreach Capabilities: Education and outreach capabilities include programs and methods already in place that could be used to support implementation of mitigation actions and communicate hazard-related information.

Figures PP-3 through **PP-16** summarize the results of the Capability Assessment by participating jurisdiction type (i.e., county/municipalities, townships, schools, fire protection districts, healthcare facilities, levee district, etc.) A capability level of "Limited", "Moderate" or "High" was assigned by capability type to each participating jurisdiction based on the number of available capabilities and resources as well as the jurisdiction's size/area served. **Figure PP-17** summarizes the individual capability levels by capability type and provides an overall capability ranking for each participant.

This assessment provides a consolidated inventory of existing plans, ordinances, programs, and resources in place. Whenever applicable, these existing capabilities were reviewed and incorporated into the Plan.

Highlights from the Capability Assessment include:

- Only Barry has a comprehensive/land use plan in place.
- Only Griggsville and Pittsfield have building codes in place while the County, Barry, Griggsville and Pittsfield all have zoning ordinances.
- Only the County and Barry have continuity of operations plan in place.

Pike County, Pittsfield, Pikeland CUSD #10, Spring Creek Fire Protection District, Illini Community Hospital, McGee Creek Drainage & Levee District (D&LD), Sny Island Levee Drainage District, and Valley City D&LD are fortunate to have the resources and abilities to potentially expand on and improve the existing policies and programs identified. A majority of the participating municipalities have limited resources and abilities to expand on and improve the existing policies and programs identified. The lack of legal authority and policies/programs currently in place, especially with regards to building codes and zoning ordinances, hamper these participants' abilities to expand and strengthen existing policies and programs.

This is due to a general resistance from many residents towards these types of regulations, which has resulted in an unwillingness by local officials to implement such policies. Their fiscal and staffing situations are also extremely limited, bordering on inadequate in most cases. Many local government officials are part-time and lack the technical expertise and funds to expand or implement new programs and policies.

Overcoming these limitations will require time and a range of actions including, but not limited to improved general awareness of natural hazards and the potential benefits that may come from the development of new standards in terms of hazard loss prevention and the identification of resources available to expand and improve existing policies and programs should the opportunity arise.

Based on conversations with Planning Committee members, none of the jurisdictions that participated in the previous Plan have incorporated it into other planning mechanisms within their jurisdictions.

2.5 REVIEW & INCORPORATION OF EXISTING PLANS

The existing plans, studies, reports, technical information, and maps that were reviewed and incorporated into the Plan update, where appropriate, can be found in Section 7.0 References and are cited in each appropriate section.

A review of local plans revealed that none of the participating jurisdictions, aside from Barry, have developed comprehensive/land use plans. Barry developed its first comprehensive plan in 2015. While hazard mitigation planning principles were not specifically incorporated into its development, it did incorporate existing Mitigation Item 11 into its Public Works/Community Development Strategy. In terms of this Plan update, the City incorporated several of the strategies related to water and sewer identified in its comprehensive plan as mitigation actions (i.e., drinking water system upgrades, sewer main replacement/lining).

Figure PP-3
County / Municipalities – Planning & Regulatory Capabilities

Capability Type	**County/Municipality**						
	Pike County	Barry	Baylis	Griggsville	New Canton	Pearl	Pittsfield
Plans, Policies, Codes & Ordinances							
Comprehensive/Master Land Use Plan		X					
Continuity of Operations Plan	X	X					
Stormwater Management Plan							
Transportation Plan	X						
Economic Development Plan							
Emergency Operations Plan	X						
Disaster Recovery Plan	X						
Threat & Hazard Identification Risk Assessment (THIRA) - County Only	X						
Infrastructure Maps		X	X	X	X		X
Building Codes				X			X
Floodplain Ordinance	X				X	X	
Stormwater Ordinance				X			
Zoning Ordinance	X	X		X			X
Subdivision Ordinance	X	X				X	X
Historic Preservation Ordinance				X	X		X
Private Sewage Disposal System Ordinance - County Only							
Manufactured/Mobile Home Tie Down Ordinance		X	X			X	X
Steep Slope Ordinance							X
Mined Areas/Developed Over Mined Areas Ordinance							
National Incident Management System (NIMS) Adoption	X			X			
National Flood Insurance Program (NFIP) Participation	X				X	X	
Community Rating System (CRS) Participation							
Level of Capability	**M**	**L**	**L**	**L**	**L**	**L**	**M**

An "X" indicates that the item is currently in place and being implemented.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-4
County / Municipalities – Administrative & Technical Capabilities

Capability Type	**County/Municipality**						
	Pike County	Barry	Baylis	Griggsville	New Canton	Pearl	Pittsfield
Adminstrative & Technical							
Zoning Board	X	X		X			X
Public Utility Board					X		
Planning Commission							X
Mutual Aid Agreements				X		X	X
Administrator/Manager	X	X					
Building Inspector/Officer		X					X
Community/Economic Development Planner		X					X
Emergency Manager	X						
Engineer/Construction Project Manager	X			X			X
GIS Coordinator	X						X
Grant Administrator/Writer							
Fire Chief - Municipalities Only			X	X			X
Floodplain Administrator							
Police Chief - Municipalities Only							X
Public Works/Streets Director - Municipalities Only		X		X			X
Water Superintendent - Municipalities Only		X	X	X		X	X
Zoning Officer/Administrator	X						X
Solid Waste Director - County Only							
Level of Capability	**L**	**L**	**L**	**L**	**L**	**L**	**M**

An "X" indicates the presence of staff with specified knowledge or skills.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-5
County / Municipalities – Financial / Education & Outreach Capabilities

Capability Type	**County/Municipality**						
	Pike County	Barry	Baylis	Griggsville	New Canton	Pearl	Pittsfield
Financial							
Roadway/Bridge Improvement Plan - County Only	X						
Capital Improvements Program			X				X
Tax Levies for Special Purposes	X	X	X		X		X
Motor Fuel Tax	X	X	X	X	X	X	X
General Obligation Bonds and/or Special Tax Bonds	X	X					X
Utility Fees (Stormwater, Sewer, Water, Gas, or Electric Service)		X		X	X		X
Impact Fees - New Development							
Federal Funding Programs (Non-FEMA)	X			X			
Level of Capability	**M**	**M**	**L**	**L**	**L**	**L**	**M**
Education & Outreach							
StormReady Certification	X						
Natural Disaster/Safety-Related School Programs	X						
Ongoing Public Education or Information Programs (Fire Safety, Household Preparedness, Responsible Water Use)	X			X			X
Seasonal Outreach	X						
Local Citizen Groups/Non-Profit Organizations (Emergency Preparedness, Access & Functional Needs Populations)	X						
Public-Private Partnership Initiatives Addressing Disaster-Related Issues	X						
Level of Capability	**H**	**L**	**L**	**L**	**L**	**L**	**L**

An "X" indicates a given resource is locally available for mitigation purposes.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-6
Townships – Planning & Regulatory / Administrative & Technical Capabilities

Capability Type	**Township**	
	Fairmount Township	Pittsfield Township
Plans, Policies, Codes & Ordinances		
Comprehensive/Master Land Use Plan		
Stormwater Management Plan		
Open Space/Recreational Area Plan		
Building Codes		
Stormwater Ordinance		
Zoning Ordinance		
Subdivision Ordinance		
Private Sewage Disposal System Ordinance		
Manufactured/Mobile Home Tie Down Ordinance		
Steep Slope Ordinance		
Mined Areas/Developed Over Mined Areas Ordinance		
Road Weight Restriction Ordinance		
Nuisance Weed, Grass & Tree Ordinance		
National Incident Management System (NIMS) Adoption		
Level of Capability	**L**	**L**
Adminstrative & Technical		
Zoning Board		
Public Utility Board		
Planning Commission		
Mutual Aid Agreements		
Assessor	X	X
Clerk		
Collector		
Highway/Road District Commissioner	X	X
Supervisor	X	X
Level of Capability	**L**	**L**

An "X" indicates that the item is currently in place and being implemented or the presence of staff with specified knowledge or skills.

Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-7
Townships – Financial / Education & Outreach Capabilities

Capability Type	**Township**	
	Fairmount Township	Pittsfield Township
Financial		
Capital Improvements Program		
Roadway/Bridge Improvement Plan		
Tax Levies for Special Purposes	X	
Motor Fuel Tax	X	X
General Obligation Bonds and/or Special Tax Bonds		
Utility Fees (Stormwater, Sewer, Water, Gas or Electric Service)		
Impact Fees - New Development		
Federal Funding Programs (Non-FEMA)		
Level of Capability	**L**	**L**

Education & Outreach		
StormReady Certification		
Natural Disaster/Safety-Related School Programs		
Ongoing Public Education or Information Programs (Fire Safety, Household Preparedness, Responsible Water Use)		
Seasonal Outreach		
Local Citizen Groups/Non-Profit Organizations (Emergency Preparedness, Access & Functional Needs Populations)		
Public-Private Partnership Initiatives Addressing Disaster-Related Issues		
Level of Capability	**L**	**L**

An "X" indicates a given resource is locally available for mitigation purposes.

Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-8
Schools – Planning & Regulatory /
Administrative & Technical Capabilities

Capability Type	**School** Pikeland CUSD #10
Plans & Policies	
Comprehensive/Master Facilities Plan	X
Continuity of Operations Plan	
Strategic Plan	X
Emergency/Crisis Response Plan	X
National Incident Management System (NIMS) Adoption	
Level of Capability	**M**
Adminstrative & Technical	
Board of Education	X
Mutual Aid Agreements	
Superintendent	X
Principal(s)	X
Chief Financial Officer/Finance Director	
Food Services Supervisor	X
Grant Writer	
Health Care Supervisor	X
IT Director/Specialist	
Maintenance Manager	X
Communications Director	
Operations Manager	
Safety & Security Director	
Transportation Director	X
Level of Capability	**M**

An "X" indicates that the item is currently in place and being implemented or the presence of staff with specified knowledge or skills.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-9
Schools – Financial / Education & Outreach Capabilities

Capability Type	**School** Pikeland CUSD #10
Financial	
Capital Improvements Program	X
Tax Levies for Special Purposes	X
General Obligation Bonds and/or Special Tax Bonds	X
Federal Funding Programs (Non-FEMA)	X
Level of Capability	**H**

Education & Outreach	
StormReady Certification	
Natural Disaster/Safety-Related School Programs	
Ongoing Public Education or Information Programs (Fire Safety, Household Preparedness, Responsible Water Use)	X
Seasonal Outreach	
Public-Private Partnership Initiatives Addressing Disaster-Related Issues	
Level of Capability	**L**

An "X" indicates a given resource is locally available for mitigation purposes.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-10
Fire Protection Districts – Planning & Regulatory Capabilities

Capability Type	**FD/FPD**	
	Baylis Fire Department	Spring Creek FPD
Plans, Policies, Codes, Ordinances, Resolutions, & Technical Documents		
Standard Operating Procedures/Guidelines for Structural Fire Fighting (NFPA 1700)	X	X
Standard Operating Procedures for Operations at Technical Search & Rescue Incidents (NFPA 1670)	X	X
Pre-Incident Planning (NFPA 1620)		X
Fire Prevention Codes		
Burn Ordinance		
National Incident Management System (NIMS) Adoption	X	X
Incident Command System (ICS) Adoption	X	X
Building Inspections		X
Tier II Reports		X
County Emergency Operations Plan		X
Safety Data Sheets		X
Pipeline Maps		X
Hazardous Materials Facilities Maps		X
Water Supply Systems Maps	X	X
Impassable Roads & Bridges Maps		X
Evacuation Zones Maps		X
Community & Special Residential Areas Maps (i.e., manufactured home parks, subdivisions, recreational communities)		X
Level of Capability	**L**	**H**

An "X" indicates that the item is currently in place and being implemented.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-11
Fire Protection Districts – Administrative & Technical Capabilities

Capability Type	**FD/FPD**	
	Baylis Fire Department	Spring Creek FPD
Adminstrative & Technical		
Board of Trustees	X	X
Board of Fire Commissioners		
Mutual Aid Box Alarm System (MABAS)	X	X
Mutual Aid Agreements		X
Hazardous Materials Response Team		
Water Rescue/Dive Team		
Technical Rescue Team		
Fire Chief	X	X
Deputy Fire Chief		
Administrative Assistant		
Financial/Business Manager		
Inspector		
Public Education Director/Officer		
Telecom Director		
Training Coordinator	X	X
Level of Capability	**L**	**L**

An "X" indicates the presence of staff with specified knowledge or skills.

Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-12
Fire Protection Districts – Financial / Education & Outreach Capabilities

Capability Type	**FD/FPD**	
	Baylis Fire Department	Spring Creek FPD
Financial		
Capital Improvements Program	X	
Tax Levies for Special Purposes	X	X
General Obligation Bonds and/or Special Tax Bonds		X
Federal Funding Programs (Non-FEMA)		X
Level of Capability	**M**	**M**
Education & Outreach		
Natural Disaster/Safety-Related School Programs		
Ongoing Public Education or Information Programs (Fire Safety, Household Preparedness, Responsible Water Use)	X	X
Seasonal Outreach		X
Public-Private Partnership Initiatives Addressing Disaster-Related Issues		X
Level of Capability	**L**	**M**

An "X" indicates a given resource is locally available for mitigation purposes.

Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-13
Healthcare Facilities – Planning & Regulatory / Administrative & Technical Capabilities

Capability Type	**Healthcare**
	Illini Community Hospita
Plans, Policies, Codes, Ordinances & Resolutions	
Continuity of Operations Plan	X
Strategic Plan	X
Facilities Plan	
Emergency Preparedness Plan	X
Medical Disaster Preparedness & Response Plan	X
Community Health Needs Assessment (CHNA)	X
Severe Weather Plan	X
National Incident Management System (NIMS) Adoption	X
Level of Capability	**H**

Administrative & Technical	
Board of Directors	X
Patient Advisory Board	X
Mutual Aid Agreements	X
Chief Executive Officer	X
Chief Medical Officer	X
Chief Financial Officer	X
Chief Development Officer	
Chief Nursing Officer	X
Communications Director	X
EMS Director	
ER Director	X
Grant Writer	X
IT Director/GIS Specialist	X
Maintenance Manager	X
Rehab & Long-Term Care Director	
Safety Officer	X
Level of Capability	**H**

An "X" indicates that the item is currently in place and being implemented or the presence of staff with specified knowledge or skills.

Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-14
Healthcare Facilities – Financial / Education & Outreach Capabilities

Capability Type	**Healthcare**
	Illini Community Hospita
Financial	
Capital Improvements Program	X
Tax Levies for Special Purposes	
General Obligation Bonds and/or Special Tax Bonds	
Federal Funding Programs (Non-FEMA)	
Level of Capability	**L**
Education & Outreach	
StormReady Certification	
Natural Disaster/Safety-Related School Programs	X
Ongoing Public Education or Information Programs (Fire Safety, Household Preparedness, Responsible Water Use)	
Seasonal Outreach	X
Local Citizen Groups/Non-Profit Organizations (Emergency Preparedness, Access & Functional Needs Populations)	X
Public-Private Partnership Initiatives Addressing Disaster-Related Issues	X
Level of Capability	**M**

An "X" indicates a given resource is locally available for mitigation purposes.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-15
Drainage & Levee Districts – Planning & Regulatory / Administrative & Technical Capabilities

Capability Type	**D&LD**		
	McGee Creek Drainage & Levee District	Sny Island Levee Drainage District	Valley City Drainage & Levee District
Plans & Policies			
Strategic/Tactical Plan			
Maintenance/Improvement Plan			
Emergency/Crisis Response Plan		X	
Continuity of Operations Plan			
National Incident Management System (NIMS)			
Level of Capability	**L**	**L**	**L**
Adminstrative & Technical			
Governing Board of Commissioners	X	X	X
Mutual Aid Agreements	X		X
Executive Director			
Superintendent	X	X	X
Secretary/Administrative Assistant		X	
Treasurer	X	X	X
Level of Capability	**M**	**M**	**M**

An "X" indicates that the item is currently in place and being implemented or the presence of staff with specified knowledge or skills.

Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-16
Drainage & Levee Districts – Financial / Education & Outreach Capabilities

Capability Type	**D&LD**		
	McGee Creek Drainage & Levee District	Sny Island Levee Drainage District	Valley City Drainage & Levee District
Financial			
Capital Improvements Program			
Tax Levies for special purposes	X	X	X
General Obligation Bonds and/or Special Tax Bonds	X	X	X
Federal Funding Programs (Non-FEMA)		X	
Level of Capability	**M**	**M**	**M**

Education & Outreach			
Natural Disaster/Safety-Related Campus Programs			
Ongoing Education or Information Programs (Household Preparedness, Environmental Education, etc.)			
Seasonal Outreach			
Public-Private Partnership Initiatives Addressing Disaster-Related Issues			
Level of Capability	**L**	**L**	**L**

An "X" indicates a given resource is locally available for mitigation purposes.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" = High

Figure PP-17
Capability Rankings by Participating Jurisdiction

Capability Type	**County/Municipality**							**Township**		**School**	**FD/FPD**		**Health**	**D&LD**		
	Pike County	Barry	Baylis	Griggsville	New Canton	Pearl	Pittsfield	Fairmount Township	Pittsfield Township	Pikeland CUSD #10	Baylis Fire Department	Spring Creek FPD	Illini Community Hospita	McGee Creek Drainage & Levee District	Sny Island Levee Drainage Distric	Valley City Drainage & Levee Distric
Planning & Regulatory	M	L	L	L	L	L	M	L	L	M	L	H	H	L	L	L
Administrative & Technical	L	L	L	L	L	L	M	L	L	M	L	L	H	M	M	M
Financial	M	M	L	L	L	L	M	L	L	H	M	M	L	M	M	M
Education & Outreach	H	L	L	L	L	L	L	L	L	L	L	M	M	L	L	L
Overall Capability	**L/M**	**L/M**	**L**	**L**	**L**	**L**	**M**	**L**	**L**	**M/H**	**L/M**	**M**	**H/M**	**L/M**	**L/M**	**L/M**

Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

3.0 RISK ASSESSMENT

Risk assessment is the process of evaluating the vulnerability of assets in order to estimate the potential loss of life, personal injury, economic loss, and property damage resulting from natural and man-made hazards. Assets are determined by each participant can include people; structures (i.e., critical facilities, lifelines, and infrastructure); systems (i.e., networks such as electrical and communications, etc.); and natural, historic, and cultural resources). This section summarizes the results of the risk assessment conducted on the natural and man-made hazards in Pike County. The information contained in this section was gathered by evaluating local, state, and federal records from the last 20 to 70 years.

This risk assessment identifies the natural and man-made hazards deemed most important to the Planning Committee and includes a profile of each hazard that identifies past occurrences, the severity or extent of the events, and the likelihood of future occurrences. It also provides a vulnerability analysis that identifies the impacts to public health and property, evaluates the assets of the participating jurisdictions and estimates the potential impacts each natural hazard would have on the evaluated assets. Where applicable, the differences in vulnerability between participating jurisdictions are described.

The subsequent sections provide detailed information on each of the selected natural hazards. The sections are color coded and ordered by the frequency with which the natural hazard has previously occurred within the County. Each natural hazard section contains three subsections: hazard identification, hazard profile, and hazard vulnerability.

Hazard Selection

One of the responsibilities of the Planning Committee was to review the natural and man-made hazards detailed in the previous Plan and decide if additional hazards should be included in the Plan update. Over the course of the first three meetings, the Planning Committee members discussed their experiences with natural and man-made hazard events and reviewed information on various hazards. After discussing the information provided and completing an online survey, the Planning Committee chose to add landslides to this Plan update.

The following identifies the hazards included in the Plan update:

- severe storms (thunderstorms, hail, lighting & heavy rain)
- floods
- severe winter storms (snow & ice)
- excessive heat
- extreme cold
- tornadoes
- drought
- landslides
- levee failures
- earthquakes
- man-made hazards including:
  - hazardous substances (generation, transportation & storage/handling)
  - waste disposal
  - hazardous materials incidents
  - waste remediation
  - terrorism

The Planning Committee chose not to include the following hazards in the Plan: land/mine subsidence and dam failures. In Illinois land subsidence general occurs in areas where mining has been conducted. According to the Illinois State Geological Survey's (ISGS) *ILMINES* mapper, there are four small industrial mines north of Pearl and one underground coal mine north of Baylis, all in unincorporated Pike County.

Karst refers to landforms underlain by limestone that has been dissolved, producing characteristic landscapes such as sinkholes. Mapping prepared by the ISGS shows karst geologic characteristics present in Pike County; however, sinkholes in this region are typically shallow, bowl-shaped depressions, many of which contain trees or are filled with water and surrounded by trees.

A review of the U.S. Army Corps of Engineers' National Inventory of Dams identified 11 classified dams located in the County. Of the 11 dams, ten have a hazard potential classification rating of "Low" while the remaining dam has a hazard classification rating "High". Based on information available from the National Inventory of Dams and a visual inspection, these dams do not have reservoirs with immense storage capacities and are not located in densely populated areas. According to the Stanford University's National Performance of Dams Incident Database, there are no known recorded dam failures associated with these dams and discussions with the Pike County EMA Director did not identify any major concerns.

While the Pine Lake Dam has a hazard potential classification of "High" according to the National Inventory of Dams, the entire pond covers approximately 32 acres, has a dam height of 25 feet, and a maximum storage capacity of 327 acre-feet, which makes it a "Small" size classification dam. Based on the topographic relief of the area, water from a dam failure at Pine Lake Dam will likely flow east along Panther Creek to Bay Creek and potentially impact a campground resort office, a church, and one to two residences. Given that the area around the tributary is primarily agricultural land where the water could spread out quickly, the impacts from a potential dam failure are considered to be limited and not likely to cause any loss of life. If the appropriate studies were conducted to determine the accurate hazard potential classification of this dam, it would not likely have a "High" classification.

Based on the information provided, the Committee did not consider these hazards warranted inclusion in the Plan update.

Risk Priority Index

After reviewing the preliminary results of the risk assessment at the second meeting, Planning Committee members and the participating jurisdictions were asked to complete a Risk Priority Index (RPI) exercise for the hazards that have the potential to impact the County and participating jurisdictions. The RPI provides quantitative guidance for ranking the hazards and offers participants with another tool to determine which hazards present the highest risk and therefore which ones to focus on when formulating mitigation actions.

Each hazard was scored on three categories: 1) frequency, 2) impacts on life and health, and 3) impacts on property and infrastructure. A scoring system was developed that assigned specific factors to values of High, Moderate, or Low for each category. For those hazards that were not applicable to a particular jurisdiction, a value of "NA" was assigned to each category. The assigned values were then given a point ranking of 3 (High), 2 (Moderate), or 1 (Low). The higher the point value, the greater the risk associated with that hazard. **Figure R-1**, located at the end of this section, identifies the factors and values/point values associated with each category. Participants were asked to score the selected hazards based on the perspective of the entity they represented on the Planning Committee.

The Consultant took the point values assigned to each category and averaged the remaining results and came up with an overall value for each category. The values for each category were then added together to calculate an RPI score for each hazard. A ranking was then assigned to each hazard based on the RPI score. **Figure R-2**, located at the end of this section, provides the hazard rankings for the participating jurisdictions. RPI scores were not generated for Pearl, McGee Creek D&LD or Valley City D&LD.

FEMA's National Risk Index

The National Risk Index (NRI) is an online mapping and data-based interface that helps illustrate a community's risk to 18 identified natural hazards. The natural hazards identified by the NRI and included in this Plan are cold wave, drought, earthquake, hail, heat wave, ice storm, lightning, riverine flooding, strong wind, tornado, and winter weather. The NRI leverages available source data for natural hazard and community risk facts, such as social vulnerability and community resilience, to develop a baseline relative risk measurement for each county and census tract in the U.S. The goal is to help individuals better understand the natural hazard risk of their communities.

In the NRI, risk is defined as the potential for negative impacts as a result of a natural hazard. The risk equation behind the NRI includes three components: a natural hazards component (expected annual loss), a consequence enhancing component (social vulnerability), and a consequence reduction component (community resilience). Social vulnerability represents the susceptibility of social groups to the adverse impacts of natural hazards. Community resilience represents the ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.

The scores and ratings generated by the NRI describe a county's or census tract's relative position among all other U.S. counties and census tracts for a given component. Dataset Update 1.18.1 released November 18, 2021 was used in this analysis. Scores can range from 0 (the lowest possible value) to 100 (the highest possible value). For every score there is assigned one of five qualitative ratings: "Very Low", "Relatively Low", "Relatively Moderate", "Relatively High", and "Very High." Because all ratings are relative, there are no specific numeric values that determine the rating.

In order to provide the participating jurisdictions and public with additional information on the natural hazards included in the Plan, **Figure R-3** located at the end of this section, presents the overall NRI scores and ratings for each census tract as well as for the County and State as a whole. 2010 census tract information was used in this version of the NRI. In 2010, there were five census tracts in Pike County. All of the census tracts have a Risk Index rating of "Relatively Moderate". One of the census tracts has a Social Vulnerability rating of "Relatively High", three have a rating of "Relatively Moderate", and one has a rating of "Relatively Low".

Figure R-4, located at the end of this section, provides the NRI scores and ratings by hazard type for each census tract as well as the County. Hazard ratings of "Relatively High" and "Very High" are highlighted in yellow by census tract. The hazards with the highest relative rating include severe storms, severe winter storms, tornadoes, extreme cold, excessive heat, and tornadoes.

Critical Facilities & Infrastructure

Critical facilities and infrastructure include structures, lifelines, systems, networks, and institutions that are critical for life, safety, and economic viability and necessary for a community's response to and recovery from emergencies. The loss of function of any of these assets can intensify the severity of the impacts and speed of recovery associated a hazard event. Critical facilities and infrastructure may include, but are not limited to, the following:

- ***Essential Facilities***: Facilities essential to the health and welfare of the whole population including hospitals and other medical facilities, police and fire stations, emergency operations centers, evacuation shelters, and schools.
- ***Government Facilities***: Facilities associated with the continued operations of government services such as courthouses, city/village halls, township buildings, and highway/maintenance centers.
- ***Infrastructure Systems***: Infrastructure associated with drinking water, wastewater, transportation (roads, railways, waterways), communication systems, electric power, natural gas and oil.
- ***Housing Facilities***: Facilities that serve populations that have access and function needs such as nursing homes, skilled and memory care facilities, residential group homes, and day care centers.
- ***High Potential Loss Facilities***: Facilities that would have an impact or high loss associated with them if their functionality is compromised such as nuclear power plants, dams, levees, military installations and facilities housing industrial or hazardous materials.
- ***Gathering Places***: Facilities such as parks, libraries, community centers, and churches.

As part of the planning process each participating jurisdiction completed a questionnaire identifying the critical facilities and infrastructure located within their jurisdiction, both publicly and privately-owned. **Figure R-5**, located at the end of this section, identifies the number of critical facilities and infrastructure located in each participating jurisdiction for select categories. Identifying these assets makes local leaders more aware of the critical facilities and infrastructure located within their jurisdictions and helps them make informed choices on how to better protect these key resources.

While considered a "local government entity" for planning purposes, Fairmount Township, Pittsfield Township, Pikeland Community Unit School District (CUSD) #10, Baylis Fire Department (FD), Spring Creek Fire Protection District (FPD), Illini Community Hospital, McGee Creek Drainage & Levee District (D&LD), Sny Island Levee Drainage District (LDD), and Valley City D&LD do not have an extensive inventory of assets in which to consider when conducting the risk assessment.

Since the assets for these local government entities are located within a participating municipality, with the exception of Fairmount Township, Spring Creek FPD, McGee Creek D&LD, Sny Island

LDD, and Valley City D&LD, and are a subset of these municipalities' critical facilities, their risk is considered to be the same or similar to the risk experienced by the municipalities for those hazards that either impact the entire planning area or can occur at any location within the planning area (i.e., severe storms, severe winter storms, etc.). For those hazards where the risk to Pittsfield Township, CUSD #10, Bayliss FD, and Illini Community Hospital varies from the risk facing the municipalities, a separate narrative assessment will be provided under the appropriate hazard's vulnerability subsection.

The critical facilities for Fairmount Township, McGee Creek D&LD, Sny Island LDD (with the exception of the Administrative Office, which is located in New Canton), and Valley City D&LD are located in unincorporated Pike County. Their risk is considered to be the same or similar to the risk experienced by the County for those hazards that either impact the entire planning area or can occur at any location within the planning area (i.e., severe storms, severe winter storms, etc.) For those hazards where the risk to Fairmount Township, the LDD, and D&LDs critical facilities varies from the risk facing the planning area (i.e., the County), a separate narrative assessment will be provided under the appropriate hazard's vulnerability subsection.

The Spring Creek FPD critical facilities are located in the Village of Nebo. Nebo's risk is considered to be the same or similar to the risk experienced by the participating municipalities and the County for those hazards that either impact the entire planning area or can occur at any location within the planning area (i.e., severe storms, severe winter storms, etc.). For those hazards where the risk to the FPD critical facilities varies from the risk facing the municipalities, a separate narrative assessment will be provided under the appropriate hazard's vulnerability subsection.

Critical Facilities Vulnerability Survey

The participating jurisdictions were also asked to complete a Critical Facilities Vulnerability Survey at the third meeting to assist them in creating problem statements summarizing the consequences and/or effects the studied hazards have on their assets. The Survey asked participants to describe their jurisdiction's greatest vulnerabilities to natural hazards and which assets they felt have the greatest vulnerabilities and the hazards they are most vulnerable to. This information is summarized under the appropriate hazard's vulnerability subsection.

Future Conditions

While we cannot predict with certainty what the weather of the future will look like, we can use models to help us make sense of the patterns we have seen in the past and to use that information to predict what events will be more likely to occur going forward.

By looking at data from previous weather conditions and taking into account trends in that data that have emerged over time, we can with some degree of accuracy project what weather may look like in the future. It is important to consider that nearer term predictions have the greatest likelihood of accuracy since they require the least extrapolation and guesswork; however, this does not mean that longer term predictions are not plausible or not useful. Often, having a prediction that is even partly right is preferable to having no guide at all. By coming up with best case and worst case scenarios, even if neither is terribly likely, we can gain a better understanding of the range of potential outcomes and a good idea of what the most probable outcomes might look like.

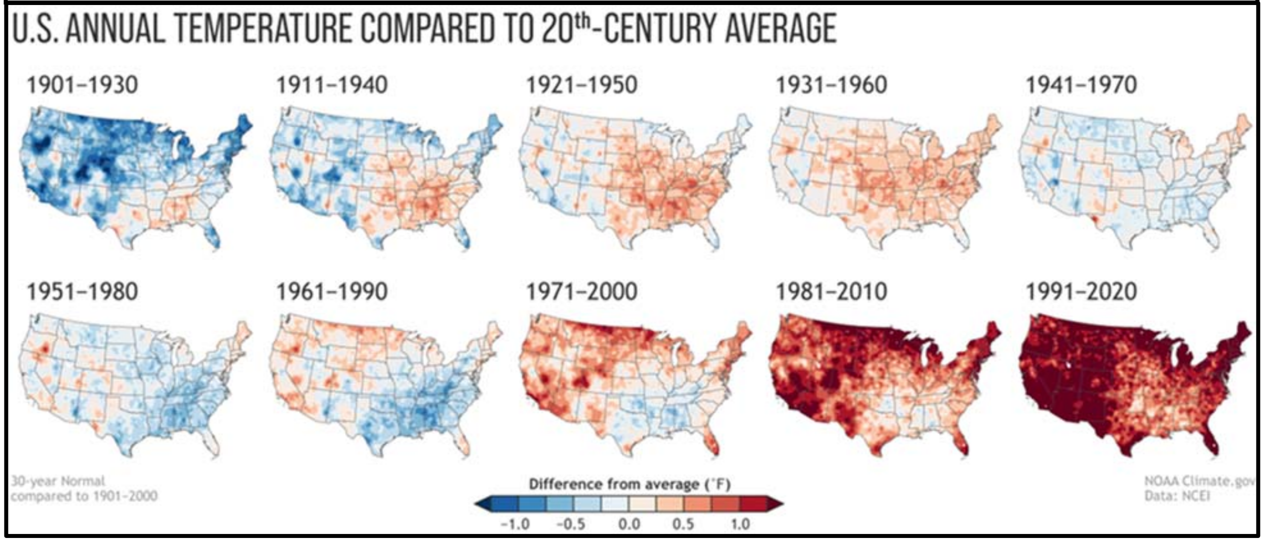
Earth's weather and climate have always been variable. Over time, sea levels have risen and fallen, glaciers have advanced and retreated, and droughts, floods, wildfires, and storms have periodically upended the notion of "normal". In recent years in the U.S., there have been several trends observed in weather patterns that offer us some insight as to what the near future may hold. Broadly, these likely changes can be referred to as "future conditions". They include more general seasonal trends as well as more specific weather pattern trends.

In recent decades we have seen both earlier springs (earlier last frost dates) and later winters (later first frost dates) in the U.S. Taken together, these two changes mean that winters are likely to be shorter and milder, and summers are likely to be longer and hotter across much of the continental U.S. than they were historically. In combination, shorter, milder winters and longer, more intense summers have resulted in an observed increase in average annual temperature.

As with any change that occurs gradually, the difference can be difficult to perceive if the time frame you are looking at is small. Additionally, smaller windows of time are more likely to be skewed by rare occurrences or anomalies. Looking at longer time frames allows us to see the big picture, putting highly unusual years into context by averaging them out with other more typical years. Looking at consecutive 30-year period averages called "Normals" allows us to detect how what is average (or 'normal') has shifted over time.

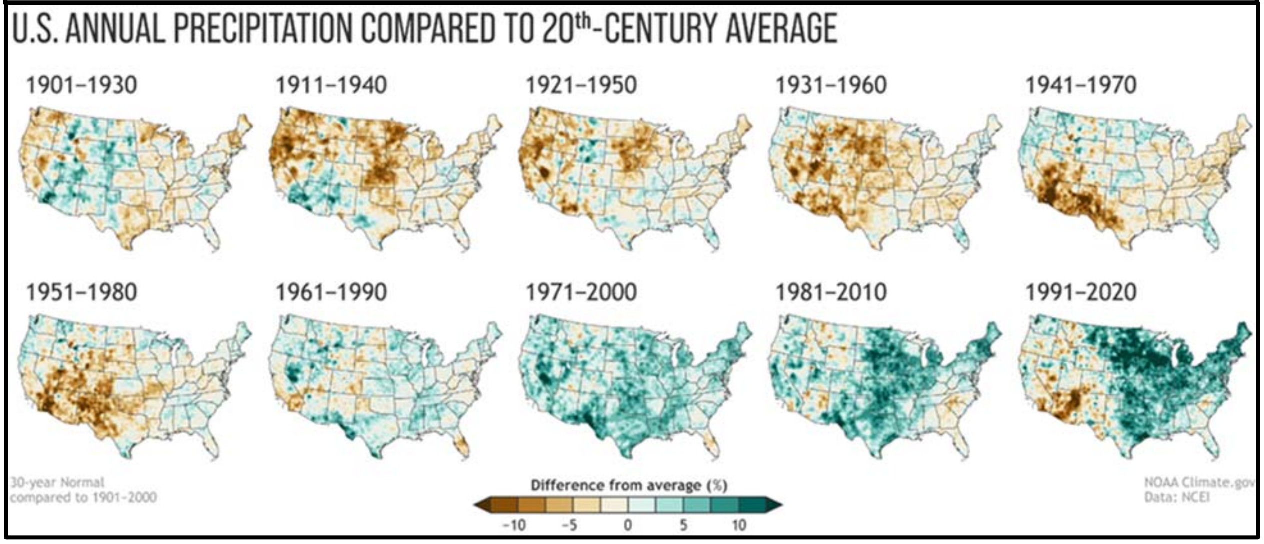
Figure R-6 shows U.S. annual temperature compared to 20th-century averages. By looking at 30 Year Normals for average annual temperature compared to overall 20th century averages, a trend of increasing annual temperature is particularly apparent in the final three 30 year periods. (1971-2000, 1981-2010, 1991-2020). Since these are average annual temperatures, even a small difference corresponds to larger temperature changes recorded within a year.

Figure R-6
U.S. Annual Temperature Compared to 20th Central Average



Also observed have been changes in when, where, and how much precipitation occurs across the U.S. **Figure R-7** shows U.S. annual precipitation compared to 20th-century averages. For some areas of the Country, this has resulted in increases in overall precipitation. T he Midwestern U.S. has been on average getting progressively wetter in 30 year rolling averages from the period of 1951-1980 onwards; elsewhere, it has resulted in decreases, such as in much of the Western and Southwestern US, which has been getting drier since the period of 1971-2000 onwards.

Figure R-7
U.S. Annual Precipitation Compared to 20th Central Average



Trends also reveal an uptick in the frequency and severity of hazardous weather events. While this is in part due to better record-keeping and a higher number of people and monitoring devices to witness hazardous events in order to report them, this trend is at least in part due to warmer bodies of air that tend to "supercharge" summer storm systems, making them more likely to produce severe weather events.

Specific information on future conditions is summarized under the appropriate hazard's probability subsection. According to Headwaters Economics' Neighborhoods at Risk Tool, Pike County does not have any census tracts where vulnerabilities to future conditions exceed the County median.

Figure R-1
Risk Priority Index Scoring System

Category	Factors	Value	Point Value
Hazard Frequency	An event is likely to occur in the next 1 to 3 years.	High	3
	An event is possible in the next 3 to 10 years.	Moderate	2
	An event is unlikely to occur within the next 10 years.	Low	1
Impacts on Life & Health	While fatalities are unlikely, injuries, some requiring hospitalization, may occur during the event.	High	3
	Minor injuries not requiring hospitalization may occur during the event.	Moderate	2
	Injuries or fatalities are unlikely to occur during the event.	Low	1
Impacts on Property & Infrastructure	- Substantial property damage is likely to occur including damage to infrastructure and critical facilities. AND/OR - Loss of access/operations at infrastructure and critical facilities (i.e., road & school closures, loss of power to drinking water/wastewater treatment facilities, municipal buildings, etc.) is anticipated for a period of time (i.e., a day or more).	High	3
	- Some minor property damage is anticipated (i.e., shingles & siding torn off homes, windows broken, etc.) but no significant damage to infrastructure or critical facilities is anticipated. AND/OR - Loss of access/operations to infrastructure and critical facilities is anticipated but only for a short period of time (i.e., up to a couple hours).	Moderate	2
	- Property damage is likely to be negligible and no loss of access/operations is anticipated at any infrastructure/critical facilities during the event.	Low	1

Figure R-2
Risk Priority Index Hazard Ranking by Participating Jurisdiction
(Sheet 1 of 2)

Hazard	**Hazard Ranking by Participating Jurisdiction**					
	Pike County	Barry	Baylis	Griggsville	New Canton	Pittsfield
Drought	11/12	8/9	8/9	9/10	11/12	9/10/11/12/13
Earthquakes	11/12	10/11	10/11/12/13	5/6/7	2/3	9/10/11/12/13
Excessive Heat	9/10	**1/2/3/4**	3/4/5	5/6/7	4/5/6/7/8	**1/2/3/4**
Extreme Cold	9/10	**1/2/3/4**	**1/2**	5/6/7	4/5/6/7/8	5/6
Floods	**1/2**	10/11	10/11/12/13	11/12/13	9/10	**1/2/3/4**
Hail	7/8	8/9	3/4/5	8	11/12	9/10/11/12/13
Heavy Rain	3	5/6/7	8/9	9/10	9/10	**1/2/3/4**
Landslides	13	12/13	10/11/12/13	11/12/13	13	9/10/11/12/13
Levee Failures	5/6	12/13	10/11/12/13	11/12/13	4/5/6/7/8	5/6
Lightning	7/8	5/6/7	6/7	**1/2/3/4**	**1**	7/8
Thunderstorms w/ Damaging Winds	**1/2**	**1/2/3/4**	6/7	**1/2/3/4**	4/5/6/7/8	**1/2/3/4**
Tornadoes	5/6	5/6/7	3/4/5	**1/2/3/4**	4/5/6/7/8	9/10/11/12/13
Winter Storms	4	**1/2/3/4**	**1/2**	**1/2/3/4**	2/3	7/8

Figure R-2
Risk Priority Index Hazard Ranking by Participating Jurisdiction
(Sheet 2 of 2)

Hazard	**Hazard Ranking by Participating Jurisdiction**						
	Fairmount Township	Pittsfield Township	Pikeland CUSD #10	Baylis Fire Department	Spring Creek Fire Protection District	Illini Community Hospital	Sny Island Levee Drainage District
Drought	6/7/8	8	9/10/11	8/9	12/13	9/10/11	11/12/13
Earthquakes	10/11/12/13	2/3	7/8	10/11/12/13	12/13	**1/2/3**	**1/2/3/4**
Excessive Heat	3/4/5	9/10/11/12/13	2/3/4/5/6	3/4/5	9/10/11	4/5/6/7	5/6/7
Extreme Cold	**1/2**	9/10/11/12/13	**1**	**1/2**	9/10/11	4/5/6/7	8/9/10
Floods	10/11/12/13	4/5/6	2/3/4/5/6	10/11/12/13	**1/2/3/4**	9/10/11	**1/2/3/4**
Hail	6/7/8	9/10/11/12/13	9/10/11	3/4/5	**1/2/3/4**	9/10/11	5/6/7
Heavy Rain	**1/2**	4/5/6	12	8/9	**1/2/3/4**	8	**1/2/3/4**
Landslides	6/7/8	9/10/11/12/13	13	10/11/12/13	9/10/11	12/13	11/12/13
Levee Failures	10/11/12/13	7	2/3/4/5/6	10/11/12/13	5/6	12/13	5/6/7
Lightning	9	9/10/11/12/13	9/10/11	6/7	7/8	**1/2/3**	11/12/13
Thunderstorms w/ Damaging Winds	3/4/5	4/5/6	2/3/4/5/6	6/7	**1/2/3/4**	4/5/6/7	**1/2/3/4**
Tornadoes	10/11/12/13	**1**	2/3/4/5/6	3/4/5	5/6	4/5/6/7	8/9/10
Winter Storms	3/4/5	2/3	7/8	**1/2**	7/8	**1/2/3**	8/9/10

Figure R-3
National Risk Index Hazard Scores/Ratings

Census Tract No.	Incorporated Municiplity Located in Census Tract	Risk Index Score	Risk Index Rating	Social Vulnerability Score	Social Vulnerability Rating	Community Resilience Score	Community Resilience Rating
9524	Baylis, Griggsville, New Salem, Perry, Valley City	24.07	Relatively Moderate	33.96	Relatively Moderate	*	*
9525	Barry, Hull, Kinderhook	22.15	Relatively Moderate	34.24	Relatively Moderate	*	*
9526	El Dara, New Canton, Pleasant Hill	23.09	Relatively Moderate	32.74	Relatively Moderate	*	*
9527	Pittsfield	20.83	Relatively Moderate	35.36	Relatively High	*	*
9528	Detroit, Florence, Milton, Nebo, Pearl, Time	19.59	Relatively Moderate	30.82	Relatively Low	*	*

Pike County	---	9.44	Relatively Low	40.63	Relatively Moderate	55.31	Relatively Moderate
Illinois	---	9.87	---	35.15	---	56.70	---
National	---	10.60	---	38.35	---	54.59	---

* Community Resilience scores are only available at the county level.

Figure R-4
NRI Hazard Scores/Ratings by Hazard by Census Tract
(Sheet 1 of 2)

Census Tract No.	Incorporated Municiplity Located in Census Tract	Severe Storms						Severe Winter Storms				Riverine Floods	
		Hail Score	Hail Rating	Lightning Score	Lightning Rating	Strong Wind Score	Stong Wind Rating	Ice Storm Score	Ice Storm Rating	Winter Weather Score	Winter Weather Rating	Score	Rating
9524	Baylis, Griggsville, New Salem, Perry, Valley City	8.92	RL	28.12	RH	30.55	RH	25.93	RH	14.55	RM	12.38	RM
9525	Barry, Hull, Kinderhook	8.19	RL	25.64	RM	28.18	RM	23.86	RM	13.63	RM	15.53	RM
9526	El Dara, New Canton, Pleasant Hill	9.22	RL	26.16	RM	30.96	RH	22.07	RM	13.81	RM	17.48	RM
9527	Pittsfield	10.18	RL	32.15	RH	38.49	RH	26.97	RH	16.77	RH	NR	NR
9528	Detroit, Florence, Milton, Nebo, Pearl, Time	7.98	RL	22.66	RM	26.89	RM	19.15	RM	11.96	RM	14.76	RM
Pike County	---	5.11	VL	10.87	RL	10.89	RL	12.67	RL	10.97	RL	7.44	RL

Rating Abbreviations: NR = No Rating; VL = Very Low; RL = Relatively Low; RM = Relatively Moderate; RH = Relatively High; VH = Very High

Figure R-4
NRI Hazard Scores/Ratings by Hazard by Census Tract
(Sheet 2 of 2)

Census Tract No.	Incorporated Municiplity Located in Census Tract	Extreme Cold		Excessive Heat		Tornadoes		Drought		Landslides		Earthquakes	
		Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating
9524	Baylis, Griggsville, New Salem, Perry, Valley City	30.43	RH	49.26	VH	37.58	RH	19.11	RH	6.68	RM	10.09	RL
9525	Barry, Hull, Kinderhook	27.07	RH	45.14	VH	33.98	RM	16.77	RM	8.41	RM	12.74	RL
9526	El Dara, New Canton, Pleasant Hill	29.84	RH	47.43	VH	35.72	RM	17.11	RM	8.36	RM	9.67	RL
9527	Pittsfield	28.24	RH	55.03	VH	43.93	RH	6.72	RL	0.28	VL	14.64	RL
9528	Detroit, Florence, Milton, Nebo, Pearl, Time	25.29	RH	40.66	RH	30.93	RM	14.33	RM	7.54	RM	8.10	VL
Pike County	---	29.44	RM	17.49	RM	14.43	RL	17.06	RM	11.58	RL	3.04	VL

Rating Abbreviations: NR = No Rating; VL = Very Low; RL = Relatively Low; RM = Relatively Moderate; RH = Relatively High; VH = Very High

Figure R-5
Critical Facilities & Infrastructure by Jurisdiction

Participating Jurisdiction	Critical Facilities				Critical Infrastructure						
	Government[1]	Emergency Protection[2]	Medical & Healthcare[3]	Schools	Drinking Water[4]	Wastewater Treatment[5]	Rail Lines	Bridges	Interstates US/State Routes & Key Roads	Power Plants	Comm. Systems
Pike County	4	2	1	---	---	---	2	6	11	---	1
Barry	4	2	2	2	3	2	---	1	4	---	---
Baylis	1	1	---	---	2	---	1	---	4	---	---
Griggsville	3	1	1	2	2	1	---	---	3	---	---
New Canton	5	1	---	---	2	2	---	1	3	---	---
Pearl	3	---	---	---	2	---	1	3	4	---	---
Pittsfield	7	5	7	5	3	5	---	---	2	---	---
Fairmount Township	1	---	---	---	---	---	---	7	1	---	---
Pittsfield Township	1	---	---	---	---	---	---	2	4	---	---
Pikeland CUSD #10	---	---	---	5	---	---	---	---	---	---	---
Baylis FD	1	1	---	---	---	---	1	---	---	---	---
Spring Creek FPD	---	1	---	---	---	---	---	---	---	---	---
Illini Community Hospital	---	---	2	---	---	---	---	---	---	---	---
McGee Creek D&LD	---	---	---	---	---	1	---	---	---	---	---
Sny Island LDD	1	---	---	---	---	5	---	2	6	---	---
Valley City D&LD	---	---	---	---	---	1	---	---	---	---	---

[1] Government includes: courthouses, city/village halls, township buildings, highway/road maintenance centers, libraries, etc.

[2] Emergency Protection includes: sheriff's department, police, fire, ambulance, emergency operations centers, jail/correctional facilities and evacuation shelters.

[3] Medical & Healthcare includes: public health departments, hospitals, urgent/prompt care and medical clinics, nursing homes, skilled nursing facilities, memory care facilities, residential group homes, etc.

[4] Drinking Water includes: drinking water treatment plants, drinking water wells, and water storage towers/tanks.

[5] Wastewater Treatment includes: wastewater treatment plants and lift stations.

--- Indicates the jurisdiction does not own/maintain any critical facilities within that category.

3.1 SEVERE STORMS (THUNDERSTORMS, HAIL, LIGHTNING & HEAVY RAIN)

HAZARD IDENTIFICATION

What is the definition of a severe storm?

The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) defines a "severe storm" as any thunderstorm that produces one or more of the following:

- winds with gust of 50 knots (58 mph) or greater;
- hail that is at least one inch in diameter (quarter size) or larger; and/or
- a tornado.

While severe storms are capable of producing deadly lightning and heavy rain that may lead to flash flooding, the NWS does not use lightning/either to define a severe storm. However, a discussion of both lightning and heavy rain is included in this section because both are capable of causing extensive damage. For the purposes of this report, tornadoes and flooding are categorized as separate hazards and are not discussed under severe storms.

What is a thunderstorm?

A thunderstorm is a rain shower accompanied by lightning and thunder. An average thunderstorm is approximately 15 miles in diameter, affecting a relatively small area when compared to winter storms or hurricanes, and lasts an average of 30 minutes. Thunderstorms can bring heavy rain, damaging winds, hail, lightning and tornadoes.

There are four basic types of thunderstorms: single-cell, multi-cell, squall line, and supercell. The following provides a brief description of each.

Single-cell Thunderstorm

Single cell storms are small, weak storms that only last about ½ hour to an hour and are not usually considered severe. They are typically driven by heating on a summer afternoon. Occasionally a single cell storm will become severe, but only briefly. When this happens, it is called a pulse severe storm.

Multi-cell Thunderstorm

Multi-cell storms are the most common type of thunderstorms. A multi-cell storm is organized in clusters of at least two to four short-lived cells. Each cell usually lasts 30 to 60 minutes while the system as whole may persist for many hours. Multi-cell storms may produce hail, strong winds, brief tornadoes, and/or flooding.

Squall Line

A Squall line is a group of storms arranged in a line, often accompanied by "squalls" of high wind and heavy rain. The line of storms can be continuous or there can be gaps and breaks in the line. Squall lines tend to pass quickly and can be hundreds of miles long but are typically only 10 to 20 miles wide. A "bow echo" is a radar signature of a squall line that "bows out" as winds fall behind the line and circulation develops on either end.

Supercell Thunderstorm

Supercell storms are long-lived (greater than one hour) and highly organized storms that feed off a rising current of air (an updraft). The main characteristic that sets a supercell storm apart from other thunderstorm types is the presence of rotation in the updraft. The rotating updraft of a supercell (called a mesocyclone when visible on radar) helps a supercell storm produce extreme weather events. Supercell storms are potentially the most dangerous storm type and have been observed to generate the vast majority of large and violet tornadoes, as well as downburst winds and large hail.

Despite their size, all thunderstorms are dangerous and capable of threatening life and property. Of the estimated 100,000 thunderstorms that occur each year in the U.S., roughly 10% are classified as severe.

What kinds of damaging winds are produced by a thunderstorm?

Aside from tornadoes, thunderstorms can produce straight-line winds. A straight-line wind is defined as any wind produced by a thunderstorm that is not associated with rotation. There are several types of straight-line winds including downdrafts, downbursts, microbursts, gust fronts and derechos.

Damage from straight-line winds is more common than damage from tornadoes and accounts for most thunderstorm wind damage. Straight-line wind speeds can exceed 87 knots (100 mph), produce a damage pathway extending for hundreds of miles and can cause damage equivalent to a strong tornado.

The NWS measures a storm's wind speed in knots or nautical miles. A wind speed of one knot is equal to approximately 1.15 miles per hour. **Figure SS-1** shows conversions from knots to miles per hour for various wind speeds.

Figure SS-1
Wind Speed Conversions

Knots (kts)	Miles Per Hour (mph)	Knots (kts)	Miles Per Hour (mph)
50 kts	58 mph	60 kts	69 mph
52 kts	60 mph	65 kts	75 mph
55 kts	63 mph	70 kts	81 mph
58 kts	67 mph	80 kts	92 mph

What is hail?

Hail is precipitation in the form of spherical or irregular-shaped pellets of ice that occur within a thunderstorm when strong rising currents of air (updrafts) carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice.

Hailstones grow by colliding with supercooled water drops. The supercooled water drops freeze on contact with ice crystals, frozen rain drops, dust, etc. Thunderstorms with strong updrafts continue lifting the hailstones to the top of the cloud where they encounter more supercooled water and continue to grow. Eventually the updraft can no longer support the weight of the hail, or the updraft weakens, and the hail falls to the ground.

In the U.S., hail causes more than $1 billion in damages to property and crops annually. Hail has been known to cause injuries, although it rarely causes fatalities or serious injury.

How is the severity of a hail event measured?

The severity or magnitude of a hail event is measured in terms of the size (diameter) of the hailstones. The hail size is estimated by comparing it to known objects. **Figure SS-2** provides descriptions for various hail sizes.

Figure SS-2
Hail Size Descriptions

Hail Diameter (inches)	Description	Hail Diameter (inches)	Description
0.25 in.	pea	1.75 in.	golf ball
0.50 in.	marble/mothball	2.50 in.	tennis ball
0.75 in.	penny	2.75 in.	baseball
0.88 in.	nickel	3.00 in.	teacup
1.00 in.	quarter	4.00 in.	grapefruit
1.50 in.	ping pong ball	4.50 in.	softball

Source: NOAA, National Severe Storm Laboratory.

Hail size can vary widely. Hailstones may be as small as 0.25 inches in diameter (pea-sized) or, under extreme circumstances, as large as 4.50 inches in diameter (softball-sized). Typically hail that is one (1) inch in diameter (quarter-sized) or larger is considered severe.

The severity of a hail event can also be measured or rated using the TORRO Hailstorm Intensity Scale. This scale was developed in 1986 by the Tornado and Storm Research Organisation of the United Kingdom. It measures the intensity or damage potential of a hail event based on several factors including: maximum hailstone size, distribution, shape and texture, numbers, fall speed and strength of the accompanying winds.

The Hailstorm Intensity Scale identifies ten different categories of hail intensity, H0 through H10. **Figure SS-3** gives a brief description of each category. This scale is unique because it recognizes that, while the maximum hailstone size is the most important parameter relating to structural damage, size alone is insufficient to accurately categorize the intensity and damage potential of a hail event.

It should be noted that the typical damage impacts associated with each intensity category reflect the building materials predominately used in the United Kingdom. These descriptions may need to be modified for use in other countries to take into account the differences in building materials typically used (i.e., whether roofing materials are predominately shingle, slate or concrete, etc.).

Figure SS-3
TORRO Hailstorm Intensity Scale

Intensity Category		Typical Hail Diameter		Description	Typical Damage Impacts
		millimeters (approx.)*	inches (approx.)*		
H0	Hard Hail	5 mm	0.2”	pea	no damage
H1	Potentially Damaging	5-15 mm	0.2” – 0.6”	pea / mothball	slight general damage to plants, crops
H2	Significant	10-20 mm	0.4” – 0.8”	dime / penny	significant damage to fruit, crops, vegetation
H3	Severe	20-30 mm	0.8” – 1.2”	nickel / quarter	severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-40 mm	1.0” – 1.6”	half dollar / ping pong ball	widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50 mm	1.2” – 2.0”	golf ball	wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60 mm	1.6” – 2.4”	golf ball / egg	bodywork of grounded aircraft dented; brick walls pitted
H7	Destructive	50-75 mm	2.0” – 3.0”	egg / tennis ball	severe roof damage, risk of serious injuries
H8	Destructive	60-90 mm	2.4” – 3.5”	tennis ball / teacup	severe damage to aircraft bodywork
H9	Super Hailstorms	75-100 mm	3.0” – 4.0”	teacup / grapefruit	extensive structural damage, risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	> 100 mm	> 4.0”	softball	extensive structural damage, risk of severe or even fatal injuries to persons caught in the open

* Approximate range since other factors (i.e., number and density of hailstones, hail fall speed and surface wind speed) affect severity.

Source: Tornado and Storm Research Organisation, TORRO Hailstorm Intensity Scale Table.

What is lightning?

Lightning, a component of all thunderstorms, is a visible electrical discharge that results from the buildup of charged particles within storm clouds. It can occur from cloud-to-ground, cloud-to-cloud, within a cloud or cloud-to-air. The air near a lightning strike is heated to approximately 50,000°F (hotter than the surface of the sun). The rapid heating and cooling of the air near the lightning strike causes a shock wave that produces thunder.

Lightning on average causes 60 fatalities and 400 injuries annually in the U.S. Most fatalities and injuries occur when people are caught outdoors in the summer months during the afternoons and evenings. In addition, lightning can cause structure and forest fires. Many of the wildfires in the western U.S. and Alaska are started by lightning. According to the NWS lightning strikes cost more than $1 billion in insured losses each year.

Are alerts issued for severe storms?

Yes. The NWS Weather Forecast Office in St. Louis, Missouri is responsible for issuing ***severe thunderstorm watches*** and ***warnings*** for Pike County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Watch.** A severe thunderstorm watch is issued when severe thunderstorms are possible in or near the watch area. Individuals should stay alert for the latest weather information and be prepared to take shelter.
- **Warning.** A severe thunderstorm warning is issued when severe weather has been reported by spotters or indicated by radar. Warnings indicate imminent danger to life and property for those who are in the path of the storm and individuals should seek safe shelter.

HAZARD PROFILE

The following identifies past occurrences of severe storms; details the severity or extent of each event (if known); identifies the locations potentially affected; and estimates the likelihood of future occurrences.

When have severe storms occurred previously? What is the extent of these previous severe storms?

Tables 1, 2, 3 and 4, located in **Appendix I,** summarize the previous occurrences as well as the extent or magnitude of severe storm events recorded in Pike County. Severe storm events are separated into four categories: thunderstorms with damaging winds, hail, lightning, and heavy rain. In Pike County, severe storms are the most frequently occurring natural hazard.

Thunderstorms with Damaging Winds

NOAA's Storm Events Database was used to document 135 reported occurrences of thunderstorms with damaging winds in Pike County between 1982 and 2022. Of the 135 occurrences, 121 had reported wind speeds of 50 knots or greater. There were 14 occurrences, however, where the wind speed was not recorded.

The highest wind speed recorded in Pike County occurred northwest of Pittsfield on April 29, 1984 when winds reached 70 knots (81 mph) during a thunderstorm event. Thunderstorms with damaging winds have been *recorded* in every participating jurisdiction within the County on multiple occasions.

Of the 135 events, 93 (69%) took place in May, June, and July making this the peak period for thunderstorms with damaging winds in Pike County. Of those 93 events, 35 (38%) occurred during June, making this the peak month for thunderstorms with damaging winds. Of the 135 occurrences, 76% of all thunderstorms with damaging winds occurred during the p.m. hours.

Severe Storms Fast Facts – Occurrences

Number of recorded Thunderstorms with Damaging Winds (1982 – 2022): ***135***

Number of recorded Severe Hail Events (1987 – 2022): ***50***

Number recorded of Lightning Strike Events (1998 – 2022): ***2***

Number of Heavy Rain Events (2000 – 2022): ***162***

Highest Recorded Wind Speed: ***70 knots (April 29, 1984)***

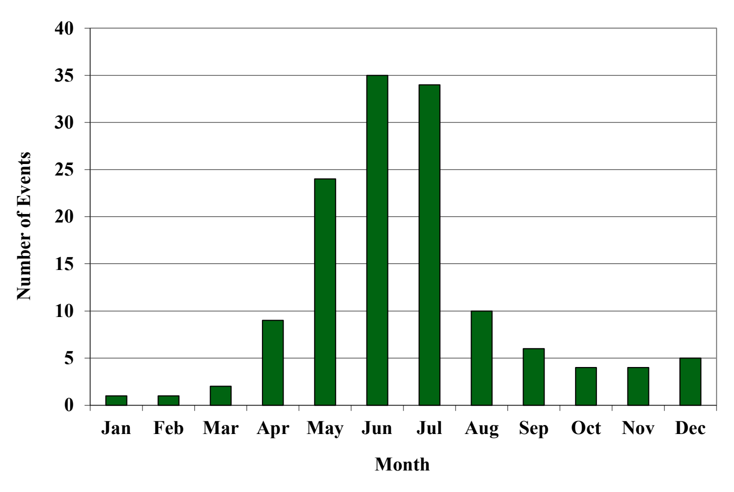
Largest Hail Recorded: ***2.75 inches (April 19, 1996, April 14, 2022, & May 21, 2014)***

Most Likely Month for Thunderstorms with Damaging Winds to Occur: ***June***

Most Likely Month for Severe Hail to Occur: ***May***

Most Likely Month for Heavy Rain to Occur: ***July***

Figure SS-4
Thunderstorms with Damaging Winds by Month
1982 – 2022



Hail

NOAA's Storm Events Database was used to document 50 reported occurrences of severe storms with hail one (1) inch in diameter or greater in Pike County between 1987 and 2022. Of the 50 occurrences, 25 produced hailstones 1.50 inches or larger in diameter.

The largest hail stones documented in Pike County measured 2.75 inches in diameter (baseball sized) and fell on three separate occasions: April 19, 1996 west of Pittsfield, April 13, 2002 in Pittsfield, and May 21, 2014 southeast of Perry. Hail one (1) inch in diameter or greater has been *recorded* in every participating jurisdiction on at least one occasion, with the exception of Baylis. This does not mean that hail one inch in diameter or greater has not fallen in Baylis, it simply indicates it wasn't recorded.

Figure SS-5 charts the reported occurrences of hail by month. Of the 50 occurrences, 29 (58%) took place in April and May, making this the peak period for hail in Pike County. Of these 29 events, 17 (59%) occurred during May, making this the peak month for hail events. Of the 50 occurrences, 45 (90%) of all severe storms with hail occurred during the p.m. hours.

Lightning

While lightning strike events occur regularly across west-central Illinois, NOAA's Storm Events Database only identified two recorded occurrences of lightning strikes in Pike County between 1998 and 2022. The data limitations are almost certainly due to the rural nature of the County. One event was recorded in May while the other was recorded in October.

According to data from Vaisala's National Lightning Detection Network, Pike County averaged from to 6 to 20 cloud-to-ground lightning flashes per square mile annually between 2009 and 2018. **Figure SS-6** illustrates the cloud-to-ground lightning flash density (number of cloud-to-ground flashes per square mile per year) by county for the continental U.S. In comparison, Illinois averaged 12.7 cloud-to-ground lightning flashes per square mile from 2009 to 2018, ranking it eighth in the Country for lightning flash density.

Figure SS-5
Hail Events by Month
1987 – 2022

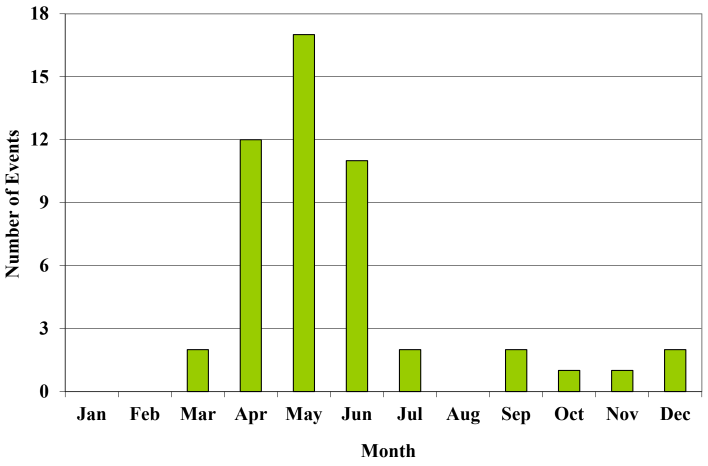
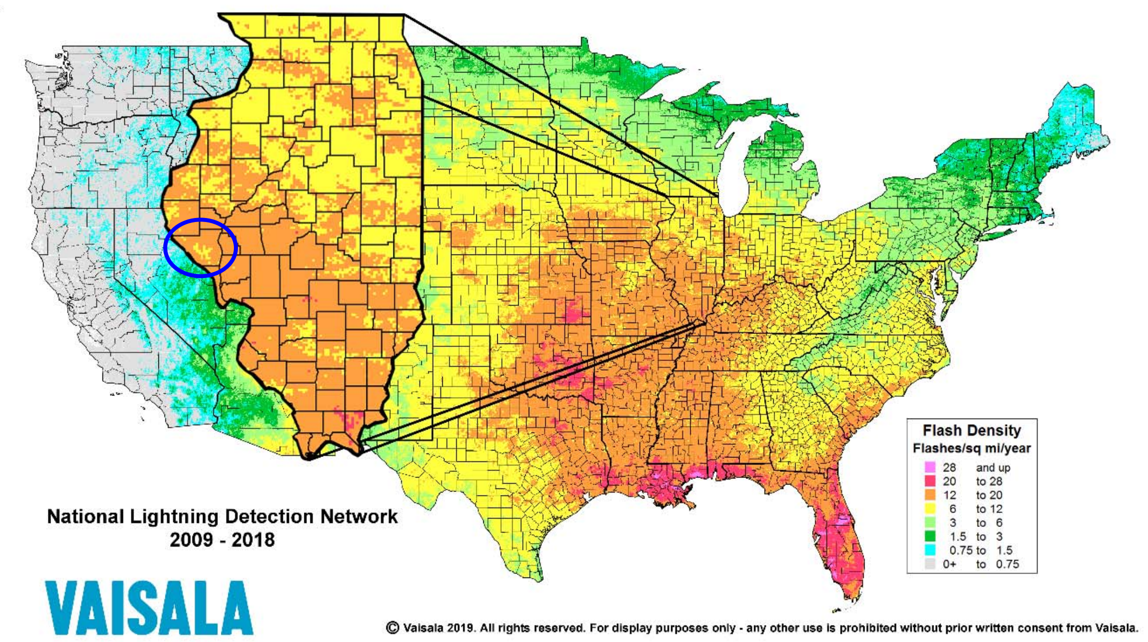


Figure SS-6
Cloud-to-Ground Lightning Flash Density: Continental U.S.



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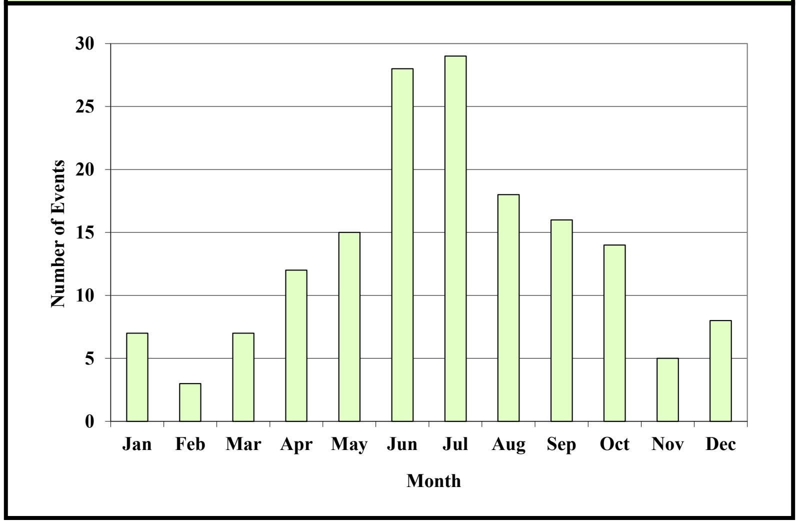
Heavy Rain

NOAA's Storm Events Database, Midwestern Regional Climate Center's cli-MATE database, and National Weather Service's COOP data records were used to document 162 heavy rain events for Pike County between 2000 and 2022. Of the 162 occurrences, 29 events (18%) produced three inches or more of rain.

Figure SS-7 charts the reported occurrences of heavy rain by month. Of the 162 events, 75 (46%) took place in June, July, and August making this the peak period for heavy rain in Pike County. Of these 75 events, 29 (39%) occurred during July, making this the peak month for heavy rains.

Figure SS-7
Heavy Rain Events by Month
2000 - 2022



What locations are affected by severe storms?

Severe storms affect the entire County. A single severe storm event will generally extend across the entire County and affect multiple locations. The *2018 Illinois Natural Hazard Mitigation Plan* prepared by the Illinois Emergency Management Agency (IEMA) classifies Pike County's hazard rating for severe storms as "high." (IEMA's overall hazard rating system has five levels: very low, low, medium, high, and severe.)

What is the probability of future severe storm events occurring based on historical data?

Thunderstorms with Damaging Winds

Pike County has had 135 verified occurrences of thunderstorms with damaging winds between 1982 and 2022. With 135 occurrences over the past 41 years, Pike County would expect to experience at least three thunderstorms with damaging winds in any given year. There were 22 years over the last 41 years where multiple (three or more) thunderstorms with damaging winds occurred. This indicates that the probability that multiple thunderstorms with damaging winds may occur during any given year within the County is 54%.

Hail

There have been 50 verified occurrences of hail one (1) inch in diameter or greater between 1987 and 2022. With 50 occurrences over the past 36 years, Pike County should expect to experience at least one severe storm with damaging hail in any given year. There were 12 years over the last 36 years where two or more hail events occurred. This indicates that the probability that more than one severe storm with hail may occur during any given year within the County is 33%.

Heavy Rain

Pike County has had 162 heavy rain events between 2000 and 2022. With 164 occurrences over the past 23 years, the County should expect to experience at least seven heavy rain events each year.

What is the probability of future heavy rain events occurring based on modeled future conditions?

In the last 120 years, total annual precipitation in Illinois has increased by between 12% to 15% across the State. This trend is likely to continue, and as a result, precipitation in Illinois is forecasted to increase in coming decades. In addition to changes in the overall amount of precipitation, changes in precipitation patterns indicate that future events will likely be less frequent, but larger and more severe. The Illinois State Climatologist indicates that since the beginning of the 20th Century, Illinois has seen a 40% increase in the number of days with extreme precipitation events (rainfall of 2 inches or greater) per year.

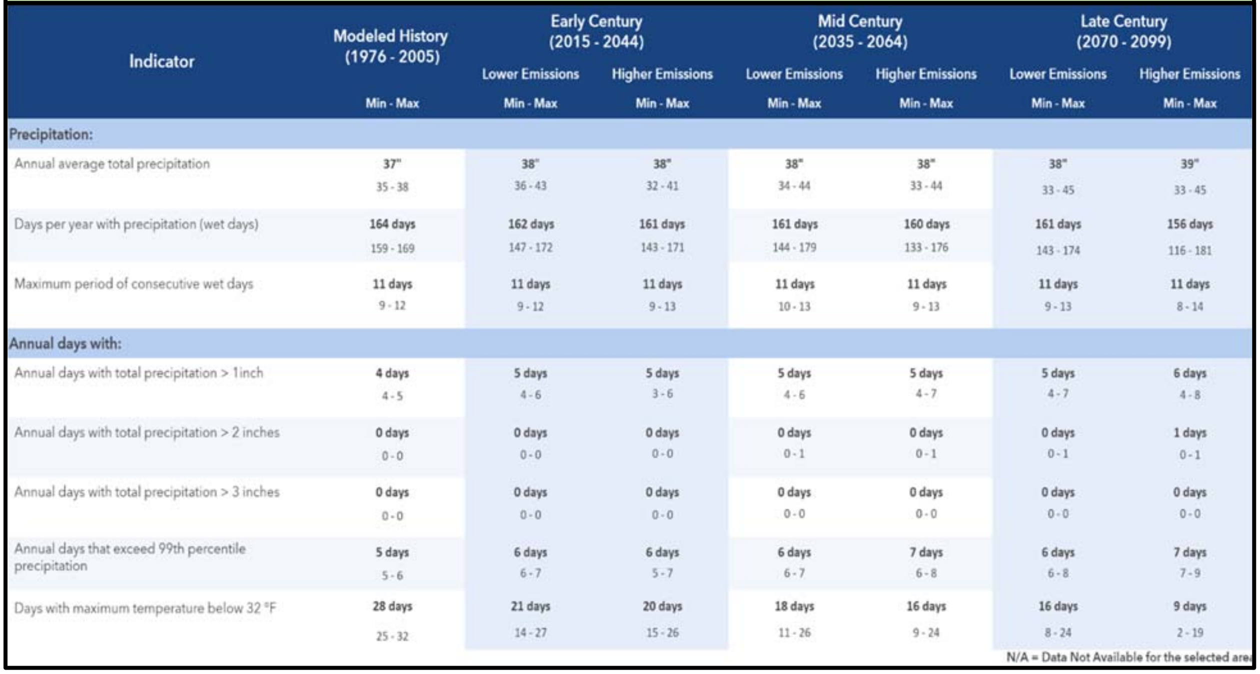
Figures SS-8, SS-9, and **SS-10** provide tabular and graphical projections for Pike County, showing estimations for average annual precipitation and number of days with total precipitation greater than 2 inches in the early, mid, and late 21st century with both low and high estimates for each time period. Most likely, the true value will fall between these two estimates. By midcentury, the average annual precipitation in Pike County is projected to increase by an inch per year, while the average number of days with precipitation per year is projected to decrease by 3 to 4 days according to the Climate Mapping for Resilience and Adaptation's Assessment Tool.

The annual number of days with total precipitation greater than 2 inches is not projected to increase significantly. This is confirmed by the Climate Explorer which indicates that in Pike County the annual counts of intense rainstorms (rainfall of 2 inches or greater in once day) are not projected to increase. This is based on the findings of the 2018 National Climate Assessment and compares projections for the middle third of the century (2035-2064) with average conditions observed from 1961-1990.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from severe storms.

Figure SS-8
Average Annual Precipitation Projections Table – Pike County



Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Annual average total precipitation	**37"** 35 - 38	**38"** 36 - 43	**38"** 32 - 41	**38"** 34 - 44	**38"** 33 - 44	**38"** 33 - 45	**39"** 33 - 45
Days per year with precipitation (wet days)	**164 days** 159 - 169	**162 days** 147 - 172	**161 days** 143 - 171	**161 days** 144 - 179	**160 days** 133 - 176	**161 days** 143 - 174	**156 days** 116 - 181
Maximum period of consecutive wet days	**11 days** 9 - 12	**11 days** 9 - 12	**11 days** 9 - 13	**11 days** 10 - 13	**11 days** 9 - 13	**11 days** 9 - 13	**11 days** 8 - 14
Annual days with:							
Annual days with total precipitation > 1inch	**4 days** 4 - 5	**5 days** 4 - 6	**5 days** 3 - 6	**5 days** 4 - 6	**5 days** 4 - 7	**5 days** 4 - 7	**6 days** 4 - 8
Annual days with total precipitation > 2 inches	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 1	**0 days** 0 - 1	**0 days** 0 - 1	**1 days** 0 - 1
Annual days with total precipitation > 3 inches	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0
Annual days that exceed 99th percentile precipitation	**5 days** 5 - 6	**6 days** 6 - 7	**6 days** 5 - 7	**6 days** 6 - 7	**7 days** 6 - 8	**6 days** 6 - 8	**7 days** 7 - 9
Days with maximum temperature below 32 °F	**28 days** 25 - 32	**21 days** 14 - 27	**20 days** 15 - 26	**18 days** 11 - 26	**16 days** 9 - 24	**16 days** 8 - 24	**9 days** 2 - 19

N/A = Data Not Available for the selected are

Figure SS-9
Average Annual Precipitation Projections Graph – Pike County

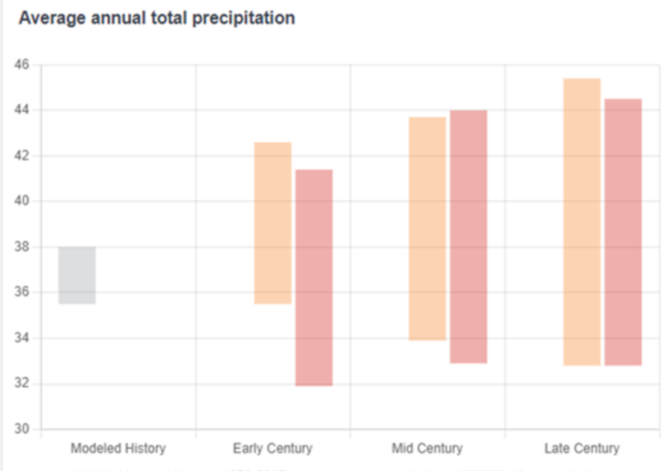
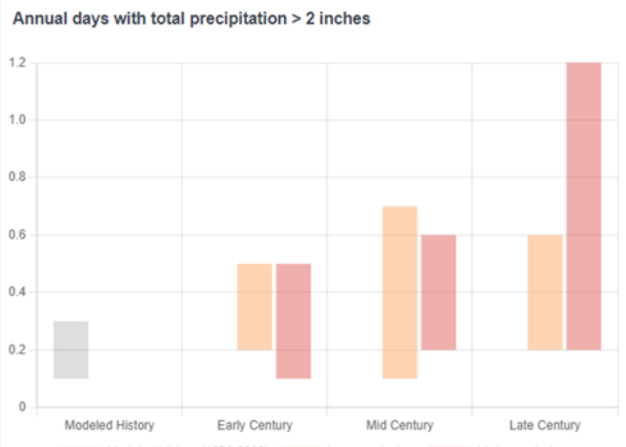


Figure SS-10
Number of Days with Total Precipitation > 2 Inches Graph – Pike County



Are the participating jurisdictions vulnerable to severe storms?

Yes. All of Pike County is vulnerable to the dangers presented by severe storms due to the topography of the region and its location in relation to the movement of weather fronts across north-central Illinois. Since 2013, Pike County has recorded 57 verified heavy rain events, 32 thunderstorms with damaging winds, 10 severe storms with hail one (1) inch in diameter or greater, and one lightning strike event with verified damages.

Figure SS-11 details the number thunderstorms with damaging winds and hail events that were recorded in or near each participating municipality while **Figure SS-12** details the number of thunderstorms with damaging winds and hail events that were recorded in or near unincorporated areas of Pike County. Two verified lightning strike events have occurred, one in Griggsville and one in Perry.

Figure SS-11
Verified Severe Storm Events by Participating Municipality

Participating Municipality	Number of Events	
	Thunderstorm & High Wind	Severe Hail
Barry	22	8
Baylis[1,4]	4	0
Griggsville	17	4
New Canton[a]	8	1
Pearl[4]	5	2
Pittsfield[3,4]	34	12

[1] Baylis FD
[2] Spring Creek FPD
[3] Illini Community Hospital
[4] Pikeland CUSD #10
[a] Sny Island LDD
[b] McGee Creek D&LD
[c] Valley City D&LD

Figure SS-12
Verified Severe Storm Events in Unincorporated Pike County

Unincorporated Area	Number of Events	
	Thunderstorm & High Wind	Severe Hail
Atlas[a]	2	1
Chambersburg	1	0
East Hannibal[a]	3	1
Fishhook	2	1
New Hartford	7	0
Martinsburg[4]	5	1
Rockport[a]	4	0
Summer Hill[4]	5	1

Of the participating municipalities, Pittsfield has had more recorded occurrences of thunderstorms with damaging winds and the greatest number of recorded hail events than any of the other municipalities. The difference in the number of recorded events is likely due to the relative size of the municipalities as well as the fact that there has been a long-term NWS COOP Observation Station is located in the Pittsfield area.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of severe storms?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to severe storms.

Pike County:

- ❖ All the County critical facilities are centrally located in Pittsfield, which could potentially be a problem if a severe storm impacts the City.
- ❖ Lightning strikes pose a threat to the County’s centrally-located communications and infrastructure.

Barry:

- Power outages associated with severe storms affect the City's drinking water treatment and wastewater treatment facilities impacting service to residents. The City's wells are 7 miles from the treatment facility and loss of power impacts service.

Baylis FD:

- Lightning strikes have affected communications, which impede emergency response to residents.

Fairmount Township:

- Heavy rain events can wash out Hill Country Road, causing adverse travel and delays in emergency response times.

Griggsville:

- Severe storms have the potential to cause power loss to key facilities and infrastructure, including the wastewater treatment plant and drinking water plant/wells.
- Lightning strikes have the potential to damage critical computer and electrical systems.

Pikeland CUSD #10:

- Heavy rain events can cause acute flooding events at Pittsfield High School due to overtopping of the drainage ditch adjacent to the school grounds that receives stormwater from the community. At times, the flood waters enter the school building and inundates sports facilities.

Pittsfield:

- Severe storms with high winds have the potential to down overhead power lines to critical facilities, impacting service to residents. The two assisted living facilities and the hospital are particularly vulnerable.
- Heavy rain events cause flooding and sewer backups on the south end of the City.

Spring Creek FPD:

- The outdoor warning siren has been struck by lightning causing significant damage and rendering the siren inoperable, which increases vulnerability for district residents.
- Heavy rain events cause several township roads within the district to be vulnerable to washouts, causing adverse travel and delays in emergency response times.
- Heavy rain floods the streets leaving the fire station.

What impacts resulted from the recorded severe storms?

Severe storms as a whole have caused an estimated $1.7 million in recorded property damages and $500,000 in crop damages. The following provides a breakdown of impacts by category.

Thunderstorms with Damaging Winds

Data obtained from NOAA's Storm Events Database indicates that between 1982 and 2022, 19 of the 135 thunderstorms with damaging winds caused $433,950 in property damages and $250,000 in crop damages. Damage information was either unavailable or none was recorded for the remaining 116 reported occurrences. No injuries or fatalities were reported associated with thunderstorm with damaging wind events.

Hail

Data obtained from NOAA's Storm Events Database indicates that between 1987 and 2022, four of the 50 hail events caused $285,250 in property damages and $250,250 in crop damage. Damage information was either unavailable or none was recorded for the remaining 46 events. No injuries or fatalities were reported as a result of any of the recorded hail events.

Lightning

Data obtained from NOAA's Storm Events Database indicates that one of the two lightning strike events caused $1 million in property damage. Damage information was unavailable for the other event. On October 1, 2014 lightning struck a historic church in Perry built in the 1880s sparking a fire that destroyed the building. One injury was reported as the result of the May 22, 1998 lighting strike event in Griggsville. Two fire fighters were injured when fighting a home fire caused by lightning.

Heavy Rain

Damage information was either unavailable or none was recorded for the 162 heavy rain events between 2000 and 2022. No injuries or fatalities were reported as a result of any of the heavy rain events.

Severe Storms Fast Facts – Impacts/Risk

Thunderstorms with Damaging Winds Impacts:
- Total Property Damage (19 events): ***$433,950***
- Total Crop Damage (1 event): ***$250,000***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Severe Hail Impacts:
- Total Property Damage (4 events): ***$285,250***
- Total Crop Damage (2 events): ***$250,250***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Lightning Strike Impacts:
- Total Property Damage (1 event): ***$1,000,000***
- Total Crop Damage: ***n/a***
- Injuries (1 event): ***2***
- Fatalities: ***n/a***

Heavy Rain Impacts:
- Total Property Damage: ***n/a***
- Total Crop Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Severe Storms Risk/Vulnerability:
- Public Health & Safety: ***Low***
- Buildings/Infrastructure/Critical Facilities: ***Medium***

What other impacts can result from severe storms?

In Pike County, the greatest risk to health and safety from severe storms is vehicle accidents. Hazardous driving conditions resulting from severe storms (i.e., wet pavement, poor visibility, high winds, etc.) can contribute to accidents that result in injuries and fatalities. Traffic accident data assembled by the Illinois Department of Transportation from 2014 through 2018 indicates that wet road surface conditions were present for 9.6% to 11.5% of all crashes recorded annually in the County.

While other circumstances cause wet road surface conditions (i.e., melting snow, condensation, light showers, etc.), law enforcement officials agree that hazardous driving conditions caused by severe storms add to the number of crashes. **Figure SS-13** provides a breakdown by year of the number of crashes and corresponding injuries and fatalities that occurred when wet road surface conditions were present.

Figure SS-13
Severe Weather Crash Data for Pike County

Year	Total # of Crashes	Presence of Wet Road Surface Conditions		
		# of Crashes	# of Injuries	# of Fatalities
2014	501	48	13	0
2015	503	53	14	1
2016	553	58	6	0
2017	469	52	15	0
2018	505	58	6	0
Total:	**2,531**	**269**	**54**	**1**

Source: Illinois Department of Transportation.

What is the level of risk/vulnerability to public health and safety from severe storms?

For Pike County the level of risk or vulnerability posed by severe storms to public health and safety is considered to be ***low***. This assessment is based on the fact that despite their relative frequency, the number of injuries and fatalities is low. In addition, Illini Community Hospital, as well as hospitals in Quincy (Adams County), Louisiana, Missouri (Pike County, MO), Hannibal, Missouri (Marion and Ralls Counties), Carrollton (Greene County), and Jacksonville (Morgan County) are equipped to provide care to persons injured during a severe storm.

Are existing buildings, infrastructure, and critical facilities vulnerable to severe storms?

Yes. All existing buildings, infrastructure and critical facilities located in Pike County and the participating jurisdictions are vulnerable to damage from severe storms. Structural damage to buildings is a relatively common occurrence with severe storms. Damage to roofs, siding, awnings, and windows can occur from hail, flying and falling debris and high winds. Lightning strikes can damage electrical components and equipment (i.e., appliances, computers etc.) and can cause fires that consume buildings. If the roof is compromised or windows are broken, rain can cause additional damage to the structure and contents of a building.

Infrastructure and critical facilities tend to be just as vulnerable to severe storm damage as buildings. The infrastructure and critical facilities that are the most vulnerable to severe storms are related to power distribution and communications. High winds, lightning and flying and falling debris have the potential to cause damage to communication and power lines; power substations; transformers and poles; and communication antennas and towers.

The damage inflicted by severe storms often leads to disruptions in communication and creates power outages. Depending on the damage, it can take anywhere from several hours to several days to restore service. Power outages and disruptions in communications can impair vital services, particularly when backup power generators are not available. Nine of the participating jurisdictions acknowledged the need for emergency backup generators to allow continued operation of critical facilities such as county/municipal buildings, drinking water facilities, wastewater treatment facilities including lift stations, warming/cooling centers, pump stations, emergency services (police and fire), and health services.

According to the Critical Facilities Survey completed by the participants, County has backup generators at the Ambulance Service, Health Department, Sheriff's Office/Jail, 911, and EOC. Pittsfield has backup generators at its drinking water and wastewater treatment facilities while New Canton has a backup generator at its drinking water facility. None of the participating municipalities have backup generators at their administrative buildings. Both Baylis FD and Spring Creek FPD have generators at their fire stations. Illini Community Hospital has a backup generator at the Hospital and Sny Island has generators at all of its pump stations. Neither of the townships or the CUSD have generators at any of their buildings.

In addition to affecting power distribution and communications, debris and flooding from severe storms can block state and local roads hampering travel. When transportation is disrupted, emergency and medical services are delayed, rescue efforts are hindered, and government services can be affected.

Based on the frequency with which severe storms occur in Pike County, the amount of property damage previously reported and the potential for disruptions to power distribution and communication; the risk or vulnerability to buildings, infrastructure and critical facilities from severe storms is ***medium***.

Are future buildings, infrastructure, and critical facilities vulnerable to severe storms?

Yes and No. While Griggsville and Pittsfield have building codes in place that will likely help lessen the vulnerability of new buildings and critical facilities to damage from severe storms, the County and the four remaining participating municipalities do not.

In addition, infrastructure such as new communication and power lines will continue to be vulnerable to severe storms as long as they are located above ground. High winds, lightning and flying and falling debris can disrupt power and communication. Steps to bury all new lines would eliminate the vulnerability, but this action would be cost prohibitive in most areas.

What are the potential dollar losses to vulnerable structures from severe storms?

Unlike other natural hazards, such as tornadoes, there are no standard loss estimation models or methodologies for severe storms. With only 24 of the 349 recorded events listing property damage numbers for all categories of severe storms, there is no way to accurately estimate future potential dollar losses. However, according to the Pike County Clerk's Office the total equalized assessed values of all residential, commercial, and industrial buildings in the planning area is $124,322,202. Since all the structures within Pike County are vulnerable to damage, it is likely this total represents the countywide property exposure to severe storm events.

3.2 FLOODS

HAZARD IDENTIFICATION

What is the definition of a flood?

The Federal Emergency Management Agency (FEMA) defines a "flood" as a general or temporary condition where two or more acres of normally dry land or two or more properties are inundated by:

- overflow of inland or tidal waters;
- unusual and rapid accumulation or runoff of surface waters from any source;
- mudflows; or
- a sudden collapse or subsidence of shoreline land.

The severity of a flooding event is determined by a combination of topography and physiography, ground cover, precipitation and weather patterns and recent soil moisture conditions. On average, flooding causes more than $5 billion in damages each year in the U.S. Floods cause utility damage and outages, infrastructure damage (both to transportation and communication systems), structural damage to buildings, crop loss, decreased land values and impede travel.

What types of flooding occur in the County?

There are two main types of flooding that affect Pike County: general flooding and flash flooding. General flooding can be broken down into two categories: riverine flooding and shallow flooding. The following provides a brief description of each type.

General Flooding – Riverine Flooding

Riverine flooding occurs when the water in a river or stream gradually rises and overflows its banks. This type of flooding affects low lying areas near rivers, streams, lakes and reservoirs and generally occurs when:

- persistent storm systems enter the area and remain for extended periods of time,
- winter and spring rains combine with melting snow to fill river basins with more water than the river or stream can handle,
- ice jams create natural dams which block normal water flow, and
- torrential rains from tropical systems make landfall.

General Flooding – Shallow Flooding

Shallow flooding occurs in flat areas where there are no clearly defined channels (i.e., rivers and streams) and water cannot easily drain away. There two main types of shallow flooding: sheet flow and ponding. If the surface runoff cannot find a channel, it may flow out over a large area at a somewhat uniform depth in what's called sheet flow. In other cases, the runoff may collect in depressions and low-lying areas where it cannot drain out, creating a ponding effect. Ponding floodwaters do not move or flow away, they remain in the temporary ponds until the water can infiltrate the soil, evaporate or are pumped out.

Flash Floods

Flash flooding occurs when there is a rapid rise of water along a stream or low-lying area. This type of flooding generally occurs within six hours of a significant rain event and is usually produced when heavy localized precipitation falls over an area in a short amount of time. Considered the most dangerous type of flood event, flash floods happen quickly with little or no warning. Typically, there is no time for the excess water to soak into the ground nor are the storm sewers able to handle the sheer volume of water. As a result, streams overflow their banks and low-lying (such as underpasses, basements etc.) areas can rapidly fill with water.

Flash floods are very strong and can tear out trees, destroy buildings and bridges and roll boulders the size of cars. Flash flood-producing rains can also weaken soil and trigger debris flows that damage homes, roads and property. A vehicle caught in swiftly moving water can be swept away in a matter of seconds. Twelve inches of water can float a car or small SUV and 18 inches of water can carry away large vehicles.

What is a base flood?

A base flood refers to any flood having a 1% chance of occurring in any given year. It is also known as the 100-year flood or the one percent annual chance flood. The base flood is the national standard used by the National Flood Insurance Program (NFIP) and the State of Illinois for the purposes of requiring the purchase of flood insurance and regulating new development.

Many individuals misinterpret the term "100-year flood". This term is used to describe the risk of future flooding; it does not mean that it will occur once every 100 years. Statistically speaking, a 100-year flood has a 1/100 (1%) chance of occurring in any given year. In reality, a 100-year flood could occur two times in the same year or two years in a row, especially if there are other contributing factors such as unusual changes in weather conditions, stream channelization or changes in land use (i.e., open space land developed for housing or paved parking lots). It is also possible not to have a 100-year flood event over the course of 100 years.

While the base flood is the standard most commonly used for floodplain management and regulatory purposes in the U.S., the 500-year flood is the national standard for protecting critical facilities, such as hospitals and power plants. A 500-year flood has a 1/500 (0.2%) chance of occurring in any given year.

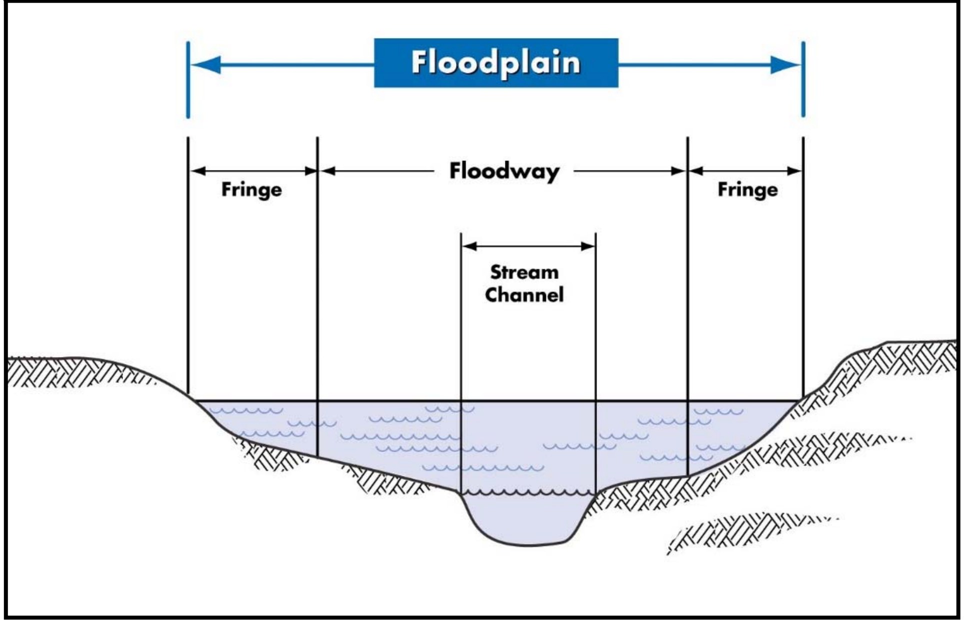
What is a floodplain?

The general definition of a floodplain is any land area susceptible to being inundated or flooded by water from any source (i.e., river, stream, lake, estuary, etc.). This general definition differs slightly from the regulatory definition of a floodplain.

A regulatory or base floodplain is defined as the land area that is covered by the floodwaters of the base flood. This land area is subject to a 1% chance of flooding in any given year. The base floodplain is also known as the 100-year floodplain or a Special Flood Hazard Area (SFHA). It is this second definition that is generally most familiar to people and the one that is used by the NFIP and the State of Illinois.

A base floodplain is divided into two parts: the floodway and the flood fringe. **Figure F-1** illustrates the various components of a base floodplain.

Figure F-1
Floodplain Illustration



Source: Illinois Department of Natural Resources, Quick Guide to Floodplain Management.

The floodway is the channel of a river or stream and the adjacent floodplain that is required to store and convey the base flood without increasing the water surface elevation. Typically, the floodway is the most hazardous portion of the floodplain because it carries the bulk of the base flood downstream and is usually the area where water is deepest and is moving the fastest. Floodplain regulations prohibit construction within the floodway that results in an increase in the floodwater's depth and velocity.

The flood fringe is the remaining area of the base floodplain, outside of the floodway, that is subject to shallow inundation and low velocity flows. In general, the flood fringe plays a relatively insignificant role in storing and discharging floodwaters. The flood fringe can be quite wide on large streams and quite small or nonexistent on small streams. Development within the flood fringe is typically allowed via permit if it will not significantly increase the floodwater's depth or velocity and the development is elevated above or otherwise protected to the base flood elevation.

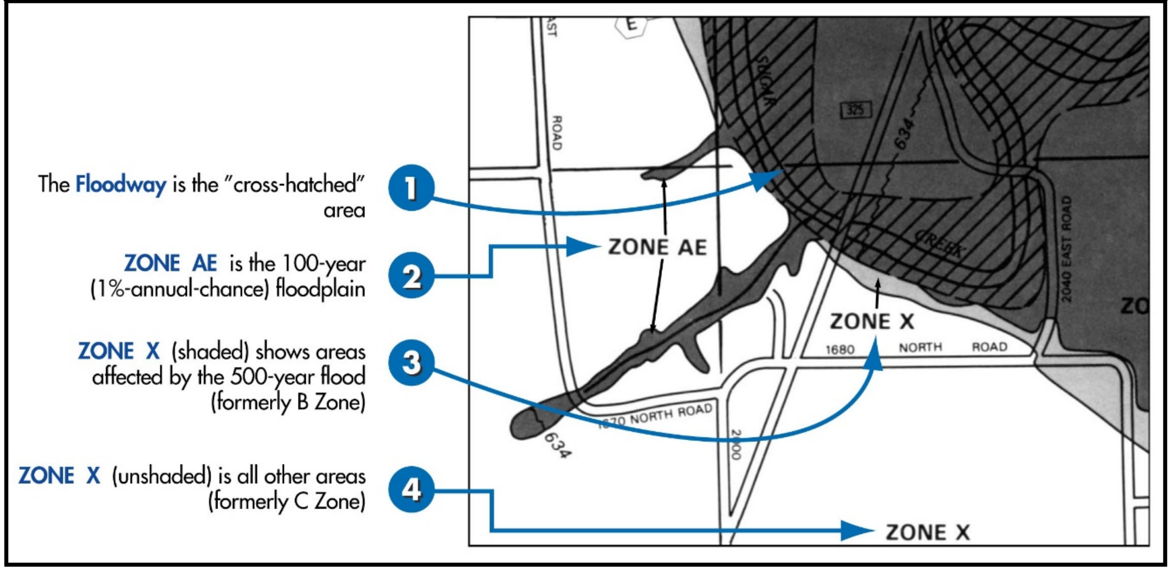
What is a Special Flood Hazard Area?

A Special Flood Hazard Area (SFHA) is the base floodplain. As discussed previously, this is the land area that is covered by the floodwaters of the base flood and has a 1% chance of flooding in any given year. The term SFHA is most commonly used when referring to the based floodplain on the Flood Insurance Rate Maps (FIRM) produced by FEMA. The SFHA is the area where floodplain regulations must be enforced by a community as a condition of participation in the NFIP and the area where mandatory flood insurance purchase requirements apply. SFHA are delineated on the FIRMs and may be designated as Zones A, AE, A1-30, AO, AH, AR, and A99 depending on the amount of flood data available, the severity of the flood hazard or the age of the flood map.

What are Flood Insurance Rate Maps?

Flood Insurance Rate Maps (FIRMs) are maps that identify both the SFHA and the risk premium zones applicable to a community. These maps are produced by FEMA in association with the NFIP for floodplain management and insurance purposes. Digital versions of these maps are referred to as DFIRMs. **Figure F-2** shows an example of a FIRM.

Figure F-2
Example of a Flood Insurance Rate Map (FIRM)



Source: Illinois Department of Natural Resources, Quick Guide to Floodplain Management.

A FIRM will generally show a community's base flood elevations, flood zones and floodplain boundaries. The information presented on a FIRM is based on historic, meteorological, hydrologic and hydraulic data as well as open-space conditions, flood-control projects and development. ***These maps only define flooding that occurs when a creek or river becomes overwhelmed. They do not define overland flooding that occurs when an area receives extraordinarily intense rainfall and storm sewers, and roadside ditches are unable to handle the surface runoff.***

What are flood zones?

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk and type of flooding. These zones are depicted on a community's FIRM. The following provides a brief description of each flood zone.

- **Zone A.** Zone A, also known as the Special Flood Hazard Area (SFHA) or base floodplain, is defined as the floodplain area that has a 1% chance of flooding in any given year. There are multiple Zone A designations, including Zones A, AO, AH, A1-30, AE, AR or A99. Land areas located within Zone A are considered high-risk flood areas.

During a 30-year period, the length of many mortgages, there is at least a 1 in 4 chance that flooding will occur in a SFHA. The purchase of flood insurance is mandatory for all buildings in SFHAs receiving federal or federally-related financial assistance.

- **Zone X (shaded).** Zone X (shaded), formerly known as Zone B, is defined as the floodplain area between the limits of the base flood (Zone A) and the 500-year flood. Land areas located within Zone X (shaded) are affected by the 500-year flood and are considered at a moderate risk for flooding.

  Zone X (shaded) is also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, shallow flooding areas with average depths of less than one foot or drainage areas less than one square mile. While flood insurance is not federally required in Zone X (shaded), it is recommended for all property owners and renters.
- **Zone X (unshaded).** Zone X (unshaded), formerly known as Zone C, is defined as all other land areas outside of Zone A and Zone X (shaded). Land areas located in Zone X (unshaded) are considered to have a low or minimal risk of flooding. While flood insurance is not federally required in Zone X (unshaded), it is recommended for all property owners and renters.

What is a Repetitive Loss Structure or Property?

FEMA defines a “repetitive loss structure” as a National Flood Insurance Program-insured structure that has received two or more flood insurance claim payments of more than $1,000 each within any 10-year period since 1978. These structures/properties account for approximately one-fourth of all National Flood Insurance Program (NFIP) insurance claim payments since 1978.

Currently, repetitive loss properties make up about 2% of all NFIP policies, and account for approximately $9 billion in claims or approximately 16% of the total claims paid over the history of the Program. These structures not only increase the NFIP’s annual losses, but they also drain funds needed to prepare for catastrophic events. As a result, FEMA and the NFIP are working with states and local governments to mitigate these properties.

What is floodplain management?

Floodplain management is the administration of an overall community program of corrective and preventative measures to reduce flood damage. These measures take a variety of forms and generally include zoning, subdivision or building requirements, special-purpose floodplain ordinances, flood control projects, education and planning. Where floodplain development is permitted, floodplain management provides a framework that minimizes the risk to life and property from floods by maintaining a floodplain’s natural function. Floodplain management is a key component of the National Flood Insurance Program.

What is the National Flood Insurance Program?

The National Flood Insurance Program (NFIP) is a federal program, administered by FEMA, that:

- mitigates future flood losses nationwide through community-enforced building and zoning ordinances; and

- provides access to affordable, federally-backed insurance protection against losses from flooding to property owners in participating communities.

It is designed to provide an insurance alternative to disaster assistance to meet escalating costs of repairing damage to buildings and their contents due to flooding. The U.S. Congress established the NFIP on August 1, 1968 with the passage of the National Flood Insurance Act of 1968. This Program has been broadened and modified several times over the years, most recently with the passage of the Flood Insurance Reform Act of 2004.

Prior to the creation of the NFIP, the national response to flood disasters was generally limited to constructing flood-control projects such as dams, levees, sea-walls, etc. and providing disaster relief to flood victims. While flood-control projects were able to initially reduce losses, their gains were offset by unwise and uncontrolled development practices within floodplains. In light of the continued increase in flood losses and the escalating costs of disaster relief to taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for protection.

Participation in the NFIP is voluntary and based on an agreement between local communities and the federal government. If a community agrees to adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in a SFHA (base floodplain), then the government will make flood insurance available within the community as a financial protection against flood losses.

If a community chooses not to participate in the NFIP or a participating community decides not to adopt new floodplain management regulations or amend its existing regulations to reference new flood hazard data provided by FEMA, then the following sanctions will apply.

- Property owners will not be able to purchase NFIP flood insurance policies and existing policies will not be renewed.
- Federal disaster assistance will not be provided to repair or reconstruct insurable buildings located in identified flood hazard areas for presidentially-declared disasters that occur as a result of flooding.
- Federal mortgage insurance and loan guarantees, such as those written by the Federal Housing Administration and the Department of Veteran Affairs, will not be provided for acquisition or construction purposes within an identified flood hazard area. Federally-insured or regulated lending institutions, such as banks and credit unions, are allowed to make conventional loans for insurable buildings in identified flood hazard areas of non-participating communities. However, the lender must notify applicants that the property is in an identified flood hazard area and that it is not eligible for federal disaster assistance.
- Federal grants or loans for development will not be available in identified flood hazard areas under programs administered by federal agencies such as the Environmental Protection Agency, Small Business Administration and the Department of Housing and Urban Development.

What is the NFIP's Community Rating System?

The NFIP's Community Rating System (CRS) is a voluntary program developed by FEMA to provide incentives (in the form of flood insurance premium discounts) for NFIP participating communities that have gone beyond the minimum NFIP floodplain management requirements to develop extra measures to provide protection from flooding. CRS discounts on flood insurance premiums range from 5% up to 45%. The discounts provide an incentive for communities to implement new flood protection activities that can help save lives and property when a flood occurs.

Are alerts issued for flooding?

Yes. The National Weather Service Weather Forecast Office in St. Louis, Missouri is responsible for issuing ***flood watches*** and ***warnings*** for Pike County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Flood Watches.** A flood watch is issued when flooding or flash flooding is possible. It does not mean that flooding will occur, just that conditions are favorable. Individuals need to be prepared.
- **Flood Advisories.** A flood advisory is issued when flooding may cause significant inconvenience but is not expected to be to pose an immediate threat to life and/or property. Individuals need to be aware.
- **Warnings.** Warnings indicate a serious threat to life and/or property.
    - **Flood Warning**. A flood warning is issued when flooding is occurring or will occur soon and is expected to last for several days or weeks.
    - **Flash Flood Warning.** A flash flood warning is issued when flash flooding is occurring or is imminent. Flash flooding occurs very quickly so individuals are advised to take action immediately.

HAZARD PROFILE

The following identifies past occurrences of floods; details the severity or extent of each event (if known); identifies the locations potentially affected; and estimates the likelihood of future occurrences.

When has flooding occurred previously? What is the extent of these previous floods?

Tables 5 and **6**, located in **Appendix I**, summarize the previous occurrences as well as the extent or magnitude of flood events recorded in Pike County. The flood events are separated into two categories: general floods (riverine and shallow/overland) and flash floods.

General Floods

NOAA's Storm Events Database, NWS's Advanced Hydrologic Prediction Service, the U.S. Army Corps of Engineers' river gauge data, and Iowa State University's National Weather Service Watch, Warning, and Advisories database were used to document 115 occurrences of general flooding in Pike County between 1965 and 2022. Included in the 115 general flood events are 17 events that contributed to 16 federally-declared disasters for Pike County.

Based on historical gauge data, the record setting Mississippi River flood at Hannibal, Missouri occurred on July 16, 1993 when the River crested at 31.80 feet. The second and third highest crests at this location occurred in 2019 and 2008 respectively. The record setting Illinois River flood at Valley City occurred on May 26, 1943 when the River crested at 27.00 feet. The second and third highest crests at this location occurred in 2019 and 2015 respectively.

Flash Floods

NOAA's Storm Events Database and Iowa State University's National Weather Service Watch, Warning, and Advisories database were used to document 45 reported occurrences of flash flooding in Pike County between 2002 and 2022. Included in the 45 flash flood events is one event that contributed to one federal disaster declaration in Pike County.

Flood Fast Facts – Occurrences

Number of General Floods Reported (1965 – 2022): ***115***

Number of Flash Floods Reported (2002 – 2022): ***45***

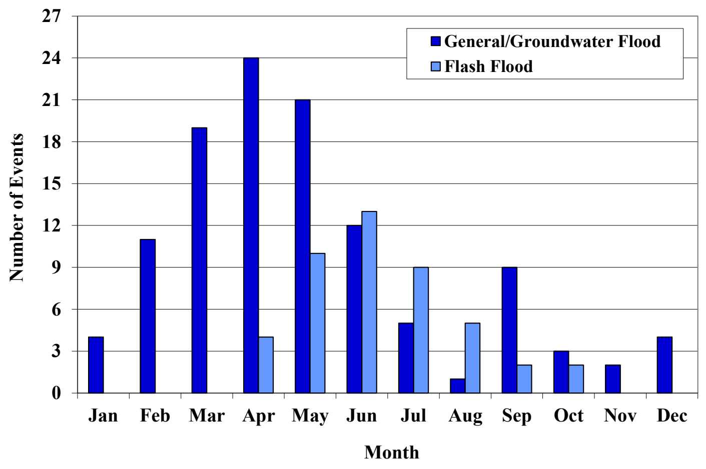
Most Likely Month for General Floods to Occur: ***April***

Most Likely Month for Flash Floods to Occur: ***June***

Number of Federal Disaster Declarations Related to General and Flash Flooding: ***17***

Figure F-3 charts the reported occurrences of flooding by month. Of the 115 general flood events, 64 (56%) began in began in March, April, and May making this the peak period for general flooding. Of those 64 events, 24 (38%) began during April making this the peak month for general flooding. There were 59 events that spanned two or more months; however, for illustration purposes only the month the event started in is graphed.

Figure F-3
Flood Events by Month



In comparison, 32 of the 45 flash flood events (71%) took place between May, June, and July making this the peak period for flash floods. Of the 32 events, 13 (41%) occurred in June making this the peak month for flash flooding.

Of the 45 flash flood occurrences, approximately 62% began during the p.m. hours. Of the 115 general flood occurrences, start times were only available for 22 of the events. Of these, 55% began during the p.m. hours.

What locations are affected by floods?

While specific locations are affected by general flooding, most areas of the County can be impacted by overland and flash flooding because of the topography and seasonally high water table of the area. In Pike County, approximately 24.1% of the area in County is designated as being within the base floodplain and susceptible to riverine floods. The *2018 Illinois Natural Hazard Mitigation Plan* classifies Pike County's hazard rating for floods as "high."

Figure F-4 identifies the floodplains in Pike County as well as the participating jurisdictions. This map is based on the Pike County DFRIMs that became effective June 2, 2011 and August 16, 2018. While a large portion of the area prone to riverine flooding is in unincorporated portions of the County, Florence, Nebo, New Canton and Pearl, and Valley City are also susceptible to riverine flooding because of their proximity to floodplains. **Appendix J** contains maps identifying the floodplains located in each of the participating municipalities.

Figure F-5 identifies the bodies of water within or immediately adjacent to participating jurisdictions that are known to cause flooding or have the potential to flood. Water bodies with Special Flood Hazard Areas located within a participating jurisdiction (as identified on the DFIRMs) are identified in bold.

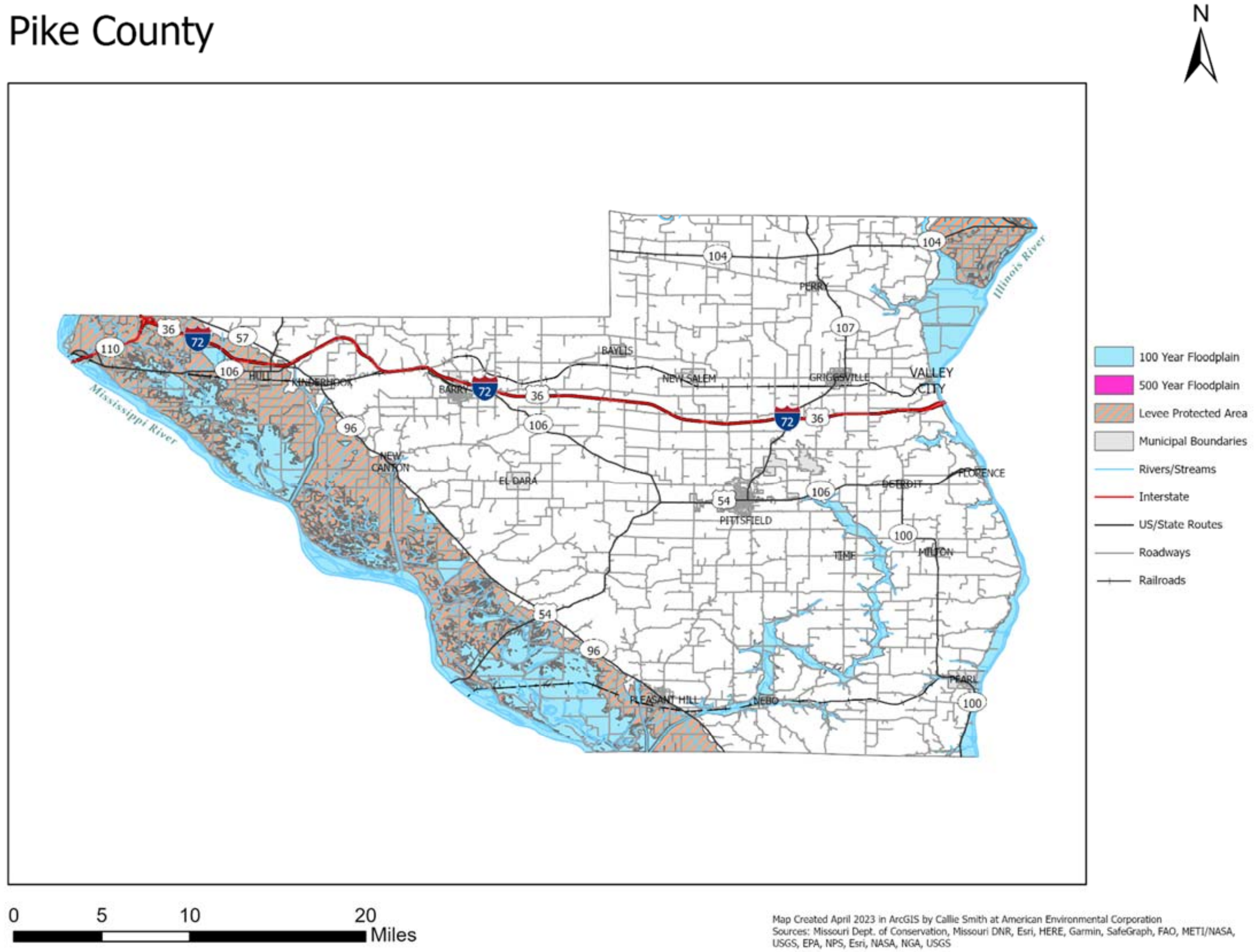
Figure F-5
Bodies of Water Subject to Flooding

Participating Jurisdiction	Water Bodies
Barry	---
Baylis	---
Griggsville	---
New Canton	**Kiser Creek**
Pearl	**Hill Creek, Illinois River**
Pittsfield	---
Unincorporated Pike County	Ambrosia Creek, **Bay Creek,** Bedford Creek, Beebe Creek, **Bettell Creek, Bird Slough, Blue Creek,** Boyd Ditch, Brewster Creek, Brower Creek, **Buck Branch,** Buckeye Creek, Buckhorn Creek, **Bull Run,** Crozier Creek, Dutch Creek, **Eagle Slough,** Fishhook Creek, **Flint Creek, Gibson Ditch, Hadley Creek, Hadley-McCranby Diversion Ditch, Hill Creek, Honey Creek,** Horton Creek, **Kiser Creek, Kiser Creek Diversion Ditch, Illinois River, Little Blue Creek, McGee Creek,** Moore Creek**, Needsmore Creek, Plum Point,** Rattlesnake Den Creek, **Running Slough, Six Mile Creek, South Fork McGee Creek, Spider Branch, Spring Branch, Spring Creek, The Sny,** Two Mile Creek, **Walnut Creek**

Source: FEMA's DFIRMs.

Municipal, Township and County officials have reported overland flood issues outside of the base floodplain in most of the participating municipalities and many unincorporated portions of the County. This overland flooding is known to impair travel.

Figure F-4
Floodplain Areas in Pike County



Map Created April 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

What jurisdictions within the County take part in the NFIP?

Participating Jurisdictions

Pike County, New Canton, and Pearl participate in the NFIP. **Figure F-6 *provides information on each NFIP-participating jurisdiction,*** including the date each participant joined, the date of their current effective FIRM and the year of their most recently adopted floodplain zoning ordinance. Barry, Baylis, Griggsville, and Pittsfield have no identified flood hazard boundaries within their corporate limits and do not wish to participate in the NFIP at this time.

Figure F-6
NFIP Participating Jurisdictions

Participating Jurisdictions	Participation (Date)	Current Effective FIRM (Date)	Floodplain Zoning/FIRM Adoption Ordinance (Year)	Adoption of Minimum NFIP Criteria (Yes/No)*	Local Floodplain Management Regulations Implemented & Enforced (Yes/No)	Position Responsible for Implementation of NFIP Commitments/ Requirements	CRS Participation
Pike County	01/03/1986	08/16/2018	2021	Yes	Yes	Zoning Administrator	No
New Canton	06/02/2011	06/02/2011	2011	Yes	Yes	Town Clerk	No
Pearl	09/16/1981	06/02/2011	2011	Yes	Yes	Village President	No

* In Pike County, all the NFIP-participating jurisdictions have adopted the State of Illinois model floodplain ordinance. This ordinance goes above and beyond NFIP minimum standards and has much more restrictive floodway regulations. As a result, all of the NFIP-participating jurisdictions are in compliance with NFIP requirements.

Discussions with the individuals responsible for implementation of the NFIP commitments and requirements within their jurisdiction and a review of the participating jurisdictions floodplain ordinances indicates that each monitor flood events and, when applicable, conduct substantial damage determinations for structures within the floodplain using FEMA's Substantial Damage Estimator Tool. For structures that meet the definition of substantial damage (total cost of repairs is 50% or more of the structure's market value before the disaster occurred, regardless of the cause of damage), the owners are notified, and the structure must be brought back into compliance with local floodplain management regulations.

Participating jurisdictions will continue to comply with the NFIP by implementing mitigation projects and activities that enforce this ordinance to reduce future flood risks to new construction within the SFHA. At this time no new construction is planned within the base floodplain. Continued compliance with NFIP requirements is addressed in the Mitigation Action Tables of the participating jurisdictions found in Section 4.7.

Non-Participating Jurisdictions

Figure F-7 provides information on those incorporated municipalities within the County that chose not to participate in the planning process but take part in the NFIP. Florence, Hull, Nebo, Pleasant Hill, and Valley City participate in the NFIP.

Figure F-7
Non-Participating Jurisdiction NFIP Status

Participating Jurisdictions	Participation Date	Current Effective FIRM Date	CRS Participation	Most Recently Adopted Floodplain Zoning Ordinance
Florence	02/18/1981	06/02/2011	No	2011
Hull	06/11/1976	06/02/2011	No	2011
Nebo	08/01/1984	06/02/2011	No	2011
Pleasant Hill	10/15/1985	06/02/2011	No	2011
Valley City	02/18/1981	06/02/2011	No	2011

Sources: FEMA, Community Status Book Report: Illinois.

What is the probability of future flood events occurring based on historical data?

General Floods

Pike County has had 115 verified occurrences of general flooding between 1965 and 2022. With 115 occurrences over the past 58 years, Pike County should expect approximately two general flood events in any given year. There were 36 years over the past 58 years where two or more general flood events occurred. This indicates that the probability or likelihood that more than one general flood event may occur during any given year within the County is 62%.

Flash Floods

There have been 45 verified flash flood events between 2002 and 2022. With 45 occurrences over the past 21 years, the County should expect at least two flash flood events in any given year. There were 11 years over the past 21 years where two or more flash flood events occurred. This indicates that the probability that more than one flash flood event may occur during any given year within the County is approximately 52%.

What is the probability of future flood events occurring based on modeled future conditions?

In the last 120 years, total annual precipitation in Illinois has increased by between 12% to 15% across the State. This means, according to the Illinois State Climatologist, that we get about an additional 5 inches of yearly rainfall compared to what was expected historically.

This trend is likely to continue, and as a result, precipitation in Illinois is forecasted to increase in coming decades. In addition to changes in the overall amount of precipitation, changes in precipitation patterns indicate that future events will likely be less frequent, but larger and more severe. The Illinois State Climatologist indicates that since the beginning of the 20th Century, Illinois has seen a 40% increase in the number of days with extreme precipitation events (rainfall of 2 inches or greater) per year.

One result of more precipitation overall and an increase in heavy rain events is an increased risk of flooding. In particular, extreme precipitation events are likely to lead to flash floods along rivers and in urban areas, where impermeable surfaces such as buildings, roads, and sidewalks will make drainage systems more likely to be overwhelmed. Rural areas will face different challenges, most notably those close to rivers and in low-lying areas with little or no drainage capability.

Figures SS-8 and **SS-9**, located in Section 3.1, provide tabular and graphical projections for Pike County, showing estimations for average annual precipitation in the early, mid, and late 21st century with both low and high estimates for each time period. Most likely, the true value will fall between these two estimates. By midcentury, the average annual precipitation in Pike County is projected to increase by an inch per year, while the average number of days with precipitation per year is projected to decrease by 3 to 4 days according to the Climate Mapping for Resilience and Adaptation's Assessment Tool.
The Climate Explorer indicates that in Pike County the annual counts of intense rainstorms (rainfall of 2 inches or greater in once day) are not projected to increase. This is based on the findings of the 2018 National Climate Assessment and compares projections for the middle third of the century (2035-2064) with average conditions observed from 1961-1990.

Taken together, the projected increase in annual rainfall, the decrease in frequency of rain events, and the negligible threat of intense rain events in Pike County means that the likelihood of flooding may be slightly higher than it is today.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure and critical facilities from floods.

Several factors including topography, precipitation and an abundance of rivers and streams make Illinois especially vulnerable to flooding. According to the Illinois State Water Survey's Climate Atlas of Illinois, since the 1940s Illinois climate records have shown an increase in heavy precipitation, which has led to increased flood peaks on Illinois rivers.

Are the participating jurisdictions vulnerable to flooding?

Yes. Pike County and the participating jurisdictions are vulnerable to the dangers presented by flooding. Precipitation levels, a seasonal high water table, and topography that includes the Mississippi River, the Illinois River, and their associated watersheds are all factors that cumulatively make virtually the entire County susceptible to some form of flooding. Flooding occurs along the floodplains of all the rivers, streams and creeks within the County as well as outside of the floodplains in low-lying areas where drainage problems occur. Since 2013, Pike County has experienced 22 flash flood events and 29 general flood events.

All of the general flood and flash flood events have impacted either a large portion or the entire County and were not location specific.

Vulnerability to flooding can change depending on several factors, including land use. As land used primarily for agricultural and open space purposes is converted for residential and commercial/industrial uses, the number of buildings and impervious surfaces (i.e., parking lots, roads, sidewalks, etc.) increases. As the number of buildings and impervious surfaces increases, so too does the potential for flash flooding. Rather than infiltrating the ground slowly, rain and snowmelt that falls on impervious surfaces runs off and fills ditches and storm drains quickly creating drainage problems and flooding.

As described in Section 1.3 Land Use and Development Trends, substantial changes in land use (from forested, open and agricultural land to residential, commercial and industrial) are not anticipated within the County in the immediate future. No substantial increases in residential or commercial/industrial developments are expected within the next five years.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of flooding?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to flooding.

Illini Community Hospital:

- River flooding impacts travel and prevents employees from getting to work.

New Canton:

- The Town's wastewater treatment plant is located in the floodplain and is vulnerable to flooding.
- The Town's drinking water wells are located in the levee-protected flood zone and potentially vulnerable to contamination from flooding.

Pearl:

- Portions of the Village are located in the Illinois River floodplain, and the Village has no permanent means of pumping floodwaters out of the Village.
- Illinois Route 100 runs through the Village and is inundated during major flood events and can be closed for months.

Pikeland CUSD #10:

- The school district covers 326 square miles, some in lowland areas. Flooding can close roads and impact the District's ability to transport students safely.
- Heavy rain events can cause acute flooding events at Pittsfield High School due to overtopping of the drainage ditch adjacent to the school grounds that receives stormwater from the community. At times, the flood waters enter the school building and inundates sports facilities.

Pittsfield:

- The City's drinking water supply is located in a low area making it potentially vulnerable to flooding.
- Flooding caused by heavy rain events can cause sewer backups on the south end of the City.

Pittsfield Township:

- Flooding has the potential to impact township roads, causing washouts and adverse travel.

Sny Island LDD:

- Heavy rain events have the potential to flood township roads within the District and potentially lead to a levee breach.

Spring Creek FPD:

- Flooding has the potential to impact the streets around the firehouse.
- Heavy rain events cause several township roads within the district to be vulnerable to washouts, causing adverse travel and delays in emergency response times.

What impacts resulted from the recorded floods?

Floods as a whole have caused a *minimum* of $5.8 million in property damages and $18 million in crop damages. The following provides a breakdown by category. In comparison, the State of Illinois has averaged an estimated $257 million annually in property damage losses, making flooding the single most financially damaging natural hazard in Illinois.

General Floods

Data obtained from NOAA's Storm Events Database and FEMA Public Assistance figures provided by IEMA indicates that between 1965 and 2022, six of the 115 general flood events caused $5,835,172 in property damages and $18,070,000 in crop damages. Damage information was either unavailable or none was recorded for the remaining 109 reported occurrences. No injuries or fatalities were reported as a result of any of the recorded events.

Flash Floods

Data obtained from NOAA's Storm Events Database indicates that between 2002 and 2022, one of the 45 flash flood events caused $20,000 in property damages. Damage information was either unavailable or none was recorded for the remaining 44 reported occurrences. One injury and two fatalities were reported as a result of three separate flash flood events. The following provides a brief description of each event.

Flood Fast Facts – Impacts/Risk

General Flood Impacts:
- Total Property Damage (x events): ***$5,835,172***
- Total Crop Damage (x events): ***$18,070,000***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Flash Flood Impacts:
- Total Property Damage(2 events): ***$20,000***
- Total Crop Damage: ***n/a***
- Injuries: ***1***
- Fatalities: ***2***

Flood Risk/Vulnerability to:
- Public Health & Safety – General Flooding: ***Low***
- Public Health & Safety – Flash Flooding: ***Medium***
- Buildings/Infrastructure/Critical Facilities: ***Medium/High***

- On June 3, 2008, a flash flood in the northern portion of the County caused a local road to collapse beneath a moving vehicle. The driver injured both feet, one was broken and the other badly sprained.
- A flash flood in the northern portion of the County caused a large sink hole to form in County Road 2 on July 19, 2015. In the darkness, a driver did not see the hole. His vehicle plunged into the hole, and he died at the scene.
- On May 24, 2020, a flash flood of Hadley Creek overflowed the crossing on 275th Street 2 miles northwest of Barry. A car was driven into the crossing and stalled out. A passenger was swept downstream and drowned.

What other impacts can result from flooding?

One of the primary threats from flooding is drowning. Nearly half of all flash flood fatalities occur in vehicles as they are swept downstream. Most of these fatalities take place when people drive into flooded roadway dips and low drainage areas. It only takes two feet of water to carry away most vehicles.

Floodwaters also pose biological and chemical risks to public health. Flooding can force untreated sewage to mix with floodwaters. The polluted floodwaters then transport the biological contaminants into buildings and basements and onto streets and public areas. If left untreated, the floodwaters can serve as breeding grounds for bacteria and other disease-causing agents. Even if floodwaters are not contaminated with biological material, basements and buildings that are not properly cleaned can grow mold and mildew, which can pose a health hazard, especially for small children, the elderly and those with specific allergies.

Flooding can also cause chemical contaminants such as gasoline and oil to enter the floodwaters if underground storage tanks or pipelines crack and begin leaking during a flood event. Depending on the time of year, floodwaters also may carry away agricultural chemicals that have been applied to farm fields.

Structural damage, such as cracks forming in a foundation, can also result from flooding. In most cases, however, the structural damage sustained during a flood occurs to the flooring, drywall and wood framing. In addition to structural damage, a flood can also cause serious damage to a building's content.

Infrastructure and critical facilities are also vulnerable to flooding. Roadways, culverts and bridges can be weakened by floodwaters and have been known to collapse under the weight of a vehicle. Buried power and communication lines are also vulnerable to flooding. Water can infiltrate lines and cause disruptions in power and communication.

What is the level of vulnerability to public health and safety from floods?

While both general and flash floods occur on a regular basis within the County, the number of injuries and fatalities is low. In terms of the risk or vulnerability to public health and safety from *general floods*, the risk is seen as ***low***. Since there is very little warning associated with flash flooding the risk to public health and safety from *flash floods* is elevated to ***medium***.

Are there any repetitive loss structures/properties within Pike County?

Yes. According to information obtained from IEMA, there are two repetitive loss structures located Florence, two in Hull, two in Valley City, and 20 in unincorporated Pike County. One record was returned for Bloomfield in Scott County which is not in Pike County. As described previously, FEMA defines a "repetitive loss structure" as an NFIP-insured structure that has received two or more flood insurance claim payments of more than $1,000 each within any 10-year period since 1978.

Figure F-8 identifies the repetitive flood loss structures by jurisdiction and provides the total flood insurance claim payments. The exact location and/or address of the insured structures are not included in this Plan to protect the owners' privacy. According to IEMA, there have been 107 flood insurance claim payments totaling $1,900,469.93 for the 26 repetitive flood loss structures.

Figure F-8
Repetitive Flood Loss Structures

Jurisdiction	Structure Type	Number of Structures	Number of Claim Payments	Flood Insurance Claim Payments		Total Flood Insurance Claim Payments
				Structure	Content	
Florence	Single Family/ Business	2	11	$155,525.32	$11,968.13	$167,493.45
Hull	Single Family/ Other Non-residence	2	4	$307,540.09	$9,493.28	$317,033.37
Valley City	Single Family/ Other Non-residence	2	5	$85,368.86	$0.00	$85,368.86
Unincorp. Pike County	Single Family/ Other Non-residence	20	87	$1,167,901.68	$162,672.57	$1,330,574.25
Total:		**26**	**107**	**$1,716,335.95**	**$184,133.98**	**$1,900,469.93**

Source: Illinois Emergency Management Agency

Are existing buildings, infrastructure and critical facilities vulnerable to flooding?

Yes. **Figure F-9** identifies the *estimated number* of existing structures by participating jurisdiction located within a base floodplain. These counts were prepared by the Consultant using FEMA's National Flood Hazard Layer and building footprints prepared by the Illinois State Water Survey. **Figure F-10** identifies the *estimated number* of existing structures by township located within the base floodplain. It should be noted that while the identified structures are located in a floodplain, the actual number impacted may differ during a real flood event.

Figure F-9
Existing Buildings, Infrastructure and Critical Facilities Located in a Base Floodplain by Participating Jurisdiction

Participating Jurisdiction	Residential			Residential Garages	Businesses (Commercial/ Industrial)	Miscellaneous (Barns, Sheds, Silos)	Infrastructure/ Critical Facilities
	Houses	Duplexes	Apartment Complexes				
Barry	---	---	---	---	---	---	---
Baylis[1,4]	---	---	---	---	---	---	---
Griggsville	---	---	---	---	---	---	---
New Canton[a]	---	---	---	---	---	---	---
Pearl[4]	6	---	---	2	2	4	---
Pittsfield[3,4]	---	---	---	---	---	---	---
Unincorp. Pike County[1,2,4,a,b,c]	140	---	---	21	15	187	6

[1] Baylis FD
[2] Spring Creek FPD
[3] Illini Community Hospital
[4] Pikeland CUSD #10
[a] Sny Island LDD
[b] McGee Creek D&LD
[c] Valley City D&LD

Aside from key roads, bridges, electrical substations, and buried power and communication lines, the following provides a description those jurisdictions that have specific infrastructure/critical facilities located within a floodplain.

- *Sny Island LDD*: Three levee pump stations are located in the base floodplain of the Mississippi River in Flint and Cincinnati Townships. While not located in a base floodplain, the LDD

Administrative Office is located in the levee protected flood zone of the Mississippi River in New Canton.

Figure F-10
Existing Buildings, Infrastructure and Critical Facilities Located in a Floodplain by Township

Participating Jurisdiction	Residential			Residential Garages	Businesses (Commercial/ Industrial)	Miscellaneous (Barns, Sheds, Silos)	Infrastructure/ Critical Facilities
	Houses	Duplexes	Apartment Complexes				
Atlas [a,4]	16	---	---	1	5	18	---
Barry	---	---	---	---	---	---	---
Chambersburg [b,c]	5	---	---	2	---	14	---
Cincinnati [a]	43	---	---	1	---	23	2
Derry	---	---	---	---	---	---	---
Detroit [4]	7	---	---	---	5	---	---
Fairmount [1,4]	---	---	---	---	---	---	---
Flint [c]	1	---	---	---	---	3	1
Griggsville [4]	---	---	---	---	---	---	---
Hadley [1,4]	---	---	---	---	---	---	---
Hardin [4]	7	---	---	4	1	16	---
Kinderhook [a]	---	---	---	---	---	3	---
Levee [a]	1	---	---	2	---	5	---
Martinsburg [4]	---	---	---	---	---	---	---
Montezuma [4]	10	---	---	---	1	6	---
Newburg [4]	1	---	---	---	---	3	---
New Salem [1,4]	---	---	---	---	---	---	---
Pearl [4]	16	---	---	4	---	23	3
Perry	---	---	---	---	---	---	---
Pittsfield [3,4]	---	---	---	---	---	---	---
Pleasant Hill [a,4]	---	---	---	---	---	---	---
Pleasant Vale [a]	---	---	---	---	---	---	---
Ross [a]	25	---	---	3	1	61	---
Spring Creek [2,4]	7	---	---	4	4	23	---

[1] Baylis FD
[2] Spring Creek FPD
[3] Illini Community Hospital
[4] Pikeland CUSD #10
[a] Sny Island LDD
[b] McGee Creek D&LD
[c] Valley City D&LD

While 24.1% of the land area in Pike County lies within the base floodplain and is susceptible to riverine flooding, ***almost the entire County is vulnerable to flash flooding***. As a result, ***a majority of the buildings, infrastructure and critical facilities that may be impacted by flooding are located outside of the base floodplain and are not easily identifiable.***

The risk or vulnerability of existing buildings, infrastructure and critical facilities to all forms of flooding is considered to be ***medium to high*** based on: (a) the frequency and severity of recorded flood events within the County; (b) the County's proximity to the Mississippi River and Illinois River; (c) the fact that most of the County is vulnerable to flash flooding; and (d) a majority of the buildings, infrastructure and critical facilities that may be impacted are located outside of the base floodplain.

Are future buildings, infrastructure and critical facilities vulnerable to flooding?

The answer to this question depends on the type of flooding being discussed.

Riverine Flooding

In terms of riverine flooding, the vulnerability of future buildings, infrastructure and critical facilities located within NFIP-participating jurisdictions is low as long as the existing floodplain ordinances are enforced. Enforcement of the floodplain ordinance is the mechanism that ensures that new structures either are not built in flood-prone areas or are elevated or protected to the base flood elevation.

Flash Flooding

In terms of flash flooding, all future buildings, infrastructure and critical facilities are still vulnerable depending on the amount of precipitation that is received, the topography and any land use changes undertaken within the participating jurisdictions.

What are the potential dollar losses to vulnerable structures from flooding?

An estimate of the potential dollar losses to vulnerable *residential structures* located within the *participating municipalities and the townships within the County* can be calculated if several assumptions are made. These assumptions represent a probable scenario based on the reported occurrences of flooding in Pike County.

The purpose of providing an estimate is to help residents and local officials make informed decisions about how they can better protect themselves and their communities. These estimates are meant to provide a ***general idea*** of the magnitude of the potential damage that could occur from a flood event in each of the participating municipalities.

Assumptions

To calculate the overall potential dollar losses to vulnerable residential structures from a flood, a set of decisions/assumptions must be made regarding:

- type of flood event;
- scope of the flood event;
- number of potentially-damaged housing units;
- value of the potentially-damaged housing units; and
- percent damage sustained by the potentially-damaged housing units (i.e., damage scenario.)

The following provides a detailed discussion of each decision/assumption.

Type of Flood Event. The first step towards calculating the potential dollar losses to vulnerable residential structures is to determine the type of flood event that will be used for this scenario. While the County has experienced all forms of flooding, riverine floods have occurred with greater regularity in the County. In addition, identifying residential structures vulnerable to flash flooding is problematic because most are located outside of the base floodplain and the number of structures impacted can change with each

Assumption #1

A riverine flood event will impact vulnerable residential structures.

event depending on the amount of precipitation received, the topography and the land use of the area.

Therefore, a riverine flood event will be used since it is (a) relatively easy to identify vulnerable residential structures within each municipality (i.e., those structures located within the base floodplain or Special Flood Hazard Areas of any river, stream or creek); and (b) the number of structures impacted is generally the same from event to event.

Assumption #2

All base floodplains will flood and experience the same degree of flooding.

Scope of the Flood Event. To establish the number of vulnerable residential structures (potentially-damaged housing units), the scope of the riverine flood event must first be determined. In this scenario, the scope refers to the number of rivers, streams and creeks that overflow their banks and the degree of flooding experienced along base floodplains for each river, stream and creek.

Generally speaking, a riverine flood event only affects one or two rivers or streams at a time depending on the cause of the event (i.e., precipitation, snow melt, ice jam, etc.) and usually does not produce the same degree of flooding along the entire length of the river, stream or creek. However, for this scenario, it was decided that:

- all rivers, streams and creeks with base floodplains would overflow their banks, and
- the base floodplains of each river, stream and/or creek located within the corporate limits of each municipality would experience the same degree of flooding.

This assumption results in the following conditions for each municipality:

- Barry, Baylis, Griggsville, and Pittsfield would not experience any residential flooding since there are no river, stream or creek base floodplains located within their municipal limits;
- New Canton: Kiser Creek would overflow its banks and flood the eastern edge of the Village; and
- Pearl: Hill Creek and the Illinois River would overflow their banks and flood portions of the Village.

Assumption #3

The number of existing residential structures located within the base floodplain(s) will be used to determine the number of potentially-damaged housing units.

Number of Potentially-Damaged Housing Units. Since this scenario assumes that all the base floodplains will experience the same degree of flooding, the number of existing residential structures located within the base floodplain(s) can be used to determine the number of potentially-damaged housing units. **Figures F-9** and **F-10** identifies the total number of existing residential structures located within the base floodplains(s) of each participating jurisdiction. These counts were prepared by the Consultant.

While base floodplains are present within New Canton, there are no residential structures located within their limits.

Assumption #4

The average market value for a residential structure will be used to determine the value of potentially-damaged housing units.

Value of Potentially-Damaged Housing Units. Now that the number of potentially-damaged housing units has been determined, the monetary value of the units must be calculated. Typically, when damage estimates are prepared after a natural disaster such as a flood, they are based on the market value of the structure. Since it would be impractical to determine the individual market value of each potentially-damaged housing unit, the average market value for a residential structure will be used.

To determine the average market value, the average assessed value must first be calculated. The average assessed value is determined by taking the total assessed value of residential buildings within a jurisdiction and dividing that number by the total number of housing units within the jurisdiction. The average market value is then determined by taking the averaged assessed value and multiplying that number by three (the assessed value of a structure in Pike County is approximately one-third of the market value). **Figure F-11** provides a sample calculation. The total assessed value is based on 2020 tax assessment information provided by the Pike County Clerk's Office. **Figures F-12** and **Figure F-13** provide the average assessed value and average market value for each participating municipality and the townships.

Figure F-11
Sample Calculation of Average Assessed Value & Average Market Value – Pearl

Average Assessed Value

Total Assessed Value of Residential Buildings in the Jurisdiction÷ Total Housing Units in the Jurisdiction = Average Assessed Value

Pearl: $442,760 ÷ 62 housing units = $7,141.29

Average Market Value

Average Assessed Value x 3 = Average Market Value (Rounded to the Nearest Dollar)

Pearl: $7,141.29 x 3 = $21,424

Figure F-12
Average Market Value of Housing Units by Participating Municipality

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2020)	Total Housing Units (2016-2020)	Average Assessed Values	Average Market Value (2020)
Barry	$8,470,772	718	$11,798	$35,394
Baylis[1,4]	$570,372	94	$6,068	$18,204
Griggsville	$6,494,308	637	$10,195	$30,585
New Canton [a]	$1,342,197	157	$8,549	$25,647
Pearl[4]	$442,760	62	$7,141	$21,423
Pittsfield[3,4]	$36,680,326	2,006	$18,285	$54,855

[1]Baylis FD [2]Spring Creek FPD [3]Illini Community Hospital [4]Pikeland CUSD #10
[a]Sny Island LDD [b]McGee Creek D&LD [c]Valley City D&LD

Source: Pike County Clerk's Office.

Figure F-13
Average Market Value of Housing Units by Township

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2020)	Total Housing Units (2016-2020)	Average Assessed Values	Average Market Value (2020)
Atlas [a,4]	$2,298,796	307	$7,488	$22,464
Barry	$9,718,795	825	$11,780	$35,341
Chambersburg [b,c]	$368,592	56	$6,582	$19,746
Cincinnati [a]	$227,920	63	$3,618	$10,853
Derry	$511,122	157	$3,256	$9,767
Detroit [4]	$1,340,408	121	$11,078	$33,233
Fairmount [1,4]	$517,364	182	$2,843	$8,528
Flint [c]	$159,293	55	$2,896	$8,689
Griggsville [4]	$7,285,916	727	$10,022	$30,066
Hadley [1,4]	$475,874	61	$7,801	$23,404
Hardin [4]	$553,368	45	$12,297	$36,891
Kinderhook [a]	$3,921,887	400	$9,805	$29,414
Levee [a]	$162,518	38	$4,277	$12,830
Martinsburg [4]	$1,427,059	220	$6,487	$19,460
Montezuma [4]	$2,188,091	244	$8,968	$26,903
Newburg [4]	$8,333,544	398	$20,939	$62,816
New Salem [1,4]	$1,597,606	335	$4,769	$14,307
Pearl [4]	$701,172	177	$3,961	$11,884
Perry	$2,137,339	294	$7,270	$21,810
Pittsfield [3,4]	$32,797,274	2,001	$16,390	$49,171
Pleasant Hill [a,4]	$6,110,319	647	$9,444	$28,332
Pleasant Vale [a]	$2,108,903	268	$7,869	$23,607
Ross [a]	$233,306	66	$3,535	$10,605
Spring Creek [2,4]	$1,323,413	312	$4,242	$12,725
Townships - 6 most populated	$68,167,735	4,998	$13,639	$40,917
Townships - 18 least populated	$18,332,144	3,001	$6,109	$18,326

[1] Baylis FD [2] Spring Creek FPD [3] Illini Community Hospital [4] Pikeland CUSD #10

[a] Sny Island LDD [b] McGee Creek D&LD [c] Valley City D&LD

Source: Pike County Clerk's Office.

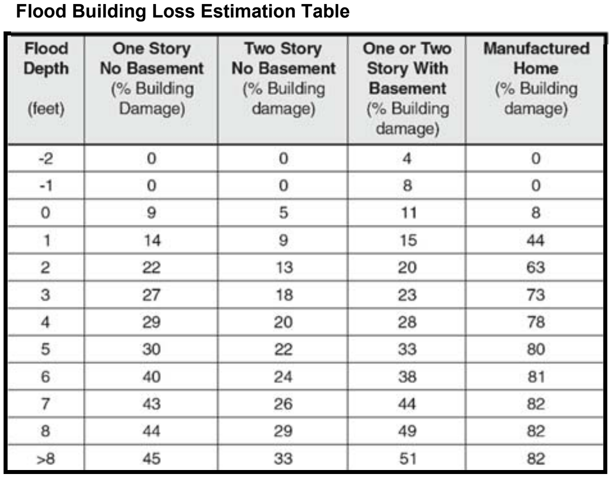
Damage Scenario. The final decision that must be made to calculate potential dollar losses is to determine the percent damage sustained by the structure and the structure's contents during the flood event. In order to determine the percent damage using FEMA's flood loss estimation tables, assumptions must be made regarding (a) the type of residential structure flooded (i.e., manufactured home, one story home without a basement, one- or two-story home with a basement, etc.) and (b) the flood depth. **Figure F-14**

Assumption #5

The potentially-damaged housing units are one or two-story homes with basements and the flood depth is two feet.
Structural Damage = 20%
Content Damage = 30%

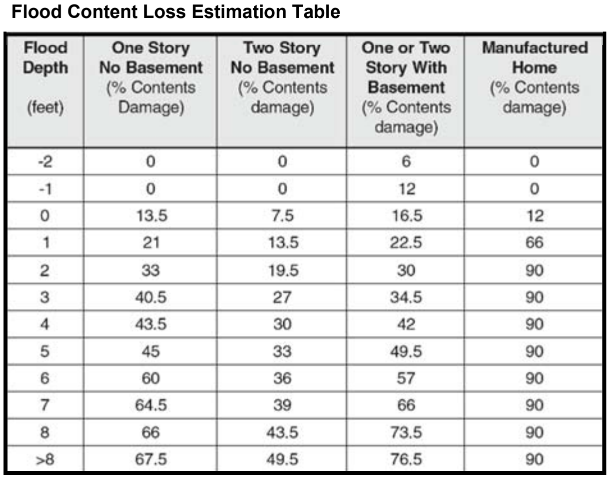
calculates the percent loss to a structure and its contents for different scenarios based on flood depth and structure type.

Figure F-14
FEMA Flood Loss Estimation Tables



Flood Building Loss Estimation Table

Flood Depth (feet)	One Story No Basement (% Building Damage)	Two Story No Basement (% Building damage)	One or Two Story With Basement (% Building damage)	Manufactured Home (% Building damage)
-2	0	0	4	0
-1	0	0	8	0
0	9	5	11	8
1	14	9	15	44
2	22	13	20	63
3	27	18	23	73
4	29	20	28	78
5	30	22	33	80
6	40	24	38	81
7	43	26	44	82
8	44	29	49	82
>8	45	33	51	82



Flood Content Loss Estimation Table

Flood Depth (feet)	One Story No Basement (% Contents Damage)	Two Story No Basement (% Contents damage)	One or Two Story With Basement (% Contents damage)	Manufactured Home (% Contents damage)
-2	0	0	6	0
-1	0	0	12	0
0	13.5	7.5	16.5	12
1	21	13.5	22.5	66
2	33	19.5	30	90
3	40.5	27	34.5	90
4	43.5	30	42	90
5	45	33	49.5	90
6	60	36	57	90
7	64.5	39	66	90
8	66	43.5	73.5	90
>8	67.5	49.5	76.5	90

Source: FEMA, Understanding Your Risks: Identifying Hazards and Estimating Losses

For this scenario it is assumed that the potentially-damaged housing units are one or two-story homes with basements and the flood depth is two feet. With these assumptions the expected percent damage sustained by the ***structure*** is estimated to be 20% and the expected percent damage sustained by the structure's ***contents*** is estimated to be 30%.

Potential Dollar Losses

Now that all of the decisions/assumptions have been made, the potential dollar losses can be calculated. First the potential dollar losses to the ***structure*** of the potentially-damaged housing units must be determined. This is done by taking the average market value for a residential structure and multiplying that by the percent damage 20% to get the average structural damage per unit. Next the average structural damage per unit is multiplied by the number of potentially-damaged housing units. **Figure F-15** provides a sample calculation.

Figure F-15
Structure: Potential Dollar Loss Sample Calculation – Pearl

Average Market Value of a Housing Unit with the Jurisdiction x Percent Damage =
Average Structural Damage per Housing Unit
Pearl: $21,424 x 20% = $4,284.80 per housing unit

Average Structural Damage x Number of Potentially-Damaged Housing
Units within the Jurisdiction = *Structure* Potential Dollar Losses
(Rounded to the Nearest Dollar)

Pearl: $4,284.80 per housing unit x 6 housing units = $25,709

Next the potential dollar losses to the ***content*** of the potentially-damaged housing units must be determined. Based on FEMA guidance, the value of a residential housing unit's content is approximately 50% of its market value. Therefore, start by taking one-half the average market value for a residential structure and multiply that by the percent damage 30% to get the average content damage per unit. Then take the average content damage per unit and multiply that by the number of potentially-damaged housing units. **Figure F-16** provides a sample calculation.

Figure F-16

***Content:* Potential Dollar Loss Sample Calculation – Pearl**

½ (Average Market Value of a Housing Unit with the Jurisdiction) x Percent Damage = Average Content Damage per Housing Unit

Pearl: ½ ($21,424) x 30% = $3,213.60 per housing unit

Average Content Damage per Housing Unit x Number of Potentially-Damaged Housing Units within the Jurisdiction = *Content* Potential Dollar Losses
(Rounded to the Nearest Dollar)

Pearl: $3,213.60 per housing unit x 6 housing unit = $19,282

Finally, the ***total potential dollar losses*** may be calculated by adding together the potential dollar losses to the structure and the content. **Figures F-17 and F-18** provide a breakdown of the total potential dollar losses by participating municipality and township.

Figure F-17

Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Riverine Flood Event by Participating Municipality

Participating Jurisdiction	Average Market Value (2020)	Potentially-Damaged Housing Units	Potential Dollar Losses		Total Potential Dollar Losses (Rounded to the Nearest Dollar)
			Structure	Content	
Barry	$35,394	0	$ 0	$ 0	$ 0
Baylis[1,4]	$18,204	0	$ 0	$ 0	$ 0
Griggsville	$30,585	0	$ 0	$ 0	$ 0
New Canton[a]	$25,647	0	$ 0	$ 0	$ 0
Pearl[4]	$21,424	6	$25,709	$19,282	$44,991
Pittsfield[3,4]	$54,855	0	$ 0	$ 0	$ 0

[1] Baylis FD [2] Spring Creek FPD [3] Illini Community Hospital [4] Pikeland CUSD #10
[a] Sny Island LDD [b] McGee Creek D&LD [c] Valley City D&LD

This assessment illustrates the <u>potential residential dollar losses</u> that should be considered when municipalities are deciding which mitigation projects to pursue. Potential dollar losses caused by riverine flooding to vulnerable residences ***in Pearl would be expected to be $44,991***. There are five participating municipalities in this scenario who do not have any residences considered vulnerable to riverine flooding. For the townships, potential dollar losses caused by riverine flooding to vulnerable residences would be expected to ***range from $3,041 in Flint Township to $163,338 in Cincinnati Township***.

Figure F-18
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Riverine Flood Event by Township

Township	Average Market Value (2020)	Potentially-Damaged Housing Units	Potential Dollar Losses		Total Potential Dollar Losses (Rounded to the Nearest Dollar)
			Structure	Content	
Atlas [a,4]	$22,464	16	$71,885	$53,914	$125,799
Barry	$35,341	0	$ 0	$ 0	$ 0
Chambersburg [b,c]	$19,746	5	$19,746	$14,810	$34,556
Cincinnati [a]	$10,853	43	$93,336	$70,002	$163,338
Derry	$9,767	0	$ 0	$ 0	$ 0
Detroit [4]	$33,233	7	$46,526	$34,895	$81,421
Fairmount [1,4]	$8,528	0	$ 0	$ 0	$ 0
Flint [c]	$8,689	1	$1,738	$1,303	$3,041
Griggsville [4]	$30,066	0	$ 0	$ 0	$ 0
Hadley [1,4]	$23,404	0	$ 0	$ 0	$ 0
Hardin [4]	$36,891	7	$51,647	$38,736	$90,383
Kinderhook [a]	$29,414	0	$ 0	$ 0	$ 0
Levee [a]	$12,830	1	$2,566	$1,925	$4,491
Martinsburg [4]	$19,460	0	$ 0	$ 0	$ 0
Montezuma [4]	$26,903	10	$53,806	$40,355	$94,161
Newburg [4]	$62,816	1	$12,563	$9,422	$21,985
New Salem [1,4]	$14,307	0	$ 0	$ 0	$ 0
Pearl [4]	$11,884	16	$38,029	$28,522	$66,551
Perry	$21,810	0	$ 0	$ 0	$ 0
Pittsfield [3,4]	$49,171	0	$ 0	$ 0	$ 0
Pleasant Hill [a,4]	$28,332	0	$ 0	$ 0	$ 0
Pleasant Vale [a]	$23,607	0	$ 0	$ 0	$ 0
Ross [a]	$10,605	25	$53,025	$39,769	$92,794
Spring Creek [2,4]	$12,725	7	$17,815	$13,361	$31,176

[1] Baylis FD
[2] Spring Creek FPD
[3] Illini Community Hospital
[4] Pikeland CUSD #10
[a] Sny Island LDD
[b] McGee Creek D&LD
[c] Valley City D&LD

Vulnerability of Infrastructure/Critical Facilities

The calculations presented above are meant to provide the reader with a sense of the scope or magnitude of a large riverine flood event in dollars. These calculations do not include the physical damages sustained by businesses or other infrastructure and critical facilities.

In terms of businesses, the impacts from a flood event can be physical and/or monetary. Monetary impacts can include loss of sales revenue either through temporary closure or loss of critical services (i.e., power, drinking water and sewer). Depending on the magnitude of the flood event, the damage sustained by infrastructure and critical facilities can be extensive in nature and expensive to repair. As a result, ***the cumulative monetary impacts to businesses and infrastructure can exceed the cumulative monetary impacts to residences.*** While average dollar amounts cannot be supplied for these items at this time, they should be taken into account when discussing the overall impacts that a large-scale riverine flood event could have on the participating jurisdictions.

In terms of specific infrastructure vulnerability, Sny Island LDD has three levee pump stations located in the base floodplain of the Mississippi River. No above-ground infrastructure within the participating jurisdictions, other than key roads, bridges and electrical substations, were identified as being vulnerable to riverine flooding.

Considerations

While the potential dollar loss scenario was only for a riverine flood event, the participating jurisdictions have been made aware through the planning process of the impacts that can result from flash flood events. Pike County has experienced multiple events over the last 20 years as have adjoining and nearby counties. These events illustrate the need for officials to consider the overall monetary impacts of all forms of flooding on their communities. All participants should carefully consider the types of activities and projects that can be taken to minimize their vulnerability.

3.3 SEVERE WINTER STORMS

HAZARD IDENTIFICATION

What is the definition of a severe winter storm?

A severe winter storm can range from moderate snow over a few hours to significant accumulations of sleet and/or ice to blizzard conditions with blinding, wind-driven snow that last several days. The amount of snow or ice, air temperature, wind speed and event duration all influence the severity and type of severe winter storm that results. In general, there are three types of severe winter storms: blizzards, heavy snowstorms and ice storms. The following provides a brief description of each type as defined by the National Weather Service (NWS).

- **Blizzards.** Blizzards are characterized by strong winds of at least 35 miles per hour and are accompanied by considerable falling and/or blowing snow that reduces visibility to ¼ mile or less. Blizzards are the most dangerous of all winter storms.
- **Heavy Snowstorms.** Heavy snowstorms are generally defined as producing snowfall accumulations of four inches or more in 12 hours or less or six inches or more in 24 hours or less.
- **Ice Storms.** An ice storm occurs when substantial accumulations of ice, generally ¼ inch or more, build up on the ground, trees and utility lines as a result of freezing rain.

What is snow?

Snow is precipitation in the form of ice crystals. These ice crystals are formed directly from the freezing of water vapor in wintertime clouds. As the ice crystals fall toward the ground, they cling to each other creating snowflakes. Snow will only fall if the temperature remains at or below 32°F from the cloud base to the ground.

What is sleet?

Sleet is precipitation in the form of ice pellets. These ice pellets are composed of frozen or partially frozen rain drops or refrozen partially melted snowflakes. Sleet typically forms in winter storms when snowflakes partially melt while falling through a thin layer of warm air. The partially melted snowflakes then refreeze and form ice pellets as they fall through the colder air mass closer to the ground. Sleet usually bounces after hitting the ground or other hard surfaces and does not stick to objects.

What is freezing rain?

Freezing rain is precipitation that falls in the form of a liquid (i.e., rain drops), but freezes into a glaze of ice upon contact with the ground or other hard surfaces. This occurs when snowflakes descend into a warmer layer of air and melt completely. When the rain drops that result from this melting fall through another thin layer of freezing air just above the surface they become "supercooled", but they do not have time to refreeze before reaching the ground. However, because the raindrops are "supercooled", they instantly refreeze upon contact with anything that is at or below 32°F (i.e., the ground, trees, utility lines, etc.).

Are alerts issued for severe winter storms?

Yes. The NWS Weather Forecast Office in St. Louis, Missouri is responsible for issuing ***winter storm watches*** and ***warning**s* for Pike County depending on the weather conditions. The following provides a brief description of each type of alert.

- ➢ **Winter Storm Watch.** A winter storm watch is issued when the risk of hazardous winter weather has increased significantly and there is a strong possibility that conditions will reach warning criteria for the area within the next 12 to 48 hours.
- ➢ **Advisories.** Winter advisories are issued for lesser winter weather events that while presenting an inconvenience, do not pose an immediate threat of injury, death or significant property damage. The following advisories will be issued when an event is occurring, is imminent or has a high probability of occurring.
  - ❖ **Winter Weather Advisory.** Depending on the time of occurrence and the temperature, a winter weather advisory is issued for:
    - ❑ snowfall of 1 to 5 inches;
    - ❑ sleet accumulations of less than ½ inch; or
    - ❑ a combination of winter precipitation which will produce hazardous conditions.
  - ❖ **Freezing Rain Advisory.** A freezing rain advisory is issued when light freezing rain will produce ice accumulations of less than ¼ inch.
- ➢ **Warnings.** Winter weather warnings are issued for events that can be life threatening. The following warnings will be issued when an event is occurring, is imminent, or has a high probability of occurring.
  - ❖ **Blizzard Warning.** A blizzard warning is issued when sustained winds or frequent gusts greater than or equal to 35 mph are accompanied by falling and/or blowing snow that frequently reduces visibility to less than ¼ mile for three hours or more.
  - ❖ **Ice Storm Warning.** An ice storm warning is issued when freezing rain is expected to produce ice accumulations of ¼ inch or more.
  - ❖ **Winter Storm Warning.** A winter storm warning is issued when:
    - ❑ 6 inches or more of snow is expected;
    - ❑ ½ inch or more of sleet accumulations are expected; or
    - ❑ a combination of winter precipitation will produce life threatening conditions.

HAZARD PROFILE

The following identifies past occurrences of severe winter storms; details the severity or extent of each event (if known); identifies the locations potentially affected; and estimates the likelihood of future occurrences.

When have severe winter storms occurred previously? What is the extent of these previous severe winter storm?

Table 7, located in **Appendix I**, summarize the previous occurrences as well as the extent or magnitude of severe winter storms (snow & ice) recorded in Pike County.

<u>*Severe Winter Storms*</u>

NOAA's Storm Events Database, Midwestern Regional Climate Center's cli-MATE database, and NWS's COOP data records were used to document 117 reported occurrences of severe winter storms (snow, ice and/or a combination of both) in Pike County between 1950 and 2022. Of the 117 recorded occurrences there were 96 heavy snowstorms or blizzards; 16 combination events (freezing rain, sleet, ice and/or snow); and five ice or sleet storms. Included in the 117 severe winter storms is one event, the February 1 & 2, 2011 Ground Hog's Day Blizzard, that contributed to a major federal disaster declaration in Pike County.

<u>Severe Winter Storm Fast Facts – Occurrences</u>

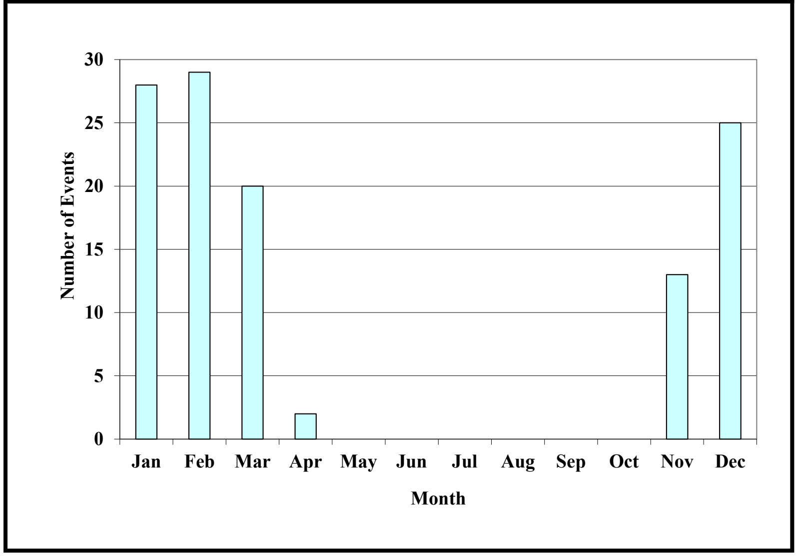
Number of Severe Winter Storm Events Reported (1950 -2022): ***117***

Maximum 24-Hour Snow Accumulation: ***20 inches (February 1 & 2, 2011)***

Most Likely Month for Severe Winter Storms to Occur: ***February***

Figure SWS-1 charts the reported occurrences of severe winter storms by month. Of the 117 events, 82 (70%) took place in in December, January, and February making this the peak period for severe winter storms. Of these 82 events, 29 (35%) occurred during February, making this the peak month for severe winter storms. There were four events that spanned two months; however, for illustration purposes only the month when the event started is graphed. Of the 117 occurrences, start times were unavailable for 33 events. Of the remaining 84 severe winter storm events with recorded times, 46 (55%) began during the p.m. hours.

Figure SWS-1
Severe Winter Storms by Month
1950 – 2022



According to the NWS's COOP data records, the maximum 24-hour snow accumulation in Pike County is 20.0 inches, which occurred on February 1 & 2, 2011 at the Perry COOP Observation Station.

What locations are affected by severe winter storms?

Severe winter storms affect the entire County. All communities in Pike County have been affected by severe winter storms. Severe winter storms generally extend across the entire County and affect multiple locations. The *2018 Illinois Natural Hazard Mitigation Plan* prepared by IEMA classifies Pike County's hazard rating for severe winter storms as "high."

What is the probability of future severe winter storms occurring?

Pike County has had 117 verified occurrences of severe winter storms between 1950 and 2022. With 117 occurrences over the past 73 years, Pike County should expect at least one severe winter storm in any given year. There were 39 years over the past 73 years where two or more severe winter storms occurred. This indicates the probability that more than one severe winter storm may occur during any given year within the County is 53%.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from severe winter storms.

Are the participating jurisdictions vulnerable to severe winter storms?

Yes. All of Pike County, including the participating jurisdictions, is vulnerable to the dangers presented by severe winter storms. Severe winter storms are among the more frequently occurring natural hazards in Illinois. Since 2013, Pike County has experienced 17 severe winter storms.

Severe winter storms have immobilized portions of the County, blocking roads; downing power lines, trees, and branches; causing power outages and property damage; and contributing to vehicle accidents. In addition, the County, township, and municipalities must budget for snow removal and de-icing of roads and bridges as well as for roadway repairs.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of severe winter storms?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to severe winter storms.

Pike County: All the County critical facilities are centrally located in Pittsfield, which could potentially be a problem if a severe winter storm impacts the City.

Barry: Power outages associated with severe winter storms affect the City's drinking water treatment and wastewater treatment facilities impacting service to residents. The City's wells are 7 miles from the treatment facility and loss of power impacts service.

Baylis: The drinking water plant and Village Hall have no backup power supplies and are vulnerable to power outages caused by ice storms, which would impact service to residents.

Griggsville: Severe winter storms have the potential to cause power loss to key facilities and infrastructure, including the wastewater treatment plant and drinking water plant/wells.

Fairmount Township: Ice storms have the potential to take down power lines, causing power outages for township residents.

Illini Community Hospital: Severe winter storms impact travel and prevent employees from getting to work.

Pittsfield: Severe winter storms with high winds have the potential to down overhead power lines to critical facilities, impacting service to residents. The two assisted living facilities and the hospital are particularly vulnerable.

Pittsfield Township: Severe winter storms have the potential to impede travel.

What impacts resulted from the recorded severe winter storms?

Severe Winter Storms & Extreme Cold Events
Fast Facts – Impacts/Risk

Severe Winter Storm (Snow & Ice) Impacts:
- Total Property Damage (2 events): ***$218,552***
- Injuries: ***1***
- Fatalities: ***n/a***

Severe Winter Storm Risk/Vulnerability:
- Public Health & Safety – General Population: ***Low to Medium***
- Public Health & Safety – Socially Vulnerable Populations: ***Medium***
- Buildings/Infrastructure/Critical Facilities: ***Medium***

Data obtained from NOAA's Storm Events Database and FEMA Public Assistance figures provided by IEMA indicates that between 1950 and 2022, two of the 117 severe winter storms caused $218,552 in property damages. Property damage information was either unavailable or none was recorded for the remaining 115 reported occurrences.

In comparison, the State of Illinois has averaged $102 million annually in winter storm losses according to the Illinois State Water Survey's Climate Atlas of Illinois, ranking winter storms second only to flooding in terms of economic loss in the State. While behind floods in terms of the amount of property damage caused, severe winter storms have a greater ability to immobilize larger areas, with rural areas being particularly vulnerable.

NOAA's Storm Events Database reported one injury associated with the recorded severe winter storm events. An individual was injured in a vehicle accident during the November 29, 2006 winter storm event.

What other impacts can result from severe winter storms?

In Pike County, vehicle accidents are the largest risk to health and safety from severe winter storms. Hazardous driving conditions (i.e., reduced visibility, icy road conditions, strong winds, etc.) contribute to the increase in accidents that result in injuries and fatalities. A majority of all severe winter storm injuries result from vehicle accidents.

Traffic accident data assembled by the Illinois Department of Transportation from 2014 through 2018 indicates that treacherous road conditions caused by snow/slush and ice were present for

5.1% to 14.0% of all crashes recorded annually in the County. **Figure SWS-2** provides a breakdown by year of the number of crashes and corresponding injuries and fatalities that occurred when treacherous road conditions caused by snow and ice were present.

Figure SWS-2
Severe Winter Weather Crash Data for Pike County

Year	Total # of Crashes	Presence of Treacherous Road Conditions caused by Snow/slush and Ice		
		# of Crashes	# of Injuries	# of Fatalities
2014	501	70	7	0
2015	503	31	5	0
2016	553	50	4	0
2017	469	24	8	0
2018	505	30	5	0
Total:	**2,531**	**205**	**29**	**0**

Source: Illinois Department of Transportation.

Persons who are outdoors during and immediately following severe winter storms can experience other health and safety problems. Frostbite to hands, feet, ears and nose and hypothermia are common injuries. Treacherous walking conditions also lead to falls which can result in serious injuries, including fractures and broken bones, especially in the elderly. Over exertion from shoveling driveways and walks can lead to life-threatening conditions such as heart attacks in middle-aged and older adults who are susceptible.

What is the level of risk/vulnerability to public health and safety from severe winter storms?

While severe winter storms occur regularly in Pike County, the number of injuries and fatalities is relatively low. Taking into consideration the potential for hazardous driving conditions, snow-removal related injuries, and power outages that could leave individuals vulnerable to hypothermia, the risk to public health and safety of the *general population* from severe winter storms safety is seen as ***low*** to ***medium***.

The level of risk or vulnerability posed by severe winter storms to the public health and safety of *socially vulnerable populations* is considered to be ***medium***. Socially vulnerable populations such as older adults (those 75 years of age and older) are more susceptible to slips and falls caused by treacherous walking conditions and therefore their risk is elevated. **Figure SWS-3** identifies the percent of socially vulnerable populations by participating municipality and the County based on the U.S. Census Bureau's 2016-2020 American Community Survey data.

Are existing buildings, infrastructure, and critical facilities vulnerable to severe winter storms?

Yes. All existing buildings, infrastructure, and critical facilities located in Pike County and the participating jurisdictions are vulnerable to damage from severe winter storms.

Structural damage to buildings caused by severe winter storms (snow and ice) is very rare but can occur particularly to flat rooftops. Information gathered from Pike County residents indicates that snow and ice accumulations on communication and power lines as well as key roads presents the greatest vulnerability to infrastructure and critical facilities within the County. Snow and ice accumulations on lines often lead to disruptions in communications and create power outages. Depending on the damage, it can take anywhere from several hours to several days to restore service.

Figure SWS-3
Socially Vulnerable Populations by Participating Jurisdictions

Participating Jurisdiction	% of Population 75 year of age & Older
Barry	7.1%
Baylis[1,4]	19.0%
Griggsville	10.7%
New Canton[a]	7.8%
Pearl[4]	6.1%
Pittsfield[3,4]	15.7%
Unincorp. Pike County	7.8%
Pike County	10.0%
State of Illinois	6.5%

[1] Baylis FD
[2] Spring Creek FPD
[3] Illini Community Hospital
[4] Pikeland CUSD #10

[a] Sny Island LDD
[b] McGee Creek D&LD
[c] Valley City D&LD

Source: U.S. Census Bureau.

In addition to affecting communication and power lines, snow and ice accumulations on state and local roads hampers travel and can cause dangerous driving conditions. Blowing and drifting snow can lead to road closures and increases the risk of automobile accidents. Even small accumulations of ice can be extremely dangerous to motorists since bridges and overpasses freeze before other surfaces.

When transportation is disrupted, schools close, emergency, and medical services are delayed, some businesses close and government services can be affected. When a severe winter storm hits there is also an increase in cost to the County, township, and municipalities for snow removal and de-icing. Road resurfacing and pothole repairs are additional costs incurred each year as a result of severe winter storms.

Based on the frequency with which severe winter storms have occurred in Pike County; the damages described; the amount of property damage previously reported; and the potential for disruptions to power distribution and communication; the risk or vulnerability to buildings, infrastructure and critical facilities from severe winter storms is ***medium***.

Are future buildings, infrastructure, and critical facilities vulnerable to severe winter storms?

Yes. While Griggsville and Pittsfield have building codes in place that will likely help lessen the vulnerability of new buildings and critical facilities to damage from severe storms, the County and four remaining participating municipalities do not.

In addition, infrastructure such as new communication and power lines will continue to be vulnerable to severe winter storms, especially to ice accumulations, as long as they are located above ground. Rural areas of the County have experienced extended periods without power due to severe winter storms. Steps to bury all new lines would eliminate the vulnerability, but this action would be cost prohibitive in most areas. In terms of new roads and bridges, there is very little that can be done to reduce or eliminate their vulnerability to severe winter storms.

What are the potential dollar losses to vulnerable structures from severe winter storms?

Unlike other natural hazards, such as tornadoes, there are no standard loss estimation models or methodologies for severe winter storms. Since only two of the 117 recorded events listing property damage numbers for severe winter storms, it is difficult to accurately estimate future potential dollar losses. However, according to the Pike County Clerk's Office the total equalized assessed values of all residential, commercial, and industrial buildings in the planning area is $124,322,202. Since all the structures within Pike County are vulnerable to damage, it is likely this total represents the countywide property exposure to severe winter storms.

3.4 EXCESSIVE HEAT

HAZARD IDENTIFICATION

What is the definition of excessive heat?

Excessive heat is generally characterized by a prolonged period of summertime weather that is substantially hotter and more humid than the average for a location at that time of year. Excessive heat criteria typically shift by location and time of year. As a result, reliable fixed absolute criteria are not generally specified (i.e., a summer day with a maximum temperature of at least 90°F).

Excessive heat events are usually a result of both high temperatures and high relative humidity. (Relative humidity refers to the amount of moisture in the air.) The higher the relative humidity or the more moisture in the air, the less likely that evaporation will take place. This becomes significant when high relative humidity is coupled with soaring temperatures.

On hot days the human body relies on the evaporation of perspiration or sweat to cool and regulate the body's internal temperature. Sweating does nothing to cool the body unless the water is removed by evaporation. When the relative humidity is high, then the evaporation process is hindered, robbing the body of its ability to cool itself.

Excessive heat is a leading cause of weather-related fatalities in the U.S. According to the Centers for Disease Control and Prevention, a total of 7,415 people died from heat-related illnesses between 1999 and 2010, an average of 618 fatalities a year.

What is the Heat Index?

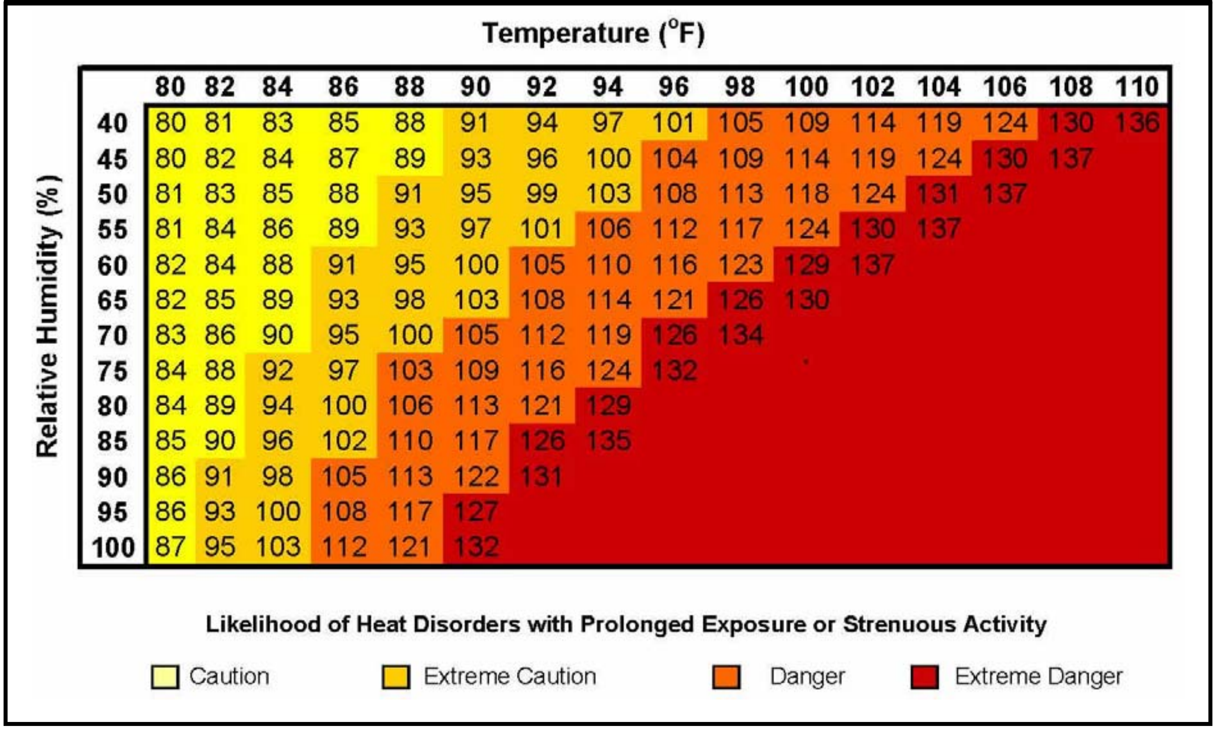
In an effort to raise the public's awareness of the hazards of excessive heat, the National Weather Service (NWS) devised the "Heat Index". The Heat Index, sometimes referred to as the "apparent temperature", is a measure of how hot it feels when relative humidity is added to the actual air temperature. **Figure EH-1** shows the Heat Index as it corresponds to various air temperatures and relative humidity.

As an example, if the air temperature is 96°F and the relative humidity is 65%, then the Heat Index would be 121°F. It should be noted that the Heat Index values were devised for shady, light wind conditions. Exposure to full sunshine can increase Heat Index values by up to 15°F. Also, strong winds, particularly with very hot, very dry air, can be extremely hazardous. When the Heat Index reaches 105°F or greater, there is an increased likelihood that continued exposure and/or physical activity will lead to individuals developing severe heat disorders.

What are heat disorders?

Heat disorders are a group of illnesses caused by prolonged exposure to hot temperatures and are characterized by the body's inability to shed excess heat. These disorders develop when the heat gain exceeds the level the body can remove or if the body cannot compensate for fluids and salt lost through perspiration. In either case the body loses its ability to regulate its internal temperature. All heat disorders share one common feature: the individual has been overexposed to heat, or over exercised for their age and physical condition on a hot day. The following describes the symptoms associated with the different heat disorders.

Figure EH-1
Heat Index



Temperature (°F)

Relative Humidity (%)

	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	126	130					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

☐ Caution ▨ Extreme Caution ▨ Danger ■ Extreme Danger

Source: NOAA, National Weather Service.

- **Heat Rash.** Heat rash is a skin irritation caused by excessive sweating during hot, humid weather and is characterized by red clusters of small blisters on the skin. It usually occurs on the neck, chest, groin or in elbow creases.
- **Sunburn.** Sunburn is characterized by redness and pain of skin exposed too long to the sun without proper protection. In severe cases it can cause swelling, blisters, fever and headaches and can significantly retard the skin's ability to shed excess heat.
- **Heat Cramps.** Heat cramps are characterized by heavy sweating and muscle pains or spasms, usually in the abdomen, arms or legs that during intense exercise. The loss of fluid through perspiration leaves the body dehydrated resulting in muscle cramps. This is usually the first sign that the body is experiencing trouble dealing with heat.
- **Heat Exhaustion.** Heat exhaustion is characterized by heavy sweating, muscle cramps, tiredness, weakness, dizziness, headache, nausea or vomiting and faintness. Breathing may become rapid and shallow and the pulse thready (weak). The skin may appear cool, moist and pale. If not treated, heat exhaustion may progress to heat stroke.
- **Heat Stroke (Sunstroke).** Heat stroke is a life-threatening condition characterized by a high body temperature (106°F or higher). The skin appears to be red, hot and dry with very little perspiration present. Other symptoms include a rapid and strong pulse, throbbing headache, dizziness, nausea and confusion. There is a possibility that the individual will become unconsciousness. If the body is not cooled quickly, then brain damage and death may result.

Studies indicate that, all things being equal, the severity of heat disorders tend to increase with age. Heat cramps in a 17-year-old may be heat exhaustion in someone 40 and heat stroke in a person over 60. Elderly persons, small children, chronic invalids, those on certain medications and persons with weight or alcohol problems are particularly susceptible to heat reactions.

Figure EH-2 below indicates the heat index at which individuals, particularly those in higher risk groups, might experience heat-related disorders. Generally, when the heat index is expected to exceed 105°F, the NWS will initiate excessive heat alert procedures.

Figure EH-2
Relationship between Heat Index and Heat Disorders

Heat Index (°F)	Heat Disorders
80°F – 90°F	Fatigue is possible with prolonged exposure and/or physical activity
90°F – 105°F	Heat cramps, heat exhaustion and heat stroke possible with prolonged exposure and/or physical activity
105°F – 130°F	Heat cramps, heat exhaustion and heat stroke likely; heat stroke possible with prolonged exposure and/or physical activity
130°F or Higher	Heat stroke highly likely with continued exposure

Source: NOAA, Heat Wave: A Major Summer Killer.

What is an excessive heat alert?

An excessive heat alert is an advisory or warning issued by the NWS when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines the type of alert issued. There are four types of alerts that can be issued for an excessive heat event. The following provides a brief description of each type of alert based on the ***excessive heat advisory/warning criteria*** established by NWS Weather Forecast Office in St. Louis, Missouri. The St. Louis Office is responsible for issuing alerts for Pike County.

- **Outlook.** An excessive heat outlook is issued when the potential exists for an excessive heat event to develop over the next three (3) to seven (7) days.
- **Watch.** An excessive heat watch is issued when conditions are favorable for an excessive heat event to occur within the next 24 to 72 hours.
- **Advisory.** An excessive heat advisory is issued when the heat index is expected to be around 105°F, *or* when the heat index will range from 100°F to 104°F for at least four (4) consecutive days.
- **Warning.** An excessive heat warning is issued when the heat index is expected to be around 110°F, *or* when the heat index is expected to reach 105°F for four (4) consecutive days.

HAZARD PROFILE

The following identifies past occurrences of excessive heat, details the severity or extent of each event (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

When have excessive heat events occurred previously? What is the extent of these events?

Excessive Heat Fast Facts – Occurrences

Number of Excessive Heat Events Reported (1994 – 2022): ***67***

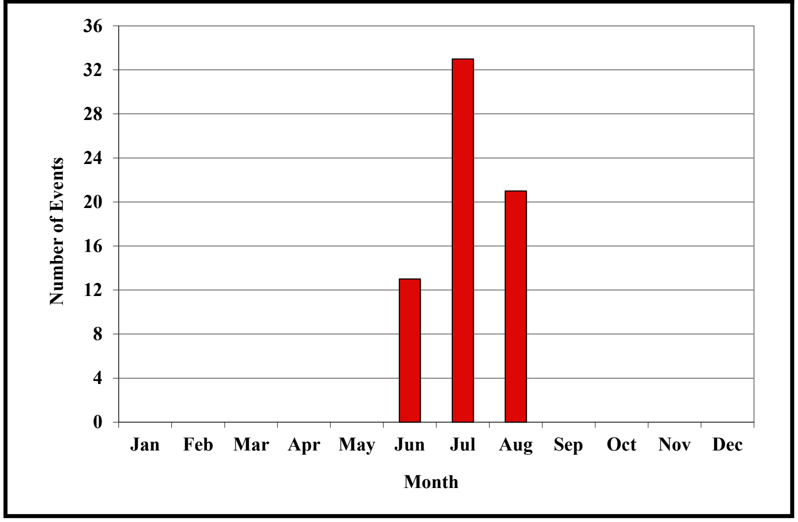
Hottest Temperature Recorded in the County: ***115°F (July 14, 1954)***

Most Likely Month for Excessive Heat Events to Occur: ***July***

Table 8, located in **Appendix I**, summarizes the previous occurrences as well as the extent or magnitude of excessive heat events recorded in Pike County. NOAA's Storm Events Database, Iowa State University's National Weather Service Watch, Warning, and Advisories database, Midwestern Regional Climate Center's cli-MATE database, and NWS's COOP Data records were used to document 67 occurrences of excessive heat in Pike County between 1994 and 2022.

Figure EH-3 charts the reported occurrences of excessive heat by month. Thirty-three of the 67 events (49%) began in July making this the peak month for excessive heat events in Pike County. There were six events that spanned two months; however, for illustration purposes only the month the event started is graphed.

Figure EH-3
Excessive Heat by Month
1994 – 2022



According to the Midwestern Regional Climate Center, almost continuous temperature records for Pike County were kept from 1890 to 2015 by the Griggsville NWS COOP Observation Station, with a gap between 1990 and 2004. The Pittsfield NWS COOP Observation Station has temperature records from 1995 to the present. **Figure EH-4** lists the hottest days recorded at the Griggsville station. Based on the available records, the hottest temperature recorded in Pike County was 115°F at the Griggsville COOP observation station on July 14, 1954.

Figure EH-4
Hottest Days Recorded at the Griggsville NWS COOP Observation Station

	Date	Temperature		Date	Temperature
1	7/14/1954	115°F	6	7/15/1936	112°F
2	7/20/1934	113°F	7	7/19/1934	111°F
3	8/8/1934	113°F	8	7/21/1934	111°F
4	8/9/1934	113°F	9	7/23/1934	111°F
5	7/24/1934	112°F	10	7/14/1936	111°F

Source: Midwest Regional Climate Center cli-MATE

What locations are affected by excessive heat?

Excessive heat affects the entire County. Excessive heat events, like drought and severe winter storms, generally extend across an entire region and affecting multiple counties. The *2018 Illinois Natural Hazard Mitigation Plan* classifies Pike County's hazard rating for excessive heat as "high."

Do any of the participating jurisdictions have designated cooling centers?

Yes. Three of the 15 participating municipalities, townships, schools, fire protection districts, hospitals, and drainage and levee districts have designated cooling centers. A "designated" cooling center is identified as any facility that has been *formally* identified by the jurisdiction (through emergency planning, resolution, Memorandum of Agreement, etc.) as a location available for use by residents of the jurisdiction during excessive heat events.

Figure EH-5 identifies the location of each cooling center by jurisdiction. At this time Baylis, Baylis FD, Fairmount Township, Griggsville, McGee Creek D&LD, New Canton, Pearl, Pikeland CUSD #10, Pittsfield, Pittsfield Township, Sny Island LDD, and Valley City D&LD do not have any cooling centers designated. In addition, there are no State of Illinois-designated cooling centers in Pike County.

Figure EH-5
Designated Cooling Centers by Participating Jurisdiction

Name/Address	Name/Address
Barry	*Spring Creek Fire Protection District*
1400 Mortimer St.	Fire Station, 310 E. Field St., Nebo
Illini Community Hospital	
Hospital, 640 W. Washington St., Pittsfield	

What is the probability of future excessive heat events occurring based on historical data?

Pike County has experienced 67 verified occurrences of excessive heat between 1994 and 2022. With 67 occurrences over the past 29 years, Pike County should expect to experience approximately two excessive heat events a year. It is important to keep in mind that there are almost certainly gaps in the excessive heat data. More events have almost certainly occurred than are documented in this section, which means that the probability is almost certainly higher than reported.

There were nine years over the last 29 years where multiple (three or more) excessive heat events occurred. This indicates that the probability that multiple excessive heat events may occur during any given year within the County is 31%.

What is the probability of future excessive heat events occurring based on modeled future conditions?

Temperature in Illinois has trended upwards over the last century, with average temperatures in Illinois having increased by 1°F to 2°F in the past 120 years according to the Illinois State Climatologist. This trend is likely to continue, with conservative long-term estimates placing average temperatures by the end of the 21st century between 4° and 9° F warmer than they are today.

With increasing temperatures comes the increasing risk of extreme heat events, which are projected to continue to become more frequent and more severe than they have been historically. This is due to increases in temperatures observed during summer months, where just a few degrees difference can turn a hot day into a dangerously hot day. The number of days greater than 95° F in Illinois are forecasted to increase in the coming decades, with conservative projections predicting that even northern Illinois will see a minimum of 10 extreme heat days per year by the end of the 21st century, compared with one or two extreme heat days per year today. Even just a few additional extreme heat days a year could prove very damaging, both in terms of human health and economic costs.

Figures EH-6, EH-7, and **EH-8** provide tabular and graphical projections for Pike County, showing estimations for annual high temperature extremes in the early, mid, and late 21st century with both low and high estimates for each time period. Most likely, the true value will fall between these two estimates. By midcentury, the average number of days per year exceeding 90° F in Pike County is forecasted to increase from around 26 today to between 68 and 76, and the single hottest temperature recorded in a year is predicted to increase by 6° to 7° F according to the Climate Mapping for Resilience and Adaptation's Assessment Tool.

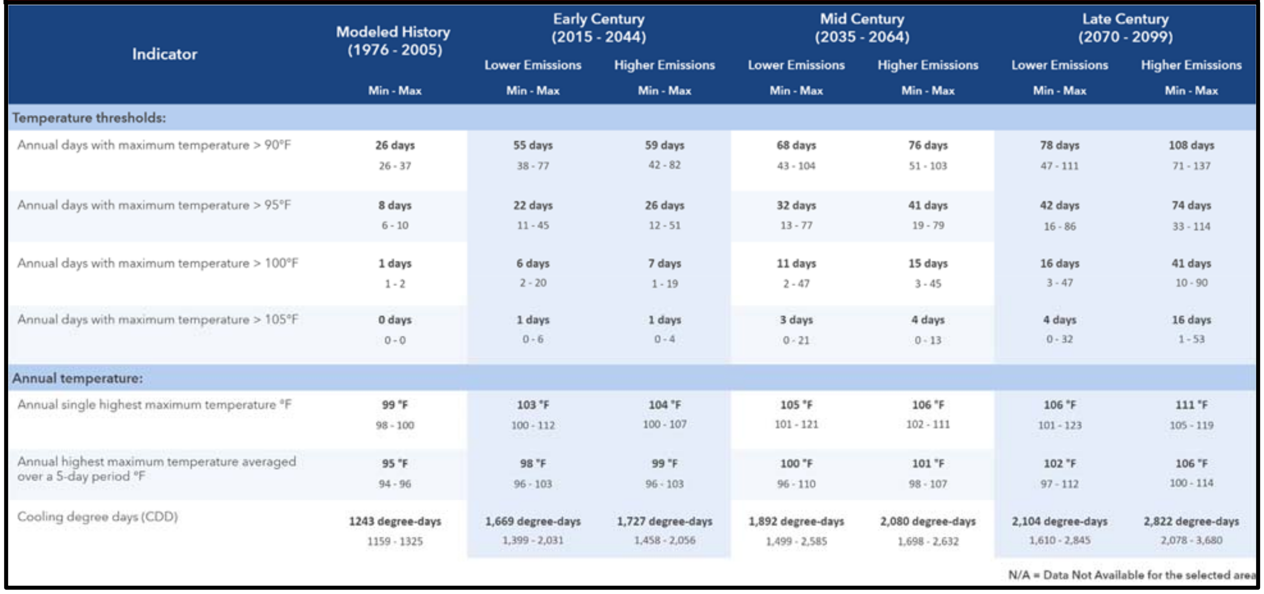
The Climate Explorer indicates that in Pike County, extreme temperatures on the hottest days of the year are projected to increase by 7°F. This is based on the findings of the 2018 National Climate Assessment and compares projections for the middle third of the century (2035-2064) with average conditions observed from 1961-1990.

Taken together, an increase in the number of days per year with temperatures over 90° F and an increase in extreme temperatures on the hottest days for Pike County indicates increased risk for extreme heat events.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from excessive heat.

Figure EH-6
Annual High Temperature Extreme Projections Table – Pike County



Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**26 days** 26 - 37	**55 days** 38 - 77	**59 days** 42 - 82	**68 days** 43 - 104	**76 days** 51 - 103	**78 days** 47 - 111	**108 days** 71 - 137
Annual days with maximum temperature > 95°F	**8 days** 6 - 10	**22 days** 11 - 45	**26 days** 12 - 51	**32 days** 13 - 77	**41 days** 19 - 79	**42 days** 16 - 86	**74 days** 33 - 114
Annual days with maximum temperature > 100°F	**1 days** 1 - 2	**6 days** 2 - 20	**7 days** 1 - 19	**11 days** 2 - 47	**15 days** 3 - 45	**16 days** 3 - 47	**41 days** 10 - 90
Annual days with maximum temperature > 105°F	**0 days** 0 - 0	**1 days** 0 - 6	**1 days** 0 - 4	**3 days** 0 - 21	**4 days** 0 - 13	**4 days** 0 - 32	**16 days** 1 - 53
Annual temperature:							
Annual single highest maximum temperature °F	**99 °F** 98 - 100	**103 °F** 100 - 112	**104 °F** 100 - 107	**105 °F** 101 - 121	**106 °F** 102 - 111	**106 °F** 101 - 123	**111 °F** 105 - 119
Annual highest maximum temperature averaged over a 5-day period °F	**95 °F** 94 - 96	**98 °F** 96 - 103	**99 °F** 96 - 103	**100 °F** 96 - 110	**101 °F** 98 - 107	**102 °F** 97 - 112	**106 °F** 100 - 114
Cooling degree days (CDD)	**1243 degree-days** 1159 - 1325	**1,669 degree-days** 1,399 - 2,031	**1,727 degree-days** 1,458 - 2,056	**1,892 degree-days** 1,499 - 2,585	**2,080 degree-days** 1,698 - 2,632	**2,104 degree-days** 1,610 - 2,845	**2,822 degree-days** 2,078 - 3,680

N/A = Data Not Available for the selected area

Figure EH-7
Number of Days with Maximum Temperature > 90°F Graph – Pike County

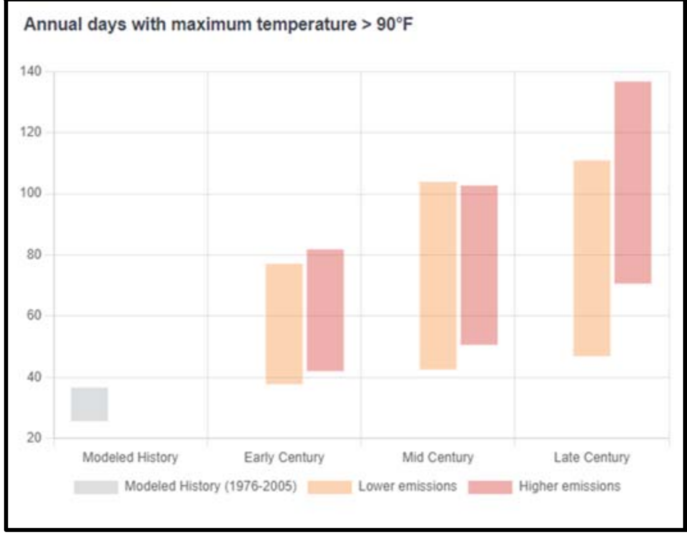
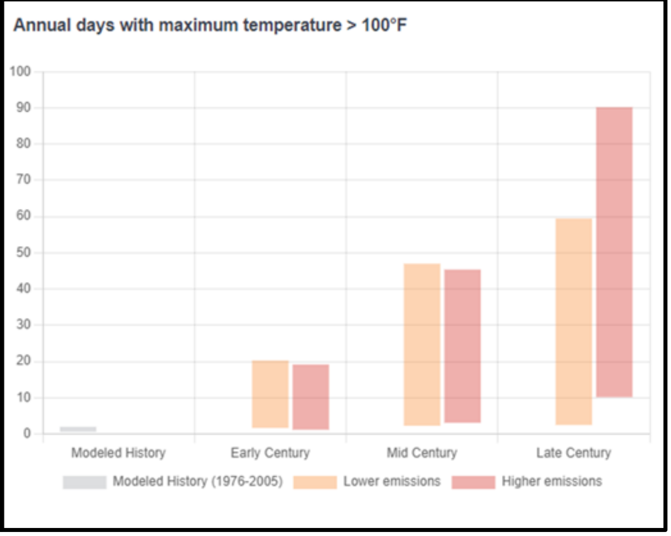


Figure EH-8
Number of Days with Maximum Temperature > 100°F Graph – Pike County



Are the participating jurisdictions vulnerable to excessive heat?

Yes. All of Pike County, including the participating jurisdictions, is vulnerable to the dangers presented by excessive heat. Since 2013, the County has experienced 27 excessive heat events.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of excessive heat?

No. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdiction considered specific assets within their jurisdiction vulnerable to excessive heat.

What impacts resulted from the recorded excessive heat events?

Damage information was either unavailable or none was recorded for any of the excessive heat events. One fatality was reported as a result of a June 18, 2009 excessive heat event. A 29 year-old Griggsville man died of heatstroke while working at a construction site in Valley City.

In comparison, Illinois averages 74 heat-related fatalities annually according to the Illinois State Water Survey's Climate Atlas of Illinois.

Excessive Heat Fast Facts – Impacts/Risk

Excessive Heat Impacts:

- Total Property Damage: ***n/a***
- Total Crop Damage: ***n/a***
- Fatalities (1 event): ***1***
- Injuries: ***n/a***

Excessive Heat Risk/Vulnerability:

- Public Health & Safety – General Population: ***Low***
- Public Health & Safety – Socially Vulnerable Populations: ***Medium***
- Buildings/Infrastructure/Critical Facilities: ***Low***

No other injuries or fatalities were reported as a result of excessive heat in Pike County. This does not mean more didn't occur; it simply means that excessive heat was not identified as the primary cause. This is especially true for fatalities. Usually, heat is not listed as the primary cause of death, but rather an underlying cause. The heat indices were sufficiently high for all the excessive heat events to produce heat cramps or heat exhaustion with the possibility of heat stroke in cases of prolonged exposure or physical activity.

What other impacts can result from excessive heat events?

Other impacts of excessive heat include road buckling, power outages, stress on livestock, early school dismissals and school closings. In addition, excessive heat events can also lead to an increase in water usage and may result in municipalities imposing water use restrictions. In Pike County, excessive heat has the ability to impact the drinking water supplies of Griggsville, New Canton, and Pearl, as well as those residents in unincorporated Pike County who rely on shallow private wells for their drinking water.

What is the level of vulnerability to public health and safety from excessive heat?

Even if injuries and fatalities due to excessive heat were under reported in Pike County, the level of risk or vulnerability posed by excessive heat to the public health and safety of the *general population* is considered to be ***low***. This assessment is based on the fact that all but one of the participating municipalities have designated cooling centers and the County does not have many large urban areas where living conditions (such as older, poorly-ventilated high rise buildings and low-income neighborhoods) tend to contribute to heat-related injuries and fatalities.

The level of risk or vulnerability posed by excessive heat to the public health and safety of *socially vulnerable populations* is considered to be ***medium***. Socially vulnerable populations such as older adults (those 75 years of age and older) and small children (those younger than 5 years of age) are more susceptible to heat-related reactions and therefore their risk is elevated. **Figure EH-9** identifies the percent of socially vulnerable populations by participating municipality and the County based on the U.S. Census Bureau's 2016-2020 American Community Survey data.

Figure EH-9
Socially Vulnerable Populations by Participating Jurisdictions

Participating Jurisdiction	% of Population 75 year of age & Older	% of Population Younger than 5 years of age	Total % of Socially Vulnerable Population
Barry	7.1%	8.6%	15.7%
Baylis[1,4]	19.0%	6.3%	25.3%
Griggsville	10.7%	7.6%	18.3%
New Canton[a]	7.8%	5.1%	12.9%
Pearl[4]	6.1%	0.0%	6.1%
Pittsfield[3,4]	15.7%	3.0%	18.7%
Unincorp. Pike County	7.8%	5.8%	13.6%
Pike County	10.0%	6.3%	16.3%
State of Illinois	6.5%	6.0%	12.5%

[1] Baylis FD [2] Spring Creek FPD [3] Illini Community Hospital [4] Pikeland CUSD #10
[a] Sny Island LDD [b] McGee Creek D&LD [c] Valley City D&LD

Source: U.S. Census Bureau.

In addition, individuals with chronic conditions, those on certain medications, and persons with weight or alcohol problems are also considered socially vulnerable populations. However, demographic information is not available for these segments of the population.

Are existing buildings, infrastructure, and critical facilities vulnerable to excessive heat?

No. In general, existing buildings, infrastructure and critical facilities located in the County and the participating jurisdictions are not vulnerable to excessive heat. The primary concern is for the health and safety of those living in the County (including all of the municipalities).

While buildings do not typically sustain damage from excessive heat, in rare cases infrastructure and critical facilities may be directly or indirectly damaged. While uncommon, excessive heat has been known to contribute to damage caused to roadways within Pike County. The combination of excessive heat and vehicle loads has caused pavement cracking and buckling.

Excessive heat has also been known to indirectly contribute to disruptions in the electrical grid. When the temperatures rise, the demand for energy also rises in order to operate air conditioners, fans, and other devices. This increase in demand places stress on the electrical grid components, increasing the likelihood of power outages. While not common in Pike County, there is the potential for this to occur. The potential may increase over the next two decades if new power sources are not built to replace the state's aging nuclear power facilities that are expected to be decommissioned.

In general, the risk or vulnerability to buildings, infrastructure and critical facilities from excessive heat is considered ***low***, even taking into consideration the potential for damage to roadways and disruptions to the electrical grid.

Are future buildings, infrastructure, and critical facilities vulnerable to excessive heat?

No. Future buildings, infrastructure and critical facilities within the County and participating jurisdictions are no more vulnerable to excessive heat events than the existing building, infrastructure, and critical facilities. As discussed above, buildings do not typically sustain damage from excessive heat. Infrastructure and critical facilities may, in rare cases, be damaged by excessive heat, but very little can be done to prevent this.

What are the potential dollar losses to vulnerable structures from excessive heat?

Unlike other natural hazards there are no standard loss estimation models or methodologies for excessive heat. With none of the recorded events listing property damage figures, there is no way to accurately estimate future potential dollar losses from excessive heat. Since excessive heat typically does not cause structure damage, it is unlikely that future dollar losses will be extreme. The primary concern associated with excessive heat is the health and safety of those living in the County and municipalities, especially socially vulnerable populations such as the elderly, infants, young children, and those with medical conditions.

3.5 EXTREME COLD

HAZARD IDENTIFICATION

What is the definition of extreme cold?

Extreme cold is generally characterized by temperatures well below what is considered normal for an area during the winter months and is often accompanied or is left in the wake of a severe winter storm. Extreme cold criteria vary from region to region. As a result, reliable fixed absolute criteria are not generally specified (i.e., a winter day with a maximum temperature of 0°F).

Whenever the temperature drops below normal and the wind speeds increase, heat can leave the body more rapidly. This can lead to dangerous situations for susceptible individuals, such as those without shelter or who are stranded, or those who live in a home that is poorly insulated or without heat.

Extreme cold is a leading cause of weather-related fatalities in Illinois. According to a 2020 study published by the University of Illinois Chicago, 1,935 individuals died from cold-related illnesses between 2011 and 2018. This is 94% of all temperature-related fatalities recorded in the State during that time period.

Extreme cold can also cause infrastructure damage, especially to residential water pipes and water distribution lines and mains. According to State Farm, in 2020 Illinois was once again the national leader in losses related to frozen pipes.

What is wind chill?

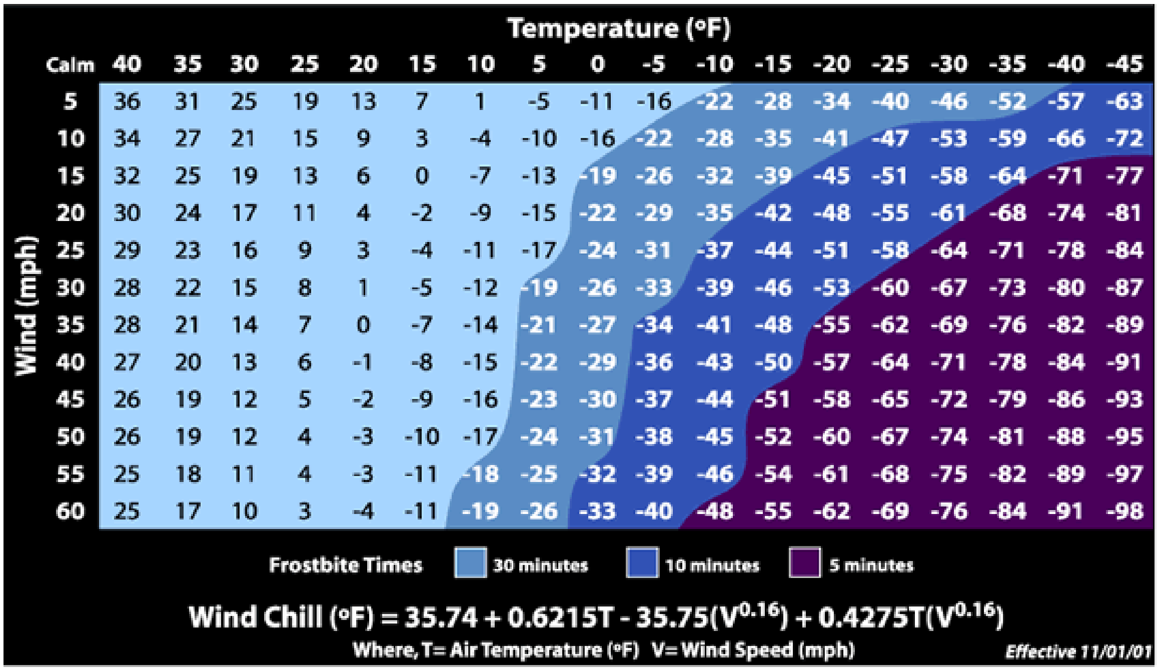
Wind chill, or wind chill factor, is a measure of the rate of heat loss from exposed skin resulting from the combined effects of wind and temperature. As the wind increases, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature.

The unit of measurement used to describe the wind chill factor is known as the wind chill temperature. The wind chill temperature is calculated using a formula. **Figure EC-1** identifies the formula and calculates the wind chill temperatures for certain air temperatures and wind speeds.

As an example, if the air temperature is 5°F and the wind speed is 20 miles per hour, then the wind chill temperature would be -15°F. The wind chill temperature is only defined for air temperatures at or below 50°F and wind speeds above three miles per hour. In addition, the wind chill temperature does not take into consideration the effects of bright sunlight which may increase the wind chill temperature by 10°F to 18°F.

Use of the current Wind Chill Temperature (WCT) index was implemented by the NWS on November 1, 2001. The new WCT index was designed to more accurately calculate how cold air feels on human skin. The new index uses advances in science, technology and computer modeling to provide an accurate, understandable and useful formula for calculating the dangers from winter winds and freezing temperatures. The former index was based on research done in 1945 by Antarctic researchers Siple and Passel.

Figure EC-1
Wind Chill Chart



Temperature (°F)

Wind (mph)

Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times ▨ 30 minutes ▨ 10 minutes ▨ 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Source: NOAA, National Weather Service.

Exposure to extreme wind chills can be life threatening. As wind chills edge toward -19°F and below, there is an increased likelihood that exposure will lead to individuals developing cold-related illnesses.

What cold-related illnesses are associated with extreme cold?

Frostbite and hypothermia are both cold-related illnesses that can result when individuals are exposed to dangerously low temperatures and wind chills. The following provides a brief description of the symptoms associated with each.

➢ **Frostbite.** During exposure to extremely cold weather the body reduces circulation to the extremities (i.e., feet, hands, nose, cheeks, ears, etc.) in order to maintain its core temperature. If the extremities are exposed, then this reduction in circulation coupled with the cold temperatures can cause the tissue to freeze.

Frostbite is characterized by a loss of feeling and a white or pale appearance. At a wind chill of -19°F, exposed skin can freeze in as little as 30 minutes. Seek medical attention immediately if frostbite is suspected. It can permanently damage tissue and in severe cases can lead to amputation.

- **Hypothermia.** Hypothermia occurs when the body's temperature begins to fall because it is losing heat faster than it can produce it. If an individual's body temperature falls below 95°F, then hypothermia has set in, and immediate medical attention should be sought.

  Hypothermia is characterized by uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness and exhaustion. Left untreated, hypothermia will lead to death. Hypothermia occurs most commonly at very cold temperatures but can occur at cool temperatures (above 40°F) if an individual isn't properly clothed or becomes chilled.

What is a wind chill alert?

A wind chill alert is an advisory or warning issued by the NWS when the wind chill is expected to have a significant impact on public safety. The expected severity of cold temperatures and wind speed determines the type of alert issued. There are three types of alerts that can be issued for an extreme cold event. The following provides a brief description of each type of alert based on the ***wind chill criteria*** established by the NWS Weather Forecast Office in St. Louis, Missouri. The St. Louis Office is responsible for issuing alerts for Pike County.

- **Wind Chill Watch.** A wind chill watch may be issued if conditions are favorable for wind chill temperatures to meet or exceed warning criteria but are not occurring or imminent.
- **Wind Chill Advisory.** A wind chill advisory is issued when the wind chill values are expected to be between -15°F and -24°F.
- **Wind Chill Warning.** A wind chill warning is issued when wind chill values are expected to be -25°F or below.

HAZARD PROFILE

The following identifies past occurrences of extreme cold events; details the severity or extent of each event (if known); identifies the locations potentially affected; and estimates the likelihood of future occurrences.

When have extreme cold events occurred previously? What is the extent of these events?

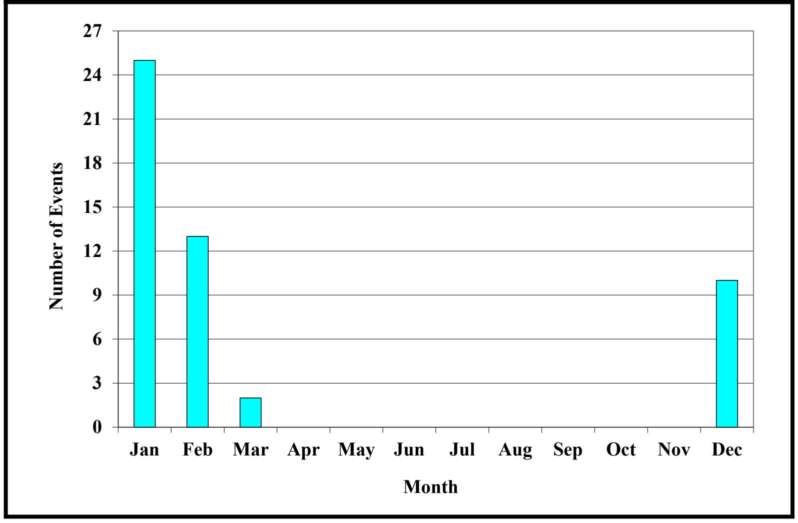
Table 9, located in **Appendix I**, summarize the previous occurrences as well as the extent or magnitude of extreme cold events recorded in Pike County. NOAA's Storm Events Database, Iowa State University's National Weather Service Watch, Warning, and Advisories database, and NWS's COOP Data records were used to document 50 occurrences of extreme cold in Pike County between 1995 and 2022.

Extreme Cold Fast Facts – Occurrences

Number of Extreme Cold Events Reported (1995 – 2022): ***50***
Coldest Temperature Recorded in the County: ***-26°F (January 5, 1999)***
Most Likely Months for Extreme Cold Events to Occur: ***January***

Figure EC-2 charts the reported occurrences of extreme cold by month. Twenty-five of the 50 events (50%) took place in January, making this the peak month for extreme cold events. There were two events that spanned two months; however, for illustration purposes only the month the event started in is graphed.

Figure EC-2
Extreme Cold by Month
1995 - 2022



According to the Midwestern Regional Climate Center, almost continuous temperature records for Pike County were kept from 1890 to 2015 by the Griggsville NWS COOP Observation Station with a gap between 1990 and 2004. The Pittsfield NWS COOP Observation Station has kept temperature records from 1995 to the present. The Perry NWS COOP Observation Station has kept records from 1992 to present with a gap between 2018 and 2020. **Figure EC-3** lists the coldest days recorded at the Griggsville station. Based on the available records, the coldest temperature recorded in Pike County was -26°F at the Perry COOP Observation Station on January 5, 1999.

Figure EC-3
Coldest Days Recorded at the Griggsville
NWS COOP Observation Station

	Date	Temperature		Date	Temperature
1	02/13/1905	-25°F	6	01/20/1985	-21°F
2	02/09/1899	-22°F	7	01/24/1894	-20°F
3	01/12/1918	-22°F	8	02/08/1895	-20°F
4	02/12/1899	-21°F	9	01/07/1912	-20°F
5	01/10/1982	-21°F			

Source: Midwest Regional Climate Center cli-MATE

What locations are affected by extreme cold?

Extreme cold affects the entire County. Extreme cold, like excessive heat and severe winter storms, generally extends across an entire region affecting multiple counties.

Do any of the participating jurisdictions have designated warming centers?

Yes. Three of the 15 participating municipalities, townships, schools, fire protection districts, hospitals, and drainage and levee districts have designated warming centers. A “designated” warming center is identified as any facility that has been *formally* identified by the jurisdiction (through emergency planning, resolution, Memorandum of Agreement, etc.) as a location available for use by residents during severe winter storms and extreme cold events.

Figure EC-4 identifies the location of each warming center by jurisdiction. At this time, Barry, Baylis, Baylis FD, Fairmount Township, Griggsville, McGee Creek D&LD, New Canton, Pearl, Pikeland CUSD #10, Pittsfield, Sny Island LDD, and Valley City D&LD do not have any warming centers designated. In addition, there are no State of Illinois-designated warming centers in Pike County.

Figure EC-4
Designated Warming Centers by Participating Jurisdiction

Name/Address	Name/Address
Illini Community Hospital	*Spring Creek Fire Protection District*
Hospital, 640 W. Washington St., Pittsfield	Fire Station, 310 E. Field St., Nebo
Pittsfield Township	
Township Building, 1407 W. Washington St., Pittsfield	

What is the probability of future extreme cold events occurring based on historical data?

Pike County has experienced 44 verified occurrences of extreme cold between 1995 and 2022. With 44 occurrences over the past 28 years, Pike County should expect to experience at least one extreme cold event in any given year. It is important to keep in mind that there are almost certainly gaps in the early extreme cold data. More events have almost certainly occurred than are documented in this section, which means that the probability is almost certainly higher than reported.

There were 12 years over the last 28 years where multiple (two or more) extreme cold events occurred. This indicates that the probability that multiple excessive heat events may occur during any given year within the County is 43%.

What is the probability of future extreme cold events occurring based on modeled future conditions?

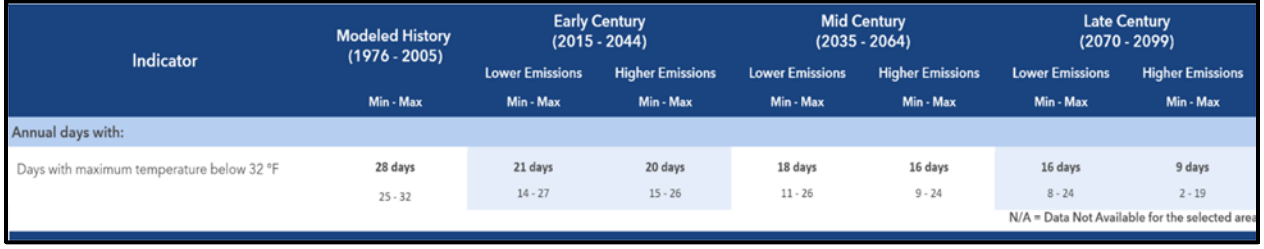
The warming trend observed in Illinois over the past century hasn’t just meant increasingly hotter summers; it has meant milder winters. Over the past 120 years, average temperatures in Illinois have increased by 1° to 2° F according to the Illinois State Climatologist, with the most prominent changes occurring in overnight temperatures and in increased winter and spring temperatures. As a result, extreme cold events are likely to continue to become less common and less intense than they were in the past. The number of days less than 32° F in Illinois are forecasted to decrease in the coming decades.

Reductions in extreme cold events could prevent some of the damages associated with them, both in terms of human health costs and economic costs.

Figures EC-5, EC-6, and **EC-7** provide tabular and graphical projections for Pike County, showing estimations for number of days where high temperatures will not exceed 32° F in the early, mid, and late 21st century with both low and high estimates for each time period. Most likely, the true value will fall between these two estimates. By midcentury, the average number of days per year not exceeding 32° F in Pike County is forecasted to decrease from around 28 today to around 18 according to the Climate Mapping for Resilience and Adaptation's Assessment Tool.

By contrast, projections from Great Lakes Integrated Sciences + Assignments indicate that there is likely to be little to no change in the number of days per year where temperatures will fall below 20° F by midcentury in Pike County.

Figure EC-5
Average Annual Precipitation Projections Table – Pike County



Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Annual days with:							
Days with maximum temperature below 32 °F	28 days 25 - 32	21 days 14 - 27	20 days 15 - 26	18 days 11 - 26	16 days 9 - 24	16 days 8 - 24	9 days 2 - 19

N/A = Data Not Available for the selected area

Figure EC-6
Number of Days with Maximum Temperature
< 32°F Graph – Pike County

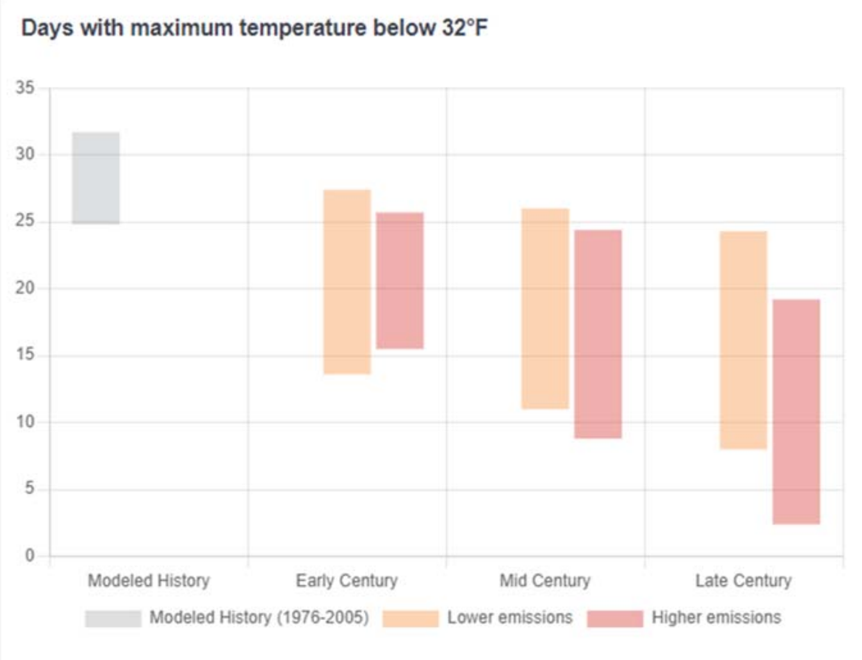
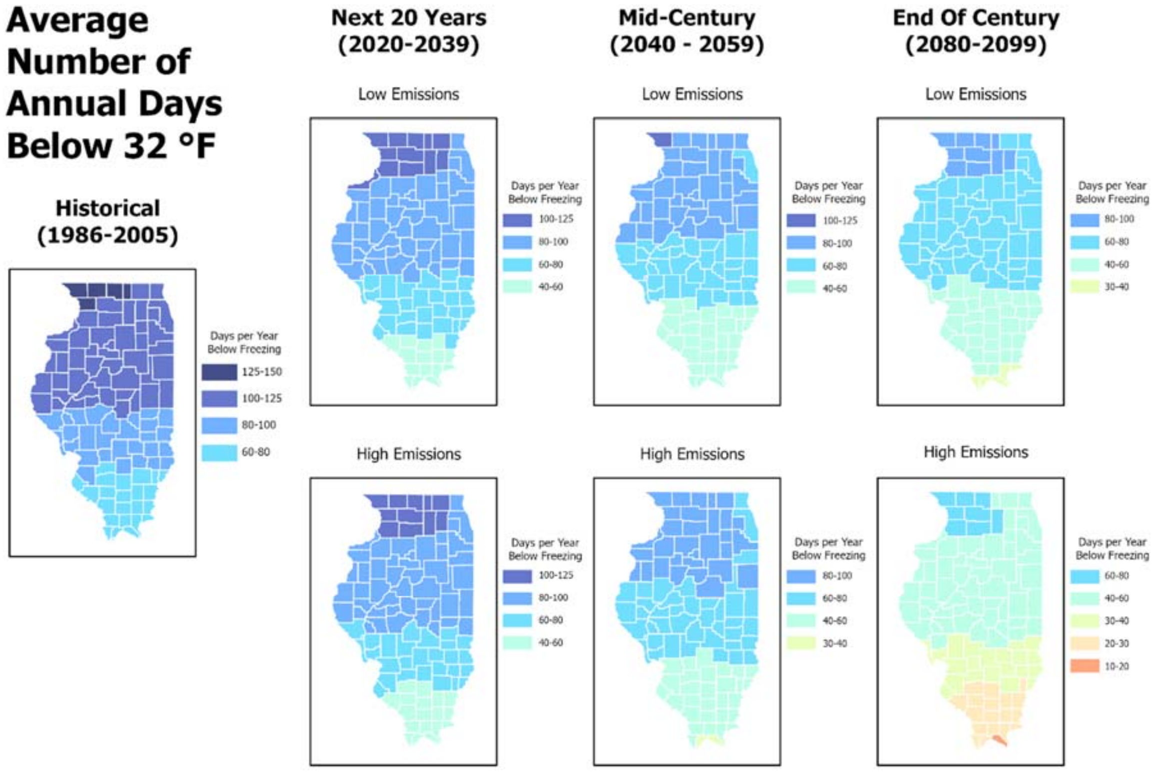


Figure EC-7
Average Number of Annual Days Below 32°F



Maps Created May 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Climate Impact Lab, ESRI

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from extreme cold.

Are the participating jurisdictions vulnerable to extreme cold?

Yes. All of Pike County, including the participating jurisdictions, is vulnerable to the dangers presented by extreme cold. Since 2013, Pike County has experienced 24 extreme cold events.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of extreme cold?

No. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdiction considered specific assets within their jurisdiction vulnerable to extreme cold.

What impacts resulted from the recorded extreme cold events?

Damage information was either unavailable or none was recorded, and no injuries or fatalities were reported as a result of any of the extreme cold events.

In comparison, the State of Illinois averages 18 cold-related fatalities annually according to the Illinois State Water Survey's Climate Atlas of Illinois.

Extreme Cold Fast Facts – Impacts/Risk

Extreme Cold Impacts:
- Total Property Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Extreme Cold Risk/Vulnerability:
- Public Health & Safety – General Population : ***Low to Medium***
- Public Health & Safety – Socially Vulnerable Population: ***Medium***
- Buildings/Infrastructure/Critical Facilities: ***Low***

What other impacts can result from extreme cold events?

Other impacts of extreme cold include early school dismissals and school closing, power outages and frozen and ruptured water pipes and water mains. Individuals who are outdoors during and immediately following extreme cold events can experience health and safety problems. Frostbite to hands, feet, ears and nose and hypothermia are common injuries.

What is the level of risk/vulnerability to public health and safety from severe winter storms and extreme cold?

For Pike County the level of risk or vulnerability posed by extreme cold to public health and safety of the *general population* is considered to be ***low to medium.*** This assessment is based on the fact that while extreme cold events occur regularly, the number of injuries and fatalities reported is low and all but three of the participating municipalities and fire protection districts have designated warming centers.

The level of risk or vulnerability posed by extreme cold to the public health and safety of *socially vulnerable populations* is considered to be ***medium***. Socially vulnerable populations such as individuals with dementia and access and functional needs populations may be more susceptible to cold-related exposures if they become disoriented outdoors during an event and therefore their risk is elevated. However, demographic information is not available for these segments of the population.

Are existing buildings, infrastructure, and critical facilities vulnerable to extreme cold?

Yes. All existing buildings, infrastructure and critical facilities located in Pike County and the participating jurisdictions are vulnerable to damage from extreme cold. Individual water pipes and distribution lines and mains are especially susceptible to freezing during extreme cold events. This freezing can lead to cracks or ruptures in the pipes in buildings as well as in buried service lines and mains. As a result, flooding can occur as well as disruptions in service. Since most buried service lines and water mains are located under local streets and roads, fixing a break requires portions of the street or road to be blocked off, excavated, and eventually repaired. These activities can be costly and must be carried out under less than ideal working conditions.

Based on the frequency with which extreme cold events have occurred in Pike County; the damages described; the amount of property damage previously reported; and the potential for disruptions to power distribution and communication; the risk or vulnerability to buildings, infrastructure and critical facilities from extreme cold events is ***low***.

Are future buildings, infrastructure, and critical facilities vulnerable to extreme cold?

Yes. While Griggsville and Pittsfield have building codes in place that will likely help lessen the vulnerability of new buildings and critical facilities to damage from extreme cold, the County and the four remaining participating municipalities do not. Infrastructure such as residential water pipes will continue to be vulnerable as long as they are located in areas such as outside walls, attics and crawl spaces that do not contain proper insulation.

What are the potential dollar losses to vulnerable structures from extreme cold?

Unlike other natural hazards, such as tornadoes, there are no standard loss estimation models or methodologies for extreme cold events. With none of the recorded events listing property damage figures, there is no way to accurately estimate future potential dollar losses from extreme cold. However, according to the Pike County Clerk's Office the total equalized assessed values of all residential, commercial, and industrial buildings in the planning area is $124,322,202. Since all the structures within Pike County are vulnerable to damage, it is likely this total represents the countywide property exposure to extreme cold.

3.6 TORNADOES

HAZARD IDENTIFICATION

What is the definition of a tornado?

A tornado is a narrow violently rotating column of air, often visible as a funnel-shaped cloud that extends from the base of a thunderstorm cloud formation to the ground. The most violent tornadoes can have wind speeds of more than 300 miles per hour and can create damage paths in excess of one mile wide and 50 miles long.

Not all tornadoes have a visible funnel cloud. Some may appear nearly transparent until dust and debris are picked up or a cloud forms within the funnel. Generally, tornadoes move from southwest to northeast, but they have been known to travel in any direction, even backtracking. A typical tornado travels at around 10 to 20 mile per hour, but this may vary from almost stationary to 60 miles per hour. Tornadoes can occur at any time of the year and happen at any time of the day or night, although most occur between 4 p.m. and 9 p.m.

About 1,200 tornadoes hit the U.S. yearly, with an average 52 tornadoes occurring annually in Illinois. The destruction caused by a tornado may range from light to catastrophic depending on the intensity, size, and duration of the storm. Tornadoes cause crop and property damage, power outages, environmental degradation, injuries, and fatalities. Tornadoes are known to blow roofs off buildings, flip vehicles and demolish homes. Typically, tornadoes cause the greatest damage to structures of light construction, such as residential homes. On average, tornadoes cause 60 to 65 facilities and 1,500 injuries in the U.S. annually.

How are tornadoes rated?

Originally tornadoes were rated using the Fujita Scale (F-Scale), which related the degree of damage caused by a tornado to the intensity of the tornado's wind speed. The Scale identified six categories of damage, F0 through F5. **Figure T-1** gives a brief description of each category.

Use of the original Fujita Scale was discontinued on February 1, 2007 in favor of the Enhanced Fujita Scale. The original scale had several flaws including basing a tornado's intensity and damages on wind speeds that were never scientifically tested and proven. It also did not take into consideration that a multitude of factors (i.e., structure construction, wind direction and duration, flying debris, etc.) affect the damage caused by a tornado. In addition, the process of rating the damage itself was based on the judgment of the damage assessor. In many cases, meteorologists and engineers highly experienced in damage survey techniques often came up with different F-scale ratings for the same damage.

The Enhanced Fujita Scale (EF-Scale) was created to remedy the flaws in the original scale. It continues to use the F0 through F5 categories, but it incorporates 28 different damage indicators (mainly various building types, towers/poles and trees) as calibrated by engineers and meteorologists. For each damage indicator there are eight degrees of damage ranging from barely visible damage to complete destruction of the damage indicator. The wind speeds assigned to each category are estimates, not measurements, based on the damage assessment. **Figure T-1** identifies the Enhanced Fujita Scale.

Figure T-1
Fujita & Enhanced Fujita Tornado Measurement Scales

F-Scale		EF-Scale		Description
Category	**Wind Speed (mph)**	**Category**	**Wind Speed (mph)**	
F0	40 – 72	EF0	65 – 85	Light damage – some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; damage to sign boards
F1	73 – 112	EF1	86 – 110	Moderate damage – peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
F2	113 – 157	EF2	111 – 135	Considerable damage – roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground
F3	158 – 207	EF3	136 – 165	Severe damage – roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown
F4	208 – 260	EF4	166 – 200	Devastating damage – well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated
F5	261 – 318	EF5	Over 200	Incredible damage – strong frame houses lifted off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 yards; trees debarked; incredible phenomena will occur

Source: NOAA, Storm Prediction Center.

The idea behind the EF-Scale is that a tornado scale needs to take into account the typical strengths and weaknesses of different types of construction, instead of applying a "one size fits all" approach. This is due to the fact that the same wind speed can cause different degrees of damage to different kinds of structures. In a real-life application, the degree of damage to each of the 28 indicators can be mapped together to create a comprehensive damage analysis. As with the original scale, the EF-Scale rates the tornado as a whole based on the most intense damage within the tornado's path.

While the EF-Scale is currently in use, ***the historical data presented in this report is based on the original F-Scale***. None of the tornadoes rated before February 1, 2007 will be re-evaluated using the EF-Scale.

Are alerts issued for tornadoes?

Yes. The National Weather Service Weather Forecast Office in St. Louis, Missouri is responsible for issuing ***tornado watches*** and ***warnings*** for Pike County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Watch.** A tornado watch is issued when tornadoes are possible in the area. Individuals need to be alert and prepared. Watches are typically large, covering numerous counties or even states.

- **Warning.** A tornado warning is issued when a tornado has been sighted or indicated by weather radar. Warnings indicate imminent danger to life and property for those who are in the path of the tornado. Individuals should see shelter immediately. Typically, warnings encompass a much smaller area, such as a city or small county.

HAZARD PROFILE

The following identifies past occurrences of tornadoes; details the severity or extent of each event (if known); identifies the locations potentially affected; and estimates the likelihood of future occurrences.

When have tornadoes occurred previously? What is the extent of these previous tornadoes?

Table 10, located in **Appendix I**, summarizes the previous occurrences as well as the extent or magnitude of tornado events recorded in Pike County. NOAA's Storm Events Database, Storm Data Publications, and Storm Prediction Center have documented 34 occurrences of tornadoes in Pike County between 1950 and 2022. In comparison, there have been 2,443 tornadoes statewide between 1950 and 2017 according to NOAA's Storm Prediction Center. **Figure T-2** charts the reported occurrences of tornadoes by magnitude. Of the 34 reported occurrences there were: 2 – F3, 4 – F2s, 6 – F1s, 11 – F0s, 1 – EF2, 3 – EF1s, 6 – EF0s, and 1 – EFU (Unknown).

Tornado Fast Facts – Occurrences

Number of Tornadoes Reported (1950 – 2022): ***34***

Highest F-Scale Rating Recorded: ***F3 (April 24, 1961 & May 14, 1961)***

Most Likely Month for Tornadoes to Occur: ***May***

Average Length of a Tornado: ***4.15 miles***

Average Width of a Tornado: ***59 yards***

Average Damage Pathway of a Tornado: ***0.14 sq. mi.***

Longest Tornado Path in the County: ***29.3 miles (F3 – April 24, 1961)***

Widest Tornado Path in the County: ***250 yards (F0 – July 2, 1992 & F1 – March 30, 2006)***

Figure T-2
Tornadoes by Magnitude
1950 – 2022

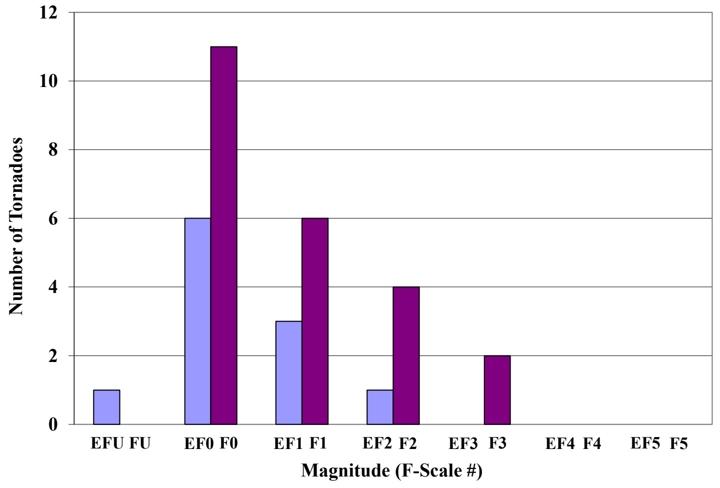
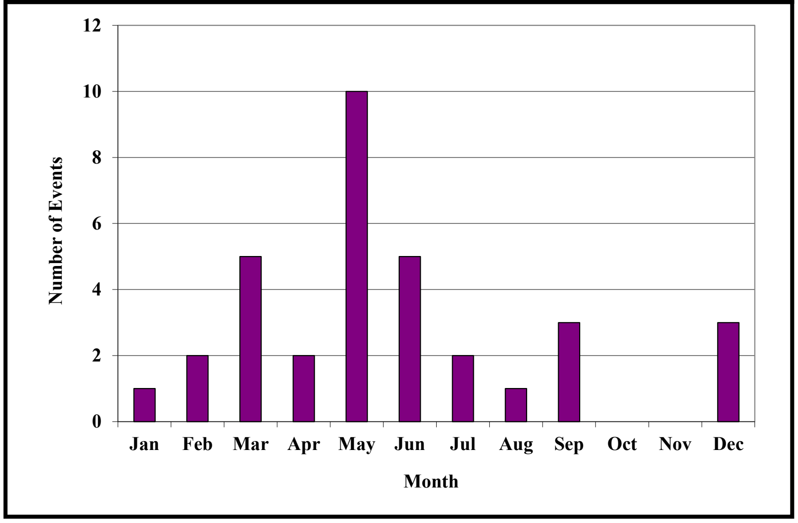


Figure T-3 charts the reported tornadoes by month. Of the 34 events, 15 (44%) took place in May, and June making this the peak period for tornadoes in Pike County. Of those 15 events, 10 (67%) occurred during May, making this the peak month for tornadoes. In comparison, 1,720 of the 2,745 tornadoes (63%) recorded in Illinois from 1950 through 2021 took place in April, May, and June.

Figure T-3
Tornadoes by Month
1950 – 2022



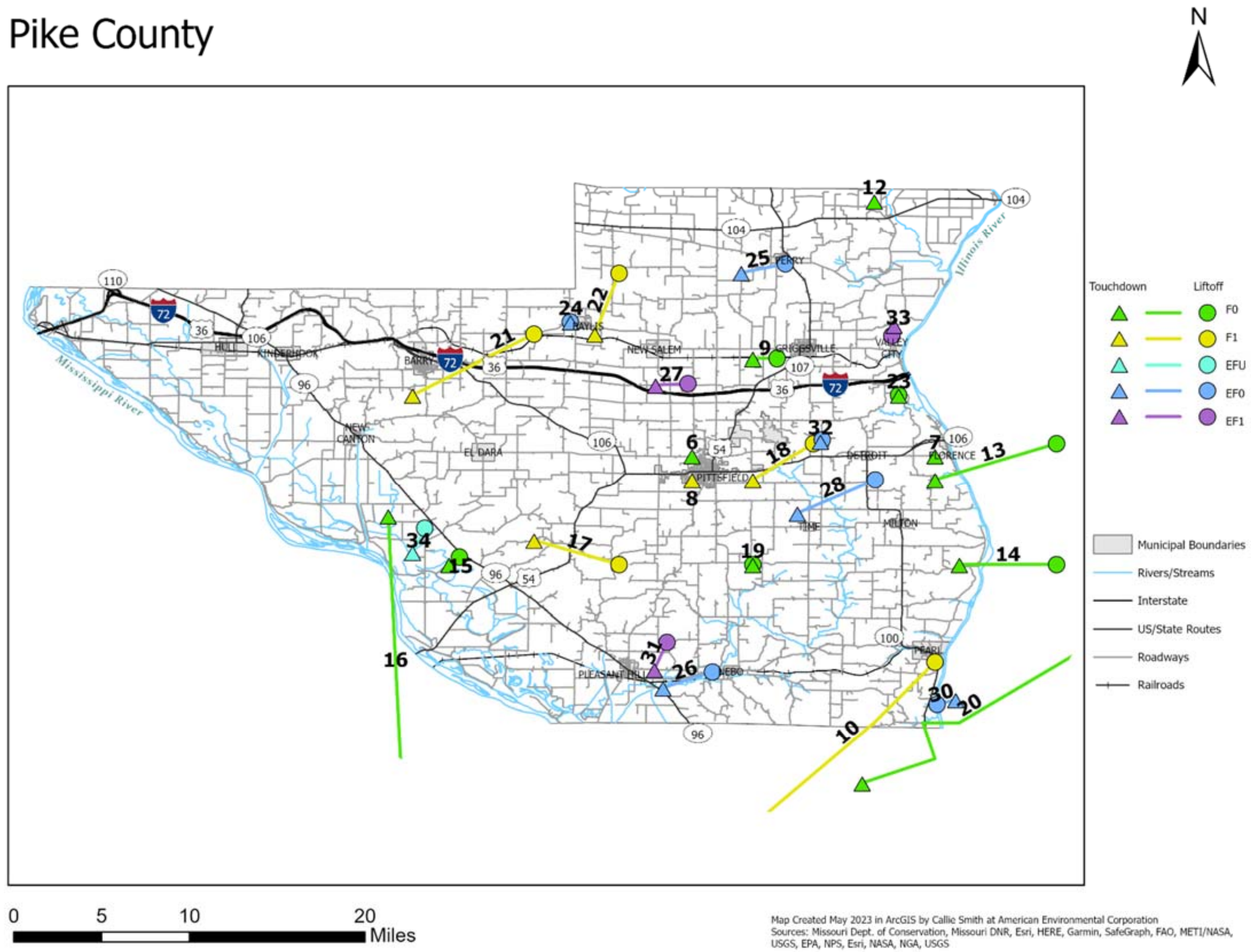
All of the tornadoes in the County occurred during the p.m. hours, with 20 of the events (59%) taking place between 2 p.m. and 8 p.m. In comparison, more than half of all Illinois tornadoes occur between 2 p.m. and 8 p.m.

The tornadoes that have impacted Pike County have varied from 0.1 miles (176 yards) to 29.3 miles in length and from 10 yards to 250 yards in width. The average length of a tornado in Pike County is 4.15 miles and the average width is 59 yards (0.03 miles).

Figures T-4 and **T-5** show the pathway of each reported tornado. Records indicate that most of these tornadoes generally moved from southwest to northeast across the County. Unlike other natural hazards (i.e., severe winter storms, drought, and excessive heat), tornadoes impact a relatively small area. Typically, the area impacted by a tornado is less than four square miles. In Pike County, the average damage pathway or area impacted by a tornado is 0.14 square miles.

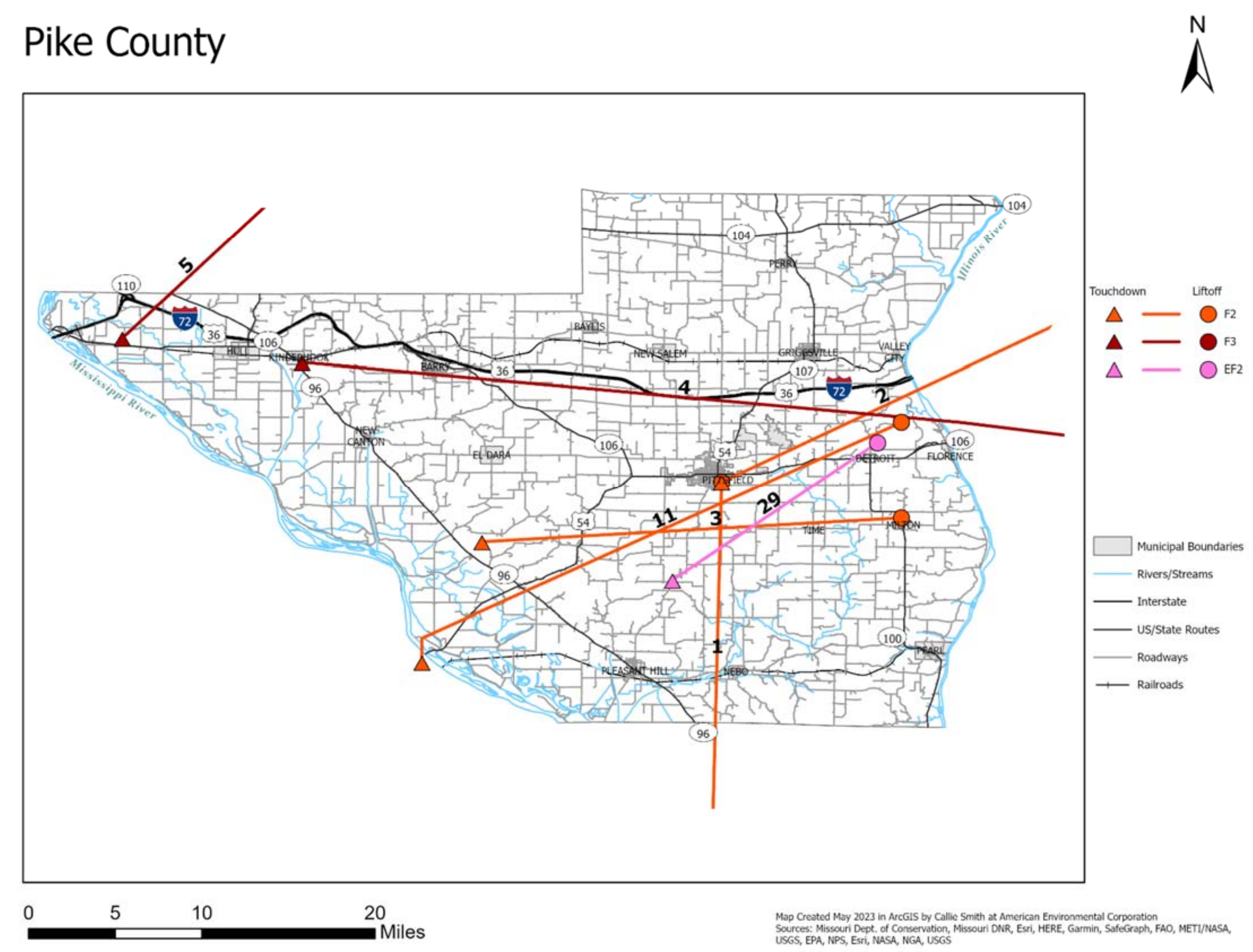
The longest recorded in Pike County occurred on April 24, 1961. This F3 tornado, measuring 10 yards in width and a total of 29.3 miles in length in Pike County, touched down in Pike County near Kinderhook and traveled east-southeast through Scott County and into Morgan County before lifting off south of Wavery. Its total length of was 64.2 mile. The widest tornado in Pike County was 250 yards in width and has occurred twice. On July 2, 1992, an F0 tornado measuring 250 yards wide and 0.1 miles long touched down near Florence. The second tornado occurred on March 30, 2006. This F1 tornado measuring 250 yard wide, and 2.7 miles long touched down near Baylis.

Figure T-4
F0/EF0 & F1/EF1 Tornado Pathways in Pike County



Map Created May 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Figure T-5
F2/EF2 & F3/EF3 Tornado Pathways in Pike County



Map Created May 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

What locations are affected by tornadoes?

Tornadoes have the potential to affect the entire County. Of the six participating municipalities, two have had reported occurrences of tornadoes within their corporate limits. The *2018 Illinois Natural Hazard Mitigation Plan* prepared by IEMA classifies Pike County's hazard rating for tornadoes as "medium."

What is the probability of future tornadoes occurring?

Pike County has had 34 verified occurrences of tornadoes between 1950 and 2022. With 34 tornadoes over the past 73 years, the probability or likelihood that a tornado will touchdown somewhere in the County in any given year is 46.5%. There were seven years over the last 73 years where more than one tornado occurred. This indicates that the probability that more than one tornado may occur during any given year within the County is 9.6%.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from tornadoes.

Are the participating jurisdictions vulnerable to tornadoes?

Yes. All of Pike County, including the participating jurisdictions, is vulnerable to the dangers presented by tornadoes. Since 2013, six tornadoes have been recorded in Pike County.

Of the participating municipalities, Barry and Pittsfield have had a tornado touch down near or pass through their municipal boundaries. **Figure T-6** lists the verified tornadoes that have touched down in or near or passed through each participating municipality.

Figure T-6
Verified Tornadoes In or Near Participating Municipalities

Participating Municipality	Number of Verified Tornadoes	Year	
		Touched Down/Passed Through Municipality	Touched Down/Passed Near Municipality
Barry	3	1956	1961, 2006
Baylis[1,4]	3	---	2006, 2006, 2007
Griggsville	4	---	1996
New Canton[a]	0	---	---
Pearl[4]	3	---	1999, 2006, 2018
Pittsfield[3,4]	6	1956, 1957, 1982, 1993	1999, 2004

[1]Baylis FD [2]Spring Creek FPD [3]Illini Community Hospital [4]Pikeland CUSD #10
[a]Sny Island LDD [b]McGee Creek D&LD [c]Valley City D&LD

In terms of unincorporated areas vulnerable to tornadoes, Rockport has had five tornadoes touch down in or near its vicinity while Martinsburg and Summer Hill have each had two tornadoes. **Figure T-7** details the verified tornadoes that have touched down in or near unincorporated areas in Pike County.

Figure T-7
Verified Tornadoes In or Near Unincorporated Areas of Pike County

Unincorporated Area	**Number of Verified Tornadoes**	**Year**	
		Touched Down/Passed *<u>Through</u>* Unincorporated Area	**Touched Down/Passed *<u>Near</u>* Unincorporated Area**
Atlas[a]	1	---	1999
Chambersburg	1	---	1999
Martinsburg[4]	2	2014	2004
Rockport[a]	5	2002	1957, 2002, 2004, 2018
Summer Hill[4]	2	2004	2004

[1] Baylis FD
[2] Spring Creek FPD
[3] Illini Community Hospital
[4] Pikeland CUSD #10
[a] Sny Island LDD
[b] McGee Creek D&LD
[c] Valley City D&LD

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of tornadoes?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, Griggsville considered specific assets within its jurisdiction vulnerable to tornadoes. The City indicated that tornadoes have the potential to cause power loss to key facilities and infrastructure, including the wastewater treatment plant and drinking water plant/wells.

What impacts resulted from the recorded tornadoes?

Data obtained from NOAA's Storm Events Database, Storm Data Publications and Storm Prediction Center indicates that between 1950 and 2022, six of the 34 tornadoes caused $627,525 in property damages. Three of the tornadoes had property damage totals of at least $150,000. Property damage information was either unavailable or none was recorded for the remaining 28 reported occurrences.

NOAA's Storm Events Database documented four injuries as a result three separate tornado events. Detailed information was not available for one of the events. The following provides a brief description of the remaining two events.

<u>Tornado Fast Facts – Impacts/Risk</u>

<u>Tornado Impacts:</u>
- Total Property Damage (6 events): ***$627,525***
- Total Crop Damage: ***n/a***
- Injuries (3 events): ***4***
- Fatalities: ***n/a***

<u>Tornado Risk/Vulnerability:</u>
- Public Health & Safety – Rural Areas: ***Low to Medium***
- Public Health & Safety – Municipalities: ***High***
- Buildings/Infrastructure/Critical Facilities – Rural Areas: ***Low to Medium***
- Buildings/Infrastructure/Critical Facilities – Municipalities/Populated Unincorp. Areas: ***High***

- On September 30, 2007, an EF0 tornado struck the south side of Perry, causing a tree to fall on a mobile home. Two children inside sustained cuts and bruises.
- A man working on repairing a fend suffered a shoulder injury when struck by flying debris from a shed that was destroyed by an EF2 tornado that touched down in the Detroit area on February 20, 2014.

In comparison, Illinois averages roughly four tornado fatalities annually; however, this number varies widely from year to year.

What other impacts can result from tornadoes?

In addition to causing damage to buildings and properties, tornadoes can damage infrastructure and critical facilities such as roads, bridges, railroad tracks, drinking water treatment facilities, water towers, communication towers, antennae, power substations, transformers, and poles. Depending on the damage done to the infrastructure and critical facilities, indirect impacts on individuals could range from inconvenient (i.e., adverse travel) to life-altering (i.e., loss of utilities for extended periods of time).

What is the level of risk/vulnerability to public health and safety from tornadoes?

According to the 2018 Illinois Natural Hazard Mitigation Plan, Pike County ***ranks in the top third of all counties in Illinois in terms of tornado frequency***. This fact alone suggests that the overall risk posed by tornadoes to public health and safety is medium to low. While frequency is important, other factors must be examined when assessing vulnerability including population distribution and density, the ratings and pathways of previously recorded tornadoes, the presence of high-risk living accommodations (such as high-rise buildings, mobile homes, etc.) and adequate access to health care for those injured following a tornado.

In addition, there are hospitals in Quincy (Adams County), Louisiana, Missouri (Pike County, MO), Hannibal, Missouri (Marion and Ralls Counties), Carrollton (Greene County), and Jacksonville (Morgan County) that are equipped to provide care and have sufficient capacity for the influx of additional patients from one or more counties.

Pike County/Townships/Fire Protection Districts/D&LDs

For Pike County, including the townships, fire protection districts and drainage and levee districts, the level of risk or vulnerability posed by tornadoes to public health and safety is considered to be ***low** to **medium.*** This assessment is based on the fact that tornadoes do not occur frequently in the County and a large majority of the tornadoes that have impacted the County have touched down in rural areas away from concentrated populations. This has contributed to a relatively low number of injuries and fatalities. In addition, the County is not densely populated and there is not a large number of high-risk living accommodations present.

Participating Municipalities (including Schools & Healthcare Facilities)

In general, if a tornado were to touch down or pass through any of the participating municipalities the risk to the public health and safety would be considered ***high***. This is based on the fact that five of the seven of the participating jurisdictions are small in size (less than one square mile) and have relatively dense and evenly distributed populations within their municipal boundaries. As a result, if a tornado were to touch down anywhere within the corporate limits of these municipalities it will have a greater likelihood of causing injuries or even fatalities.

Do any participating jurisdictions have community safe rooms?

No. As a result, if a tornado were to touch down or pass through any of the population centers in the County, then there would be a greater likelihood of injuries and fatalities due to the lack of structures specifically designed and constructed to provide life-safety protection. Each jurisdiction should consider whether the potential impacts to public health and safety from a tornado are considered great enough to warrant the consideration of community safe rooms as a mitigation action.

Are existing buildings, infrastructure, and critical facilities vulnerable to tornadoes?

Yes. All existing buildings, infrastructure, and critical facilities located within the County and participating municipalities are vulnerable to tornado damage. Buildings, infrastructure, and critical facilities located in the path of a tornado usually suffer extensive damage, if not complete destruction.

While some buildings adjacent to a tornado's path may remain standing with little or no damage, all are vulnerable to damage from flying debris. It is common for flying debris to cause damage to roofs, siding, and windows. In addition, mobile homes, homes on crawlspaces, and buildings with large spans (i.e., schools, barns, airport hangers, factories, etc.) are more likely to suffer damage. Most workplaces and many residential units do not provide sufficient protection from tornadoes.

The damages sustained by infrastructure and critical facilities during a tornado are similar to those experienced during a severe storm. There is a high probability that power, communication, and transportation will be disrupted in and around the affected area.

Assessing the Vulnerability of Existing Residential Structures

One way to assess the vulnerability of existing residential structures is to estimate the number of housing units that may be potentially damaged if a tornado were to touch down or pass through any of the participating municipalities or the County. In order to accomplish this, a set of decisions/assumptions must be made regarding:

- the size (area impacted by) of the tornado;
- the method used to estimate the area impacted by the tornado within each jurisdiction; and
- the method used to estimate the number of potentially-damaged housing units.

The following provides a brief discussion of each decision/assumption.

Assumption #1

Size of Tornado = 0.14 sq. miles

Assumption #1: Size of Tornado. To calculate the number of existing residential structures vulnerable to a tornado, the size (area impacted by) of the tornado must first be determined. There are several scenarios that can be used to calculate the size, including the worst case and the average. For this analysis, the area impacted by an average-sized tornado in Pike County will be used since it has a higher probability of recurring. In Pike County, the area impacted by an average-sized tornado is 0.14 square miles. This average is based on more than 70 years of data.

Assumption #2

The entire area impacted by the average-sized tornado falls within the limits of each participating jurisdiction.

Assumption #2: Method for Estimating the Area Impacted. Next, a method for determining the area within each jurisdiction impacted by the average-sized tornado needs to be chosen. There are several methods that can be used including creating an outline of the area impacted by the average-sized tornado and overlaying it on a map of each jurisdiction (most notably the municipalities) to see if any portion of the area falls outside of the corporate limits (which would require additional calculations) or just assume that the entire area of the average-sized tornado falls within the limits of each jurisdiction. For this discussion, it is assumed that the entire area of the average-sized tornado will fall within the limits of the participating jurisdictions.

This method is quicker, easier, and more likely to produce consistent results when the Plan is updated again. There is, however, a greater likelihood that the number of potentially-damaged housing units will be overestimated for those municipalities that have irregular shaped boundaries or occupy less than one square mile.

Assumption #3

The average housing unit density for each municipality will be used to determine the number of potentially-damaged housing units.

Assumption #3: Method for Estimating Potentially-Damaged Housing Units. With the size of the tornado selected and a method for estimating the area impacted chosen, a decision must be made on an approach for estimating the number of potentially-damaged housing units. There are several methods that can be used including overlaying the average-sized tornado on a map of each jurisdiction and counting the impacted housing units or calculating the average housing unit density to estimate the number of potentially-damaged housing units.

For this analysis, the average housing unit density will be used since it provides a realistic perspective on potential residential damages without conducting extensive counts. Using the average housing unit density also allows future updates to the Plan to be easily recalculated and provides an exact comparison to previous estimates.

Calculating Average Housing Unit Density

The average housing unit density can be calculated by taking the number of housing units in a jurisdiction and dividing that by the land area within the jurisdiction. **Figure T-8** provides a sample calculation. **Figure T-9** provides a breakdown of housing unit densities by participating municipality as well as for the unincorporated areas of the County and the County as a whole.

Figure T-8
Calculation of Average Housing Unit Density – Pike County

Total Housing Units in the Jurisdiction ÷ Land Area within the Jurisdiction =
Average Housing Unit Density
(Rounded Up to the Nearest Whole Number)

Pike County: 7,999 housing units ÷ 831.352 sq. miles = 9.622 housing units/sq. mile
(10 housing units)

Figure T-9
Average Housing Unit Density by Participating Jurisdiction

Participating Jurisdiction	Township Location	Total Housing Units (2016-2020)	Mobile Homes (2016-2020)	Land Area (Sq. Miles) (2010)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)
Barry	Barry	718	23	1.432	501.397
Baylis[1,4]	New Salem	94	7	0.471	---
Griggsville	Griggsville	637	77	1.106	575.949
New Canton[a]	Pleasant Vale	157	21	0.881	---
Pearl[4]	Pearl	62	8	1.505	41.196
Pittsfield[3,4]	Pittsfield	2,006	42	4.782	419.490
Unincorp. County		2,726	297	805.745	3.383
County		7,999	672	831.352	9.622

[1] Baylis FDD [2] Spring Creek FPD [3] Illini Community Hospital [4] Pikeland CUSD #10

[a] Sny Island LDD [b] McGee Creek D&LD [c] Valley City D&LD

Source: U.S. Census Bureau.

While the average housing unit density provides an adequate assessment of the number of housing units in areas where the housing density is fairly constant, such as municipalities, it does not provide a realistic assessment for those counties with large, sparsely populated rural areas such as Pike County.

In Pike County, as well as many other west-central Illinois counties, there are pronounced differences in housing unit densities. Approximately 62% of all housing units are located in six of the County's 24 townships (Barry, Griggsville, Kinderhook, Newbery, Pittsfield, and Pleasant Hill), while approximately 61% of all mobile homes are located in nine of the townships (Atlas, Griggsville, Fairmount, Pleasant Hill, Kinderhook, Montezuma, Pittsfield, Pleasant Vale, and Spring Creek). **Figure I-5**, located in Section 1.2, identifies the township boundaries. Tornado damage to buildings (especially mobile homes), infrastructure and critical facilities in these more densely populated townships is likely to be greater than in the rest of the County. While Barry, Baylis, Pearl, and Pittsfield have an ordinance that requires anchoring systems for mobile home that would help limit the damage from lower rated tornadoes, the County, Griggsville and New Canton do not.

This substantial difference in density skews the average *county* housing unit density in Pike County and is readily apparent when compared to the average housing unit densities for each of the townships within the County. **Figure T-10** provides a breakdown of housing unit densities by township and illustrates the differences between the various townships and the County as a whole.

For 18 of the 24 townships, the *average county* housing unit density is greater (in most cases considerably greater) than the *average township* housing unit densities. However, the *average county* housing unit density is considerably less than the housing unit densities for the four most populated townships.

Figure T-10
Average Housing Unit Density by Township

Township	**Incorporated Municipalities Located in Township**	**Total Housing Units (2016-2020)***	**Mobile Homes (2016-2020)***	**Land Area (Sq. Miles) (2020)**	**Average Housing Unit Density (Units/Sq. Mi.) (Raw)**
Atlas [a,4]		307	38	63.766	4.814
Barry	Barry	825	30	38.521	21.417
Chambersburg [b,c]		56	8	29.011	1.930
Cincinnati [a]		63	0	23.846	2.642
Derry	El Dara	157	5	37.414	4.196
Detroit [4]	Detroit, Florence	121	31	26.152	4.627
Fairmount [1,4]		182	58	37.603	4.840
Flint [c]	Valley City	55	32	15.324	3.589
Griggsville [4]	Griggsville	727	83	37.677	19.296
Hadley [1,4]		61	0	36.821	1.657
Hardin [4]	Time	45	7	37.382	1.204
Kinderhook [a]	Hull, Kinderhook	400	45	37.920	10.549
Levee [a]		38	0	22.032	1.725
Martinsburg [4]		220	26	37.743	5.829
Montezuma [4]	Milton	244	36	33.806	7.218
Newburg [4]		398	6	37.203	10.698
New Salem [1,4]	Baylis	335	26	38.222	8.765
Pearl [4]	Pearl	177	16	24.702	7.165
Perry	Perry	294	20	37.206	7.902
Pittsfield [3,4]	Pittsfield	2,001	42	37.793	52.946
Pleasant Hill [a,4]	Pleasant Hill	647	52	37.533	17.238
Pleasant Vale [a]	New Canton	268	37	38.905	6.889
Ross [a]		66	16	27.492	2.401
Spring Creek [2,4]	Nebo	312	58	37.276	8.370
Townships - 6 most populated		4,998	258	226.647	22.052
Townships - 18 least populated		3,001	414	604.703	4.963

[1] Baylis FD
[2] Spring Creek FPD
[3] Illini Community Hospital
[4] Pikeland CUSD #10
[a] Sny Island LDD
[b] McGee Creek D&LD
[c] Valley City D&LD

Source: U.S. Census Bureau.

Estimating the Number of Potentially-Damaged Housing Units

Before an estimate of the number of potentially-damaged housing units can be calculated for the participating municipalities, an additional factor needs to be taken into consideration: the presence of commercial/industrial developments and/or large tracts of undeveloped land. Occasionally villages and cities will annex large tracts of undeveloped land or have commercial/industrial parks/developments located within their corporate limits. In many cases these large tracts of land include very few residential structures. Consequently, including these tracts of land in the calculations to determine the number of potentially-damaged housing units skews the results, especially for very small municipalities. Therefore, to provide a more realistic assessment of the number of potentially-damaged housing units, these areas need to be subtracted from the land area figures obtained from the U.S. Census Bureau.

In Pike County, all of the participating municipalities have large commercial/industrial and/or undeveloped land areas within their municipal boundaries. These areas account for approximately one-fifth to four-fifths of the land area in these municipalities. If these areas are subtracted from the U.S. Census Bureau land area figures, then the remaining land areas have fairly consistent housing unit densities and contain a majority of the housing units. **Figure T-11** provides a breakdown of the refined land area figures for select municipalities. These refined land area figures will be used to update the average housing unit density calculations for these municipalities.

Figure T-11
Refined Land Area Figures for Participating Municipalities with Large Tracts of Commercial/Industrial and Undeveloped Land Areas

Participating Jurisdiction	Land Area (Sq. Miles) (2020)	Estimated Open Land Area & Commercial/ Industrial Tracts (Sq. Miles)	Refined Land Area (Sq. Miles)
Barry	1.432	0.690	0.742
Baylis	0.471	0.380	0.091
Griggsville	1.106	0.530	0.576
New Canton	0.881	0.760	0.121
Pearl	1.505	1.440	0.065
Pittsfield	4.782	0.830	3.952

[1]Baylis FDD [2]Spring Creek FPD [3]Illini Community Hospital [4]Pikeland CUSD #10
[a]Sny Island LDD [b]McGee Creek D&LD [c]Valley City D&LD

With updated average housing unit densities calculated it is relatively simple to provide an estimate of the number of existing potentially-damaged housing units. This can be done by multiplying the average housing unit density by the area impacted by the average-sized Pike County tornado. **Figure T-12** provides a sample calculation.

Figure T-12
Sample Calculation of Potentially-Damaged Housing Units – Pike County

Average Housing Unit Density x Area Impacted by the Average-Sized Pike County Tornado = Potentially-Damaged Housing Units (Rounded Up to the Nearest Whole Number)

Pike County: 9.622 housing units/sq. mile x 0.14 sq. miles = 1.35 housing units
(2 housing units)

The average housing unit density cannot be used to calculate the number of potentially-damaged housing units for municipalities that cover less than one square mile like those in Pike County. The average housing unit density assumes that the land area within the municipality is at least one square mile and as a result distorts the number of potentially-damaged housing units for very small municipalities.

To calculate the number of potentially-damaged housing units for these municipalities, the area impacted by the averaged-sized Pike County tornado is divided by the land area within the municipality to get the impacted land area. The impacted land area is then multiplied by the total number of housing units within the municipality to get the number of potentially-damaged housing units. **Figure T-13** provides a sample calculation. Since the refined land areas in Baylis, New Canton, and Pearl are less than the average area impacted, it is assumed that all of the housing units within these villages will be potentially damaged.

Figure T-13
Sample Calculation of Potentially-Damaged Housing Units
for Municipalities Covering Less Than One Square Mile – Barry

Area Impacted by the Average-Sized Pike County Tornado ÷ Land Area within the Jurisdiction x Total Housing Units in the Jurisdiction = Potentially-Damaged Housing Units
(Rounded Up to the Nearest Whole Number)

Barry: 0.14 sq. mile ÷ 0.742 sq. miles x 718 housing units = 135.47
(136 housing units)

Figures T-14 and **T-15** provide a breakdown of the number of potentially-damaged housing units by participating municipality, as well as by township and for the unincorporated areas of the County and the County as a whole. It is important to note that for the most densely populated townships, the estimated number of potentially-damaged housing units would only be reached if a tornado's pathway included the major municipality within the township. If the tornado remained in the rural portion of the township, then the number of potentially-damaged housing units would be considerably lower.

What is the level of risk/vulnerability to existing buildings, infrastructure, and critical facilities vulnerable from tornadoes?

There are several factors that must be examined when assessing the vulnerability of existing buildings, infrastructure, and critical facilities to tornadoes. These factors include tornado frequency, population distribution and density, the ratings and pathways of previously recorded tornadoes, and the presence of high-risk living accommodations (such as high-rise buildings, mobile homes, etc.)

Unincorporated Pike County/Fire Protection Districts/Townships/D&LD

For Pike County, the level of risk or vulnerability posed by tornadoes to existing buildings, infrastructure and critical facilities is considered to be ***low***. This assessment is based on the frequency with which tornadoes have occurred in the County, as well as the amount of damage that has been sustained tempered by the low population density throughout most the County and the relative absence of high risk living accommodations. While previously recorded tornadoes have followed largely rural pathways, they have caused significant damage on several occasions.

Figure T-14
Estimated Number of Housing Units by Participating Jurisdiction Potentially Damaged by a Tornado

Participating Jurisdiction	Total Housing Units (2016-2020)	Land Area/Refined Land Area (Sq. Miles) (2020)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.14 Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.14 Sq. Mi.) (Rounded Up)
Barry	718	0.742	---	135.47	136
Baylis[1,4]	94	0.091	---	144.62	145
Griggsville	637	0.276	---	154.83	155
New Canton [a]	157	0.386	---	157.00	157
Pearl[4]	62	0.434	---	62.00	62
Pittsfield[3,4]	2,006	0.121	507.591	71.06	72
Unincorp. County	2,726	805.745	3.383	0.47	1
County	7,999	831.352	9.622	1.35	2

[1] Baylis FD [2] Spring Creek FPD [3] Illini Community Hospital [4] Pikeland CUSD #10
[a] Sny Island LDD [b] McGee Creek D&LD [c] Valley City D&LD

Participating Municipalities (including Schools and Healthcare Facilities)

In general, if a tornado were to touch down or pass through any of the participating municipalities the risk to existing buildings, infrastructure, and critical facilities would be considered ***high***. This assessment is based on the population and housing unit distribution within the municipalities where wide expanses of open spaces do not generally exist. As a result, if a tornado were to touch down within any of the municipalities it would have a greater likelihood of causing substantial property damage.

Are future buildings, infrastructure, and critical facilities vulnerable to tornadoes?

Yes and No. While Griggsville and Pittsfield have building codes in place that will likely lessen the vulnerability of new buildings and critical facilities to damage from tornadoes, the County and four remaining municipalities do not. However, even new buildings and critical facilities built to code are vulnerable to the risks posed by a higher rated tornado.

Infrastructure such as new communication and power lines will continue to be vulnerable to tornadoes as long as they are located above ground. Flying debris can disrupt power and communication lines even if they are not directly in the path of the tornado. Steps to bury all new lines would eliminate the vulnerability, but this action would be cost prohibitive in most areas.

What are the potential dollar losses to vulnerable structures from tornadoes?

Unlike other hazards, such as flooding, there are no standard loss estimation models or methodologies for tornadoes. However, a rough estimate of potential dollar losses to the *potentially-damaged housing units* determined previously can be calculated if several additional decisions/assumptions are made regarding:

- ➢ the value of the potentially-damaged housing units; and
- ➢ the percent damage sustained by the potentially-damaged housing units (i.e., damage scenario).

Figure T-15
Estimated Number of Housing Units by Township Potentially Damaged by a Tornado

Township	Total Housing Units (2016-2020)	Land Area (Sq. Miles) (2020)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.14 Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.14 Sq. Mi.) (Rounded Up)
Atlas [a,4]	307	63.766	4.814	0.67	1
Barry	825	38.521	21.417	3.00	3
Chambersburg [b,c]	56	29.011	1.930	0.27	1
Cincinnati [a]	63	23.846	2.642	0.37	1
Derry	157	37.414	4.196	0.59	1
Detroit [4]	121	26.152	4.627	0.65	1
Fairmount [1,4]	182	37.603	4.840	0.68	1
Flint [c]	55	15.324	3.589	0.50	1
Griggsville [4]	727	37.677	19.296	2.70	3
Hadley [1,4]	61	36.821	1.657	0.23	1
Hardin [4]	45	37.382	1.204	0.17	1
Kinderhook [a]	400	37.920	10.549	1.48	2
Levee [a]	38	22.032	1.725	0.24	1
Martinsburg [4]	220	37.743	5.829	0.82	1
Montezuma [4]	244	33.806	7.218	1.01	2
Newburg [4]	398	37.203	10.698	1.50	2
New Salem [1,4]	335	38.222	8.765	1.23	2
Pearl [4]	177	24.702	7.165	1.00	2
Perry	294	37.206	7.902	1.11	2
Pittsfield [3,4]	2,001	37.793	52.946	7.41	8
Pleasant Hill [a,4]	647	37.533	17.238	2.41	3
Pleasant Vale [a]	268	38.905	6.889	0.96	1
Ross [a]	66	27.492	2.401	0.34	1
Spring Creek [2,4]	312	37.276	8.370	1.17	2
Townships - 6 most populated	4,998	226.647	22.052	3.09	4
Townships - 18 least populated	3,001	604.703	4.963	0.69	1

[1] Baylis FD
[2] Spring Creek FPD
[3] Illini Community Hospital
[4] Pikeland CUSD #10
[a] Sny Island LDD
[b] McGee Creek D&LD
[c] Valley City D&LD

These assumptions represent a ***probable scenario*** based on the reported historical occurrences of tornadoes in Pike County. The purpose of providing a rough estimate is to help residents and municipal/county officials make informed decisions to better protect themselves and their communities. These estimates are meant to provide a ***general idea*** of the magnitude of the potential damage that could occur. The following provides a brief discussion of each decision/assumption.

Assumption #4

The average market value for residential structures in each participating jurisdiction will be used to determine the value of potentially-damaged housing units.

Assumption #4: Value of Potentially-Damaged Housing Units. In order to determine the potential dollar losses to the potentially-damaged housing units, the monetary value of the units must first be calculated. Typically, when damage estimates are prepared after a natural disaster such as a tornado, they are based on the market value of the structure. Since it would be impractical to determine the individual market value of each potentially-damaged housing unit, the average market value of residential structures in each municipality will be used.

To determine the average market value, the average assessed value must first be calculated. The average assessed value is calculated by taking the total assessed value of residential buildings within a jurisdiction and dividing that number by the total number of housing units within the jurisdiction. The average market value is then determined by taking the average assessed value and multiplying that number by three (the assessed value of a structure in Pike County is approximately one-third of the market value). **Figure T-16** provides a sample calculation. The total assessed value is based on 2020 tax assessment information provided by the Pike County Clerk's Office.

Figure T-16
Sample Calculation of Average Assessed Value & Average Market Value – Barry

Average Assessed Value

Total Assessed Value of Residential Buildings in the Jurisdiction÷ Total Housing Units in the Jurisdiction = Average Assessed Value (Rounded to the Nearest Dollar)

Barry:$8,470,772 ÷ 718 housing units =$11,798

Average Market Value

Average Assessed Value x 3 = Average Market Value

Barry:$11,798 x 3 =$35,394
($35,394)

Figures T-17 and **T-18** provide the average assessed value and average market value for each participating municipality as well as by township and for the unincorporated areas of the County and the County as a whole.

Assumption #5

The tornado would completely destroy the potentially-damaged housing units.

Structural Damage = 100%
Content Damage = 100%

Assumption #5: Damage Scenario. Finally, a decision must be made regarding the percent damage sustained by the potentially-damaged housing units and their contents. For this scenario, the expected percent damage sustained by the structure and its contents is 100%; in other words, all of the potentially-damaged housing units would be completely destroyed. While it is highly unlikely that each and every housing unit would sustain the maximum percent damage, identifying and calculating different degrees of damage within the average area impacted is complex and provides an additional complication when updating the Plan.

Figure T-17
Average Market Value of Housing Units by Participating Jurisdiction

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2020)	Total Housing Units (2016-2020)	Average Assessed Values	Average Market Value (2020)
Barry	$8,470,772	718	$11,798	$35,394
Baylis[1,4]	$570,372	94	$6,068	$18,204
Griggsville	$6,494,308	637	$10,195	$30,585
New Canton [a]	$1,342,197	157	$8,549	$25,647
Pearl[4]	$442,760	62	$7,141	$21,423
Pittsfield[3,4]	$36,680,326	2,006	$18,285	$54,855
Unincorp. County	$18,459,935	2,726	$6,772	$20,316
County	$86,499,879	7,999	$10,814	$32,442

[1] Baylis FD [2] Spring Creek FPD [3] Illini Community Hospital [4] Pikeland CUSD #10
[a] Sny Island LDD [b] McGee Creek D&LD [c] Valley City D&LD

Source: Pike County Clerk's Office.

Calculating Potential Dollar Losses

With all the decisions and assumptions made, the potential dollar losses can now be calculated. First, the potential dollar losses to the ***structure*** of a potentially-damaged housing unit must be determined. This is done by taking the average market value for a residential structure and multiplying it by the percent damage (100%) to get the average structural damage per unit. Next the average structural damage per unit is multiplied by the number of potentially-damaged housing units. **Figure T-19** provides a sample calculation.

Figure T-19
Structure: **Potential Dollar Loss Sample Calculation – Barry**

Average Market Value of a Housing Unit with the Jurisdiction x Percent Damage = Average Structural Damage per Housing Unit
Barry:$35,394 x 100% =$35,394 per housing unit

Average Structural Damage per Housing Unit x Number of Potentially-Damaged Housing Units within the Jurisdiction = *Structure* Potential Dollar Losses
Barry:$35,394 per housing unit x 136 housing units =$4,813,584
($4,813,584)

Next, the potential dollar losses to the ***content*** of a potentially-damaged housing unit must be determined. Based on FEMA guidance, the average value of a residential housing unit's content is approximately 50% of its market value. Therefore, start by taking one-half the average market value for a residential structure and multiply by the percent damage (100%) to get the average content damage per unit. Next the average content damage per unit is multiplied by the number of potentially-damaged housing units. **Figure T-20** provides a sample calculation.

Figure T-18
Average Market Value of Housing Units by Township

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2020)	Total Housing Units (2016-2020)	Average Assessed Values	Average Market Value (2020)
Atlas [a,4]	$2,298,796	307	$7,488	$22,464
Barry	$9,718,795	825	$11,780	$35,341
Chambersburg [b,c]	$368,592	56	$6,582	$19,746
Cincinnati [a]	$227,920	63	$3,618	$10,853
Derry	$511,122	157	$3,256	$9,767
Detroit [4]	$1,340,408	121	$11,078	$33,233
Fairmount [1,4]	$517,364	182	$2,843	$8,528
Flint [c]	$159,293	55	$2,896	$8,689
Griggsville [4]	$7,285,916	727	$10,022	$30,066
Hadley [1,4]	$475,874	61	$7,801	$23,404
Hardin [4]	$553,368	45	$12,297	$36,891
Kinderhook [a]	$3,921,887	400	$9,805	$29,414
Levee [a]	$162,518	38	$4,277	$12,830
Martinsburg [4]	$1,427,059	220	$6,487	$19,460
Montezuma [4]	$2,188,091	244	$8,968	$26,903
Newburg [4]	$8,333,544	398	$20,939	$62,816
New Salem [1,4]	$1,597,606	335	$4,769	$14,307
Pearl [4]	$701,172	177	$3,961	$11,884
Perry	$2,137,339	294	$7,270	$21,810
Pittsfield [3,4]	$32,797,274	2,001	$16,390	$49,171
Pleasant Hill [a,4]	$6,110,319	647	$9,444	$28,332
Pleasant Vale [a]	$2,108,903	268	$7,869	$23,607
Ross [a]	$233,306	66	$3,535	$10,605
Spring Creek [2,4]	$1,323,413	312	$4,242	$12,725
Townships - 6 most populated	$68,167,735	4,998	$13,639	$40,917
Townships - 18 least populated	$18,332,144	3,001	$6,109	$18,326

[1] Baylis FD [2] Spring Creek FPD [3] Illini Community Hospital [4] Pikeland CUSD #10
[a] Sny Island LDD [b] McGee Creek D&LD [c] Valley City D&LD

Source: Pike County Clerk's Office.

Figure T-20
Content: Potential Dollar Loss Sample Calculation – Barry

½ (Average Market Value of a Housing Unit) with the Jurisdiction x Percent Damage = Average Content Damage per Housing Unit
Barry: ½ ($35,394) x 100% =$17,697 per housing unit

Average Content Damage per Housing Unit x Number of Potentially-Damaged Housing Units within the Jurisdiction = *Content* Potential Dollar Losses
Barry:$17,697 per housing unit x 136 housing units =$2,406,792
($2,406,792)

Finally, the ***total potential dollar losses*** may be calculated by adding together the potential dollar losses to the structure and content. **Figures T-21** and **T-22** give a breakdown of the total potential dollar losses by municipality and township.

This assessment illustrates why potential residential dollar losses should be considered when jurisdictions are deciding which mitigation projects to pursue. ***Potential dollar losses caused by an average tornado in Pike County would be expected to exceed at least $3.9 million in any of the participating municipalities, with the exception of Pearl.***

Figure T-21
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Tornado by Participating Jurisdiction

Participating Jurisdiction	Average Market Value (2020)	Potentially-Damaged Housing Units (Rounded Up)	Potential Dollar Losses		Total Potential Dollar Losses
			Structure	Content	
Barry	$35,394	136	$4,813,584	$2,406,792	$7,220,376
Baylis[1,4]	$18,204	145	$2,639,580	$1,319,790	$3,959,370
Griggsville	$30,585	155	$4,740,675	$2,370,338	$7,111,013
New Canton [a]	$25,647	157	$4,026,579	$2,013,290	$6,039,869
Pearl[4]	$21,423	62	$1,328,226	$664,113	$1,992,339
Pittsfield[3,4]	$54,855	72	$3,949,560	$1,974,780	$5,924,340
Unincorp. County	$20,316	1	$20,316	$10,158	$30,474
County	$32,442	2	$64,884	$32,442	$97,326

[1] Baylis FD [2] Spring Creek FPD [3] Illini Community Hospital [4] Pikeland CUSD #10
[a] Sny Island LDD [b] McGee Creek D&LD [c] Valley City D&LD

For comparison, an estimate of potential dollar losses was calculated for the entire County, the unincorporated portions of the County, the six most populated townships and the 18 least populated townships. As discussed previously, the estimate for the entire County is skewed because it does not take into consideration the differences in the housing density.

Vulnerability of Commercial/Industrial Businesses and Infrastructure/Critical Facilities

The calculations presented above are meant to provide the reader with a sense of the scope or magnitude of an average-sized tornado in term of residential dollar losses. These calculations do not include damages sustained by businesses or other infrastructure and critical facilities within the participating jurisdictions.

In terms of businesses, the impacts from an average-sized tornado event can be physical and/or monetary. Monetary impacts can include loss of sales revenue either through temporary closure or loss of critical services (i.e., power, drinking water, and sewer). Depending on the magnitude of the event, the damage sustained by infrastructure and critical facilities can be extensive in nature and expensive to repair. As a result, the cumulative monetary impacts to businesses and infrastructure can exceed the cumulative monetary impacts to residences. ***While average dollar***

amounts cannot be supplied for these items at this time, they should be taken into account when discussing the impacts that an average-sized tornado could have on the participating jurisdictions.

Figure T-22
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Tornado by Township

Participating Jurisdiction	**Average Market Value (2020)**	**Potentially-Damaged Housing Units (Rounded Up)**	**Potential Dollar Losses**		**Total Potential Dollar Losses**
			Structure	**Content**	
Atlas [a,4]	$22,464	1	$22,464	$11,232	$33,696
Barry	$35,341	3	$106,023	$53,012	$159,035
Chambersburg [b,c]	$19,746	1	$19,746	$9,873	$29,619
Cincinnati [a]	$10,853	1	$10,853	$5,427	$16,280
Derry	$9,767	1	$9,767	$4,884	$14,651
Detroit [4]	$33,233	1	$33,233	$16,617	$49,850
Fairmount [1,4]	$8,528	1	$8,528	$4,264	$12,792
Flint [c]	$8,689	1	$8,689	$4,345	$13,034
Griggsville [4]	$30,066	3	$90,198	$45,099	$135,297
Hadley [1,4]	$23,404	1	$23,404	$11,702	$35,106
Hardin [4]	$36,891	1	$36,891	$18,446	$55,337
Kinderhook [a]	$29,414	2	$58,828	$29,414	$88,242
Levee [a]	$12,830	1	$12,830	$6,415	$19,245
Martinsburg [4]	$19,460	1	$19,460	$9,730	$29,190
Montezuma [4]	$26,903	2	$53,806	$26,903	$80,709
Newburg [4]	$62,816	2	$125,632	$62,816	$188,448
New Salem [1,4]	$14,307	2	$28,614	$14,307	$42,921
Pearl [4]	$11,884	2	$23,768	$11,884	$35,652
Perry	$21,810	2	$43,620	$21,810	$65,430
Pittsfield [3,4]	$49,171	8	$393,368	$196,684	$590,052
Pleasant Hill [a,4]	$28,332	3	$84,996	$42,498	$127,494
Pleasant Vale [a]	$23,607	1	$23,607	$11,804	$35,411
Ross [a]	$10,605	1	$10,605	$5,303	$15,908
Townships - 6 most populated	$40,917	4	$163,668	$81,834	$245,502
Townships - 18 least populated	$18,326	1	$18,326	$9,163	$27,489

[1] Baylis FD
[2] Spring Creek FPD
[3] Illini Community Hospital
[4] Pikeland CUSD #10
[a] Sny Island LDD
[b] McGee Creek D&LD
[c] Valley City D&LD

3.7 DROUGHTS

HAZARD IDENTIFICATION

What is the definition of a drought?

While difficult to define, the National Drought Mitigation Center (NDMC) considers "drought" in its most general sense to be a deficiency of precipitation over an extended period of time, usually a season or more, resulting in a water shortage.

Drought is a normal and recurrent feature of climate and can occur in all climate zones, though its characteristics and impacts vary significantly from one region to another. Unlike other natural hazards, drought does not have a clearly defined beginning or end. Droughts can be short, lasting just a few months, or they can persist for several years. There have been 26 drought events with losses exceeding $1 billion each (CPI-Adjusted) across the U.S. between 1980 and 2018. This is due in part to the sheer size of the areas affected.

What types of drought occur?

There are four main types of drought that occur: meteorological, agricultural, hydrological, and socioeconomic. They are differentiated based on the use and need for water. The following provides a brief description of each type.

- **Meteorological Drought.** Meteorological drought is defined by the degree of dryness or rainfall deficit and the duration of the dry period. Due to climate differences, what might be considered a drought in one location of the country may not be in another location.
- **Agricultural Drought.** An agricultural drought refers to a period when rainfall deficits, soil moisture deficits, reduced ground water or reservoir levels needed for irrigation impact crop development and yields.
- **Hydrological Drought.** Hydrological drought refers to a period when precipitation deficits (including snowfall) impact surface (stream flow, reservoir and lake levels) and subsurface (aquifers) water supply levels.
- **Socioeconomic Drought.** Socioeconomic drought refers to a period when the demand for an economic good (fruit, vegetables, grains, etc.) exceeds the supply as a result of weather-related shortfall in the water supply.

How are droughts measured?

There are numerous quantitative measures (indicators and indices) that have been developed to measure drought. How these indicators and indices measure drought depends on the discipline affected (i.e., agriculture, hydrology, meteorology, etc.) and the region being considered. There is no single index or indicator that can account for and be applied to all types of drought.

Although none of the major indices are inherently superior to the rest, some are better suited than others for certain uses. The first comprehensive drought index developed in the U.S. was the Palmer Drought Severity Index (PDSI). The PDSI is calculated based on precipitation and temperature data, as well as the local Available Water Content of the soil. It is most effective measuring drought impacts on agriculture. For many years it was the only operational drought index, and it is still very popular around the world.

The Standardized Precipitation Index (SPI), developed in 1993, uses precipitation records for any location to develop a probability of precipitation for any time scale in order to reflect the impact of drought on the availability of different water resources (groundwater, reservoir storage, streamflow, snowpack, etc.) In 2009 the World Meteorological Organization recommended SPI as the main meteorological drought index that countries should use to monitor and follow drought conditions.

The first operational 'composite' approach applied in the U.S. was the U.S. Drought Monitor (USDM). The USDM utilizes five key indicators, numerous supplementary indicators, and local reports from expert observers around the country to produce a drought intensity rating that is ideal for monitoring droughts that have many impacts, especially on agriculture and water resources during all seasons over all climate types. NOAA's Storm Events Database records include USDM ratings and utilized them along with additional weather information to describe the severity of the drought conditions impacting affected counties. Therefore, this Plan will utilize USDM ratings to identify and describe previous drought events recorded within the County. The following provides a more detailed discussion of the USDM to aid the Plan's developers and the general public in understanding how droughts are identified and categorized.

U.S. Drought Monitor (USDM)

Established in 1999, the USDM is a relatively new index that combines quantitative measures with input from experts in the field. It is designed to provide the general public, media, government officials and others with an easily understandable "big picture" overview of drought conditions across the U.S. It is unique in that it combines a variety of numeric-based drought indices and indicators with local expert input to create a single composite drought indicator, the results of which are illustrated via a weekly map that depicts the current drought conditions across the U.S. The USDM is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the U.S. Department of Agriculture, and the National Oceanic and Atmospheric Administration.

The USDM has a scale of five intensity categories, D0 through D4, that are utilized to identify areas of drought. **Figure DR-1** provides a brief description of each category.

Because the ranges of the various indicators often don't coincide, the final drought category tends to be based on what a majority of the indictors show and on local observations. The authors also weight the indices according to how well they perform in various parts of the country and at different times of the year. It is the combination of the best available data, location observations and experts' best judgment that make the U.S. Drought Monitor more versatile than other drought indices.

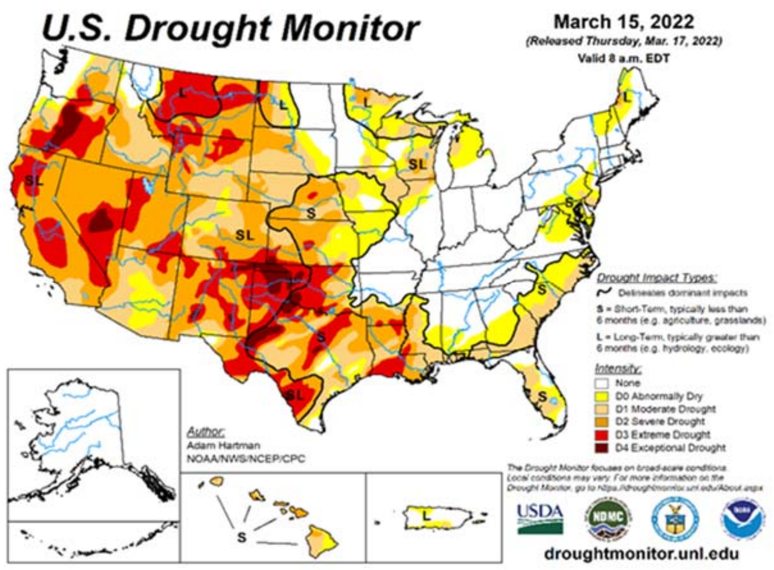
In addition to identifying and categorizing general areas of drought, the USDM also identifies whether a drought's impacts are short-term (typically less than 6 months – agriculture, grasslands) or long-term (typically more than 6 months – hydrology, ecology). **Figure DR-2** shows an example of the USDM weekly map. The USDM is designed to provide a consistent big-picture look at drought conditions in the U.S. It is not designed to infer specifics about local conditions.

Figure DR-1
U.S. Drought Monitor – Drought Intensity Categories

Category	Possible Impacts
D0 (Abnormally Dry)	• Going into drought: - short-term dryness slowing planting, growth of crops or pastures. • Coming out of drought: - some lingering water deficits - pastures or crops not fully recovered
D1 (Moderate Drought)	• Some damage to crops, pastures • Streams, reservoirs, or wells low; some water shortages developing or imminent • Voluntary water-use restrictions requested
D2 (Severe Drought)	• Crop or pasture losses likely • Water shortages common • Water restrictions imposed
D3 (Extreme Drought)	• Major crop/pasture losses • Widespread water shortages or restrictions
D4 (Exceptional Drought)	• Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies

Source: U.S. Drought Monitor.

Figure DR-2
U.S. Drought Monitor



The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the U.S. Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map Courtesy of NDMC.

HAZARD PROFILE

The following identifies past occurrences of drought, details the severity or extent of each event (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

When have droughts occurred previously? What is the extent of these previous droughts?

Drought Fast Facts – Occurrences

Number of Drought Events Reported (1980 – 2022): ***7***

Table 11, located in **Appendix I**, summarizes the previous occurrences as well as the extent or magnitude of the drought events recorded in Pike County. NOAA's Storm Events Database, the Illinois State Water Survey, the Illinois Emergency Management Agency (IEMA), the NDMC at the University of Nebraska-Lincoln, and the USDA have documented seven official droughts for Pike County between 1980 and 2022.

The recorded drought events with available durations ranged in length from four to 16 months, with two of the events beginning in June (29%) and two events beginning in August (29%). Of the five drought events that were assigned drought intensity category ratings by the USDM, the 2005 and 2012 droughts reached D3, extreme drought.

The State of Illinois Drought Preparedness and Response Plan identified seven additional outstanding statewide droughts since 1900 based on statewide summer values of the PDSI provided by NOAA's National Center for Environmental Information. Those seven droughts occurred in 1902, 1915, 1931, 1934, 1936, 1954 and 1964; however, the extent to which Pike County was impacted was unavailable.

What locations are affected by drought?

Drought events affect the entire County. Droughts, like excessive heat and severe winter storms, tend to impact large areas, extending across an entire region and affecting multiple counties. The *2018 Illinois Natural Hazard Mitigation Plan* classifies Pike County's hazard rating for drought as "low."

What is the probability of future drought events occurring based on historical data?

Pike County, including the participating jurisdictions, has experienced seven droughts between 1980 and 2022. With seven occurrences over 43 years, the probability or likelihood that the County may experience a drought in any given year is 16%. However, if earlier recorded droughts are factored in, then the probability that Pike County may experience a drought in any given year decreases to 11.5%.

What is the probability of future drought events occurring based on modeled future conditions?

Despite precipitation trending upwards in Illinois in recent decades, drought conditions are likely to be more problematic in the future than they have been in the recent past, due to a combination of changes in precipitation patterns and an increase in summer temperatures.

In terms of predicting the likelihood of drought conditions, the amount of precipitation received is important, but even more critical is the timing of precipitation events. More frequent precipitation events maintain soil in a spongy, porous state that readily absorbs moisture; alternatively, more infrequent precipitation events tend to lead to dry, hardened earth, which is more effective at repelling water than absorbing it. When a precipitation event does occur over this drought-stricken soil, most of the water runs off and pools in bottomlands, leaving most land 'high and dry' while simultaneously flooding the lowest-lying areas.

Another factor making this outcome more likely is the trend of increasing temperatures in Illinois, particularly during the summer when rain events are already more sporadic. Over the past 120 years, average temperatures in Illinois have increased by 1°F and 2°F according to the Illinois State Climatologist, a trend that is likely to continue. In the future, hotter summer temperatures are likely to lead to more evaporation that will exacerbate dry conditions, causing droughts to intensify more rapidly and become more intense.

Figures SS-8 and **SS-9,** located in Section 3.1, and **Figures EH-6, EH-7,** and **EH-8,** located in Section 3.4, provide tabular and graphical projections for Pike County showing average annual estimates for temperature and precipitation in the early, mid, and late century, with both low and high estimates for each time period. Most likely, the true values will fall between these two estimates. According to the Climate Mapping for Resilience and Adaptation's Assessment Tool, the number of days over 90°F in Pike County are projected to more than double, while days exceeding 100°F are likely to increase from an average of one day a year today to 11 to 15 days by midcentury. It also forecasts that the average annual precipitation in Pike County is likely to increase by an inch per year, while the average number of days per year without precipitation is projected to increase by 3 to 5 days.

The Climate Explorer indicates that in Pike County, the average number of dry spell (a period of consecutive days without precipitation) is projected to increase by one. Extreme temperatures on the hottest days of the year are projected to increase by 7°F. This is based on the findings of the 2018 National Climate Assessment and compares projections for the middle third of the century (2035-2064) with average conditions observed from 1961-1990.

In combination, a decrease in the frequency of precipitation and a significant increase in the number of days with extreme heat in Pike County would create conditions that will be more likely to produce droughts than today.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from drought.

Are the participating jurisdictions vulnerable to drought?

Yes. All of Pike County, including the participating jurisdictions, is vulnerable to drought. Neither the amount nor the distribution of precipitation; soil types; topography; or water table conditions provides protection for any area within the County. Since 2013, Pike County has experienced one drought.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of drought?

No. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdiction considered specific assets within their jurisdiction vulnerable to drought.

What impacts resulted from the recorded drought events?

Damage information was not available for any of the seven drought events experienced between 1980 and 2022. Of the seven drought events, disaster relief payment information was only available for one of the events. In 1988, landowners and farmers in Illinois were paid in excess of $382 million in relief payments; however, a breakdown by county was unavailable.

Drought Fast Facts – Impacts/Risk

Drought Impacts:
- Total Property Damage: ***n/a***
- Total Crop Damage: ***n/a***

Drought Risk/Vulnerability:
- Public Health & Safety: ***Low***
- Buildings/Infrastructure/Critical Facilities: ***Low***

What other impacts can result from drought events?

Based on statewide drought records available from the Illinois State Water Survey, the most common impacts that result from drought events in Illinois include reductions in crop yields and drinking water shortages.

Crop Yield Reductions

Agriculture is the primary industry in Pike County. According to the 2017 Census of Agriculture, there were 956 farms in Pike County occupying approximately 84.0% (447,007 acres) of the total land area in the County. In comparison, there were 970 farms occupying 77.4% (411,446 acres) of the total land area in the County in 2012. Of the land in farms, approximately 67.9% or 303,458 acres is in crop production. Less than 1% of the land in crop production is irrigated.

The major crops include corn and soybeans while the major livestock includes hogs and cattle. The County ranks 4th in the State for livestock and poultry and ranks 25th in the State for crop cash receipts. A severe drought would have a major financial impact on the large agricultural community, particularly if it occurred during the growing season. Dry weather conditions, particularly when accompanied by excessive heat, can result in diminished crop yields and place stress on livestock.

A reduction in crop yields was seen as a result of the 1983, 1988, 2005, 2007, 2011 and 2012 droughts. **Figure DR-3** illustrates the reduction yields seen for corn and soybeans during the five recorded drought events. The USDA's National Agricultural Statistics Service records show that yield reductions for corn and soybeans were most severe for the 1983 drought when there was a 43.7% reduction in corn yields and a 32.4% reduction in soybean yields.

Figure DR-3
Crop Yield Reductions Due to Drought in Pike County

Year	Corn		Soybeans	
	Yield (bushel)	% Reduction Previous Year	Yield (bushel)	% Reduction Previous Year
1982	119	---	37	---
1983	**67**	**43.7%**	**25**	**32.4%**
1984	109	---	29	---
1987	125	---	34.5	---
1988	**89**	**28.8%**	**32**	**7.2%**
1989	118	---	37.5	---
2004	187	---	50	---
2005	**137**	**26.7%**	**45**	**10.0%**
2006	160	---	49	---
2007	**156**	**2.5%**	**38**	**22.4%**
2008	155	---	41	---
2010	137.5	---	52.9	---
2011	150.7	---	**44.5**	**15.9%**
2012	**90.5**	**39.9%**	**44.4**	---
2013	164.3	---	45.3	---
2014	199.5	---	50.4	---

Source: USDA, National Agricultural Statistics Service.

Drinking Water Shortages

Municipalities that rely on surface water sources for their drinking water supplies are more vulnerable to shortages as a result of drought. In Pike County, ***none of the participating municipalities rely on surface water sources*** for their drinking water supply. All obtain drinking water from wells in unconfined sand and gravel aquifers ranging in depth from 35 feet to 100 feet in depth. Griggsville, New Canton, and Pearl have the shallowest wells with depths of 35 feet, 53 feet, and 72 feet respectively, making them potentially vulnerable to the effects of a prolonged drought. Baylis purchases its water from the Pike County Water District, which obtains its water from wells ranging from 57 feet to 112 feet in depth in sand and gravel aquifers.

While most of the participating municipalities are less vulnerable to drinking water shortages, a prolonged drought or a series of droughts in close succession have the potential to impact water levels in aquifers used for individual drinking water wells in rural areas. This is because individual (private) water wells tend to be shallower than municipal (public) water wells.

What is the level of vulnerability to public health and safety from drought?

Unlike other natural hazards that affect the County, drought events do not typically cause injuries or fatalities. The primary concern centers on the financial impacts that result from loss of crop yields and livestock and potential drinking water shortages. Even taking into consideration the potential impacts that a water shortage may have on the general public, the risk or vulnerability to public health and safety from drought is ***low***.

Are existing buildings, infrastructure, and critical facilities vulnerable to drought?

No. In general, existing buildings, infrastructure and critical facilities located in Pike County and the participating jurisdictions are not vulnerable to drought. The primary concern centers on the financial impacts that result from loss of crop yields and livestock.

While buildings do not typically sustain damage from drought events, in rare cases infrastructure and critical facilities may be directly or indirectly impacted. While uncommon, droughts can contribute to roadway damage. Severe soil shrinkage can compromise the foundation of a roadway and lead to cracking and buckling.

Prolonged heat associated with drought can also increase the demand for energy to operate air conditioners, fans, and other devices. This increase in demand places stress on the electrical grid, which increases the likelihood of power outages.

Additionally, droughts have impacted drinking water supplies. Reductions in aquifer water levels can cause water shortages that jeopardize the supply of water needed to provide drinking water and fight fires. While water use restrictions can be enacted in an effort to maintain a sufficient supply of water, they are only temporary and do not address long-term viability issues. Drinking water supplies vulnerable to drought, such as those that rely solely on surface water or shallow wells, need to consider mitigation measures that will provide long-term stability before a severe drought, or a series of droughts occur. Effective mitigation measures include drilling additional wells, preferably deep wells, securing agreements with alternative water sources and constructing water lines to provide a backup water supply.

In general, the risk or vulnerability to buildings, infrastructure, and critical facilities from drought is ***low***, even taking into consideration the potential impact a drought may have on drinking water supplies and the stress that prolonged heat may place on the electrical grid.

Are future buildings, infrastructure, and critical facilities vulnerable to drought?

No. Future buildings, infrastructure and critical facilities within the County are no more vulnerable to drought than the existing building, infrastructure, and critical facilities. As discussed above, buildings do not typically sustain damage from drought. Infrastructure and critical facilities may, in rare cases, be damaged by drought, but very little can be done to prevent this damage.

What are the potential dollar losses to vulnerable structures from drought?

Unlike other natural hazards there are no standard loss estimation models or methodologies for drought. Since drought typically does not cause structure damage, it is unlikely that future dollar losses will be excessive. The primary concern associated with drought is the financial impacts that result from loss of crop yields and the potential impacts to drinking water supplies. Since a majority of the County is involved in farming activities, it is likely that there will be future dollar losses to drought. In addition, reduced water levels and the water conservation measures that typically accompany a drought will most likely impact consumers as well as businesses and industries that are water-dependent (i.e., car washes, landscapers, etc.).

3.8 LANDSLIDES

HAZARD IDENTIFICATION

What is the definition of a slope?

A slope generally refers to any natural or artificial incline of the earth's surface.

What is the definition of a landslide?

A landslide or slope failure is the mass downward and outward movement of slope-forming materials such as rock, soil, artificial fill, organic matter, debris or a combination of these that occurs under the force of gravity. Depending on the type of landslide, it can move rapidly damaging roads and homes or develop slowly causing gradual damage that may occur over months and even years.

How are landslides classified?

Landslides are classified by 1) the type of slope movement and 2) the slope material involved and include rock falls, rock slides, debris flows, mudflows, debris avalanches, earth flows and debris slides.

Slope Movement

Slope movements include falls, topples, slides, spreads and flows. A combination of two or more of the main types of slope movement is referred to as a "complex movement". The following provides a brief description of each.

- ***Falls*** occur when masses of rock or other material become detached from steep slopes or cliffs and descend by free-falling, bouncing or rolling.
- ***Topples*** consist of forward rotation of rocks or other material about a pivot point on a slope. Toppling can be driven by gravity or by fluids (water or ice) in cracks.
- ***Slides*** involve the downslope movement of rock or other material along one or more distinct zones of weakness that separate the slide material from more stable underlying material. The two major types of slides are rotational and transitional.
- ***Spreads*** usually occur on very gentle slopes or essentially flat terrain where a stronger upper layer of rock or soil moves above an underlying softer, weaker layer. In some cases, the stronger upper layer will subside into the weaker underlying layer. The failure is caused by liquefaction and usually triggered by rapid ground motion, such as that experienced during an earthquake.
- ***Flows*** are distinguished from slides by high water content and have a velocity resembles that of a viscous liquid. There are five basic categories of flows: debris flow, debris avalanche, earthflow, mudflow and creep.

Slope Material

The slope material in a landslide is either rock, soil or both. Soil is further classified as "debris" if it is composed of predominantly course fragments or "earth" if it is composed of sand-sized or finer particles.

What causes a landslide?

Landslides can have multiple causes, both natural and man-made. In terms of natural factors, topography, geology and precipitation play an important role in the formation of landslides. Frequently landslides occur when soil is saturated from heavy rain or snowmelt. Landslides can also be initiated in slopes already on the verge of movement by changes in water levels, stream erosion, bedrock fracturing, freeze-thaw cycles, tree root growth, changes in ground water, earthquakes and volcanic activity.

Man-made factors that can contribute to landslides include mining operations, excavation of a slope or its toe for building purposes, loading of a slope or its crest related to construction activities, deforestation, artificial vibrations, irrigation and water leakage from utilities. Individuals seeking unique views of rivers, valleys and lakes can also contribute to landslides by building on land that might have been better left to agriculture, open-space or other uses than for dwellings. The construction of homes on slopes that overwhelm the underlying support material have resulted in landslides. This activity is also referred to as overloading the top of the slope. This type of problem involving residential construction has occurred in Lake County along Lake Michigan and in LaSalle County along the Illinois River.

Where do landslides occur?

Landslides typically start on steep hillsides (slopes) and are primarily associated with mountainous regions, although they can also occur in areas of generally low relief. In low-relief areas, landslides occur in cut-and-fill area associated with roadways and building excavations, along river bluffs, and at quarries and open-pit mines.

Landslides occur in all 50 states, including Illinois. In Illinois, landslides primarily occur in areas adjacent to major rivers and lakes where there are bluffs, hills and valleys. Areas most vulnerable to landslides include the upper Mississippi River, the lower Mississippi River, the middle portion of the Illinois River (roughly covering the area from LaSalle County to Mason County), and the bluff areas along Lake Michigan.

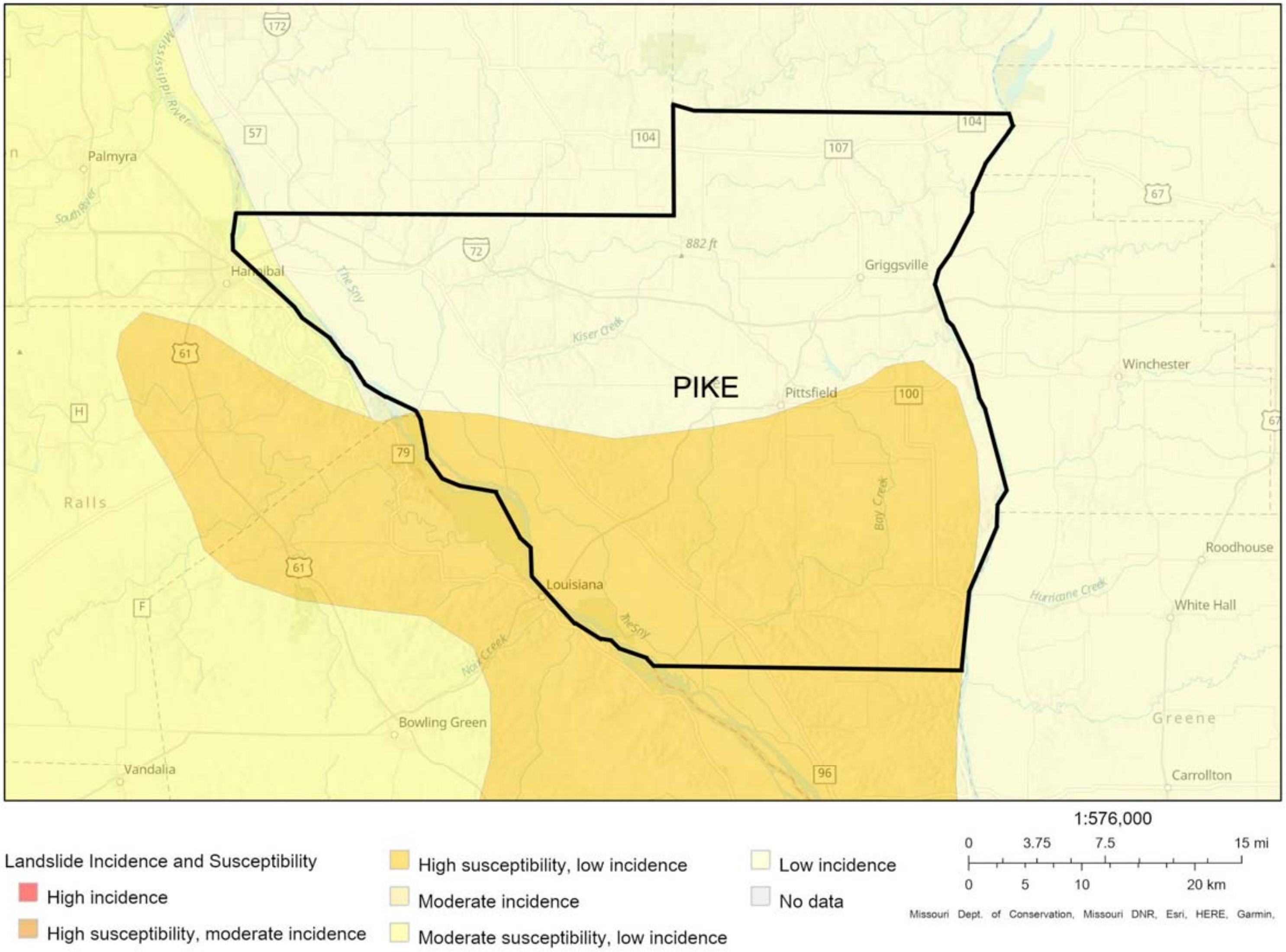
HAZARD PROFILE

The following details the location of steep slope areas, identifies past occurrences of landslides, details the severity or extent of future potential failures (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

Are there any areas in the County susceptible to landslides?

Yes. According to the *Landslide Overview Map of the Conterminous United States* prepared by the U.S. Geological Survey, there are steep slope areas with a ***high susceptibility and low incidence*** to landslides located in Pike County. **Figure L-1** illustrates the location of the susceptible areas.

Figure L-1
Areas Susceptible to Landslides in Pike County



Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin,

When have landslides occurred previously? What is the extent of these previous landslides?

Landslide Fast Facts – Occurrences

Number of Landslide Events Reported: ***8+***

Probability of Future Landslide Events: ***Low/Medium***

No comprehensive, publicly-accessible database detailing landslide occurrences currently exists in Illinois. A review of the Illinois State Geologic Survey's 1985 *Landslide Inventory of Illinois*, NASA's Global Landslide Catalog, local newspaper articles and discussions with Planning Committee members documented at least eight landslide events in Pike County. According to the ISGS *Landslide Inventory of Illinois,* there have been three unclassified man-induced landslides, one man-induced rock slump, one man-induced rock fall, one natural rock fall, one natural earth slump and one unclassified natural landslide in Pike County prior to 1985. The natural earth slump occurred in Pearl while one of the unclassified man-induced landslides occurred in Barry. The remaining six events occurred in unincorporated Pike County, three in the northern portion and three in the southern portion of the County. There have certainly been additional landslides that were either not reported or were not identified as part of the data review.

What locations are affected by landslides? What is the extent of future potential landslides?

The topography and geologic materials within the State greatly limit the locations where landslides can occur. Pike County is uniquely situated between the Mississippi River floodplain and the Illinois River floodplain making areas along the bluffs the most likely locations affected by landslides.

Figure L-1 illustrates the moderate to high susceptibility areas in Pike County based on the USGS *Landslide Overview Map of the Conterminous United States*. The southern portion of Pike County is considered to have a high susceptibility to landslides but a low incidence of actual events.

What is the probability of future landslide events occurring?

Given the limited amount of data available, it is difficult to specifically establish the probability of a future landslide. However, if factors such as topography, soil stability and weather events are taken into consideration then the probability is estimated to be ***medium*** for the southern portion of the County, including Pearl, and ***low*** for the remaining participating jurisdictions and unincorporated Pike County. For the purposes of this analysis "medium" is defined as have at least a 50% chance of occurring in any given year while "low" is defined as having less than a 10% chance of occurring in any given year.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure and critical facilities from landslides.

Are the participating jurisdictions vulnerable to landslides?

Yes. Pearl and portions of Pittsfield and unincorporated Pike County are vulnerable to the dangers presented by landslides. None of the other participating jurisdictions or the remainder of the County are considered vulnerable.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of landslides?

No. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdiction considered specific assets within their jurisdiction vulnerable to landslides.

What impacts resulted from the recorded landslide events?

Damage information was either unavailable or none was reported for any of the recorded events. In comparison, the U.S. averages an estimated $3.5 billion in property damage losses and between 25 and 50 fatalities annually due to landslides according to the U.S. Geological Survey.

Landslides Fast Facts – Impacts/Risk

Landslides Impacts:
- Total Property Damage: ***none***
- Fatalities: ***n/a***
- Injuries: ***n/a***

Landslide Risk/Vulnerability:
- Public Health & Safety –High Incident/Susceptibility Areas: ***Low to Medium***
- Public Health & Safety – Low Incident Areas: ***Low***
- Buildings/Infrastructure/Critical Facilities –High Incident/Susceptibility Areas: ***Medium***
- Buildings/Infrastructure/Critical Facilities – Low Incident Areas: ***Low***

What other impacts can result from landslides?

Landslides have the potential to impact not only human life and public safety, but they also have the potential to damage or destroy buildings and infrastructure. Depending on the type of landslide, there may be little if any warning an event is about to occur. Individuals caught in a landslide, especially motorists, face potential injury or loss of life.

Property owners seeking views of valleys, rivers and lakes have built in vulnerable locations and experienced damage as the slope they built on slumps, impacting their foundation and potentially carrying away their home. Buildings downslope from a landslide face the threat of structural damage, if not complete destruction. In addition to structural damage, a landslide can also cause serious damage to a building's content.

Infrastructure is also vulnerable to landslides. Electrical, water, gas and sewer lines can be weakened or broken during an event resulting in disruptions to vital services. A major concern associated with landslides is damage sustained to transportation systems, both highway and rail. At the very least, landslides can disrupt the flow of traffic, resulting in delays and adverse travel until the material is removed. These disruptions have the potential to impact emergency services (ambulance, fire and police) along with school bus routes and business traffic. Road and rail beds can be weakened or completely undermined by landslides which can lead to the indefinite closure of those facilities while repairs are made.

In addition to impacting the human environment, landslides can affect the natural environment. The material carried along by landslides can fill drainage ditches, streams and creeks causing drainage and flooding problems. The force of a landslide can cave in stream banks, uproot trees and shrubs and negatively impact wildlife.

What is the level of vulnerability to public health and safety from landslides?

For Pike County, the risk or vulnerability posed by landslides to public health and safety is considered to be ***low*** to ***medium*** for high susceptibility (steep slope) areas as described previously. This assessment is based on the fact that most landslides that occur in Illinois are not life-threatening nor are they considered to be severe in comparison to landslides that occur in other parts of the country. In addition, the number of injuries and fatalities recorded is low.

Are existing buildings, infrastructure and critical facilities vulnerable to landslides?

Yes. Buildings, infrastructure and critical facilities located within high susceptibility (steep slope) areas are vulnerable to landslides. Currently only Pittsfield has specific regulations for building practices within steep slope areas in place that will likely lessen the vulnerability of those buildings and critical facilities built since the ordinances were enacted. None or the other participating jurisdictions have specific regulations for building practices within steep slope areas. This means existing buildings as well as buildings in steep slope areas may be more vulnerable to landslides.

In addition to impacting structures, landslides primarily damage roads, bridges and utilities. Roadways, culverts and bridges can be damaged by landslides and even destroyed if the landslide occurs directly next of them. Water, sewer, gas, power and communication lines, both above and below ground, are also vulnerable to landslides. Depending on the location of the landslide, water, sewer, gas and power lines can experience ruptures causing major disruptions to vital services.

As with public health and safety, the risk or vulnerability to buildings, infrastructure and critical facilities is dependent on several factors including the extent of the development and infrastructure in the vicinity of the steep slopes, soil stability and weather conditions. When these factors are taken into consideration, the overall risk posed by landslides to vulnerability to buildings, infrastructure and critical facilities in Pike County is considered to be ***medium*** for high susceptibility (steep slope) areas and ***low*** for all other areas in the County.

Are future buildings, infrastructure and critical facilities vulnerable to landslides?

Yes and No. While Pittsfield has specific regulations for building practices within steep slope areas in place that will likely lessen the vulnerability of new buildings and critical facilities to damage from landslides, the County and Pearl do not. As a result, any future buildings and critical facilities built on steep slope areas in these jurisdictions will face the same vulnerabilities as those of existing buildings, infrastructure and critical facilities described previously. In addition, infrastructure such as roadway and communication, power and sewer lines built in steep slope areas will also continue to be vulnerable as long as specific building regulations are not enacted.

What are the potential dollar losses to vulnerable structures from landslides?

Unlike other hazards, there are no standard loss estimation models or methodologies for landslides. Given the lack of recorded events and unpredictability of landslides, sufficient information was not available to prepare a reasonable estimate of future potential dollar losses to vulnerable structures. However, those buildings, infrastructure and critical facilities located near steep slope areas have the potential to experience future dollar losses from landslides.

3.9 LEVEE FAILURES

HAZARD IDENTIFICATION

What is the definition of a levee?

The U.S. Army Corps of Engineers (USACE or the Corps) defines a "levee" as an earthen embankment, floodwall or structure along a water course whose purpose is flood risk reduction or water conveyance while the National Flood Insurance Program defines a "levee" as a man-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. Levees are typically not designed to hold back water for extended periods of time, rather they are meant to provide temporary flood protection from seasonal high water, precipitation and other weather events. While levees reduce the risk from a flooding event, they do not eliminate it. There is always the chance a flood will exceed the capacity of a levee, no matter how well it is built.

In Illinois, the Mississippi and Illinois River valleys were largely transformed from permanent, seasonal wetlands to highly productive agricultural lands by the construction of levees and the organization of drainage districts between 1879 and 1916.

What is the definition of a levee breach?

A levee breach is a rupture, break or gap in a levee which causes previously contained water to flood the land behind the levee. If the levee breach is identified as a "failure breach" then the cause of the breach is known and occurred without overtopping. In order for a breach to be termed a failure breach, an investigation is usually required to determine the cause.

What is the definition of overtopping?

Overtopping occurs when the water levels contained by the levee exceed the levee's crest elevation and flood the land behind the levee. The flooding occurs from overflow/overwash (waves) and other sources. In most cases overtopping may damage the levee but not compromise it. If the levee is compromised because of overtopping, then it is identified as an "overtopping breach."

What causes a levee breach?

Levee breaches can result from one or more of the following:

- ➢ ***erosion of the crown and land-side face of the levee*** caused by overtopping (the higher the velocity of flow over the levee, the more quickly that erosion will occur and cause a failure of the levee);
- ➢ ***sand boils and piping*** resulting from the relatively fast passage of flood waters through permeable materials under the base of the levee to the land behind the levee (depending on the amount of sand and soil transported by the waters from the base to the surface, the levee may settle unevenly, crack or even completely fail);
- ➢ ***seepage and saturation*** (prolonged exposure to water will cause levee materials to become saturated, leading to seepage and sloughing of the soil on land-side face of the levee and resulting in the loss of slope stability and ultimately failure of the levee);

- ***erosion of the river-side slope of the levee*** as a result of wave action caused by wind and/or commercial or recreational vessels over a long period of time (most Illinois levees are constructed of sand and alluvial materials, both of which are among the easiest materials to erode);
- ***structural failures*** at gates, walls or closure structures;
- ***improper maintenance*** (including failure to maintain gates, walls or closure structures; remove trees; fill in holes created by burrowing animals, etc.); and
- ***earthquakes*** which can cause loss of soil strength and destabilize the levee and foundation materials.

Who is responsible for regulating levees?

This is no single agency with responsibility for levee oversight nationwide. The USACE has specific and limited authorities for approximately 2,000 levees across the country, totaling 14,000 miles. While the Corps serves as one of the nation's largest infrastructure stewards, the misperception exists that the USACE has universal responsibility for the nation's levees. There are three different classifications of levees:

- ***Federally Authorized Levees***. A levee typically designed and built by the Corps in cooperation with a local sponsor, then turned over to the local sponsor (i.e., drainage district) to operate, maintain, repair and replace the levee.
- ***Non-Federally Authorized Levees***. A levee designed and built by a non-federal agency, which is responsible for the operation, maintenance, repair and replacement of the levee.
- ***Private or Corporate-Owned Levees***. A levee designed and built by a private citizen, company or other public entity, which is responsible for the operation, maintenance, repair and replacement of the levee. The Corps has no responsibility for this type of levee.

What is a drainage district?

A drainage district is a local unit of government formed by area landowners to "…construct, maintain or repair drains or levees or to engage in other drainage or levee work for agricultural, sanitary or mining purposes" (70 ILCS 605/3-1). Drainage districts may be organized by petition or referendum and are approved by the circuit court of the county in which the greater part of the district lies.

Each district is usually governed by three drainage commissioners, although there are districts in Illinois that have as many as five drainage commissioners. The drainage commissioners may be any adult who resides in Illinois and owns land within the district's boundaries. Commissioners are either appointed by the county or elected.

Drainage districts are funded through assessments. Each benefited landowner in a district is assessed a fee for the maintenance and upkeep of the district. Under the Illinois Drainage Code, a district which is organized to maintain levees shall include the term "drainage and levee district" in its name.

HAZARD PROFILE

According to the USACE National Levee Database, there are 36 levees located in Pike County; however, 34 of these levees fall under four levee systems of significance, Hardy Creek Levee System, McGee Creek Drainage & Levee District (D&LD), Sny Island Levee Drainage District (LDD), and Valley City D&LD. Levees systems of significance include those levees protecting a sizable amount of land, considerable number of structures and/or individuals. Only the levee systems of significance will be analyzed as part of this Plan update due to the limited impacts on the population, land use and infrastructure associated with the remaining levees.

The following details the levee systems of significance located in the county; identifies the location of these levee systems; details past occurrences of levee failures associated with these levee systems; describes the severity or extent of future potential failures (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences of levee failures.

Are there any levees located in the County?

Yes. According to the USACE National Levee Database there are four levee systems of significance located in Pike County. **Figure LF-1** provides information about each levee system.

When have levee breaches occurred previously?

No comprehensive, public-accessible database detailing levee failures currently exists in Illinois. A review of newspaper articles and information obtained from the Corps. and the Illinois State Water Survey identified one levee system failure in Pike County. In 1993 very frequent, heavy rainfall across the upper Midwest from April through August, coupled with high soil moisture levels led to record-breaking flooding along the Mississippi, Missouri and lower reaches of the Illinois Rivers. The sheer volume of water coupled with the length of the event caused many levees along these rivers to fail. On July 25, 1993, Sny Island LDD – Reach 1 experienced a levee breach prompting the evacuation of Fall Creek, Hull, and East Hannibal. Less than an hour after the levee broke, the River had opened a breach 1,000 yard wide.

<u>Levee Breach Fast Facts – Occurrences</u>

Total Number of Levee Systems Located in the County: ***4***

Number of Levee Systems Studied: ***4***

Number of Levee Breaches Reported: ***1***

Probability of Future Levee Breach Events: ***Low***

What is the extent of future potential levee breaches?

Emergency Action Plans (EAPs)/Emergency Preparedness Plans (EPPs) defining the extent or magnitude of future potential levee breaches (water depth, speed of onset and warning times) have not been developed or were not made available to the Pike County Emergency Management Agency for any of the levee systems studied. As a result, a data deficiency exists in terms of defining the extent or magnitude of the inundation areas associated future potential levee breaches for these systems.

Figure LF-1
Levee Systems of Significance in Pike County

Levee System Name	**Levee Category**	**Year Constructed**	**# of Levee Segments**	**Length of Levee(s) (Miles)**	**Total Land Protected (Acres)**	**Approx. Land Protected in Pike County (Acres)**	**Inspection Rating**	**PL 84-99 Status**
Hardy Creek Levee System	Non-Federal	n/a	1	0.53	21	21	n/a	n/a
McGee Creek D&LD System[1]	Federal	1985	1	14.64	12,264	7,239[×]	Minimally Acceptable	Active
Sny Island LDD[2]								
Kinderhook V	Federal	1968	1	5.20	872	872	Minimally Acceptable	Active
Pleasant Hill V	Federal	1968	1	8.27	2,460	2,460	Minimally Acceptable	Active
Reach 1[a] (w/ Pigeon Creek Levees)	Federal	1968	1	58.61	44,567	38,667[‡]	Minimally Acceptable	Active
Reach 2	Non-Federal; portion Federal	1968	1	27.63	17,018	17,018	Minimally Acceptable	Active
Reach 3[b]	Non-Federal; portion Federal	1968	1	53.23	41,863	40,778[^]	Minimally Acceptable	Active
Reach 4[b]	Federal; portion Non-Federal	1968	2	23.25	11,296	2,485[†]	Minimally Acceptable	Active
Valley City D&LD System	Federal	1920	2	8.16	4,772	4,772	Minimally Acceptable*	Active

[1] The District extends between Brown and Pike Counties

[2] The District extends between Adams, Pike, and Calhoun Counties

[a] The Levee System extends between Adams and Pike Counties

[b] The Levee System extends between Pike and Calhoun Counties

*awaiting USAC inspection to confirm rating

Source: US Army Corps. of Engineers, National Levee Database.

[×] Approximately 5,025 acres protected by this levee are in Brown County

[‡] Approximately 5,900 acres protected by this levee are in Adams County

[^] Approximately 1,085 acres protected by this levee are in Calhoun County

[†] Approximately 2,485 acres protected by this levee are in Pike County

What locations are potentially affected by levee breaches?

Levee breaches along the studied levees have the potential to affect Hull, Kinderhook, New Canton, Pearl, Pleasant Hill, and unincorporated Pike County. **Figure LF-2** identifies the locations potentially impacted by levee breaches.

What is the probability of future levee breach events occurring?

There are several factors that must be considered when calculating the probability of future levee breaches including whether a breach has occurred previously, the age and current conditions of the levee, whether proper maintenance is ongoing and the magnitude of the event. Since only one of the studied levee systems has experienced a breach, it is difficult to specifically establish the probability of future levee breaches associated with these levees; however, based on the data available, it is estimated to be ***low***. For the purposes of this analysis "low" is defined as having a less than 10% chance of occurring in any given year.

According to the USACE National Levee Database, the McGee Creek D&LD System and the Valley City D&LD System have a Levee Safety Action Classification (LSAC) of "Low" (likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in low risk). In the Sny Island LDD, five of the six levee groups are rated "Low"; however, Reach 1, which includes the Pigeon Creek Levees, has a classification of "Moderate" (likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in moderate risk). The Hardy Creek Levee System has not been screened for a Levee Safety Action Classification.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions associated with the levees of significance studied, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure and critical facilities from levee failures.

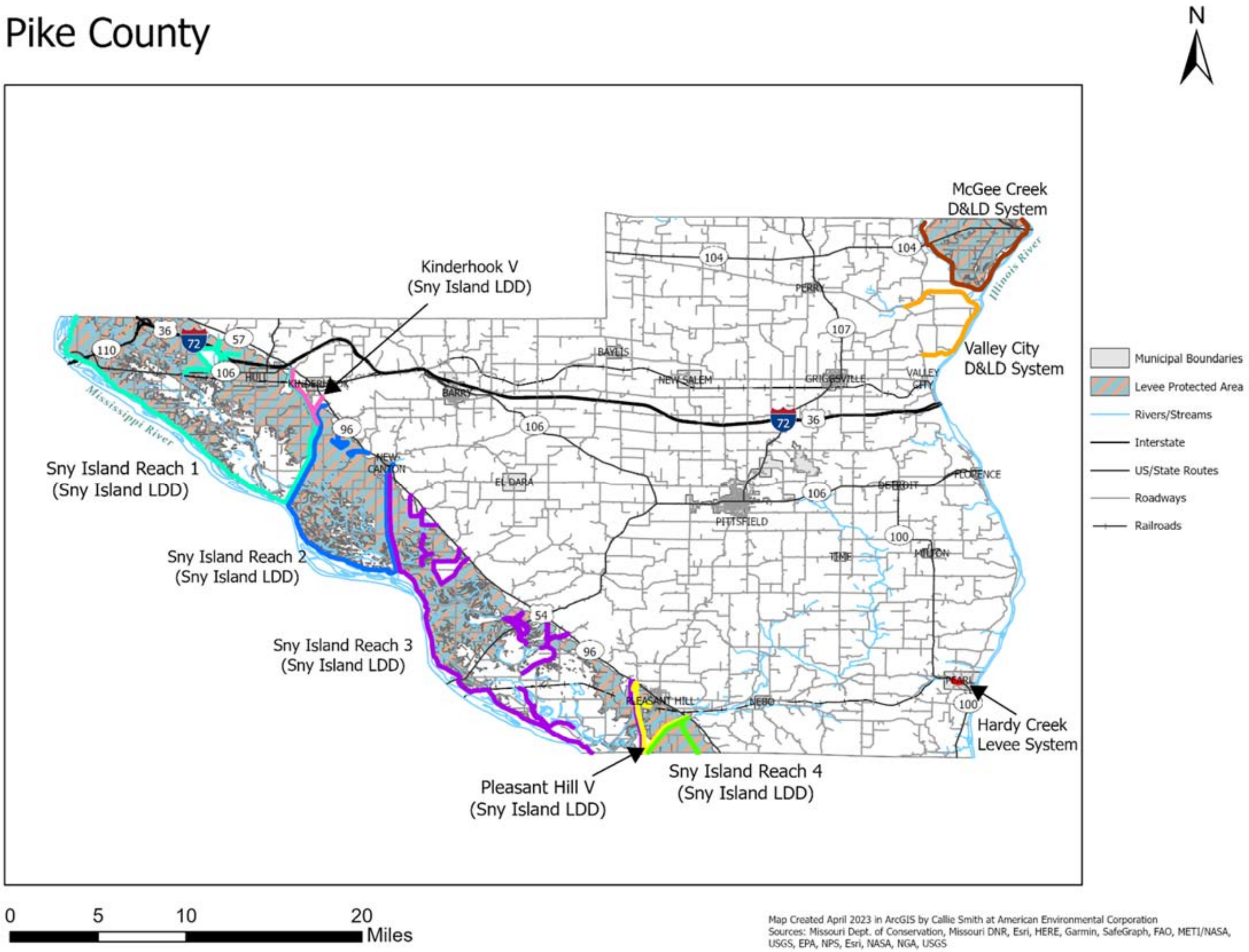
Are the participating jurisdictions vulnerable to levee breaches from the levee systems of significance?

Yes. New Canton, Pearl, and portions of unincorporated Pike County are vulnerable to the dangers presented by levee breaches associated with the levee systems of significance studied. None of the other participating municipalities or the remainder of the County are considered vulnerable.

Levee Failure Fast Facts – Risk

Levee Breach Risk/Vulnerability:
- Public Health & Safety: ***Low/Medium***
- Buildings/Infrastructure/Critical Facilities:– ***Low/Medium***

Figure LF-2
Pike County Levee Systems of Significance Map



Map Created April 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of levee breaches?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to levee failures.

New Canton: The Town's drinking water wells are located in the levee-protected flood zone and potentially vulnerable to contamination from levee breach flooding.

Sny Island LDD: Heavy rain events have the potential to flood township roads within the District and potentially lead to a levee breach.

What impacts resulted from the recorded levee breaches?

While property and crop damage figures were unavailable for the 1993 Sny Island LDD – Reach 1 breach, approximately 44,000 acres of cropland were flooded and an estimate 2,000 individuals were forced from their homes. Approximately six miles of Interstate 72 had to be closed. Hull was under eight feet of water damaging all the buildings and homes in the Village. Wildlife fled before the rising floodwater. Deer, rabbits and possums crossed highways, causing at least one vehicular accident. No injuries or fatalities were reported as a result of the event.

What other impacts can result from levee breaches?

Aside from causing damage to buildings, infrastructure and critical facilities, floodwaters released due to a levee breach also pose biological and chemical risks to public health. Flooding can force untreated sewage to mix with floodwaters. The polluted floodwaters then transport the biological contaminants into buildings and basements and onto roads and public areas. If left untreated, the floodwaters can serve as breeding grounds for bacteria and other disease-causing agents. Even if floodwaters are not contaminated with biological material, basements and buildings that are not properly cleaned can grow mold and mildew which can pose a health hazard, especially for small children, the elderly and those with specific allergies. Flooding also has the potential to contaminate drinking water sources used for both human and livestock consumption.

Flooding resulting from a levee breach can also cause chemical contaminants such as gasoline and oil to enter the floodwaters if underground storage tanks or pipelines crack and begin leaking during an event. Depending on the time of year, floodwaters also may carry away agricultural chemicals that have been applied to farm fields.

What is the level of vulnerability to public health and safety from levee breaches?

In terms of the risk or vulnerability to public health and safety from a levee breach associated with the studied levees, there are several factors that must be taken into consideration including the magnitude or severity of the precipitating event (whether an earthquake or flooding); the extent and type of development and infrastructure protected by the levee; the amount of time available to enact emergency measures such as evacuations; and USACE's Risk Classification Rating. **Figure LF-3** identifies the number of individuals vulnerable to a levee breach by levee system, the USACE's Levee Safety Action Classification (LSAC) Risk Rating assigned to each levee system and the assessment date, if available. The USACE's Risk Classification Rating has five classes: Very Low, Low, Moderate, High and Very High.

Figure LF-3
Number of Individuals Vulnerable to a Levee Breach

Levee System Name	Total Number of Individuals Protected by Levee	Estimated Number of Individuals Protected by Levee in Pike County†	USACE LSAC Risk Rating	Risk Rating Assessment Date
Hardy Creek Levee System	0	0	Not Screened	---
McGee Creek D&LD System[1]	20	7	Low	11/17/2022
Sny Island LDD[2]				
Kinderhook V	51	51	Low	09/01/2021
Pleasant Hill V	698	698	Low	02/02/2017
Reach 1[a] (w/ Pigeon Creek Levees)	692	644	Moderate	07/08/2021
Reach 2	409	409	Low	07/08/2021
Reach 3[b]	302	296	Low	07/16/2020
Reach 4[b]	12	3	Low	07/13/2021
Valley City D&LD System	14	14	Low	02/28/2018

[1] District extends between Brown & Pike Counties

[2] District is through Adams, Pike, & Calhoun Counties

[a] Levee extends between Adams & Pike Counties.

[b] Levee extends between Pike & Calhoun Counties

† A visual inspection was conducted by the Consultant. The estimated number of individuals protected by the levee in Pike County was extrapolated using the houses identified in the adjoining County multiplied by the U.S. Census Bureau's Persons Per Household 2016-2020 average and subtracted from the total number of individuals protected by the levee.

Source: US Army Corps of Engineers, National Levee Database.

When all these factors are taken into consideration, the overall risk to public health and safety posed by a levee breach from the levees in Pike County is considered to be ***medium*** Sny Island LDD and ***low*** for the remaining three levee systems. The Sny Island LDD protects a portion of Kinderhook and all of Hull, New Canton, and Pleasant Hill, including a majority of their critical facilities and businesses.

Are existing buildings, infrastructure and critical facilities vulnerable to levee breaches?

Yes. Buildings, infrastructure and critical facilities located within the leveed areas associated with the studied levees are vulnerable to levee breaches. **Figure LF-4** , located at the end of this section, identifies infrastructure and critical facilities vulnerable to a levee breach by participating jurisdiction while **Figure LF-5** identifies the number of existing structures vulnerable to a levee breach by levee system, the total estimated property value of the vulnerable structures and the participating jurisdiction the structures are located within. These counts were acquired from the USACE's National Levee Database. The estimated property value is a sum of the structure value, structure contents and vehicles in the leveed area. The value does not include economic productivity loss, transportation infrastructure values (i.e., bridges, runways, roads) or land value.

Depending on the magnitude of the breach, all of the vulnerable buildings, infrastructure and critical facilities may be inundated by water and structural and content damage may result. In addition to impacting structures, a levee breach can damage roads and utilities. Roadways and culverts can be weakened by levee breach floodwaters and may collapse under the weight of a vehicle. Power and communication lines, both above and below ground, are also vulnerable to levee breach flooding. Depending on their location and the velocity of the water as it escapes the levee, power poles may be snapped causing disruptions to power and communication. Water may also get into any buried lines causing damage and disruptions.

Figure LF-5
Number of Existing Structures Vulnerable to a Levee Breach

Levee System Name	Total Number of Vulnerable Structures	Estimated Number of Vulnerable Structures in Pike County[†]	Total Estimated Property Value of Vulnerable Structures	Structure Locations in Pike County
Hardy Creek Levee System	3	3	$1.38 million	Pearl
McGee Creek D&LD System[1]	21	11	$9.15 million	Unincorp. Pike County
Sny Island LDD[2]				
Kinderhook V	24	24	$5.57 million	Kinderhook; Unincorp. Pike County
Pleasant Hill V	510	510	$85.3 million	Pleasant Hill; Unincorp. Pike County
Reach 1[a] (w/ Pigeon Creek Levees)	513	44[‡]	$75.3 million	Hull; Unincorp. Pike County
Reach 2	304	304	$48.1 million	New Canton; Unincorp. Pike County
Reach 3[b]	289	282	$28.7 million	Unincorp. Pike County
Reach 4[b]	24	10	$1.31 million	Unincorp. Pike County
Valley City D&LD System	15	15	$809,000	Unincorp. Pike County

[1] District extends between Brown & Pike Counties

[2] District is through Adams, Pike, & Calhoun Counties

[a] Levee extends between Adams & Pike Counties.

[b] Levee extends between Pike & Calhoun Counties

Source: US Army Corps. of Engineers, National Levee Database.

As with public health and safety, the risk or vulnerability to buildings, infrastructure and critical facilities is dependent on several factors including the magnitude or severity of the precipitating event (whether an earthquake, general flood or flash flood), the extent and type of development and infrastructure protected by the levee, the amount of time available to implement emergency measures such as sandbagging, and the USACE's Risk Classification Rating. In general, the risk to existing buildings, infrastructure and critical facilities from a levee breach is ***low*** for all of the levees studied.

The Sny Island LDD protects a portion of Kinderhook and all of Hull, New Canton, and Pleasant Hill, including a majority of its critical facilities and the businesses. Given the resources protected by this system, the risk to existing buildings, infrastructure and critical facilities is considered to be ***medium***.

Are future buildings, infrastructure and critical facilities vulnerable to levee breaches?

Yes. Any future buildings, infrastructure and critical facilities located within the studied leveed systems of significance are vulnerable to damage from a levee breach. As a result, future buildings, infrastructure and critical facilities face the same vulnerabilities as those of existing buildings, infrastructure and critical facilities described previously.

What are the potential dollar losses to vulnerable structures from levee breaches?

Unlike other hazards, there are no standard loss estimation models or methodologies for levee breaches. With no recorded events listing property damage numbers for levee breaches, there is no way to reasonably estimate future potential dollar losses. However, according to the National Levee Database, the total estimated property value of vulnerable structures in the leveed areas is $255.6 million, which includes some structures in Adams, Brown, and Calhoun Counties. Since all of the structures in the leveed areas are susceptible to levee breach impacts to varying degrees, this total represents the maximum property exposure to levee breach events.

Figure LF-4
Critical Facilities/Infrastructure Vulnerable to a Levee Breach by Jurisdiction in Pike County

Participating Jurisdiction	Government[1]	Law Enforcement	Fire Stations	Ambulance Service	Schools	Drinking Water	Wastewater Treatment	Medical[2]	Healthcare Facilities[3]
Pike County	---	---	---	---	---	---	---	---	---
Barry	---	---	---	---	---	---	---	---	---
Baylis	---	---	---	---	---	---	---	---	---
Griggsville	---	---	---	---	---	---	---	---	---
New Canton	5	1	---	---	---	2	2	---	---
Pearl	---	---	---	---	---	---	---	---	---
Pittsfield	---	---	---	---	---	---	---	---	---
Pikeland CUSD #10	---	---	---	---	---	---	---	---	---
Baylis FD	---	---	---	---	---	---	---	---	---
Spring Creek FPD	---	---	---	---	---	---	---	---	---
Fairmount Township	---	---	---	---	---	---	---	---	---
Pittsfield Township	---	---	---	---	---	---	---	---	---
McGee Creek D&LD	---	---	---	---	---	---	---	---	---
Sny Island LDD	---	---	---	---	---	---	---	---	---
Valley City D&LD	---	---	---	---	---	---	---	---	---

[1] Government includes: courthouses, city/village halls, township buildings, highway/road maintenance centers, etc.

[2] Medical includes: public health departments, hospitals, urgent/prompt care and medical clinics.

[3] Healthcare Facilities include: nursing homes, skilled care facilities, memory care facilities, residential group homes, etc.

3.10 EARTHQUAKES

HAZARD IDENTIFICATION

What is the definition of an earthquake?

An earthquake is a sudden shaking of the ground caused when rocks forming the earth's crust slip or move past each other along a fault (a fracture in the rocks). Most earthquakes occur along the boundaries of the earth's tectonic plates. These slow-moving plates are being pulled and dragged in different directions, sliding over, under and past each other. Occasionally, as the plates move past each other, their jagged edges will catch or stick causing a gradual buildup of pressure (energy).

Eventually, the force exerted by the moving plates overcomes the resistance at the edges and the plates snap into a new position. This abrupt shift releases the pent-up energy, producing vibrations or seismic waves that travel outward from the earthquake's point of origin. The location below the earth's surface where the earthquake starts is known as the hypocenter or focus. The point on the earth's surface directly above the focus is the epicenter.

The destruction caused by an earthquake may range from light to catastrophic depending on a number of factors including the magnitude of the earthquake, the distance from the epicenter, the local geologic conditions as well as construction standards and time of day (i.e., rush hour). Earthquake damage may include power outages, general property damage, road, and bridge failure, collapsed buildings and utility damage (ruptured gas lines, broken water mains, etc.).

Most of the damage done by an earthquake is caused by its secondary or indirect effects. These secondary effects result from the seismic waves released by the earthquake and include ground shaking, surface faulting, liquefaction, landslides and, in rare cases, tsunamis.

According to the U.S. Geological Survey, more than 143 million Americans in the contiguous U.S. are exposed to potentially damaging ground shaking from earthquakes. More than 44 million of those Americans, located in 18 states, are exposed to very strong ground shaking from earthquakes. Illinois ranks 10th in terms of the number of individuals exposed to very strong ground shaking. The Federal Emergency Management Agency's Hazus analysis indicates that the annualized earthquake losses to the national building stock is $6.1 billion per year. A majority of the average annual loss is concentrated in California ($3.7 million). The central U.S. (including Illinois) ranks third in annualized earthquake losses at $480 billion, behind the pacific northwest (Washington and Oregon) with annualized earthquake losses at $710 billion.

What is a fault?

A fault is a fracture or zone of fractures in the earth's crust between two blocks of rock. They may range in length from a few millimeters to thousands of kilometers. Many faults form along tectonic plate boundaries. Faults are classified based on the angle of the fault with respect to the surface (known as the dip) and the direction of slip or movement along the fault. There are three main groups of faults: normal, reverse (thrust) and strike-slip (lateral).

Normal faults occur in response to pulling or tension along the two blocks of rock causing the overlying block to move down the dip of the fault plane. Most of the faults in Illinois are normal faults. Thrust or reverse faults occur in response to squeezing or compression of the two blocks of rock causing the overlying block to move up the dip of the fault plane. Strike-slip or lateral faults can occur in response to either pulling/tension or squeezing/compression causing the blocks to move horizontally past each other.

Geologists have found that earthquakes tend to recur along faults, which reflect zones of weakness in the earth's crust. Even if a fault zone has recently experienced an earthquake, there is no guarantee that all the stress has been relieved. Another earthquake could still occur.

What are tectonic plates?

Tectonic plates are large, irregularly-shaped, relatively rigid sections of the earth's crust that float on the top, fluid layer of the earth's mantle. There are about a dozen tectonic plates that make up the surface of the planet. These plates are approximately 50 to 60 miles thick and the largest are millions of square miles in size.

How are earthquakes measured?

The severity of an earthquake is measured in terms of its magnitude and intensity. A brief description of both terms and the scales used to measure each are provided below.

Magnitude

Magnitude refers to the amount of seismic energy released at the hypocenter of an earthquake. The magnitude of an earthquake is determined from measurements of ground vibrations recorded by seismographs. As a result, magnitude is represented as a single, instrumentally determined value. A loose network of seismographs has been installed all over the world to help record and verify earthquake events.

There are several scales that measure the magnitude of an earthquake. The most well-known is the Richter Scale. This logarithmic scale provides a numeric representation of the magnitude of an earthquake through the use of whole numbers and decimal fractions. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in ground vibrations measured. In addition, each whole number increase corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number. It is important to note that the Richter Scale is used only to determine the magnitude of an earthquake, it does not assess the damage that results.

Once an earthquake's magnitude has been confirmed, it can be classified. **Figure EQ-1** categorizes earthquakes by class based on their magnitude (i.e., Richter Scale value). Any earthquake with a magnitude less than 3.0 on the Richter Scale is classified as a micro earthquake while any earthquake with a magnitude of 8.0 or greater on the Richter Scale is considered a "great" earthquake. Earthquakes with a magnitude of 2.0 or less are not commonly felt by individuals. The largest earthquake to occur in the U.S. since 1900 took place off the coast of Alaska in Prince William Sound on March 28, 1964 and registered a 9.2 on the Richter Scale.

Intensity

Intensity refers to the effect an earthquake has on a particular location. The intensity of an earthquake is determined from observations made of the damage inflicted on individuals, structures, and the environment. As a result, intensity does not have a mathematical basis; instead, it is an arbitrary ranking of observed effects. In addition, intensity generally diminishes with distance. There may be multiple intensity recordings for a region depending on a location's distance from the epicenter.

Figure EQ-1
Earthquake Magnitude Classes

Class	Magnitude (Richter Scale)
micro	smaller than 3.0
minor	3.0 – 3.9
light	4.0 – 4.9
moderate	5.0 – 5.9
strong	6.0 – 6.9
major	7.0 – 7.9
great	8.0 or larger

Source: Michigan Technological University

Although numerous intensity scales have been developed over the years, the one currently used in the U.S. is the Modified Mercalli Intensity Scale. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. The lower numbers of the intensity scale are based on human observations (i.e., felt only by a few people at rest, felt quite noticeably by persons indoors, etc.).

The higher numbers of the scale are based on observed structural damage (i.e., broken windows, general damage to foundations etc.). Structural engineers usually contribute information when assigning intensity values of VIII or greater. **Figure EQ-2** provides a description of the damages associated with each level of intensity as well as comparing Richter Scales values to Modified Mercalli Intensity Scale values.

Generally, the Modified Mercalli Intensity value assigned to a specific site after an earthquake is a more meaningful measure of severity to the general public than magnitude because intensity refers to the effects actually experienced at that location.

When and where do earthquakes occur?

Earthquakes can strike any location at any time. However, history has shown that most earthquakes occur in the same general areas year after year, principally in three large zones around the globe. The world's greatest earthquake belt, the circum-Pacific seismic belt (nicknamed the "Ring of Fire"), is found along the rim of the Pacific Ocean, where about 81 percent of the world's largest earthquakes occur.

The second prominent belt is the Alpide, which extends from Java to Sumatra and through the Himalayan Mountains, the Mediterranean Sea and out into the Atlantic Ocean. It accounts for about 17 percent of the world's largest earthquakes, including those in Iran, Turkey, and Pakistan. The third belt follows the submerged mid-Atlantic Ridge, the longest mountain range in the world, nearly splitting the entire Atlantic Ocean north to south.

While most earthquakes occur along plate boundaries some are known to occur within the interior of a plate. (As the plates continue to move and plate boundaries change over time, weakened boundary regions become part of the interiors of the plates.) Earthquakes can occur along zones of weakness within a plate in response to stresses that originate at the edges of the plate or from deep within the earth's crust. The New Madrid earthquakes of 1811 and 1812 occurred within the North American plate.

Figure EQ-2
Comparison of Richter Scale and Modified Mercalli Intensity Scale

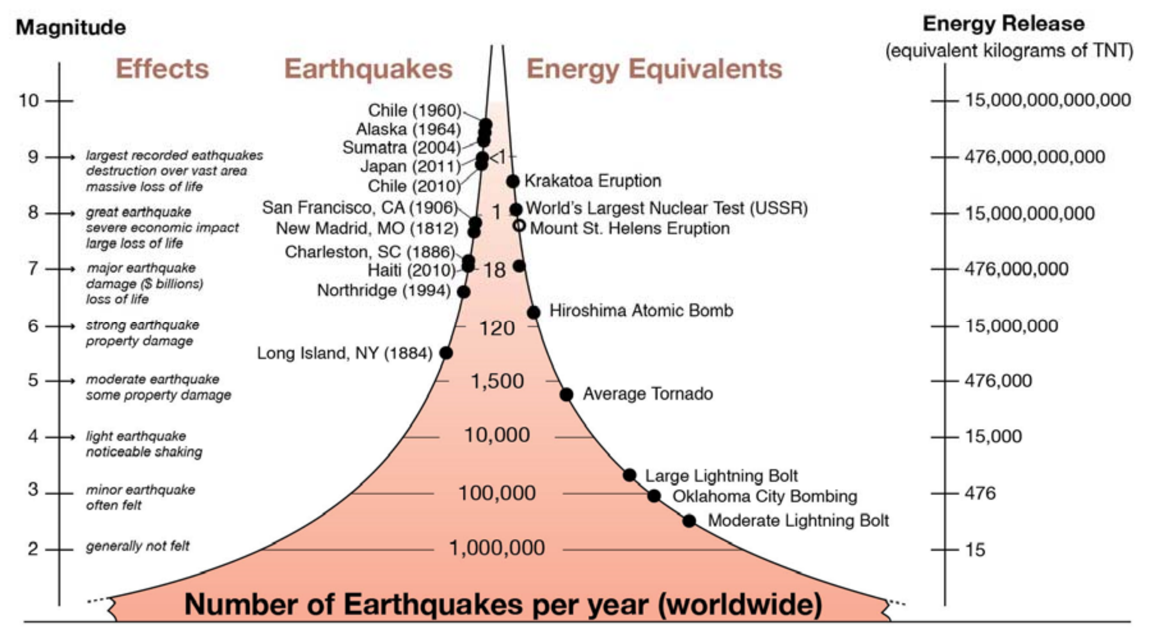
Richter Scale	Modified Mercalli Scale	Observations
1.0 – 1.9	I	Felt by very few people; barely noticeable. No damage.
2.0 – 2.9	II	Felt by a few people, especially on the upper floors of buildings. No damage.
3.0 – 3.9	III	Noticeable indoors, especially on the upper floors of buildings, but may not be recognized as an earthquake. Standing cars may rock slightly; vibrations similar to the passing of a truck. No damage.
4.0	IV	Felt by many indoors and a few outdoors. Dishes, windows, and doors disturbed. Standing cars rocked noticeably. No damage.
4.1 – 4.9	V	Felt by nearly everyone. Small, unstable objects displaced or upset; some dishes and glassware broken. Negligible damage.
5.0 – 5.9	VI	Felt by everyone. Difficult to stand. Some heavy furniture moved. Weak plaster may fall and some masonry, such as chimneys, may be slightly damaged. Slight damage.
6.0	VII	Slight to moderate damage to well-built ordinary structures. Considerable damage to poorly-built structures. Some chimneys may break. Some walls may fall.
6.1 – 6.9	VIII	Considerable damage to ordinary buildings. Severe damage to poorly built buildings. Some walls collapse. Chimneys, monuments, factory stacks, columns fall.
7.0	IX	Severe structural damage in substantial buildings, with partial collapses. Buildings shifted off foundations. Ground cracks noticeable.
7.1 – 7.9	X	Most masonry and frame structures and their foundations destroyed. Some well-built wooden structures destroyed. Train tracks bent. Ground badly cracked. Landslides.
8.0	XI	Few, if any structures remain standing. Bridges destroyed. Wide cracks in ground. Train tracks bent greatly. Wholesale destruction.
> 8.0	XII	Total damage. Lines of sight and level are distorted. Waves seen on the ground. Objects thrown up into the air.

Sources: Michigan Technological University, Department of Geological and Mining Engineering and Sciences, UPSeis.
U.S. Geological Survey.

How often do earthquakes occur?

Earthquakes occur every day. Magnitude 2 and smaller earthquakes occur several hundred times a day worldwide. These earthquakes are known as micro earthquakes and are generally not felt by humans. Major earthquakes, greater than magnitude 7, generally occur at least once a month. **Figure EQ-4** illustrates the approximate number of earthquakes that occur worldwide per year based on magnitude. This figure also identifies manmade and natural events that release approximately the same amount of energy for comparison.

Figure EQ-3
Approximate Number of Earthquakes Recorded Annually



Source: Incorporated Research Institutions for Seismology, Education and Outreach Series, "How Often Do Earthquakes Occur?"

HAZARD PROFILE

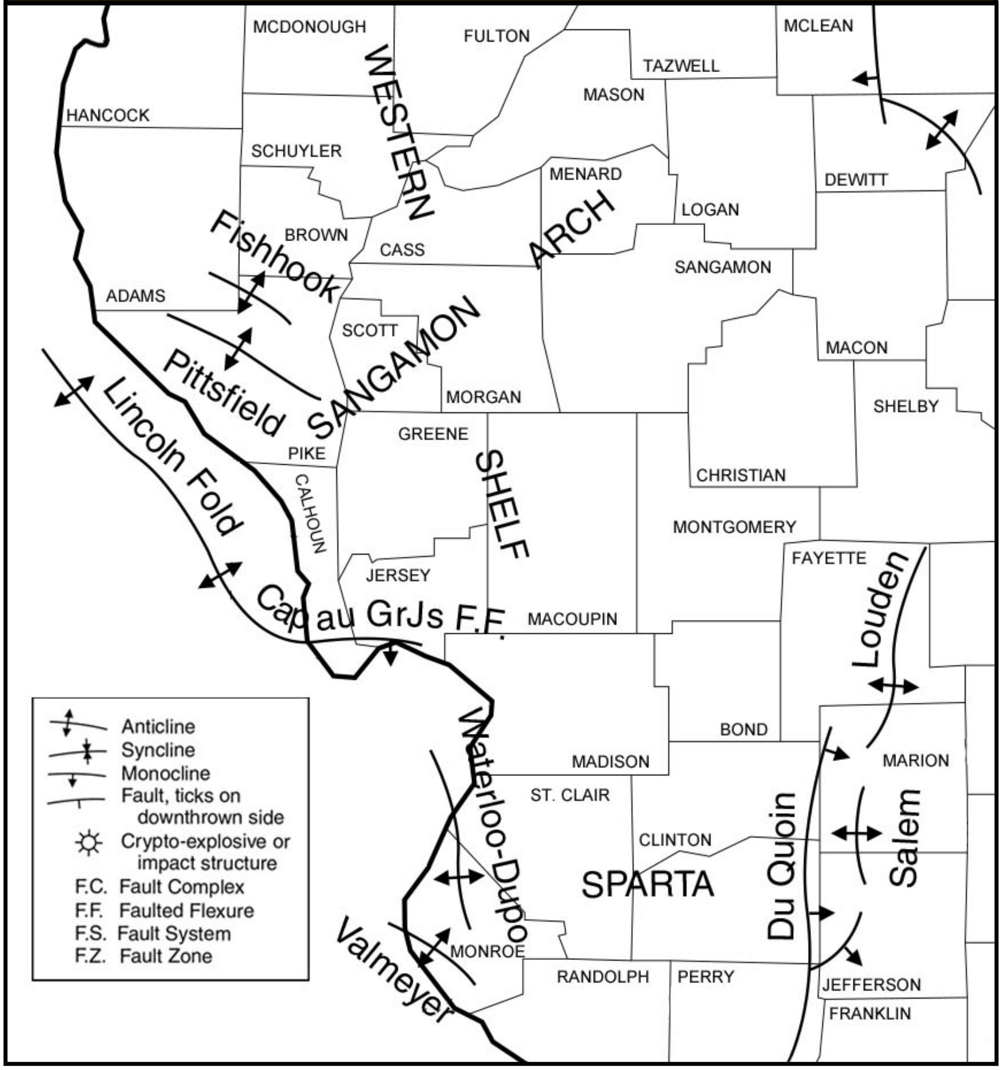
The following details the location of known fault zones and geologic structures, identifies past occurrences of earthquakes, details the severity or extent of each event (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

Are there any faults located within the County?

No, there are no known faults located in Pike County; however, there are two geological structures, the Fishhook Anticline and the Pittsfield Anticline, which run through the County. The following provides a brief description of each while **Figure EQ-5** illustrates the location of these geologic structures.

- *Fishhook Anticline*: The Fishhook Anticline is approximately 30 miles long and as much as 5 miles wide. It trends northwest, parallel with the Pittsfield Anticline, from northern Pike County into southeast Adams County.
- *Pittsfield Anticline*: The Pittsfield Anticline is located in central Pike County and is a highly elongated anticline that trends northwest. It is the largest anticline in western Illinois north of the Cap au Grès Faulted Flexure in Calhoun and Jersey Counties.

Figure EQ-4
Geological Structures in West-Central Illinois



Source: Illinois State Geological Survey.

When have earthquakes occurred previously? What is the extent of these previous quakes?

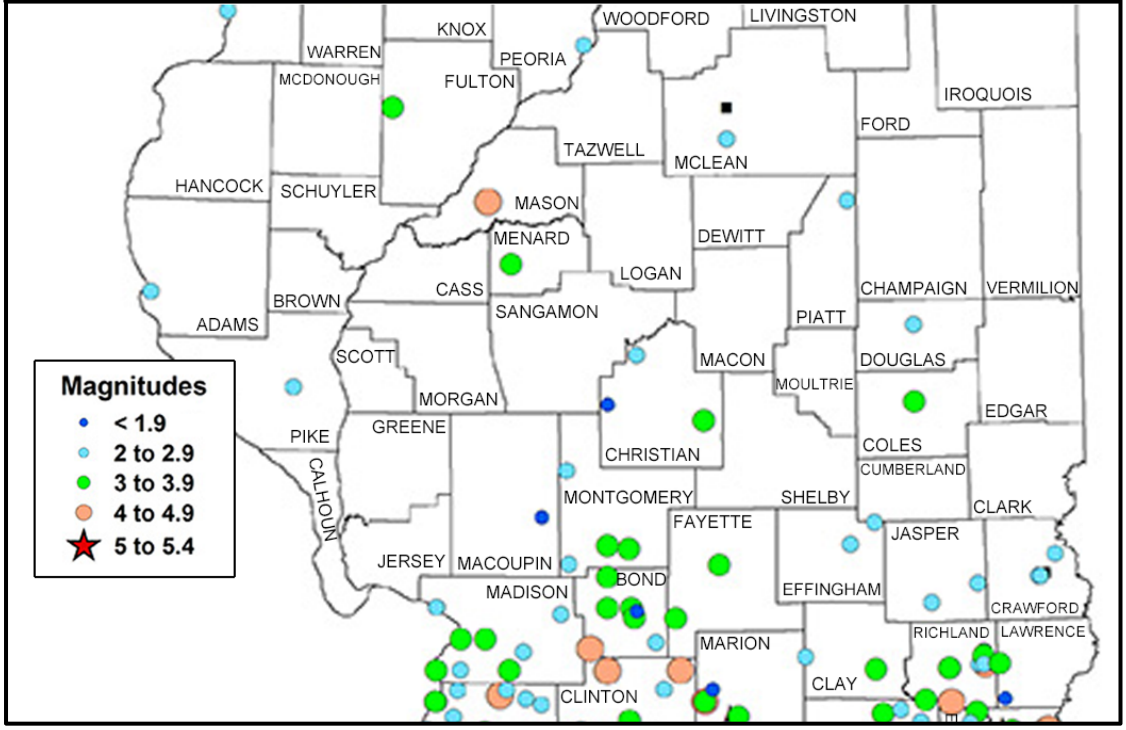
According to the Illinois State Geological Survey (ISGS), the U.S. Geological Survey and Center for Earthquake Research and Information (CERI) at the University of Memphis, one earthquake originated in Pike County during the last 200 years. On October 29, 1935, an estimated 2.0 to 2.9 magnitude earthquake originated in Pittsfield. No intensity rating was available from ISGS for this event.

<u>Earthquake Fast Facts – Occurrences</u>

Earthquakes Originating in the County (1795 – 2021): ***1***
Fault Zones Located within the County: ***0***
Geological Structures Located within the County: ***2***
Earthquakes Originating in Adjacent Counties (1795-2021): ***1***
Fault Zones Located in Nearby Counties: ***0***
Geologic Structures Located in Adjacent Counties: ***3***

Additionally, County residents have felt ground shaking caused by earthquakes that have originated outside of the County. The following provides a brief description, by region, of these events. **Figure EQ-5** illustrates the epicenters of the nearby earthquakes.

Figure EQ-5
Earthquakes Originating in Pike County Illinois



Source: Illinois State Geological Survey.

West-Central Illinois

On August 22, 1905, an earthquake with an estimated magnitude of 2.0 to 2.9 originated in Adams County on the south side of Quincy. This earthquake had an intensity of III on the Modified Mercalli Scale.

Southern Illinois

Pike County residents also felt ground shaking caused by several earthquakes that have originated in southern Illinois. The following provides a brief description of a few of the larger events that have occurred.

- On April 18, 2008, a magnitude 5.2 earthquake with an estimated intensity of VII for the area surrounding the epicenter was reported in southeastern Illinois near Bellmont in Wabash County. The earthquake was located along the Wabash Valley seismic zone. Minor structural damage was reported in several towns in Illinois and Kentucky. Ground shaking was felt over all or parts of 18 states in the central U.S. and southern Ontario, Canada.

- A magnitude 5.2 earthquake with an estimated intensity of VII for the area surrounding the epicenter took place on June 10, 1987, in southeastern Illinois near Olney in Richland County. This earthquake was also located along the Wabash Valley seismic zone. Only minor structural damage was reported in several towns in Illinois and Indiana. Ground shaking was felt over all or parts of 17 states in the central and eastern U.S. and southern Ontario, Canada.
- The strongest earthquake in the central U.S. during the 20th century occurred along the Wabash Valley seismic zone in southeastern Illinois near Dale in Hamilton County. This magnitude 5.4 earthquake occurred on November 9, 1968, with an intensity estimated at VII for the area surrounding the epicenter. Moderate structural damage was reported in several towns in south-central Illinois, southwest Indiana, and northwest Kentucky. Ground shaking was felt over all or parts of 23 states in the central and eastern U.S. and southern Ontario, Canada.

Three of the ten largest earthquakes ever recorded within the continental U.S. took place in 1811 and 1812 along the New Madrid seismic zone. This zone lies within the central Mississippi Valley and extends from northeast Arkansas through southeast Missouri, western Tennessee, western Kentucky, and southern Illinois. These magnitude 7.5 and 7.3 major earthquakes were centered near the town of New Madrid, Missouri and caused widespread devastation to the surrounding region and were felt by people in cities as far away as Pittsburgh, Pennsylvania and Norfolk, Virginia.

The quakes locally changed the course of the Mississippi River creating Reelfoot Lake in northwestern Tennessee. These earthquakes were not an isolated incident. The New Madrid seismic zone is one of the most seismically active areas of the U.S. east of the Rockies. Since 1974 more than 4,000 earthquakes have been recorded within this seismic zone, most of which were too small to be felt.

What locations are affected by earthquakes? What is the extent of future potential earthquakes?

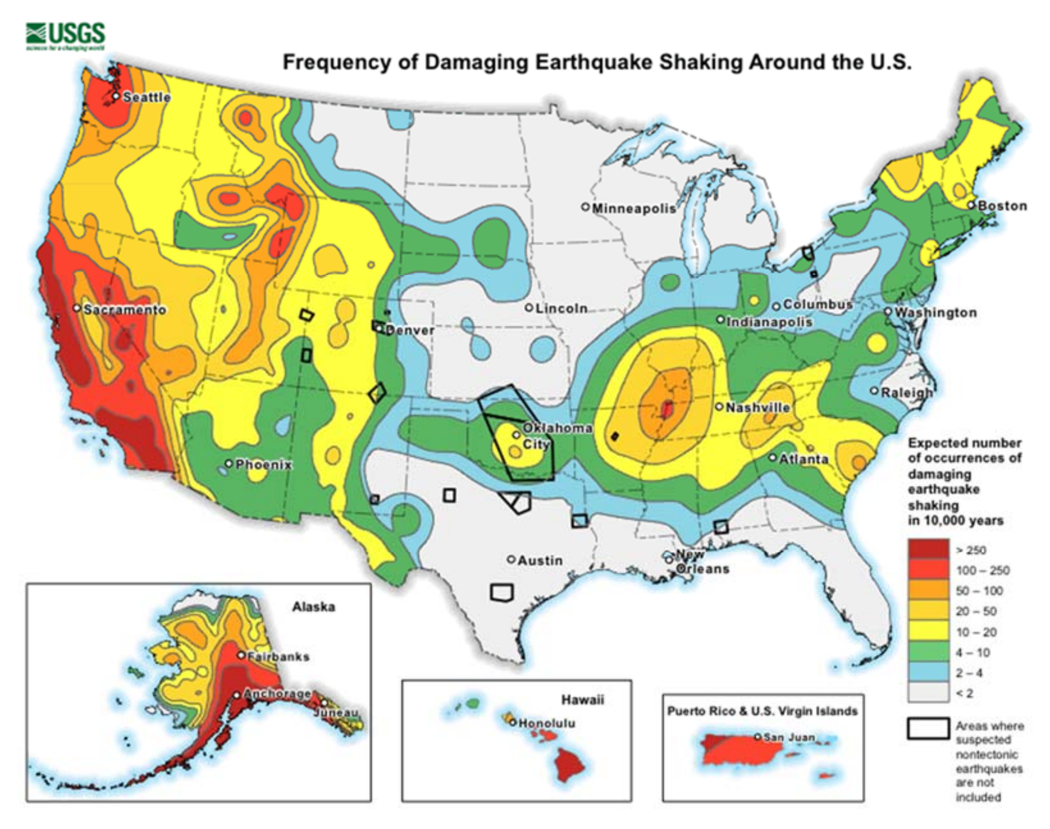
Earthquake events generally affect the entire County. Earthquakes, like drought, impact large areas extending across an entire region and affecting multiple counties. Pike County's proximity to the New Madrid Seismic Zone makes the entire area likely to be affected by an earthquake if this fault becomes seismically active. The *2018 Illinois Natural Hazard Mitigation Plan* classifies Pike County's hazard rating for earthquakes as "medium."

According to the USGS, Pike County can expect 4 and 20 occurrences of damaging earthquake shaking over a 10,000-year period. **Figure EQ-6** illustrates the frequency of damaging earthquake shaking around the U.S.

What is the probability of future earthquake events occurring?

As with flooding, calculating the probability of future earthquakes changes depending on the magnitude of the event. According to the ISGS, Illinois is expected to experience a magnitude 3.0 earthquake every year, a magnitude 4.0 earthquake every four years and a magnitude 5.0 earthquake every 20 years. The likelihood of an earthquake with a magnitude of 6.3 or greater occurring somewhere in the central U.S. within the next 50 years is between 86% and 97%.

Figure EQ-6
Frequency of Damaging Earthquake Shaking Around the U.S.



Source: U.S Geological Survey.

While the major earthquakes of 1811 and 1812 do not occur often along the New Madrid fault, they are not isolated events. In recent decades, scientists have collected evidence that earthquakes similar in size and location to those felt in 1811 and 1812 have occurred several times before within the central Mississippi Valley around 1450 A.D., 900 A.D. and 2350 B.C.

The general consensus among scientists is that earthquakes similar to the 1811-1812 earthquakes are expected to recur on average every 500 years. The U.S. Geological Survey and the Center for Earthquake Research and Information (CERI) at the University of Memphis estimates that for a 50-year period the probability of a repeat of the 1811-1812 earthquakes is between 7% and 10% and the probability of an earthquake with a magnitude of 6.0 or larger is between 25% and 40%.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from earthquakes.

Are the participating jurisdictions vulnerable to earthquakes?

Yes. All of Pike County is vulnerable to earthquakes. The unique geological formations topped with glacial drift soils found in the central U.S. conduct an earthquake's energy farther than in other parts of the Nation. Consequently, earthquakes that originate in the Midwest tend to be felt at greater distances than earthquakes with similar magnitudes that originate on the West Coast.

Earthquake Fast Facts – Risk

Earthquake Risk/Vulnerability:

- Public Health & Safety – Light/Moderate Quake within the County or immediate region: ***Low***
- Public Health & Safety – Major Quake in the region: ***Medium***
- Buildings/Infrastructure/Critical Facilities – Light/ Moderate Quake within the County or immediate region: ***Low***
- Buildings/Infrastructure/Critical Facilities – Major Quake in the region: ***Medium***

This vulnerability, found throughout most of Illinois and all of Pike County, is compounded by relatively high water tables within the region. When earthquake shaking mixes the groundwater and soil, ground support is further weakened thus adding to the potential structural damages experienced by buildings, roads, bridges, electrical lines, and natural gas pipelines.

The *Projected Earthquake Intensities Map* prepared by the Missouri State Emergency Management Agency predicts that if a magnitude 6.7 earthquake were to take place anywhere along the New Madrid seismic zone, then the highest projected intensity felt in Pike County would be a VII on the Modified Mercalli Intensity Scale. If a magnitude 8.6 earthquake were to occur, then the highest projected intensity felt would be a IX.

The infrequency of major earthquakes, coupled with relatively low magnitude/intensity of past events, has led the public to perceive that Pike County is not vulnerable to damaging earthquakes. This perception has allowed the County and participating municipalities to develop largely without regard to earthquake safety.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of earthquakes?

No. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdiction considered specific assets within their jurisdiction vulnerable to earthquakes.

What impacts resulted from the recorded earthquake events?

While Pike County residents almost certainly felt the earthquakes that originated in the County and others that have occurred in Illinois, no damages were reported in the County as a result of any of these events. Given the magnitude of the great earthquakes of 1811 and 1812, it is almost certain that individuals in what is now Pike County felt those quakes; however, historical records do not indicate the intensity or impacts that these quakes had on the County.

What other impacts can result from earthquakes?

Earthquakes can impact human life, health, and public safety. **Figure EQ-7** details the potential impacts that may be experienced by the County should a magnitude 6.0 or greater earthquake occur in the region.

Figure EQ-7
Potential Earthquake Impacts

Direct	Indirect
Buildings • Temporary displacement of businesses, households, schools, and other critical services where heat, water and power are disrupted • Long-term displacement of businesses, households, schools, and other critical services due to structural damage or fires *Transportation* • Damages to bridges (i.e., cracking of abutments, subsidence of piers/supports, etc.) • Cracks in the pavement of critical roadways • Increased traffic on Interstate, U.S., and State Routes as residents move out of the area to seek shelter and medical care and as emergency response, support services and supplies move south to aid in recovery • Misalignment of rail lines due to landslides (most likely near stream crossings), fissures and/or heaving *Utilities* • Downed power and communication lines • Breaks in drinking water and sanitary sewer lines resulting in the temporary loss of service • Disruptions in the supply of natural gas due to cracking and breaking of pipelines *Health* • Injuries/deaths due to falling debris and fires *Other* • Cracks in the earthen dams of the lakes and reservoirs within the County, which could lead to dam failures	*Health* • Use of County health facilities (especially if the quake originates along the New Madrid Fault) to treat individuals injured closer to the epicenter • Emergency services (ambulance, fire, law enforcement) may be needed to provide aid in areas where damage was greater *Other* • Disruptions in land line telephone service throughout an entire region (i.e., central and southern Illinois) • Depending on the seasonal conditions present, more displacements may be expected as those who may not have enough water and food supplies seek alternate shelter due to temperature extremes that make their current housing uninhabitable

What is the level of vulnerability to public health and safety from earthquakes?

The risk or vulnerability to public health and safety from an earthquake is dependent on the intensity and location of the event. Since there are no known faults in Pike County, the likelihood that an earthquake will originate in the County is very small, decreasing the changes for catastrophic damages. However, if a light earthquake originates within the County or from the structures in the immediate region, the risk or vulnerability to public health and safety is considered ***low***. This risk is elevated to ***medium*** for a major earthquake originating along seismic zones in the region (i.e., New Madrid or Wabash Valley).

Are existing buildings, infrastructure, and critical facilities vulnerable to earthquakes?

Yes. All existing buildings, infrastructure and critical facilities located in Pike County and the participating jurisdictions are vulnerable to damage from earthquakes. However, given the

County's size (approximately 14,600 individuals), its population density, the fact that there are very few buildings higher than two stories (with the exception of grain elevators and several multi-story buildings in Pittsfield) tempered by the potential for magnitude 5.0 and above earthquakes to occur in the immediate region, the damage is anticipated to be slight to considerable for well-built ordinary structures and considerable to severe for poorly-built structures.

If a strong earthquake (6.0 – 6.9) were to occur in the region, then unreinforced masonry buildings are most at risk during an earthquake because the walls are prone to collapse outward. Steel and wood buildings have more ability to absorb the energy from an earthquake while wood buildings with proper foundation ties have rarely collapsed in earthquakes. **Figure EQ-8** identifies the number of unreinforced masonry buildings that serve as critical facilities within the participating jurisdictions.

If the epicenter of a magnitude 7.6 earthquake were to originate anywhere along the New Madrid seismic zone, the highest projected Modified Mercalli intensity felt in Pike County would be a VIII according to the *Projected Earthquake Intensities Map* prepared by the Missouri State Emergency Management Agency.

An earthquake also has the ability to damage infrastructure and critical facilities such as roads and utilities. In the event of a major earthquake, bridges are expected to experience moderate damage such as cracking in the abutments and subsidence of piers and supports. The structural integrity may be compromised to the degree where safe passage is not possible, resulting in adverse travel times as alternate routes are taken. Some rural families may become isolated where alternate paved routes do not exist. In addition, cracks may form in the pavement of key roadways. **Figure R-5** lists the number of each type of critical infrastructure by jurisdiction.

An earthquake may also down overhead power and communication lines causing power outages and disruptions in communications. Cracks or breaks may form in natural gas pipelines and drinking water and sewage lines resulting in temporary loss of service. In addition, an earthquake could cause cracks to form in the earthen dams located within the County, increasing the likelihood of a dam failure.

As with public health and safety, the risk or vulnerability to buildings, infrastructure and critical facilities is dependent on the intensity and location of the event. The risk to buildings, infrastructure and critical facilities is considered to be ***low*** for a light to moderate earthquake that originates within the County or immediate region. This risk is elevated to ***medium*** for a major earthquake originating along seismic zones in the region (i.e., New Madrid or Wabash Valley).

Are future buildings, infrastructure, and critical facilities vulnerable to earthquakes?

Yes. All future buildings, infrastructure and critical facilities located in Pike County and the participating jurisdictions are vulnerable to damage from earthquakes. While Griggsville and Pittsfield have building codes in place, these codes do not contain seismic provisions that address structural vulnerability for earthquakes. As a result, there is the potential for future buildings, infrastructure, and critical facilities to face the same vulnerabilities as those of existing buildings, infrastructure, and critical facilities described previously.

What are the potential dollar losses to vulnerable structures from earthquakes?

Since property damage information was either unavailable or none was recorded for the documented earthquakes that impacted Pike County, there is no way to accurately estimate future potential dollar losses to vulnerable structures. However, according to the Pike County Clerk's Office the total equalized assessed values of all residential, commercial, and industrial buildings in the planning area is $124,322,202. Since all of the structures in the planning area are susceptible to earthquake impacts to varying degrees, this total represents the countywide property exposure to earthquake events.

Given Pike County's proximity to geologic structures and fault zones, both large and small, and the fact that all structures within the County are vulnerable to damage, it is likely that there will be future dollar losses from any earthquake ranging from strong to great. As a result, participating jurisdictions were asked to consider mitigation projects that could provide wide ranging benefits for reducing the impacts or damages associated with earthquakes.

Figure EQ-8
Number of Unreinforced Masonry Buildings Serving as Critical Facilities by Jurisdiction

Participating Jurisdiction	Government[1]	Law Enforcement	Fire Stations	Ambulance Service	Schools	Drinking Water	Wastewater Treatment	Medical[2]	Healthcare Facilities[3]
Pike County	3	---	---	---	---	---	---	1	---
Barry	1	1	---	---	2	1	1	2	---
Baylis	---	---	---	---	---	1	---	---	---
Griggsville	2	---	---	---	---	---	---	---	---
New Canton	2	---	1	---	---	1	---	---	---
Pearl	2	---	---	---	---	---	---	---	---
Pittsfield	3	---	---	---	---	1	5	1	---
Pikeland CUSD #10	---	---	---	---	---	---	---	---	---
Baylis FD	---	---	---	---	---	---	---	---	---
Spring Creek FPD	---	---	---	---	---	---	---	---	---
Fairmount Township	---	---	---	---	---	---	---	---	---
Pittsfield Township	---	---	---	---	---	---	---	---	---
Illini Community Hospital	---	---	---	---	---	---	---	---	1
McGee Creek D&LD	---	---	---	---	---	---	---	---	---
Sny Island LDD	---	---	---	---	---	---	---	---	---
Valley City D&LD	---	---	---	---	---	---	---	---	---

[1] Government includes: courthouses, city/village halls, township buildings, highway/road maintenance centers, etc.

[2] Medical includes: public health departments, hospitals, urgent/prompt care, and medical clinics.

[3] Healthcare Facilities include: nursing homes, skilled care facilities, memory care facilities, residential group homes, etc.

--- Indicates jurisdiction does not own/maintain any critical facilities within that category.

3.11 MAN-MADE HAZARDS

While the focus of this Plan update is on natural hazards, an ***overview of selected man-made hazards*** has been included. The Planning Committee recognizes that man-made hazards can also pose risks to public health and property. The extent and magnitude of the impacts that result from man-made hazard events can be influenced by natural hazard events. For example, severe winter storms can cause accidents involving trucks transporting hazardous substances. These accidents may lead to the release of these substances, which can result in injury and potential contamination of the natural environment.

Consequently, the Planning Committee decided to summarize the more prominent man-made hazards in Pike County. The man-made hazards profiled in this Plan update include:

- Hazardous Substances
    - Generation
    - Transportation
    - Storage/Handling
- Waste Disposal
- Hazardous Material Incidents
- Hazardous Waste Remediation
- Terrorism

While the man-made hazards risk assessment does not have the same depth as the natural hazards risk assessment, it does provide useful information that places the various man-made hazards in perspective.

3.11.1 Hazardous Substances

Hazardous substances broadly include any flammable, explosive, biological, chemical, or physical material that has the potential to harm public health or the environment. For the purposes of this Plan, the term hazardous substance includes hazardous product and hazardous waste. A hazardous waste is defined as the byproduct of a manufacturing process that is either listed or has the characteristics of ignitability, corrosivity, reactivity, or toxicity and cannot be reused. A hazardous product is all other hazardous material.

Hazardous substances can pose a public health threat to individuals at their workplace and where they reside. The type and quantity of the substance, the pathway of exposure (inhalation, ingestion, dermal, etc.), and the frequency of exposure are factors that will determine the risk of adverse health effects experienced by individuals. Impacts can range from minor, short-term health issues to chronic, long-term illnesses.

In addition to impacting public health, hazardous substances can also cause damage to buildings, infrastructure, and the environment. Incidents involving hazardous substances can range from minor (scarring on building floors and walls) to catastrophic (i.e., destruction of entire buildings, structural damage to roadways, etc.) and lead to injuries and fatalities. The number of incidents involving hazardous substances in Illinois and across the U.S. every year underscores the need for trained and equipped emergency responders to minimize damages.

Since 1970, significant changes have occurred in regard to how hazardous substances are transported and disposed. Comprehensive regulations and improved safety and industrial hygiene practices have reduced the frequency of incidents involving hazardous substances. Based on the small number of facilities in Pike County that generate and use hazardous substances, the population size, transportation patterns, and land use, the probability of a release occurring in Pike County should remain relatively moderate compared to other counties in Illinois. The relatively low numbers of transportation incidents should not diminish municipal or county commitment to emergency management.

HAZARD PROFILE – HAZARDOUS SUBSTANCES

The following subsections identify the general pathways – generation, transportation, and storage/handling – by which hazardous substances pose a risk to public health and the environment in Pike County.

3.11.1.1 Generation

Pike County has one facility that generated reportable quantities of hazardous substances as a result of their operations according to the U.S. Environmental Protection Agency (USEPA) Toxic Release Inventory. **Figure MMH-1** identifies the hazardous substance generators located in Pike County and summarizes the substances generated.

Hazardous Substances Fast Facts - Occurrences

Generation

Number of Facilities that Generate Reportable Quantities of Hazardous Substances (2019): ***1***

Transportation

Number of Roadway Incidents Involving Hazardous Substance Shipments (2011 - 2020): ***9***

Number of Railway Accidents/Incidents Involving Hazardous Substance Shipments (2011 - 2020): ***5***

Number of Pipeline Incidents Involving Hazardous Substances (2011 - 2020): ***2***

Storage/Handling

Number of Facilities that Store/Handle Hazardous Substances (2019): ***29***

Number of Facilities that Store/Handle Extremely Hazardous Substances (2019): ***14***

Figure MMH-1
Generators of Solid & Liquid Hazardous Substances – 2019

Name	Hazardous Substances Generated	Amount Generated (Pounds)
Barry		
Dyno Nobel Inc.	Ammonia	500

Source: U.S. Environmental Protection Agency, TRI Explorer, Releases: Facility Report.

3.11.1.2 Transportation

Roadways

Illinois has the nation's third largest interstate system and third largest inventory of bridges. According to the Illinois Department of Transportation, there were just over 147,000 miles of highways and streets in Illinois in 2021. Most of the truck traffic in Pike County is carried on Interstate 72 and U.S. Route 54. Other major roadways that carry truck traffic include Illinois Route 96, Illinois Route 106, and Illinois Route 107. While this modern roadway system provides convenience and efficiency for commuters, it also aids in-state and intra-state commerce, which includes the transportation of hazardous substances. A Commodity Flow Study to gauge chemical transport has not been conducted for Pike County.

For the purposes of this report a roadway incident is generally defined as an accident/incident that occurs while in the process of transporting a hazardous substance(s) on a highway, roadway, access drive, field entrance, rest area, or parking lot. Vehicles that experience a release while refueling are not considered roadway incidents but are instead considered fixed facility incidents.

According to records obtained from the Illinois Emergency Management Agency (IEMA), there were nine (9) recorded roadway incidents involving the shipment of hazardous waste and/or products in Pike County between 2011 through 2020. **Figure MMH-2** provides information on these incidents.

Figure MMH-2
Roadway Incidents* Involving Shipments of Hazardous Substances
2011 – 2020

Date	Area	Location	Hazardous Product Released	Quantity Released
11/15/2011	Pittsfield⮝	205th Ave.	Anhydrous ammonia	Unknown
4/21/2012	Grubb Hollow Prairie Nature Preserve⮝	Tributary of Hadley Creek, 1 mile west of the intersection of 230th St. & 28th Ave., ½ mile east of IL Rte. 96 & 28t7th Ave.	28% Nitrogen solution & Guardsman Max	300 gallons (estimated)
5/18/2017	Barry⮝	275 Ave. and 325th St.	Valor XLT	800 gallons
10/30/2017	Griggsville⮝	EB I-72, M.P. 41	Diesel fuel & automotive fluids	Unknown
1/21/2018	Rockport⮝	Ambrosia Hollow, ½ mile from IL Rte. 96	Oil & diesel fuel	Unknown (hydraulic fluid), 10 gallons (diesel)
4/25/2018	New Canton⮝	245th Ave. & 230th St.	Keystone NXT	3.2 gallons
10/09/2018	Griggsville⮝	WB I-72, M.P. 35	Diesel fuel	Unknown
11/25/2019	Pleasant Hill⮝	15607 CH. 11	Anhydrous ammonia	1,800 gallons
4/08/2020	Fishhook	Fairmount Township, Section 27, northeast quarter	Hog manure	6,000 gallons (estimated)

* For the purposes of this report a roadway incident is generally defined as an accident/incident that occurs while in the process of transporting a hazardous substance(s) on a highway, roadway, access drive, field entrance, rest area or parking lot. Vehicles that experience a release while refueling are not considered roadway incidents but are instead considered fixed facility incidents.

⮝ Accident verified in the vicinity of this area.

Source: Illinois Emergency Management Agency, Hazardous Materials Incident Reports

Railways

Illinois' rail system is the country's second largest, with the East St. Louis and Chicago terminals being two of the nation's busiest. In Pike County there are two Class I rail lines operated by: Kansas City Southern Railway Co. (KCS) and Norfolk Southern Railway Co. (NS). According to the Association of American Railroads, 3,796,300 carloads (125.9 million tons) of freight originated in Illinois in 2019 (the latest year for which data is available). Chemicals accounted for 101,100 carloads (9.7 million tons) or 2.8% of the total freight handled. In comparison, 27,549,000 carloads of freight originated in the U.S. in 2019 with approximately 2,014,000 carloads (7.1%) involved in the transport of chemicals.

The Illinois Commerce Commission (ICC) is required to maintain records on railway accidents/incidents that involve hazardous substances. Their records are divided into three categories. These three categories are described in **Figure MMH-3**.

Figure MMH-3
ICC Hazardous Substances Railroad Accident/Incidents Classification Categories

Category	Description
A	railroad derailments resulting in the release of the hazards substance(s) being transported
B	railroad derailments where hazards substance(s) were being transported but no release occurred
C	releases of hazardous substance(s)s from railroad equipment occurred; however, no railroad derailment was involved

Since 2011, there have been no rail accidents involving hazardous substances in Pike County according to the ICC. In comparison, ICC records indicate that since 2011 the annual number of railway accidents in Illinois involving hazardous substances has ranged between 45 and 122. **Figure MMH-4** provides a breakdown by category of the ICC-recorded railway accidents/incidents involving hazardous substances. Included is a comparison of the number of accidents/incidents in Pike County to those in Cook and the Collar Counties as well as the rest of Illinois.

Figure MMH-4
ICC Recorded Railway Accidents/Incidents Involving Hazardous Substances
2011 – 2020
(Sheet 1 of 2)

Year	Category	Accident/Incident Location			
		Illinois	Pike County	Cook & Collar Counties	All Other Counties
2011	A	8	0	1	7
	B	10	0	9	1
	C	60	0	33	27
2012	A	4	0	2	2
	B	13	0	11	2
	C	73	0	42	31
2013	A	5	0	3	2
	B	23	0	16	7
	C	82	0	51	31
2014	A	2	0	2	0
	B	36	0	22	14
	C	84	0	40	44
2015	A	4	0	3	1
	B	27	0	15	12
	C	69	0	36	33
2016	A	4	0	1	3
	B	14	0	6	8
	C	65	0	33	32

Figure MMH-4
ICC Recorded Railway Accidents/Incidents Involving Hazardous Substances
2011 – 2020
(Sheet 2 of 2)

Year	Category	Accident/Incident Location			
		Illinois	Pike County	Cook & Collar Counties	All Other Counties
2017	A	2	0	1	1
	B	14	0	9	5
	C	69	0	34	35
2018	A	1	0	0	1
	B	8	0	4	4
	C	55	0	24	31
2019	A	6	0	4	2
	B	6	0	4	2
	C	33	0	12	21
2020	A	4	0	2	2
	B	7	0	5	2
	C	46	0	30	16

Source: Illinois Commerce Commission.

According IEMA's hazardous materials incident records for 2011 through 2020, there were five (5) rail accidents/incidents involving the release of hazardous substances. **Figure MMH-5** provides information on these incidents by rail line. No derailments were associated with any of these accidents/incidents.

Figure MMH-5
IEMA Recorded Railway Accidents/Incidents Involving Hazardous Substances
2011 – 2020

Date	Area	Location	Hazardous Substance Released	Quantity Released
Norfolk Southern				
7/09/2011	Kinderhook^	M.P. DH503.6, Hannibal District	Lube oil	Approx. 5 gallons
9/28/2011	Hadley	Mainline/ Township Rd. 148	Lube oil	100 gallons (estimated)
4/11/2012	Hull^	M.P. DH509.2, Hannibal District	Lube oil	15 gallons
1/09/2018	Hadley	300 St.	Motor oil/diesel fuel	20 gallons
1/13/2018	Valley City	M.P. DH475.8, Hannibal District	Diesel fuel & motor oil	20 gallons of lube oil, 5 gallons of diesel fuel

^ Accident/incident verified in the vicinity of this area.

Source: Illinois Emergency Management Agency, Hazardous Materials Incident Reports.

The top 20 hazardous substances moved by rail through Illinois include: sodium hydroxide, petroleum gases (liquefied), sulfuric acid, anhydrous ammonia, chlorine, sulfur, vinyl chloride, propane, fuel oil, denatured alcohol, methanol, gasoline, phosphoric acid, hydrochloric acid, styrene monomer, carbon dioxide (refrigerated liquid), ammonium nitrate, sodium chlorate, and diesel fuel.

Pipelines

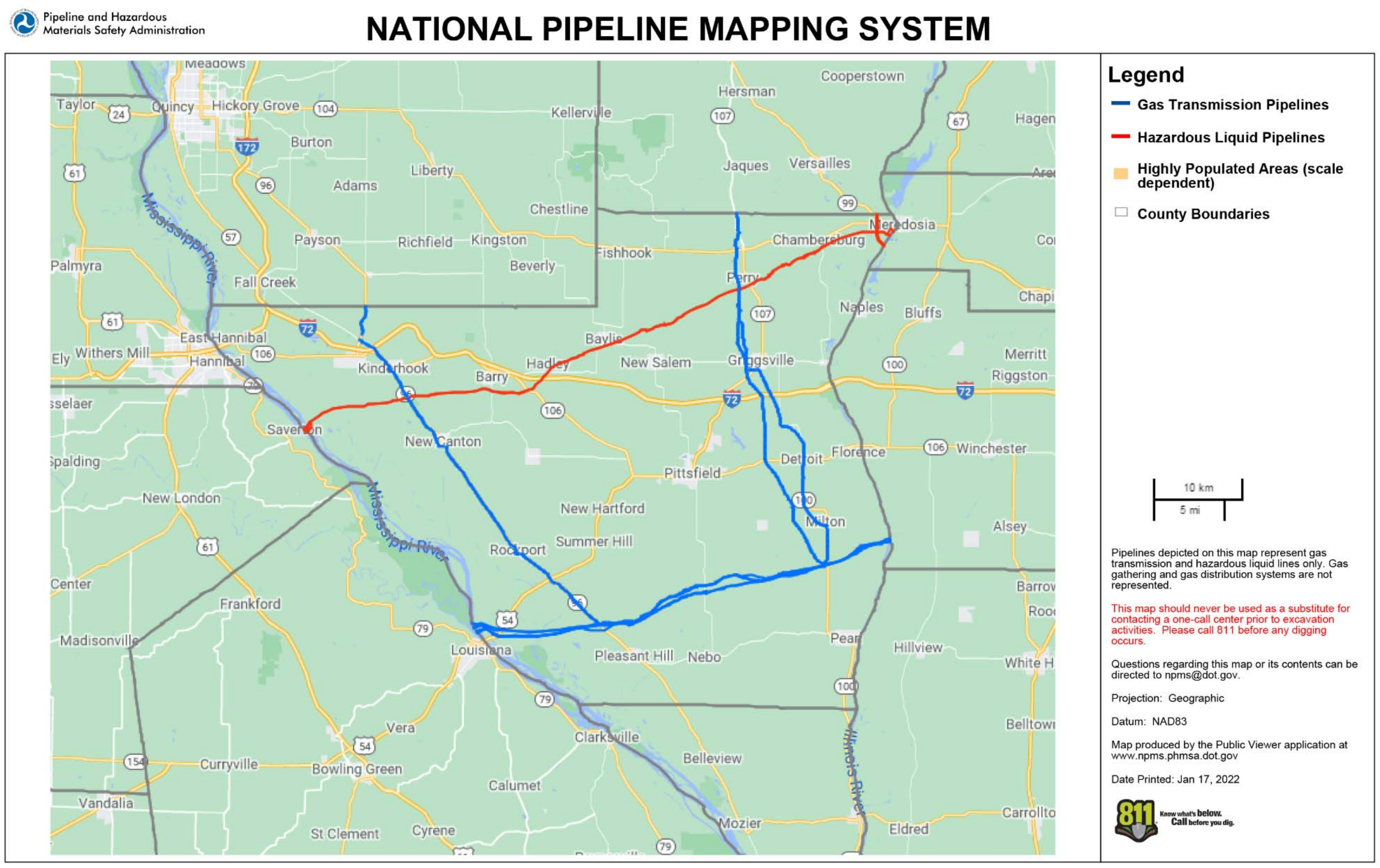
Energy gases (natural gas and liquefied petroleum gas), petroleum liquids (crude oil and gasoline), and liquid and gas products used in industrial processes are carried in above-ground and buried pipelines across Illinois. In Pike County, there is one interstate hazardous liquids pipeline, two interstate natural gas pipelines and two intrastate natural gas pipelines according to the U.S. Department of Transportation's National Pipeline Mapping System. The hazardous liquids pipeline carries crude oil and is owned by DAPL-ETCO Operations Management LLC. There is an abandoned hazardous liquids line owned by Magellan Pipeline. The natural gas pipelines are owned by Northern Illinois Gas, Ameren Illinois, Panhandle Eastern Pipeline and Rockies Express Pipeline. **Figure MMH-6** shows the pipelines in Pike County.

Two pipeline releases occurred in Pike County during a 10-year period from 2011 through 2020. The first release took place on August 24, 2019 when a driver had a medical emergency and struck a small above-ground natural gas regulating facility near Kinderhook. The second release was discovered while line testing was being conducted on April 14, 2020 near Pleasant Hill.

There have been several high-profile incidents across the U.S., including one in Illinois, that have raised public concerns about our aging pipeline infrastructure. The following provides a brief description of each incident.

- On July 26, 2010, a 30-inch liquid product pipeline rupture near Marshall, Michigan and released at least 840,000 gallons of oil into a creek that led to the Kalamazoo River, a tributary of Lake Michigan.
- On September 9, 2010, another pipeline release received national attention. A 34-inch liquid product pipeline in the Chicago suburb of Romeoville, Illinois released more than 360,000 gallons of crude oil that flowed through sewers and into a retention pond narrowly avoiding the Des Plaines River. This release triggered numerous odor complaints from residents in the adjacent municipalities of Lemont and Bolingbrook. The property damage/cleanup costs were estimated at $46.6 million.
- Also, on September 9, 2010, a 30-inch high pressure natural gas pipeline ruptured in the San Francisco suburb of San Bruno, California that resulted in an explosion that killed eight people, injured 51, destroyed more than 30 homes and damaged an entire neighborhood. The property damage was estimated at around $55 million.
- On March 12, 2014, a gas main rupture in Manhattan, New York resulted in an explosion that killed eight people and leveled two multi-use, five story buildings.
- On May 19, 2015, a 24-inch liquid product pipeline ruptured near Refugio State Beach in Santa Barbara County, California and released approximately 100,000 gallons of crude oil. The release occurred along a rustic stretch of coastline that forms the northern boundary of the Santa Barbara Channel, home to a rich array of sea life. Oil ran down a ravine and entered the Pacific Ocean, blackening area beaches, creating a 9-mile oil slick and impacting birds, marine mammals, fish and coastal and subtidal habitats.

Figure MMH-6
Pipeline Location Map



Pipeline and Hazardous Materials Safety Administration

NATIONAL PIPELINE MAPPING SYSTEM

Legend

- — **Gas Transmission Pipelines**
- — **Hazardous Liquid Pipelines**
- 🟧 **Highly Populated Areas (scale dependent)**
- ☐ **County Boundaries**

Pipelines depicted on this map represent gas transmission and hazardous liquid lines only. Gas gathering and gas distribution systems are not represented.

This map should never be used as a substitute for contacting a one-call center prior to excavation activities. Please call 811 before any digging occurs.

Questions regarding this map or its contents can be directed to npms@dot.gov.

Projection: Geographic

Datum: NAD83

Map produced by the Public Viewer application at www.npms.phmsa.dot.gov

Date Printed: Jan 17, 2022

811 Know what's below. Call before you dig.

Continual monitoring and maintenance of these pipelines is necessary to prevent malfunctions from corrosion, aging, or other factors that could lead to a release. In addition to normal wear and tear experienced by pipelines, the possibility of sabotage and seismic activity triggering a release must be considered when contemplating emergency response scenarios.

3.12.1.3 Storage/Handling

Beyond knowing where hazardous substances are generated and the methods and routes used to transport them, it is important to identify where hazardous substances are handled and stored. This information will help government officials and emergency management professionals make informed choices on how to better protect human health, property and the environment and what resources are needed should an incident take place.

Records obtained from IEMA's Tier II database were used to gather information on the facilities that generate, use and store chemicals in excess of reportable threshold quantities within Pike County. The Tier II information was then compared with USEPA's Toxic Release Inventory (TRI) and information from Illinois Environmental Protection Agency (IEPA) databases. This review identified 29 facilities within Pike County in 2019 that store and handle hazardous substances.

Of these 29 facilities, 14 reported the presence of Extremely Hazardous Substances (EHSs) at their facilities. An EHS is any USEPA-identified chemical that could cause serious, irreversible health effects from an accidental release. There are approximately 400 chemicals identified as EHSs. Stationary sources that possess one or more of these substances at or above threshold reporting quantities are required to notify IEMA.

3.11.2 Waste Disposal

Waste disposal has caused surface water and ground water contamination in Illinois and across the U.S. Beginning in the late 1970s substantial regulatory changes strengthened the design, operating and monitoring requirements for landfills where the majority of waste is disposed. These regulatory changes have helped reduce the public health threat posed by landfills.

HAZARD PROFILE – WASTE DISPOSAL

The following subsections identify the general pathways – solid, medical, and hazardous – by which waste disposal poses a risk to public health and the environment in Pike County.

3.11.2.1 Solid Waste

While recycling activities have reduced the amount of solid waste (waste generated in households), the majority continues to be disposed of in landfills. As of 2020, the most recent year for which data was available, there were 37 landfills operating in Illinois.

Waste Disposal Fast Facts - Occurrences

Solid Waste
Number of Solid Waste Landfills Operating in Pike County (2019): ***1***

Number of Landfills Serving Pike and adjacent counties (2019): ***1***

Potentially-Infectious Medical Waste (PIMW)
Number of Facilities within the County Permitted to Handle PIMW: ***0***

Hazardous Waste
Number of Commercial Off-Site Hazardous Waste Treatment or Disposal Facilities located in the County: ***0***

According IEPA's Annual Landfill Capacity Report issued in October 2020, there was one active commercial landfill that operated in Pike County, Hickory Ridge Landfill, located near Baylis. There is currently one other Illinois landfill that serves Pike and the adjacent counties: Envirofil of Illinois Inc., in McDonough County.

3.11.2.2 Potentially- Infectious Medical Waste

Potentially-Infectious Medical Waste (PIMW) is generated in connection with medical research; biological testing; and the diagnosis, treatment or immunization of human beings or animals. PIMW is typically generated at hospitals, nursing homes, medical or veterinary clinics, dental offices, clinical or pharmaceutical laboratories, and research facilities.

According to IEPA's list of permitted PIMW Facilities, there are no facilities permitted to accept medical waste for disposal in Pike County.

3.11.2.3 Hazardous Waste

A hazardous waste is defined as the byproduct of a manufacturing process that is either listed or has the characteristics of ignitability, corrosivity, reactivity, or toxicity and cannot be reused.

According to IEPA's Storage, Treatment, Recycling, Incinerating, Transfer Stations, and Processing list, there are currently no off-site hazardous waste treatment or disposal facilities located in Pike County.

3.11.3 Hazardous Material Incidents

A hazardous material or hazmat incident refers to any accident involving the release of hazardous substances, which broadly include any flammable, explosive, biological, chemical, or physical material that has the potential to harm public health or the environment. These incidents can take place where the substances are used, generated or stored or while they are being transported. In addition, hazmat incidents also include the release of hazardous substances, such as fuel, used to operate vehicles. These releases can be the result of an accident or a leak.

HAZARD PROFILE – HAZARDOUS MATERIALS INCIDENTS

From 2011 to 2020, there were 31 hazmat incidents recorded in Pike County. **Figure MMH-7** provides information on the hazmat incidents recorded in Pike County. Of these incidents, 15 (48%) involved transportation incidents/accidents while 16 (52%) occurred at fixed facilities. Eight of the fifteen (53%) transportation incidents/accidents involved petroleum-based products.

Hazmat Incident Fast Facts - Occurrences

Number of Hazardous Material Incidents in Pike County (2011 - 2020): ***31***

Number of Transportation-Related Incidents/Accidents: ***15***

Number of Fixed Facility-Related Incidents/Accidents: ***16***

Average Number of Hazardous Material Incidents Experienced Annually: ***3***

Based on the recorded incidents, Pike County experienced an average of 3 hazmat incidents annually between 2011 through 2020. The types of existing industries; the major transportation corridors through the County, which include interstate and Illinois highways, rail and pipeline; and chemical use within and adjacent to the County suggest that hazmat incidents are likely to continue to take place at the rate reflected in the 10-year study period. Constant vigilance, proper training and equipment, and prompt response are needed to minimize the potential impacts of each incident.

3.11.4 Waste Remediation

The improper disposal or containment of special and hazardous waste through the years has led to soil, groundwater and surface water contamination of sites across the U.S. In order to safeguard human health and the environment, these contaminants must be removed or neutralized so they cannot cause harm. This process is known as waste remediation.

HAZARD PROFILE – WASTE REMEDIATION

In Illinois, waste remediation is handled through several programs including the federal Superfund program, the State Response Action Program, the state Site Remediation Program, and the Leaking Underground Storage Tanks Program. The following provides a brief description of each.

Superfund (CERLCA) Program/National Priorities List

Superfund is a USEPA-led program to clean up sites within the U.S. contaminated by hazardous waste that has been dumped, left out in the open, or otherwise improperly managed and which pose a risk to human health and/or the environment. Sites of national priority among the known or threatened releases of hazardous substances, pollutants or contaminants throughout the U.S. and its territories are identified on the National Priorities List (NPL). Those sites that pose the largest threat to public health and the environment are typically found on the NPL.

According to the NPL database, there are 45 Superfund sites in Illinois. However, there are **no sites** in Pike County being **managed through the Superfund program**.

Waste Remediation Fast Facts - Occurrences

Superfund
Number of Superfund Sites in the County: ***0***

Illinois Site Response Action Program
Number of SRAP Sites in the County: ***1***

Illinois Site Remediation Program
Number of SRP Sites in the County: ***9***

Number of SRP Sites with NFR Letters: ***8***

Illinois Leaking Underground Storage Tanks Program
Number of LUST Sites in County: ***74***

Number of LUST Sites with NFR/Non-Lust/4Y Letters: ***55 (74%)***

State Response Action Program (SRAP)

The main objective of the State Response Action Program (SRAP) is to clean up hazardous substances at sites that present an imminent and substantial threat to human health and the environment, but which may not be addressed by other federal or state cleanup programs. The sites handled by the SRAP include abandoned landfills, old manufacturing plants, former waste oil recycling operations, contaminated agrichemical facilities, and other areas where surface water, groundwater, soil and air may be contaminated with hazardous substances. Since the mid-1980s, cleanup activities have been conducted at more than 500 sites in Illinois through this Program.

Once the threat to human health and the environment has been mitigated, some sites are transferred to other state cleanup programs to complete remediation activities.

There was one SRAP site in Pike County, Milton School in Milton. This site completed the Program in 2007.

Illinois Site Remediation Program (SRP)

The Site Remediation Program (SRP) is a voluntary cleanup program that provides applicants the opportunity to receive technical assistance in determining what course of action is needed to remediate sites where hazardous substances, pesticides, or petroleum may be present. The goal of the SRP is to receive a no further remediation determination from IEPA. Most site remediation in Illinois is handled through this Program. Since the mid-1980s, remediation activities have been conducted and monitored at approximately 5,800 sites in Illinois. Properties that satisfy respective IEPA laws and regulations can receive a No Further Remediation (NFR) letter. They must demonstrate, through proper investigation and, when warranted, remedial action, that environmental conditions at their remediation site do not present a significant risk to human health or the environment. This letter describes what remediation activities have been taken and whether any portion of the property, based on future property use, might need additional remediation.

There are nine SRP sites in Pike County. Eight of the nine SRP sites have received NFR letters. The remaining site does not pose an immediate threat to public health or the environment.

Leaking Underground Storage Tank Program (LUST)

The Leaking Underground Storage Tanks Program (LUST) oversees remedial activities associated with petroleum product releases from underground storage tanks (UST). This program began in the late 1980s as a result of the threats posed by vapors in homes and businesses, contaminated groundwater, and contaminated soil. In Illinois more than 14,500 acres of soil contaminated by leaking underground tanks have been remediated between 1988 and 2010 (the most recent year for which data was available).

In Pike County there are 74 sites involving the remediation of petroleum product releases from underground storage tanks. Of the 74 LUST sites, 55 (approximately 74%) have received NFR letters, other clearance letters, or remediation is virtually complete.

3.11.5 Terrorism

Terrorism has different definitions across the globe. For the purpose of this Plan, terrorism will be defined as any event that includes violent acts which threaten, or harm lives, health or property conducted by domestic or foreign individuals or groups aimed at civilians, the federal government or symbolic locations intended to cause widespread fear.

HAZARD PROFILE – TERRORISM

The attack on the World Trade Center and the Pentagon on September 11, 2001 by foreign terrorists galvanized national action against terrorism and resulted in the creation of the U.S. Department of Homeland Security. While the number of terrorist activities garnering national attention in the U.S. has been relatively small, approximately 201,183 terrorist events have occurred worldwide between 1970 and 2019, according to the National Consortium for the Study of Terrorism and Responses to Terrorism (the Consortium). During this same time span, the Consortium documented 3,004 terrorist events within the U.S.

Terrorism Fast Facts – Occurrences*

Number of Recorded Terrorism Events Worldwide (1970 – 2019): ***201,183***

Number of Recorded Terrorism Events in the U.S. (1970 – 2019): ***3,004***

Number of Recorded Terrorism Events in Illinois (1970 – 2019): ***117***

* Based on data from the National Consortium for the Study of Terrorism and Responses to Terrorism (START) Global Terrorism Database.

Acts of terrorism have resulted in fatalities and injuries as a result of kidnappings, hijackings, bombings, and the use of chemical and biological weapons. The Global Terrorism Database has documented 3,633 American fatalities in the U.S. between 1995 and 2019 from terrorist attacks. The attacks on September 11, 2001 account for 3,001of the 3,633 fatalities. A search of the Global Terrorism Database identified 117 incidents of terrorism in Illinois between 1970 and 2019. These incidents resulted in six fatalities and 38 injuries.

The Federal Bureau of Investigation's (FBI) provides supporting documentation on domestic terrorist attacks in a series of reports on terrorism. These reports provide a chronological summary of terrorist incidents in the U.S. with detailed information on attacks between 1980 and 2005. During this time period, 192 incidents were documented within the U.S. Six of these incidents occurred in Illinois; five in the Chicago area and one downstate.

On September 24, 2009, a single individual from Macon County sought to carry out his anger at the federal government by detonating a van filled with explosive outside of the Federal Courthouse in Springfield. This attempt was thwarted by the FBI.

On May 16, 2018 at around 8:00 a.m., 19-year-old boy, armed with a 9-mm semi-automatic rifle, fired several shots near the Dixon High School Gymnasium where approximately 180 students were practicing for graduation. The school's resource officer confronted the shooter, who fled from the school on foot. The shooter fired several shots at the resource officer, who returned fire, wounding the shooter in the shoulder. The gunman suffered non-life threatening injuries. No students or staff were injured in the incident. Faculty and staff barricaded doors and took cover as the incident unfolded.

More recently an active shooter incident occurred at the Highland Park Independence Day parade on July 4, 2022. A 22-year-old man, armed with a semi-automatic rifle, gained access to the roof of a building along the parade route and opened fire on spectators and those in the parade killing seven individuals and wounding an additional 48 individuals. The shooter evaded immediate capture and fled the scene but was apprehended later the same day. He confessed to the shooting and is being held without bail as he awaits trial.

It is impossible to predict with any reasonable degree of accuracy how many terrorism events might be expected to occur in Pike County or elsewhere in Illinois. Although targets for terrorist activity are more likely centered in larger urban areas, recruitment, training and other support activities, such as the ones described above, have occurred in rural areas.

The economic resources available to some terrorist groups coupled with the combination of global tensions, economic uncertainty and frustration towards government appear to have recently raised the frequency of attempts. Enhanced efforts by law enforcement officials and civilian vigilance for unusual activity or behavior will be needed to repel terrorists whether they are domestic or foreign in origin.

4.0 MITIGATION STRATEGY

The mitigation strategy identifies how participating jurisdictions are going to reduce or eliminate the potential loss of life and property damage that results from the natural and man-made hazards identified in the Risk Assessment section of this Plan. The strategy includes:

- Reviewing and updating the mitigation goals. Mitigation goals describe the objective(s) or desired outcome(s) that the participants would like to accomplish in terms of hazard and loss prevention. These goals are intended to reduce or eliminate long-term vulnerabilities to natural and man-made hazards.
- Evaluating the status of the existing mitigation actions and identifying a comprehensive range of jurisdiction-specific mitigation actions including those related to continued compliance with the National Flood Insurance Program (NFIP). Mitigation actions are projects, plans, activities, or programs that achieve at least one of the mitigation goals identified.
- Analyzing the existing and new mitigation actions identified for each jurisdiction. This analysis ensures each action will reduce or eliminate future losses associated with the hazards identified in the Risk Assessment section.
- Reviewing and updating the mitigation actions prioritization methodology. The prioritization methodology outlines the approach used to prioritize the implementation of each identified mitigation action.
- Identifying the entity(s) responsible for implementation and administration. For each mitigation action, the entity(s) responsible for implementing and administering that action is identified as well as the timeframes for completing the actions and potential funding sources.
- Conducting a preliminary cost/benefit analysis of each mitigation action. The qualitative cost/benefit analysis provides participants a general idea of which actions are likely to provide the greatest benefit based on the financial cost and staffing efforts needed.

As part of the Plan update, the mitigation strategy was reviewed and revised. A detailed discussion of each aspect of the mitigation strategy and any updates made is provided below.

4.1 MITIGATION GOALS REVIEW

As part of the Plan update process, the mitigation goals developed in the previous Plan were reviewed and re-evaluated. The Planning Committee chose to update the five existing goals and add three new goals in order to address a more comprehensive range of mitigation activities and projects.

The previous list of mitigation goals as well as potential updates to the list were distributed to the Planning Committee members at the first meeting on June 15, 2021. Members were asked to review the potential updates before the second meeting and consider whether any changes needed to be made or if additional goals should be included. A survey was sent out to the Committee members on August 19, 2021 soliciting feedback on the potential updates. Based on the responses received, modifications were made to Goal 2. The results of the survey were discussed at the Planning Committee's September 1, 2021 meeting and the Committee approved the updated goal with the recommended changes. **Figure MIT-1** lists the approved mitigation goals.

Figure MIT-1
Mitigation Goals

Goal 1	Protect the lives, health, and property of the individuals living in the Pike County from the effects of natural and man-made hazards.
Goal 2	Educate individuals and businesses about the natural and man-made hazards that impact Pike County, the actions they can take before an event occurs to protect themselves, their households, homes, and businesses from these hazards and the resources available to implement identified actions in an effort to promote hazard resiliency.
Goal 3	Incorporate natural and man-made hazard mitigation into existing as well as new community plans and regulations to minimize the potential damage from these hazards.
Goal 4	Place a priority on protecting public services, including critical facilities, utilities, roads, and schools from the effects of natural and man-made hazards.
Goal 5	Retrofit existing infrastructure (buildings, roads, bridges, utilities, water supplies, sanitary sewer systems, etc.) and design new infrastructure to be resilient to the effects of natural and man-made hazards.
Goal 6	Preserve and protect the rivers, streams, and floodplains in Pike County.
Goal 7	Ensure future development does not increase the vulnerability of hazard-prone areas within a jurisdiction or create unintended exposures to natural and man-made hazards.
Goal 8	Protect historic, cultural, and natural resources from the effects of natural and man-made hazards.

4.2 EXISTING MITIGATION ACTIONS REVIEW

The Plan update process included a review and evaluation of the ***existing hazard mitigation actions*** listed in the previous Plan. A copy of these actions is included in **Appendix K**. A review of the existing hazard mitigation actions revealed the following shortcomings:

- Actions were not jurisdiction-specific. Most of the action were applied to every participating jurisdiction no matter their level of interest, ability to implement or relevant to their jurisdiction.
- Actions did not identify specific entities responsible for implementation. This created a situation in which the participating jurisdictions did not have a clear understanding of which department within their own jurisdiction was tasked with implementing the action and therefore no sense of responsibility or ownership of the action was taken.
- Actions focused on emergency preparedness or response and not mitigation. Several of the actions identified were aimed at addressing emergency preparedness or response and not mitigation needs.

As a result of these findings, the Planning Committee agreed to the creation of individual, jurisdiction-specific mitigation action lists for each participant. In addition, those actions identified as emergency preparedness/response in the previous Plan, Mitigation Actions 4, 9, 12, 13, 14, 32, 33, and 36, were eliminated. The remaining existing mitigation actions were evaluated, assigned to the appropriate participating jurisdiction(s), and presented to the Planning Committee members for their review and evaluation at the second meeting held on September 1, 2021. Each participating jurisdiction was asked to identify those actions that were either in progress or that had been completed since the previous Plan was prepared in 2010. Because jurisdictional priorities change over time, they were also given the opportunity to eliminate any action on their specific list that they did not deem currently relevant, viable, and/or practical for implementation.

Figures MIT-2 through **MIT-7**, located at the end of this section, summarize the results of this evaluation by participating jurisdiction. Each action listed includes a reference number to the previous mitigation action list found in **Appendix K**. None of the participants identified changes in priorities since the previous Plan was approved.

Fairmount Township, Pittsfield Township, Pikeland CUSD #10, and McGee Creek Drainage & Levee District (D&LD) did not participate in the previous Plan update and therefore are not included in the summary. Baylis Fire Department, Spring Creek Fire Protection District, Illini Community Hospital, Sny Island Levee Drainage District, and Valley City D&LD participated in the previous Plan update but did not include any mitigation actions in the Plan and are also not included in the summary. While Florence, Kinderhook, Milton, Nebo, New Salem, Perry, and Pleasant Hill theoretically participated in the previous Plan, they chose not to participate in the Plan update process and are not included in the summary.

4.3 NEW MITIGATION ACTION IDENTIFICATION

Following the review and evaluation of the existing mitigation actions, the Planning Committee members were asked to consult with their respective jurisdictions to identify ***new, jurisdiction-specific mitigation actions***. Instead of focusing on all-inclusive actions covering multiple jurisdictions, participants were asked to identify mitigation actions that met the specific needs and risks associated with their jurisdiction.

Representatives of Pike County and New Canton were also asked to identify mitigation actions that would ensure their continued compliance with the National Flood Insurance Program. The compiled lists of new mitigation actions were then reviewed to assure the appropriateness and suitability of each action. Those actions that were not deemed appropriate and/or suitable were either reworded or eliminated.

4.4 MITIGATION ACTION ANALYSIS

Next, those existing mitigation actions retained, and the new mitigation actions identified were assigned to one of four broad mitigation activity categories that allowed Planning Committee members to compare and consolidate similar actions. **Figure MIT-8** identifies each mitigation activity category and provides a brief description.

Each mitigation action was then analyzed to determine:

- the hazard or hazards being mitigated;
- the general size of the population affected (i.e., small, medium, or large);
- the goal or goals fulfilled;
- whether the action would reduce the effects on new or existing buildings and infrastructure; and
- whether the action would ensure continued compliance with the National Flood Insurance Program.

Each mitigation action was also evaluated to determine whether it would mitigate risk to one or more of FEMA's seven Community Lifelines. Community Lifelines are the most fundamental services in the community that, when stabilized, enable all aspects of society to function. These fundamental services enable the continuous operation of critical government and business functions essential to human health and safety or economic security. The Community Lifelines include Safety & Security; Food, Water, Shelter; Health & Medical; Energy (Power & Fuel); Communications; Transportation; and Hazardous Materials. **Figure MIT-9** provides a brief description of each Community Lifeline.

Figure MIT-8
Types of Mitigation Activities

Category	Description
Local Plans & Regulations (LP&R)	Local Plans & Regulations include actions that influence the way land and buildings are being developed and built. Examples include stormwater management plans, floodplain regulations, capital improvement projects, participation in the NFIP Community Rating System, comprehensive plans, and local ordinances (i.e., building codes, etc.)
Structure & Infrastructure Projects (S&IP)	Structure & Infrastructure Projects include actions that protect infrastructure and structures from a hazard or remove them from a hazard area. Examples include acquisition and elevation of structures in flood prone areas, burying utility lines to critical facilities, construction of community safe rooms, install "hardening" materials (i.e., impact resistant window film, hail resistant shingles/doors, etc.) and detention/retention structures.
Natural System Protection (NSP)	Natural System Protection includes actions that minimize damage and losses and also preserve or restore natural systems. Examples include sediment and erosion control, stream restoration and watershed management.
Education & Awareness Programs (E&A)	Education & Awareness Programs include actions to inform and educate citizens, elected officials and property owners about hazards and the potential ways to mitigate them. Examples include outreach/school programs, brochures, and handout materials, becoming a StormReady community, evacuation planning and drills, and volunteer activities (i.e., culvert cleanout days, initiatives to check in on the elderly/disabled during hazard events such as storms and extreme heat events, etc.)

4.5 MITIGATION ACTION PRIORITIZATION METHODOLOGY & COST/BENEFIT ANALYSIS REVIEW

The methodology developed to prioritize mitigation actions in the previous Plan was reviewed by the Planning Committee as part of the Plan update process. The previous prioritization methodology was based on the significance of the hazard (most significant versus less significant), the permanence or far-reaching effect of an action, and those actions ready for implementation within existing budgets constraints and time frames.

To better characterize the benefits of the identified actions and clarify the hazard impacts, the Planning Committee decided to replace the previous prioritization methodology with one focused on just two key factors: 1) the frequency of the hazard and 2) the degree of mitigation attained. This updated prioritization methodology was presented to the Planning Committee members at the third meeting held on December 2, 2022. The group reviewed and discussed the methodology and chose to approve it with no changes.

Figure MIT-10 identifies and describes the four-tiered prioritization methodology adopted by the Planning Committee. The methodology developed provides a means of objectively determining which actions have a greater likelihood of eliminating or reducing the long-term vulnerabilities associated with the most frequently-occurring natural hazards.

Figure MIT-9
Community Lifelines

Category	Components/Subcomponents
Safety & Security	- Law Enforcement/Security (police stations, law enforcement, site security, correctional facilities) - Fire Service (fire stations, firefighting resources) - Search & Rescue (local search & rescue) - Government Service (emergency operation centers, essential government functions, government offices, schools, public records, historic/cultural resources) - Community Safety (flood control, other hazards, protective actions)
Food, Water, Shelter	- Food [commercial food distribution, commercial food supply chain, food distribution programs (e.g., food banks)] - Water [drinking water utilities (intake, treatment, storage & distribution), wastewater systems, commercial water supply chain]; - Shelter [housing (e.g., homes, shelters), commercial facilities (e.g., hotels)]; - Agriculture (animals & agriculture)
Health & Medical	- Medical Care (hospitals, dialysis, pharmacies, long-term care facilities, VA health system, veterinary services, home care) - Patient Movement (emergency medical services) - Fatality Management (mortuary and post-mortuary services) - Public Health (epidemiological surveillance, laboratory, clinical guidance, assessment/interventions/treatments, human services, behavioral health) - Medical Supply Chain [blood/blood products, manufacturing (e.g., pharmaceutical, device, medical gases), distribution, critical clinical research, sterilization, raw materials]
Energy	- Power Grid (generation systems, transmission systems, distribution systems) - Fuel [refineries/fuel processing, fuel storage, pipelines, fuel distribution (e.g., gas stations, fuel points), off-shore oil platforms]
Communications	- Infrastructure [wireless, cable systems and wireline, broadcast (e.g., TV and radio), satellite, data centers/internet] - Alerts, Warnings, & Messages (local alert/warning ability, access to IPAWS, NAWAS terminals) - 911 & Dispatch (public safety answering points, dispatch) - Responder Communications (LMR networks) - Finance (banking services, electronic payment processing)
Transportation	- Highway/Roadway/Motor Vehicle (roads, bridges) - Mass Transit (bus, rail, ferry) - Railway (freight, passenger) - Aviation [commercial (e.g., cargo/passenger), general, military] - Maritime (waterways, ports and port facilities)
Hazardous Materials	- Facilities [oil/hazmat facilities (e.g., chemical, nuclear), oil/hazmat/toxic incidents from facilities] - Hazmat, Pollutants, Contaminants (oil/hazmat/toxic incidents from non-fixed facilities, radiological or nuclear incidents)

While prioritizing the actions is useful and provides participants with additional information, it is important to keep in mind that implementing any the mitigation actions is desirable regardless of which prioritization category an action falls under.

Figure MIT-10
Mitigation Action Prioritization Methodology

		Hazard	
		Most Frequent Hazard **(M)** (i.e., severe storms, floods, severe winter storms, excessive heat, extreme cold)	Less Frequent Hazard **(L)** (i.e., tornadoes, drought, landslides, levee failures, earthquakes)
Mitigation Action	Mitigation Action with the Potential to Virtually Eliminate or Significantly Reduce Impacts **(H)**	**HM** mitigation action will virtually eliminate damages and/or significantly reduce the probability of fatalities and injuries from the most frequent hazards	**HL** mitigation action will virtually eliminate damages and/or significantly reduce the probability of fatalities and injuries from less frequent hazards
	Mitigation Action with the Potential to Reduce Impacts **(L)**	**LM** mitigation action has the potential to reduce damages, fatalities and/or injuries from the most frequent hazards	**LL** mitigation action has the potential to reduce damages, fatalities and/or injuries from less frequent hazards

While this methodology does not take cost into consideration, it is a factor that may affect the order in which projects are implemented. As a result, a preliminary qualitative cost/benefit analysis was conducted to demonstrate each action’s monetary and non-monetary benefits and provide additional information that can be considered in each participant’s decision-making process. The costs and benefits were analyzed in terms of the general overall cost to complete an action as well as the staffing efforted needed and the action’s likelihood of permanently eliminating or significantly reducing the risk associated with a specific hazard. The general descriptors of high, medium, and low were used. These terms are not meant to translate into a specific dollar amount, but rather to provide a relative comparison between the actions identified by each jurisdiction.

This analysis is only meant to give the participants a starting point to compare which actions are likely to provide the greatest benefit. It was repeatedly communicated to the Planning Committee members that when a grant application is submitted to IEMA/FEMA for a specific action, a detailed cost/benefit analysis will be required to receive funding.

4.6 MITIGATION ACTION IMPLEMENTATION & ADMINISTRATION

Finally, each participating jurisdiction was asked to identify how the mitigation actions will be implemented and administered. This included:

- identifying the party or parties responsible for oversight and administration;
- determining what funding source(s) are available or will be pursued; and
- describing the time frame for completion.

Oversight & Administration

It is important to keep in mind that most of the participating jurisdictions have extremely limited capabilities related to organization and staffing for oversight and administration of the identified mitigation actions. Three of the six participating municipalities are very small in size, with populations of less than 300 individuals while two of the six participating municipalities range in size from approximately 1,400 to 1,700 individuals. In most cases these jurisdictions have minimal staff. Their organizational structure is such that most have very few offices and/or departments, generally limited to public works and water/sewer. Those in charge of the offices/departments often lack the technical expertise needed to individually oversee and administer the identified mitigation actions. As a result, most of the participating jurisdictions identified their governing body (i.e., village board, city council or board of trustees) as the entity responsible for oversight and administration simply because it is the only practical option given their organizational constraints. Other participants felt that oversight and administration fell under the purview of the entity's governing body (board/council) and not individual departments.

Funding Sources

While the Two Rivers Regional Council of Public Officials has the ability to provide grant writing services to Pike County, most of the participating jurisdictions do not have administrators with grant writing capabilities. As a result, assistance was needed in identifying possible funding sources for the identified mitigation actions. The consultant provided written information to the participants about FEMA and non-FEMA funding opportunities that have been used previously to finance mitigation actions. In addition, funding information was discussed with participants during planning committee meetings and in one-on-one contacts so that an appropriate funding source could be identified for each mitigation action.

A handout was prepared and distributed that provided specific information on the non-FEMA grant sources available including the grant name, the government agency responsible for administering the grant, grant ceiling, contact person and application period among other key points. Specific grants from the following agencies were identified: U.S. Department of Agricultural – Rural Development (USDA – RD), Illinois Department of Agriculture (IDOA), Illinois Department of Commerce and Economic Opportunity (DCEO), Illinois Environmental Protection Agency (IEPA), Illinois Department of Natural Resources (IDNR) and Illinois Department of Transportation (IDOT).

The funding source identified for each action is the most likely source to be pursued; however, if grant funding is unavailable through the most likely or other suggested sources, then implementation of medium and large-scale projects and activities is unlikely due to the budgetary constraints experienced by most, if not all, of the participants due to their size, projected population growth and limited revenue streams. It is important to remember that the population for the entire County is less than 16,000 individuals. Five of the six participating municipalities have populations less than 1,700 individuals. Most of the jurisdictions struggle to maintain and provide the most critical of services to their residents. Additional funding is necessary if implementation is to be achieved.

Time Frame for Completion

The time frame for completion identified for each action is the timespan in which participants would like to see the action successfully completed. In most cases, however, the time frame identified is dependent on obtaining the necessary funding. As a result, a time range has been identified for many of the mitigation actions to allow for unpredictability in securing funds.

4.7 RESULTS OF MITIGATION STRATEGY

Figures MIT-11 through **MIT-26**, located at the end of this section, summarize the results of the mitigation strategy. The mitigation actions are arranged alphabetically by participating jurisdiction following the County and include both existing and new actions.

Figure MIT-2
Pike County – Status of Existing Mitigation Actions
(Sheet 1 of 5)

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Establish Multi-Jurisdictional Long Term Recovery / Mitigation Committee to coordinate and guide long term recovery efforts and mitigation activities within the county. Responsibilities will include but are will not be limited to 1) Host annual Mitigation Plan Meeting as required by FEMA; 2) Meet semi-annually to review progress, identify new funding streams and projects being initiated within the county; 3) coordinate and lead the long term economic recovery of the county from the floods of 2008. (Mitigation Item 1)		✓			Incorporated into Plan Maintenance and Update procedures.		✓
Establish a county wide early warning system for natural hazards. (Mitigation Item 2)			✓	2019	Hyper Reach system purchased and used		✓
Develop and conduct a citizen awareness campaign regarding protection from natural hazards (Mitigation Item 3)		✓				✓	
Develop multipurpose shelter facilities for areas of dense rural population. (Mitigation Item 5)		✓				✓	

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability since the previous Plan was approved. The County did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Pike County has three infrastructure improvement projects completed or in progress that have the potential to decrease vulnerability to Shelter and Communications Community Lifelines. These projects however will not significantly change the vulnerability of hazard prone areas in the County. The County also has nine administrative activities in progress. One of the administrative activities, maintaining NFIP participation, decreases the vulnerability of hazard prone areas to flooding. Three of the activities have the potential to decrease the vulnerability to Shelter, Communications, and Transportation Community Lifelines. Aside from the activity related to NFIP participation, none of activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Pike County – Status of Existing Mitigation Actions
(Sheet 2 of 5)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Identify and permanently mark roadways that flood frequently with appropriate signage. (Mitigation Item 6)	✓						✓
Establish "check-in" policy and procedure for vulnerable populations in the event of extreme weather and/or power outage. (Mitigation Item 7)	✓						✓
Evaluate/Update Watershed/Drainage System throughout the county and establish and adopt policies and procedures (Mitigation Item 8)	✓					✓	
Establish and maintain a Comprehensive Plan for the county, incorporating mitigation activities and Brownfield assessment into the planning. (Mitigation Item 10)	✓						✓
Map water mains to establish points where connections may be made to ensure potable water throughout the county. (Mitigation Item 11)	✓					✓	

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability since the previous Plan was approved. The County did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Pike County has three infrastructure improvement projects completed or in progress that have the potential to decrease vulnerability to Shelter and Communications Community Lifelines. These projects however will not significantly change the vulnerability of hazard prone areas in the County. The County also has nine administrative activities in progress. One of the administrative activities, maintaining NFIP participation, decreases the vulnerability of hazard prone areas to flooding. Three of the activities have the potential to decrease the vulnerability to Shelter, Communications, and Transportation Community Lifelines. Aside from the activity related to NFIP participation, none of activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Pike County – Status of Existing Mitigation Actions
(Sheet 3 of 5)

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Maintain NFIP Participation Status; adopt or amend floodplain management regulations to comply with NFIP requirements and review periodically (Mitigation Item 15)		✓				✓	
Review and update Building Codes to ensure that newly constructed dwellings, infrastructure, and public facilities are designed and built to be disaster resistant. (Mitigation Item 16)	✓						✓
Tree Program – removal of old trees, pruning / topping (Mitigation Item 17)	✓						✓
Backup generator: inventory existing stock, determine both new and replacement needs and cost (Mitigation Item 18)	✓					✓	
Reverse 911 contact system for public notification by Sheriff's Department (Mitigation Item 19)			✓	2019	Hyper Reach system purchased and used		✓
Dredging of small streams (Mitigation Item 20)	✓						✓
Require the construction of storm shelters in existing and new mobile home developments (Mitigation Item 21)	✓						✓

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability since the previous Plan was approved. The County did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Pike County has three infrastructure improvement projects completed or in progress that have the potential to decrease vulnerability to Shelter and Communications Community Lifelines. These projects however will not significantly change the vulnerability of hazard prone areas in the County. The County also has nine administrative activities in progress. One of the administrative activities, maintaining NFIP participation, decreases the vulnerability of hazard prone areas to flooding. Three of the activities have the potential to decrease the vulnerability to Shelter, Communications, and Transportation Community Lifelines. Aside from the activity related to NFIP participation, none of activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Pike County – Status of Existing Mitigation Actions
(Sheet 4 of 5)

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Establish animal management system (Mitigation Item 22)	✓						✓
Educate public and disseminate information regarding all hazards to population through town hall meetings, presentations to groups, and displays (Mitigation Item 23)		✓				✓	
Encourage the use of NOAA all-hazard radios in residences and business throughout unincorporated area (Mitigation Item 24)		✓				✓	
Provide information to local cable and public radio and television stations regarding emergency warning and public service announcements (Mitigation Item 25)	✓					✓	
Distribute information regarding hazards and safety procedures to all school districts annually (Mitigation Item 26)	✓					✓	
Identify and prioritize needed improvements to county maintained roads that flood in heavy rainstorms, blocking or impairing road use and through access by vehicular traffic (Mitigation Item 27)		✓				✓	

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability since the previous Plan was approved. The County did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Pike County has three infrastructure improvement projects completed or in progress that have the potential to decrease vulnerability to Shelter and Communications Community Lifelines. These projects however will not significantly change the vulnerability of hazard prone areas in the County. The County also has nine administrative activities in progress. One of the administrative activities, maintaining NFIP participation, decreases the vulnerability of hazard prone areas to flooding. Three of the activities have the potential to decrease the vulnerability to Shelter, Communications, and Transportation Community Lifelines. Aside from the activity related to NFIP participation, none of activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Pike County – Status of Existing Mitigation Actions
(Sheet 5 of 5)

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Research potential funding sources to acquire information regarding boundaries of the floodway and floodplain throughout unincorporated areas of the county (Mitigation Item 28)	✓						✓
Adopt building regulations that require wind-resistant and earthquake-resistant construction measures for critical facilities that house vulnerable populations or that house volatile liquids or hazardous waste (Mitigation Item 29)	✓						✓
Maintain and educate Storm Spotter program volunteers (Mitigation Item 30)		✓				✓	
Identify existing buildings as heating / cooling / storm shelters for vulnerable populations; create map(s) and make available to public (Mitigation Item 31)		✓				✓	
Develop public education campaign to inform residents on what to do and where to go in the event of an emergency. (Mitigation Item 34)		✓				✓	

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability since the previous Plan was approved. The County did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Pike County has three infrastructure improvement projects completed or in progress that have the potential to decrease vulnerability to Shelter and Communications Community Lifelines. These projects however will not significantly change the vulnerability of hazard prone areas in the County. The County also has nine administrative activities in progress. One of the administrative activities, maintaining NFIP participation, decreases the vulnerability of hazard prone areas to flooding. Three of the activities have the potential to decrease the vulnerability to Shelter, Communications, and Transportation Community Lifelines. Aside from the activity related to NFIP participation, none of activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-3
Barry – Status of Existing Mitigation Actions
(Sheet 1 of 2)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Develop multipurpose shelter facilities for areas of dense rural population. (Mitigation Item 5)	✓					✓	
Identify and permanently mark roadways that flood frequently with appropriate signage. (Mitigation Item 6)	✓						✓
Establish "check-in" policy and procedure for vulnerable populations in the event of extreme weather and/or power outage. (Mitigation Item 7)	✓						✓
Map water mains to establish points where connections may be made to ensure potable water throughout the county. (Mitigation Item 11)		✓				✓	
Tree Program – removal of old trees, pruning / topping (Mitigation Item 17)		✓			Done by power co-op		✓
Backup generator: inventory existing stock, determine both new and replacement needs and cost (Mitigation Item 18)		✓			Small portable backup generator currently available	✓	
Educate public and disseminate information regarding all hazards to population through town hall meetings, presentations to groups, and displays (Mitigation Item 23)		✓				✓	

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Barry has two infrastructure improvement projects completed or in progress that have the potential to decrease the vulnerability of hazard prone areas to flooding. It is still too early to tell the degree of reduction that will be experienced from the implementation of this project. The City also has two infrastructure improvement projects and five administrative activities completed or in progress. The two projects have the potential to decrease the vulnerability to Communications, Energy, Food, Water, Shelter and Safety & Security Community Lifelines. None of these actions however will significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-3
Barry – Status of Existing Mitigation Actions
(Sheet 2 of 2)

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Educate public and disseminate information regarding all hazards to population through town hall meetings, presentations to groups, and displays (Mitigation Item 23)		✓				✓	
Identify existing buildings as heating / cooling / storm shelters for vulnerable populations; create map(s) and make available to public (Mitigation Item 31)		✓				✓	
Develop public education campaign to inform residents on what to do and where to go in the event of an emergency. (Mitigation Item 34)		✓				✓	
Participate in Multi-jurisdictional Hazard Mitigation Implementation Committee. (Mitigation Item 35)		✓					✓
Replace older culverts in the community (Mitigation Item 37)		✓			A few each year are replaced to reduce flooding	✓	
Develop new lift station to accommodate new waste stream and groundwater infiltration. (Mitigation Item 38)			✓	2010			✓

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Barry has two infrastructure improvement projects completed or in progress that have the potential to decrease the vulnerability of hazard prone areas to flooding. It is still too early to tell the degree of reduction that will be experienced from the implementation of this project. The City also has two infrastructure improvement projects and five administrative activities completed or in progress. The two projects have the potential to decrease the vulnerability to Communications, Energy, Food, Water, Shelter and Safety & Security Community Lifelines. None of these actions however will significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-4
Baylis – Status of Existing Mitigation Actions

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Identify and permanently mark roadways that flood frequently with appropriate signage. (Mitigation Item 6)	✓						✓
Establish "check-in" policy and procedure for vulnerable populations in the event of extreme weather and/or power outage. (Mitigation Item 7)	✓					✓	
Tree Program – removal of old trees, pruning / topping (Mitigation Item 17)	✓					✓	
Backup generator: inventory existing stock, determine both new and replacement needs and cost (Mitigation Item 18)	✓					✓	
Educate public and disseminate information regarding all hazards to population through town hall meetings, presentations to groups, and displays (Mitigation Item 23)	✓					✓	
Identify existing buildings as heating / cooling / storm shelters for vulnerable populations; create map(s) and make available to public (Mitigation Item 31)	✓					✓	
Develop public education campaign to inform residents on what to do and where to go in the event of an emergency. (Mitigation Item 34)	✓					✓	
Participate in Multi-jurisdictional Hazard Mitigation Implementation Committee. (Mitigation Item 35)	✓						✓

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved. The Village did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Baylis did not begin or complete any of the identified mitigation actions due to budgetary and personnel constraints experience by a village of this size (approx. 130 individuals.) The Village struggles to maintain even the most critical of services to its residents. As a result, there has been no changes in the vulnerability of hazard prone areas with the Village.

Figure MIT-5
Griggsville – Status of Existing Mitigation Actions

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Identify and permanently mark roadways that flood frequently with appropriate signage. (Mitigation Item 6)	✓						✓
Establish "check-in" policy and procedure for vulnerable populations in the event of extreme weather and/or power outage. (Mitigation Item 7)		✓					✓
Tree Program – removal of old trees, pruning / topping (Mitigation Item 17)		✓			ongoing as needed		✓
Backup generator: inventory existing stock, determine both new and replacement needs and cost (Mitigation Item 18)	✓					✓	
Educate public and disseminate information regarding all hazards to population through town hall meetings, presentations to groups, and displays (Mitigation Item 23)	✓						
Identify existing buildings as heating / cooling / storm shelters for vulnerable populations; create map(s) and make available to public (Mitigation Item 31)	✓						✓
Develop public education campaign to inform residents on what to do and where to go in the event of an emergency. (Mitigation Item 34)	✓						✓
Participate in Multi-jurisdictional Hazard Mitigation Implementation Committee. (Mitigation Item 35)			✓				✓

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Griggsville has one infrastructure improvement project and two administrative activities completed or in progress. The infrastructure improvement project has the potential to decrease the vulnerability to Communications and Energy Community Lifelines. None of these actions however will significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-6
New Canton – Status of Existing Mitigation Actions
(Sheet 1 of 2)

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Identify and permanently mark roadways that flood frequently with appropriate signage. (Mitigation Item 6)	✓					✓	
Establish “check-in” policy and procedure for vulnerable populations in the event of extreme weather and/or power outage. (Mitigation Item 7)	✓					✓	
Maintain NFIP Participation Status; adopt or amend floodplain management regulations to comply with NFIP requirements and review periodically (Mitigation Item 15)		✓				✓	
Tree Program – removal of old trees, pruning / topping (Mitigation Item 17)		✓				✓	
Backup generator: inventory existing stock, determine both new and replacement needs and cost (Mitigation Item 18)	✓					✓	
Educate public and disseminate information regarding all hazards to population through town hall meetings, presentations to groups, and displays (Mitigation Item 23)		✓				✓	

(Mitigation Item “No.”) refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Town’s vulnerability since the original Plan was approved. The Town did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, New Canton has one infrastructure improvement project and four administrative activities completed or in progress. The infrastructure improvement project has the potential to decrease the vulnerability to Communications and Energy Community Lifelines. One of the administrative activities, maintaining NFIP participation, decreases the vulnerability of hazard prone areas to flooding. None of the remaining actions however will significantly change the vulnerability of hazard prone areas within the Town.

Figure MIT-6
New Canton – Status of Existing Mitigation Actions
(Sheet 2 of 2)

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Identify existing buildings as heating / cooling / storm shelters for vulnerable populations; create map(s) and make available to public (Mitigation Item 31)	✓						✓
Develop public education campaign to inform residents on what to do and where to go in the event of an emergency. (Mitigation Item 34)		✓				✓	
Participate in Multi-jurisdictional Hazard Mitigation Implementation Committee. (Mitigation Item 35)			✓				✓

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Town's vulnerability since the original Plan was approved. The Town did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, New Canton has one infrastructure improvement project and four administrative activities completed or in progress. The infrastructure improvement project has the potential to decrease the vulnerability to Communications and Energy Community Lifelines. One of the administrative activities, maintaining NFIP participation, decreases the vulnerability of hazard prone areas to flooding. None of the remaining actions however will significantly change the vulnerability of hazard prone areas within the Town.

Figure MIT-7
Pittsfield – Status of Existing Mitigation Actions
(Sheet 1 of 2)

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Identify and permanently mark roadways that flood frequently with appropriate signage. (Mitigation Item 6)	✓						✓
Establish "check-in" policy and procedure for vulnerable populations in the event of extreme weather and/or power outage. (Mitigation Item 7)	✓						✓
Map water mains to establish points where connections may be made to ensure potable water throughout the county. (Mitigation Item 11)			✓	2021	City water is mapped; interconnects exist for backup supply		✓
Tree Program – removal of old trees, pruning / topping (Mitigation Item 17)		✓			Part of annual maintenance in City; power companies assist		✓
Backup generator: inventory existing stock, determine both new and replacement needs and cost (Mitigation Item 18)			✓		Have generators for water plant, sewer plant, water wells and fire station		✓
Educate public and disseminate information regarding all hazards to population through town hall meetings, presentations to groups, and displays (Mitigation Item 23)		✓			Done as needed		✓

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Pittsfield has two infrastructure improvement projects and three administrative activities completed or in progress. Two of these projects and activities have the potential to decrease the vulnerability to Communications, Energy, Food, Water, Shelter and Safety & Security Community Lifelines. None of these actions however will significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-7
Pittsfield – Status of Existing Mitigation Actions
(Sheet 2 of 2)

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Identify existing buildings as heating / cooling / storm shelters for vulnerable populations; create map(s) and make available to public (Mitigation Item 31)	✓						✓
Develop public education campaign to inform residents on what to do and where to go in the event of an emergency. (Mitigation Item 34)	✓						✓
Participate in Multi-jurisdictional Hazard Mitigation Implementation Committee. (Mitigation Item 35)			✓				✓

(Mitigation Item "No.") refers to the action identified in the previous Plan by number detailed in Appendix K.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Pittsfield has two infrastructure improvement projects and three administrative activities completed or in progress. Two of these projects and activities have the potential to decrease the vulnerability to Communications, Energy, Food, Water, Shelter and Safety & Security Community Lifelines. None of these actions however will significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-11
Pike County Hazard Mitigation Actions
(Sheet 1 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	**Existing**							
Retrofit existing County-owned buildings and/or construct new stand-alone structures to serve as community safe rooms equipped with emergency backup generators and HVAC systems for use by County staff and residents at strategic locations (i.e., mobile home parks, campgrounds, unincorporated subdivisions, etc.) to establish Community Lifelines essential to human health and safety.	EC, EH, SS, T	FWS	S&IP	Small County SVI: 0.3679	Yes	---	1	HM	High/High	County Board Chair / EMA Director	5-10 years	Count / FEMA HMGP / HUD CDBG	New / Existing (2010) Mitigation Item 5
Evaluate the need for emergency backup generators at County-owned buildings, critical facilities, and infrastructure systems. Based on evaluation, purchase and install emergency backup generators at identified locations to establish resilient and reliable power supplies in order to maintain continuity of government/ operations during extended power outages and mitigate risk to Community Lifelines.	EC, EH, EQ, F, SS, SWS, T	C FWS S&S	S&IP	Large County SVI: 0.3679	Yes	Yes	4, 5	HM	High/High	County Board Chair	2-5 years	County / USDA -RD Critical Facilities Programs / FEMA HMGP	New / Existing (2010) Mitigation Item 18

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a largely rural county (unincorporated Pike County is approx. 4,500 individuals) and projected population growth. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	LF	Levee Failure
EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado
L	Landslides		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-11
Pike County Hazard Mitigation Actions
(Sheet 2 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Partner with Drainage & Levee Districts to develop Emergency Preparedness Plans/Inundation Maps that identify the extent of potential failures (water depth, speed of onset, warning times, etc.) for the studied levees to address data deficiencies.	LF	S&S	E&A	Small County SVI: 0.3679	---	---	1, 4, 5	LL	Low/Medium	EMA Director	3-5 years	County / D&LD	New
Develop watershed plans and associated policies and procedures in order to identify potential flood mitigation projects and best management practices (BMPs).	F, SS	S&S	NSP LP&R	Large County SVI: 0.3679	---	---	3, 6, 8	LM	Low/Medium	County Board Chair / EMA Director	3-5 years	County / IEPA Section 319(h)	Existing (2010) Mitigation Item 8
Map the water mains in unincorporated County areas to establish points where interconnections could be made with potential drinking water suppliers to ensure a constant supply of potable water that is drought resilient.	DR	FWS	E&A	Medium County SVI: 0.3679	---	---	1, 4, 5	LM	Low/Medium	County Board Chair / EMA Director	5 years	County	Existing (2010) Mitigation Item 11

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a largely rural county (unincorporated Pike County is approx. 4,500 individuals) and projected population growth. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	LF	Levee Failure
EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado
L	Landslides		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-11
Pike County Hazard Mitigation Actions
(Sheet 3 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Distribute weather radios to vulnerable populations within the County as well as critical facilities and infrastructure to establish Communications Community Lifelines that notify residents of natural and man-made hazard event information. In addition, encourage residents and businesses throughout the County to use weather radios to receive timely notification of natural and man-made hazard event information.	EC, EH, EQ, F, L, LF, MMH, SS, SWS, T	C	E&A	Medium County SVI: 0.3679	---	---	1	LM	Low/High	EMA Director	1-5 years	County	Existing (2010) Mitigation Item 24
Identify county roads along critical routes repeatedly impacted by flooding (i.e., those that require closure or that impair through access by vehicular traffic) and prioritize the implementation of design solutions at these locations to alleviate drainage/flooding problems and ensure continued functionality of Transportation Community Lifelines.	F, SS	T	E&A	Medium County SVI: 0.3679	---	---	1, 4, 5	LM	Low/Medium	County Engineer	1-3 years	County / IDOT Local Roads	Existing (2010) Mitigation Item 27

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a largely rural county (unincorporated Pike County is approx. 4,500 individuals) and projected population growth. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	LF	Levee Failure
EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado
L	Landslides		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-11
Pike County Hazard Mitigation Actions
(Sheet 4 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Develop and implement an outreach program that works with schools to identify the risk to their infrastructure and students/staff from natural hazard events, the actions they can take to reduce those risks, the procedures in place in case of an evacuation, and the steps they can take to maintain operations after a hazard event occurs.	EC, EH, EQ, F, MMH, SS, SWS, T	S&S	E&A	Large County SVI: 0.3679	---	---	1, 4, 5	LM	Low/Medium	EMA Director	5 years	County	Existing (2010) Mitigation Item 26
Ensure there are an adequate number of storm spotter volunteers in the County and that they receive continued training.	F, L, SS, SWS, T	---	E&A	Large County SVI: 0.3679	---	---	1	LM	Low/Medium	EMA Director	1-5 years	County	Existing (2010) Mitigation Item 30
Identify warming/cooling centers and emergency shelters available within the City and inform residents of their locations.	EC, EH	---	E&A	Large County SVI: 0.3679	---	---	1	LM	Low/Medium	EMA Director	1-2 years	County	Existing (2010) Mitigation Item 31
Make public information materials available to residents that detail the risk to life and property associated with the natural and man-made hazards that impact the County and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, L, LF, MMH, SS, SWS, T	---	E&A	Large County SVI: 0.3679	---	---	1, 2	LM	Low/Medium	EMA Director	1-5 years	County	Existing (2010) Mitigation Items 3/23/25/34

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† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a largely rural county (unincorporated Pike County is approx. 4,500 individuals) and projected population growth. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

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Hazard(s) to be Mitigated:

DR	Drought	LF	Levee Failure
EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado
L	Landslides		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-11
Pike County Hazard Mitigation Actions
(Sheet 5 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to reflect the revised FIRMs and exceed federal standards and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	S&S	LP&R	Small County SVI: 0.3679	Yes	Yes	1, 2, 3, 6, 7	HM	Low/Medium	County Board Chair / County Board	1-5 years	County	Existing (2010) Mitigation Item 15
Continue to make the most recent Flood Insurance Rate Maps available at the Clerk's Office to assist the public in considering where to construct new buildings.*	F	S&S	E&A	Small County SVI: 0.3679	Yes	n/a	1, 2, 6, 7	LM	Low/Medium	EMA Director / County Clerk	1-3 years	County	New
Continue to make County officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	S&S	E&A	Small County SVI: 0.3679	Yes	n/a	1, 2, 6, 7	LM	Low/Medium	EMA Director / County Clerk	1-5 years	County	New

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[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a largely rural county (unincorporated Pike County is approx. 4,500 individuals) and projected population growth. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

* Mitigation action to ensure continued compliance with NFIP.

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Hazard(s) to be Mitigated:

DR	Drought	LF	Levee Failure
EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado
L	Landslides		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-12
Barry Hazard Mitigation Actions
(Sheet 1 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase and install emergency backup generators at Village-owned critical facilities and infrastructure systems (i.e., City Hall, drinking water facility and wells, wastewater treatment plant and lift station, community center, library, etc.). to establish resilient and reliable power supplies in order to maintain continuity of government/operations during extended power outages and mitigate risk to Community Lifelines.	EC, EH, EQ, F, MMH, SS, SWS, T	C FWS S&S	S&IP	Large 9525 SVI: 0.5864 EDRC: Yes	Yes	Yes	4, 5	HM	High/High	Mayor / City Council	2-5 years	City / USDA -RD Critical Facilities Programs / FEMA HMGP	New / Existing (2010) Mitigation Item 18
Replace/upsize select roadway culverts and drainage structures to increase carrying capacity, alleviate recurring drainage/flooding problems, and ensure system resilience and functionality.	F, SS	T	S&IP	Medium 9525 SVI: 0.5864 EDRC: Yes	---	Yes	4, 5	HM	Medium/High	Mayor / City Council	2-5 years	City / IDOT Local Roads	New / Existing (2010) Mitigation Item 37
Clean debris/obstructions out of roadway culverts and drainage structures within the City to maximize carrying capacity, reduce/prevent drainage problems, and mitigate risk to Transportation Community Lifelines.	F, SS	T	S&IP	Large 9525 SVI: 0.5864 EDRC: Yes	---	Yes	4, 5	HM	Low/Medium	Mayor / City Council	2-5 years	City	New

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† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 1,700 individuals). The City works hard to provide critical services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-12
Barry Hazard Mitigation Actions
(Sheet 2 of 6)

Activity/Project Description	**Hazard(s) to be Mitigated**	**Community Lifeline(s) to be Mitigated**	**Type of Mitigation Activity**	**Population Affected (Size, SVI, and/or EDRC)§**	**Reduce Effects of Hazard(s) on Buildings & Infrastructure**		**Goal(s) Met**	**Priority**	**Cost/Benefit Analysis**	**Organization / Department Responsible for Implementation & Administration**	**Time Frame to Complete Activity**	**Funding Source(s)†**	**Status**
					New	**Existing**							
Upgrade and/or expand the City's storm sewer system to alleviate flood/drainage problems, increase storage and draining capacity, better manage stormwater runoff, and ensure system resilience and functionality.	F, SS	FWS	S&IP	Medium 9525 SVI: 0.5864 EDRC: Yes	Yes	Yes	1, 4, 5	HM	High/High	Mayor / City Council	2-5 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – WPCLP	New
Upgrade/retrofit drinking water system (water lines, mains, hydrants, pumping system, etc.) within the City to increase system resilience, ensure a constant supply of water for residents, and aid in fire suppression during hazard events.	EC, EH, F, MMH, SS, SWS, T	FWS	S&IP	Medium 9525 SVI: 0.5864 EDRC: Yes	Yes	Yes	1, 4, 5	HM	High/High	Mayor / City Council	2-5 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

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DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
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F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
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FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-12
Barry Hazard Mitigation Actions
(Sheet 3 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase portable emergency pumps for use in removal of excess water from critical infrastructure during heavy rain/flood events to maintain continuity of government/operations and ensure functionality of Community Lifelines.	F, SS	FWS T	S&IP	Small 9525 SVI: 0.5864 EDRC: Yes	---	Yes	4, 5	LM	Low/Medium	Mayor / City Council	2-5 years	City	New
Conduct sewer line reconnaissance study to identify locations where storm water infiltrates the lines and mitigate risk to a Community Lifeline.	F, SS	FWS	E&A	Medium 9525 SVI: 0.5864 EDRC: Yes	---	---	4, 5	LM	Medium/Medium	Mayor / City Council	2-5 years	Village / USDA – RD Water & Waste Disposal Program	New
Repair/reline sanitary sewer sections to eliminate stormwater infiltration, improve capacity, function and reliability of the City's sewer system and mitigate risk to a Community Lifeline.	F, SS	FWS	S&IP	Medium 9525 SVI: 0.5864 EDRC: Yes	Yes	Yes	4, 5	HM	High/High	Mayor / City Council	2-5 years	Village / USDA – RD Water & Waste Disposal Program	New

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† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 1,700 individuals). The City works hard to provide critical services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
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Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-12
Barry Hazard Mitigation Actions
(Sheet 4 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Secure a Memorandum of Agreement with the Western CUSD #12 to construct a community safe room (concrete monolithic dome) at Western High School for use by school staff, students, and City residents to establish a Community Lifeline essential to essential to human health and safety.	SS, T	FWS	LP&R	Large 9525 SVI: 0.5864 EDRC: Yes	---	---	1	LM	Low/Low	Mayor / City Council	1-2 years	City	New
Design and construct a community safe room(concrete monolithic dome), equipped with an emergency backup generator and HVAC system, at Western High School for use by school staff, students, and City residents to establish a Community Lifeline essential to essential to human health and safety.	SS, T	FWS	S&IP	Large 9525 SVI: 0.5864 EDRC: Yes	Yes	---	1	HM	High/High	Mayor / City Council	3-5 years	City / FEMA HMGP	New

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Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
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Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-12
Barry Hazard Mitigation Actions
(Sheet 5 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Design and construct a community safe room, equipped with an emergency backup generator and HVAC system that can also serve as a warming/cooling center, for use by City residents to establish a Community Lifeline essential to human health and safety.	EC, EH, SS, T	FWS	S&IP	Large 9525 SVI: 0.5864 EDRC: Yes	Yes	---	1	HM	High/High	Mayor / City Council	5 years	City / FEMA HMGP	Existing (2010) Mitigation Item 5
Conduct a study to map the City's water mains, establish points within the City where interconnections could be made, and identify potential outside drinking water suppliers to provide additional capacity and ensure system resilience in the event the City's water supply is impacted by a hazard event.	DR, EC, EH, F, SS, SWS, T	FWS	E&A	Large 9525 SVI: 0.5864 EDRC: Yes	---	---	1, 4, 5	LM	Low/Medium	Mayor / City Council	1-5 years	City	Existing (2010) Mitigation Item 11

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

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Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-12
Barry Hazard Mitigation Actions
(Sheet 6 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Identify and designate warming/cooling centers and emergency shelters within the City for use by residents. Inform residents of the locations designated as warming/cooling centers and emergency shelters.	EC, EH	FWS	LP&R E&A	Large 9525 SVI: 0.5864 EDRC: Yes	---	---	1	LM	Low/Medium	Mayor / City Council	1-2 years	City	Existing (2010) Mitigation Item 31
Make public information materials available to residents that detail the risk to life and property associated with the natural and man-made hazards that impact the City and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, MMH, SS, SWS, T	---	E&A	Large 9525 SVI: 0.5864 EDRC: Yes	---	---	1, 2	LM	Low/Medium	Mayor / City Council	1-5 years	City	Existing (2010) Mitigation Items 23/34

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Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
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EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-13
Baylis Hazard Mitigation Actions
(Sheet 1 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	**Existing**							
Purchase and install emergency backup generators at Village-owned critical facilities and infrastructure systems (i.e., Village Hall, drinking water facility, maintenance building, etc.). to establish resilient and reliable power supplies in order to maintain continuity of government/operations during extended power outages and mitigate risk to Community Lifelines.	EC, EH, EQ, F, SS, SWS, T	C FWS S&S T	S&IP	Large 9524 SVI: 0.5873 EDRC: No	Yes	Yes	4, 5	HM	High/High	President / Village Board	1-3 years	Village / USDA -RD Critical Facilities Programs / FEMA HMGP	New / Existing (2010) Mitigation Item 18
Replace/upsize roadway culverts/drainage structures to increase carrying capacity, alleviate recurring drainage/flooding problems associated with heavy rain events, and ensure system resilience and functionality.	F, SS	T	S&IP	Medium 9525 SVI: 0.5873 EDRC: No	---	Yes	4, 5	HM	Medium/High	President / Village Board	1-3 years	Village / IDOT Local Roads	New
Install booster pumps at drinking water facility to improve water pressure and aid in fire suppression during natural and man-made hazard incidents.	MMH, SS, T	FWS	S&IP	Medium 9525 SVI: 0.5873 EDRC: No	Yes	Yes	1, 4, 5	LM	Medium/Medium	President / Village Board	1-5 years	Village / USDA – RD Water & Waste Disposal Program	New

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Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-13
Baylis Hazard Mitigation Actions
(Sheet 2 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upgrade/retrofit drinking water system (fire hydrants, water lines, mains, etc.) to improve system resilience, ensure a constant supply of water for residents, and aid in fire suppression during natural and man-made hazard incidents.	EC, EH, F, MMH, SS, SWS, T	FWS	S&IP	Medium 9525 SVI: 0.5873 EDRC: No	Yes	Yes	1, 4, 5	HM	High/High	President / Village Board	1-5 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	New
Install hardening materials (shatter-resistant/ shatter-proof windows, hail resistant doors/ shingles, etc.) at Village-owned critical facilities and infrastructure systems (i.e., Village Hall, drinking water facility, maintenance building, etc.) to increase building resilience to natural hazards, maintain continuity of government/operations, protect staff and residents, and mitigate risk to Community Lifelines.	EQ, F, SS, SWS, T	FWS S&S T	S&IP	Medium 9525 SVI: 0.5873 EDRC: No	---	Yes	1, 4, 5	HM	High/High	President / Village Board	1-3 years	Village / FEMA HMGP	New

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F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-13
Baylis Hazard Mitigation Actions
(Sheet 3 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	**Existing**							
Prepare an Emergency Operations Plan for the Village.	DR, EC, EH, EQ, F, MMH, SS, SWS, T	S&S	LP&R E&A	Large 9524 SVI: 0.5873 EDRC: No	---	---	1, 3, 4	LM	Low/High	President / Village Board	1-3 years	Village	New
Purchase and distribute NOAA weather radios to Village-owned critical facilities as well as every household in the Village to notify staff and residents of natural/man-made hazard event information and establish Communications Community Lifelines.	EC, EH, EQ, F, MMH, SS, SWS, T	C	E&A	Large 9524 SVI: 0.5873 EDRC: No	---	---	1	LM	Low/High	President / Village Board	1-3 years	Village	New
Designate the Village Hall as a warming & cooling center for area residents to establish a Community Lifeline essential to human health and safety.	EC, EH	FWS	LP&R	Large 9524 SVI: 0.5873 EDRC: No	---	---	1	LM	Low/Medium	President / Village Board	1-3 years	Village	New

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Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-13
Baylis Hazard Mitigation Actions
(Sheet 4 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Clean debris/obstructions out of roadway culverts and drainage ditches within the Village to maximize carrying capacity, reduce/prevent drainage problems, and mitigate risk to Transportation Community Lifelines.	F, SS	T	S&IP	Large 9524 SVI: 0.5873 EDRC: No	---	Yes	4, 5	HM	Low/Medium	President / Village Board	1-5 years	Village	New
Establish volunteer network to check on the Town's vulnerable populations during natural hazard events and/or power outages.	EC, EH, EQ, F, SS, SWS, T	H&M	E&A	Large 9524 SVI: 0.5873 EDRC: No	---	---	1	LM	Low/High	President / Village Board	3-5 years	Village	Existing (2010) Mitigation Item 7
Trim and manage trees to minimize the number and duration of service disruptions, improve community resilience and mitigate risk to Community Lifelines.	SS, SWS, T	C E T	S&IP	Large 9524 SVI: 0.5873 EDRC: No	Yes	Yes	1, 4, 5	HM	Low/High	President / Village Board	1-5 years	Village	Existing (2010) Mitigation Item 17

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Type of Mitigation Activity:

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Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-13
Baylis Hazard Mitigation Actions
(Sheet 5 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	**Existing**							
Identify and designate warming/cooling centers and emergency shelters within the Village for use by residents. Inform residents of the locations designated as warming/cooling centers and emergency shelters.	EC, EH	FWS	LP&R E&A	Large 9524 SVI: 0.5873 EDRC: No	---	---	1	LM	Low/Medium	President / Village Board	1-2 years	Village	Existing (2010) Mitigation Item 31
Make public information materials available to residents that detail the risk to life and property associated with the natural and man-made hazards that impact the Village and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, MMH, SS, SWS, T	---	E&A	Large 9524 SVI: 0.5873 EDRC: No	---	---	1, 2	LM	Low/Medium	President / Village Board	1-5 years	Village	Existing (2010) Mitigation Items 23/34

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DR	Drought	MMH	Man-Made Hazard
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Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-14
Baylis Fire Department Hazard Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Purchase and install new storm warning siren system to establish Communications Community Lifelines essential to human health and safety.	SS, T	C	E&A	Large 9524 SV: 0.5873	---	---	1	HM	Medium/High	Fire Chief / Board of Trustees	1-3 years	FPD / USDA – RD Critical Facilities Programs	New
Identify dry hydrants and water wells within the District that can be used as filling stations to supply an uninterrupted flow of water to aid in fire suppression as necessary during natural and man-made hazard events.	DR, EH, EQ, MMH, SS, T	S&S	E&A	Large 9524 SV: 0.5873	---	---	1, 4	LM	Low/Medium	Fire Chief / Board of Trustees	1-3 years	FPD	New
Purchase and install an automatic emergency backup generator at the Fire Department Building to establish a resilient and reliable power supply, ensure sustained functionality during extended power outages, maintain continuity of operations and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, MMH, SS, SWS, T	S&S	S&IP	Large 9524 SV: 0.5873	---	Yes	1, 4, 5	HM	Medium/High	Fire Chief / Board of Trustees	1-3 years	FPD / FEMA HMGP / USDA – RD Critical Facilities Programs	New
Designate the Fire Department Building as a warming center for district residents to establish a Community Lifeline essential to human health and safety.	EC	FWS	LP&R	Large 9524 SV: 0.5873	---	---	1	LM	Low/Medium	Fire Chief / Board of Trustees	1-3 years	FPD	New

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a rural, all-volunteer fire protection district. Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-14
Baylis Fire Department Hazard Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Install hardening materials (shatter-proof windows, hail resistant doors/shingles, etc.) at Fire Department Building to improve building resilience to natural hazards, safeguard functionality and mitigate risk to a Safety & Security Community Lifeline.	EQ, F, MMH, SS, SWS, T	S&S	S&IP	Large 9524 SV: 0.5873	---	Yes	1, 4, 5	HM	High/High	Fire Chief / Board of Trustees	1-5 years	FPD / USDA – RD Critical Facilities Programs	New
Prepare an Emergency Operations Plan for the District.	DR, EC, EH, EQ, F, MMH, SS, SWS, T	S&S	LP&R E&A	Large 9524 SV: 0.5873	---	---	1, 3, 4	LM	Low/High	Fire Chief / Board of Trustees	1-5 years	FPD	New
Make public information materials available to District residents that detail the risks to life and property associated with the natural hazards that impact the District and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, FR, SS, SWS, T	---	E&A	Large 9524 SV: 0.5873	---	---	3	LM	Low/Medium	Fire Chief / Board of Trustees	1-5 years	FPD	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a rural, all-volunteer fire protection district. Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-15
Fairmount Township Hazard Mitigation Actions

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Secure a Memorandum of Agreement with the United Brethren Church board to designate the organization's building as a warming/cooling center and emergency shelter for use by township residents to establish a Community Lifeline essential to human health and safety.	EC, EH, EQ, F, SS, SWS, T	FWS	LP&R	Medium 9524 SVI: 0.5873	---	---	1	LM	Low/Medium	Supervisor / Township Trustees	1-2 years	Township	New
Purchase and install an automatic emergency backup generator at the United Brethren Church building, a designated warming/cooling center and emergency shelter, to establish a resilient and reliable power supply to ensure sustained functionality during extended power outages and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, SS, SWS, T	FWS	S&IP	Medium 9524 SVI: 0.5873	---	Yes	1, 4, 5	HM	Medium/High	Supervisor / Township Trustees	2-5 years	Township / USDA – RD Critical Facilities Program	New
Make public information materials available to township residents that detail the risks to life and property associated with the natural hazards that impact the Township and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	---	E&A	Large 9524 SVI: 0.5873	---	---	1	LM	Low/Medium	Supervisor / Township Trustees	1-5 years	Township	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a small, rural township of this size (less than 400 individuals). The Township works hard to provide critical services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Griggsville Hazard Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	**Hazard(s) to be Mitigated**	**Community Lifeline(s) to be Mitigated**	**Type of Mitigation Activity**	**Population Affected (Size, SVI, and/or EDRC)**[§]	**Reduce Effects of Hazard(s) on Buildings & Infrastructure**		**Goal(s) Met**	**Priority**	**Cost/Benefit Analysis**	**Organization / Department Responsible for Implementation & Administration**	**Time Frame to Complete Activity**	**Funding Source(s)**[†]	**Status**
					New	**Existing**							
Evaluate the need for emergency backup generators at City-owned critical facilities and infrastructure systems. Based on evaluation, purchase and install emergency backup generators at identified locations (i.e., wellheads, etc.) to establish resilient and reliable power supplies in order to maintain continuity of government/operations during extended power outages and mitigate risk to Community Lifelines.	EC, EH, EQ, F, SS, SWS, T	C FWS S&S	S&IP	Large 9524 SVI: 0.5873 EDRC: Yes	Yes	Yes	4, 5	HM	High/High	Mayor / City Council	2-5 years	City / USDA -RD Critical Facilities Programs / FEMA HMGP	New / Existing (2010) Mitigation Item 18
Design and construct a community safe room, equipped with an emergency backup generator and HVAC system, that can also serve as a warming/cooling center for use by City staff and residents to establish a Community Lifeline essential to human health and safety.	EC, EH, SS, T	FWS	S&IP	Large 9524 SVI: 0.5873 EDRC: Yes	Yes	---	1	HM	High/High	Mayor / City Council	2-5 years	City / FEMA HMGP	New
Monitor drinking water usage/capacity to identify water conservation measures and determine whether mitigation measures need to be unacted in the future to ensure the resiliency of the City's drinking water supply to drought.	DR	FWS	E&A	Large 9524 SVI: 0.5873 EDRC: Yes	---	Yes	4	LL	Low/Medium	Mayor / City Council	1-5 years	City	New

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (less than 1,500 individuals). The City works hard to provide critical services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Griggsville Hazard Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Make public information materials available to residents that detail the risk to life and property associated with the natural and man-made hazards that impact the Village and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, MMH, SS, SWS, T	---	E&A	Large 9524 SVI: 0.5873 EDRC: Yes	---	---	1, 2	LM	Low/Medium	Mayor / City Council	2-5 years	City	New

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (less than 1,500 individuals). The City works hard to provide critical services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-17
Illini Community Hospital Hazard Mitigation Actions

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Purchase and install an automatic emergency backup generator at the Illini Xpress Walk-In Clinic to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Community Lifeline. The Xpress Clinic is utilized as an alternate care site to treat a patient surge following a major hazard event resulting in mass casualties.	EC, EH, EQ, F, MMH, SS, T	H&M	S&IP	Large County SVI: 0.3679	---	Yes	1, 4, 5	HM	Medium/High	Administrator / Board of Directors	2-5 years	Illinois Community Hospital / FEMA HMGP	New
Install hardening materials (i.e., shatter-proof glass, hail resistant doors, EPDM roof system, etc.) at the Emergency Department and Rural Health Clinic attached to the Hospital to increase building resilience, safeguard functionality and mitigate risk to a Community Lifeline. The entire southwest side of the Hospital is mainly floor to ceiling glass.	EQ, SS, SWS, T	H&M	S&IP	Large County SVI: 0.3679	---	Yes	1, 4, 5	HM	High/High	Administrator / Board of Directors	2-5 years	Illinois Community Hospital / USDA – RD Critical Facilities Programs	New
Upgrade fuel containment system to provide increased fuel storage capacity needed to ensure continued compliance with the 96-hour sustainability requirements outlined in the Joint Commission's Emergency Management Standards for the Environment of Care. One of the minimum Resources and Assets categories required by the Joint Commission during an emergency is fuel.	EC, EH, EQ, F, MMH, SS, SWS, T	H&M	S&IP	Large County SVI: 0.3679	---	Yes	1, 4, 5	HM	Medium/High	Administrator / Board of Directors	2-5 years	Illinois Community Hospital / USDA – RD Critical Facilities Programs	New

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural hospitals. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-18
McGee Creek Drainage & Levee District Hazard Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upgrade pump station pumps to increase pump capacity, improve system resilience, and ensure continued functionality of a Safety & Security Community Lifeline.	F, LF, SS	S&S	S&IP	Large 9952400 SVI: 0.5873	---	Yes	4, 5	HM	High/High	Commissioners / Board	2-5 years	District	New
Purchase and install emergency backup generator at the pump station to establish a resilient and reliable power supply, ensure sustained functionality during extended power outages, maintain continuity of operations and mitigate risk to a Safety & Security Community Lifeline.	F, LF, SS	S&S	S&IP	Large 9952400 SVI: 0.5873	---	Yes	4, 5	HM	Medium/High	Commissioners / Board	2-5 years	District / FEMA HMGP	New
Purchase and install a grounding system at the pump station to improve infrastructure resilience and ensure continued operations of a Safety & Security Community Lifeline.	SS	S&S	S&IP	Large 9952400 SVI: 0.5873	---	Yes	4, 5	HM	Medium/High	Commissioners / Board	2-5 years	District / FEMA HMGP	New
Make public information materials available to District residents that detail the risks to life and property associated with the natural hazards that impact the District and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, L, LF, SS, SWS, T	---	E&A	Large 9952400 SVI: 0.5873	---	---	3	LM	Low/Medium	Commissioners / Board	1-5 years	District	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural drainage and levee districts. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	LF	Levee Failure
EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado
L	Landslides		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-18
McGee Creek Drainage & Levee District Hazard Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Provide the County EMA with or partner with the County EMA to develop an Emergency Preparedness Plan/Inundation Map for the District that identifies the extent of potential failures (water depth, speed of onset, warning times, etc.) for the levee system to address identified data deficiencies.	LF	S&S	E&A	Large 9952400 SVI: 0.5873	---	---	1, 4, 5	LL	Low/Medium	Commissioners / Board	3-5 years	County / D&LD	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural drainage and levee districts. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	LF	Levee Failure
EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado
L	Landslides		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-19
New Canton Hazard Mitigation Actions
(Sheet 1 of 4)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Conduct a study of the Town's drinking water wells to determine their vulnerability to flooding and identify best management practices to ensure a safe and reliable potable water supply for Town residents. The Town's drinking water wells are located in the levee-protected floodplain of Sny Island Levee Drainage District – Reach 2. If a levee failure were occur, the Town's water supply would be vulnerable to flooding.	F, LF	FWS	E&A	Large 9526 SVI: 0.3425 EDRC: Yes	---	---	1, 3, 4	LM	Medium/Medium	Mayor / Board of Trustees	2-5 years	Town / Legislative Award	New
Monitor drinking water usage/capacity to identify water conservation measures and determine whether mitigation measures need to be unacted in the future to ensure the resiliency of the Town's drinking water supply to drought.	DR	FWS	E&A	Large 9526 SVI: 0.3425 EDRC: Yes	---	Yes	4	LL	Low/Medium	Mayor / Board of Trustees	1-5 years	Town	New
Identify roadways within the Town that frequently flood and mark the roadways with the appropriate signage to alert the public of potentially hazardous conditions.	F, SS	---	E&A	Small 9526 SVI: 0.3425 EDRC: Yes	---	---	1, 2	LM	Low/Medium	Mayor / Board of Trustees	2-4 years	Town / IDOT Local Roads	Existing (2010) Mitigation Item 6

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a town of this size (just over 250 individuals). The Town struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-19
New Canton Hazard Mitigation Actions
(Sheet 2 of 4)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	**Existing**							
Establish volunteer network to check on the Town's vulnerable populations during natural hazard events and/or power outages.	EC, EH, EQ, F, SS, SWS, T	H&M	E&A	Small 9526 SVI: 0.3425 EDRC: Yes	---	---	1	LM	Low/High	Mayor / Board of Trustees	3-5 years	Town	Existing (2010) Mitigation Item 7
Trim and manage trees to minimize the number and duration of service disruptions, improve community resilience and mitigate risk to Community Lifelines.	SS, SWS, T	C E T	S&IP	Large 9526 SVI: 0.3425 EDRC: Yes	Yes	Yes	1, 4, 5	HM	Low/High	Mayor / Board of Trustees	1-5 years	Town	Existing (2010) Mitigation Item 17
Evaluate the need for additional emergency backup generators at town-owned critical facilities and infrastructure systems to ensure continued operation of Community Lifelines and maintain continuity of government/operations during extended power outages.	EC, EH, EQ, F, MMS, SS, SWS, T	C S&S	S&IP	Large 9526 SVI: 0.3425 EDRC: Yes	Yes	Yes	4, 5	HM	High/High	Mayor / Board of Trustees	2-5 years	Town / USDA -RD Critical Facilities Programs / FEMA HMGP	Existing (2010) Mitigation Item 18

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a town of this size (just over 250 individuals). The Town struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-19
New Canton Hazard Mitigation Actions
(Sheet 3 of 4)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Make public information materials available to residents that detail the risk to life and property associated with the natural and man-made hazards that impact the Town and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, MMH, SS, SWS, T	---	E&A	Large 9526 SVI: 0.3425 EDRC: Yes	---	---	1, 2	LM	Low/Medium	Mayor / Board of Trustees	1-5 years	Town	Existing (2010) Mitigation Items 23/34
Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to exceed federal standards and reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	S&S	LP&R	Small 9526 SVI: 0.3425 EDRC: Yes	Yes	Yes	1, 2, 3, 6, 7	HM	Low/Medium	Mayor / Board of Trustees	2-5 years	Town	Existing (2010) Mitigation Item 15

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a town of this size (just over 250 individuals). The Town struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

* Mitigation action to ensure continued compliance with NFIP.

Acronyms

Priority

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Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-19
New Canton Hazard Mitigation Actions
(Sheet 4 of 4)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Continue to make the most recent Flood Insurance Rate Maps available at the Town Clerk's Office to assist the public in considering where to construct new buildings.*	F	S&S	E&A	Small 9526 SVI: 0.3425 EDRC: Yes	Yes	---	1, 2, 6, 7	LM	Low/Low	Mayor / Board of Trustees	2-5 years	Town	New
Continue to make Town officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	S&S	E&A	Small 9526 SVI: 0.3425 EDRC: Yes	Yes	---	1, 2, 6, 7	LM	Low/Low	Mayor / Board of Trustees	2-5 years	Town	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a town of this size (just over 250 individuals). The Town struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

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Acronyms

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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-20
Pearl Hazard Mitigation Actions
(Sheet 1 of 3)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Clean debris/obstructions out of roadway culverts and drainage structures within the Village to maximize carrying capacity, reduce/prevent drainage problems, and mitigate risk to Transportation Community Lifelines.	F, SS	T	S&IP	Large 9526 SVI: 0.2864 EDRC: Yes	---	Yes	4, 5	HM	Low/Medium	President / Village Board	1-5 years	Village	New
Conduct discussions with IDOT regarding remedies to address overtopping of Illinois Route 100 during flood events. Flood waters have repeatedly overtopped the road causing its closure and cutting off the main egress routes in and out of the Village.	F, SS	T	E&A	Large 9526 SVI: 0.2864 EDRC: Yes	---	---	1, 4	LM	Low/Low	President / Village Board	1-3 years	Village	New
Install stormwater pump station(s) within the Village to alleviate recurring flood/drainage problems caused by heavy rain and Illinois River flood events, better manage stormwater runoff, and ensure continued functionality of Community Lifelines.	F, SS	FWS S&S T	S&IP	Large 9526 SVI: 0.2864 EDRC: Yes	Yes	Yes	1, 4, 5	HM	High/High	President / Village Board	1-3 years	Village / FEMA FMA BRIC / USDA – RD Water & Waste Disposal Program	New

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† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 100 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

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LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	L	Landslides
EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-20
Pearl Hazard Mitigation Actions
(Sheet 2 of 3)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upgrade drainage tile system to alleviate recurring flood/drainage problems, better manage stormwater runoff and ensure system resilience and functionality. The current system has been impacted by previous flood events and experiences blockages.	F, SS	S&S	S&IP	Large 9526 SVI: 0.2864 EDRC: Yes	Yes	Yes	4, 5	HM	High/High	President / Village Board	1-3 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – WPCLP / Legislative Award	New
Monitor drinking water usage/capacity to identify water conservation measures and determine whether mitigation measures need to be enacted in the future to ensure the resiliency of the City's drinking water supply to drought.	DR	FWS	E&A	Large 9526 SVI: 0.2864 EDRC: Yes	---	Yes	4	LL	Low/Medium	President / Village Board	1-5 years	Village	New
Make public information materials available to residents that detail the risk to life and property associated with the natural and man-made hazards that impact the Village and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, MMH, SS, SWS, T	---	E&A	Large 9526 SVI: 0.2864 EDRC: Yes	---	---	1, 2	LM	Low/Medium	President / Village Board	1-5 years	Village	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

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Acronyms

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Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-20
Pearl Hazard Mitigation Actions
(Sheet 3 of 3)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to exceed federal standards and reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	S&S	LP&R	Medium 9526 SVI: 0.2864 EDRC: Yes	Yes	Yes	1, 2, 3, 6, 7	HM	Low/Medium	President / Village Board	1-5 years	Village	New
Continue to make the most recent Flood Insurance Rate Maps available at the Village Clerk's Office to assist the public in considering where to construct new buildings.*	F	S&S	E&A	Medium 9526 SVI: 0.2864 EDRC: Yes	Yes	---	1, 2, 6, 7	LM	Low/Low	President / Village Board	1-2 years	Village	New
Continue to make Village officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	S&S	E&A	Medium 9526 SVI: 0.2864 EDRC: Yes	Yes	---	1, 2, 6, 7	LM	Low/Low	President / Village Board	1-5 years	Village	New

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

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* Mitigation action to ensure continued compliance with NFIP.

Acronyms

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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-21
Pikeland CUSD #10 Hazard Mitigation Actions

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Install mass communications system to alert staff, students, and visitors of natural and man-hazard event information.	EQ, F, MMH, SS, SWS, T	C	E&A	Large County SVI: 0.3679	---	---	1	HM	Medium/High	Superintendent / District Administration	2-5 years	CUSD	New
Coordinate with the Pittsfield Public Works Department regarding upgrades to the storm sewer system at the Pittsfield High School to better manage stormwater runoff, alleviate drainage/flooding problems, increase system resilience, and mitigation risk to Community Lifelines.	F, SS	S&S T	E&A	Large County SVI: 0.3679	---	---	4, 5	LM	Low/Medium	Superintendent / District Administration	2-5 years	CUSD	New
Educate students and staff about the natural and man-made hazards that have the potential to impact the District and the proactive actions they can take to reduce their risks.	EC, EH, EQ, F, MMH, SS, SWS, T	---	E&A	Large County SVI: 0.3679	---	---	1, 2	LM	Low/Low	Superintendent / District Administration	2-5 years	CUSD	New

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[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural school districts. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-22
Pittsfield Hazard Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Honey Creek Sewer Replacement: Install new lift station and sewer line on the south side of the City to increase pump capacity in order to handle excess runoff from storm drains during heavy rain events, minimize sewer backups, improve system resilience, and ensure continued functionality of a Community Lifelines. The line will run southeast from the lift station to the south lagoon behind Quail Ridge subdivision. The current system is not capable of handling the flow that occurs during heavy rain events.	F, SS	FWS	S&IP	Medium 9527 SVI: 0.6547 EDRC: No	Yes	Yes	1, 4, 5	HM	High/High	Mayor / City Council	2-4 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – WPCLP	New
Purchase and install storm warning sirens in areas without or limited alert coverage (i.e., Pike Lake, etc.) to establish Community Lifelines essential to human health and safety.	SS, T	C	E&A	Large 9527 SVI: 0.6547 EDRC: No	---	---	1	HM	Medium/High	Mayor / City Council	1-3 years	County / USDA – RD Critical Facilities Program	New

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of “Yes” identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 4,200 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-22
Pittsfield Hazard Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Identify and address cybersecurity risks and threats to information systems owned/operated by the City.	MMH	C FWS S&S	E&A	Large 9527 SVI: 0.6547 EDRC: No	---	Yes	3, 4, 8	LL	Low/Medium	Mayor / City Council	2-5 years	County / CISA Cybersecurity	New
Make public information materials available to residents that detail the risk to life and property associated with the natural and man-made hazards that impact the City and the proactive approaches they can take to reduce their risk.	EC, EH, EQ, F, MMH, SS, SWS, T	---	E&A	Large 9527 SVI: 0.6547 EDRC: No	---	---	1, 2	LM	Low/Medium	Mayor / City Council	1-5 years	City	New

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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-23
Pittsfield Township Hazard Mitigation Actions

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Retrofit the Township Building to include air conditioning so that it can serve as a cooling center for township residents.	EH	FWS	S&IP	Medium 9527 SVI: 0.6547	---	Yes	1, 4, 5	HM	Medium/High	Supervisor / Township Trustees	2-5 years	Township / USDA – RD Critical Facilities Program	New
Purchase a portable backup generator for use at the Township Building, a designated warming/cooling center, to establish a resilient and reliable power supply to ensure sustained functionality during extended power outages and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, SS, SWS, T	FWS	S&IP	Medium 9527 SVI: 0.6547	---	Yes	1, 4, 5	HM	Medium/High	Supervisor / Township Trustees	2-5 years	Township / USDA – RD Critical Facilities Program	New
Make public information materials available to township residents that detail the risks to life and property associated with the natural hazards that impact the Township and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	---	E&A	Large 9526 SVI: 0.3425 9527 SVI: 0.6547	---	---	1	LM	Low/Medium	Supervisor / Township Trustees	1-5 years	Township	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a small, rural township of this size (less than 4,200 individuals). The Township works hard to provide critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-24
Sny Island Levee Drainage District Hazard Mitigation Actions

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Construct approximately three miles of levee berm in Levee Township on the landward side of the mainstem Mississippi River Levee (Reach 1) to provide additional flood protection and ensure system resilience of a Safety & Security Community Lifeline.	F, LF	S&S	S&IP	Medium 9952500 SVI: 0.5864	Yes	---	1, 4, 5	HM	High/High	Superintendent / Board of Commissioners	5 years	District / Legislative Award / FEMA BRIC	New
Make public information materials available to District residents that detail the risks to life and property associated with the natural hazards that impact the District and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, L, LF, SS, SWS, T	---	E&A	Large 9952500 SVI: 0.5864 9952600 SVI: 0.3425	---	---	2	LM	Low/Medium	Superintendent / Board of Commissioners	1-5 years	District	New
Provide the County EMA with or partner with the County EMA to develop Emergency Preparedness Plans/Inundation Maps for the District that identifies the extent of potential failures (water depth, speed of onset, warning times, etc.) for the levees system to address identified data deficiencies.	LF	S&S	E&A	Large 9952500 SVI: 0.5864 9952600 SVI: 0.3425	---	---	1, 4, 5	LL	Low/Medium	Superintendent / Board of Commissioners	3-5 years	County / D&LD	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by rural drainage and levee districts. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	LF	Levee Failure
EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado
L	Landslides		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-25
Spring Creek Fire Protection District Hazard Mitigation Actions

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Evaluate the need for additional outdoor warning sirens within the District to maximize the system's effectiveness and establish a Communications Community Lifeline essential to human health and safety in areas without coverage.	SS, T	C	E&A	Large 9528 SVI: 0.2864	---	---	1	LM	Low/Medium	Fire Chief / Board of Trustees	2 years	FPD	New
Purchase and install storm warning sirens in areas without alert coverage to establish Communications Community Lifelines essential to human health and safety.	SS, T	C	S&IP	Large 9528 SVI: 0.2864	---	---	1	HM	Medium/High	Fire Chief / Board of Trustees	2-5 years	FPD / USDA – RD Critical Facilities Programs	New
Make public information materials available to District residents that detail the risks to life and property associated with the natural hazards that impact the District and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	---	E&A	Large 9528 SVI: 0.2864	---	---	3	LM	Low/Medium	Fire Chief / Board of Trustees	1-5 years	FPD	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a rural, all-volunteer fire protection district. Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-26
Valley City Drainage & Levee District Hazard Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upgrade pump station pump to increase pump capacity, improve system resilience, and ensure continued functionality of a Safety & Security Community Lifeline.	F, LF, SS	S&S	S&IP	Large 9952400 SVI: 0.5873	---	Yes	1, 4, 5	HM	High/High	Commissioners / Board	2-5 years	District	New
Purchase and install a grounding system at the pump station to improve infrastructure resilience and ensure continued operations of a Safety & Security Community Lifeline.	SS	S&S	S&IP	Large 9952400 SVI: 0.5873	---	Yes	1, 4, 5	HM	Medium/High	Commissioners / Board	2-5 years	District	New
Purchase and install an emergency backup generator at the pump station to establish a resilient and reliable power supply, ensure sustained functionality during extended power outages, maintain continuity of operations and mitigate risk to a Safety & Security Community Lifeline.	F, LF, SS	S&S	S&IP	Large 9952400 SVI: 0.5873	---	Yes	4, 5	HM	Medium/High	Commissioners / Board	2-5 years	District / FEMA HMGP	New
Make public information materials available to District residents that detail the risks to life and property associated with the natural hazards that impact the District and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, L, LF, SS, SWS, T	---	E&A	Large 9952400 SVI: 0.5873	---	---	2	LM	Low/Medium	Commissioners / Board	1-5 years	District	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural drainage and levee districts. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MMH	Man-Made Hazard
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-26
Valley City Drainage & Levee District Hazard Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Provide the County EMA with or partner with the County EMA to develop an Emergency Preparedness Plan/Inundation Map for the District that identifies the extent of potential failures (water depth, speed of onset, warning times, etc.) for the levee system to address identified data deficiencies.	LF	S&S	E&A	Large 9952400 SVI: 0.5873	---	---	1, 4, 5	LL	Low/Medium	Commissioners / Board	3-5 years	County / D&LD	New

[§] Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater and/or an Economically Disadvantaged Rural Community (EDRC) designation of “Yes” identifies potentially underserved communities and/or socially vulnerable populations using the SVI and EDRC as described in Section 1.2.

[†] Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural drainage and levee districts. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	LF	Levee Failure
EC	Extreme Cold	MMH	Man-Made Hazard
EH	Excessive Heat	SS	Severe Storms
EQ	Earthquake	SWS	Severe Winter Storm
F	Flood	T	Tornado
L	Landslides		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

5.0 PLAN MAINTENANCE

This section focuses on the Federal Emergency Management Agency (FEMA) requirements for maintaining and updating the Plan once it has been approved by FEMA and adopted by the participating jurisdictions. These requirements include:

- establishing the method and schedule for monitoring, evaluating and updating the Plan;
- describing how the requirements of the Plan will be incorporated into existing planning mechanisms; and
- detailing how continued public input will be obtained during the plan maintenance process.

These requirements ensure that the Plan remains an effective and relevant document. The following provides a detailed discussion of each requirement.

5.1 MONITORING, EVALUATING & UPDATING THE PLAN

Outlined below is a method and schedule for monitoring, evaluating and updating the Plan. This method allows the participating jurisdictions to make necessary changes and updates to the Plan and track the implementation and results of the mitigation actions that have been undertaken.

5.1.1 Monitoring and Evaluating the Plan

The Plan update will be monitored and evaluated by a Plan Maintenance Subcommittee on an annual basis. The Plan Maintenance Subcommittee will be composed of the participating jurisdictions who sought Plan approval and other key members of the Planning Committee. The Pike County Emergency Management Agency (EMA) will chair the Plan Maintenance Subcommittee.

The Pike County EMA will assume lead responsibility for monitoring and tracking the implementation status of the mitigation actions identified in the Plan update. It will be the responsibility of each Plan participant to provide the Pike County EMA with an annual progress report on the status of their existing mitigation actions and identify whether any actions need to be modified. New mitigation actions may be added to the Plan during the annual monitoring and evaluation period or at any time during the plan maintenance cycle by contacting the Pike County EMA Director and providing the appropriate information.

<u>Monitoring & Evaluating</u>

- A Plan Maintenance Subcommittee will be formed to monitor and evaluate the Plan update.
- The ***Plan update will be monitored and evaluated*** on an ***annual basis***.
- Each Plan participant will be responsible for providing an annual progress report on the status of their mitigation actions.
- Plan participants can add ***new mitigation actions*** to the Plan ***during the annual monitoring phase or by contacting*** the Pike County EMA Director.

The Pike County EMA together with the Plan Maintenance Subcommittee will also evaluate the Plan update on an annual basis to determine the effectiveness of the Plan at achieving its stated purpose and goals. In order to evaluate the effectiveness of the Plan update, the Subcommittee will review the mitigation actions that have been successfully implemented and determine whether the action achieved the identified goal(s) and had the intended result (i.e., were losses avoided or the vulnerability of hazard-prone areas reduced.)

The Subcommittee will also ask each Plan participant to identify any significant changes in development or priorities that have occurred within the previous 12 months; whether any new plans, policies, regulations, or reports have been adopted; and if any hazard-related damages to critical facilities and infrastructure have been sustained.

In order to streamline the plan maintenance process, the Pike County EMA will provide each Plan participant with a Plan Maintenance Checklist along with the necessary forms to complete and return. **Appendix L** contains a copy of Checklist and associated forms.

The Pike County EMA will then prepare a progress report detailing the results of the annual Plan monitoring and evaluation period and provide copies to the Subcommittee. The annual progress report will include:

- ➢ information on any hazard-related damages sustained by critical facilities and infrastructure within the planning area during the previous year.
- ➢ implementation status of the mitigation actions identified in the Mitigation Strategy.
- ➢ identification of any new mitigation actions proposed by the Plan participants.
- ➢ information on changes in development, priorities, and planning and regulatory capabilities for the Plan participants.
- ➢ identification of how information will be disseminated to stakeholders and constituents on the Plan and its progress in effort to seek continued public participation.

If any existing mitigation actions are modified or new mitigation actions are identified for the Plan participants, then Section 4.7 of the Mitigation Strategy will be updated, and the Plan update resubmitted to the Illinois Emergency Management Agency (IEMA) and FEMA for reference.

On an as needed basis the Pike County EMA, in consultation with the Subcommittee, will evaluate requests from non-participating jurisdictions to "join" the Plan before the five-year update. Consideration will be given if certain conditions are met as outlined in Appendix D of *FEMA's Local Mitigation Planning Policy Guide.*

5.1.2 Updating the Plan

The Plan must be updated within five years of the of the Plan approval date indicated on the signed FEMA final approval letter. (This date can be found in Section 6, Plan Adoption.) This ensures that all the participating jurisdictions will remain eligible to receive federal grant funds to implement those mitigation actions identified in this Plan.

Updating the Plan

- ❖ The Pike County EMA, with assistance from the Plan Maintenance Subcommittee, will be responsible for updating the Plan.
- ❖ The Plan ***must be updated within 5 years*** of the ***date of the final approval letter*** provided by FEMA.
- ❖ Once the Plan update has received FEMA/IEMA approval, each participating jurisdiction ***must adopt the Plan to remain eligible to receive federal mitigation funds.***

The Pike County EMA, with assistance from the Plan Maintenance Subcommittee, will be responsible for updating the Plan. The update will incorporate all of the information gathered during the monitoring and evaluation phase and will also include:

- a review of the Mitigation Strategy, including potential updates to the mitigation goals and prioritization methodology;
- an evaluation of whether additional natural or man-made hazards need to be addressed or included in the Plan;
- a review of new hazard data that may affect the Risk Assessment Section;
- identification of any changes in priorities within each participating jurisdiction; and
- identification of any changes in development that have occurred in hazard prone areas that would increase or decrease the participating jurisdictions' vulnerability.

A Mitigation Advisory Task Force will be reformed to update the Plan and a public involvement strategy similar to the one employed for this Plan update will be implemented to ensure that the public and stakeholders have ample opportunities to become engaged and provide input during the development of the Plan update. In addition, any jurisdictions that did not take part in the previous Plan may do so at this time. It will be the responsibility of these jurisdictions to provide all of the information needed to be integrated into the Plan update.

A public forum will be held to present the Plan update to the public for review and comment. The comments received at the public forum will be reviewed and incorporated into the Plan update. The Plan update will then be submitted to IEMA and FEMA for review and approval. ***Once the Plan update has received state and federal approval, FEMA requires that each of the participating jurisdictions adopt the Plan to remain eligible to receive federal funds to implement identified mitigation actions.***

5.2 INCORPORATING THE MITIGATION STRATEGY INTO EXISTING PLANNING MECHANISMS

As part of the planning process, the Planning Committee identified each participating jurisdiction's existing capabilities (i.e., existing authorities, policies, programs, technical information, etc.) and resources available to support or accomplish mitigation and reduce long-term vulnerability. **Figures PP-_** through **PP-__** identify the existing authorities, policies, programs, technical information, and resources available by capability type by jurisdiction. ***It will be the responsibility of each participating jurisdiction to incorporate, where applicable, the mitigation strategy and other information contained in the Plan update into the planning mechanisms identified for their jurisdiction.***

Adoption of this Plan update will trigger each participating jurisdiction to review and, where appropriate, integrate the Plan into other available planning mechanisms. The Plan Maintenance Subcommittee's annual review will help maintain awareness of the Plan among the participating jurisdictions and encourage active integration of the Plan into their day-to-day operations and planning mechanisms. Any time a mitigation action is slated for implementation by a participating jurisdiction, it will be integrated into their capital improvement plan/budget.

There is no indication that the County or any of the participating jurisdictions will be adopting, reviewing, or strengthening current policies or programs in the near future. Most of the participating jurisdictions (Baylis, Griggsville, New Canton, and Pearl) have limited capabilities to integrate the mitigation strategy and other information contained in the Plan update into existing planning mechanisms. These jurisdictions are small in size and do not have the financial resources or trained personnel to develop planning mechanisms such as comprehensive plans or building and zoning ordinances.

5.3 CONTINUED PUBLIC INVOLVEMENT

The County and participating jurisdictions understand the importance of continued public involvement and will seek public input on the Plan update throughout the plan maintenance cycle. Any meetings held by the Plan Maintenance Subcommittee will be noticed and open to the public. Stakeholders and public will be encouraged to participate and provide feedback. Following distribution of the annual progress report, each participating jurisdiction will be encouraged to discuss the findings at their monthly board/council meetings to help maintain awareness of the Plan and encourage integration of the Plan in day-to-day operations.

Participating jurisdictions will also be encouraged to make the annual progress report available via social media and on their websites, as available, and at their offices. As the lead organization responsible for maintaining the Plan update, Pike County EMA will also periodically post mitigation-related topics to social media including where to access the approved Plan, information on the hazards that have the potential to impact the County, interesting facts about each hazard, locations of warming/cooling centers, and no or low-cost actions that residents can take to reduce their risk from natural hazards.

A copy of the approved Plan will be maintained and available for review at the Pike County Clerk’s Office and on the County’s website. The public will be encouraged to provide feedback and submit comments for the next Plan update to the Pike County EMA Director. The comments received will be compiled and included in the annual progress report and considered for incorporation into the next Plan update. Separate committee meetings and a public forum will be held prior to the next Plan update submittal to ensure that the public and stakeholders have ample opportunity to become engaged, provide input during the development of the Plan update, and comment on the proposed revision to the Plan update.

6.0 PLAN ADOPTION

The final step in the planning process is the adoption of the approved Plan update by each participating jurisdiction. Each jurisdiction must formally adopt the Plan to become or remain eligible for federal grant funds to implement mitigation actions identified in this Plan.

6.1 PLAN ADOPTION PROCESS

Before the Plan update could be adopted by the participating jurisdictions, it was made available for public review and comment through a public forum and comment period. Comments received were incorporated into the Plan update and the Plan was then submitted to the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA) for their review and approval.

Upon receipt of the Approval Pending Adoption (APA) letter from FEMA, the Plan update was presented to the County and participating jurisdictions for adoption. ***Each participating jurisdiction was required to formally adopt*** the Plan to become or remain eligible to receive federal grant funds to implement the mitigation actions identified in this Plan. Any jurisdiction that chose not to adopt the Plan update did not affect the eligibility of those who did.

Figure PA-1 identifies the participating jurisdictions and the date each formally adopted the Plan update. Signed copies of the adoption resolutions are located in **Appendix M**. FEMA signed the final approval letter on (Date) which began the five-year approval period and set the expiration date of (Date) for the Plan.

Figure PA-1
Plan Adoption Dates

Participating Jurisdiction	Plan Adoption Date

7.0 REFERENCES

Provided below is a listing, by section, of the resources utilized to create this document.

1.0 INTRODUCTION

1. Federal Emergency Management Agency. Data Visualization: Disaster Declarations for States and Counties. Database. <https://www.fema.gov/data-visualization-disaster-declarations-states-and-counties>.
2. Federal Emergency Management Agency. OpenFEMA Dataset: Disaster Declarations Summaries – V2. Excel Dataset. <https://www.fema.gov/openfema-dataset-disaster-declarations-summaries-v1>.
3. Federal Emergency Management Agency. Getting Started: Building Support for Mitigation Planning. FEMA 386-1. September 2002.
4. Illinois Emergency Management Agency. Mitigation Planning. 2018 Illinois Natural Hazard Mitigation Plan. October 2018. <https://iema.illinois.gov/content/dam/soi/en/web/iema/recovery/documents/plan-illmitigationplan.pdf>.

1.2 County Profile

1. Illinois Department of Commerce and Economic Opportunity. Community Profiles. Database. <https://app.locationone.com/areas/communities?organization=59eaba35bec80e09b4bbf0df&buildings:filters=%5B%5B%22railServed%22%2C%5B%22Y%22%5D%5D%5D&buildings:sort=sqft:high&sites:filters=%5B%5D&sites:sort=acres:high>.
2. Illinois Department of Public Health. IDPH Population Projections, Illinois, Chicago, and Illinois Counties by Age and Sex: July 1, 2015 to July 1, 2030 (2019 Edition). <https://dph.illinois.gov/content/dam/soi/en/web/idph/files/publications/population-projections-report-2010-2030.pdf>.
3. United States Census Bureau. 2010 Census Tract Reference Maps. <https://www.census.gov/geographies/reference-maps/2010/geo/2010-census-tract-maps.html>.
4. United States Census Bureau. Gazetteer Files. <https://www.census.gov/geographies/reference-files/time-series/geo/gazetteer-files.html>.
5. United States Census Bureau. American Community Survey. Data Profiles. <https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/>.
6. United States Department of Agriculture. National Agricultural Statistics Service. Census of Agriculture. 2017 State and County Profiles – Illinois. <https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Illinois/>.
7. United States Department of Agriculture. Census of Agriculture Historical Archive. <https://agcensus.library.cornell.edu/>.

8. United States Department of Agriculture. Natural Resources Conservation Service. Soil Surveys by State. <https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/soil/soil-surveys-by-state>.

1.3 Land Use and Development Trends

1. United States Census Bureau. Explore Census Data. <https://data.census.gov/>.
2. United States Census Bureau. Illinois: Population of Counties by Decennial Census: 1900 to 1990. 1995.
3. United States Census Bureau. American Community Survey. Data Profiles. <https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/>.

2.0 PUBLIC INVOLVEMENT

1. Federal Emergency Management Agency. Local Mitigation Plan Review Guide. October 1, 2011. <https://www.fema.gov/sites/default/files/2020-06/fema-local-mitigation-plan-review-guide_09_30_2011.pdf>.
2. Federal Emergency Management Agency. Local Mitigation Planning Policy Guide. FP 206-21-0002. April 19, 2022. <https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-policy-guide_042022.pdf>.

2.4 EXISTING CAPABILITIES

1. Barry, City of. City of Barry Comprehensive Plan. Adopted July 30, 2015. <https://www.barryil.org/vertical/sites/%7B5D37F131-A111-4AD1-A123-E21AEE05191D%7D/uploads/Barry_Comprehensive_Plan.pdf>
2. Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee. Capability Assessment Worksheet. Form.

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4.0 MITIGATION STRATEGY

1. Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee. Existing Mitigation Project/Activity Status. Form.

2. Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee. Hazard Mitigation Projects. Form.

APPENDIX A

Attendance Sheet – Teleconference

Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee Meeting

June 15, 2021

Due to the COVID-19 outbreak, the 1st meeting was held via teleconference to comply with gathering restrictions. Attendance was taken verbally during the teleconference by the Consultant and recorded below.

	Name (Please Print)	***Representing (Jurisdiction/Organization)***	***Title***
1.	Sharon Bargmann	Pike County Health Department	Director of Nursing
2.	Andrea Bostwick	American Environmental Corporation	EMS Manager
3.	Scott Brangenburg	Pearl Township	Road Commissioner
4.	Brenda DeSpain	Valley City Drainage & Levee District / McGee Creek Drainage & Levee District	Treasurer (for both)
5.	Charlie Gilbert	Village of Pearl	Board Member
6.	Kent Goewey	City of Griggsville	Mayor
7.	Nancy Halpin	Pike County Health Department	Communicable Disease Coordinator
8.	Melissa Helkey	Illini Community Hospital	Emergency Preparedness Coordinator
9.	Chris Johnson	Pike County Highway Department	County Engineer
10.	Zachary Krug	American Environmental Corporation	EMS Specialist
11.	Tom Lewis	Village of Baylis / Baylis Fire Department	Trustee / Chief
12.	Joshua Martin	Pike County EMA / Spring Creek Fire Protection District	Director / Fire Chief
13.	Adam Perrine	Town of New Canton	Mayor
14.	Kevin Risley	Fairmount Township	Road Commissioner

Attendance Sheet – Teleconference

Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee Meeting

June 15, 2021

Due to the COVID-19 outbreak, the 1st meeting was held via teleconference to comply with gathering restrictions. Attendance was taken verbally during the teleconference by the Consultant and recorded below.

	Name (Please Print)	***Representing (Jurisdiction/Organization)***	***Title***
1.	Angie Ruebush	Pikeland School District	Assistant Superintendent
2.	J.D. Stonecypher	American Red Cross	Disaster Program Specialist
3.	Jason White	Pittsfield Fire Department	Chief
4.	Katie Wilson	Mental Health Centers of Western Illinois	Executive Director
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Attendance Sheet – Teleconference

Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee Meeting

September 1, 2021

Due to the COVID-19 outbreak, the 2nd meeting was held via teleconference to comply with gathering restrictions. Attendance was taken verbally during the teleconference by the Consultant and recorded below.

	Name (Please Print)	***Representing (Jurisdiction/Organization)***	***Title***
1.	Andrea Bostwick	American Environmental Corporation	EMS Manager
2.	Charlie Gilbert	Village of Pearl	Board Member
3.	Melissa Helkey	Illini Community Hospital	Emergency Preparedness Coordinator
4.	Zachary Krug	American Environmental Corporation	EMS Specialist
5.	Tom Lewis	Baylis Fire Department / Village of Baylis	Chief / Trustee
6.	Joshua Martin	Pike County EMA / Spring Creek Fire Protection District	Director / Fire Chief
7.	Blake Roderick	Pike County Farm Bureau	Executive Director
8.	Angie Ruebush	Pikeland School District	Assistant Superintendent
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Attendance Sheet

Pike County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

December 2, 2021

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Kirby Hobbs	Pittsfield Township	Road Commissione
2.	Andrea Bostwick	American Environmental	EMS Manager
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Attendance Sheet

Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee Meeting

December 2, 2021

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Tom Lewis	Village of Baylis / Fire Dept	Fire Chief / Pike Co Board member
2.	Devin Conkright	Barry Fire	Ast. Chief
3.	Jim Sheppard	Pike County Board	Chairman
4.	Bill [illegible]	City of Pittsfield	Alderman
5.	Mike Reed	Sny Island Levee D.D.	Superintendent
6.	Blake Roderick	Pike-Scott Farm Bureau	Executive Director
7.	Josh Martin	Pike County EMA / Spring Creek	
8.	Bill Grimsley	Pittsfield Fire Dept	Fire Fighter
9.	Kevin Risley	Fairmount TWP Road Commissioner	
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Attendance Sheet – Teleconference

Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee Meeting

December 2, 2021

Due to the COVID-19 outbreak, the 3rd meeting was held as a hybrid meeting with individuals attending in-person and virtually or via teleconference. For those attending virtually attendance was taken during the meeting by the Consultant and recorded below.

	Name (Please Print)	***Representing (Jurisdiction/Organization)***	***Title***
1.	Brenda DeSpain	Valley City Levee / McGee Creek Levee / Pike County Highway Department	Treasurer / Administrative Assistant
2.	Melissa Helkey	Illini Community Hospital	Emergency Preparedness Coordinator
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APPENDIX B

Meeting Minutes

Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee

June 15, 2021
7:00 p.m.
Virtual/Teleconference

Committee Members

- American Red Cross
- Baylis Fire Department
- Baylis, Village of
- Fairmount Township
- Griggsville, City of
- Illini Community Hospital
- McGee Creek Drainage & Levee District
- Mental Health Centers of Western Illinois
- New Canton, Town of
- Pearl Township
- Pearl, Village of
- Pike County Offices:
  - EMA
  - Highway Department
  - Health Department
- Pikeland School District
- Spring Creek Fire Protection District
- Valley City Drainage & Levee District
- American Environmental Corp.

Welcome and Introductions

Josh Martin, Chairman of the Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee, welcomed attendees. He indicated that the purpose of this Committee is to update the Pike County All Hazards Mitigation Plan.

Handout materials were distributed digitally via email to each member prior to the meeting. Links to a citizen questionnaire and contact information form were provided to potential members via email as well. The questionnaire will help gauge residents and committee member understanding of the natural hazards that impact the County and also identifies communication preferences.

Andrea Bostwick, American Environmental Corporation (AEC) began the meeting by asking participants online to provide their name, title and jurisdiction represented and any questions they might have during the presentation in the chat log. For those who can't access the chat, the phone lines will be opened to take attendance mid-way through the meeting and again at the end to answer any questions. She asked all those in attendance to mute their phones or computers when not speaking to reduce background noise during the presentation.

Before discussing the plan development, Andrea provided background on the grant and its planning process. Pike County EMA applied for and received a planning grant from FEMA to update the County's hazard mitigation plan. This grant is administered through the Illinois Emergency Management Agency (IEMA) and pays for 75% of the planning cost. The remaining 25% will be met through in-kind services. The goal of the grant is to obtain a FEMA-approved hazard mitigation plan. The process generally takes 12 to 18 months from start to finish.

What is Mitigation?

For the purpose of this process, mitigation is any sustained action that reduces the long-term risk to people and property from natural and man-made hazards and their impacts. Sustained actions can include projects and activities such as building a community safe room or establishing warming and cooling centers. Mitigation is one of the phases of emergency management and is an important component in creating hazard-resistant communities.

What is an All Hazards Mitigation Plan?

An All Hazards mitigation plan details the natural and man-made hazard events that have previously impacted the County and identifies activities and projects that reduce the risk to people and property from these hazards before an event occurs. A hazard mitigation plan is different from the County's Emergency Operations Plan (EOP) because it identifies actions that can be taken before a disaster strikes whereas the EOP identifies how the County will respond during and immediately after an event occurs.

The natural and man-made hazards that will be included in the Plan update include: floods; tornadoes; severe summer storms (including thunderstorms, hail, lightning and heavy rain events); severe winter storms (including ice and snow storms); extreme cold; excessive heat; drought; earthquakes; levee failures; transportation, generation and storage/handling of hazardous substances; hazardous materials incidents; and waste disposal and remediation.

Andrea indicated that the Committee can also include additional hazards it feels have a significant impact on the County and then discussed mine subsidence, dam failures and landslides. Of these three hazards, only landslides and dam failures have the potential to significantly impact the County. She informed the Committee that AEC would send out a survey to poll the Committee on whether to include landslides and dam failures in the next week.

Why Update an All Hazards Mitigation Plan?

Since the early 1990s damages caused by weather extremes have risen substantially. In 2020 the United States experienced $95 billion in severe storm damages from twenty-two (22) severe weather and natural hazard events. 2020 shattered the record number of annual billion-dollar events set in 2011 and 2017 by six events. In addition, the losses experienced in 2020 were the 4th highest only behind 2017, 2005, and 2012. In the last decade the United States has experienced the top three years with the highest total number of billion dollar events and two of the top three years with the highest total losses ever recorded. Consequently, the Federal Emergency Management Agency (FEMA) continues to encourage counties throughout the United States to prepare and develop hazard mitigation plans because what they've found is that for every dollar spent on mitigation, $6 dollars can be reaped in savings.

Updating this plan provides several major benefits:

1.) Access to federal mitigation assistance fund. Specific projects and activities will be developed and updated through the planning process to help each participating jurisdiction reduce damages. By including these actions in this Plan, the participating jurisdictions will become eligible to receive state and federal funds to implement the actions.

2.) Increased awareness of the impacts associated with natural hazards. Verifiable information about the natural hazards that occur in Pike County will be gathered to help participants in municipal and county meetings make decisions about how to better protect citizens and property from storm damages.

The Planning Process

The goal of the Committee meetings is to develop a Plan that meets state and federal requirements so that it can be approved by the IEMA and FEMA. The Planning Committee is an integral part of the planning process and ensures that the Plan is tailored to the needs of the County and participating jurisdictions.

A five meeting process has been developed to achieve this goal. Specific activities for the Committee meetings include:

1st Committee meeting	Orientation to the planning process Discuss Mission Statement and Goals Identify information needed to participate
2nd Committee meeting	Review the Risk Assessment Approve Mission Statement & Goals Return required forms Begin discussing mitigation projects and activities
3rd Committee meeting	Review Vulnerability Analysis Discuss and approve Prioritization Methodology Return draft list of mitigation projects and activities
4th Committee meeting	Review mitigation projects and activities Committee discusses approval/adoption and maintenance of the Plan
5th Committee meeting (Public Forum)	Present the Plan update for public review Answer questions from the public

Jurisdictions who wish to be part of the Plan must meet certain participation requirements that include:

- Participating in the planning meetings and public forum
- Complete required forms
- Coordinate with their constituents and the public; and
- Adopt the Plan once it's completed

At this point in the presentation, Andrea paused and took attendance.

Information Needed from the Committee

As part of the plan update, Andrea indicated that there is information that will be needed from each participating jurisdiction. The information provided will be used to meet FEMA plan requirements. She then talked about each of the forms that must be completed at the beginning of the planning process. These Include:

> ***Critical Facilities.*** Completed lists of Critical Facilities will be used to identify facilities vulnerable to natural hazards and will be provided to IEMA and FEMA as a separate supplement. Copies of the Plan made available to the public will not include these lists for security reasons.
>
> ***Capability Assessment:*** Each jurisdiction has a unique set of capabilities and resources available to accomplish hazard mitigation and reduce long-term vulnerabilities to hazard events. As part of the update of the plan, the existing capabilities of each jurisdiction need to be identified and described.
>
> ***Shelter Surveys***. Identifies locations designated as severe weather shelters within each jurisdiction including warming centers, cooling centers and community safe rooms.
>
> ***Drinking Water Supply Worksheet:*** Information on the drinking water supplies that serve the participating communities needs to be identified to assist in assessing vulnerability including drought.

Andrea indicated that Zachary Krug (AEC) would email the forms out to all who have expressed an interest in being included in the Plan within the next week. She asked participants to complete the forms and return them by the next meeting if possible and to let her or Zak know if they had any questions.

Severe Weather Events

Given the format of the meeting, instead of having the Committee share their recollections of recent and historic hazard events that have impacted the County verbally, Andrea asked the Committee members to jot down any events that come to mind.

Andrea told the Committee that, while AEC will review multiple data sources, including NOAA, NWS, and state and federal databases, these sources don’t always include every event nor do they always include damage information, especially dollar amounts. In many cases, individuals at the local level are her best resource for this kind of information. The information provided in their questionnaires will be used to supplement the information for the next meeting.

Andrea also asked Committee members if they had any photos of storm damage they would be willing to share for inclusion in the Plan.

Community Participation

Andrea stressed the importance of attending each committee meeting and indicated that member participation helps the County meet its 25% match for this grant in addition to assuring that member jurisdictions are eligible for IEMA/FEMA funds. She indicated that tag-teaming and designating substitute representatives is permissible when other obligations arise. Andrea pointed out that a designated substitute representative does not have be an official or employee of the jurisdiction.

Andrea requested that each jurisdiction consider sharing meeting information with their boards, councils, etc. at regularly scheduled meetings and consider posting the press release or adding a calendar item to their web pages. She also asked jurisdictions who are on Facebook to consider posting about the Plan on their pages as well.

Andrea indicated that another opportunity to include the public in the process is to post the link to the Citizen Questionnaire on their web pages or Facebook. The more individuals who complete the survey, the better our understanding will be of the public's perception of the hazards that impact the County. Finally, she asked the participants to consider posting or making available at their offices the "Frequently Asked Questions" document in their meeting packet. It provides a quick summary of what the Plan is and why it's important to participate.

Mission Statement & Goals

A draft mission statement and goals were distributed in the meeting packet. Committee Members were asked to review these drafts prior to the next meeting. The mitigation goals describe the objectives or end results the Committee would like to accomplish in terms of hazard and loss reduction/prevention. Every project included in the Plan should be aimed at one or more of the goals identified by this Committee. Specific goals related to where you live can be added to this list as well.

What Happens Next?

The risk assessment will be the main topic of the next committee meeting.

The second meeting of the Committee was scheduled for:

Wednesday, September 1st, 2021
In-person
7:00 P.M.

Andrea asked Committee members to please review the "Tasks to be Completed" handout before the next meeting and indicated that her and Zak's contact information could be found on the last page of the meeting handout if any questions come up. Andrea then opened up the phone lines for any questions. A question was posed in regards to the inclusion of cyberattacks in the Plan update. Andrea explained that cyberattacks are not typically included in hazard mitigation plans. With no further questions she adjourned the meeting.

Meeting Minutes

Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee

September 1, 2021
7:00 p.m.
Virtual

Committee Members

Baylis Fire Department
Baylis, Village of
Illini Community Hospital
Pearl, Village of
Pike County EMA
Pike County Farm Bureau
Pikeland School District
Spring Creek Fire Protection District
American Environmental Corp.

Welcome and Introductions

Joshua Martin, Chairman of the Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee, welcomed attendees. He indicated that the purpose of this Committee is to update the Pike County All Hazards Mitigation Plan.

Handout materials were distributed electronically via email to each member prior to the meeting.

Information Needed for the Plan

Before beginning the risk assessment presentation, Andrea Bostwick, American Environmental Corporation (AEC) asked participants online to provide their name, title and jurisdiction represented and any questions they might have during the presentation in the chat log. For those participating by phone, the lines will be opened to take attendance mid-way through the meeting and again at the end to answer any questions. She asked all those in attendance to mute their phones or computers when not speaking to reduce background noise during the presentation.

Risk Assessment

Andrea began the presentation by noting that there have been nineteen (19) federally-declared disasters in Pike County since 1965. A total of 724 verified natural hazard events have been document over the last 20 to 70 years. A minimum of $5.2 million in damages have resulted from approximately 32 documented natural hazard events. In addition, $18.5 million in crop damages from 6 documented natural hazard events has been verified in Pike County. The actual damage amounts are actually much higher based on several facts:

1.) damage descriptions for many floods, tornadoes, and severe storm events did not include dollar amounts;
2.) damages to roads from heat and freeze/thaws conditions were not included; and

3.) crop damage figures were unavailable for a majority of the events.

The frequency, magnitude and property damages for each category of natural hazard were described.

Severe Storms

Severe storms are the most frequently occurring natural hazard in Pike County with 334 events verified. Approximately $1.7 million in damages has resulted from 21 events. Additionally, there was $500,000 in crop damage from 3 events. At least 1 fatality and 54 injuries can be attributed to severe storms. All the injuries and fatalities are attributed crashes associated with wet pavement conditions.

The highest recorded wind speed in the County, not associated with a tornado, is 70 knots (81 mph) and occurred northwest of Pittsfield on April 29, 1984. The largest hail recorded in the county is 2.75 inches (baseball-sized) on 3 separate occasions.

Severe Winter Storms

There were at least 119 verified events involving severe winter storms (snow, ice, or extreme cold) since 1950 and 44 extreme cold events since 1996. One of the federal disaster declarations for Pike County is related to severe winter storms. Approximately $3,500 dollars in damages/emergency protective measures resulted from a January 18, 1995 heavy snow event. One injury can be attributed to to the November 29, 2006 storm while an additional 29 injuries can be attributed to crashes involving ice and snow-covered roadways.

At least 12 severe winter storms have occurred in every decade since 1950. Between 2010 and 2019, 20 severe winter storms took place. There have been no severe winter storms recorded during the current decade.

The record maximum 24-hour snowfall in the County is 20.0 inches which occurred at the Perry COOP Station on February 1st & 2nd, 2011. The coldest recorded temperature is -26°F at the Perry COOP Station on January 5, 1999.

Floods

Seventeen of the nineteen federally disaster declarations for Pike County are related to flooding. There have been a least 118 verified flood events in Pike County, 107 riverine/shallow flood events since 1965 and 11 flash flood events since 2002. At least $2.8 million in damages has resulted from 4 flood events. In addition, almost $18.1 million in crop damages has occurred from 3 documented events. Two fatalities and one injury was recorded as a result of 3 separate flash flood events.

Tornadoes

Since 1950, 33 tornadoes have been verified in Pike County. A minimum of $627,525 in property damages has occurred from 6 of these tornadoes. Three of the tornadoes have recorded property damages of at least $150,000 per event.

Four injuries can be attributed to three separate tornado events from 1959 and 1982.

The average tornado in Pike County is approximately 4.2 miles long and 61 yards wide. The average area covered by a tornado in Pike County is 0.15 square miles.

The highest recorded F-Scale rating for a tornado in the County was an F3 which occurred on April 24, 1961 and May 14, 1961. The longest tornado recorded in the County occurred on April 24, 1961 and was 29.3 miles long in the County and its total length was 64.2 miles. The widest tornado recorded in the County occurred on July 2, 1992 and March 30, 2006 and was 250 yards wide.

Excessive Heat

There have been 60 recorded excessive heat events reported in Pike County since 1994. One fatality was recorded as the result of the June 18, 2009 excessive heat event.

The hottest temperature recorded in Pike County was 115°F at the Griggsville COOP Station on July 14, 1954.

Drought

Seven droughts have occurred during the last four decades – 1983, 1988, 2005, 2007, 2011, 2012 and 2013. There has been at least one drought per decade with the exception of the 1990s when no substantial droughts were recorded. Corn and soybean yield reductions were most severe for the 1983 drought when there was a 43.7% reduction in corn yields and a 32.4% reduction in soybean yields.

Year	Corn	Soybeans
1983	43.7%	32.4%
1988	28.8%	7.2%
2005	26.7%	10.0%
2007	2.5%	22.4%
2011	----	15.9%
2012	39.9%	----
2013	----	----

Landslides

There have eight recorded landslide events reported in Pike County. There were no damages or injuries/fatalities reported as a result of any of these events.

Earthquakes

In the previous 200 years, one earthquake has originated in Pike County. A 2.0 to 2.9 magnitude earthquake originated in Pittsfield on October 29, 1935. No damages or injuries/fatalities were reported as a result of this event. There are no known fault zones or geologic structures located in Pike County.

Andrea then turned the meeting over to Zachary Krug, American Environmental Corp. (AEC), for a presentation of Man-Made Hazards in Pike County.

Man-Made Hazards Risk Assessment

Zachary began the presentation by informing the Committee that while the focus of this planning effort is directed at natural hazards, FEMA allows a small portion of the planning process to be devoted to an overview of selected man-made hazards.

Although this overview does not have the same depth as the assessment of natural hazards, it provides useful information to place various man-made hazards in perspective. The man-made hazard risk assessment focused on the following categories of:

- generation, storage/handling, and transportation of hazardous substances;
- waste disposal;
- hazardous materials (hazmat) incidents; and
- waste remediation.

Hazardous substances broadly include flammable, explosive, biological, chemical or physical material that has the potential to harm public health or the environment. For the purposes of this Plan, the term includes both hazardous product and hazardous waste.

Generation, Storage/Handling & Transportation

In 2019 there was one facility in Pike County who generated reportable quantities of hazardous substances according to the USEPA.

Based on records obtained from IEMA's Tier II database, there were 29 stationary facilities within Pike County that stored and/or handled hazardous substances. Fourteen (14) of these facilities stored and/or handled chemicals identified as "Extremely Hazardous Substances".

Waste Disposal

There is one active commercial solid (household) waste landfill operating in Pike County, Hickory Ridge Landfill near Baylis. There are no facilities within the County permitted to handle Potentially Infectious Medical Waste and no commercial off-site hazardous waste treatment or disposal facilities.

Hazardous Materials (Hazmat) Incidents

A hazardous materials (hazmat) incident refers to any accident involving the release of hazardous substances. Incidents can take place at fixed facilities or as they are being transported. Between 2011 and 2020 there were 31 hazmat incidents recorded in Pike County. Of the 31 incidents, 17 occurred at fixed facilities, while the remaining 14 occurred during transport.

Of the fourteen incidents that occurred during transport, nine (9) were roadway incidents and five (5) were rail incidents.

Waste Remediation

Waste remediation in Illinois is primarily conducted through three programs: the federal Superfund Program (for sites posing the largest threat to public health and the environment), the Illinois Site Remediation Program (SRP) and the Illinois Leaking Underground Storage Tank (LUST) Program.

Superfund: There are no active Superfund sites in Pike County.

Illinois SRP: There are 9 sites located Pike County. Eight (8) of the sites have received "No Further Remediation" (NFR) letters.

Illinois LUST: There are 74 LUST sites located in Pike County. Approximately 74% of these sites have received NFR, Non-Lust Determination or Section 4(y) letters or remediation is virtually complete.

Mission Statement & Goals

Zachary asked Committee members to review the updated draft mission statement and mitigation goals provided in the meeting materials. Both of these are required elements of the Plan.

Mission Statement

AEC received 8 responses to the Mission Statement survey sent out in August. Based on the survey responses, no modifications were made.

Mitigation Goals

Zachary indicated that the mitigation goals are intended to reduce or eliminate long-term vulnerabilities to natural and man-made hazards and that each project included in the Plan should be aimed at one or more of the goals developed by the committee.

Based on the survey responses, modifications were made to three of the mitigation goals. AEC received 9 responses to the mitigation goals survey sent out in August. The updated goals were presented to committee for review at the meeting.

He indicated to the Committee that an email would be sent out after the meeting to confirm that no additional changes needed to be made to the mission statement or goals.

Mitigation

Andrea explained that mitigation actions include activities and projects that reduce the long-term risk to people and property from the natural and man-made hazards discussed in the risk assessment.

Status of Existing Projects

Andrea explained that as part of the update process the status of the projects and activities included in the Original Plan need to be determined. She described how the "Status of Existing Mitigation Projects" form should be completed so that this information can be included in the Plan update. Zak will email these forms out after the meeting.

New Projects

Next Andrea discussed how to identify new mitigation projects and activities. Zak will email out the forms titled, "Hazard Mitigation Projects" after the meeting. To help the jurisdictions think about and assemble their lists a 2-page list of potential mitigation projects was included in the handout material along with mitigation project lists from jurisdictions in two other counties. These examples can be used to help Committee members when they prepare their list. Finally, Andrea provided excerpts from a FEMA publication on mitigation ideas as another resource.

She indicated individual mitigation project lists will be developed for each participating jurisdiction and that this is a list of projects each jurisdiction would like to see accomplished if funding becomes available. FEMA is trying to stimulate the implementation of mitigation projects and activities to reduce the extraordinary amount of money being expended on hazard event damages.

The projects and activities included in the Plan should be mitigation-related, not emergency preparedness/response or maintenance. Mitigation projects can include studies, regulatory activities, structural and infrastructure projects, and information/education activities. She provided advice for completing the mitigation project list including providing a detailed description of the project, the jurisdiction responsible for the project and the time frame to complete the project.

Committee members were encouraged to contact Andrea and Zak if questions arise before they return to the next Committee meeting.

What Happens Next?

The mitigation project prioritization and project lists will be the main topics of the next committee meeting.

The third meeting of the Committee was set for November 18th at 7:00 p.m.

Public Comment

With no questions or comments, Mr. Martin adjourned the meeting.

Following discussions with the Pike County EMA Director, the third meeting scheduled for Thursday, November 18th was cancelled and rescheduled. The meeting will be held on Thursday, December 2nd at the Pike County Farm Bureau. The Committee members and public were notified of the change.

Meeting Minutes

Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee

December 2, 2021
7:00 p.m.
Pike County Farm Bureau
1301 East Washington Street, Pittsfield

Committee Members

- Barry Fire Protection District
- Baylis, Village of
- Baylis Fire Department
- Fairmount Township
- Illini Community Hospital
- McGee Creek Drainage & Levee District
- Pike County Offices:
  - County Board
  - EMA
  - Highway Department
- Pike-Scott Farm Bureau
- Pittsfield City Fire Department
- Pittsfield, City of
- Pittsfield Township
- Sny Island Levee Drainage District
- Spring Creek Fire Protection District
- Valley City Drainage & Levee District
- American Environmental Corp.

Welcome and Introductions

Joshua Martin, Chairman of the Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee, welcomed attendees. He turned the meeting over to Andrea Bostwick, American Environmental Corporation (AEC), who opened the meeting.

Handout materials were distributed to each member in attendance. For persons participating virtually, handout materials were distributed digitally via email to each member prior to the meeting.

Before providing a brief recap to reorient Committee Members, Andrea asked the participating jurisdictions to submit any of their completed critical facilities surveys, capability assessments, and shelter surveys if they hadn't done so already.

Andrea then summarized what mitigation is and what hazards will be included in the Plan update. The results of an electronic survey that was sent out in June 2021 asking Committee Members whether landslides and dam failures should be included in the Plan was discussed. Based on the responses received, the Committee chose to include landslides but not dam failures in the Plan update. Andrea then provided a brief review of the results of the preliminary risk assessment discussed at the September 1, 2021 Committee Meeting.

Risk Priority Index Exercise

Following the risk assessment review, Andrea led the Committee through a Risk Priority Index (RPI) exercise. The RPI is a quantitative means of providing guidance for ranking the hazards that have the potential to impact the County. This ranking can assist participants in determining which hazards present the highest risks and therefore which ones to focus on when formulating mitigation projects and activities. Each hazard is scored on three categories: frequency, impacts on life and health, and impacts on property and infrastructure based on a scoring system provided. Andrea walked the Committee through the scoring system using excessive heat as an example and then provided time for the Committee to fill out the RPI form during the meeting. The results will be compared to the exercise completed as part of the previous Plan to provide a comparison.

Critical Facilities Vulnerability Survey

As part of the Plan update, Andrea indicated that vulnerable community assets need to be identified for the participating jurisdictions. She asked Committee members to complete a 2-page survey distributed to help identify each community's most vulnerable assets as well as identify a list of key issues that clearly describe each community's greatest vulnerabilities. This information will be used in the vulnerability analysis.

Mitigation Actions Prioritization Methodology

Andrea then went over the Mitigation Actions Prioritization Methodology. She explained that the prioritization methodlogy outlines the approach used to classify each mitigation action identified by the participating jurisdictions and is a FEMA-required element of the Plan.

Mitigation actions can be prioritized in a number of ways. Andrea explained that the updated methodology is based on two key factors:

1) Frequency of hazard—severe storms occur more frequently than earthquakes.
2) Degree of mitigation—some projects will *significantly reduce* damages while other projects only have the potential to reduce damages.

This methodology helps objectively identify which projects and activities have a greater likelihood to significantly reduce the long-term vulnerabilities associated with the most frequently-occurring hazards. After reviewing the updated methodology, the Committee determined that no changes needed to be made.

Andrea acknowledged that while this methodology does not take cost or politics into consideration, these factors may affect the order in which projects are implemented. She also noted that it is important to keep in mind that implementing all of the mitigation projects is desirable regardless of which prioritization category they fall under.

Mitigation Actions

Mitigation actions include activities and projects that reduce the long-term risk to people and property from the natural and man-made hazards discussed in the risk assessment. Andrea summarized the "Existing Mitigation Project/Activity Status" and "Hazard

Mitigation Projects" forms distributed at the previous meeting. She explained that as part of the update process the status of the projects and activities included in the previous Plan need to be determined. She described how the "Status of Existing Mitigation Projects" form should be completed so that this information can be included in the Plan update.

Then she discussed how to identify new mitigation projects and activities. To help the jurisdictions think about and assemble their lists a 2-page list of potential mitigation projects along with mitigation project lists from jurisdictions in other counties and excerpts from a FEMA publication on mitigation ideas were provided in the handout material.

Andrea indicated individual mitigation project lists will be developed for each participating jurisdiction and that this is a list of projects each jurisdiction would like to see accomplished if funding becomes available. FEMA is trying to stimulate the implementation of mitigation projects and activities to reduce the extraordinary amount of money being expended on hazard event damages.

The projects and activities included in the Plan should be mitigation-related, not emergency preparedness/response or maintenance. Mitigation projects can include studies, regulatory activities, structural and infrastructure projects, and information/education activities. She provided advice for completing the mitigation project form including providing a detailed description of the project, the jurisdiction responsible for the project and the time frame to complete the project. Andrea noted that as the committee members put their lists together, if they are unsure about whether a project would be considered mitigation, go ahead and include it on their list. AEC will review the lists and help make the appropriate determinations.

What Happens Next?

It is anticipated that participants will need time to assemble their mitigation project lists. Consequently, the Committee agreed to schedule the next meeting on:

Thursday, March 17, 2022*
Pike County Farm Bureau
1301 East Washington Street, Pittsfield
7:00 p.m.

Public Comment

With no questions or comments, Andrea adjourned the meeting.

* Following conversations between AEC and the Pike County EMA on February 24, 2022, it was decided that the meeting on Thursday, March 17, 2022 would be postponed to allow more time for the participants to complete the required forms and encourage additional jurisdictions to participate in the planning process.

APPENDIX C

Pike County Citizen Questionnaire

You can help protect lives and property from natural hazard events in the County by taking a few moments to complete this questionnaire.

Asterisk (*) desonates required questions for form completion.

* 1. **Please indicate where you live in the County (Please check only one.):**

☐ Barry
☐ Baylis
☐ Detroit
☐ El Dara
☐ Florence
☐ Griggsville
☐ Hull
☐ Kinderhook
☐ Milton
☐ Other (please specify)
☐ Nebo
☐ New Canton
☐ New Salem
☐ Pearl
☐ Pittsfield
☐ Pleasant Hill
☐ Perry
☐ Time
☐ Unincorp. County

* 2. **Please place a checkmark next to each of the natural hazards listed below that you have experienced in the County. (Please check all that apply.)**

☐ Severe Summer Storms (thunderstorms, hail, lightning strikes)
☐ Floods
☐ Severe Winter Storms/Extreme Cold (snow,sleet, ice)
☐ Excessive Heat
☐ Tornadoes
☐ Drought
☐ Earthquakes
☐ Mine/Land Subsidence
☐ Landslides
☐ Dam Failures
☐ Levee Failures
☐ Other (please specify)

3. **Which of the natural hazards above have you encountered most frequently?**

4. **Rank the natural hazards listed below in order from 1 to 11 based on which hazard you feel poses the greatest threat. (1 = greatest threat and 11 = least threat)** ***Each number should only be used once.***

≣ ☐ Severe Summer Storms
≣ ☐ Floods
≣ ☐ Severe Winter Storms
≣ Excessive Heat

☐

- ☐ Tornadoes
- ☐ Drought
- ☐ Earthquakes
- ☐ Mine/Land Subsidence
- ☐ Landslides
- ☐ Dam Failures
- ☐ Levee Failures

* 5. **What types of mitigation projects or activities are most needed in the County? (Please check the five you feel are most important.)**

- ☐ Public information fact sheets and brochures describing actions residents can take to protect themselves and their property against natural hazard impacts.
- ☐ Floodplain Ordinances
- ☐ Building Codes and Enforcement
- ☐ Sirens or other Alert Systems
- ☐ Flood or Drainage Protection (i.e., culvert and drainage ditch maintenance, retention pond construction, dam or levee conctruction/maintenance and/or hydraulic studies to determine cause of drainage problems.)
- ☐ Maintain power during storms by burying power lines, trimming trees and/or purchasing a back-up generator
- ☐ Other (please specify)
- ☐ Tornado Safe Shelters
- ☐ Maintain roadway passage during snow storms and heavy rains
- ☐ Provide sufficient water supply during drought
- ☐ Identify residents with special needs in order to provide assistance during a ntural hazard event
- ☐ Retrofit critical infrastructure (public water supplies, schools, sewage treatment facilities, bridges, hospitals and other important services) to reduce potential damages

* 6. **What are the most effective ways *for you* to receive information about how to make your household and property safer from natural hazards (Please check all that apply.)**

- ☐ Newspapers
- ☐ Television
- ☐ Radio
- ☐ Internet
- ☐ Social Media (Facebook, Twitter, etc.)
- ☐ Schools
- ☐ Mailings
- ☐ Other (please specify)
- ☐ Fact Sheet/Brochure
- ☐ Extension Service
- ☐ Public Workshops/Meeting
- ☐ Fire Department/Law Enforcement
- ☐ Public Health Department
- ☐ Municipal/County Government

Thank you for your time in assisting with the development of the County's Hazard Mitigation Plan.
Pike County Multi-Jurisdictional Multi-Hazard Mitigation Planning Committee

Done

APPENDIX D

Frequently Asked Questions

Pike County Multi-Jurisdictional All Hazards Mitigation Plan Update

1) **What is the Pike County All Hazard Mitigation Plan?**
The Pike County Multi-Jurisdictional All Hazards Mitigation Plan evaluates damage to life and property from natural and man-made hazards in the County and identifies projects and activities that can reduce these damages. The Plan is considered to be multi-jurisdictional because it includes municipalities, townships, and other jurisdictions (fire protection districts, schools, hospital, etc.) who want to participate.

2) **What is hazard mitigation?**
Hazard mitigation is any action taken to ***reduce*** the long-term risk to life and property from a natural or man-made hazard ***before*** an event occurs.

3) **Why is this Plan being updated?**
The Plan update fulfills federal planning requirements of the Stafford Act as amended by the Disaster Mitigation Act and the Disaster Recovery and Reform Act. While meeting federal requirements, this Plan update also provides these benefits:
    - Funding for mitigation projects and activities ***before*** disasters occur.
    - Funding for mitigation projects and activities ***following*** federally-declared disasters.
    - Increased awareness about natural and man-made hazards and closer cooperation among the various organizations and political jurisdictions involved in emergency planning and response.

4) **Who is updating this Plan?**
The Pike County Multi-Jurisdiction All Hazards Mitigation Planning Committee is updating the Plan with assistance from technical experts in emergency planning, environmental matters, and infrastructure. The Committee includes members from education, emergency services, municipal and county government, health care, and law enforcement.

5) **How can I participate?**
You are invited to attend public meetings of the Pike County All Hazards Mitigation Planning Committee. In addition, you are encouraged to provide photographs, other documentation, and anecdotal information about damages you experienced from natural and man-made hazards in Pike County. Surveys will be available at participating jurisdictions and through Pike County to help gather specific information from residents. All of this information will be used to update the Plan. A draft of the Plan update will be presented at a public forum for further public input.

More information can be obtained by contacting:

Joshua Martin, Director
Pike County Emergency Management Agency
204 East Adams Street, Pittsfield, Illinois 62363
(217) 617-5268
martin.ema@pikecountyil.org

APPENDIX E

PIKE COUNTY EMERGENCY MANAGEMENT AGENCY
204 E. Adams St. Pittsfield IL 62363
DIRECTOR-JOSHUA MARTIN

Contact: Joshua Martin
(217)-617-5268

County Prepares For Natural Disasters

Pittsfield, IL (June 1, 2021)—Pike County will update its plan to reduce the damages caused by natural hazards such as floods, tornadoes, snow storms, thunderstorms, and ice storms among others. The plan is called a Hazard Mitigation Plan and the process to update it will be funded through a grant from the Federal Emergency Management Agency (FEMA).

“The Plan identifies activities and projects to reduce the impacts of severe weather on residents and property before an event occurs.” said Pike County Emergency Management Agency Director Joshua Martin. “By having an updated hazard mitigation plan, the County will remain eligible for federal funds to implement these projects.” he added.

The Pike County Hazard Mitigation Planning Committee will hold its first meeting on Tuesday, June 15th, 2021 at 7 P.M. The meeting will be conducted via teleconference. Persons interested in participating in the meeting should contact Zachary Krug, American Environmental Corp. at (217)-585-9517 Ext. 8 or zkrug@aecspfld.com.

The Planning Committee includes County, municipal, school, fire protection district and healthcare representatives, as well as, technical partners and other stakeholders. Meetings of this committee will be conducted over the next year as working sessions so that any interested resident can attend and ask questions. The purpose of these working sessions is to gather and discuss information that will be used to update the plan.

“This mitigation plan is different from our County’s emergency response plan because it focuses on ways to reduce and prevent damages before they occur,” added Martin.

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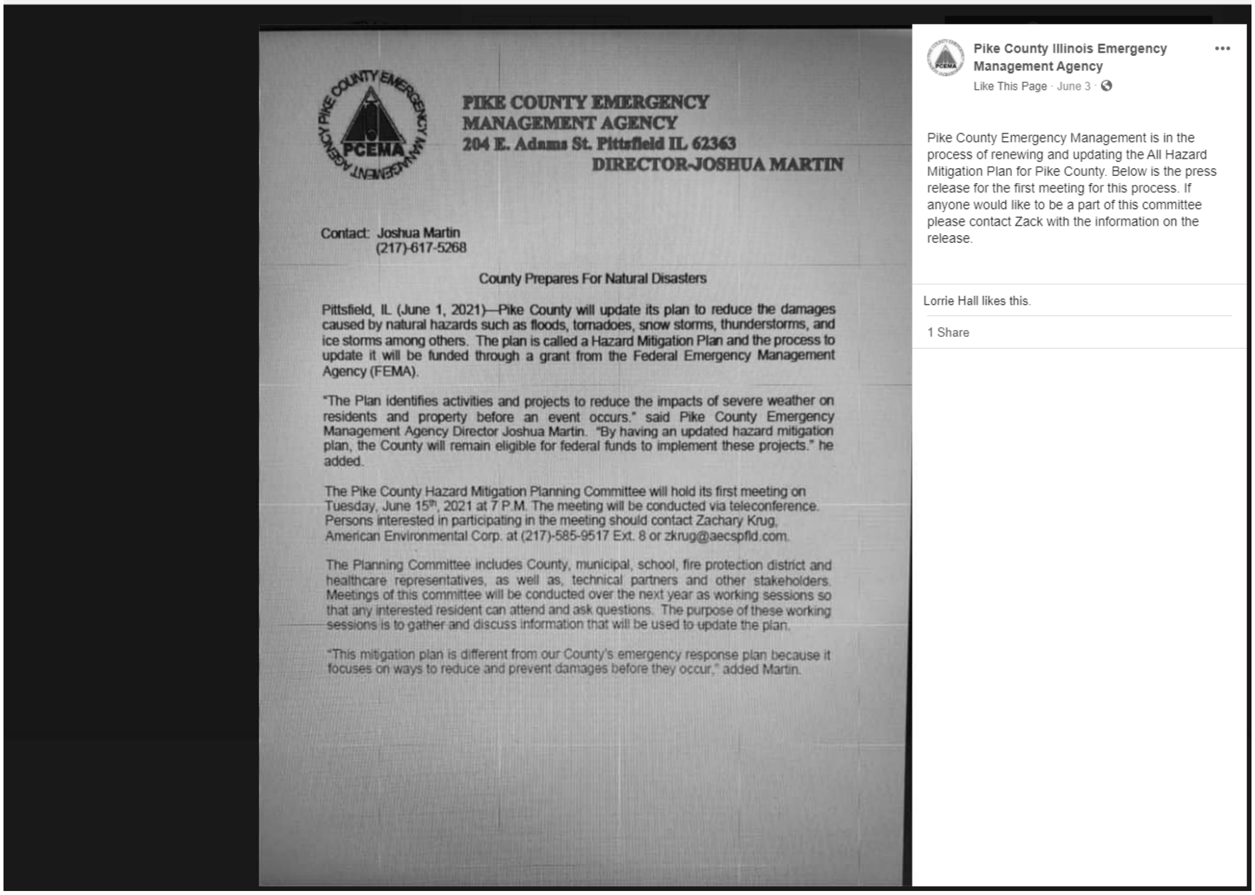

PIKE COUNTY EMERGENCY MANAGEMENT AGENCY
204 E. Adams St. Pittsfield IL 62363
DIRECTOR-JOSHUA MARTIN

Contact: Joshua Martin
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"This mitigation plan is different from our County's emergency response plan because it focuses on ways to reduce and prevent damages before they occur," added Martin.

Pike County Illinois Emergency Management Agency
Like This Page · June 3 ·

Pike County Emergency Management is in the process of renewing and updating the All Hazard Mitigation Plan for Pike County. Below is the press release for the first meeting for this process. If anyone would like to be a part of this committee please contact Zack with the information on the release.

Lorrie Hall likes this.

1 Share

Posted 6/3/2021

NEWS

Pike updating hazard mitigation plan

Rochelle Eiselt
June 4, 2021

PITTSFIELD — The Pike County Hazard Mitigation Planning Committee will have its first meeting at 7 p.m. June 15 to start the process of updating the county's hazard mitigation plan.

The plan outlines how the county will try to reduce damage caused by natural hazards such as floods, tornadoes and other severe weather.

The process will be funded by a grant from the Federal Emergency Management Agency.

The planning committee includes representatives of the county, its municipalities, school districts, fire protection districts and health care, along with technical partners and other stakeholders.

"The plan identifies activities and projects to reduce the impacts of severe weather on residents and property before an event occurs," Pike County Emergency Management Agency director Joshua Martin said. "By having an updated hazard mitigation plan, the county will remain eligible for federal funds to implement these projects."

The mitigation plan differs from the county's emergency response plan by focusing on ways to reduce and prevent damage before it occurs rather than responding after the fact.

The committee, which will meet via teleconference, will have working-session meetings during the next year so any interested resident can attend and ask questions. The purpose of the working sessions is to gather and discuss information that will be used to update the plan.

— Rochelle Eiselt

**PIKE COUNTY EMERGENCY
MANAGEMENT AGENCY
204 E. Adams St. Pittsfield IL 62363
DIRECTOR-JOSHUA MARTIN**

Contact: Joshua Martin

(217)-617-5268

Reducing Damages Caused By Severe Weather

Pittsfield, IL (August 16, 2021)—The frequency and damages caused by severe storms and other natural hazards in Pike County will be discussed when the Pike County Hazards Mitigation Planning Committee meets Wednesday, September 1, beginning at 7 p.m. This Committee, comprised of County and municipal representatives as well as technical partners and stakeholders, will meet over the next several months to update the Pike County All Hazards Mitigation Plan. All Committee Meetings are open to the public.

"The goal of this Committee Meeting is to identify how often severe weather events occur within the County and what kinds of damages have resulted. Based on this information we will begin to update lists of activities and projects to reduce damages caused by these events," said Pike County Emergency Management Agency Director Joshua Martin.

The focus of this effort is on natural hazards— severe thunderstorms with damaging winds or hail, tornadoes, snow and ice storms, floods, drought, excessive heat, earthquakes and dam and levee failures.

Interested persons can provide input at these Pike County Hazards Mitigation Planning Committee meetings, or submit their comments and questions to their municipal or county representatives.

Participants include Pike County and the incorporated municipalities, as well as, several fire protection districts, drainage and levee districts, schools and healthcare organizations.

"This Plan will be our best resource for determining how to prepare for storms and other natural hazards. After the Plan update is completed, comprehensive information will be available in one document to help guide those who are making decisions about how to better protect Pike County residents," added Martin

PIKE COUNTY EMERGENCY
MANAGEMENT AGENCY
204 E. Adams St. Pittsfield IL 62363
DIRECTOR-JOSHUA MARTIN

FOR IMMEDIATE RELEASE

Contact: Joshua Martin
(217)-617-5268

Projects to Reduce Damages Caused By Natural Hazards

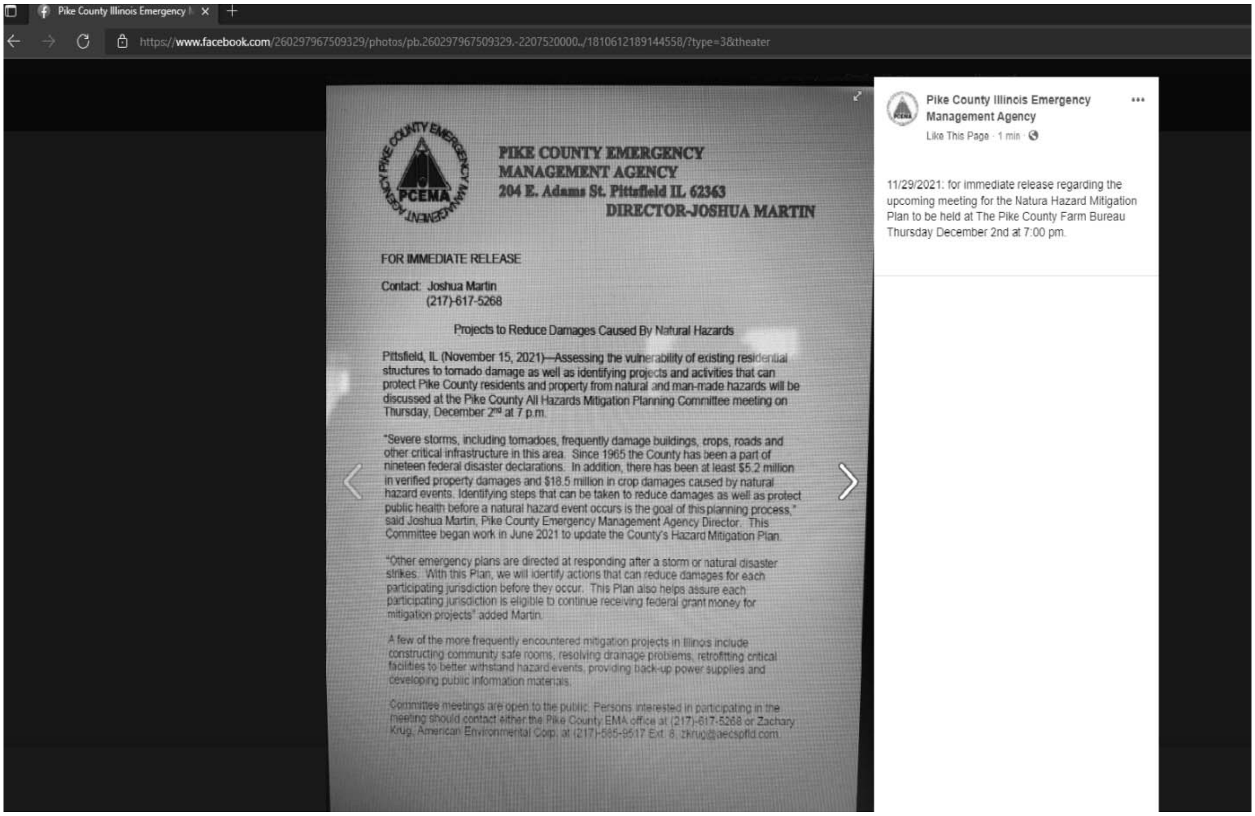
Pittsfield, IL (November 15, 2021)—Assessing the vulnerability of existing residential structures to tornado damage as well as identifying projects and activities that can protect Pike County residents and property from natural and man-made hazards will be discussed at the Pike County All Hazards Mitigation Planning Committee meeting on Thursday, December 2nd at 7 p.m.

“Severe storms, including tornadoes, frequently damage buildings, crops, roads and other critical infrastructure in this area. Since 1965 the County has been a part of nineteen federal disaster declarations. In addition, there has been at least $5.2 million in verified property damages and $18.5 million in crop damages caused by natural hazard events. Identifying steps that can be taken to reduce damages as well as protect public health before a natural hazard event occurs is the goal of this planning process,” said Joshua Martin, Pike County Emergency Management Agency Director. This Committee began work in June 2021 to update the County’s Hazard Mitigation Plan.

“Other emergency plans are directed at responding after a storm or natural disaster strikes. With this Plan, we will identify actions that can reduce damages for each participating jurisdiction before they occur. This Plan also helps assure each participating jurisdiction is eligible to continue receiving federal grant money for mitigation projects” added Martin.

A few of the more frequently encountered mitigation projects in Illinois include constructing community safe rooms, resolving drainage problems, retrofitting critical facilities to better withstand hazard events, providing back-up power supplies and developing public information materials.

Committee meetings are open to the public. Persons interested in participating in the meeting should contact either the Pike County EMA office at (217)-617-5268 or Zachary Krug, American Environmental Corp. at (217)-585-9517 Ext. 8, zkrug@aecspfld.com.



Pike County Illinois Emergency Management Agency

11/29/2021: for immediate release regarding the upcoming meeting for the Natura Hazard Mitigation Plan to be held at The Pike County Farm Bureau Thursday December 2nd at 7:00 pm.

**PIKE COUNTY EMERGENCY
MANAGEMENT AGENCY
204 E. Adams St. Pittsfield IL 62363
DIRECTOR-JOSHUA MARTIN**

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Posted 11/29/2021

PIKE COUNTY EMERGENCY
MANAGEMENT AGENCY
204 E. Adams St. Pittsfield IL 62363
DIRECTOR-JOSHUA MARTIN

FOR IMMEDIATE RELEASE

Contact: Joshua Martin
217-617-5268

Plan to Protect Public Health and Property in Pike County Ready for Public Review

Pittsfield, IL (April 24, 2023) -- The updated Pike County Multi-Jurisdictional All Hazards Mitigation Plan outlining projects and activities to reduce damages caused by severe weather and other natural hazards will be available for public review and comment starting May 11, 2023. The Plan, along with a summary sheet and a comment survey, will be available on the Pike County Emergency Management Agency (EMA) webpage. The comment period will remain open through May 25, 2023.

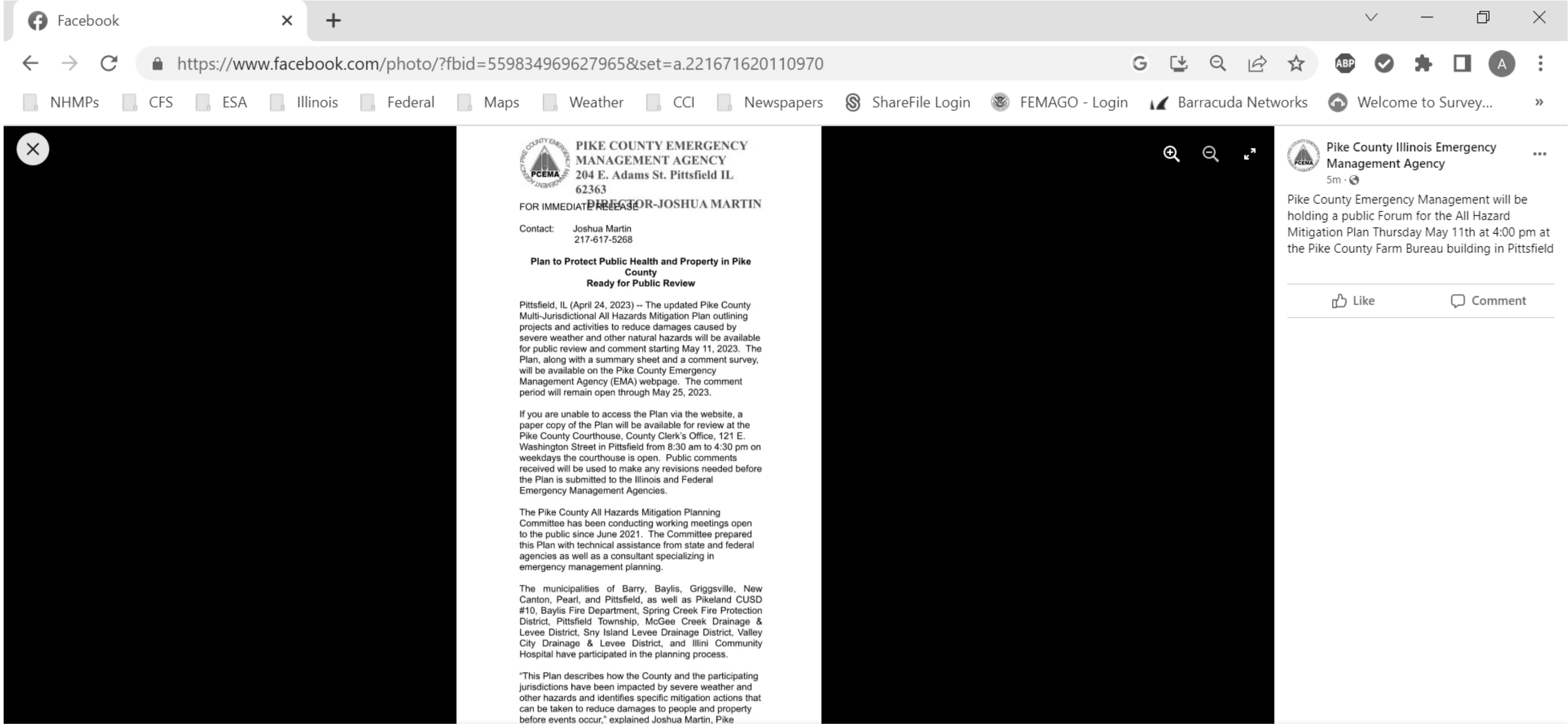
If you are unable to access the Plan via the website, a paper copy of the Plan will be available for review at the Pike County Courthouse, County Clerk's Office, 121 E. Washington Street in Pittsfield from 8:30 am to 4:30 pm on weekdays the courthouse is open. Public comments received will be used to make any revisions needed before the Plan is submitted to the Illinois and Federal Emergency Management Agencies.

The Pike County All Hazards Mitigation Planning Committee has been conducting working meetings open to the public since June 2021. The Committee prepared this Plan with technical assistance from state and federal agencies as well as a consultant specializing in emergency management planning.

The municipalities of Barry, Baylis, Griggsville, New Canton, Pearl, and Pittsfield, as well as Pikeland CUSD #10, Baylis Fire Department, Spring Creek Fire Protection District, Pittsfield Township, McGee Creek Drainage & Levee District, Sny Island Levee Drainage District, Valley City Drainage & Levee District, and Illini Community Hospital have participated in the planning process.

“This Plan describes how the County and the participating jurisdictions have been impacted by severe weather and other hazards and identifies specific mitigation actions that can be taken to reduce damages to people and property before events occur,” explained Joshua Martin, Pike County EMA Director.

A public forum will be held at the Pike-Scott Farm Bureau, 1301 E Washington St., Pittsfield from 4 p.m. to 6 p.m. on Thursday, May 11, 2023. Individuals can still review the Plan and provide comments without participating in the public forum.



PIKE COUNTY EMERGENCY MANAGEMENT AGENCY
204 E. Adams St. Pittsfield IL 62363
DIRECTOR-JOSHUA MARTIN

FOR IMMEDIATE RELEASE

Contact: Joshua Martin
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"This Plan describes how the County and the participating jurisdictions have been impacted by severe weather and other hazards and identifies specific mitigation actions that can be taken to reduce damages to people and property before events occur," explained Joshua Martin, Pike

Pike County Illinois Emergency Management Agency
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Pike County Emergency Management will be holding a public Forum for the All Hazard Mitigation Plan Thursday May 11th at 4:00 pm at the Pike County Farm Bureau building in Pittsfield

Posted 5/5/2023

APPENDIX F

PIKE COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

PUBLIC FORUM SUMMARY HANDOUT

MAY 11, 2023

4:00 P.M. – 6:00 P.M.

Each year natural hazards (i.e., severe thunderstorms, tornadoes, severe winter storms, flooding, etc.) cause damage to property and threaten the lives and health of Pike County residents. Since 1965, Pike County has been included in 19 major federally-declared disasters and experienced at least $8.4 million in recorded property damages and $18.5 million in recorded crop damages.

In the last 10 years alone (2013 – 2022), there have been 57 heavy rain events, 32 thunderstorms with damaging winds, 29 riverine flood events, 27 excessive heat events, 24 extreme cold events, 23 flash flood events, 17 severe winter storms, 10 severe storms with hail one inch in diameter or greater, 6 tornadoes, and 1 drought verified in the County. While natural hazards cannot be avoided, their impacts can be reduced through effective hazard mitigation planning and implementation.

What is hazard mitigation planning?

Hazard mitigation planning is the process of determining how to reduce or eliminate property damage and loss of life from natural and man-made hazards. This process helps the County and participating jurisdictions reduce their risk by identifying vulnerabilities and developing mitigation actions to lessen and sometimes even eliminate the effects of a hazard. The results of this process are documented in an all hazards mitigation plan.

Why prepare an updated all hazards mitigation plan?

By preparing and adopting an updated all hazards mitigation plan, participating jurisdictions become eligible to apply for and receive federal hazard mitigation funds to implement mitigation actions identified in the plan. These funds, made available through the Disaster Mitigation Act of 2000, can help provide local government entities with the opportunity to complete mitigation projects that would not otherwise be financially possible.

Who participated in the update of the County's All Hazards Mitigation Plan?

Recognizing the benefits that could be gained from preparing an updated all hazards mitigation plan, Pike County invited all the local government entities within the County to participate. The following jurisdictions chose to participate in the Plan update with the County:

- Barry, City of
- Baylis, Village of
- Baylis Fire Department
- Fairmount Township
- Griggsville, City of
- Illini Community Hospital
- McGee Creek D&LD
- New Canton, Town of
- Pearl, Village of
- Pikeland CUSD #10
- Pittsfield, City of
- Pittsfield Township
- Sny Island Levee Drainage District
- Spring Creek FPD
- Valley City D&LD

How was the Plan update developed?

The Pike County Multi-Jurisdictional All Hazards Mitigation Plan update was developed through the Pike County Multi-Jurisdictional All Hazards Mitigation Planning Committee. The Planning Committee included representatives from each participating jurisdiction, as well as agriculture, education, emergency services, healthcare, and social services. The Planning Committee met four times between June 2021 and May 2023.

PIKE COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

Which natural and man-made hazards are included in the Plan update?
After reviewing the risk assessment, the Planning Committee chose to include the following natural and man-made hazards in the Plan:

Natural Hazards:

- severe storms (thunderstorms, hail, lightning, heavy rain)
- floods (riverine & flash)
- severe winter storms (snow & ice)
- excessive heat
- extreme cold
- tornadoes
- drought
- levee failures
- landslides
- earthquakes

Man-Made hazards:

- hazardous substances (generation, transportation, and storage/handling)
- waste disposal
- hazardous material incidents
- waste remediation
- terrorism

What is included in the Plan update?
The Plan update is divided into sections that cover the planning process; the risk assessment; the mitigation strategy, including the jurisdiction-specific mitigation action lists; and plan maintenance and adoption. The majority of the Plan update is devoted to the risk assessment and mitigation strategy.

The risk assessment identifies the natural and man-made hazards that pose a threat to the County and includes a profile of each natural hazard, which describes the location and severity of past occurrences, reported damages to public health and property, and the likelihood of future occurrences. It also provides a vulnerability analysis that estimates the potential impacts each natural hazard would have on the health and safety of the residents of Pike County, as well as the buildings, critical facilities, and infrastructure in the County.

The key component of the mitigation strategy is a list of the projects and activities developed by each participating jurisdiction to reduce the potential loss of life and property damage that results from the natural and man-made hazards identified in the risk assessment. These projects and activities are intended to be implement *before* a hazard event occurs.

What happens next?
Any comments received at today's public forum and during the public comment period will be reviewed and, where applicable, incorporated into the draft Plan update before it is submitted to the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA) for review. Once IEMA and FEMA have reviewed and approved the Plan, it will be presented to the County and each participating jurisdiction for formal adoption. After adopting the Plan update, each participating jurisdiction will be eligible to apply for federal mitigation funds and can begin implementing the mitigation actions identified in the Plan update.

APPENDIX G

PIKE COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

COMMENT SHEET

PLAN COMMENT PERIOD
MAY 11, 2023 THRU MAY 25, 2023

The County's Multi-Jurisdictional All Hazards Mitigation Plan evaluates damage to life and property from natural and man-made hazards that occur in the County. This Plan also identifies projects and activities for the County and each participating jurisdiction that will help reduce these damages. This comment sheet should be used to provide feedback on the draft Plan update.

What comments, concerns or questions do you have regarding the draft Plan update? (Use additional sheets if necessary.)

Please Print Your Name, Address, and Phone Number Below:

Name: ____________________ Phone: ____________

Address: ____________________

____________________ Zip Code: ____________

Comments will be accepted through May 25, 2023.

Place
Stamp
Here

Joshua Martin, Director
Pike County EMA
204 E. Adams St.
Pittsfield, IL 92363

Pike County Multi-Jurisdictional All Hazards Mitigation Plan Update Comment Survey

The Pike County Multi-Jurisdictional All Hazards Mitigation Plan Update evaluates damage to life and property from natural and man-made hazards that occur in the County. This Plan also identifies projects and activities for the County and each participating jurisdiction to help reduce these damages. This comment survey should be used to provide feedback on the draft Plan.

An Asterisk (*) denotes a question that is required for form completion.

* 1. What comments, concerns or questions do you have regarding the draft Plan?

* 2. Name:

3. Address:

4. City/Village/Town:

5. State/Province:

6. Zip Code:

* 7. Email Address:

8. Phone Number:

Comments will be accepted through May 25, 2023.

Done

APPENDIX H

PIKE COUNTY EMERGENCY
MANAGEMENT AGENCY
204 E. Adams St. Pittsfield IL 62363
DIRECTOR-JOSHUA MARTIN

May 5th 2023

The purpose of this memorandum is to inform you that Pike County is updating its countywide All Hazards Mitigation Plan. Since we share common boundaries, you are invited to review our draft Plan and provide comments during the public comment period, which runs from May 11 through May 25, 2023. Starting May 11, the Plan along with a summary sheet and a comment survey can be viewed on the Pike County webpage.

A public forum is scheduled for:

Thursday, May 11, 2023
4 p.m. to 6 p.m.
Pike-Scott Farm Bureau
1301 E Washington St., Pittsfield, IL

If you have any questions, please contact me at 217-617-5268 or martin.ema@pikecountyil.org

American Environmental Corp., an emergency management and environmental consulting firm experienced in preparing these plans, is leading our planning process. If you have specific questions about the Plan, please contact Ken Runkle, a consultant team member, at 217-585-9517 Ext. 8 or krunkle@aecspfld.com

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From: Pike - EMA <martin.ema@Pikecountyil.org>
Sent: Friday, May 05, 2023 11:29 AM
To: John Simon; Brown County EMA: Curt Hannig; Calhoun County ESDA: J.T. Moomey; Greene County ESDA: Cale Hoesman; Phil McCarty; 'jdaws2@yahoo.com'; MO EMA: John Hark; MO EMA: Al Murry
Cc: Runkle, Ken; Bostwick, Andrea
Subject: Memo for All Hazard Mitigation Plan Public Forum
Attachments: Adjacent County Memo.docx

Good Afternoon all,

Pike County will be having our public forum for our All Hazard Mitigation Plan. Attached is a memo with information regarding the forum.

Joshua Martin, Director
Pike County Emergency Management Agency
204 E. Adams St Pittsfield, IL 62363
Office:217-285-5550
Cell: 217-617-5268

APPENDIX I

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
4/16/1982	5:30 PM	Rockport	n/a	n/a	n/a	n/a	n/a	
6/8/1982	6:30 PM	Hull	n/a	n/a	n/a	n/a	n/a	
6/8/1982	7:25 PM	Pittsfield	65 kts	n/a	n/a	n/a	n/a	
4/29/1984	5:55 PM	Pittsfield^	70 kts	n/a	n/a	$250,000	$250,000	Many trees were uprooted and broken and a few houses were damaged. Several pigs were killed by flying debris.
7/29/1986	12:50 AM	New Hartford^	52 kts	n/a	n/a	n/a	n/a	
7/6/1987	3:30 PM	New Hartford^	n/a	n/a	n/a	n/a	n/a	Winds damaged electric utility poles and wires. Widespread power outages occurred in rural areas of the county.
4/5/1988	7:00 PM	Pittsfield	n/a	n/a	n/a	n/a	n/a	
11/15/1988	8:00 PM	Pleasant Hill	n/a	n/a	n/a	n/a	n/a	A trailer was blown off its foundation and trees and power lines were blown down by strong straight-line winds.
5/25/1989	12:20 AM	New Hartford^	n/a	n/a	n/a	$12,500	n/a	Scattered wind damage was reported.
6/22/1990	6:42 PM	Griggsville Pittsfield	52 kts	n/a	n/a	$25,000	n/a	Winds damaged trees and power poles from Griggsville to Pittsfield.
10/17/1990	3:50 PM	Hull^ East Hannibal^	n/a	n/a	n/a	$2,500	n/a	Trees were downed between Hull and East Hannibal.
7/2/1992	3:40 PM	Griggsville	n/a	n/a	n/a	$25,000	n/a	The Sheriff's office reported windows blown out and some structural damage to a building.
7/2/1992	4:00 PM	Pittsfield Martinsburg Pleasant Hill	n/a	n/a	n/a	$27,500	n/a	Trees were blown down in Pleasant Hill.
7/2/1992	7:50 PM	Perry^	n/a	n/a	n/a	$2,500	n/a	Trees were blown down and blocking Highway 104.
9/9/1992	5:05 PM	Pittsfield Griggsivlle	n/a	n/a	n/a	$2,750	n/a	

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

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1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
9/2/1993	6:00 PM	Fishhook	n/a	n/a	n/a	$500	n/a	A newspaper employee reported large trees down.
5/16/1995	7:20 PM	East Hannibal	n/a	n/a	n/a	$200	n/a	The Illinois State Police reported several large trees down.
6/8/1995	6:00 AM	Barry	n/a	n/a	n/a	$200	n/a	Numerous large trees were blown over damaging homes and parked vehicles in Barry.
6/8/1995	6:10 AM	Pittsfield	61 kts	n/a	n/a	$300	n/a	Winds as high as 70 mph were also reported in Pittsfield knocking down numerous trees across town.
5/27/1996	1:50 AM	Barry Barry^	58 kts	n/a	n/a	n/a	n/a	Thunderstorm winds downed trees near Barry.
7/19/1996	5:20 PM	Pleasant Hill	52 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed trees.
7/19/1997	1:10 PM	Barry	50 kts	n/a	n/a	n/a	n/a	The County Sheriff reported trees down in Barry.
5/20/1998	8:30 AM	Martinsville^	54 kts	n/a	n/a	n/a	n/a	Large trees and power lines were also downed in Martinsburg.
5/20/1998	8:30 AM	Barry	54 kts	n/a	n/a	n/a	n/a	Large trees and power lines were also downed in Barry. One home, a boat and a motorcycle were damaged by falling limbs.
5/20/1998	8:35 AM	Baylis	54 kts	n/a	n/a	n/a	n/a	Large trees and power lines were also downed in Baylis.
5/20/1998	8:35 AM	Pittsfield	54 kts	n/a	n/a	n/a	n/a	Trees went down on the north side of the square in Pittsfield knocking out the power to much of the north side of town.
5/22/1998	2:25 AM	Pittsfield	55 kts	n/a	n/a	n/a	n/a	The County Sheriff reported numerous trees down across town.
5/22/1998	7:30 AM	Pittsfield	55 kts	n/a	n/a	n/a	n/a	6 power pole were downed on the south side of Pittsfield. A few fences were damaged and a few homes sustained minor damage from broken limbs.
5/22/1998	7:35 AM	Griggsville Detroit	55 kts	n/a	n/a	n/a	n/a	In Detroit, a car was destroyed by a fallen tree.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6/29/1998	4:20 PM	Pittsfield^	55 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed several trees east of Pittsfield.
11/10/1998	2:05 AM	Pleasant Hill Pleasant Hill^	56 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed some trees and power lines between Pleasant Hill and the Pike/Calhoun County line.
11/10/1998	3:36 AM	Detroit^	56 kts	n/a	n/a	n/a	n/a	The Illinois State Police reported trees down on US Highway 54.
6/4/1999	4:25 PM	Chambersburg^	55 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed trees blocking Highway 104.
6/11/1999	12:45 PM	Pittsfield	52 kts	n/a	n/a	n/a	n/a	Several trees were reported down by thunderstorm wind gusts.
4/20/2000	3:50 AM	Summer Hill	62 kts	n/a	n/a	n/a	n/a	Numerous trees and power lines were downed, some fell and blocked U.S. Highway 54. Several outbuildings were also damaged.
4/20/2000	3:55 AM	Valley City Pittsfield	62 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts caused damage across parts of Pike County.
5/26/2000	9:45 PM	Summer Hill^	55 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed trees along Highway 54 southwest of Summer Hill.
5/26/2000	9:50 PM	Pleasant Hill Nebo	55 kts	n/a	n/a	n/a	n/a	A thunderstorm downburst downed trees and power lines from Pleasant Hill to Nebo.
5/26/2000	10:05 PM	Pearl^	55 kts	n/a	n/a	n/a	n/a	Thunderstorm winds downed trees along Highway 100 northwest of Pearl.
6/20/2000	5:35 PM	Pittsfield Martinsburg	52 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed trees across Pike County. The County Sheriff reported trees down in Martinsburg. Storm spotters reported large tree limbs down in Pittsfield. Some roads were blocked in Martinsburg.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6/20/2000	5:40 PM	Time Milton Pearl	52 kts	n/a	n/a	n/a	n/a	The County Sheriff reported trees down in Milton and Pearl.
7/11/2000	6:55 AM	Pearl	55 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed trees in the Pearl area. Chain line fencing around a basketball court was knocked down by the wind. Some corn in fields was also blown down.
8/22/2000	7:55 PM	Barry	55 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts caused scattered damage in Barry. A few trees and power lines were downed, the chimney on a home was blown down, and a trailer at a service station was blown over.
9/11/2000	8:45 PM	Barry	56 kts	n/a	n/a	n/a	n/a	The Sheriff's office reported power lines down in Barry.
8/30/2001	5:35 PM	Pleasant Hill	51 kts	n/a	n/a	n/a	n/a	Amateur radio spotters reported some trees down in Pleasant Hill.
6/11/2002	2:10 PM	Barry New Salem Griggsville	55 kts	n/a	n/a	n/a	n/a	Local law enforcement reported trees down in a 15 mile path from Barry to Griggsville.
7/9/2002	4:30 PM	Milton	52 kts	n/a	n/a	n/a	n/a	The County Sheriff reported trees down in the Milton area.
7/22/2002	4:40 PM	Barry New Canton	55 kts	n/a	n/a	n/a	n/a	The County Sheriff reported trees and power lines down in Barry and New Canton.
7/22/2002	4:50 PM	Perry	55 kts	n/a	n/a	n/a	n/a	The County Sheriff reported trees and power lines down in Perry.
7/8/2003	6:30 PM	Griggsville Perry	55 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed some large trees and power lines in Griggsville and Perry. A downed utility pole in Perry damaged a fence at the Middle School.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
7/8/2003	9:00 PM	Barry	55 kts	n/a	n/a	$5,000	n/a	Thunderstorm wind gusts downed trees and power lines in Barry. A couple of cars received minor damage from falling trees and branches.
7/18/2003	7:25 AM	Pittsfield	55 kts	n/a	n/a	n/a	n/a	The Sheriff department reported some large tree limbs and power lines down.
8/28/2003	4:30 PM	New Canton	55 kts	n/a	n/a	n/a	n/a	The County Sheriff reported numerous trees and power lines down.
8/28/2003	4:50 PM	Pittsfield	55 kts	n/a	n/a	n/a	n/a	The Illinois State Police reported trees and power lines down in Pittsfield.
5/24/2004	9:55 PM	Hull	55 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed several trees in the Hull area.
5/24/2004	10:00 PM	New Canton	55 kts	n/a	n/a	n/a	n/a	Local law enforcement reported trees down.
5/24/2004	10:05 PM	Atlas Rockport Summer Hill New Hartford	55 kts	n/a	n/a	n/a	n/a	A microburst downed several large trees near Atlas. Storm spotters reported trees down in Rockport. Thunderstorm wind gusts downed trees in New Hartford.
5/24/2004	10:11 PM	Pittsfield Pittsfield^	55 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed trees and power lines across the south and east side of Pittsfield. Some homes and vehicles were damaged by downed trees and large limbs.
5/24/2004	10:17 PM	Griggsville Detroit	60 kts	n/a	n/a	n/a	n/a	The Sheriff Department reported trees and power lines down in Griggsville. Thunderstorm wind gusts downed trees and power lines and caused some building damage in the Detroit area. One garage was destroyed by the winds.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5/31/2004	5:50 PM	Perry New Salem Baylis Berry	55 kts	n/a	n/a	n/a	n/a	Local law enforcement reported trees and power lines down near Perry and in Barry.
10/29/2004	4:55 PM	Pleasant Hill Pleasant Hill^	60 kts	n/a	n/a	$30,000	n/a	Thunderstorm wind gusts caused damage in the Pleasant Hill area. Trees and power lines were downed and one home on Vin Friz road suffered minor roof and soffit damage. A nearby storage building was destroyed leaving tin sheeting in a tree. South of Pleasant Hill, a home lost half of its roof and a trampoline was blown 100 yards away.
6/8/2005	1:40 PM	Pleasant Hill	55 kts	n/a	n/a	n/a	n/a	Storm spotters reported several trees and power lines down. A few roads were blocked by the downed trees.
6/13/2005	4:30 PM	Barry	50 kts	n/a	n/a	n/a	n/a	Some power lines were reported down in Barry.
9/19/2005	4:45 PM	Griggsville^	55 kts	n/a	n/a	n/a	n/a	The County Sheriff reported several large trees down blocking a road north of Griggsville.
9/19/2005	4:45 PM	Kinderhook	55 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts caused scattered wind damage across Kinderhook. One home lost a quarter of its roof, several sheds and outbuildings were destroyed, and numerous trees were downed.
9/19/2005	4:50 PM	Hull^	55 kts	n/a	n/a	n/a	n/a	The County Sheriff reported trees and power lines down east of Hull.
11/5/2005	7:50 PM	Pittsfield	55 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts damaged the roof of a business, damaged signs, and downed some trees. An auto tire and repair business lost part of the roof over three repair bays. Some street and business signs damaged and a few trees were downed in the area.
4/2/2006	3:50 PM	Hull	55 kts	n/a	n/a	n/a	n/a	Storm spotters reported some trees blown down.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	**Start Time**	**Location(s)**	**Magnitude Windspeed (knots)**	**Injuries**	**Fatalities**	**Property Damages**	**Crop Damages**	**Impacts/Event Description**
4/2/2006	3:51 PM	Griggsville	60 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed trees and blew roof shingles off of roofs.
7/13/2006	4:40 PM	Hull	60 kts	n/a	n/a	n/a	n/a	Several trees, large tree limbs and power lines were blown down in Hull.
7/13/2006	4:45 PM	Kinderhook	60 kts	n/a	n/a	n/a	n/a	Several trees, large tree limbs and power lines were blown down in Kinderhook. One tree fell onto a mobile home but only caused minor damage. No injuries were reported.
7/13/2006	4:50 PM	Barry	55 kts	n/a	n/a	n/a	n/a	Several trees and large tree limbs were blown down in Barry.
8/18/2006	7:10 PM	Pleasant Hill	52 kts	n/a	n/a	n/a	n/a	A storm spotter reported a large tree down.
8/18/2006	7:20 PM	Pittsfield	52 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed some large tree limbs and power lines. Over 1100 customers lost power.
8/18/2006	7:25 PM	Milton	52 kts	n/a	n/a	n/a	n/a	Thunderstorm wind gusts downed some large tree limbs and power lines. The local power company reported that 170 out of the 174 customers lost power.
3/1/2007	2:45 AM	Barry	61 kts	n/a	n/a	n/a	n/a	Thunderstorm winds caused minor damage in Barry. A metal storage shed was blown over and a large tree was blown down. The tree landed on a mobile home causing minor roof damage.
8/16/2007	8:32 AM	New Canton Barry El Dara	61 kts	n/a	n/a	n/a	n/a	Several large trees, numerous tree limbs and power lines were blown down in New Canton. One tree caused roof damage to one home. Numerous large trees, tree limbs, power poles and power lines were blown down around Barry. In El Dara, a grain bin was blown over and moved approximately 300 yards. Also, numerous large tree limbs were blown down.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
8/16/2007	8:49 AM	Pittsfield	56 kts	n/a	n/a	n/a	n/a	Numerous trees, tree limbs and power lines were blown down across town. A couple of trees landed on cars, causing extensive damage. No injuries were reported.
8/16/2007	9:01 AM	Time^	52 kts	n/a	n/a	n/a	n/a	Numerous large tree limbs were blown down.
10/18/2007	12:10 AM	New Canton	52 kts	n/a	n/a	n/a	n/a	A tree was blown down across a road in town.
1/7/2008	5:15 PM	Nebo^	56 kts	n/a	n/a	n/a	n/a	Downburst winds caused considerable damage to numerous trees and tree limbs from half a mile to 1.5 miles south of Nebo.
5/30/2008	3:25 PM	New Salem^	55 kts	n/a	n/a	$5,000	n/a	Storm spotters reported a machine shed destroyed by thunderstorm winds.
6/3/2008	9:00 AM	Perry^	56 kts	n/a	n/a	n/a	n/a	Illinois Route 107 was closed due to several trees blown down onto the road north of Perry.
7/27/2008	7:20 PM	Barry Kinderhook^ Hull^	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down numerous trees 11 miles west of Barry. In Barry, numerous large tree limbs and power lines were blown down.
7/27/2008	7:40 PM	Pittsfield^	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down numerous tree limbs and flattened some corn in the area.
12/27/2008	10:37 AM	Barry	52 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several large tree limbs and a few power lines in Barry.
12/27/2008	10:54 AM	Perry^	56 kts	n/a	n/a	n/a	n/a	Several large trees were blown down blocking the intersection of Illinois Routes 104 and 107.
6/19/2009	3:00 PM	Fishhook	52 kts	n/a	n/a	n/a	n/a	Several trees were blown down in Fishhook.
6/19/2009	3:10 PM	Perry	52 kts	n/a	n/a	n/a	n/a	Several trees were blown down in Perry.
6/8/2010	7:36 PM	Hull^	52 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down a large tree onto Illinois Route 96 about half a mile north of Interstate 72, blocking it for awhile.
6/13/2010	3:05 PM	Barry	52 kts	n/a	n/a	n/a	n/a	

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
7/19/2010	10:40 AM	Pleasant Hill	52 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down numerous large trees, tree limbs and power lines around town. Also, one power pole was snapped off at the base.
12/31/2010	10:52 AM	Martinsburg^	61 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down a large tree just north of Martinsburg.
2/27/2011	8:05 PM	New Canton^	61 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several large trees along Illinois Route 96 between New Canton and Rockport. One of the trees landed on a house causing moderate damage.
6/13/2011	2:50 PM	Kinderhook	61 kts	n/a	n/a	n/a	n/a	
6/13/2011	10:55 PM	Barry	52 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several large tree limbs.
6/27/2011	12:50 AM	Baylis	65 kts	n/a	n/a	n/a	n/a	An intense bow echo moved through Baylis. Thunderstorm winds blew down several trees, tree limbs and power lines. Also, the winds caused a large dent in a 55,000 bushel grain bin.
6/27/2011	1:00 AM	Perry Griggsville	65 kts	n/a	n/a	n/a	n/a	An intense bow echo moved through the Perry and Griggsville area. Numerous trees, tree limbs and power lines were blown down. In Perry, a large pecan tree was uprooted and fell onto a house causing extensive damage. Also, when the tree fell over the roots broke a gas line causing a leak. No injuries were reported.
7/12/2011	3:12 PM	Barry	56 kts	n/a	n/a	$10,000	n/a	Thunderstorm winds blew part of the roof off of the library, causing some water damage to the museum that is on the second floor of the building. Also, numerous tree limbs and power lines were blown down.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
7/12/2011	3:25 PM	New Hartford	52 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew half of a large tree onto U.S. Highway 54. Also, several other trees and numerous tree limbs were blown down around town.
4/15/2012	5:55 PM	Rockport^	61 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several large trees, power lines and destroyed a large machine shed as well as a couple of smaller sheds just northwest of Rockport along Illinois Route 96.
6/16/2012	6:10 PM	Perry Griggsville Pittsfield Martinsburg Pleasant Hill	50 kts	n/a	n/a	n/a	n/a	Thunderstorm winds associated with a line of storms blew down numerous tree limbs and a few trees in Perry, Pittsfield and Pleasant Hill. One unoccupied vehicle in Pittsfield was damaged from a flying piece of plywood.
7/26/2012	6:10 PM	Kinderhook^	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds caused minor roof and door damage to a machine shed 5 miles south of Hull. Also, numerous small tree limbs and several power lines were blown down.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5/20/2013	6:30 PM	East Hannibal Hull	65 kts	n/a	n/a	n/a	n/a	Considerable wind damage was noted along the I-72 corridor from the Mississippi River to the I-72/I-172 interchange. There was a great deal of tree damage on both sides of the road where it extended from the eastern bank of the river to the levee. Varying sizes of limbs and branches were broken, twisted and dangling. Three residences on the north side of the interstate near the first Illinois exit had minor roof damage. Further east, the winds destroyed a large machine shed at a farmstead. The next farm along the north side of the road suffered the worst damage. All 11 grain bins were dented on the southwest side to some degree. There was some tree damage to the next two residences on the south side of the interstate prior to the interchange with I-172.
6/21/2014	3:15 PM	Barry	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds split a large tree with parts of it blocking the nearby road in Barry.
6/21/2014	4:15 PM	Pittsfield	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several trees and power lines around town.
7/7/2014	11:40 PM	Pittsfield Griggsville^	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down numerous trees across Pittsfield. Also, a large tree was blown down across Illinois Route 107 just north of Interstate 72.
6/13/2015	6:40 PM	Nebo	52 kts	n/a	n/a	n/a	n/a	

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
7/13/2015	5:39 PM	Barry New Salem Pittsfield^ Griggsville	61 kts	n/a	n/a	n/a	n/a	A wide swath of damaging winds occurred across the northern half of Pike County. Numerous trees, tree limbs, power poles and power lines were blown down in Barry, Griggsville and northeast of Pittsfield. A couple of homes in Griggsville and Barry sustained minor roof and siding damage.
7/13/2016	1:20 PM	Hull	65 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several trees in Hull.
7/13/2016	1:48 PM	Pleasant Hill Nebo Pearl^	52 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several large trees as well as numerous tree limbs. A couple of trees were blown down at the intersection of Illinois Route 96 and County Road 10. Also, several trees were blown down onto Illinois Route 100 north of Pearl.
7/19/2016	5:30 PM	Pittsfield	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several large tree limbs on the north side of town.
7/19/2016	5:55 PM	Pearl	52 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down a few trees around town.
3/6/2017	11:34 PM	Pleasant Hill	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew over a utility pole in town.
6/14/2017	5:50 PM	New Canton	65 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down numerous trees, tree limbs, power poles and power lines around town.
6/14/2017	6:18 PM	Nebo	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several trees, tree limbs, power poles and power lines around town.
5/14/2018	4:20 PM	Hull Kinderhook Baylis New Salem Pittsfield Griggsville	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds caused a wide swath of damage across Pike County. In Hull, a large tree was blown down across a road in town. Several trees and tree limbs were blown down just south of Pittsfield and several trees were blown down across a road in Baylis. In Griggsville, several power lines were blown down.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6/14/2018	1:25 PM	Hull Hull^	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down a large tree across Illinois Route 96 just east of Hull.
6/28/2018	3:30 PM	Pleasant Hill	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down a tree in town.
7/14/2018	2:13 PM	Rockport Summer Hill New Hartford Pittsfield	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down numerous trees in Rockport, Summer Hill and Pittsfield. One tree fell onto power lines in Summer Hill.
4/7/2019	7:10 PM	Pleasant Hill	52 kts	n/a	n/a	n/a	n/a	
5/22/2019	9:50 PM	Barry^	52 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down numerous tree limbs.
5/22/2019	10:20 PM	Pittsfield	61 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several trees around town, as well as numerous tree limbs and power lines.
6/21/2019	9:40 AM	New Canton	61 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several trees and power lines around town.
6/21/2019	9:59 AM	Pittsfield	52 kts	n/a	n/a	n/a	n/a	
7/17/2019	3:15 PM	Perry Perry^	61 kts	n/a	n/a	n/a	n/a	Thunderstorm winds caused minor roof damage to a house 3 miles north northwest of Perry. On the outskirts of Perry, the roof of a barn was destroyed, windows were blow out of a tractor and some shingles were ripped off the roof of a house.
7/17/2019	3:25 PM	Pittsfield	61 kts	n/a	n/a	n/a	n/a	Several large trees were blown down around town.
6/3/2020	2:35 PM	Pittsfield	54 kts	n/a	n/a	n/a	n/a	
6/3/2020	3:20 PM	Rockport^	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds destroyed a shed and tossed it about 200 feet to the southwest as the storm moved through.
7/21/2020	1:36 PM	Pittsfield	63 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down several trees around town. One tree fell onto a house and caused moderate damage.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Pike County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6/24/2021	11:50 PM	Pittsfield^	61 kts	n/a	n/a	n/a	n/a	Widespread tree damage around RV Resort about 3 miles north of Pittsfield.
7/9/2021	8:36 PM	Perry Griggsville Valley City	61 kts	n/a	n/a	$20,000	n/a	A wide swath of damaging winds from Perry southward into Griggsville and Valley City. Numerous trees, tree limbs and power lines were blown down. Some of the trees fell onto Illinois Route 107 both north and south of Perry. A power pole was blown down in Griggsville.
10/24/2021	4:23 PM	Atlas Summer Hill New Hartford Pittsfield Griggsville	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down numerous tree limbs near Pike along U.S. Highway 54. In Griggsville, several power lines were blown down.
12/10/2021	6:57 PM	El Dara El Dara^	61 kts	n/a	n/a	$5,000	n/a	Several large trees were blown down along County Highway 4 near El Dara.
12/10/2021	7:11 PM	Perry^ Perry Griggsville	61 kts	n/a	n/a	$10,000	n/a	Pike County dispatch reported three to four trees blown down at the intersection of Illinois Routes 104 and 107. In Griggsville, a transformer was blown and several power lines were blown down.

GRAND TOTAL:				0	0	$433,950	$250,000

Source: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 2
Severe Storms - Hail Events Reported in Pike County
1987 - 2022

Date(s)	Start Time	Location(s)	Magnitude Hail Stone Diameter (inches)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5/21/1987	7:35 PM	Time^	1.75 in.	n/a	n/a	n/a	n/a	
5/8/1988	3:45 PM	Perry	1.75 in.	n/a	n/a	n/a	n/a	Golfball-sized hail damaged cars, home windows and did some damage to recently planted crops.
4/26/1989	9:55 PM	Pittsfield^	1.50 in.	n/a	n/a	$250,000	$250,000	
5/4/1991	7:40 PM	Perry	1.75 in.	n/a	n/a	n/a	n/a	
10/4/1991	4:02 PM	Time^	1.75 in.	n/a	n/a	$250	$250	
4/19/1996	4:15 PM	Pittsfield^	2.75 in.	n/a	n/a	n/a	n/a	
5/27/1996	7:35 PM	East Hannibal	1.00 in.	n/a	n/a	n/a	n/a	
5/27/1996	7:45 PM	Perry^	1.75 in.	n/a	n/a	$10,000	n/a	A few cars were damaged by the hail.
4/13/1998	3:20 PM	Perry	1.00 in.	n/a	n/a	n/a	n/a	
5/12/1998	5:35 PM	Milton	1.75 in.	n/a	n/a	n/a	n/a	
6/4/1998	8:16 PM	Plesant Hill	1.75 in.	n/a	n/a	n/a	n/a	
5/17/1999	1:45 AM	Griggsville	1.00 in.	n/a	n/a	n/a	n/a	
4/16/2000	3:40 PM	Plesant Hill	1.25 in.	n/a	n/a	n/a	n/a	
5/26/2000	10:05 PM	Pittsfield	1.00 in.	n/a	n/a	n/a	n/a	
6/23/2000	4:40 PM	Barry^	1.75 in.	n/a	n/a	n/a	n/a	
9/20/2001	3:13 PM	Barry^	1.75 in.	n/a	n/a	n/a	n/a	
4/14/2002	12:04 PM	Nebo^	1.75 in.	n/a	n/a	n/a	n/a	
4/14/2002	12:30 PM	Pittsfield	2.75 in.	n/a	n/a	$25,000	n/a	Numerous vehicles were damaged.
5/1/2002	12:46 PM	New Canton^	1.75 in.	n/a	n/a	n/a	n/a	
5/10/2003	5:15 AM	Nebo^	1.00 in.	n/a	n/a	n/a	n/a	
5/23/2004	3:57 PM	Pittsfield	1.75 in.	n/a	n/a	n/a	n/a	
11/5/2005	8:00 PM	Pittsfield	1.00 in.	n/a	n/a	n/a	n/a	
3/11/2006	5:15 PM	Pittsfield	1.75 in.	n/a	n/a	n/a	n/a	
3/30/2006	10:55 PM	Barry^	1.75 in.	n/a	n/a	n/a	n/a	
4/2/2006	3:50 PM	Detroit	1.50 in.	n/a	n/a	n/a	n/a	

^ Hail event verified in the vicinity of this location(s).

Table 2
Severe Storms - Hail Events Reported in Pike County
1987 - 2022

Date(s)	Start Time	Location(s)	Magnitude Hail Stone Diameter (inches)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
7/13/2006	4:45 PM	Kinderhook	1.00 in.	n/a	n/a	n/a	n/a	
4/25/2008	3:35 PM	Barry^	1.00 in.	n/a	n/a	n/a	n/a	
5/30/2008	3:10 PM	Barry^	1.00 in.	n/a	n/a	n/a	n/a	
6/22/2008	4:17 PM	Griggsville	1.25 in.	n/a	n/a	n/a	n/a	
9/18/2010	5:20 PM	Hull	1.00 in.	n/a	n/a	n/a	n/a	
12/31/2010	10:57 AM	Time^	1.00 in.	n/a	n/a	n/a	n/a	
4/19/2011	4:15 AM	Pearl^	1.75 in.	n/a	n/a	n/a	n/a	Large hail broke a window on a house and the windshields on a couple of cars.
4/19/2011	3:55 PM	Nebo	1.25 in.	n/a	n/a	n/a	n/a	
4/19/2011	4:00 PM	Pearl^	1.75 in.	n/a	n/a	n/a	n/a	
5/11/2011	1:40 PM	Barry	1.25 in.	n/a	n/a	n/a	n/a	
5/11/2011	2:05 PM	Martinsburg	1.00 in.	n/a	n/a	n/a	n/a	
5/11/2011	2:12 PM	Pittsfield	2.00 in.	n/a	n/a	n/a	n/a	
6/10/2011	5:24 PM	Griggsville	1.50 in.	n/a	n/a	n/a	n/a	
6/10/2011	5:34 PM	Barry	1.75 in.	n/a	n/a	n/a	n/a	
4/25/2012	9:19 PM	Pittsfield Pittsfield Airport	1.00 in.	n/a	n/a	n/a	n/a	
5/21/2014	8:00 PM	Perry^	2.75 in.	n/a	n/a	n/a	n/a	
7/19/2018	8:03 PM	Pittsfield	1.75 in.	n/a	n/a	n/a	n/a	
12/1/2018	2:36 PM	Griggsville	1.00 in.	n/a	n/a	n/a	n/a	
6/1/2019	4:19 PM	Hull	1.00 in.	n/a	n/a	n/a	n/a	
6/1/2019	5:12 PM	Pleasant Hill	1.00 in.	n/a	n/a	n/a	n/a	
6/21/2019	9:59 AM	Pittsfield	1.00 in.	n/a	n/a	n/a	n/a	
6/3/2020	2:15 PM	Fishhook^	1.00 in.	n/a	n/a	n/a	n/a	
6/3/2020	2:35 PM	New Salem^ Pittsfield^	1.00 in.	n/a	n/a	n/a	n/a	

^ Hail event verified in the vicinity of this location(s).

Table 2
Severe Storms - Hail Events Reported in Pike County
1987 - 2022

Date(s)	Start Time	Location(s)	Magnitude Hail Stone Diameter (inches)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6/3/2020	3:20 PM	Summer Hill^ Atlas^	1.00 in.	n/a	n/a	n/a	n/a	
5/13/2022	5:30 PM	Hull Kinderhook Barry	1.00 in.	n/a	n/a	n/a	n/a	
GRAND TOTAL:				**0**	**0**	**$285,250**	**$250,250**	

Source: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

^ Hail event verified in the vicinity of this location(s).

Table 3
Severe Storms - Lightning Events Reported in Pike County
1998 - 2022

Date(s)	Start Time	Location(s)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5/22/1998	7:35 AM	Griggsville	2	n/a	n/a	n/a	A home sustained moderate damage from a fire started by a lightning strike. Two firemen suffered minor injuries fighting the fire when a ceiling collapsed.
10/1/2014	3:00 PM	Perry	n/a	n/a	$1,000,000	n/a	Lightning struck a historic church built in the 1880s and it caught fire and was a total loss.
GRAND TOTAL:			**2**	**0**	**$1,000,000**	**$0**	

Source: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

^ Lightning event verified in the vicinity of this location(s).

Table 4
Severe Storms - Heavy Rain Events Reported in Pike County
2000 - 2022

Date(s)	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
04/20/2000	1.58 in.	Pittsfield	n/a	n/a	n/a	n/a	
05/27/2000	3.34 in.	Griggsville Perry Pittsfield	n/a	n/a	n/a	n/a	
06/11/2000	2.69 in.	Pittsfield	n/a	n/a	n/a	n/a	
06/21/2000	2.30 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
07/29/2000	1.60 in.	Griggsville	n/a	n/a	n/a	n/a	
05/18/2001	1.64 in.	Pittsfield	n/a	n/a	n/a	n/a	
05/31/2001	1.80 in.	Perry Pittsfield Griggsville	n/a	n/a	n/a	n/a	
06/04/2001	1.73 in.	Pittsfield	n/a	n/a	n/a	n/a	
06/06/2001	3.00 in.	Griggsville Perry Pittsfield	n/a	n/a	n/a	n/a	
06/15/2001	1.66 in.	Pittsfield	n/a	n/a	n/a	n/a	
08/03/2001	1.64 in.	Perry	n/a	n/a	n/a	n/a	
08/23/2001	2.30 in.	Griggsville Perry Pittsfield	n/a	n/a	n/a	n/a	
09/19/2001	1.60 in.	Pittsfield	n/a	n/a	n/a	n/a	
01/31/2002	2.46 in.	Griggsville Perry Pittsfield	n/a	n/a	n/a	n/a	
04/21/2002	1.65 in.	Pittsfield	n/a	n/a	n/a	n/a	

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[1] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

Table 4 Severe Storms - Heavy Rain Events Reported in Pike County 2000 - 2022							
Date(s)	**Magnitude Rainfall (inches)**	**Observed Location(s)[1]**	**Injuries**	**Fatalities**	**Property Damages**	**Crop Damages**	**Impacts/Event Description**
04/25/2002	1.60 in.	Griggsville	n/a	n/a	n/a	n/a	
4/27/2002 thru 4/28/2002	2.41 in.	Pittsfield Griggsville Perry	n/a	n/a	n/a	n/a	
05/07/2002	2.60 in.	Griggsville Perry Pittsfield	n/a	n/a	n/a	n/a	
05/12/2002	1.84 in.	Griggsville	n/a	n/a	n/a	n/a	
06/12/2002	3.71 in.	Perry Griggsville Pittsfield	n/a	n/a	n/a	n/a	
07/11/2002	1.90 in.	Perry	n/a	n/a	n/a	n/a	
07/23/2002	1.99 in.	Perry	n/a	n/a	n/a	n/a	
08/19/2002	1.85 in.	Pittsfield	n/a	n/a	n/a	n/a	
08/20/2002	2.10 in.	Griggsville	n/a	n/a	n/a	n/a	
08/24/2002	1.95 in.	Griggsville Perry	n/a	n/a	n/a	n/a	
10/19/2002	1.50 in.	Perry	n/a	n/a	n/a	n/a	
12/18/2002	1.57 in.	Pittsfield	n/a	n/a	n/a	n/a	
03/21/2003	2.10 in.	Pittsfield Griggsville	n/a	n/a	n/a	n/a	
05/10/2003	1.63 in.	Pittsfield	n/a	n/a	n/a	n/a	
06/26/2003	2.00 in.	Pittsfield Perry Griggsville	n/a	n/a	n/a	n/a	
07/09/2003	1.73 in.	Perry	n/a	n/a	n/a	n/a	

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Table 4
Severe Storms - Heavy Rain Events Reported in Pike County
2000 - 2022

Date(s)	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
7/18/2003 thru 7/19/2003	2.50 in.	Pittsfield Griggsville Perry	n/a	n/a	n/a	n/a	
07/28/2003	1.72 in.	Perry Pittsfield	n/a	n/a	n/a	n/a	
09/01/2003	5.05 in.	Perry Pittsfield Griggsville	n/a	n/a	n/a	n/a	
09/22/2003	2.79 in.	Perry	n/a	n/a	n/a	n/a	
11/05/2003	1.58 in.	Perry	n/a	n/a	n/a	n/a	
12/10/2003	2.03 in.	Perry Griggsville Pittsfield	n/a	n/a	n/a	n/a	
03/05/2004	1.64 in.	Perry	n/a	n/a	n/a	n/a	
07/03/2004	1.59 in.	Pittsfield	n/a	n/a	n/a	n/a	
08/26/2004	4.00 in.	Griggsville Perry Pittsfield	n/a	n/a	n/a	n/a	
08/28/2004	1.63 in.	Perry	n/a	n/a	n/a	n/a	
10/31/2004	3.46 in.	Pittsfield	n/a	n/a	n/a	n/a	
11/1/2004 thru 11/2/2004	2.13 in.	Perry Griggsville	n/a	n/a	n/a	n/a	
1/12/2005 thru 1/13/2005	1.92 in.	Pittsfield Griggsville Perry	n/a	n/a	n/a	n/a	

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Table 4
Severe Storms - Heavy Rain Events Reported in Pike County
2000 - 2022

Date(s)	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
01/28/2005	2.00 in.	Pittsfield	n/a	n/a	n/a	n/a	
04/12/2005	1.65 in.	Perry Pittsfield	n/a	n/a	n/a	n/a	
09/14/2005	3.24 in.	Griggsville	n/a	n/a	n/a	n/a	
10/21/2005	1.68 in.	Griggsville	n/a	n/a	n/a	n/a	
03/12/2006	1.50 in.	Pittsfield	n/a	n/a	n/a	n/a	
06/01/2006	1.78 in.	Perry	n/a	n/a	n/a	n/a	
07/13/2006	2.65 in.	Griggsville	n/a	n/a	n/a	n/a	
08/08/2006	2.50 in.	Griggsville Perry Pittsfield	n/a	n/a	n/a	n/a	
08/19/2006	1.55 in.	Pittsfield	n/a	n/a	n/a	n/a	
09/12/2006	2.79 in.	Perry Griggsville Pittsfield	n/a	n/a	n/a	n/a	
11/30/2006	1.58 in.	Pittsfield	n/a	n/a	n/a	n/a	
08/17/2007	1.61 in.	Pittsfield	n/a	n/a	n/a	n/a	
10/03/2007	2.07 in.	Perry	n/a	n/a	n/a	n/a	
12/11/2007	1.55 in.	Perry	n/a	n/a	n/a	n/a	
01/08/2008	3.22 in.	Pittsfield Griggsville Perry	n/a	n/a	n/a	n/a	
02/06/2008	1.53 in.	Griggsville	n/a	n/a	n/a	n/a	
02/17/2008	1.72 in.	Perry Pittsfield	n/a	n/a	n/a	n/a	
05/11/2008	1.63 in.	Pittsfield	n/a	n/a	n/a	n/a	

[1] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

Table 4
Severe Storms - Heavy Rain Events Reported in Pike County
2000 - 2022

Date(s)	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
05/31/2008	1.65 in.	Griggsville	n/a	n/a	n/a	n/a	
6/3/2008 thru 6/4/2008	4.75 in.	Griggsville Pittsfield Perry	n/a	n/a	n/a	n/a	
06/26/2008	1.72 in.	Pittsfield	n/a	n/a	n/a	n/a	
07/03/2008	1.67 in.	Pittsfield	n/a	n/a	n/a	n/a	
07/09/2008	1.88 in.	Griggsville	n/a	n/a	n/a	n/a	
07/09/2008	1.61 in.	Pittsfield	n/a	n/a	n/a	n/a	
08/29/2008	1.97 in.	Griggsville	n/a	n/a	n/a	n/a	
9/4/2008 thru 9/5/2008	4.62 in.	Perry Pittsfield Griggsville	n/a	n/a	n/a	n/a	
09/14/2008	4.42 in.	Perry Griggsville Pittsfield	n/a	n/a	n/a	n/a	
03/29/2009	1.90 in.	Perry Griggsville	n/a	n/a	n/a	n/a	
04/28/2009	1.92 in.	Perry Pittsfield Griggsville	n/a	n/a	n/a	n/a	
05/14/2009	1.70 in.	Griggsville Pittsfield	n/a	n/a	n/a	n/a	
08/17/2009	2.06 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
10/09/2009	2.34 in.	Griggsville Pittsfield	n/a	n/a	n/a	n/a	

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Table 4
Severe Storms - Heavy Rain Events Reported in Pike County
2000 - 2022

Date(s)	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
10/23/2009	1.54 in.	Pittsfield	n/a	n/a	n/a	n/a	
10/30/2009	3.35 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
11/16/2009 thru 11/17/2009	4.38 in.	Perry Pittsfield	n/a	n/a	n/a	n/a	
04/25/2010	1.76 in.	Perry	n/a	n/a	n/a	n/a	
05/11/2010	2.41 in.	Perry Pittsfield	n/a	n/a	n/a	n/a	
06/09/2010	2.21 in.	Perry Griggsville	n/a	n/a	n/a	n/a	
06/19/2010	2.09 in.	Perry Griggsville	n/a	n/a	n/a	n/a	
06/21/2010	1.60 in.	Perry	n/a	n/a	n/a	n/a	
06/28/2010	1.65 in.	Griggsville	n/a	n/a	n/a	n/a	
07/08/2010	1.82 in.	Pittsfield Perry Griggsville	n/a	n/a	n/a	n/a	
7/20/2010 thru 7/21/2010	5.16 in.	Pittsfield	n/a	n/a	n/a	n/a	
07/25/2010	3.90 in.	Perry Griggsville	n/a	n/a	n/a	n/a	
07/29/2010	2.55 in.	Griggsville	n/a	n/a	n/a	n/a	
08/14/2010	1.87 in.	Pittsfield Griggsville	n/a	n/a	n/a	n/a	

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Table 4
Severe Storms - Heavy Rain Events Reported in Pike County
2000 - 2022

Date(s)	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
09/01/2010	1.76 in.	Griggsville	n/a	n/a	n/a	n/a	
09/11/2010	1.95 in.	Pittsfield	n/a	n/a	n/a	n/a	
09/19/2010	1.78 in.	Pittsfield	n/a	n/a	n/a	n/a	
12/31/2010	1.65 in.	Pittsfield	n/a	n/a	n/a	n/a	
12/31/2010	1.61 in.	Griggsville	n/a	n/a	n/a	n/a	
05/12/2011	1.70 in.	Griggsville	n/a	n/a	n/a	n/a	
06/02/2011	1.50 in.	Perry	n/a	n/a	n/a	n/a	
06/14/2011	3.81 in.	Perry Pittsfield Griggsville	n/a	n/a	n/a	n/a	
6/26/2011 thru 6/27/2011	2.62 in.	Perry Griggsville Pittsfield	n/a	n/a	n/a	n/a	
12/14/2011 thru 12/15/2011	2.69 in.	Perry	n/a	n/a	n/a	n/a	
04/30/2012	2.38 in.	Griggsville	n/a	n/a	n/a	n/a	
08/03/2012	1.98 in.	Pittsfield	n/a	n/a	n/a	n/a	
09/01/2012	4.00 in.	Perry Griggsville Pittsfield	n/a	n/a	n/a	n/a	
09/25/2012	2.24 in.	Perry Griggsville	n/a	n/a	n/a	n/a	
10/14/2012	2.86 in.	Griggsville Pittsfield Perry	n/a	n/a	n/a	n/a	

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Table 4
Severe Storms - Heavy Rain Events Reported in Pike County
2000 - 2022

Date(s)	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
01/30/2013	1.91 in.	Pittsfield Griggsville Perry	n/a	n/a	n/a	n/a	
04/11/2013	1.91 in.	Perry Griggsville Pittsfield	n/a	n/a	n/a	n/a	
05/04/2013	2.00 in.	Griggsville Perry Pittsfield	n/a	n/a	n/a	n/a	
06/16/2013	1.80 in.	Pittsfield Griggsville	n/a	n/a	n/a	n/a	
7/30/2013 thru 7/31/2013	1.89 in.	Perry Griggsville Pittsfield	n/a	n/a	n/a	n/a	
9/8/2013 thru 9/9/2013	2.35 in.	Pittsfield Griggsville Perry	n/a	n/a	n/a	n/a	
04/03/2014	2.44 in.	Griggsville Pittsfield Perry	n/a	n/a	n/a	n/a	
06/04/2014	2.60 in.	Griggsville Perry Pittsfield	n/a	n/a	n/a	n/a	
07/08/2014	1.68 in.	Griggsville Pittsfield	n/a	n/a	n/a	n/a	
08/02/2014	1.51 in.	Pittsfield	n/a	n/a	n/a	n/a	

[1] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

Table 4
Severe Storms - Heavy Rain Events Reported in Pike County
2000 - 2022

Date(s)	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
08/08/2014	2.75 in.	Pittsfield	n/a	n/a	n/a	n/a	
08/17/2014	2.53 in.	Pittsfield	n/a	n/a	n/a	n/a	
9/10/2014 thru 9/11/2014	5.50 in.	Griggsville Perry Pittsfield	n/a	n/a	n/a	n/a	
10/2/2014 thru 10/3/2014	3.44 in.	Pittsfield Griggsville	n/a	n/a	n/a	n/a	
06/16/2015	1.81 in.	Perry	n/a	n/a	n/a	n/a	
06/21/2015	2.58 in.	Perry Pittsfield	n/a	n/a	n/a	n/a	
06/25/2015	2.90 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
07/09/2015	2.18 in.	Perry Pittsfield	n/a	n/a	n/a	n/a	
07/19/2015	2.96 in.	Perry	n/a	n/a	n/a	n/a	
07/26/2015	1.55 in.	Perry	n/a	n/a	n/a	n/a	
11/18/2015	1.83 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
12/14/2015	1.55 in.	Perry	n/a	n/a	n/a	n/a	
12/27/2015 thru 12/29/20215	457.00 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
07/03/2016	1.93 in.	Pittsfield	n/a	n/a	n/a	n/a	
04/30/2017	4.31 in.	Pittsfield	n/a	n/a	n/a	n/a	

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Table 4
Severe Storms - Heavy Rain Events Reported in Pike County
2000 - 2022

Date(s)	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
04/30/2017	3.50 in.	Perry	n/a	n/a	n/a	n/a	
5/19/2017 thru 5/20/2017	5.79 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
06/15/2017	2.08 in.	Perry Pittsfield	n/a	n/a	n/a	n/a	
07/28/2017	1.88 in.	Perry	n/a	n/a	n/a	n/a	
01/22/2018	1.52 in.	Pittsfield	n/a	n/a	n/a	n/a	
02/21/2018	1.92 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
03/27/2018	1.70 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
07/30/2018	1.94 in.	Pittsfield	n/a	n/a	n/a	n/a	
10/08/2018	2.25 in.	Pittsfield	n/a	n/a	n/a	n/a	
05/01/2019	1.70 in.	Pittsfield	n/a	n/a	n/a	n/a	
06/22/2019	1.60 in.	Pittsfield	n/a	n/a	n/a	n/a	
08/21/2019	2.59 in.	Pittsfield	n/a	n/a	n/a	n/a	
01/11/2020	2.09 in.	Pittsfield	n/a	n/a	n/a	n/a	
6/29/2020 thru 6/30/2020	3.67 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
07/22/2020	1.67 in.	Pittsfield	n/a	n/a	n/a	n/a	
09/12/2020	1.50 in.	Perry	n/a	n/a	n/a	n/a	
03/18/2021	3.30 in.	Perry Pittsfield	n/a	n/a	n/a	n/a	
05/17/2021	1.66 in.	Pittsfield	n/a	n/a	n/a	n/a	

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Table 4
Severe Storms - Heavy Rain Events Reported in Pike County
2000 - 2022

Date(s)	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6/25/2021 thru 6/26/2021	4.15 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
06/29/2021	1.98 in.	Perry	n/a	n/a	n/a	n/a	
07/01/2021	1.59 in.	Perry	n/a	n/a	n/a	n/a	
07/10/2021	2.30 in.	Perry Pittsfield	n/a	n/a	n/a	n/a	
07/16/2021	3.08 in.	Perry	n/a	n/a	n/a	n/a	
10/03/2021	2.02 in.	Perry	n/a	n/a	n/a	n/a	
10/08/2021	3.22 in.	Perry	n/a	n/a	n/a	n/a	
10/24/2021 thru 10/25/2021	5.12 in.	Perry	n/a	n/a	n/a	n/a	
03/31/2022	1.80 in.	Pittsfield Perry	n/a	n/a	n/a	n/a	
06/01/2022	1.50 in.	Pittsfield	n/a	n/a	n/a	n/a	
07/08/2022	2.50 in.	Perry	n/a	n/a	n/a	n/a	
07/26/2022	2.65 in.	Pittsfield	n/a	n/a	n/a	n/a	
09/19/2022	1.80 in.	Perry	n/a	n/a	n/a	n/a	
10/26/2022	1.54 in.	Pittsfield	n/a	n/a	n/a	n/a	
GRAND TOTAL:			**0**	**0**	**$ -**	**$ -**	

Sources: Midwestern Regional Climate Center, cli-MATE.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

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[1] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

Table 5
General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
04/07/1965 thru 05/17/1965	n/a	Mississippi River, Illinois River	western & eastern portion of county	24.59 ft. 05/01/1965	17.62 ft. 04/18/1965				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #194)***
09/23/1965 thru 09/29/1964	n/a	Mississippi River	western portion of county	19.90 ft. 09/25/1965	---				n/a	n/a	n/a	n/a	
5/25/1966	n/a	Illinois River	eastern portion of county	---	17.93 ft. 05/25/1966				n/a	n/a	n/a	n/a	
04/14/1967 thru 04/25/1967	n/a	Mississippi River	western portion of county	19.70 ft. 04/17/1967	---				n/a	n/a	n/a	n/a	
2/11/1968	n/a	Illinois River	eastern portion of county	---	18.23 ft. 02/11/1968				n/a	n/a	n/a	n/a	
2/9/1969	n/a	Illinois River	eastern portion of county	---	17.62 ft. 02/09/1969				n/a	n/a	n/a	n/a	
04/18/1969 thru 05/12/1969	n/a	Mississippi River	western portion of county	20.50 ft. 05/01/1969	---				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #262)***

[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

[2] Moderate flood stage at Valley City gauge location is 21.0 feet and major flood stage is 23.0 feet.

[3] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 5
General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
07/07/1969 thru 07/25/1969	n/a	Mississippi River	western portion of county	22.50 ft. 07/11/1969	---				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #276)***
5/22/1970	n/a	Illinois River	eastern portion of county	---	22.57 ft. 05/22/1970				n/a	n/a	n/a	n/a	
09/24/1970 thru 10/01/1970	n/a	Mississippi River, Illinois River	western & eastern portion of county	18.60 ft. 09/25/1970	17.43 ft. 10/01/1970				n/a	n/a	n/a	n/a	
02/26/1971 thru 03/02/1971	n/a	Mississippi River	western portion of county	17.50 ft. 02/27/1971	---				n/a	n/a	n/a	n/a	
03/10/1973 thru 06/13/1973	n/a	Mississippi River	western portion of county	28.59 ft. 04/25/1973 4th highest crest on record	---				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #373)***
05/18/1974 thru 06/04/1974	n/a	Mississippi River	western portion of county	23.28 ft. 05/22/1974	---				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #438)***

[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

[2] Moderate flood stage at Valley City gauge location is 21.0 feet and major flood stage is 23.0 feet.

[3] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 5
General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
06/09/1974 thru 07/05/1974	n/a	Mississippi River, Illinois River	western & eastern portion of county	21.33 ft. 06/28/1974	24.84 ft. 06/29/1974				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #438)***
3/4/1975	n/a	Illinois River	western & eastern portion of county	---	16.46 ft. 03/04/1975				n/a	n/a	n/a	n/a	
03/26/1975 thru 03/28/1975	n/a	Mississippi River	western portion of county	19.00 ft. 03/27/1975	---				n/a	n/a	n/a	n/a	
05/05/1975 thru 05/22/1975	n/a	Mississippi River	western portion of county	21.00 ft. 05/10/1975	---				n/a	n/a	n/a	n/a	
3/13/1976	n/a	Illinois River	eastern portion of county	---	20.63 ft. 03/13/1976				n/a	n/a	n/a	n/a	
04/25/1976 thru 05/03/1976	n/a	Mississippi River	western portion of county	22.40 ft. 04/27/1976	---				n/a	n/a	n/a	n/a	

[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

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[3] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 5
General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
04/20/1978 thru 04/25/1978	n/a	Mississippi River	western portion of county	17.10 ft. 04/21/1978	---				n/a	n/a	n/a	n/a	
5/20/1978	n/a	Illinois River	eastern portion of county	---	19.85 ft. 05/20/1978				n/a	n/a	n/a	n/a	
02/28/1979 thru 03/01/1979	n/a	Mississippi River	western portion of county	18.60 ft. 02/28/1979	---				n/a	n/a	n/a	n/a	
03/07/1979 thru 03/08/1979	n/a	Mississippi River	western portion of county	18.60 ft. 03/07/1979	---				n/a	n/a	n/a	n/a	
03/22/1979 thru 05/20/1979	n/a	Mississippi River, Illinois River	western & eastern portion of county	23.00 ft. 04/13/1979	25.20 ft. 04/19/1979				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #583)***
5/24/1981	n/a	Illinois River	eastern portion of county	---	20.95 ft. 05/24/1981				n/a	n/a	n/a	n/a	

---

[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

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[3] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 5
General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
3/24/1982	n/a	Illinois River	eastern portion of county	---	25.56 ft. 03/24/1982 10th highest crest on record				n/a	n/a	n/a	n/a	
04/17/1982 thru 05/04/1982	n/a	Mississippi River	western portion of county	20.60 ft. 04/19/1982	`				n/a	n/a	n/a	n/a	
07/19/1982 thru 07/23/1982	n/a	Mississippi River	western portion of county	18.30 ft. 07/21/1982	---				n/a	n/a	n/a	n/a	
12/03/1982 thru 12/09/1982	n/a	Mississippi River	western portion of county	20.00 ft. 12/04/1982	---				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #674)***
03/17/1983 thru 05/04/1983	n/a	Mississippi River	western portion of county	23.90 ft. 04/05/1983	---				n/a	n/a	n/a	n/a	

---

[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

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[3] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 5
General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
05/04/1984 thru 05/16/1984	n/a	Mississippi River	western portion of county	18.00 ft. 05/05/1984	---				n/a	n/a	n/a	n/a	
06/26/1984 thru 07/06/1984	n/a	Mississippi River	western portion of county	18.60 ft. 06/30/1984	---				n/a	n/a	n/a	n/a	
02/23/1985 thru 03/11/1985	n/a	Mississippi River, Illinois River	western & eastern portion of county	23.10 ft. 03/05/1985	25.60 ft. 03/11/1985 8th highest crest on record				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #735)***
11/27/1985	n/a	Illinois River	eastern portion of county	---	24.85 ft. 11/27/1985				n/a	n/a	n/a	n/a	
05/18/1986 thru 06/04/1986	n/a	Mississippi River	western portion of county	22.30 ft. 05/20/1986	---				n/a	n/a	n/a	n/a	
07/11/1986 thru 07/15/1986	n/a	Mississippi River	western portion of county	17.70 ft. 07/14/1986	---				n/a	n/a	n/a	n/a	

[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

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General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
09/26/1986 thru 10/28/1986	n/a	Mississippi River, Illinois River	western & eastern portion of county	25.30 ft. 10/04/1986 9th highest crest on record	21.60 ft. 10/11/1986				n/a	n/a	n/a	n/a	
6/27/1990	n/a	Illinois River	eastern portion of county	---	18.90 ft. 06/27/1990				n/a	n/a	n/a	n/a	
06/19/1990 thru 07/07/1990	n/a	Mississippi River	western portion of county	22.25 ft. 06/23/1990	---				n/a	n/a	n/a	n/a	
05/25/1991 thru 06/22/1991	n/a	Mississippi River	western portion of county	18.72 ft. 05/26/1991	---				n/a	n/a	n/a	n/a	
04/28/1992 thru 05/05/1992	n/a	Mississippi River	western portion of county	18.21 ft. 05/02/1992	---				n/a	n/a	n/a	n/a	
03/04/1993 thru 03/06/1993	n/a	Mississippi River	western portion of county	19.53 ft. 03/05/1993	---				n/a	n/a	n/a	n/a	

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General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
03/30/1993 thru 09/17/1993	n/a	Mississippi River, Illinois River	western & eastern portion of county	31.80 ft. 07/16/1993 Flood of Record	25.95 ft. 07/27/1993 6th highest crest on record				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #997)***
4/22/1994	n/a	Illinois River	eastern portion of county	---	17.46 ft. 04/22/1994				n/a	n/a	n/a	n/a	
04/11/1995 thru 04/14/1995	n/a	Mississippi River	western portion of county	18.16 ft. 04/13/1995	---				n/a	n/a	n/a	n/a	
04/30/1995 thru 06/01/1995	n/a	Mississippi River, Illinois River	western & eastern portion of county	21.90 ft. 05/26/1995	26.56 ft. 05/30/1995 5th highest crest on record				n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #1053)***
05/06/1996 thru 05/18/1996	n/a	Mississippi River	western portion of county	22.63 ft. 05/12/1996	---				n/a	n/a	n/a	n/a	

---

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Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
05/26/1996 thru 06/09/1996	n/a	Mississippi River, Illinois River	western & eastern portion of county	24.41 ft. 05/29/1996	21.45 ft. 06/07/1996				n/a	n/a	n/a	n/a	
02/22/1997 thru 03/06/1997	n/a	Mississippi River, Illinois River	western & eastern portion of county	19.10 ft. 02/27/1997	21.07 ft. 03/06/1997				n/a	n/a	n/a	n/a	
04/12/1997 thru 05/06/1997	n/a	Mississippi River	western portion of county	20.80 ft. 04/22/1997	---				n/a	n/a	n/a	n/a	
03/30/1998 thru 04/29/1998	n/a	Mississippi River	western portion of county	23.48 ft. 04/15/1998	---				n/a	n/a	n/a	n/a	
5/17/1998	n/a	Illinois River	eastern portion of county	---	19.27 ft. 05/17/1998				n/a	n/a	n/a	n/a	

[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

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Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
07/01/1998 thru 07/17/1998	n/a	Mississippi River	western portion of county	19.64 ft. 07/09/1998	---				n/a	n/a	n/a	n/a	
04/17/1999 thru 05/07/1999	n/a	Mississippi River, Illinois River	western & eastern portion of county	20.03 ft. 04/30/1999	17.55 ft. 05/03/1999				n/a	n/a	n/a	n/a	
05/19/1999 thru 06/08/1999	n/a	Mississippi River	western portion of county	18.80 ft. 05/29/1999	---				n/a	n/a	n/a	n/a	
06/18/2000 thru 06/20/2000	n/a	Mississippi River	western portion of county	17.28 ft. 06/19/2000	---				n/a	n/a	n/a	n/a	
06/26/2000 thru 06/29/2000	n/a	Mississippi River	western portion of county	18.62 ft. 06/27/2000	---				n/a	n/a	n/a	n/a	

[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

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1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
3/2/2001	n/a	Illinois River	eastern portion of county	---	18.49 ft. 03/02/2001				n/a	n/a	n/a	n/a	
04/16/2001 thru 06/12/2001	n/a	Mississippi River	western portion of county	26.91 ft. 05/16/2001 6th higest crest on record	---				n/a	n/a	$263,885	n/a	***This event is part of a federally-declared disaster (Declaration #1368)*** Floodig was mainly limited to natural floodplain and agricultural lowland. Public Assistance figures for Pike County totaled $263,885.

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[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

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General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
02/13/2002 thru 05/19/2002	n/a	Mississippi River, Illinois River	western & eastern portion of county	21.41 05/13/2002	25.56 ft. 05/19/2002 9th highest crest on record				n/a	n/a	$362,245	n/a	***This event is part of a federally-declared disaster (Declaration #1416)*** Numerous roads along the Illinois River were closed for almost the entire month of May. However, damage was primarily limited to farmlanda nd club houses along the river. Public Assistance figures for Pike County totaled $362,245.
06/13/2002 thru 06/16/2002	n/a	Mississippi River	western portion of county	19.17 ft. 06/14/2002	---				n/a	n/a	n/a	n/a	
05/28/2004 thru 07/01/2004	n/a	Mississippi River	western portion of county	21.07 06/04/2004	---				n/a	n/a	n/a	n/a	

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1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
1/2/2005	n/a	Illinois River	eastern portion of county	---	21.30 ft. 01/02/2005				n/a	n/a	n/a	n/a	
04/04/2007 thru 04/18/2007	n/a	Mississippi River, Illinois River	western & eastern portion of county	18.16 ft. 04/14/2007	17.39 ft. 04/04/2007				n/a	n/a	n/a	n/a	
08/25/2007 thru 08/31/2007	11:30 PM	Mississippi River	western portion of county	18.55 ft. 08/27/2007	---				n/a	n/a	n/a	n/a	
01/16/2008 thru 01/25/2008	10:30 PM	Illinois River	eastern portion of county	---	15.27 ft. 01/20/2008				n/a	n/a	n/a	n/a	
02/10/2008 thru 03/12/2008	8:30 AM	Illinois River	eastern portion of county	---	17.57 ft. 02/23/2008				n/a	n/a	n/a	n/a	
04/10/2008 thru 05/23/2008	n/a	Mississippi River, Illinois River	western & eastern portion of county	23.26 ft. 05/05/2008	14.81 ft. 04/16/2008				n/a	n/a	n/a	n/a	

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[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

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General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
06/03/2008 thru 07/12/2008	9:00 AM	Mississippi River, Illinois River	western & eastern portion of county	29.54 ft. 06/18/2008 3rd highest crest on record	19.19 ft. 06/28/2008				n/a	n/a	$2,106,935	$18,000,000	***This event is part of a federally-declared disaster (Declaration #1771)*** While the Sny Island L&DD held firm, there was some seepage of water under the levee system causing many of the drainage ditches to overflow and flood fields. Public Assistance figures for Pike County totaled $2,106,935.

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1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
9/14/2008	2:00 AM	area rivers, streams & creeks	countywide	---	---				n/a	n/a	n/a	n/a	Three to five inches of rain fell onto already saturated soils causing flooding due to the remnants of Hurricane Ike. Numerous roads were flooded countywide, especially in the Hull, Nebo, Pleasant Hill, Perry and Pittsfield areas.
09/14/2008 thru 10/08/2008	2:30 PM	Mississippi River, Illinois River	western & eastern portion of county	18.83 ft. 09/15/2008	21.20 ft. 09/25/2008				n/a	n/a	n/a	n/a	
12/31/2008 thru 01/16/2009	3:30 PM	Illinois River	eastern portion of county	---	18.56 ft. 01/06/2009				n/a	n/a	n/a	n/a	
03/10/2009 thru 06/14/2009	10:30 PM	Illinois River	eastern portion of county	---	24.00 ft. 05/22/2009				n/a	n/a	n/a	n/a	

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[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

[2] Moderate flood stage at Valley City gauge location is 21.0 feet and major flood stage is 23.0 feet.

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Table 5
General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
03/10/2009 thru 03/17/2009	n/a	Mississippi River	western portion of county	22.15 ft. 03/12/2009	---				n/a	n/a	n/a	n/a	
05/01/2009 thru 05/06/2009	n/a	Mississippi River	western portion of county	19.23 ft. 05/02/2009	---				n/a	n/a	n/a	n/a	
05/16/2009 thru 05/20/2009	n/a	Mississippi River	western portion of county	21.09 ft. 05/17/2009	---				n/a	n/a	n/a	n/a	
10/30/2009 thru 12/04/2009	1:00 AM	Mississippi River, Illinois River	western & eastern portion of county	19.78 11/01/2009	19.97 ft. 11/06/2009				n/a	n/a	n/a	n/a	
12/25/2009 thru 01/08/2010	9:00 PM	Illinois River	eastern portion of county	---	17.68 ft. 01/01/2010				n/a	n/a	n/a	n/a	

[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

[2] Moderate flood stage at Valley City gauge location is 21.0 feet and major flood stage is 23.0 feet.

[3] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 5
General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
01/26/2010 thru 02/05/2010	5:30 PM	Illinois River	eastern portion of county	---	15.28 ft. 01/30/2010				n/a	n/a	n/a	n/a	
03/13/2010 thru 04/16/2010	n/a	Mississippi River, Illinois River	western & eastern portion of county	20.15 ft. 03/16/2010	17.48 ft. 03/22/2010				n/a	n/a	n/a	n/a	
04/26/2010 thru 04/28/2010	n/a	Mississippi River	western portion of county	18.64 ft. 04/27/2010	---				n/a	n/a	n/a	n/a	

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General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
05/14/2010 thru 08/26/2010	n/a	Mississippi River, Illinois River	western & eastern portion of county	22.59 ft. 06/24/2010	22.86 ft. 06/29/2010				n/a	n/a	$1,389,888		***This event is part of a federally-declared disaster (Declaration #1935)*** Some roads near the Mississippi River were closed and some lowland farm fields flooded. Public Assistance figures for Pike County totaled $1,389,888.
10/05/2010 thru 10/13/2010	n/a	Mississippi River	western portion of county	18.27 ft. 10/09/2010	---				n/a	n/a	n/a	n/a	
02/28/2011 thru 03/21/2011	4:00 AM	Illinois River	eastern portion of county	---	16.20 ft. 03/10/2011				n/a	n/a	n/a	n/a	

[1] Moderate flood stage at Hannibal gauge location is 22.0 feet and major flood stage is 24.0 feet.

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[3] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

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1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
04/01/2011 thru 05/23/2011		Mississippi River, Illinois River	western & eastern portion of county	23.17 04/24/2011	20.07 ft. 05/04/2011				n/a	n/a	n/a	n/a	
05/25/2011 thru 07/10/2011	n/a	Mississippi River, Illinois River	western portion of county	23.59 ft. 06/17/2011	20.94 ft. 06/28/2011				n/a	n/a	n/a	n/a	
03/12/2013 thru 03/15/2013	n/a	Mississippi River	western portion of county	18.14 ft. 03/13/2013	---				n/a	n/a	n/a	n/a	
04/12/2013 thru 07/13/2013	7:15 AM	Mississippi River, Illinois River	western & eastern portion of county	27.63 04/21/2013 5th higest crest on record	26.63 ft. 04/27/2013 4th highest crest on record				n/a	n/a	$182,911	$70,000	***This event is part of a federally-declared disaster (Declaration #4116)*** Damage along the Mississippi River was limited to some flooded roads and farm fields. Public Assistance figures for Pike County totaled $169,911.

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General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
05/13/2014 thru 05/27/2014	n/a	Mississippi River	western portion of county	18.57 ft. 05/16/2014	---				n/a	n/a	n/a	n/a	
06/24/2014 thru 07/21/2014	n/a	Mississippi River, Illinois River	western & eastern portion of county	26.68 ft. 07/08/2014 7th highest crest on record	15.73 ft. 07/12/2014				n/a	n/a	n/a	n/a	
09/11/2014 thru 09/13/2014	n/a	Mississippi River	western portion of county	19.36 09/12/2014	---				n/a	n/a	n/a	n/a	
06/14/2015 thru 08/05/2015	2:00 PM	Mississippi River, Illinois River	western & eastern portion of county	23.67 ft. 06/28/2015	26.85 ft. 07/02/2015 3rd highest crest on record				n/a	n/a	n/a	n/a	
11/29/2015 thru 12/03/2015	n/a	Mississippi River	western portion of county	17.62 ft. 12/02/2015	---				n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
12/16/2015 thru 01/25/2016	n/a	Mississippi River, Illinois River	western & eastern portion of county	22.16 ft. 12/29/2015	25.72 ft. 01/05/2016 7th highest crest on record				n/a	n/a	n/a	n/a	
09/29/2016 thru 10/11/2016	n/a	Mississippi River	western portion of county	19.80 ft. 10/07/2016	---				n/a	n/a	n/a	n/a	
04/07/2017 thru 04/24/2017	n/a	Mississippi River, Illinois River	western & eastern portion of county	18.41 ft. 04/07/2017	16.42 ft. 04/13/2017				n/a	n/a	n/a	n/a	
04/29/2017 thru 06/09/2017	n/a	Mississippi River, Illinois River	western portion of county	20.33 05/03/2017	22.36 ft. 05/07/2017				n/a	n/a	n/a	n/a	
02/28/2018 thru 03/17/2018	11:00 PM	Illinois River	eastern portion of county	---	17.62 ft. 03/07/2018				n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
05/08/2018 thru 05/24/2018	n/a	Mississippi River	western portion of county	19.93 05/16/2018	---				n/a	n/a	n/a	n/a	
06/27/2018 thru 07/12/2018	n/a	Mississippi River	western portion of county	19.44 ft. 07/06/2018	---				n/a	n/a	n/a	n/a	
09/07/2018 thru 09/20/2018	n/a	Mississippi River	western portion of county	20.61 ft. 09/09/2018	---				n/a	n/a	n/a	n/a	
10/01/2018 thru 11/07/2018	n/a	Mississippi River	western portion of county	24.80 ft. 10/12/2018 10th highest crest on record	---				n/a	n/a	n/a	n/a	
02/11/2019 thru 03/05/2019	8:00 AM	Illinois River	eastern portion of county	---	15.71 ft. 02/18/2019				n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
03/09/2019 thru 07/18/2019	11:00 PM	Mississippi River, Illinois River	western & eastern portion of county	30.16 ft. 06/02/2019 2nd highest crest on record	26.99 ft. 06/04/2019 2nd highest crest on record				n/a	n/a	$1,529,308	n/a	***This event is part of a federally-declared disaster (Declaration #4461)*** Public Assistance figures for Pike County totaled $1,529,308.
09/29/2019 thru 11/07/2019	n/a	Mississippi River	western portion of county	20.82 ft. 10/17/2019	---				n/a	n/a	n/a	n/a	
01/17/2020 thru 01/30/2020	7:00 PM	Illinois River	eastern portion of county	---	15.68 ft. 01/22/2020				n/a	n/a	n/a	n/a	
03/20/2020 thru 04/26/2020	n/a	Mississippi River, Illinois River	western & eastern portion of county	20.34 ft. 04/02/2020	15.03 ft. 04/01/2020				n/a	n/a	n/a	n/a	
04/28/2020 thru 06/14/2020	3:00 PM	Mississippi River, Illinois River	western & eastern portion of county	18.79 ft. 06/11/2020	23.15 ft. 05/27/2020				n/a	n/a	n/a	n/a	

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General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
06/30/2020 thru 07/03/2020	n/a	Mississippi River	western portion of county	18.15 ft. 07/02/2020	---				n/a	n/a	n/a	n/a	
03/18/2021 thru 03/20/2021	n/a	Mississippi River	western portion of county	18.35 ft. 03/19/2021	---				n/a	n/a	n/a	n/a	
04/11/2021 thru 04/14/2021	n/a	Mississippi River	western portion of county	19.03 ft. 04/12/2021	---				n/a	n/a	n/a	n/a	
05/21/2021 thru 05/26/2021	8:30 AM	Illinois River	eastern portion of county	---	14.41 ft. 05/25/2021				n/a	n/a	n/a	n/a	
07/01/2021 thru 07/24/2021	9:30 AM	Illinois River	eastern portion of county	---	16.10 ft. 07/10/2021				n/a	n/a	n/a	n/a	

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General Flood Events Reported in Pike County
1965 - 2022

Date(s)	Start Time	Water Body	Location(s)	Magnitude		Impacts[3]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Flood Crest Mississippi River Hannibal[1]	Flood Crest Illinois River Valley City[2]	Home	Business	Infra-structure					
04/04/2022 thru 04/19/2022	11:00 AM	Illinois River	eastern portion of county	---	15.30 ft. 04/11/2022				n/a	n/a	n/a	n/a	
04/27/2022 thru 04/30/2022	n/a	Mississippi River	western portion of county	17.35 ft. 04/28/2022	---				n/a	n/a	n/a	n/a	
GRAND TOTAL:									**0**	**0**	**$5,835,172**	**$18,070,000**	

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Data.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.
NOAA, National Weather Service, River Observations, North Central River Forecast Center, Illinois River at Valley City.
NOAA, National Weather Service, River Observations, North Central River Forecast Center, Mississippi River at Hannibal.
United States Army Corps of Engineers, RiverGages.com, Data Mining.

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[2] Moderate flood stage at Valley City gauge location is 21.0 feet and major flood stage is 23.0 feet.

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Table 6
Flash Flood Events Reported in Pike County
2002 - 2022

Date(s)	Start Time	Location(s)	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
6/12/2002	12:35 AM	countywide				n/a	n/a	n/a	n/a	
5/10/2003	5:15 AM	southern portion of county	X		X	n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #1469)*** Heavy rain caused flash flooding across the south portion of Pike County. Highway 100 was closed in several locations due to high water. The town of Pearl, in extreme southeast Pike County, suffered flood damage as Hill Creek rose out of its banks. At least 9 homes were flooded by 2 to 3 feet of water. Buck Branch Creek south of Nebo washed out 3 bridges serving private residences.
5/27/2004	5:00 PM	countywide			X	n/a	n/a	n/a	n/a	Another day of 2 to 3 inches of rain caused flash flooding across the area. Many rural county roads were damaged by the rushing water. Standing water at least a foot deep was reported on Highway 108 and 67.
8/25/2004	1:30 PM	countywide			X	n/a	n/a	n/a	n/a	Rainfall up to 5 inches caused flash flooding across west central Illinois. Numerous county roads were flooded and damaged by the runoff.
8/27/2004	8:46 AM	countywide				n/a	n/a	n/a	n/a	Flooding reported in the Kinderhook area.
09/11/2006 thru 09/12/2006	7:25 PM	countywide				n/a	n/a	n/a	n/a	
5/25/2008	9:48 AM	western portion of county				n/a	n/a	n/a	n/a	

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^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 6
Flash Flood Events Reported in Pike County
2002 - 2022

Date(s)	Start Time	Location(s)	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
6/3/2008	7:00 AM	northern portion of county			X	1	n/a	$ 20,000	n/a	Up to 6 inches of rain fell in a short amount of time over northern Pike County. Numerous secondary roads had water over them. Around 810 am, an eastbound Norfolk Southern freight train derailed on a bridge that just got washed out between Kinderhook and Barry. Hadley Creek was out of its banks and the force of the water washed out the railroad bridge as the train was going over it. Thirty-two cars of the 78 car train derailed. The cars were not carrying anything toxic, just coal and corn oil product. In Pittsfield, the heavy rains caused a basement wall to collapse on a home while several other homes suffered water damage to their basements due to sewer backups. Near the Pike/Adams county line, a couple were driving on a local road when the road gave way and collapsed. The car remained suspended between the two sections of roadway, so the couple had to carefully exit the vehicle. The driver sustained a broken foot and a badly sprained foot on the other leg. Her husband was able to get her out of the vehicle without the car falling further into the hole.
06/03/2008 thru 06/04/2008	8:35 PM	countywide				n/a	n/a	n/a	n/a	

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 6
Flash Flood Events Reported in Pike County
2002 - 2022

Date(s)	**Start Time**	**Location(s)**	**Impacts[1]**			**Injuries**	**Fatalities**	**Property Damages**	**Crop Damages**	**Impacts/ Event Description**
			Home	**Business**	**Infra-structure**					
07/27/2008 thru 07/28/2008	8:51 PM	countywide				n/a	n/a	n/a	n/a	
7/28/2008	5:30 PM	northeastern portion of county			X	n/a	n/a	n/a	n/a	Two to four inches of rain fell in a short amount of time causing flash flooding. Several roads were flooded including a couple of streets in Milton.
8/5/2008	3:23 PM	countywide				n/a	n/a	n/a	n/a	
4/30/2009	1:10 AM	western portion of county				n/a	n/a	n/a	n/a	
5/15/2009	5:12 PM	countywide				n/a	n/a	n/a	n/a	
7/28/2009	6:14 PM	east-central portion of county				n/a	n/a	n/a	n/a	
10/29/2009 thru 10/30/2009	4:19 PM	countywide				n/a	n/a	n/a	n/a	
06/08/2010 thru 06/09/2010	9:38 PM	northern portion of county				n/a	n/a	n/a	n/a	

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Table 6 Flash Flood Events Reported in Pike County 2002 - 2022										
Date(s)	**Start Time**	**Location(s)**	**Impacts[1]**			**Injuries**	**Fatalities**	**Property Damages**	**Crop Damages**	**Impacts/ Event Description**
			Home	**Business**	**Infra-structure**					
7/20/2010	7:10 AM	countywide			X	n/a	n/a	n/a	n/a	Up to five inches of rain fell in a short amount of time causing flash flooding. Numerous roads were flooded including Illinois Route 96 near New Canton. On the north side of Pittsfield, a church was completely flooded with three to four inches of water flowing through the church.
09/18/2010 thru 09/19/2010	10:26 PM	southeastern portion of county				n/a	n/a	n/a	n/a	
4/22/2011	9:36 AM	northern portion of county				n/a	n/a	n/a	n/a	
6/2/2011	5:41 AM	northern portion of county				n/a	n/a	n/a	n/a	
06/13/2011 thru 06/14/2011	5:41 PM	countywide				n/a	n/a	n/a	n/a	
04/17/2013 thru 04/18/2013	7:46 PM	northwestern portion of county				n/a	n/a	n/a	n/a	
5/30/2013	5:01 PM	west-central portion of county				n/a	n/a	n/a	n/a	
6/4/2014	4:23 AM	northern portion of county				n/a	n/a	n/a	n/a	

^ Flash flood event verified in the vicinity of this location(s).

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Table 6
Flash Flood Events Reported in Pike County
2002 - 2022

Date(s)	Start Time	Location(s)	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
6/21/2015	3:54 AM	southern portion of county				n/a	n/a	n/a	n/a	
6/25/2015	9:57 PM	southern portion of county				n/a	n/a	n/a	n/a	
06/28/2015 thru 06/29/2015	7:06 PM	western portion of county				n/a	n/a	n/a	n/a	
7/19/2015	4:45 AM	northern portion of county			X	n/a	1	n/a	n/a	Up to six inches of rain fell onto already saturated soils causing flash flooding. Numerous roads were flooded across the northern part of Pike County. County Road 2 about a mile east of New Salem was washed out due to a creek that flowed through the area. This created a 30 foot wide by 30 foot deep hole. A lineman with a local electric company was driving through the area and did not see the hole due to darkness. His vehicle plunged into the hole. He died at the scene.
7/26/2015	4:45 AM	countywide				n/a	n/a	n/a	n/a	
07/27/2015 thru 07/28/2015	7:49 PM	countywide				n/a	n/a	n/a	n/a	
7/19/2016	6:11 PM	northeastern portion of county				n/a	n/a	n/a	n/a	
8/12/2016	6:17 PM	southeastern portion of county				n/a	n/a	n/a	n/a	

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 6
Flash Flood Events Reported in Pike County
2002 - 2022

Date(s)	Start Time	Location(s)	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
8/28/2016	10:05 AM	northcentral portion of county				n/a	n/a	n/a	n/a	
4/29/2017	3:08 PM	countywide				n/a	n/a	n/a	n/a	
5/29/2019	6:15 PM	central portion of county			X	n/a	n/a	n/a	n/a	Up to three inches of rain fell in a short amount of time causing flash flooding. Numerous secondary roads were flooded. Also, several creeks rose out of their banks due to the heavy rain.
5/24/2020	8:30 PM	northwestern portion of county			X	n/a	1	n/a	n/a	Up to three inches of rain fell in about a two hour time period causing localized flash flooding on Hadley Creek, about 2 miles north northeast of Barry. Hadley Creek was overflowing the low water crossing on 275th Street. A car was driven into the flood waters at the low water crossing and stalled out. The passenger was swept downstream and drowned. The driver was able to make it to dry land. Rescue crews found her body about 1500 feet down stream from the location where the car stalled about 3 hours later.
5/28/2020	3:20 PM	northwestern portion of county			X	n/a	n/a	n/a	n/a	Up to three inches of rain fell in about an hour causing flash flooding, including on Illinois Route 106 between Hull and Kinderhook.
6/22/2020	2:15 PM	southeastern portion of county				n/a	n/a	n/a	n/a	
6/30/2020	12:21 AM	northwestern & central portions of county				n/a	n/a	n/a	n/a	

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 6
Flash Flood Events Reported in Pike County
2002 - 2022

Date(s)	Start Time	Location(s)	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
06/25/2021 thru 06/26/2021	7:32 PM	northwester portion of county				n/a	n/a	n/a	n/a	
7/31/2021	8:34 AM	southeastern portion of county				n/a	n/a	n/a	n/a	
10/24/2021	5:14 PM	northeastern portion of county				n/a	n/a	n/a	n/a	
5/6/2022	9:00 AM	countywide			X	n/a	n/a	n/a	n/a	At least 2 - 3 inches of rain fell causing small creeks and streams to flood. Low-lying areas flooded causing roads across the county and in cities to be closed.
5/13/2022	6:23 PM	northern portion of county				n/a	n/a	n/a	n/a	
GRAND TOTAL:						**1**	**2**	**$ 20,000**	**$ -**	

Sources: Iowa State University, Iowa Environmental Mesonet, National Weather Service Data, Search for Warnings.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Data.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

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^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 7
Severe Winter Storm Events Reported in Pike County
1950 - 2022

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
11/5/1951 thru 11/6/1951	n/a	Heavy Snow	6.4 in.					Pleasant Hill	n/a	n/a	n/a	
12/13/1951 thru 12/14/1951	n/a	Heavy Snow	5.0 in.					Griggsville Pleasant Hill	n/a	n/a	n/a	
3/1/1953	n/a	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
3/1/1953	11:00 AM	Heavy Snow	6.0 in.					Pleasant Hill	n/a	n/a	n/a	
4/18/1953	n/a	Heavy Snow	5.0 in.					Griggsville	n/a	n/a	n/a	
12/22/1953	n/a	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
3/14/1956	n/a	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
12/9/1956	n/a	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
3/26/1957	n/a	Heavy Snow	4.5 in.					Griggsville	n/a	n/a	n/a	
4/12/1957	n/a	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
12/31/1957	n/a	Heavy Snow	5.0 in.					Griggsville	n/a	n/a	n/a	
11/27/1958 thru 11/28/1958	7:30 PM	Heavy Snow	5.0 in.					Pleasant Hill	n/a	n/a	n/a	
3/2/1960 thru 3/3/1960	8:30 AM	Heavy Snow	5.0 in.					Griggsville	n/a	n/a	n/a	

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[1] An "X" in the snow, freezing rain, ice, sleet and/or strong winds columns indicates the presences of that weather condition during the severe winter storm event.

[2] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Pike County
1950 - 2022

Date(s)	Start	Event Type	Magnitude[1]					Observed	Injuries	Fatalities	Property	Impacts/
3/8/1960 thru 3/9/1960	2:30 PM	Heavy Snow	8.0 in.					Griggsville	n/a	n/a	n/a	
3/15/1960 thru 3/16/1960	4:00 PM	Heavy Snow	9.0 in.					Griggsville	n/a	n/a	n/a	snow drifted as it fell
12/10/1960 thru 12/11/1960	8:30 PM	Heavy Snow	6.0 in.					Pleasant Hill	n/a	n/a	n/a	
2/2/1961 thru 2/3/1961	5:30 AM	Heavy Snow	9.0 in.					Pleasant Hill Griggsville	n/a	n/a	n/a	
12/8/1961	6:30 PM	Heavy Snow	5.0 in.					Griggsville	n/a	n/a	n/a	
12/18/1961 thru 12/19/1961	5:00 PM	Heavy Snow	6.0 in.					Griggsville	n/a	n/a	n/a	
2/20/1962	5:00 PM	Heavy Snow	5.0 in.					Griggsville	n/a	n/a	n/a	
2/23/1962	12:30 PM	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
2/23/1963 thru 2/24/1963	n/a	Heavy Snow	11.5 in.					Griggsville	n/a	n/a	n/a	
12/11/1963	n/a	Heavy Snow	8.0 in.					Griggsville	n/a	n/a	n/a	
1/11/1964 thru 1/12/1964	n/a	Heavy Snow	7.0 in.					Griggsville	n/a	n/a	n/a	
3/5/1964	n/a	Heavy Snow	7.0 in.					Griggsville	n/a	n/a	n/a	
11/29/1964	n/a	Heavy Snow	4.4 in.					Griggsville	n/a	n/a	n/a	

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Table 7
Severe Winter Storm Events Reported in Pike County
1950 - 2022

Date(s)	Start	Event Type	Magnitude[1]					Observed	Injuries	Fatalities	Property	Impacts/
2/23/1965 thru 2/24/1965	9:30 AM	Heavy Snow	11.0 in.					Griggsville Pleasant Hill	n/a	n/a	n/a	
3/3/1965 thru 3/4/1965	8:00 PM	Heavy Snow	6.0 in.					Pleasant Hill	n/a	n/a	n/a	
1/31/1966 thru 12/1/1966	10:00 PM	Heavy Snow	6.0 in.					Pleasant Hill	n/a	n/a	n/a	
1/26/1967 thru 1/27/1967	1:30 AM	Heavy Snow	8.1 in.					Griggsville	n/a	n/a	n/a	
3/8/1969	12:30 AM	Heavy Snow	4.5 in.					Pleasant Hill	n/a	n/a	n/a	
2/13/1970 thru 2/14/1970	7:30 PM	Heavy Snow	4.0 in.					Pleasant Hill	n/a	n/a	n/a	
1/2/1971 thru 1/3/1971	11:00 PM	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
11/28/1971 thru 11/29/1971	6:00 PM	Heavy Snow	7.0 in.					Pleasant Hill	n/a	n/a	n/a	
2/10/1972	5:00 AM	Heavy Snow	7.0 in.					Griggsville	n/a	n/a	n/a	
11/19/1972	1:30 AM	Heavy Snow	6.0 in.					Griggsville	n/a	n/a	n/a	
12/18/1973 thru 12/19/1973	7:30 PM	Winter Storm	8.0 in.			X		Griggsville Pleasant Hill	n/a	n/a	n/a	

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[2] Observed Location information was obtained from NWS’s COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center’s cli-MATE data system and NOAA’s Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Pike County
1950 - 2022

Date(s)	Start	Event Type	Magnitude[1]					Observed	Injuries	Fatalities	Property	Impacts/
2/6/1974	3:00 AM	Winter Storm	5.0 in.		X	X		Pleasant Hill	n/a	n/a	n/a	
2/23/1974 thru 2/24/1974	5:00 PM	Heavy Snow	4.0 in.					Pleasant Hill	n/a	n/a	n/a	
2/23/1975 thru 2/24/1975	1:30 PM	Heavy Snow	12.2 in.					Griggsville	n/a	n/a	n/a	
11/26/1975 thru 11/27/1975	8:30 AM	Heavy Snow	9.5 in.					Griggsville	n/a	n/a	n/a	
1/4/1977 thru 1/5/1977	9:00 AM	Heavy Snow	7.0 in.					Griggsville	n/a	n/a	n/a	
11/26/1977 thru 11/27/1977	7:00 PM	Heavy Snow	6.5 in.					Griggsville	n/a	n/a	n/a	
2/12/1978 thru 2/13/1978	11:00 PM	Heavy Snow	6.5 in.					Griggsville	n/a	n/a	n/a	
3/8/1978	12:00 AM	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
1/29/1980 thru 1/30/1980	10:00 PM	Heavy Snow	6.0 in.					Griggsville	n/a	n/a	n/a	
2/29/1980 thru 3/1/1980	4:00 PM	Heavy Snow	7.0 in.					Griggsville	n/a	n/a	n/a	

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[2] Observed Location information was obtained from NWS’s COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center’s cli-MATE data system and NOAA’s Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Pike County
1950 - 2022

Date(s)	Start	Event Type	Magnitude[1]					Observed	Injuries	Fatalities	Property	Impacts/
3/12/1980 thru 3/13/1980	9:00 AM	Heavy Snow	6.0 in.					Griggsville	n/a	n/a	n/a	
2/9/1981 thru 2/10/1981	8:30 PM	Heavy Snow	8.0 in.					Pleasant Hill	n/a	n/a	n/a	
12/16/1981	9:30 AM	Heavy Snow	8.0 in.					Griggsville	n/a	n/a	n/a	
12/22/1981	10:30 AM	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
3/12/1984	8:30 AM	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
1/9/1985	3:30 PM	Heavy Snow	4.0 in.					Perry	n/a	n/a	n/a	
1/9/1987	5:00 AM	Heavy Snow	8.6 in.					Griggsville	n/a	n/a	n/a	
1/17/1987	2:00 PM	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
1/18/1987	11:30 PM	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
3/2/1988 thru 3/3/1988	11:00 PM	Winter Storm	5.5 in.		X			Griggsville	n/a	n/a	n/a	
12/27/1988	5:30 AM	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
3/24/1990	n/a	Heavy Snow	7.0 in.					Perry	n/a	n/a	n/a	
11/6/1991	4:30 PM	Heavy Snow	4.0 in.					Pittsfield	n/a	n/a	n/a	
11/18/1992	6:00 AM	Heavy Snow	4.0 in.					Perry	n/a	n/a	n/a	
1/9/1993	10:00 AM	Heavy Snow	7.0 in.					Pittsfield	n/a	n/a	n/a	
2/15/1993	3:30 PM	Heavy Snow	6.6 in.					Pittsfield	n/a	n/a	n/a	
2/23/1994	n/a	Winter Storm	4.0 in.			X		Perry	n/a	n/a	n/a	
2/28/1994 thru 3/1/1994	4:00 PM	Heavy Snow	4.5 in.					Perry	n/a	n/a	n/a	

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Table 7
Severe Winter Storm Events Reported in Pike County
1950 - 2022

Date(s)	Start	Event Type	Magnitude[1]					Observed	Injuries	Fatalities	Property	Impacts/
1/18/1995 thru 1/19/1995	6:00 PM	Heavy Snow	6.5 in.				40 mph	Perry	n/a	n/a	$3,500	*Event Description Provided Below*
- heavy snow lead to school closures and closed highways - wind gusts caused considerable drifting - numerous vehicle accidents and stranded motorists were reported												
2/3/1995	5:00 AM	Heavy Snow	4.0 in.					Perry	n/a	n/a	n/a	
12/6/1995	1:00 PM	Heavy Snow	5.0 in.					Pittsfield	n/a	n/a	n/a	
12/19/1995	1:00 AM	Winter Storm	3.5 in.			X		Pittsfield	n/a	n/a	n/a	- numerous traffic accidents occurred - schools throughout the region closed for the day
2/16/1996	n/a	Heavy Snow	4.0 in.					Perry	n/a	n/a	n/a	
1/8/1997 thru 1/9/1997	6:00 PM	Winter Storm	6.5 in.				X	Perry	n/a	n/a	n/a	- winds caused drifting snow and very cold wind chills - schools remained closed for several days
1/15/1997 thru 1/16/1997	11:00 PM	Winter Storm	5.0 in.	X	X	X	X	Perry	n/a	n/a	n/a	*Event Description Provided Below*
- numerous vehicle accidents occurred - some power outages also occurred - most area schools were closed												
1/28/1997	n/a	Winter Storm	5.5 in.	X				Pittsfield Perry	n/a	n/a	n/a	
12/9/1997	2:00 PM	Heavy Snow	7.0 in.					Pittsfield Perry	n/a	n/a	n/a	roads quickly became snow packed

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Table 7
Severe Winter Storm Events Reported in Pike County
1950 - 2022

Date(s)	Start	Event Type	Magnitude[1]					Observed	Injuries	Fatalities	Property	Impacts/
1/1/1999 thru 1/2/1999	8:00 PM	Heavy Snow	11.9 in.					Pittsfield	n/a	n/a	n/a	most area schools remained closed through the middle of the next week
3/8/1999 thru 3/9/1999	6:00 AM	Heavy Snow	12.0 in.					Griggsville	n/a	n/a	n/a	
12/10/2000 thru 12/11/2000	4:00 AM	Ice Storm		X	0.5 in.	X		Perry	n/a	n/a	n/a	*Event Description Provided Below*
- travel on are roadways was very dangerous throughout the day - some power lines were downed due to a combination of ice and wind												
12/13/2000	6:00 AM	Heavy Snow	4.5 in.					Perry	n/a	n/a	n/a	
3/2/2002	10:00 AM	Winter Storm	3.0 in.			0.5 in.	30 mph	Perry	n/a	n/a	n/a	winds caused considerable blowing and drifting
12/25/2002	n/a	Heavy Snow	5.0 in.					Perry	n/a	n/a	n/a	
1/1/2003 thru 1/2/2003	8:00 PM	Heavy Snow	6.7 in.					Perry	n/a	n/a	n/a	
1/16/2003	n/a	Heavy Snow	5.0 in.					Perry	n/a	n/a	n/a	
2/15/2003 thru 2/16/2003	1:00 AM	Winter Storm	6.0 in.	X		X		Pittsfield	n/a	n/a	n/a	
1/25/2004	6:00 AM	Winter Storm	1.5 in.	X		X		Perry	n/a	n/a	n/a	transportation in some areas was temporarily brought to a halt
11/24/2004	6:00 AM	Heavy Snow	5.8 in.					Perry	n/a	n/a	n/a	
3/21/2006	n/a	Heavy Snow	9.5 in.					Griggsville Pittsfield	n/a	n/a	n/a	

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[2] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Pike County
1950 - 2022

Date(s)	Start	Event Type	Magnitude[1]					Observed	Injuries	Fatalities	Property	Impacts/
11/29/2006 thru 12/1/2006	10:00 PM	Winter Storm	10.0 in.					Perry	1	n/a	n/a	*Event Description Provided Below*
- one person was injured in an auto accident during the storm							- The Health Department in Pittsfield had to be closed because of a sagging roof from snow accumulations					
1/12/2007 thru 1/14/2007	10:00 PM	Ice Storm			0.8 in.	X		Pittsfield	n/a	n/a	n/a	significant tree & limb damage was reported along with widespread power outages
1/21/2007	n/a	Heavy Snow	4.0 in.					Pittsfield	n/a	n/a	n/a	
2/13/2007	12:00 AM	Heavy Snow	9.3 in.					Griggsville	n/a	n/a	n/a	
12/8/2007 thru 12/12/2007	11:00 PM	Ice Storm			0.5 in.	1.0 in.		Griggsville	n/a	n/a	n/a	*Event Description Provided Below*
- numerous trees & power lines were reported down across the area - some businesses had to close due to power loss							- most schools were closed for a couple of days					
12/15/2007	6:00 AM	Heavy Snow	5.5 in.					Griggsville	n/a	n/a	n/a	travel was disrupted across the area
1/31/2008	n/a	Heavy Snow	7.0 in.					Griggsville	n/a	n/a	n/a	
12/18/2008 thru 12/19/2008	4:00 PM	Ice Storm			0.5 in.			SED	n/a	n/a	n/a	tree limbs were reported down and there were scattered power outages
1/6/2010 thru 1/7/2010	2:00 PM	Winter Storm	6.5 in.				30 mph	Perry	n/a	n/a	n/a	many rural roads were impassable due to blowing & drifting snow
2/15/2010	n/a	Heavy Snow	4.0 in.					Griggsville	n/a	n/a	n/a	
12/25/2010	n/a	Heavy Snow	4.0 in.					Perry	n/a	n/a	n/a	
1/11/2011	n/a	Heavy Snow	5.0 in.					Perry	n/a	n/a	n/a	

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[2] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Pike County
1950 - 2022

Date(s)	Start	Event Type	Magnitude[1]					Observed	Injuries	Fatalities	Property	Impacts/
1/31/2011 thru 2/2/2011	12:00 PM	Blizzard	20.0 in.	X		1.0 in.	40 mph	Perry	n/a	n/a	$215,052	*Event Description Provided Below*
- ***This event was part of a federally-declared disaster (Declaration #1960)*** - the region was brought to a standstill for several days - the National Guard was called out to help clear County roads and assist with emergency transportation												
2/25/2011	n/a	Heavy Snow	6.0 in.					Perry Griggsville	n/a	n/a	n/a	
2/21/2013 thru 2/22/2013	10:00 AM	Winter Storm	10.0 in.	X		X		Griggsville	n/a	n/a	n/a	
2/26/2013	n/a	Heavy Snow	5.0 in.					Pittsfield	n/a	n/a	n/a	
3/24/2013	4:00 AM	Blizzard	16.5 in.						n/a	n/a	n/a	some schools were closed for one day
12/14/2013	n/a	Heavy Snow	4.0 in.					Griggsville Pittsfield	n/a	n/a	n/a	
12/21/2013 thru 12/22/2013	7:00 AM	Ice Storm			0.25 in.	0.5 in.		SED	n/a	n/a	n/a	scattered power outages & travel problems were reported
2/4/2014 thru 2/5/2014	10:00 AM	Heavy Snow	8.0 in.					Perry	n/a	n/a	n/a	- travel was very difficult especially in rural areas - most rural schools were closed for a couple of days
2/15/2014	n/a	Heavy Snow	4.0 in.					Perry	n/a	n/a	n/a	
1/31/2015	n/a	Heavy Snow	4.5 in.					Perry	n/a	n/a	n/a	
2/20/2015 thru 2/21/2015	8:00 PM	Heavy Snow	9.0 in.					Griggsville	n/a	n/a	n/a	

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Table 7
Severe Winter Storm Events Reported in Pike County
1950 - 2022

Date(s)	Start	Event Type	Magnitude[1]					Observed	Injuries	Fatalities	Property	Impacts/
3/1/2015	n/a	Heavy Snow	6.4 in.					Pittsfield	n/a	n/a	n/a	
11/15/2018	4:00 AM	Heavy Snow	6.0 in.					Pittsfield	n/a	n/a	n/a	
11/25/2018 thru 11/25/2018	8:45 PM	Blizzard	4.0 in.				40 mph	SED	n/a	n/a	n/a	
1/11/2019 thru 1/13/2019	4:30 PM	Heavy Snow	12.0 in.					SED	n/a	n/a	n/a	
1/1/2021	3:00 AM	Winter Storm			0.5 in.			SED	n/a	n/a	n/a	
2/1/2022 thru 2/3/2022	8:30 PM	Heavy Snow	10.0 in.					SED	n/a	n/a	n/a	
2/17/2022	8:00 AM	Heavy Snow	8.0 in.					SED	n/a	n/a	n/a	
12/22/2022	8:30 AM	Winter Storm	2.0 in.				35 mph	SED	n/a	n/a	n/a	

GRAND TOTAL:	**1**	**0**	**$218,552**

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

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[1] An "X" in the snow, freezing rain, ice, sleet and/or strong winds columns indicates the presences of that weather condition during the severe winter storm event.

[2] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

Table 8
Excessive Heat Events Reported in Pike County
1994 - 2022

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
6/13/1994 thru 6/22/1994	n/a	95 °F	67 °F	n/a	Pittsfield	n/a	n/a	n/a	n/a	
7/11/1995 thru 7/16/1995	n/a	98 °F	66 °F	n/a	Perry	n/a	n/a	n/a	n/a	
7/29/1995 thru 7/31/1995	n/a	93 °F	68 °F	n/a	Pittsfield	n/a	n/a	n/a	n/a	
8/9/1995 thru 8/19/1995	n/a	95 °F	69 °F	n/a	Pittsfield	n/a	n/a	n/a	n/a	
7/25/1997 thru 7/27/1997	n/a	96 °F	71 °F	n/a	Pittsfield	n/a	n/a	n/a	n/a	
6/24/1998 thru 6/28/1998	n/a	94 °F	71 °F	n/a	Pittsfield	n/a	n/a	n/a	n/a	
7/18/1999 thru 7/30/1999	12:00 PM	101 °F	72 °F	115 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/7/2001 thru 7/10/2001	n/a	96 °F	69 °F	110 °F	Perry	n/a	n/a	n/a	n/a	
7/17/2001	11:00 AM	95 °F	72 °F	115 °F	Perry	n/a	n/a	n/a	n/a	

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[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 8
Excessive Heat Events Reported in Pike County
1994 - 2022

Date(s)	Start	Magnitude - Temperature °F			Observed	Injuries	Fatalities	Property	Crop	Impacts/Event Description
7/29/2001 thru 8/2/2001	11:00 AM	95 °F	66 °F	110 °F	Perry	n/a	n/a	n/a	n/a	
8/7/2001 thru 8/9/2001	12:00 AM	98 °F	68 °F	110 °F	Perry	n/a	n/a	n/a	n/a	
8/21/2001 thru 8/22/2001	12:00 AM	94 °F	67 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/8/2002 thru 7/9/2002	11:00 AM	96 °F	71 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/19/2002 thru 7/22/2002	n/a	99 °F	66 °F	115 °F	Pittsfield	n/a	n/a	n/a	n/a	
8/15/2003 thru 8/17/2003	12:00 PM	96 °F	69 °F	110 °F	Perry	n/a	n/a	n/a	n/a	many schools reduced their schedule to a half day while a few closed altogether
8/20/2003 thru 8/21/2003	n/a	99 °F	67 °F	110 °F	Perry	n/a	n/a	n/a	n/a	many schools reduced their schedule to a half day while a few closed altogether
8/25/2003 thru 8/28/2003	n/a	99 °F	67 °F	110 °F	Perry	n/a	n/a	n/a	n/a	
7/20/2005 thru 7/25/2005	12:00 PM	102 °F	72 °F	n/a	Griggsville	n/a	n/a	n/a	n/a	

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[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 8
Excessive Heat Events Reported in Pike County
1994 - 2022

Date(s)	Start	Magnitude - Temperature °F			Observed	Injuries	Fatalities	Property	Crop	Impacts/Event Description
7/16/2006 thru 7/20/2006	n/a	96 °F	72 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/29/2006 thru 8/2/2006	12:47 PM	101 °F	74 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
8/2/2007 thru 8/8/2007	n/a	99 °F	68 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
8/11/2007 thru 8/16/2007	n/a	104 °F	68 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
8/4/2008	11:29 AM	97 °F	78 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
6/18/2009 thru 6/27/2009	n/a	95 °F	69 °F	105 °F	Pittsfield	n/a	1	n/a	n/a	a 29-year-old Griggsville man died of heat stroke while working at a construction site in Valley City
8/8/2009	12:00 PM	94 °F	77 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
6/20/2010 thru 6/21/2010	n/a	92 °F	68 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
6/26/2010	n/a	93 °F	76 °F	n/a	Pittsfield	n/a	n/a	n/a	n/a	
7/14/2010	12:00 PM	94 °F	78 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/17/2010	12:00 PM	93 °F	70 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/22/2010 thru 7/25/2010	12:00 PM	94 °F	69 °F	10 °F	Pittsfield	n/a	n/a	n/a	n/a	
8/3/2010 thru 8/4/2010	3:56 PM	97 °F	73 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	

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[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 8
Excessive Heat Events Reported in Pike County
1994 - 2022

Date(s)	Start	Magnitude - Temperature °F			Observed	Injuries	Fatalities	Property	Crop	Impacts/Event Description
8/8/2010 thru 8/12/2010	1:00 PM	98 °F	71 °F	115 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/1/2011 thru 7/2/2011	12:00 PM	94 °F	71 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/10/2011 thru 7/12/2011	12:00 PM	96 °F	68 °F	110 °F	Perry	n/a	n/a	n/a	n/a	
7/17/2011 thru 7/28/2011	12:00 PM	100 °F	69 °F	110 °F	Perry	n/a	n/a	n/a	n/a	
8/1/2011 thru 8/3/2011	12:00 AM	102 °F	69 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
8/31/2011 thru 9/2/2011	12:00 PM	103 °F	67 °F	105 °F	Perry	n/a	n/a	n/a	n/a	
6/28/2012 thru 7/7/2012	n/a	103 °F	68 °F	115 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/15/2012 thru 7/19/2012	n/a	102 °F	69 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/22/2012 thru 7/26/2012	12:00 PM	106 °F	71 °F	110 °F	Perry	n/a	n/a	n/a	n/a	

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[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 8
Excessive Heat Events Reported in Pike County
1994 - 2022

Date(s)	Start	Magnitude - Temperature °F			Observed	Injuries	Fatalities	Property	Crop	Impacts/Event Description
8/26/2013 thru 9/1/2013	n/a	99 °F	69 °F	n/a	Pittsfield	n/a	n/a	n/a	n/a	
8/21/2014 thru 8/26/2014	n/a	95 °F	71 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/12/2015 thru 7/13/2015	11:00 AM	93 °F	75 °F	110 °F	Perry	n/a	n/a	n/a	n/a	
7/17/2015 thru 7/18/2015	11:00 AM	95 °F	75 °F	110 °F	Perry	n/a	n/a	n/a	n/a	
7/27/2015 thru 7/28/2015	11:00 AM	95 °F	70 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
6/9/2016 thru 6/15/2016	n/a	98 °F	68 °F	n/a	Pittsfield	n/a	n/a	n/a	n/a	
6/19/2016 thru 6/20/2016	n/a	97 °F	72 °F	n/a	Pittsfield	n/a	n/a	n/a	n/a	
6/22/2016	11:00 AM	98 °F	74 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/17/2016 thru 7/19/2016	n/a	92 °F	69 °F	n/a	Perry	n/a	n/a	n/a	n/a	
7/23/2016 thru 7/24/2016	n/a	95 °F	71 °F	110 °F	Perry	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 8
Excessive Heat Events Reported in Pike County
1994 - 2022

Date(s)	Start	Magnitude - Temperature °F			Observed	Injuries	Fatalities	Property	Crop	Impacts/Event Description
8/10/2016 thru 8/12/2016	n/a	96 °F	72 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/9/2017 thru 7/12/2017	n/a	97 °F	75 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/18/2017 thru 7/22/2017	n/a	100 °F	73 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
6/15/2018 thru 6/19/2018	12:00 PM	97 °F	70 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
6/29/2018 thru 7/1/2018	n/a	95 °F	71 °F	111 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/3/2018 thru 7/5/2018	n/a	96 °F	72 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/13/2018 thru 7/14/2018	n/a	97 °F	71 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
8/26/2018 thru 8/28/2018	n/a	97 °F	75 °F	104 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/18/2019 thru 7/20/2019	n/a	94 °F	74 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	

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[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 8
Excessive Heat Events Reported in Pike County
1994 - 2022

Date(s)	Start	Magnitude - Temperature °F			Observed	Injuries	Fatalities	Property	Crop	Impacts/Event Description
7/25/2020 thru 7/26/2020	n/a	92 °F	74 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
8/9/2021 thru 8/11/2011	n/a	92 °F	70 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
8/23/2021 thru 8/30/2021	n/a	94 °F	68 °F	110 °F	Pittsfield	n/a	n/a	n/a	n/a	
6/13/2022 thru 6/16/2022	n/a	96 °F	74 °F	109 °F	Pittsfield	n/a	n/a	n/a	n/a	
6/21/2022	n/a	94 °F	71 °F	105 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/4/2022 thru 7/5/2022	n/a	99 °F	71 °F	109 °F	Pittsfield	n/a	n/a	n/a	n/a	
7/23/2022	n/a	99 °F	79 °F	107 °F	Pittsfield	n/a	n/a	n/a	n/a	
8/6/2022	n/a	92 °F	75 °F	107 °F	Pittsfield	n/a	n/a	n/a	n/a	

GRAND TOTAL:	**0**	**1**	**$ -**	**$ -**

Sources: Iowa State University, Iowa Environmental Mesonet, National Weather Service Data, Search for Warnings.
Midwestern Regional Climate Center, cli-MATE.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

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[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 9
Extreme Cold/Wind Chill Events Reported in Pike County
1995 - 2022

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
		Low (Min)	High (Max)	Wind Chill (Max)					
1/4/1995	n/a	-4 °F	13 °F	n/a	Perry	n/a	n/a	n/a	
1/30/1996 thru 2/3/1996	n/a	-21 °F	15 °F	n/a	Perry	n/a	n/a	n/a	
1/10/1997 thru 1/13/1997	n/a	-6 °F	10 °F	n/a	Pittsfield	n/a	n/a	n/a	
1/16/1997 thru 1/17/1997	n/a	-7 °F	13 °F	n/a	Pittsfield	n/a	n/a	n/a	
1/28/1997	n/a	-8 °F	9 °F	n/a	Pittsfield	n/a	n/a	n/a	
1/16/2000 thru 1/17/2000	n/a	1 °F	11 °F	-40 °F	Pittsfield	n/a	n/a	n/a	
1/19/2000	n/a	-2 °F	15 °F	n/a	Perry	n/a	n/a	n/a	
1/21/2000 thru 1/22/2000	n/a	-3 °F	15 °F	n/a	Perry	n/a	n/a	n/a	
1/24/2000	n/a	-9 °F	15 °F	n/a	Pittsfield	n/a	n/a	n/a	
12/12/2000 thru 12/13/2000	n/a	0 °F	17 °F	n/a	Perry	n/a	n/a	n/a	
12/19/2000	n/a	-2 °F	15 °F	n/a	Perry	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 9
Extreme Cold/Wind Chill Events Reported in Pike County
1995 - 2022

Date(s)	Start	Magnitude - Temperature °F			Observed	Injuries	Fatalities	Property	Impacts/Event Description
12/21/2000 thru 12/22/2000	n/a	-3 °F	15 °F	n/a	Perry	n/a	n/a	n/a	
12/24/2000 thru 12/25/2000	n/a	-8 °F	16 °F	n/a	Perry	n/a	n/a	n/a	
1/22/2003 thru 1/23/2003	n/a	-4 °F	14 °F	n/a	Perry	n/a	n/a	n/a	
1/26/2003	n/a	-5 °F	16 °F	n/a	Perry	n/a	n/a	n/a	
1/29/2004 thru 1/30/2004	n/a	-15 °F	9 °F	n/a	Perry	n/a	n/a	n/a	
2/17/2006 thru 2/17/2006	n/a	-1 °F	15 °F	-20 °F	Pittsfield	n/a	n/a	n/a	
2/14/2007 thru 2/15/2007	n/a	-5 °F	16 °F	-20 °F	Perry	n/a	n/a	n/a	
2/10/2008 thru 2/12/2008	n/a	6 °F	19 °F	-20 °F	Perry	n/a	n/a	n/a	
12/21/2008 thru 12/22/2008	n/a	-2 °F	7 °F	-24 °F	Perry	n/a	n/a	n/a	

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[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 9
Extreme Cold/Wind Chill Events Reported in Pike County
1995 - 2022

Date(s)	Start	Magnitude - Temperature °F			Observed	Injuries	Fatalities	Property	Impacts/Event Description
1/14/2009 thru 1/16/2009	n/a	-10 °F	15 °F	-24 °F	Perry	n/a	n/a	n/a	
1/1/2010 thru 1/5/2010	n/a	-6 °F	17 °F	-23 °F	Perry	n/a	n/a	n/a	
1/8/2010 thru 1/9/2010	n/a	-13 °F	14 °F	-24 °F	Perry	n/a	n/a	n/a	
12/12/2010 thru 12/13/2010	n/a	-2 °F	18 °F	-20 °F	Perry	n/a	n/a	n/a	
2/2/2011 thru 2/3/2011	n/a	-8 °F	18 °F	-24 °F	Pittsfield	n/a	n/a	n/a	
2/8/2011 thru 2/9/2011	n/a	-10 °F	18 °F	-24 °F	Perry	n/a	n/a	n/a	
1/5/2014 thru 1/6/2014	n/a	-12 °F	15 °F	-39 °F	Pittsfield	n/a	n/a	n/a	
1/21/2014	n/a	7 °F	16 °F	-17 °F	Pittsfield	n/a	n/a	n/a	
1/23/2014	n/a	-3 °F	11 °F	-24 °F	Pittsfield	n/a	n/a	n/a	
1/27/2014 thru 1/28/2014	n/a	-4 °F	16 °F	-20 °F	Pittsfield	n/a	n/a	n/a	

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[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 9
Extreme Cold/Wind Chill Events Reported in Pike County
1995 - 2022

Date(s)	Start	Magnitude - Temperature °F			Observed	Injuries	Fatalities	Property	Impacts/Event Description
2/5/2014 thru 2/7/2014	n/a	-16 °F	17 °F	-27 °F	Pittsfield	n/a	n/a	n/a	
2/10/2014 thru 2/11/2014	n/a	-12 °F	15 °F	-18 °F	Perry	n/a	n/a	n/a	
3/2/2014	n/a	-8 °F	10 °F	-23 °F	Perry	n/a	n/a	n/a	
1/7/2015	n/a	-3 °F	7 °F	-18 °F	Perry	n/a	n/a	n/a	
2/18/2015 thru 2/19/2015	n/a	-3 °F	16 °F	-20 °F	Perry	n/a	n/a	n/a	
2/23/2015	n/a	1 °F	17 °F	-20 °F	Pittsfield	n/a	n/a	n/a	
2/26/2015 thru 2/27/2015	n/a	-5 °F	19 °F	-20 °F	Pittsfield	n/a	n/a	n/a	
1/10/2016	n/a	3 °F	15 °F	-20 °F	Pittsfield	n/a	n/a	n/a	
1/17/2016 thru 1/28/2016	n/a	-2 °F	13 °F	-21 °F	Perry	n/a	n/a	n/a	
12/18/2016	n/a	-10 °F	7 °F	-24 °F	Perry	n/a	n/a	n/a	
12/26/2017 thru 12/28/2017	n/a	-9 °F	18 °F	-20 °F	Perry	n/a	n/a	n/a	
12/30/2017 thru 1/5/2018	n/a	-14 °F	21 °F	-24 °F	Perry	n/a	n/a	n/a	

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[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 9
Extreme Cold/Wind Chill Events Reported in Pike County
1995 - 2022

Date(s)	Start	Magnitude - Temperature °F			Observed	Injuries	Fatalities	Property	Impacts/Event Description
1/15/2018 thru 1/16/2018	n/a	-5 °F	16 °F	-25 °F	Perry	n/a	n/a	n/a	
1/24/2019 thru 1/25/2019	n/a	n/a	n/a	-20 °F		n/a	n/a	n/a	
1/29/2019 thru 1/31/2019	n/a	n/a	n/a	-40 °F		n/a	n/a	n/a	
3/4/2019	n/a	n/a	n/a	-20 °F		n/a	n/a	n/a	
2/13/2020	n/a	-9 °F	9 °F	-20 °F	Pittsfield	n/a	n/a	n/a	
2/7/2021	n/a	-6 °F	5 °F	-20 °F	Perry	n/a	n/a	n/a	
2/12/2021 thru 2/16/2021	n/a	-12 °F	11 °F	-30 °F	Perry	n/a	n/a	n/a	
12/22/2022 thru 12/23/2022	n/a	-10 °F	17 °F	-40 °F	Perry	n/a	n/a	n/a	

GRAND TOTAL:	**0**	**0**	**$ -**

Sources: Iowa State University, Iowa Environmental Mesonet, National Weather Service Data, Search for Warnings.
Midwestern Regional Climate Center, cli-MATE.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

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[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 10
Tornadoes Reported in (Name) County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
1	6/19/1956	8:00 PM	Barry Pittsfield	F 2	14.0 mi.	10 yd.	n/a	n/a	$25,000	n/a	
2	6/10/1957	10:05 PM	Pittsfield Valley City^	F 2	10.3 mi.	10 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Multiple Counties* touched down in Pike County on the southeast side of Pittsfield and traveled northeast through Scott and Morgan counties before lifting off near Philadelphia in Cass County – total length: 42.3 miles
3	6/14/1957	1:00 PM	Rockport^ Time^ Milton	F 2	18.5 mi.	10 yd.	1	n/a	$250,000	n/a	
4	4/24/1961	7:30 PM	Kinderhook Barry^ Florence^	F 3	29.3 mi.	10 yd.	n/a	n/a	n/a	n/a	- destroyed a shed near Kinderhook *Touchdown/Liftoff – Multiple Counties* touched down in Pike County near Kinderhook and traveled east-southeast through Scott County and into Morgan County before lifting off south of Waverly – total length: 64.2 miles

[1] The length provided is only for the portion(s) of the tornado that occurred in the County.

^ Tornado touchdown verified in the vicinity of this location(s).

Table 10
Tornadoes Reported in (Name) County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5	5/14/1961	5:00 PM	Hull^	F 3	3.3 mi.	100 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Multiple Counties* touched down in Pike County west-northwest of Hull and traveled northeast through Adams, Brown, Schuyler, McDonough, Fulton, Knox and Peoria counties before lifting off near Castleton in Stark County – total length: 127.1 miles
6	7/4/1982	5:35 PM	Pittsfield	F 0	0.1 mi.	10 yd.	n/a	n/a	$25	n/a	
7	7/2/1992	3:55 PM	Florence^	F 0	0.1 mi.	250 yd.	n/a	n/a	n/a	n/a	
8	6/24/1993	7:35 PM	Pittsfield	F 1	0.2 mi.	20 yd.	n/a	n/a	$2,500	n/a	- knocked down one tree and damaged a few others at the Courthouse - blew out windows at a store
9	5/27/1996	7:30 PM	Griggsville^	F 0	1.0 mi.	50 yd.	n/a	n/a	n/a	n/a	downed a few trees west of the City
10	2/11/1999	2:12 PM	Pearl^	F 1	5.7 mi.	70 yd.	n/a	n/a	$200,000	n/a	*Event Description Provided Below*

Touchdown/Liftoff – Multiple Counties

touched down in Pike County, Missouri southwest of Annada and traveled northeast crossing the Mississippi River and passing through Calhoun County and into Pike County before lifting off near Pearl – total length: 12.1 miles

- hundreds of trees were downed
- part of the roof of a building was blown off
- one home suffered roof damage- a barn was destroyed and several outbuildings were damaged
- at another home, windows on 3 sides of the house were blown out and a trampoline was blown about 300 feet way

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^ Tornado touchdown verified in the vicinity of this location(s).

Table 10
Tornadoes Reported in (Name) County
1950 - 2022

<table>
<tr><th>Map No.</th><th>Date(s)</th><th>Start Time</th><th>Location(s)</th><th>Magnitude Fujita Scale</th><th>Length (Miles)[1]</th><th>Width (Yards)</th><th>Injuries</th><th>Fatalities</th><th>Property Damages</th><th>Crop Damages</th><th>Impacts/Event Description</th></tr>
<tr><td>11</td><td>4/8/1999</td><td>6:35 PM</td><td>Atlas^
Pittsfield^
Detroit^</td><td>F 2</td><td>26.8 mi.</td><td>120 yd.</td><td>n/a</td><td>n/a</td><td>$150,000</td><td>n/a</td><td>*Event Description Provided Below*</td></tr>
<tr><td colspan="12">*Touchdown/Liftoff – Two Counties*
touched down in Pike County, Missouri on the north side of Louisiana and traveled north-northeast crossing the Mississippi River into Pike County, Illinois where it traveled northeast before lifting off northeast of Detroit – total length: 27.3 miles
Mississippi River & US Rte. 54
- damaged a boat dock along the Mississippi River
- along US Rte. 54 a barn was destroyed and trees were downed
Pittsfield area (east-northeast)
- 3 barns were destroyed, an equipment building was heavily damaged and a grain bin was destroyed
- a home lost part of its roof and numerous trees were damaged
Detroit area (northeast)
- a home lost its roof, a barn was destroyed and 2 grain bins were damaged
- numerous large trees were snapped of at their bases</td></tr>
<tr><td>12</td><td>8/12/1999</td><td>7:13 PM</td><td>Chambersburg^</td><td>F 0</td><td>0.1 mi.</td><td>50 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>13</td><td>5/26/2000</td><td>10:13 PM</td><td>Florence^</td><td>F 0</td><td>1.0 mi.</td><td>50 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>*Event Description Provided Below*</td></tr>
<tr><td colspan="12">*Touchdown/Liftoff – Two Counties*
touched down in Pike County southwest of Florence and traveled northeast crossing the Illinois River into Scott County before lifting off west of Winchester – total length: 6.3 miles</td></tr>
<tr><td>14</td><td>5/26/2000</td><td>10:14 PM</td><td>Milton^</td><td>F 0</td><td>0.8 mi.</td><td>50 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>*Event Description Provided Below*</td></tr>
<tr><td colspan="12">*Touchdown/Liftoff – Two Counties*
touched down in Pike County southeast of Milton and traveled east crossing the Illinois River into Scott County before lifting off southwest of Glasgow – total length: 4.3 miles
- trees were downed southeast of the Village</td></tr>
</table>

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Table 10
Tornadoes Reported in (Name) County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
15	6/11/2002	2:15 PM	Rockport Rockport^	F 0	0.7 mi.	60 yd.	n/a	n/a	n/a	n/a	the roof of the Post Office was heavily damaged & several trees were downed
16	5/24/2004	10:00 PM	Rockport^	F 0	1.0 mi.	40 yd.	n/a	n/a	n/a	n/a	flattened corn & damaged trees east and west of IL Rte. 96 north of Rockport
17	5/24/2004	10:05 PM	Summer Hill^ Summer Hill Martinsburg^	F 1	5.0 mi.	50 yd.	n/a	n/a	n/a	n/a	uprooted and downed trees
18	5/24/2004	10:15 PM	Pittsfield^ Detroit^	F 1	3.0 mi.	50 yd.	n/a	n/a	n/a	n/a	
19	3/11/2006	5:16 PM	Time^	F 0	0.1 mi.	40 yd.	n/a	n/a	n/a	n/a	snapped and uprooted a few trees
20	3/12/2006	7:11 PM	Pearl^	F 0	1.0 mi.	40 yd.	n/a	n/a	n/a	n/a	*Event Description Provided Below*

Touchdown/Liftoff – Multiple Counties
touched down in Calhoun County northwest of Kampsville and traveled northeast to IL Rte. 100 where it turned north crossing into extreme southeastern Pike County at which point it turned east crossing the Illinois River into Greene County where it followed a generally northeast path through Scott and Morgan counties before lifting off in Springfield in Sangamon County – total length: 67.0 miles

- damaged a barn and several large trees

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Table 10
Tornadoes Reported in (Name) County
1950 - 2022

<table>
<tr><th>Map No.</th><th>Date(s)</th><th>Start Time</th><th>Location(s)</th><th>Magnitude Fujita Scale</th><th>Length (Miles)[1]</th><th>Width (Yards)</th><th>Injuries</th><th>Fatalities</th><th>Property Damages</th><th>Crop Damages</th><th>Impacts/Event Description</th></tr>
<tr><td>21</td><td>3/30/2006</td><td>10:55 PM</td><td>Barry^
Baylis^</td><td>F 1</td><td>4.5 mi.</td><td>200 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>*Event Description Provided Below*</td></tr>
<tr><td colspan="7"><u><i>Intersection of 1850N & 1750E</i></u>
- damaged house made of prefabricated panels of compressed styrofoam insulation
- the roof was completely lifted off and the entire north wall fell away from the structure
<u><i>1900N area</i></u>
- several outbuildings were damaged & a 2 foot diameter walnut tree was blown over
- a residence had minor shingle, siding and trim damage
<u><i>I-72 (Mile Marker 22) area</i></u>
- caused minor exterior damage to residences and produced minor tree damage</td><td colspan="5"><u><i>Hadley</i></u>
- -a two-story brick home sustained extensive damage
- the roof was lifted off and destroyed and the back half of the 2nd story was completely demolished
- extensive tree damage also occurred
- a grain wagon and auger were tipped over
- a barn lost some of its tin roof and two wooden telephone poles were leaning east</td></tr>
<tr><td>22</td><td>3/30/2006</td><td>11:10 PM</td><td>Baylis^</td><td>F 1</td><td>2.7 mi.</td><td>250 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>*Event Description Provided Below*</td></tr>
<tr><td colspan="7"><u><i>2500E one-half mile south of 2200N</i></u>
- damaged a barn which lost some of its roof and siding panels
<u><i>22N one mile east of Baylis</i></u>
- 2 houses and ad bard were damaged
- one of the homes was missing half its shingles on the southside of the roof & the other home sustained minor shingle and trim damage
- several large evergreen trees were snapped off & a barn was destroyed</td><td colspan="5"><u><i>2700E 2 miles northeast of Baylis</i></u>
- a barn was damaged</td></tr>
<tr><td>23</td><td>9/22/2006</td><td>4:20 PM</td><td>Valley City^</td><td>F 0</td><td>0.1 mi.</td><td>20 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>24</td><td>9/30/2007</td><td>8:05 PM</td><td>Baylis^</td><td>EF 0</td><td>0.1 mi.</td><td>30 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>destroyed a barn south of town</td></tr>
</table>

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<table>
<tr><th colspan="12">Table 10
Tornadoes Reported in (Name) County
1950 - 2022</th></tr>
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<tr><td>25</td><td>9/30/2007</td><td>8:15 PM</td><td>Perry^
Perry</td><td>EF 0</td><td>2.0 mi.</td><td>40 yd.</td><td>2</td><td>n/a</td><td>n/a</td><td>n/a</td><td>*Event Description Provided Below*</td></tr>
<tr><td colspan="7"><u>*Perry (southside)*</u>
- a vacant mobile home had its roof ripped off
- another mobile home had a tree land on it causing extensive damage with 2 children in the home sustaining minor cuts and bruises</td><td colspan="5">- 3 homes sustained window and shingle damage
- a barn lost part of its roof
- numerous trees and tree limbs were blown down
- 2 vehicles sustained damage from fall tree limbs</td></tr>
<tr><td>26</td><td>1/7/2008</td><td>8:40 PM</td><td>Pleasant Hill^
Nebo^</td><td>EF 0</td><td>2.35 mi.</td><td>40 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>27</td><td>5/30/2008</td><td>3:25 PM</td><td>New Salem^</td><td>EF 1</td><td>1.42 mi.</td><td>50 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>damaged trees & destroyed a machine shed about 1/2 mile north of 1900N & 2800E</td></tr>
<tr><td>28</td><td>5/30/2008</td><td>5:15 PM</td><td>Time^
Detroit^</td><td>EF 0</td><td>3.91 mi.</td><td>40 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>only tree damage was sustained along the tornado's path</td></tr>
</table>

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Table 10
Tornadoes Reported in (Name) County
1950 - 2022

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<tr><td>29</td><td>2/20/2014</td><td>2:25 PM</td><td>Martinsburg
Time^
Detroit^</td><td>EF 2</td><td>12.09 mi.</td><td>80 yd.</td><td>1</td><td>n/a</td><td>n/a</td><td>n/a</td><td><i>Event Description Provided Below</i></td></tr>
<tr><td colspan="7"><u><i>Martinsburg</i></u>
- one home sustained minor roof and fascia damage & a window was damaged along the south side of the home
- a few large trees and several large branches were downed
<u><i>County Road 11 (north of Martinsburg)</i></u>
- the tornado sheared a path of large pine trees 30 to 40 feet tall
- many of the trees were snapped from near the base to halfway up the trunk
<u><i>County Road 7 & 205th Avenue Intersection area</i></u>
- a one story home sustained minor fascia damage and a few pine trees were snapped at the base
- a medium sized machine shed was totally destroyed
- several tomb stones in Watson's Cemetery were damaged
- at another farmstead 2 empty medium sized grain bins & a machine shed were destroyed</td><td colspan="5"><u><i>Detroit area</i></u>
- a farm house was moved off its foundation 5 inches while part of the east side of the roof was taken off
- the upper half of a large barn was removed
- an old machine shed & 2 canvas hoop sheds were completely destroyed
- damaged several large trees
- a hog building which was supported by steel I-beams was pushed to the north and northeast and debris from the structure was tossed over 1/2 mile to the northeast
- destroyed a shed before lifting off north-northeast of the Village
- several people were in the area of the shed working on repairing fence and one man sustained a minor shoulder injury and was taken to the hospital</td></tr>
<tr><td>30</td><td>5/15/2018</td><td>5:22 PM</td><td>Pearl^</td><td>EF 0</td><td>0.17 mi.</td><td>50 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>31</td><td>12/1/2018</td><td>1:54 PM</td><td>Pleasant Hill^</td><td>EF 1</td><td>1.65 mi.</td><td>25 yd.</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td><i>Event Description Provided Below</i></td></tr>
<tr><td colspan="7">- a grain bin sustained damage
- some large trees sustained damage</td><td colspan="5">- a barn was rolled about 20 yards off its foundation & another barn sustained heavy roof damage</td></tr>
</table>

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Table 10
Tornadoes Reported in (Name) County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)^1	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
32	12/1/2018	2:29 PM	Detroit^	EF 0	0.11 mi.	25 yd.	n/a	n/a	n/a	n/a	damage was primarily confined to trees but there was a home with roof damage and a large camper was blown on its side
33	12/1/2018	2:40 PM	Valley City^	EF 1	0.60 mi.	110 yd.	n/a	n/a	n/a	n/a	- significant tree damage was sustained along the east side County Highway 21 with some of the trees uprooted - a mobile home lost its roof & sustained wall damage
34	3/23/2021	6:19 PM	Valley City^								

GRAND TOTAL:	**4**	**0**	**$627,525**	**$0**

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Data.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.
NOAA, National Weather Service, Weather Forecast Office St. Louis, Tornado Database, Pike County, Illinois.
NOAA, National Weather Service, Storm Prediction Center, SVRGIS, Tornadoes (1950-2017) Database.

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Table 11
Drought Events Reported in Pike County
1980 - 2022

Year(s)	Start Month	Duration (Months)	Magnitude Drought Intensity Category[1]					Percent Crop Yield Reduction from Previous Year		Designated USDA Primary Natural Disaster Area	Crop Damages	Impacts/Event Description
			D0	D1	D2	D3	D4	Corn	Soybeans			
1983	n/a	n/a						43.7 %	32.4 %	n/a	n/a	All 102 counties in Illinois were proclaimed state disaster areas because of high temperatures and insufficient precipitation beginning in mid-June
1988 - 1989	June	16						28.8 %	7.2 %	n/a	n/a	Approximately half of all Illinois counties were impacted by drought conditions
2005 - 2006	May	13	X	X	X	X		26.7 %	10.0 %	Yes	n/a	
2007	August	5	X	X				2.5 %	22.4 %	No	n/a	
2011	August	4	X	X	X			-----	15.9 %	No	n/a	
2012 - 2013	June	9	X	X	X	X		39.9 %	-----	No	n/a	
2013 - 2014	July	8	X	X				-----	-----	No	n/a	A “flash drought” hit parts of Illinois at the end of August/beginning of September but because of its timing had very little impact on crop yields

GRAND TOTAL: **$ -**

Sources: Illinois State Water Survey, Illinois State Climatologist.
National Drought Mitigation Center, United States Drought Monitor.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.
United States Department of Agriculture, National Agricultural Statistics Service, Quik Stats Lite.

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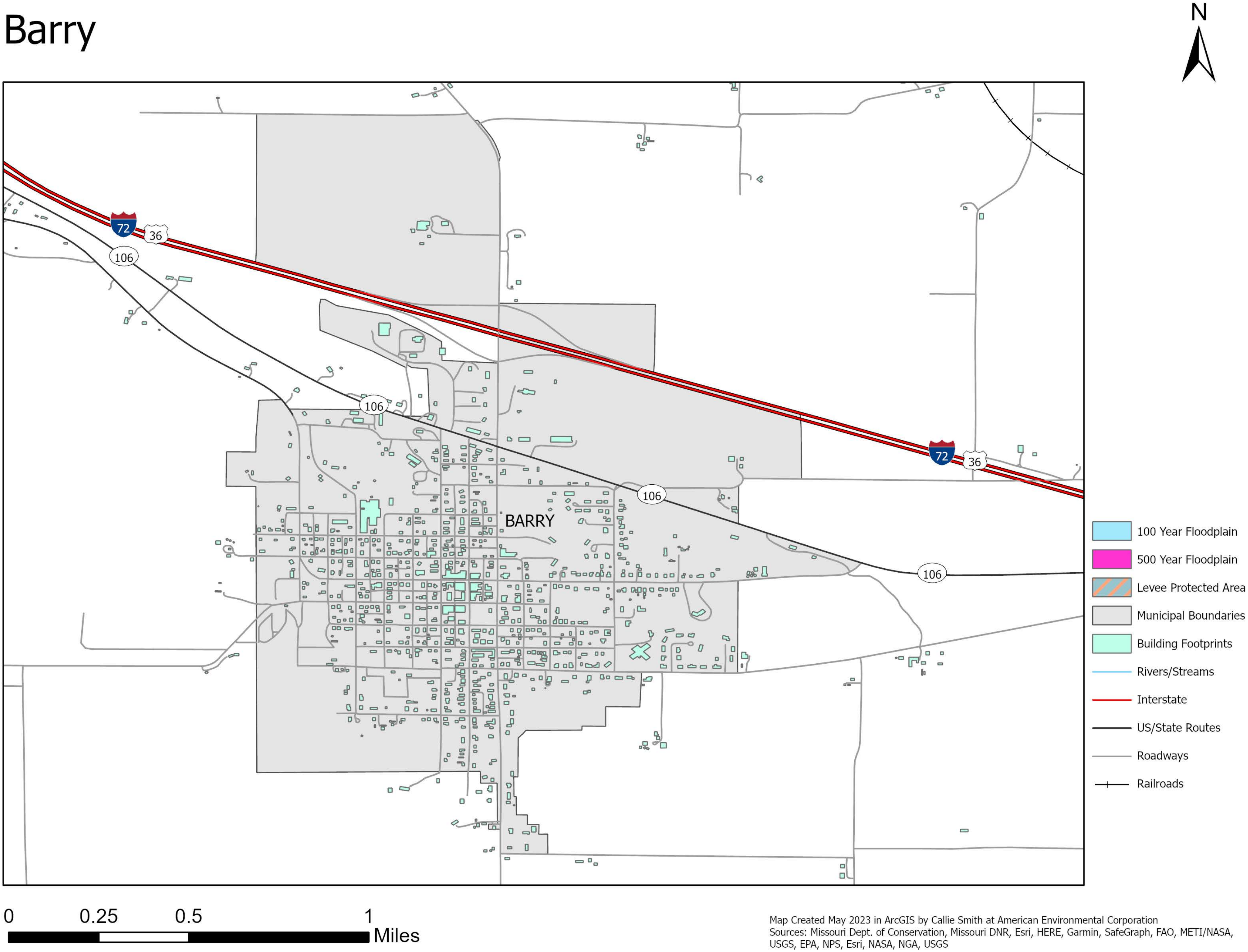
[1] An “X” identifies the level of drought intensity reached by at least a portion of the County during the event, if available.

US Drought Monitor – Drought Intensity Category Descriptions

D0	abnormally dry	D3	extreme drought
D1	moderate drought	D4	exceptional drought
D2	severe drought		

APPENDIX J

Barry

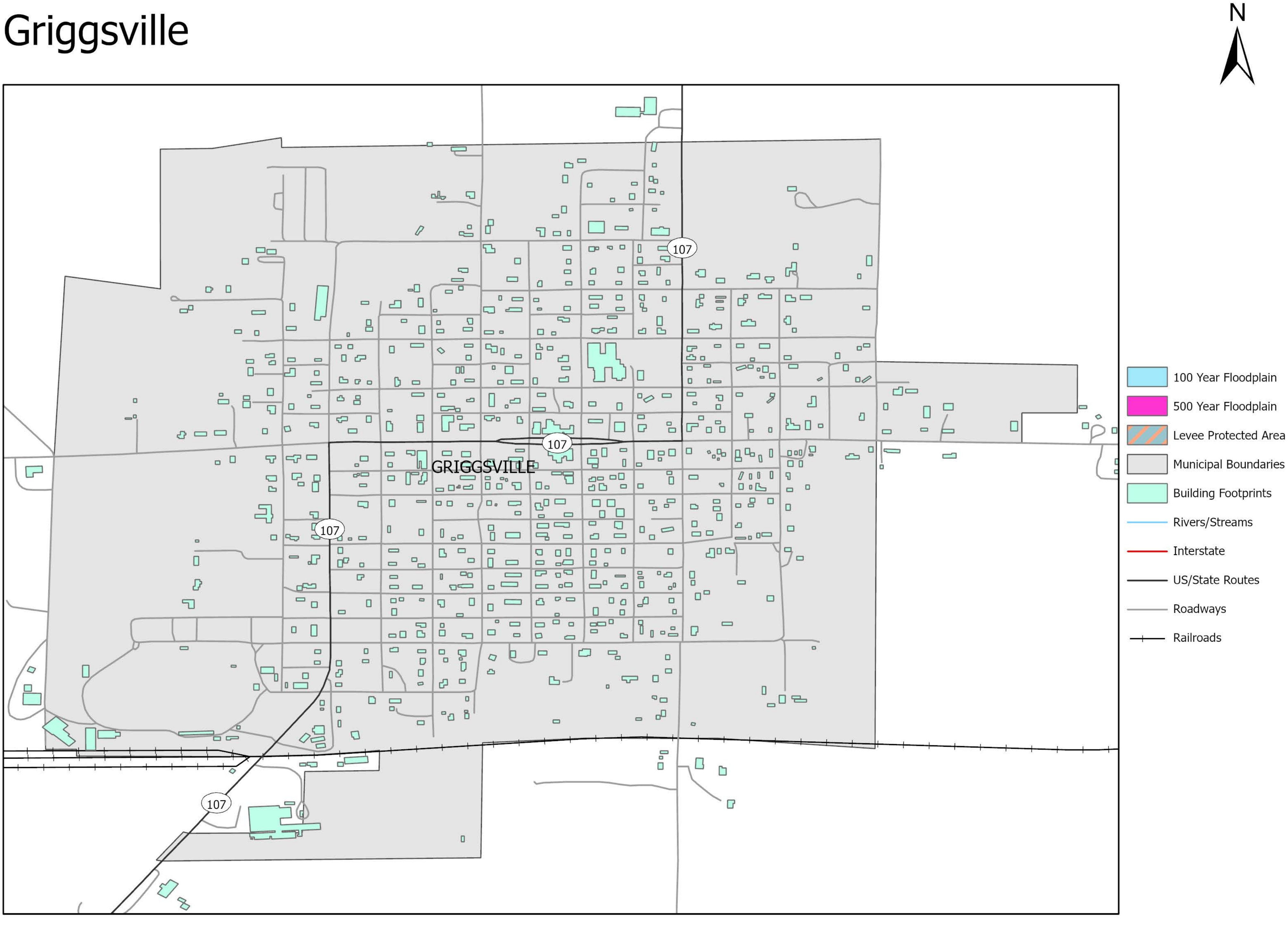


Map Created May 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Baylis

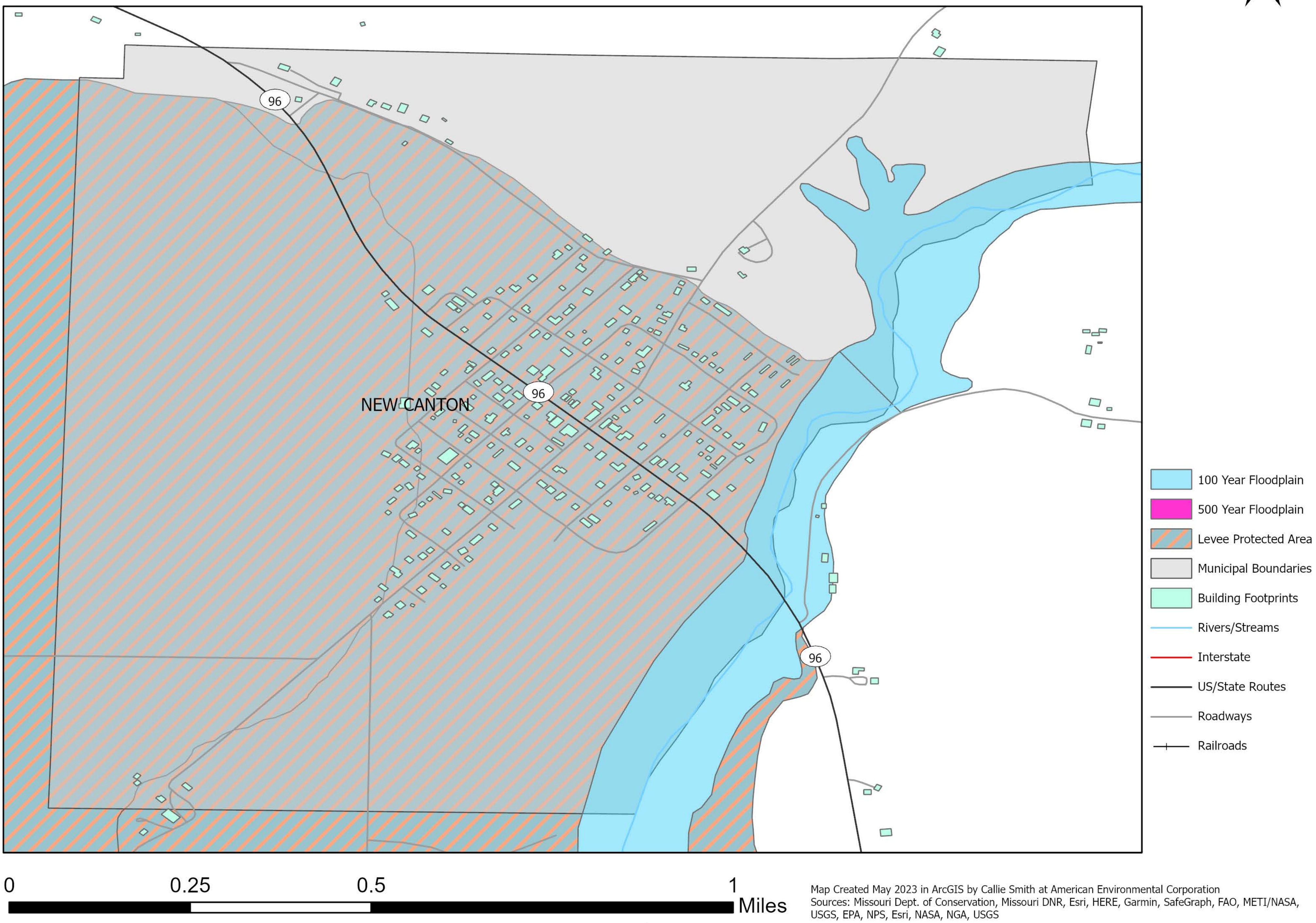
Map Created May 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Griggsville



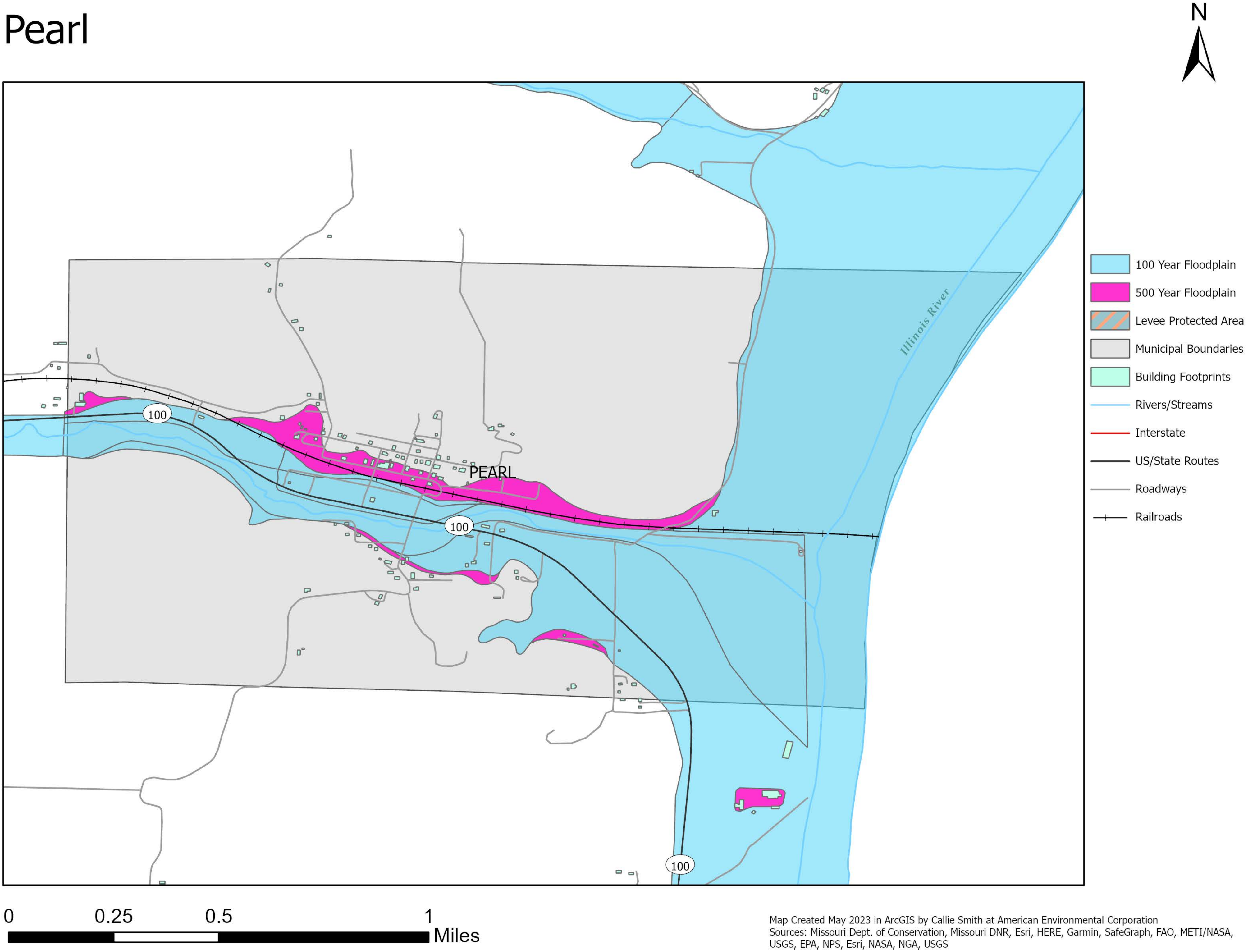
Map Created May 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

New Canton



Map Created May 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Pearl



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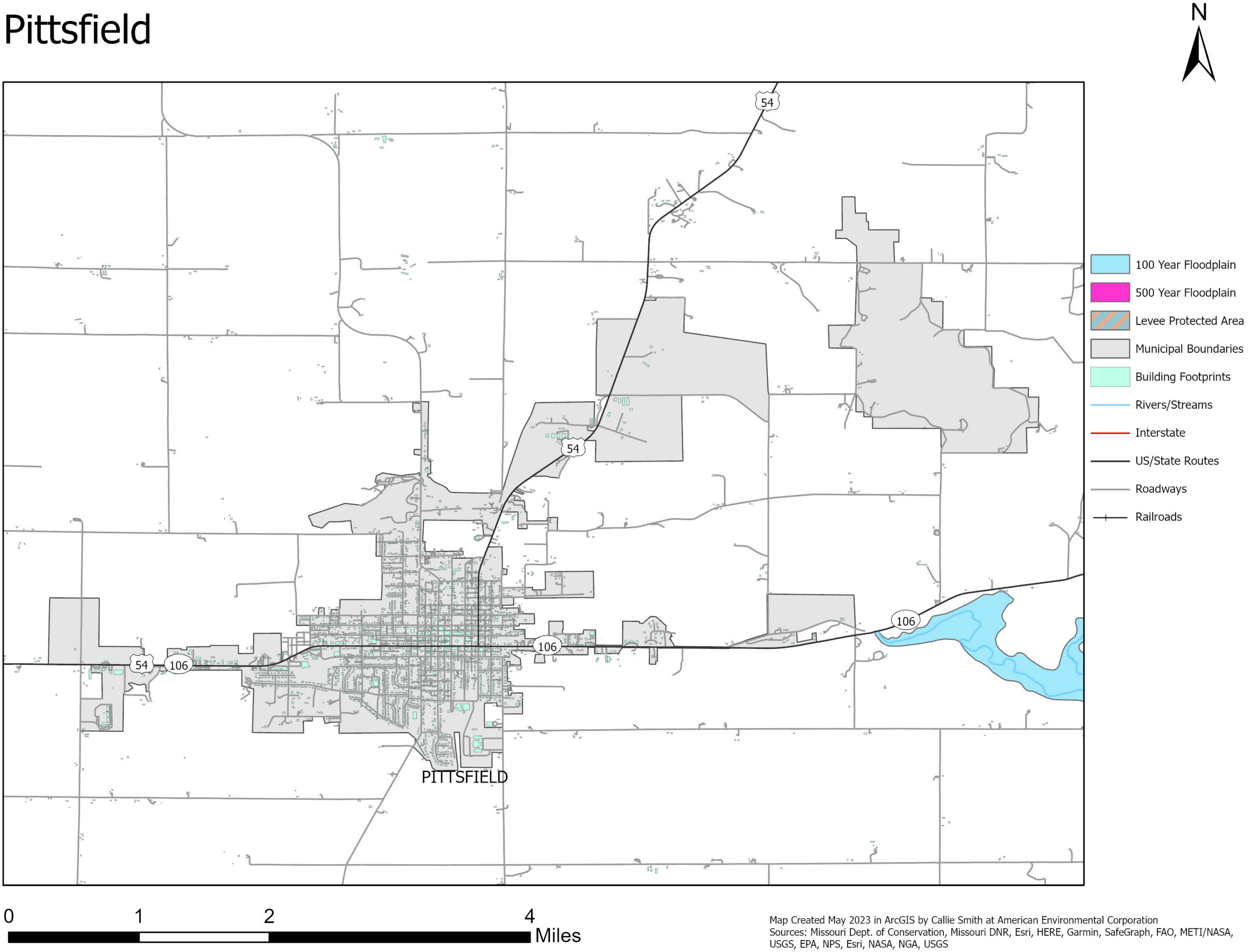
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Pittsfield



Map Created May 2023 in ArcGIS by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

APPENDIX K

JURISDICTIONAL PROJECT GRID

In the project grid below, whenever Pike County is listed alone, the implication is that the project would apply to unincorporated areas. Specific municipalities are listed if their representatives identified the project as needed in their respective communities. Whenever 'ALL' is included under community it signifies value for that project to all incorporated municipalities in the county.

In the following Project Grid, the codes under Hazard are: ***F = Flood***; **FF -= Flash Flooding**; **T = Tornado**; **SS = Severe Storms**; **ET = Extreme Temperatures**; **E = Earthquake**; and **D = Drought**. The codes under Benefit / Cost are: **H = High**; **M = Medium**; and **L = Low**. Whenever **ESDA Director** is cited under **Lead / Contact**, the implication is that person will be assisted by the municipal employees assigned that role as well who meet regularly with the County ESDA Director.

Figure 52: Pike County / Jurisdictional Project Grid

No.	Goal	Community	Project Type	Hazard	Possible Funding	Project	Priority	Lead / Contact	Proposed Schedule	Benefit / Cost
1	4	Pike County	Coordination	All	Local	Establish Multi-Jurisdictional Long Term Recovery / Mitigation Committee to coordinate and guide long term recovery efforts and mitigation activities within the county. Responsibilities will include, but are will not be limited to: 1) Host annual Mitigation Plan Meeting as required by FEMA; 2) Meet semi-annually to review progress, identify new funding streams and projects being initiated within the county; 3) coordinate and lead the long term economic recovery of the county from the floods of 2008.	J	County Board Chair	2010	H/L
2	3b	Pike County; ALL	Emergency Management	T / SS	Funding Search	Establish a county wide early warning system for natural hazards.	B	ESDA Director	2010-2011	H/H
3	2a 2b	Pike County; ALL	Education	All	Local	Develop and conduct a citizen awareness campaign regarding protection from natural hazards	B	ESDA Director / Public Health Dept / Extension / Red Cross	2010-2015	H/L
4	3a	Pike County; ALL	Emergency Management	All	Funding Search	Identify and implement an improved emergency response communication system	B	ESDA Director / Emergency Responders	2010-2012	H/H

No.	Goal	Community	Project Type	Hazard	Possible Funding	Project	Priority	Lead / Contact	Proposed Schedule	Benefit / Cost
5	1a	Pike County; ALL, Barry	Shelter	T / SS / ET	FEMA / Federal	Develop multipurpose shelter facilities for areas of dense rural population.	A	County Board / Townships / Village Board / City Council / ESDA Director	2010-2015	H/H
6	5c	Pike County; All, Barry	Policy	F / FF	Funding Search	Identify and permanently mark roadways that flood frequently with appropriate signage.	B	County Highway Department / Village & City Public Works / Township Highway Commissioners	2011	H/M
7	1a	All	Policy / Social Service	All	Funding Search	Establish "check-in" policy and procedure for vulnerable populations in the event of extreme weather and/or power outage.	J	Social Service Agencies / Public Health Dept	2010-2012	H/L
8	5d	Pike County	Infrastructure	F / FF	Funding Search	Evaluate/Update Watershed/Drainage System throughout the county and establish and adopt policies and procedures	B	County Board / Drainage District	2013-2015	H/H
9	1a	Pike County; All	Emergency Management	All	Funding Search	Assess current placement of portable defibrillators throughout the county and fill gaps; encourage countywide training on their usage; map locations	B/C	ESDA / Emergency Response Agencies	2012-2015	H/M
10	4 5	Pike County; All	Policy / Planning	All	Funding Search	Establish and maintain a Comprehensive Plan for the county, incorporating mitigation activities and Brownfield assessment into the planning.	J	County Board	2013-2015	M/M
11	5b	Pike County; Barry, Pittsfield	Infrastructure	D	Local	Map water mains to establish points where connections may be made to ensure potable water throughout the county.	J	Water Providers / ESDA Director / City Public Works	2012	M/L

No.	Goal	Community	Project Type	Hazard	Possible Funding	Project	Priority	Lead / Contact	Proposed Schedule	Benefit / Cost
12	3b	Pike County; All	Emergency Management	All	Local	Establish an enhanced Mutual Aid Agreement throughout the county.	J	ESDA Director / Emergency Response Agencies	2010	M/L
13	3a	Pike County; All	Policy / Emergency Management	All	Local	Update NIMS Training for elected and appointed officials.	J	ESDA Director / County Officials	2010	H/L
14	3b	Pike County; All	Policy	All	Local	Establish policies and procedures for documenting volunteer hours in disaster response.	J	ESDA Director	2010-2011	H/L
15	5	Pike County; All	Policy	F	Local	Maintain NFIP Participation Status; adopt or amend floodplain management regulations to comply with NFIP requirements and review periodically	J	County Board / City Councils / Village Boards	Ongoing	H/L
16	5a	Pike County;	Policy	All	Local	Review and update Building Codes to ensure that newly constructed dwellings, infrastructure, and public facilities are designed and built to be disaster resistant.	B/C	County Board / City Councils / Village Boards	2010-2015	H/L
17	1a	Pike County; All, Barry, Pittsfield	Infrastructure	T / SS	Local	Tree Program – removal of old trees, pruning / topping	B	County Board / City Councils / Village Boards	Ongoing	M/M
18	1a	Pike County; All, Barry, Griggsville, Pittsfield, Pleasant Hill	Infrastructure	All	Funding Search	Backup generator: inventory existing stock, determine both new and replacement needs and cost	B	County Board	2011-2015	H/H
19	3b	Pike County; All	Infrastructure	All	Funding Search	Reverse 911 contact system for public notification by Sheriff's Department	B	County Board	2013	H/H
20	5d	Pike County;	Infrastructure	FF	Local	Dredging of small streams	J	County Board / City Councils / Village Boards / Public Works Dept	Ongoing	M/M

No.	Goal	Community	Project Type	Hazard	Possible Funding	Project	Priority	Lead / Contact	Proposed Schedule	Benefit / Cost
21	1a 4	Pike County;	Policy / Infrastructure	T / SS	Funding Search	Require the construction of storm shelters in existing and new mobile home developments	A	County Board / City Councils / Village Boards	2012	H/H
22	1a 4	Pike County; All	Policy	All	Local	Establish animal management system	J	County Board / City Councils / Village Boards / Humane Society	2011-2012	H/L
23	2a 2b	Pike County; All	Education	All	Local	Educate public and disseminate information regarding all hazards to population through town hall meetings, presentations to groups, and displays	B/C	ESDA Director	Ongoing	H/L
24	3b	Pike County; All	Emergency Management	All	Local	Encourage the use of NOAA all-hazard radios in residences and business throughout unincorporated area	B	ESDA Director	Ongoing	H/L
25	3b	Pike County; All	Education	All	Local	Provide information to local cable and public radio and television stations regarding emergency warning and public service announcements	B/C	ESDA Director	Ongoing	H/L
26	2b	Pike County; All	Education	All	Local	Distribute information regarding hazards and safety procedures to all school districts annually	B/C	ESDA Director	Ongoing	H/L
27	5c	Pike County	Infrastructure	SS / FF	Local	Identify and prioritize needed improvements to county maintained roads that flood in heavy rainstorms, blocking or impairing road use and through access by vehicular traffic	J	County Highway Dept	2011	H/L
28	5d	Pike County	Policy	F / FF	Local	Research potential funding sources to acquire information regarding boundaries of the floodway and floodplain throughout unincorporated areas of the county	J	ESDA Director	Ongoing	H/L
29	5a	Pike County; All	Policy	T / SS / E	Local	Adopt building regulations that require wind-resistant and earthquake-resistant construction measures for critical facilities that house vulnerable populations or that house volatile liquids or hazardous waste	B/C	County Board / City Council / Village Board	2012-2014	H/L
30	3a	Pike County	Education	T / SS	Local	Maintain and educate Storm Spotter program volunteers	B	ESDA Director	Ongoing	H/L

No.	Goal	Community	Project Type	Hazard	Possible Funding	Project	Priority	Lead / Contact	Proposed Schedule	Benefit / Cost
31	1a	Pike County; All	Infrastructure	T / SS / ET	Local	Identify existing buildings as heating / cooling / storm shelters for vulnerable populations; create map(s) and make available to public	B	ESDA Director / City Council / Village Board	2011	H/L
32	3a	Pike County; All	Emergency Management	All	Local	Adopt policies and procedures delineating chain of command for emergency situations.	B/C	ESDA / Village Board	2010	H/L
33	3a 3b	Pike County; All	Education	All	Local	Educate employees, officials and community volunteers on the protocol developed for emergency situations.	J	ESDA / County Health Dept / Extension	2010	H/L
34	3b	Pike County; All	Education	All	Local	Develop public education campaign to inform residents on what to do and where to go in the event of an emergency.	J	ESDA / County Health Dept / Extension	2010-2015	H/L
35	3a	Pike County; All	Emergency Management	All	Local	Participate in county-wide Mutual Aid Agreement and Multi-jurisdictional Hazard Mitigation Implementation Committee.	J	Village Board / ESDA	2010 on	M/L
36	2b	Pike County; All	Education	All	Local	Develop comprehensive list of resources from within and outside of the county that can be used for emergency situations.	J	County Board/City Council/Village Board/ESDA Director	2010-2011	H/L
37	5c	Barry	Infrastructure	All	Funding Search/ Local	Replace older culverts in the community	B	City Council	Ongoing	M/M
38	5b	Barry	Infrastructure	All	Funding Search	Develop new lift station to accommodate new waste stream and groundwater infiltration.	B	City Council	2012-2015	H/H

APPENDIX L

Plan Maintenance Checklist

We are in the process of conducting our annual evaluation/status update for our Multi-Jurisdictional Hazard Mitigation Plan. Please review the following tasks and complete and return this checklist along with the necessary forms. If you have any questions, please let us know.

Jurisdiction: ____

Prepared By: ____

Title: ______________________________ Date: ________________

TASK 1: DAMAGE INFORMATION

Has your jurisdiction sustained any natural hazard-related damages to critical facilities and infrastructure within the last year?

☐ Yes ☐ No ☐ Don't Know

If Yes, please complete and return the attached critical facilities damages questionnaire.

TASK 2: STATUS OF EXISTING PROJECTS/ACTIVITIES

Please look over the attached Mitigation Action Tables for your jurisdiction and determine whether any of the mitigation projects/activities listed have been completed or are in progress (in the planning stages.)

Does your jurisdiction have any mitigation projects/activities in progress (in the planning stages) or completed?

☐ Yes ☐ No

If Yes, please fill out and return the attached Mitigation Action Progress Report for each project/activity that has been completed or is in progress.

Has your jurisdiction undergone any changes in priorities within the last 12 months that would impact the implementation of the listed mitigation projects/activities?

☐ Yes ☐ No

If yes, please detail the changes in priorities.

____

____

____

Plan Maintenance Checklist

TASK 3: IDENTIFICATION OF NEW PROJECTS/ACTIVITIES

Are there any new mitigation projects/activities your jurisdiction would like to see add to the Plan? (Remember, only projects included in the Plan are potentially eligible for federal mitigation projects funding.)

☐ Yes ☐ No

If yes, please complete and return the attached New Mitigation Project Form.

TASK 4: JURISDICTION EVALUATION

Have there been any significant changes in development in your jurisdiction within the last 12 months (i.e. expansion of existing businesses, siting of new businesses, new subdivision development, or expansion of existing subdivisions, demolition of businesses/residents to create green spaces, etc.)

☐ Yes ☐ No

If yes, please specify the type of development changes.

Has your jurisdiction adopted any new/updated policies, plans, regulations, or reports (i.e., comprehensive plans, building codes, zoning ordinance, etc.) that could be incorporated into this Plan?

☐ Yes ☐ No

If yes, please provide the name of the policy, plan, regulation, or report and its purpose.

Were any components of the Hazard Mitigation Plan (i.e., mitigation actions, vulnerability analyses, etc.) integrated into any new/updated policies, plans, regulations, or reports (i.e., comprehensive plans, building codes, zoning ordinance, etc.)?

☐ Yes ☐ No

If yes, please provide the name of the policy, plan, regulation, or report and what component(s) of the hazard mitigation plan were integrated.

Plan Maintenance Checklist

TASK 4: JURISDICTION EVALUATION CONTINUED…

Do any new critical facilities or infrastructure need to be added to your jurisdiction's Critical Facilities Survey?

☐ Yes ☐ No

If yes, please provide the name and address of the facility.

What are your plans for sharing information on the Plan and its annual progress with your jurisdiction and constituents (i.e., informal presentation at board/council meeting, posting update to social media or website, etc.)?

Critical Facilities Damage Questionnaire

Supplemental information about ***damages to critical infrastructure/facilities*** (i.e., government buildings, schools, communication tower and radio equipment, water & sewer treatment facilities, hospitals, etc.) that have ***taken place*** in the municipalities and County is needed for the risk assessment/vulnerability analysis portion of the Plan. If you could take a moment and think about the critical infrastructure damages caused by past natural hazard occurrences and provide any available information in the form below, it would be greatly appreciated.

Please complete <u>one record</u> for <u>each natural hazard event that damaged a critical facility</u>. Do not combine multiple events on one record. Additional forms are located on the back of this page.

Prepared By: ______________________________ Date: ______________

1.) Date of Event (month/day/year if possible)**:** ______________________

2.) Critical Facility Damaged: ______________________________

3.) Type of Hazard:

- ☐ thunderstorm (straight-line winds)
- ☐ hail
- ☐ lightning strike
- ☐ heavy rain
- ☐ flood
- ☐ tornado
- ☐ snow storm
- ☐ ice storm
- ☐ extreme cold
- ☐ drought
- ☐ excessive heat
- ☐ landslide
- ☐ sinkhole
- ☐ mine subsidence
- ☐ earthquake
- ☐ levee failure
- ☐ dam failure

4.) Types of Damages: ______________________________

____

5.) Estimate of Damages: $ ______________________________

Critical Facilities Damage Questionnaire

Prepared By: ______________________________ Date: ______________

1.) Date of Event (month/day/year if possible)**:** ______________________

2.) Critical Facility Damaged: ______________________________________

3.) Type of Hazard:

☐ thunderstorm (straight-line winds)
☐ hail
☐ lightning
☐ heavy rain
☐ flood
☐ tornado
☐ snow storm
☐ ice storm
☐ extreme cold
☐ drought
☐ excessive heat
☐ landslide
☐ sinkhole
☐ mine subsidence
☐ earthquake
☐ levee failure
☐ dam failure

4.) Types of Damages: ______________________________________

____

5.) Estimate of Damages: $ ______________________________________

1.) Date of Event (month/day/year if possible)**:** ______________________

2.) Critical Facility Damaged: ______________________________________

3.) Type of Hazard:

☐ thunderstorm (straight-line winds)
☐ hail
☐ lightning
☐ heavy rain
☐ flood
☐ tornado
☐ snow storm
☐ ice storm
☐ extreme cold
☐ drought
☐ excessive heat
☐ landslide
☐ sinkhole
☐ mine subsidence
☐ earthquake
☐ levee failure
☐ dam failure

4.) Types of Damages: ______________________________________

____

5.) Estimate of Damages: $ ______________________________________

Mitigation Action Progress Report

As part of the Plan Maintenance "monitoring" phase, the implementation status of each project and activity listed in the Plan for the participating jurisdictions needs to be identified.

1) Please review the Mitigation Action Tables provided for your jurisdiction to determine whether any of the projects/activities listed have been ***"Completed"*** or are ***"In Progress"*** (in the planning stages.)
2) For each project or activity that is ***"Completed"*** or "***In Progress"***, please fill out the following Progress Report.

Jurisdiction: ______________________________

Prepared By: ______________________________

Title: ____________________ Date: ____________________

Progress Report Period	From Date: To Date:
Project/Activity Description	
Responsible Agency	
Project Status	☐ In Progress ☐ Approved by Council/Board ☐ Included in Capital Improvement Plan/Slated for Construction & Implementation ☐ Grant Completed & Submitted ☐ Letting/Contractor Selected ☐ Notice to Proceed Issued ☐ Construction Underway ☐ Anticipated Completion Date: ____________ ☐ Other (please specify): ____________ ☐ Completed ☐ Project Delayed ☐ Project Cancelled

SUMMARY OF PROJECT PROGRESS FOR THIS REPORT PERIOD

What was accomplished during this reporting period for this project?

Were any obstacles, problems or delays encountered?	☐ Yes	☐ No	☐ Don't Know
If Yes, please describe:			

If the project was delayed, is it still relevant?	☐ Yes	☐ No	☐ Don't Know
If Yes, should the project be changed/revised?			

Other comments:

Mitigation Action Progress Report

Jurisdiction: ____________________

Prepared By: ____________________

Title: ____________________ Date: ____________________

Progress Report Period	From Date: To Date:
Project/Activity Description	
Responsible Agency	
Project Status	☐ In Progress ☐ Approved by Council/Board ☐ Included in Capital Improvement Plan/Slated for Construction & Implementation ☐ Grant Completed & Submitted ☐ Bid Letting/Contractor Selected ☐ Notice to Proceed Issued ☐ Construction Underway ☐ Anticipated Completion Date: ____________________ ☐ Other (please specify): ____________________ ☐ Completed ☐ Project Delayed ☐ Project Cancelled

SUMMARY OF PROJECT PROGRESS FOR THIS REPORT PERIOD

What was accomplished during this reporting period for this project?

Were any obstacles, problems or delays encountered?	☐ Yes ☐ No ☐ Don't Know
If Yes, please describe:	

If the project was delayed, is it still relevant?	☐ Yes ☐ No ☐ Don't Know
If Yes, should the project be changed/revised?	

Other comments:

Hazard Mitigation Projects

Multi-Jurisdictional Hazard Mitigation Plan

Participating Jurisdiction ______________________________

Prepared by: ______________________________

Title ____________________ Date: ____________

	Project Description	**Position/Organization Responsible for Implementation & Administration of the Project** *(i.e. Mayor / City Council; Public Works Director; Fire Chief / Board of Trustees)*	**Time Frame to Complete the Project** *(i.e. 1 year; 5 years; 2-5 years)*
1.			
2.			
3.			
4.			

APPENDIX M