Perry County, Illinois Multi-Hazard Mitigation Plan

A 2015 Update of the 2009 Countywide MHMP

FEMA

IEMA
ILLINOIS EMERGENCY MANAGEMENT AGENCY

County of Perry, Illinois 1827

Greater Egypt Regional Planning & Development Commission

SIU Southern Illinois University Carbondale

Multi-Hazard Mitigation Plan

Perry County, Illinois

Adoption Date: -- _____ --

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Section 1. Introduction

Hazard mitigation is any sustained action to reduce or eliminate long-term risk to human life and property from hazards. The Federal Emergency Management Agency (FEMA) makes reducing hazards one of its primary goals; hazard-mitigation planning and the subsequent implementation of mitigation projects, measures, and policies is a primary mechanism in achieving FEMA's goal.

The Multi-Hazard Mitigation Plan (MHMP) is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000). The development of a local government plan is required in order to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs. In order for the National Flood Insurance Program (NFIP) communities to be eligible for future mitigation funds, they must adopt an MHMP.

In recognition of the importance of planning in mitigation activities, FEMA created Hazus Multi-Hazard (Hazus-MH), a powerful geographic information system (GIS)-based disaster risk assessment tool. This tool enables communities of all sizes to estimate losses from floods, hurricanes, earthquakes, and other natural hazards and to measure the impact of various mitigation practices that might help reduce those losses. The Illinois Emergency Management Agency (IEMA) has determined that Hazus-MH should play a critical role in the risk assessments performed in Illinois.

Perry County completed their first Multi-Hazard Mitigation Plan in 2009. Throughout the five-year planning cycle, the Perry County Emergency Management Agency and Mitigation Planning Team reconvened to monitor, evaluate, and update the plan on an annual basis. The Natural Hazards Research and Mitigation Group at Southern Illinois University Carbondale (SIU), Greater Egypt Regional Planning and Development Commission (Greater Egypt) and Perry County have joined efforts in updating the County's first mitigation plan. The update process addressed changes in the probability and impact of specific hazards to the county, as well as changes in land-use, population, and demographics. The plan incorporates detailed GIS and Hazus-MH Level 2 analyses to improve the risk assessment, and finally revised and updated mitigation strategies. This document hereby serves as Perry County's Multi-Hazard Mitigation Plan update.

Section 2. Planning Process

2.1 Timeline

The MHMP update process is broken into a series of four meetings. These meetings were organized by SIU, Greater Egypt and hosted by the Perry County Emergency Management Agency. At these meetings, various tasks were completed by SIU, Greater Egypt, and the Perry County Mitigation Planning Team.

Meeting 1: Introduction of the MHMP process and organize resources. SIU gathered local resources that contributed to the detailed county risk assessment and presented the county's historical hazards. Based on this information, the Planning Team identified natural hazards to include in the plan, and ranked hazards by potential damages and occurrences.

Meeting 2: SIU presented the draft risk assessment, derived from the Hazus-MH and GIS modeling of the identified disasters, to the Planning Team. The general public was invited to this meeting through a series of newspaper articles and/or radio spots. At the end of the meeting, SIU encouraged the general public to ask questions and provide input to the planning process, fulfilling one of FEMA's requirements for public input.

Meeting 3: This meeting also consisted of a "brainstorming session." The Planning Team lent local knowledge to identify and prioritize mitigation strategies and projects that can address the threats identified in the risk assessment. FEMA requires the plan to contain mitigation strategies specific to each hazard and for each incorporated area within the county. At this meeting, SIU and Greater Egypt presented options for funding implementation of different mitigation strategies, including a written guide to be distributed to all participants.

Meeting 4: The Planning Team reviewed the draft plan and, proposed revisions, and accepted the plan after SIU incorporated the necessary changes. Subsequently, SIU forwarded the county MHMP to the mitigation staff at the Illinois Emergency Management Agency (IEMA) for review prior to submitting it to FEMA.

2.2 Jurisdiction Participation Information

Approximately twenty-one jurisdictions participated in the development of this MHMP with the intent of formally adopting the plan and subsequently fulfill the requirements of the DMA 2000. Various representatives from each jurisdiction were present at the meetings (see Section 2.3 Planning Team Information). Each jurisdiction falls under the one of the following categories: County, City, Village, Town, School, or Non-Profit Organization.

Participating Jurisdictions

Perry County	Pinckneyville Community Hospital	Community Consolidated School District #204
Cutler	Marshall Browning Hospital	Du Quoin CUSD #300
Du Quoin	Perry County Counseling Center	Pinckneyville Community High School District #101
Pinckneyville	Gold Plate Program of Perry County	Pinckneyville School District #50
St. Johns	Five Star Industries, Inc.	Tamaroa School District #5
Tamaroa	Rend Lake Conservancy District	Christian Fellowship School
Willisville	Coulterville Community Fire Protection District	Rend Lake College

2.3 Planning Team Information

David Searby, Perry County EMA Coordinator, heads the Planning Team. The Planning Team includes representatives from various county departments, municipalities, and public and private utilities. Members of the Planning Team have a common vested interest in the County's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. All members of the Planning Team actively participated in the meetings, reviewed and provided comments on the draft plan, participated in the public input process and the county's formal adoption of the plan.

Perry County Planning Team Members

Jurisdiction	Name	Title
Perry County	David Searby	EMA Coordinator
	Joyce Rheal	EMA Staff
	Bruce Reppert	EMA Staff
	Steve Behm	Sheriff's Lieutenant
	Robert Kelly	Chairman, County Commissioner
Cutler	Ricky Hepp	Village Trustee
Du Quoin	Bradley Myers	City Clerk
	Raymond Clark	ESDA Coordinator
	Bob Shaw	Fire Chief
Pinckneyville	James Gielow	Fire Chief
	Shane Malawy	Administrator, Pinckneyville Ambulance Service
St. Johns	Matthew Benson	Village Attorney
Tamaroa	Curtis Stube	Village President
Willisville	Clarence Warner, Jr.	Village President
Pinckneyville Community Hospital	Kevin Daughterty	Environmental Service Manager
	Eva Hopp	CNE
Marshall Browning Hospital	Lisa Smith	Director of Cardiopulmonary
Perry County Counseling Center	Susan Engelhardt	Executive Director
Gold Plate Program of Perry County	Tammy Asbury	Director
Five Star Industries, Inc.	Susan Engelhardt	Executive Director
Rend Lake Conservancy District	Andrew Neal	GIS Mapping Coordinator
Coulterville Community Fire Protection District	Robert Fox	President
Community Consolidated School District #204	Jerry Travelstead	Superintendent
Du Quoin CUSD #300	Cory Robbins	Business Manager
Pinckneyville Community High School District #101	Keith Hagene	Superintendent
Pinckneyville School District #50	Timothy O'Leary	Superintendent
Tamaroa School District #5	Cindy Opp	Principal
Christian Fellowship School	Stuart L. Davis	Principal
American Red Cross	Sandra Webster	Direction, Little Egypt Network

The DMA 2000 planning regulations require that Planning Team members from each jurisdiction actively participate in the MHMP process. The Planning Team was actively involved on the following components:

- Attending the MHMP meetings
- Providing available assessment and parcel data and historical hazard information
- Reviewing and providing comments on the draft plans
- Coordinating and participating in the public input process
- Coordinating the formal adoption of the plan by the county

The first MHMP update meeting was held in Pinckneyville, Illinois on September 11th, 2014. Representative from SIU explained the rationale behind the MHMP update process and answered questions from the participants. SIU representatives also provided an overview of GIS/Hazus-MH, described the timeline and the process of mitigation planning.

Planning Meetings

MEETING 1	Sept 11th, 2014
MEETING 2	Jan 26th, 2015
MEETING 3	June 29th, 2015 July 10th, 2015
MEETING 4	September 23rd, 2015

The Perry County Planning Team assembled for four formal meetings. Each meeting was approximately two hours in length. Additional meeting were held outside of the four formal meetings. Appendix A includes the minutes for all meeting. During these meetings, the Planning Team successfully identified critical facilities, reviewed hazard data and maps, identified and assessed the effectiveness of existing mitigation measures, established mitigation projects for the future, and assisted with preparation of the public participation information.

2.4 Public Involvement

The Perry County EMA solicited public input throughout the planning process and a public meeting was held on January 26th, 2015 to review the County's risk assessment. Appendix A contains the minutes from the public meeting. Appendix B contains press releases and/or articles sent to local newspapers throughout the MHMP development process.

2.5 Neighboring Community Involvement

The Planning Team invited participation from various representatives of county government, local city and town governments, community groups, local businesses, and universities. The Planning Team also invited participation from adjacent counties to obtain their involvement in the planning process.

Neighboring Community Participation

Person Participating	Neighboring Jurisdiction	Title/Organization
Ryan Buckingham	Franklin County	EMA Coordinator
Derek Misener	Jackson County	EMA Coordinator
Steve Lueker	Jefferson County	EMA Coordinator
Kelly Huddleston	Williamson County	EMA Coordinator

2.6 Review of Technical Documents

The Perry County Planning Team identified technical documents from key agencies to assist in the planning process. These documents include land use plans, comprehensive plans, emergency response plans, municipal ordinances, and building codes. The planning process incorporated the existing natural hazard mitigation elements from previous planning efforts. The following technical data, reports, and studies were utilized:

Federal Emergency Management Agency
- *Developing the Mitigation Plan (April 2003)*
- *Mitigation Ideas (January 2003)*
- *Local Mitigation Planning Handbook*
- *Flood Insurance Study (May 2010)*

United States Census Bureau
- *County Profile Information*
- *2010 Census Data*
- *American Community Survey (2009-2013)*

NOAA National Climatic Data Center
- *Climate Data*

NOAA / National Water Service Storm Prediction Center
- *Severe Weather Data*

Illinois Emergency Management Agency
- *2013 Illinois Natural Hazard Mitigation Plan*

Illinois Environmental Protection Agency
- *2014 303d Listed Waters and Watershed Maps*

Illinois State Water Survey
- *Climate Data*

Illinois Department of Commerce and Economic Opportunity
- *Community Profiles*

Greater Egypt Regional Planning and Development Commission
- *Comprehensive Economic Development Strategy 2010-2014*

Perry County
- *2013 Assessment Records*
- *2013 Countywide GIS Parcel Database*
- *2009 Multi-Hazard Mitigation Plan*
- *2014 Perry County LEPC HAZMAT Plan*
- *2014 Perry County Emergency Operations Plan*

Du Quoin
- *2014 Du Quoin Emergency Operations Plan*

2.7 Adoption by Local Government

Upon IEMA and FEMA approval, the Planning Team presented and recommended the plan to the County Board of Commissioners for formal adoption. The plan was formally adopted by the Perry County Board on <adoption date>. The Planning Team worked with the County and its jurisdictions to ensure all parties formally adopted the plan. Appendix C contains the Adopting Resolutions for each participating jurisdiction.

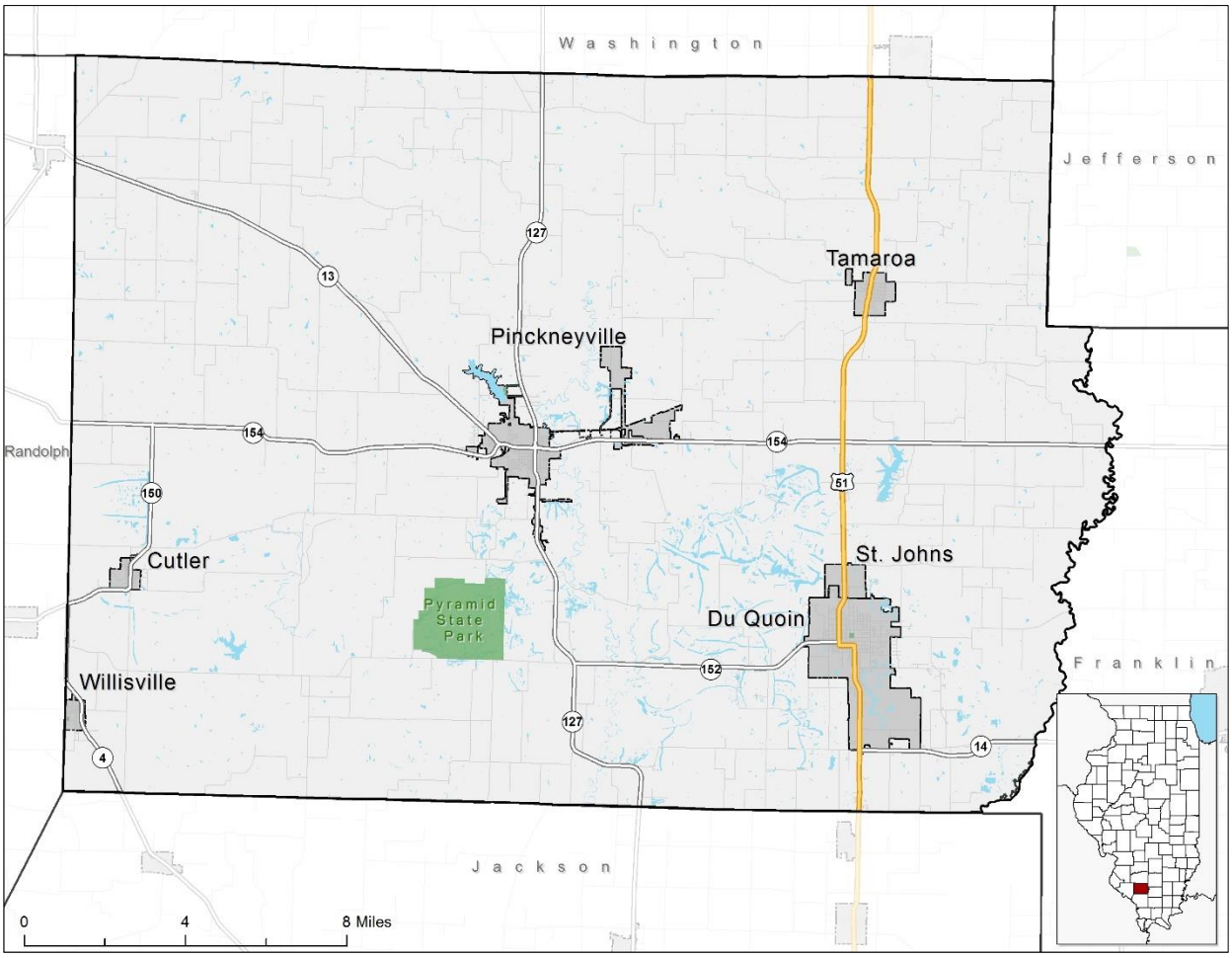
Section 3. County Profile

3.1 County Background

Perry County organized and claimed its boundaries from the division of Randolph and Jackson Counties in 1827. The county was named after Commodore Oliver Hazard Perry of the United States Navy, who won distinction as Commander of the fleet in the battle of Lake Erie. In 1828 the location of the county seat was established in Pinckneyville.

Perry County is located in the southwest Illinois (Figure 3-1). It is bounded on the north by Washington County, on the south by Jackson County, on the west by Randolph County, and on the east by Perry and Franklin Counties. Its relation to major urban areas is as follows: 73 miles southeast of St. Louis, Missouri; 143 miles south of Springfield, Illinois; 316 miles south-southwest of Chicago, Illinois.

Figure 3-1. Perry County and Surrounding Region



Perry County's population has remained relatively stable over the past three decades. The major sources of economic activity include manufacturing, coal mining, education, health, agriculture, social services, public administration, retail trade, arts, entertainment, recreation, accommodation, and food services. A few of the top private employers in the county include Illinois Department of Corrections, Pinckneyville

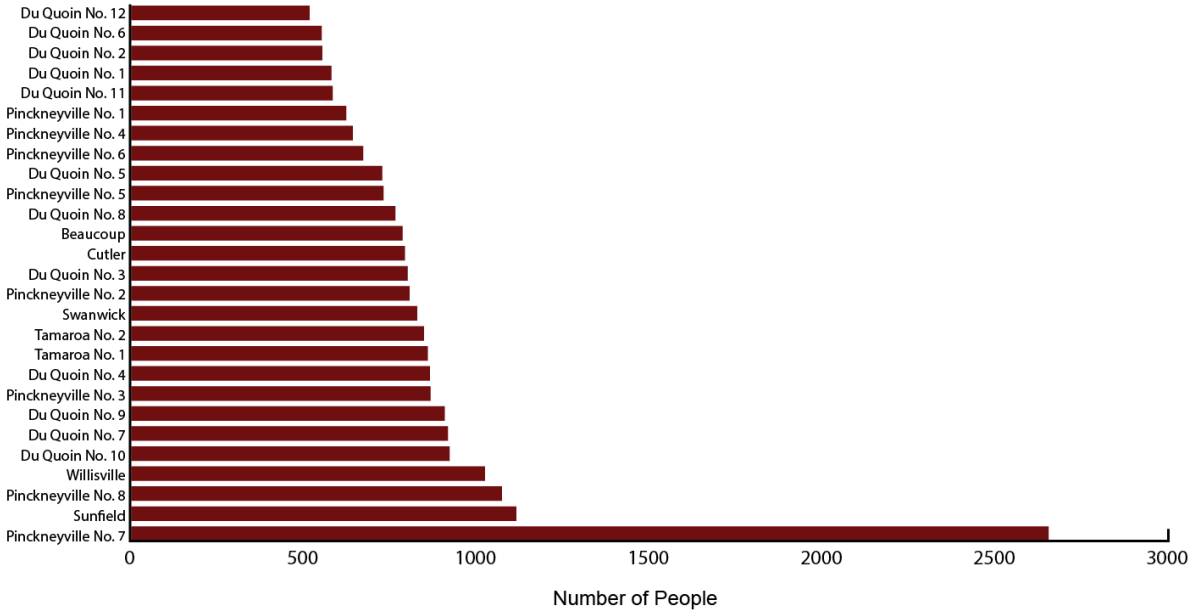
Community Hospital, Marshall Browing Hospital, and General Cable. New development in Perry County tends to focus around the cities of Du Quoin and Pinckneyville.

Perry County offers amenities such as recreation, shopping centers, education, restaurants, and entertainment. A Rend Lake College off-campus site is located in Pinckneyville. Pyramid State Park is the largest state park in Illinois located just south of Pinckneyville. The State Fair Grounds in Du Quoin hosts fairs, concerts, racing, and many other events. Other communities within the county offer similar amenities, such as restaurants, entertainment, and shopping on a rural scale.

3.2 Demographics

According to the U.S. Census Bureau, Perry County's 2013 population estimate is 21,887, a decrease of 2.1% from 2010. The population is spread throughout 27 precincts: Beaucoup, Cutler, Du Quoin 1-12, Pinckneyville 1-8, Sunfield, Swanwick, Tamaroa 1-2, and Willisville. Figure 3-2 displays the breakdown of population by township from the 2010 Census.

Figure 3-2. Perry County 2010 Population by Township



3.3 Economy and Industry

Perry County is strategically located along the bustling business corridor along US Highway 51 and home to the Du Quoin State Fairgrounds. Education, health, social services, manufacturing and retail continue to drive the industrial sectors in Perry County (American Community Survey 2013). Education services, health care, social assistance and manufacturing employ 41% of the workforce. Perry County's major employers include Illinois Department of Corrections, Marshall Browning Hospital, Pinckneyville Community Hospital, and General Cable. The 2013 annual per capita income in the county is $19,716, compared to an Illinois average of $29,666. Table 3-1 lists the major employers and the approximate number of employees in Perry County.

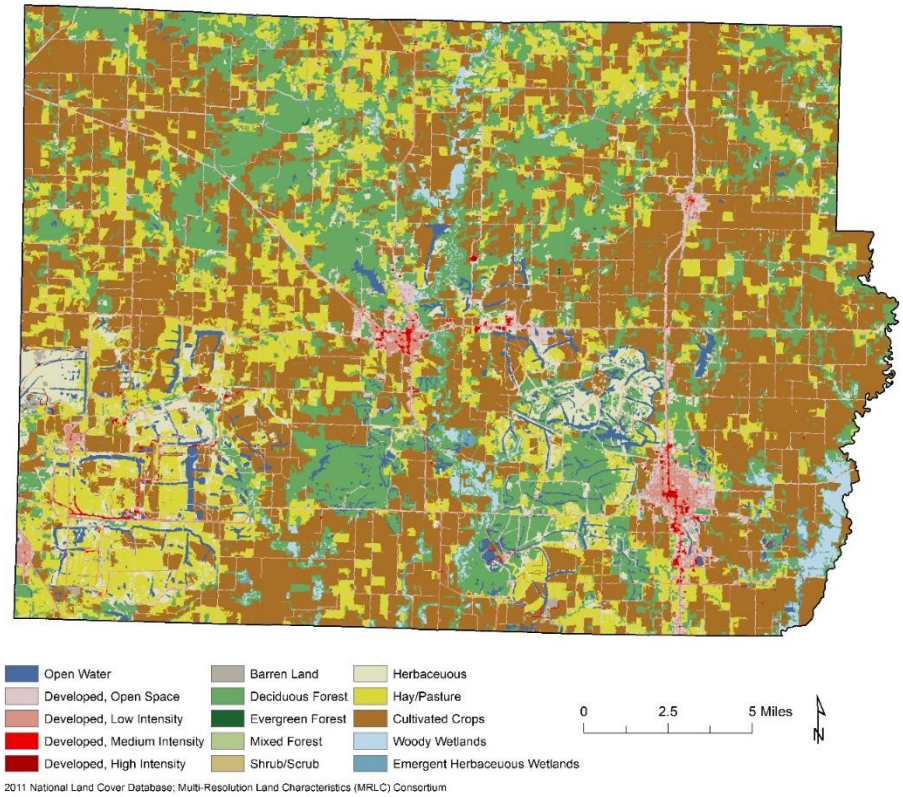
Table 3-1. Perry County's Major Employers

Employer	Industry	Approximate Number of Employees
Illinois Department of Corrections	State Government	400
Pinckneyville Community Hospital	Health Care	224
Marshall Browning Hospital	Health Care	220
General Cable	Industry	192
Du Quoin CUSD #300	Education	180
Perry County Government	Local Government	124
Five Star Industries, Inc.	Nonprofit	75
City of Du Quoin	Local Government	53
Pinckneyville High School District #50	Education	47
City of Pinckneyville	Local Government	32

3.4 Land Use and Development Trends

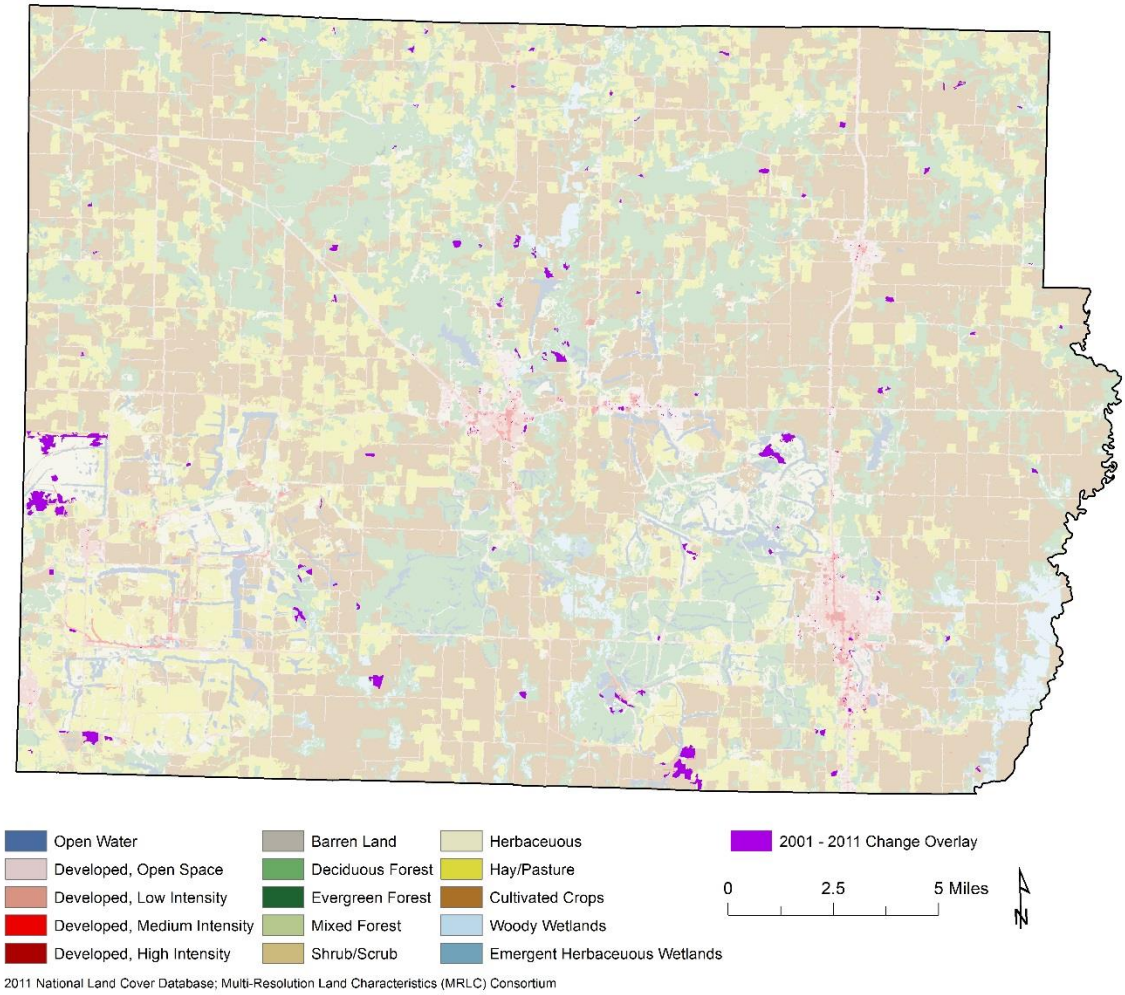
Pre-European settlement, Perry County was densely forested with few areas of prairie. Since settlement, agriculture, coal mining, and urbanization have dramatically altered the county's land cover. Figure 3-3 depicts the current land uses in Perry County. Today, agriculture is the predominant land cover in the county. This fact did not result because of great agricultural capabilities of the land as a major agricultural producer; neither did it occur because of maximum economic development potential resting in agricultural pursuits. Rather it is a result of the existence of large volumes of land which cannot rationally be occupied by major urban uses within the foreseeable future. As a result many agricultural uses have only limited agricultural potential. The western and northern portions of the county are the primary areas of agriculture use. Additional scattered areas are located within the urban core in segments which need not be utilized for urban expansion. These agricultural areas become the overflow areas of future growth. Corn is the primary crop, followed by soybeans, winter wheat, and hay.

Figure 3-3. Land Use in Perry County



The National Land Cover Database was analyzed to determine land cover change across Perry County from 2001 to 2011. Figure 3-4 depicts the National Land Cover Database 2011 land cover with change areas highlighted in magenta. The analysis revealed that approximately 5.2 square kilometers (km^2) of the total land area (1,157.9 km^2) changed.

Figure 3-4. Land Use in Perry County



In recent years, residential developments tend to focus in the Du Quoin and Pinckneyville areas. Residential land use has had few significant developments within the county. The largest communities within the county are the cities of Du Quoin (5,977) and Pinckneyville (5,570) according to the U.S. Census Bureau 2013 population estimates.

Commercial land use has historically been, and continues to be, concentrated within the business districts of the incorporated municipalities of the county. However, the most recent commercial growth has occurred in and around the city of Du Quoin and Pinckneyville.

Industrial land use has been strategically planned and concentrated within the Du Quoin Industrial Park and Pinckneyville Industrial Park. Pinckneyville is the predominant location for most of the industries in the county. The major industries in the county are Cooper B-Line, Contempri Industries Inc., and General Cable.

Coal mining was an important industry in Southern Illinois Region between the 1930s and 1980s. Although coal mining activities declined significantly between 1990 and 2002, a modest rejuvenation of the coal industry is occurring in Perry County. Strip mining has left an indelible mark on Perry County. In areas that were strip mined, particularly prior to Surface Mine Reclamation Action of 1977, the land has been left unsuitable for agriculture or significant commercial or residential development. These areas often contain large piles of mine spoil and deep pits filled with water that alter surface water drainage. In Perry County abandon strip mines are generally found in the southern portions of the county.

Public land use in Perry County includes schools, parks, playgrounds, public utilities, and transportation facilities. The major areas of public land use are located in the southern parts of the county, Pyramid State Park. Other major areas include the Pinckneyville-Du Quoin Airport, Pinckneyville Fairgrounds, and Du Quoin State Fairgrounds.

3.5 Climate

The climate in Perry County is typical of Southern Illinois and is generally characterized by hot dry summers and cool wet winters. The variables of temperatures, precipitation, and snowfall can vary greatly from one year to the next. In summer, the average low is 64.8° F and average high is 87.8° F; however, daily maximum temperatures often exceed 103° F for the period of time (several weeks) between June and September.

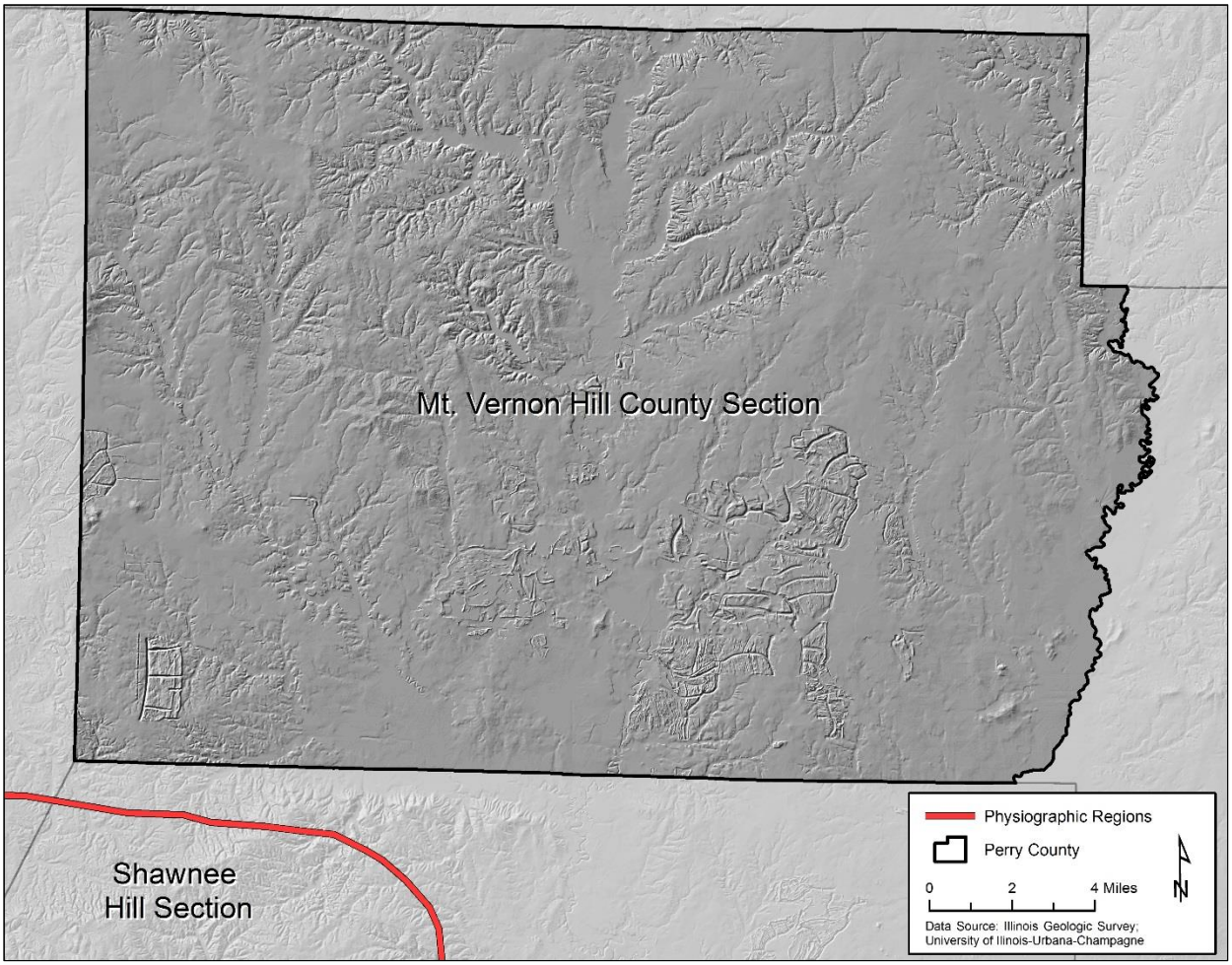
During the fall and into the spring, freezing temperatures can occur any time between September and May. The average low and high temperatures in January are 15.3° F and 42.6° F, respectively. Average annual precipitation is 42.42 inches. While the winters are generally cool, i.e. temperatures are above freezing most days. Extended periods (days to a couple of weeks) of sub-freezing temperatures often occur and are sometimes accompanied by significant amounts of ice and snow.

3.6 Topography

Perry County is located in the Mount Vernon Hill Country physiographic sub-division of the Till Plains. Figure 3-5 depicts the physiographic divisions within Perry County. The Mount Vernon Hill Country is characterized by low rolling hills and broad alluvial valleys along the major streams. The relief in this region is not pronounced. Upland prairies are flat to moderately hilly, and the valleys are shallow. The land surface is primarily controlled by bedrock, which has been only slightly modified by glacial drift deposits. While the southern boundary of the Mount Vernon Hill Country lies within a few miles of the limits of glaciations, moraine ridges are essentially absent in the area.

The highest elevation(s) (~576 feet above sea level) in Perry County are found in the northwest corner of the county near Swanwick. The lowest elevation(s) (~388 feet above sea level) are found in the central southern portion of the county near Pyatts.

Figure 3-5. Physiographic Divisions of Perry County and Surrounding Terrain

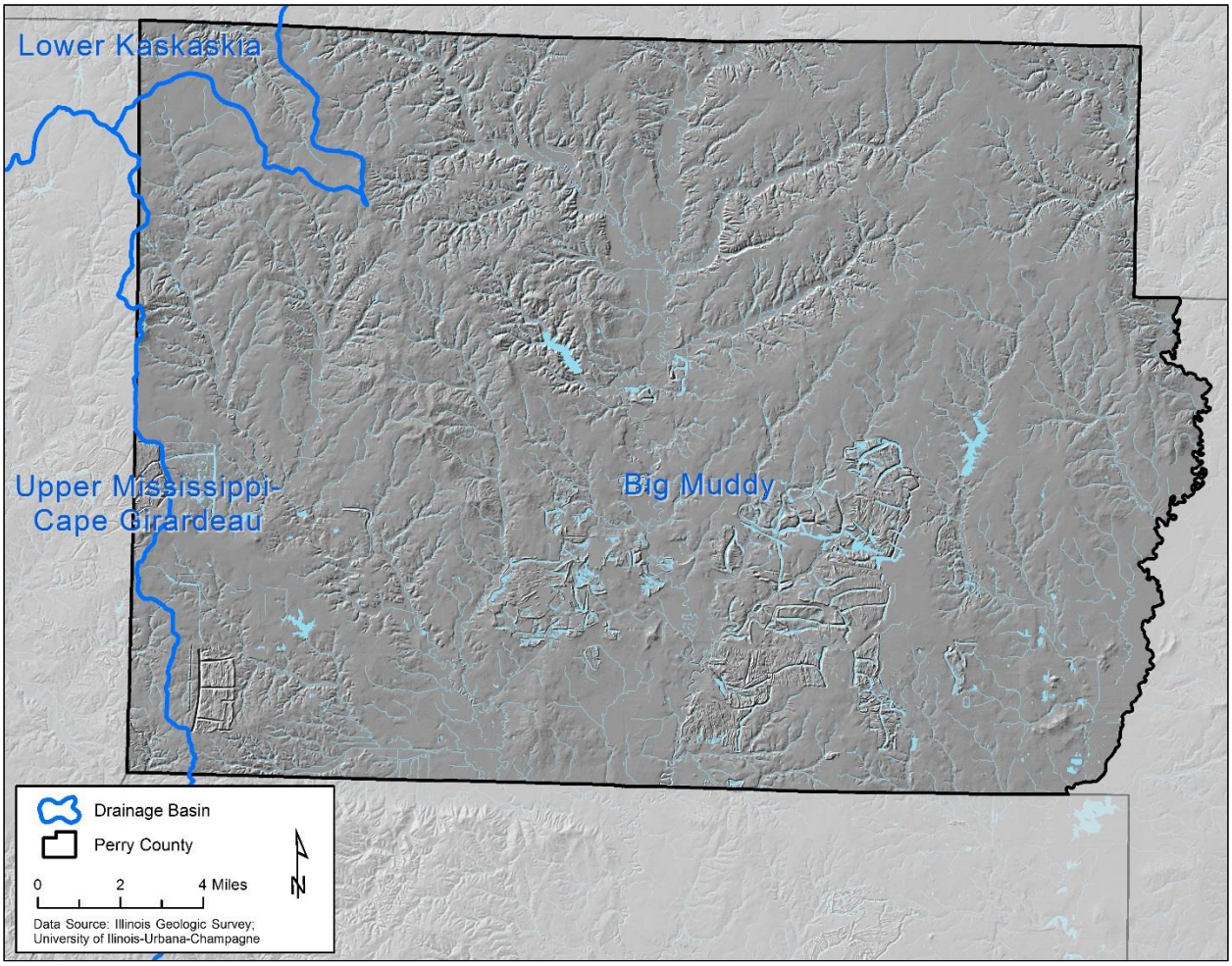


3.7 Major Lakes, Rivers, and Watersheds

Of the 102 Illinois counties, Perry County ranks fourty-one in total open water acreage in Illinois. Nearly 8,000 acres are covered by lakes, rivers and streams. Figure 3-6 depicts the major drainage basins in Perry County. The county crosses three eight-digit Hydrologic Unit Code (HUC) Watersheds: Big Muddy River Watershed, Lower Kaskaskia River Watershed, and Upper Mississippi – Cape Girardeau Watershed. There are seven significant lakes in Perry County: Pinckneyville Reservoir, Boulder North, Boulder South, Crystal, Big Beaver, Wesslyn Cut, Green River, and Du Quoin City Lake.

The Big Muddy River Watershed enters into the county from the north and covers the majority of the county. This watershed has a general slope toward the south and is drained by the Little Muddy River and Beaucoup Creek into the Big Muddy River, which flows into the Mississippi River. The Lower Kaskaskia River Watershed covers a small portion of the northwest corner of the county and lies west of the Big Muddy River Watershed with a general slope to the northwest. It is drained by Mud Creek, which eventually flows to the Mississippi River. The Upper Mississippi – Cape Girardeau Watershed covers a small portion of the southwest corner of the county and lies to the west of the Big Muddy River Watershed with a general slope toward the southwest. It is drained by Mississippi River.

Figure 3-6. Major drainage basins in Perry County



Section 4. Risk Assessment

The goal of mitigation is to reduce future hazard impacts including loss of life, property damage, disruption to local and regional economies, and the expenditure of public and private funds for recovery. Sound mitigation requires a rigorous risk assessment. A risk assessment involves quantifying the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people. This assessment identifies the characteristics and potential consequences of a disaster, how much the disaster could affect the community, and the impact on community assets. This risk assessment consists of three components—hazard identification, vulnerability assessment, and risk analysis.

4.1 Hazard Identification

4.1.1 Existing Plans

The Planning Team identified technical documents from key agencies to assist in the planning process and incorporated the natural hazard mitigation elements from previous 2009 Perry County Multi-Hazard Mitigation Planning efforts. Several other documents were used to profile historical hazards and guide the Planning Team during the hazard ranking exercise. Section 2-6 contains a complete list of the technical documents utilized to develop this plan.

4.1.2 National Hazard Records

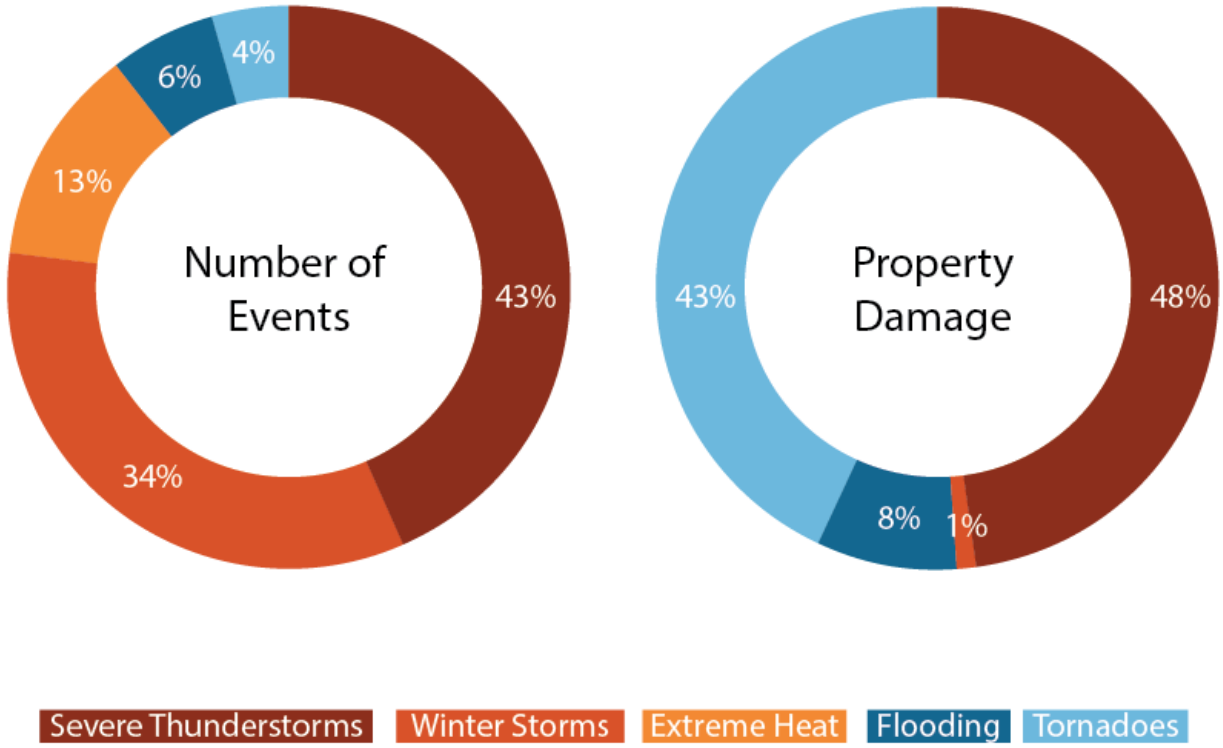
To assist the Planning Team, historical storm event data from the National Climatic Data Center (NCDC) was complied. NCDC records are estimates of damages reported to the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses.

The NCDC database included 710 reported meteorological events in Perry County from 1950-2014 (the most updated information as of the date of this plan). The following hazard-profile sections each include a summary table of events related to each hazard type. Table 4-1 summarizes the meteorological hazards reported for Perry County. Figure 4-1 summarize the relative frequency of NCDC reported meteorological hazards and the percent of total damage associated with each hazard for Perry County. Full details of individual hazard events are on the NCDC website. In addition to NCDC data, Storm Prediction Center (SPC) data associated with tornadoes, strong winds, and hail was mapped using SPC-recorded latitudes and longitudes. Appendix D includes a map of these events.

Table 4-1. Summary of Meteorological Hazards Reported by the NCDC for Perry County

Hazards	Time Period		Number of Events	Property Damage	Deaths	Injuries
	Start	End				
Flooding	1996	2014	28	$592,000	0	1
Severe Thunderstorms	1955	2014	200	$3,665,200	0	6
Tornadoes	1957	2013	20	$3,326,500	1	17
Winter Storms	1996	2014	155	$115,000	3	0
Extreme Heat	1997	2013	58	$0	0	0

Figure 4-1. Distribution of NCDC Meteorological Hazards for Perry County



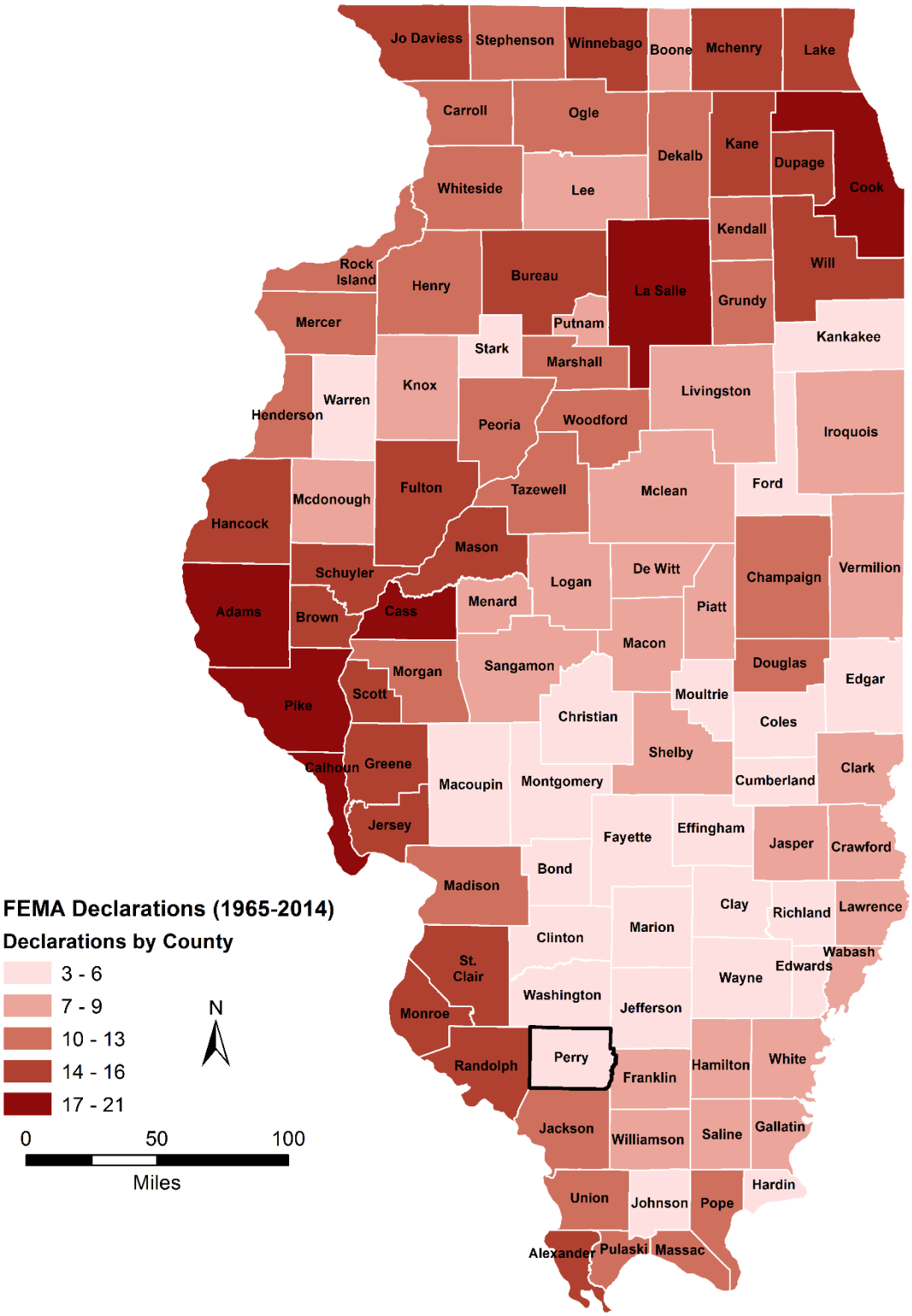
4.1.3 FEMA Disaster Information

Since 1957, FEMA has declared 53 major disasters and 7 emergencies for the State of Illinois. Emergency declarations allow states to access FEMA funds for Public Assistance (PA); disaster declarations allow for even more PA funding, including Individual Assistance (IA) and the Hazard Mitigation Grant Program (HMGP). Perry County has received federal aid for four declared disasters and one emergency since 1965. Table 4-2 lists specific information for each disaster declaration in Perry County. Figure 4-2 depicts the disasters and emergencies that have been declared for the State of Illinois and Perry County since 1965.

Table 4-2. Details of FEMA-declared Emergencies and Disasters in Perry County

Declaration Number	Date of Declaration	Description
660	06/05/1982	Severe Storms and Tornadoes
1112	05/06/1996	Severe Storms and Flooding
1416	05/21/2002	Severe Storms, Tornadoes, and Flooding
3230	09/07/2005	Hurricane Katrina Evacuation
1991	06/07/2011	Severe Storms and Flooding

Figure 4-2. FEMA-declared Emergencies and Disasters in Illinois



4.1.4 Hazard Ranking Methodology

Based on Planning Team input, national datasets, and existing plans, the Perry County Planning Team re-ranked the list of hazards from the 2009 MHMP. These hazards ranked the highest based on the Risk Priority Index discussed in Section 4.1.5.

Perry County Hazard List

TORNADOES

HAZARDOUS MATERIALS RELEASE

EARTHQUAKES

SEVERE THUNDERSTORM

WINTER STORMS

FLOODING

WILDFIRE

GROUND FAILURE

4.1.5 Risk Priority Index

The Risk Priority Index (RPI) quantifies risk as the product of hazard probability and magnitude so Planning Team members can prioritize mitigation strategies for high-risk-priority hazards. Planning Team members use historical hazard data to determine the probability, combined with knowledge of local conditions to determine the possible severity of a hazard. Tables 4-3 and 4-4 display the criteria the Planning Team used to quantify hazard probability and magnitude.

Table 4-3. Hazard Probability Ranking

Probability	Characteristics
4 – Highly Likely	Event is probable within the next calendar year This event has occurred, on average, once every 1-2 years in the past
3 – Likely	Event is probable within the next 10 years Event has a 10-50% chance of occurring in any given year This event has occurred, on average, once every 3-10 years in the past
2 – Possible	Event is probable within the next 50 years Event has a 2-10% chance of occurring in any given year This event has occurred, on average, once every 10-50 years in the past
1 – Unlikely	Event is probable within the next 200 years Event has a 0.5-2% chance of occurring in any given year This event has occurred, on average, once every 50-200 years in the past

Table 4-4. Hazard Severity Ranking

Magnitude/Severity	Characteristics
8 – Catastrophic	Multiple deaths Complete shutdown of facilities for 30 or more days More than 50% of property is severely damaged
4 – Critical	Injuries and/or illnesses result in permanent disability Complete shutdown of critical facilities for at least 14 days More than 25% of property is severely damaged
2 – Limited	Injuries and/or illnesses do not result in permanent disability Complete shutdown of critical facilities for more than seven days More than 10% of property is severely damaged
1 – Negligible	Injuries and/or illnesses are treatable with first aid Minor quality of life lost Shutdown of critical facilities and services for 24 hours or less Less than 10% of property is severely damaged

The product of hazard probability and magnitude is the RPI. The Planning Team members ranked specified hazards based on the RPI, with larger numbers corresponding to greater risk. After evaluating the calculated RPI, the Planning Team adjusted the ranking to better suit the County. Table 4-5 identifies the RPI and adjusted ranking for each hazard specified by the Planning Team.

Table 4-5. Perry County Hazard Priority Index and Ranking

Hazard	Probability	Magnitude/Severity	Risk Priority Index	Rank
Tornadoes	3	8	24	1
Hazardous Materials Release	3	4	12	2
Earthquakes	2	6	12	3
Severe Thunderstorms	4	2	8	4
Winter Storms	3	2	6	5
Flooding	2	2	4	6
Wildfire	2	1	2	7
Ground Failure	2	1	2	8

4.1.6 Jurisdictional Hazard Ranking

Each jurisdiction created its own RPI because hazard susceptibility may differ by jurisdiction. During the five-year review of the plan, the Planning Team will update this table to ensure these jurisdictional rankings accurately reflect each community's assessment of these hazards. Table 4-6 lists the jurisdictions and their respective hazard rankings (Ranking 1 being the highest concern). The individual jurisdictions made these rankings at Meeting 1.

Table 4-6. Hazard Ranking by Jurisdiction

Jurisdiction	Tornadoes	Hazmat	Earthquakes	Severe Storms	Winter Storms	Flooding	Wildfire	Ground Failure
Cutler	1	4	6	2	3	8	7	5
Du Quoin	1	2	3	4	5	6	7	8
Pinckneyville	1	2	5	3	4	6	7	8
St. Johns	1	2	3	4	5	6	7	8
Tamaroa	1	2	3	4	5	6	7	8
Willisville	1	4	6	2	3	8	7	5

Jurisdiction	Tornadoes	Hazmat	Earthquakes	Severe Storms	Winter Storms	Flooding	Wildfire	Ground Failure
Pinckneyville Community Hospital	1	2	3	4	5	6	7	8
Marshall Browning Hospital	1	2	3	4	5	6	7	8
Perry County Counseling Center	1	2	3	4	5	6	7	8
Gold Plate Program of Perry County	1	2	3	4	5	6	-	-
Five Star Industries, Inc.	1	2	3	4	5	6	7	8
Rend Lake Conservancy District	2	3	1	6	7	4	-	-
Coulterville FPD	1	2	3	4	5	6	7	8
Community Consolidated School District #204	1	2	3	4	5	6	8	7
Du Quoin CUSD #300	1	2	3	4	5	6	8	7
Pinckneyville Community High School District #101	1	3	2	5	4	-	7	6
Pinckneyville School District #50	1	2	3	4	5	6	-	7
Tamaroa School District #5	1	2	3	4	5	6	-	-
Christian Fellowship School	1	2	3	4	5	6	7	8
Rend Lake College	2	5	4	1	3	-	-	-

4.2 Vulnerability Assessment

4.2.1 Asset Inventory

Processes and Sources for Identifying Assets

Before meeting one, the Planning Team used their resources to update the list of critical facilities from the 2009 MHMP. Local GIS data was used to verify the locations of all critical facilities. SIU GIS analysts incorporated these updates and corrections to the Hazus-MH data tables prior to performing the risk assessment. The updated Hazus-MH inventory contributed to a Level 2 analysis, which improved the accuracy of the risk assessment. Perry County also provided local assessment and parcel data to estimate the actual number of buildings susceptible to damage for the risk assessment.

Essential Facilities List

Table 4-7 identifies the number of essential facilities identified in Perry County. Essential facilities are a subset of critical facilities. Appendix E include a comprehensive list of the essential facilities in Perry County and Appendix F displays a large format map of the locations of the critical facilities within the county.

Table 4-7. Perry County's Essential Facilities

Facility	Number of Facilities
Care Facilities	2
Emergency Operations Centers	1
Fire Stations	7
Police Stations	4
Schools	13

Facility Replacement Costs

Table 4-8 identifies facility replacement costs and total building exposure. Perry County provided local assessment data for updates to replacement costs. Tax-exempt properties such as government buildings, schools, religious and non-profit structures were excluded from this study because they do not have an assessed value. Table 4-8 also includes the estimated number of buildings within each occupancy class.

Table 4-8. Perry County's Building Exposure

General Occupancy	Estimated Total Buildings	Total Building Exposure
Residential	8,152	$668,874,414
Agriculture	134	$18,525,634
Commercial	536	$99,312,240
Industrial	20	$49,541,557
Total:	**8,842**	**$836,253,845**

Future Development

Perry County is expected to see a modest increase in population due to the expansion of existing distribution centers, light industry, and the creation of new opportunities in the service industry such as retail stores, restaurants, and hotels. Most of this expansion is expected to take place within the city limits of Pinckneyville and Du Quoin and within close proximity to transportation corridors such as U.S. Route 51 and Illinois State Route 127.

4.3 Risk Analysis

4.3.1 GIS and Hazus-MH

The third step in the risk assessment is the risk analysis, which quantifies the risk to the population, infrastructure, and economy of the community. The hazards were quantified using GIS analyses and Hazus-MH where possible. This process reflects a Level 2 Hazus-MH analysis. A level 2 Hazus-MH analysis involves substituting selected Hazus-MH default data with local data and improving the accuracy of model predictions.

Updates to the default Hazus-MH data include:

- Updating the Hazus-MH defaults, critical facilities, and essential facilities based on the most recent available data sources.
- Reviewing, revising, and verifying locations of critical and essential point facilities with local input.
- Applying the essential facility updates (schools, medical care facilities, fire stations, police stations, and EOCs) to the Hazus-MH model data.
- Updating Hazus-MH reports of essential facility losses.

The following assumptions were made during analysis:

- Hazus-MH aggregate data was used to model the building exposure for all earthquake analyses. It is assumed that the aggregate data is an accurate representation of Perry County.
- The analyses were restricted to the county boundaries. Events that occur near the county boundaries do not contain damage assessments from adjacent counties.
- For each tax-assessment parcel, it is assumed there is only one building that bares all the associated values (both structure and content).
- For each parcel, it is assumed that all structures are wood-framed, one-story, slab-on-grade structures, unless otherwise stated in assessment records. These assumptions are based on sensitivity analyses of Hazus and regional knowledge.

Depending upon the analysis options and the quality of data the user inputs, Hazus-MH generates a combination of site-specific and aggregated loss estimates. Hazus-MH is not intended as a substitute for detailed engineering studies; it is intended to serve as a planning aid for communities interested in assessing their risk to flood-, earthquake-, and hurricane-related hazards. This plan does not fully document the processes and procedures completed in its development, but this documentation is available upon request. Table 4-9 indicates the analysis type (i.e. GIS, Hazus-MH, or historical records) used for each hazard assessment.

Table 4-9. Risk Assessment Tool Used for Each Hazard

Hazard	Risk Assessment Tool(s)
Tornadoes	GIS-based
Hazmat Release	GIS-based
Earthquakes	Hazus-MH
Severe Thunderstorm	Historical Records
Winter Storms	Historical Records
Flooding	Hazus-MH
Wildfire	GIS-based
Ground Failure	GIS-based

4.3.2 Tornado Hazard

Hazard Definition

Tornadoes are violently rotating columns of air extending from thunderstorms to the ground. Funnel clouds are rotating columns of air not in contact with the ground; however, the violently rotating column of air can reach the ground quickly and become a tornado. If the funnel cloud picks up and blows debris, it has reached the ground and is a tornado.

Tornadoes are a significant risk to Illinois and its citizens. Tornadoes can occur at any time on any day. The unpredictability of tornadoes makes them one of Illinois' most dangerous hazards. Tornado winds are violently destructive in developed and populated areas. Current estimates place maximum wind velocity at about 300 miles per hour, but higher values can occur. A wind velocity of 200 miles per hour results in a pressure of 102.4 pounds per square foot—a load that exceeds the tolerance limits of most buildings. Thus, it is easy to understand why tornadoes can devastate the communities they hit.

Tornadoes are classified according to the Enhanced Fujita tornado intensity scale. The Enhanced Fujita scale ranges from intensity EF0, with effective wind speeds of 40 to 70 miles per hour, to EF5 tornadoes, with effective wind speeds of over 260 miles per hour. Table 4-10 outlines the Enhanced Fujita intensity scale.

Table 4-10. Enhanced Fujita Tornado Rating

Enhanced Fujita Number	Estimated Wind Speed	Path Width	Path Length	Description of Destruction
0 Gale	40-72 mph	6-17 yards	0.3-0.9 miles	Light damage, some damage to chimneys, branches broken, signboards damaged, shallow-rooted trees blown over.
1 Moderate	73-112 mph	18-55 yards	1.0-3.1 miles	Moderate damage, roof surfaces peeled off, mobile homes pushed off foundations, attached garages damaged.
2 Significant	113-157 mph	56-175 yards	3.2-9.9 miles	Considerable damage, entire roofs torn from frame houses, mobile homes demolished, boxcars pushed over, large trees snapped or uprooted.
3 Severe	158-206 mph	176-566 yards	10-31 miles	Severe damage, walls torn from well-constructed houses, trains overturned, most trees in forests uprooted, heavy cars thrown about.
4 Devastating	207-260 mph	0.3-0.9 miles	32-99 miles	Complete damage, well-constructed houses leveled, structures with weak foundations blown off for some distance, large missiles generated.
5 Incredible	261-318 mph	1.0-3.1 miles	100-315 miles	Foundations swept clean, automobiles become missiles and thrown for 100 yards or more, steel-reinforced concrete structures badly damaged.

Previous Occurrences of Tornadoes

There have been several occurrences of tornadoes in Perry County during recent decades. The National Climatic Data Center (NCDC) database reported twenty tornadoes/funnel clouds in Perry County since 1950. Table 4-11 identifies NCDC-recorded tornadoes that caused damage, death, or injury in Perry County. Additional details of individual hazard events are on the NCDC website.

The most devastating recorded event in the NDCD occurred on March 11th, 2006. A period of active weather started with a major derecho event on March 9 across the South Central United States, which also included several tornadoes, although straight-line winds did most of the damage. The outbreak produced 99 confirmed tornadoes.

The March 11 tornado entered Perry County from Randolph County about 1.5 miles south of Highway 154. Shortly after crossing into Perry County, some coal trucks were blown over, and a modular home was totally destroyed on Route 154 near Route 150. Route 150 was closed for 12 hours due to downed trees and power lines. Within a few miles of the destroyed modular home, some hogs were killed at a hog farm, and an empty grain bin was picked up and blown 100 yards into a field. Several eyewitnesses at this location reported two funnels. As the tornado continued its northeast movement, passing northwest of Pinckneyville, it weakened to F1 intensity. Near where it crossed Illinois Route 13, trees were uprooted, roofs were blown off, and power poles were snapped. Siding was blown off a house. Near the end of the tornado track, just northwest of Tamaroa, a metal building was destroyed. Debris from the building was blown about 400 yards. A nearby house lost all of its shingles. Along the 20-mile path through Perry County, dozens of barns and outbuildings were severely damaged or destroyed. Dozens of homes sustained varying degrees of damage, ranging from minor to major. Hundreds of trees were uprooted or snapped. Peak winds on this county segment were estimated at 140 MPH, mainly near the Randolph County line. The average path width was close to 200 yards. A deputy sheriff reported a tornado crossing U.S. Highway 51 north of Tamaroa. This was the last evidence of the tornado, which likely dissipated as it crossed Route 51.

Table 4-11. NCDC-Recorded Tornadoes That Caused Damage, Death, or Injury in Perry County

Location or County*	Date	Scale	Deaths	Injuries	Property Damage
Perry County	3/11/2006	F2	0	2	$1,200,000
Perry County	9/26/1959	F1	0	0	$2,500
Du Quoin	6/8/2009	EF1	0	0	$20,000
Perry County	12/21/1967	F3	0	0	$250,000
Perry County	5/29/1982	F3	0	0	$250,000
Perry County	5/30/2004	F1	0	0	$250,000
Perry County	12/18/1957	F3	0	1	$250,000
Perry County	5/29/1982	F3	0	7	$250,000
Perry County	12/18/1957	F5	1	6	$250,000
Sunfield	6/8/2009	EF0	0	0	$4,000
Du Quoin	4/19/1996	F1	0	0	$50,000
Perry County	6/19/2011	EF1	0	1	$550,000
		Total:	**1**	**17**	**$3,326,500**

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Geographic Location for Tornado Hazard

The entire county has the same risk of tornado occurrence. Tornadoes can occur at any location within the county.

Hazard Extent for Tornado Hazard

Historical tornadoes generally moved from southwest to northeast across the county, although many other tracks are possible, from more southerly to northerly directions. The extent of the hazard varies in terms of the size of the tornado, its path, and its wind speed.

Risk Identification for Tornado Hazard

Based on historical information, the probability of future tornadoes in Perry County is likely. The County should expect tornadoes with varying magnitudes to occur in the future. Tornadoes ranked as the number one hazard according to the Perry County Planning Team's risk assessment.

Risk Priority Index

Probability	x	Magnitude	=	RPI
3	x	8	=	24

Vulnerability Analysis for Tornado Hazard

Tornadoes can occur within any area in the county; therefore, the entire county population and all buildings are vulnerable to tornadoes. To accommodate this risk, this plan considers all buildings located within the county as vulnerable. Tables 4-7 and 4-8 display the existing buildings and critical infrastructure in Perry County.

Critical Facilities

All critical facilities are vulnerable to tornadoes. Critical facilities are susceptible to many of the same impacts as any other building within the jurisdiction. These impacts vary based on the magnitude of the tornado but can include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, and loss of facility functionality (e.g., a damaged police station will no longer be able to serve the community). Table 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

Table 4-8 lists the building exposure in terms of types and numbers of buildings for the entire county. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, and loss of building function (e.g., damaged home will no longer be habitable, causing residents to seek shelter).

Infrastructure

The types of infrastructure that could be impacted during a tornado include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is vulnerable, it is important to emphasize that any number of these structures could become damaged during a tornado. The impacts to these structures include broken, failed, or impassable roadways, broken or failed utility lines (e.g., loss of power or gas to community), and railway failure from broken or impassable rail lines. Bridges could fail or become impassable, causing risk to motorists.

GIS-based Tornado Analysis

One tornado scenario was conducted for Perry County through the Village of Willisville, City of Pinckneyville, and Village of Tamaroa. The following analysis quantifies the anticipated impacts of tornadoes in the county in terms of numbers and types of buildings and infrastructure damaged.

GIS-overlay modeling was used to determine the potential impacts of an EF4 tornado. The analysis used a hypothetical path based upon an EF4 tornado event that runs for 44 miles through the Village of Willisville, City of Pinckneyville, and Village of Tamaroa. Table 4-12 depicts tornado damage curves and path widths utilized for the modeled scenario. The damage curve is based on conceptual wind speeds, path winds, and path lengths from the Enhanced-Fujita Scale guidelines.

Table 4-12. Tornado Path Widths and Damage Curves

Fujita Scale	Path Width (feet)	Maximum Expected Damage
5	2,400	100%
4	1,800	100%
3	1,200	80%
2	600	50%
1	300	10%
0	150	0%

Degrees of damage depend on proximity to the path centerline within a given tornado path. The most intense damage occurs within the center of the damage path, with decreasing amounts of damage away from the center. To model the EF4 tornado, a hypothetical tornado path was used in GIS with buffers added (damage zones) around the tornado path. Table 4-13 and Figure 4-3 illustrate the zone analysis. Figure 4-4 depicts the selected hypothetical tornado path.

Table 4-13. EF4 Tornado Zones and Damage Curves

Zone	Buffer (feet)	Damage Curve
1	0-150	100%
2	150-300	80%
3	300-600	50%
4	600-900	10%

Figure 4-3. Tornado Analysis (Damage Curves) Using GIS Buffers

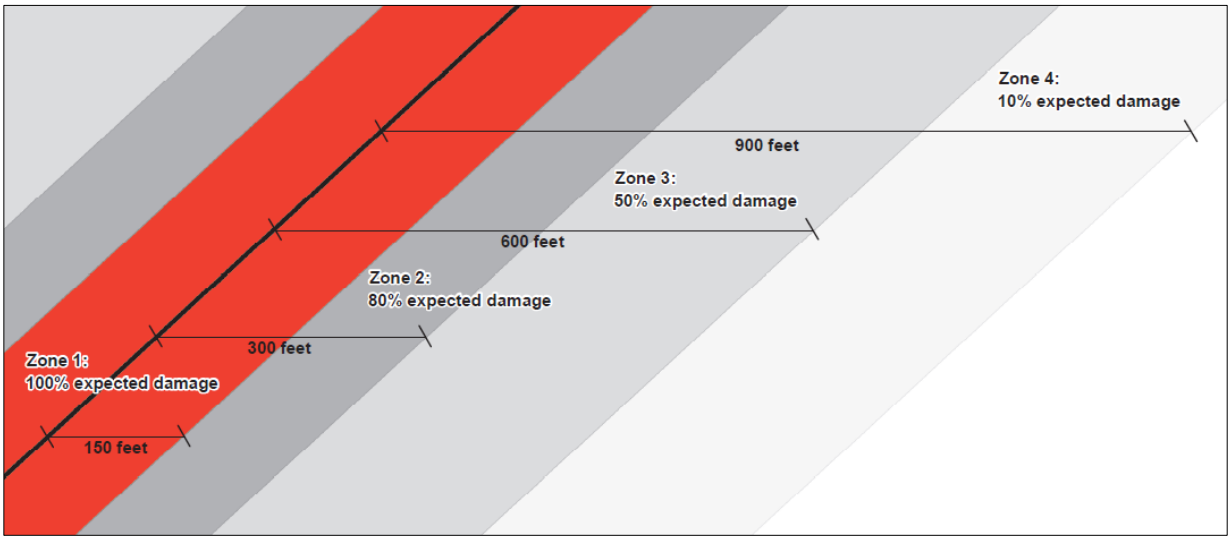
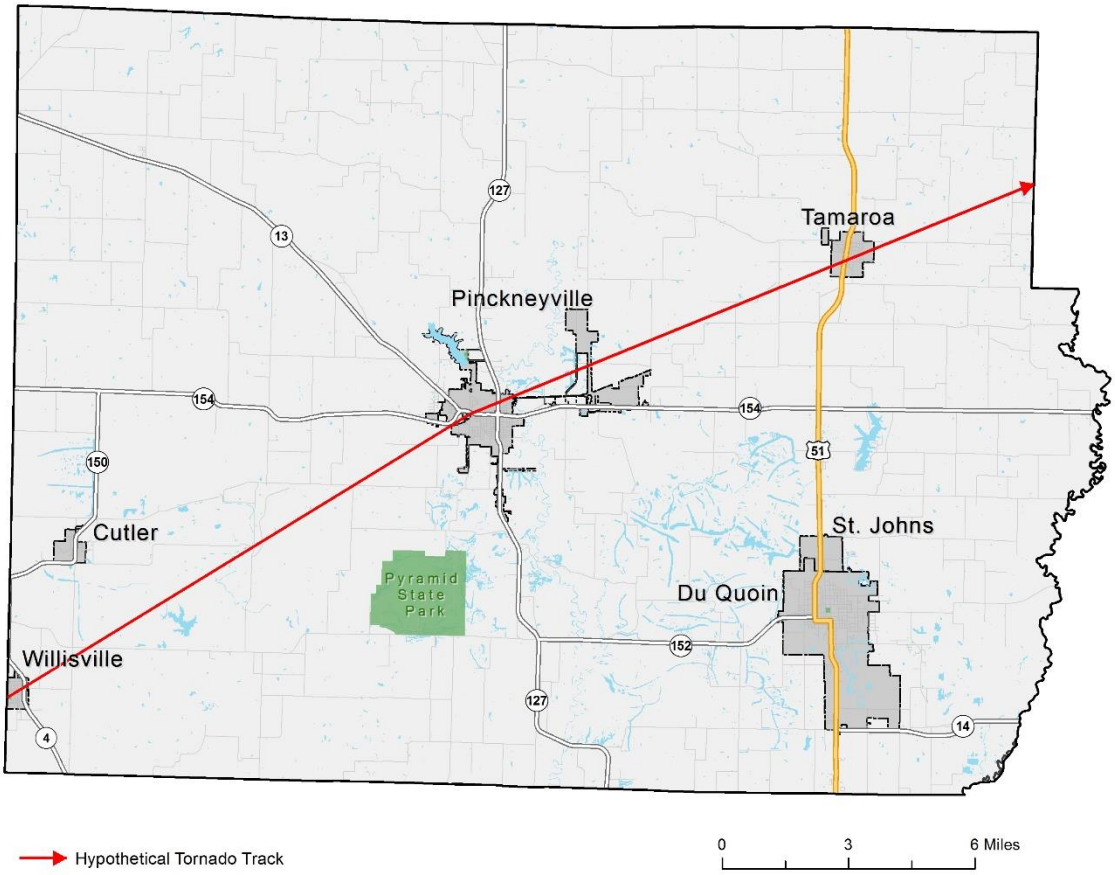


Figure 4-4. Modeled Hypothetical EF4 Tornado Track for Perry County



Modeled Impacts of the EF4 Tornado

The GIS analysis estimates that the modeled EF4 tornado would damage 543 buildings. The estimated building losses are over $16 million. The building losses are an estimate of building replacement costs multiplied by the damage percent. Table 4-14 and Figures 4-5 and 4-6 show the results of the EF4 tornado analysis.

Table 4-14. Estimated Building Loss by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$3,912,171	$2,868,943	$4,320,632	$1,333,540
Agriculture	$0	$0	$37,818	$0
Commercial	$1,794,978	$460,085	$1,457,538	$116,233
Industrial	$0	$0	$0	$0
Total:	**$5,707,149**	**$3,329,028**	**$5,815,988**	**$1,449,773**

Figure 4-5. Building Inventory and Essential Facilities Affected by the EF4 Tornadoes Modeled for Willisville and Tamaroa

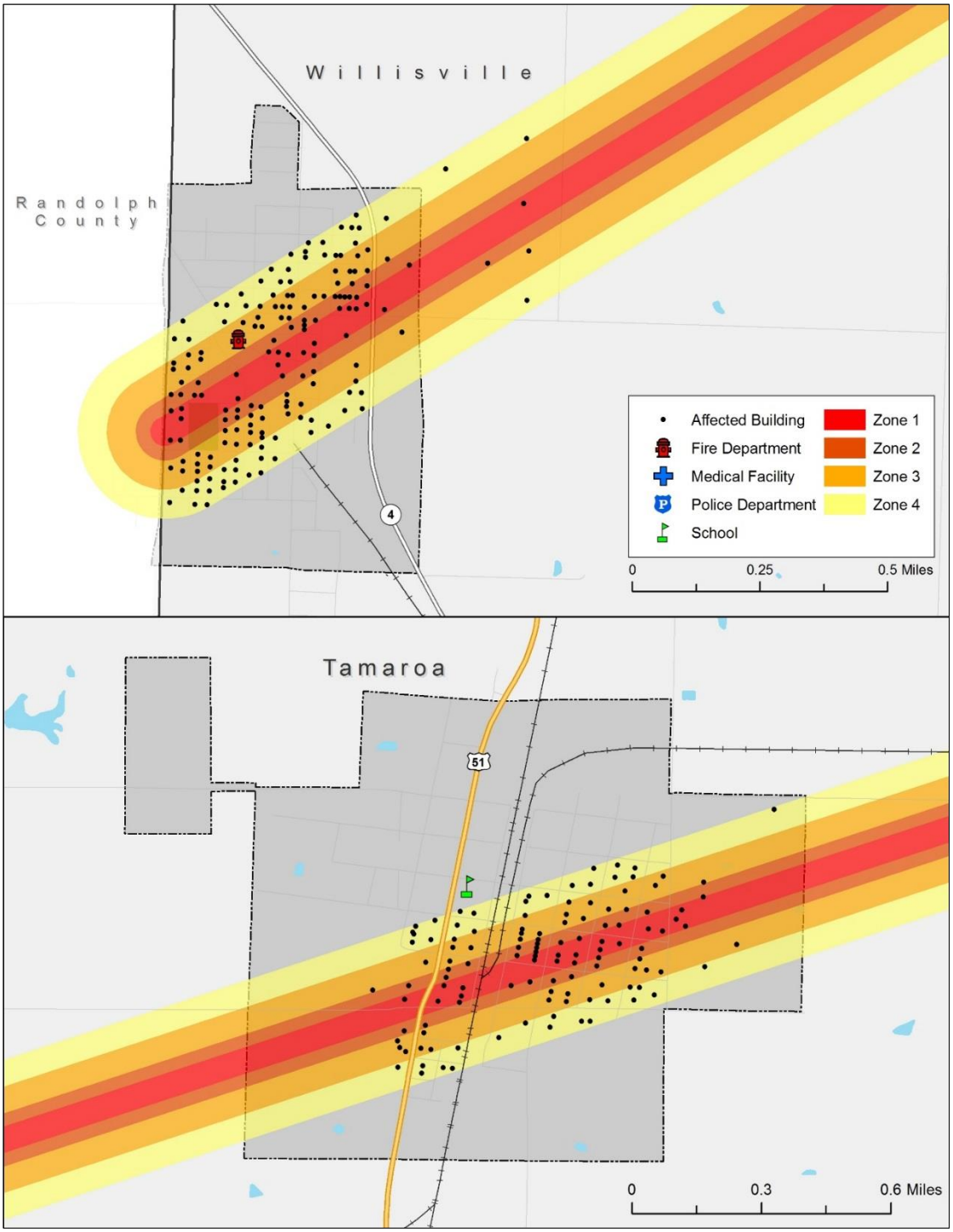
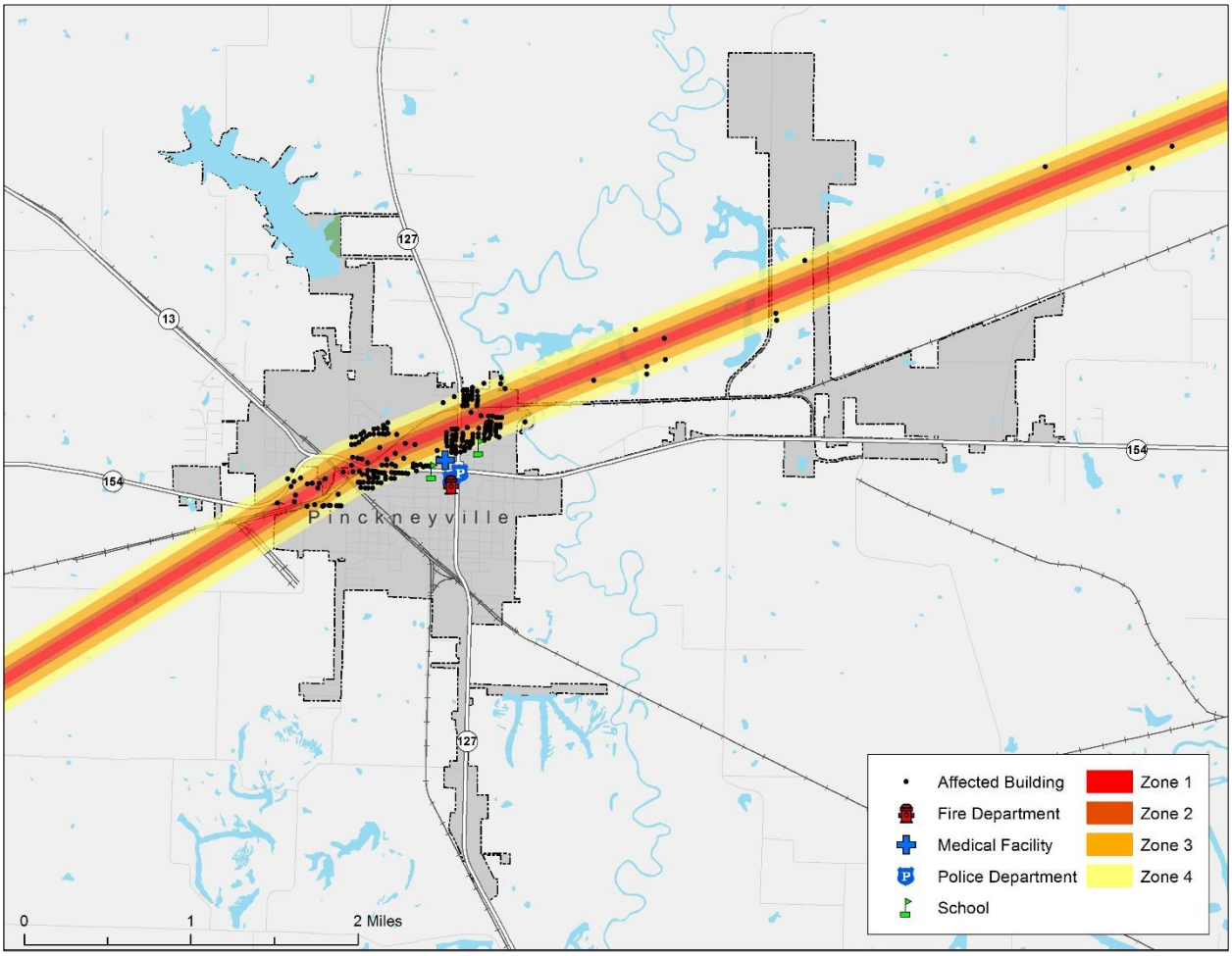


Figure 4-6. Buildings Inventory and Essential Facilities Affected by the EF4 Tornadoes Modeled for Pinckneyville



Essential Facilities Damage

There are eight essential facility located within 900 feet of the EF4 tornado path. The model predicts that one care facilities, three schools, two fire stations and two police station would experience damage across Perry County. The affected facilities are identified in Table 4-15, and their geographic locations are shown in Figures 4-5 and 4-6.

Table 4-15. Essential Facilities Affected by the EF4 Tornadoes Modeled for Perry County

Critical Facility	Facility Name
Care Facilities	Pinckneyville Community Hospital
Schools	St. Bruno Catholic School
	Pinckneyville Elementary School
	Tamaroa Elementary School
Fire Departments	Pinckneyville Fire Department
	Willisville Fire Department
Police Departments	Pinckneyville Police Department
	Perry County Sheriff's Department

Vulnerability to Future Assets/Infrastructure for Tornado Hazard

The entire population and all buildings are at risk because tornadoes can occur anywhere within the state, at any time. Furthermore, any future development in terms of new construction within the county is at risk. Table 4-8 includes the building exposure for Perry County. All essential facilities in the county are at risk. Appendix E include a list of the essential facilities in Perry County and Appendix F displays a large format map of the locations of all critical facilities within the county.

Suggestions for Community Development Trends

Preparing for severe storms will be enhanced if local officials sponsor a wide range of programs and initiative to address severe storm preparedness. It is suggested that the county should build new structures with more sturdy construction, and harden existing structures to lessen the potential impacts of severe weather. This is particularly import where the future economic expansion is expected to take place within the city limits of Pinckneyville and Du Quoin. Additional warning sirens can warn the community of approaching storms to ensure the safety of Perry County residents and minimizing property damage.

4.3.3 Hazardous Material Storage and Transportation Hazard

Hazard Definition

Illinois has numerous active transportation lines that run through many of its counties. Active railways transport harmful and volatile substances across county and state lines every day. Transporting chemicals and substances along interstate routes is commonplace in Illinois. The rural areas of Illinois have considerable agricultural commerce, meaning transportation of fertilizers, herbicides, and pesticides is common on rural roads. These factors increase the chance of hazardous material releases and spills throughout the state of Illinois.

The release or spill of certain substances can cause an explosion. Explosions result from the ignition of volatile products such as petroleum products, natural and other flammable gases, hazardous materials/chemicals, dust, and bombs. An explosion can potentially cause death, injury, and property damage. In addition, a fire routinely follows an explosion, which may cause further damage and inhibit emergency response. Emergency response may require fire, safety/law enforcement, search and rescue, and hazardous materials units.

Previous Occurrences of Hazardous Materials Storage and Transportation Hazard

Perry County has not experienced a significantly large-scale hazardous material incident at a fixed site or during transport resulting in multiple deaths or serious injuries. However, about 9:04 a.m. central standard time on February 9, 2003, a northbound Canadian National freight train M33371, traveling about 40 mph, derailed 22 of its 108 cars in Tamaroa. Four of the derailed cars released methanol, and the methanol from two of these four cars fueled a fire. Other derailed cars contained phosphoric acid, hydrochloric acid, formaldehyde, and vinyl chloride. Two cars containing hydrochloric acid, one car containing formaldehyde, and one car containing vinyl chloride released product but were not involved in the fire. About 850 residents were evacuated from the area within a 3-mile radius of the derailment, which included the entire village of Tamaroa. No one was injured during the derailment, although one contract employee was injured during cleanup activities. Damages to track, signals, and equipment, and clearing costs associated with the accident totaled about $1.9 million.

February 2003 Train derailment in Tamaroa, IL (c/o The Southern Illinoisan)

Geographic Location of Hazardous Materials Storage and Transportation Hazard

Hazardous material hazards are countywide and are primarily associated with the transport of materials via highway, railroad, and/or river barge.

Hazard Extent of Hazardous Materials Storage and Transportation Hazard

The extent of the hazardous material hazard varies both in terms of the quantity of material being transported as well as the specific content of the container.

Risk Identification of Hazardous Materials Storage and Transportation Hazard

Based on input from the Planning Team, future occurrence of hazardous materials accident in Perry County is likely. According to the Risk Priority Index (RPI) and County input, hazardous materials storage and transportation hazard is ranked as the number two hazard.

Risk Priority Index

Probability	x	Magnitude	=	RPI
3	x	4	=	12

Vulnerability Analysis for Hazardous Materials Storage and Transportation Hazard

The entire county is vulnerable to a hazardous material release and can expect impacts within the affected area. The main concern during a release or spill is the affected population. This plan will therefore consider all buildings located within the county as vulnerable. To accommodate this risk, this plan considers all buildings located within the county as vulnerable. Tables 4-7 and 4-8 display the existing buildings and critical infrastructure in Perry County.

Critical Facilities

All critical facilities and communities within the county are at risk. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure

due to fire or explosion and loss of function of the facility (e.g., a damaged police station can no longer serve the community). Table 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

Table 4-8 lists the building exposure in terms of types and numbers of buildings for the entire county. The buildings within the county can expect similar impacts to those discussed for critical facilities. These impacts include structural failure due to fire or explosion or debris, and loss of function of the building (e.g., a person cannot inhabit a damaged home, causing residents to seek shelter).

Infrastructure

During a hazardous material release, the types of potentially impacted infrastructure include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan, it is important to emphasize that a hazardous materials release could damage any number of these items. The impacts to these items include: broken, failed, or impassable roadways; broken or failed utility lines (e.g., loss of power or gas to community); and railway failure from broken or impassable railways. Bridges could become impassable causing risk to motorists.

ALOHA Hazardous Chemical Release Analysis

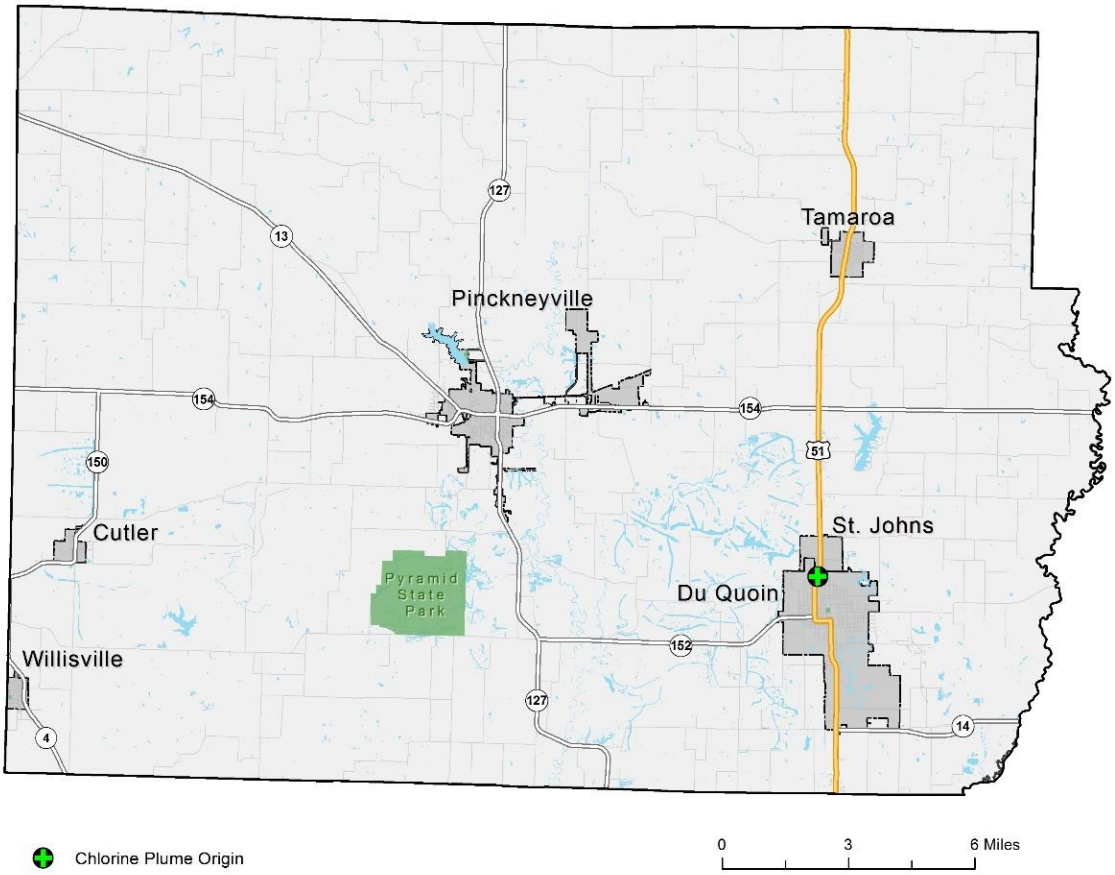
The U.S. Environmental Protection Agency's ALOHA (Areal Locations of Hazardous Atmospheres) model was used to assess the impacted area for chlorine release at intersection of Route 13 and US Highway 51 in Du Quoin. The Perry County Planning Team selected the chlorine scenario because of significant truck and train traffic along major transportation routes within a relatively densely populated area.

ALOHA is a computer program designed for response to chemical accidents, as well as emergency planning and training. Ammonia, chlorine, and propane are common chemicals used in industrial operations and are found in either liquid or gas form. Rail and truck tankers haul ammonia, chlorine, and propane to and from facilities.

Chlorine is a greenish yellow gas with a pungent suffocating odor. Toxic by inhalation. Slightly soluble in water. Liquefies at -35°C and room pressure. Readily liquefied by pressure applied at room temperature. Density (as a liquid) 13.0 lb / gal. Contact with unconfined liquid can cause frostbite by evaporative cooling. Does not burn but, like oxygen, supports combustion. Long-term inhalation of low concentrations or short-term inhalation of high concentrations has ill effects. Vapors are much heavier than air and tend to settle in low areas.

For the chlorine scenario, SIU assumed average atmospheric and climatic conditions for the fall season with a breeze from the north-northwest. SIU considered the seasonal conditions upon the request of the Planning Team and obtained average monthly conditions for St. Louis from NOAA's Monthly Weather Summary. Figures 4-7 depicts the plume origin of the modeled hazardous chemical release in Perry County. The ALOHA atmospheric modeling parameters for the chlorine release, depicted in Figure 4-8, were based upon a northeasterly speed of 10 miles per hour. The temperature was 59°F with 75% humidity and a cloud cover of five-tenths skies. SIU used average weather conditions for the month of June reported from NOAA for wind direction, wind speed, and temperature to simulate fall conditions.

Figure 4-7. ALOHA Modeled Hazardous Chemical Plume Origin in Perry County



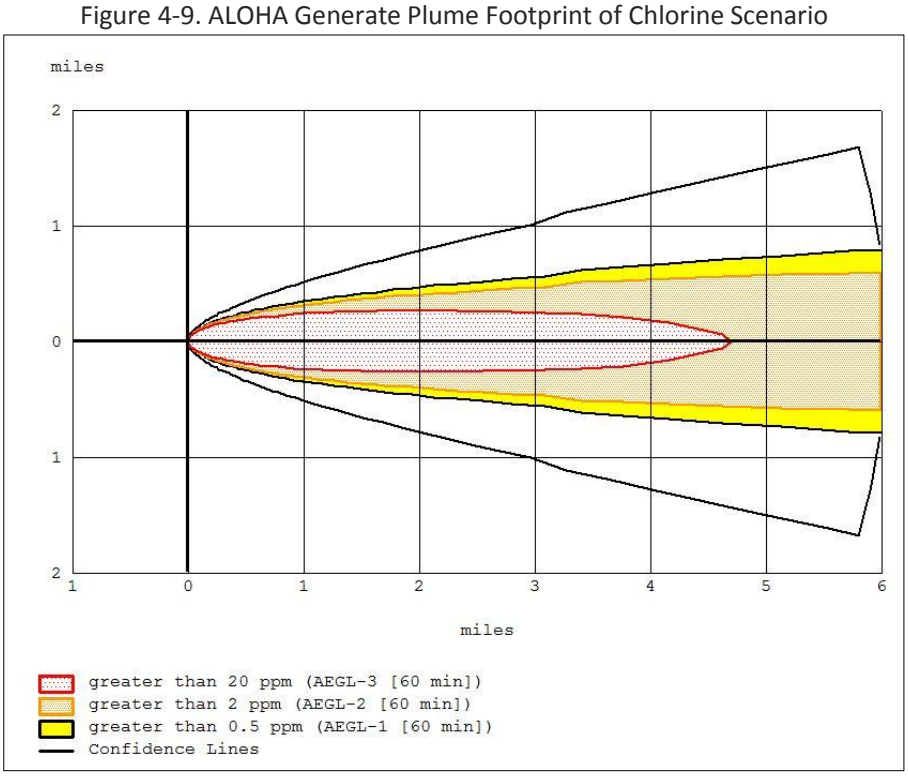
The source of the chemical spill is a horizontal, cylindrical-shaped tank. The diameter of the tank was set to 8 feet and the length set to 33 feet (12,408 gallons). At the time of its release, it was estimated that the tank was 75% full. The chlorine in this tank is in its liquid state. This release was based on a leak from a 2.5-inch-diameter hole, 12 inches above the bottom of the tank. According to these ALOHA parameters, this scenario would release approximately 9,600 pounds of material per minute. Figure 4-8 shows the plume modeling parameters in greater detail.

Figure 4-8. ALOHA Modeling Parameters for Chlorine Release

```
 SITE DATA:
  Location: DUQUOIN, ILLINOIS
  Building Air Exchanges Per Hour: 0.96 (unsheltered single storied)
  Time: October 23, 2014  1055 hours CDT (user specified)

CHEMICAL DATA:
  Chemical Name: CHLORINE                 Molecular Weight: 70.91 g/mol
  AEGL-1 (60 min): 0.5 ppm   AEGL-2 (60 min): 2 ppm   AEGL-3 (60 min): 20 ppm
  IDLH: 10 ppm
  Ambient Boiling Point: -29.9° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 10 miles/hour from NNW at 3 meters
  Ground Roughness: open country          Cloud Cover: 5 tenths
  Air Temperature: 59° F                  Stability Class: D
  No Inversion Height                     Relative Humidity: 75%

SOURCE STRENGTH:
  Leak from hole in horizontal cylindrical tank
  Non-flammable chemical is escaping from tank
  Tank Diameter: 8 feet                   Tank Length: 33 feet
  Tank Volume: 12,408 gallons
  Tank contains liquid                    Internal Temperature: 59° F
  Chemical Mass in Tank: 55.5 tons        Tank is 75% full
  Circular Opening Diameter: 2.5 inches
  Opening is 12 inches from tank bottom
  Release Duration: 17 minutes
  Max Average Sustained Release Rate: 9,600 pounds/min
     (averaged over a minute or more)
  Total Amount Released: 102,860 pounds
  Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
  Model Run: Heavy Gas
  Red    : 4.7 miles --- (20 ppm = AEGL-3 [60 min])
  Orange: greater than 6 miles --- (2 ppm = AEGL-2 [60 min])
  Yellow: greater than 6 miles --- (0.5 ppm = AEGL-1 [60 min])
```

Using the parameters in Figure 4-8, approximately 102,860 pounds of material would be realized per minutes. The image in Figure 4-9 depicts the plume footprint generated by ALOHA. As the substance moves away from the source, the level of substance concentration decreases. Each color-coded area depicts a level of concentration measured in parts per million.

Figure 4-9. ALOHA Generate Plume Footprint of Chlorine Scenario



The red buffer (20 ppm) extends no more than 4.5 miles from the point of release after one hour. The orange buffer (2 ppm) and yellow buffer (0.5 ppm) extends no more than six miles from the point of release. The dashed line depicts the level of confidence within the confines of the entire plume footprint. The ALOHA model is 95% confident that the release will stay within this boundary.

Acute Exposure Guideline Levels (AEGL) are intended to describe the risk to humans resulting from once-in-a-lifetime, or rare exposure to airborne chemical (U.S. EPA AEGL Program). The National Advisory Committee for the Development of Acute Exposure Guideline Levels for Hazardous Substances (AEGL Committee) is involved in developing these guidelines to help both national and local authorities, as well as private companies, deal with emergencies involving spills, or other catastrophic exposures. AEGLs represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. The three AEGLs have been defined as follows:

> AEGL-1: the airborne concentration, expressed as parts per million or milligrams per cubic meter (ppm or mg/m3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
>
> AEGL-2: the airborne concentration (expressed as ppm or mg/m3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
>
> AEGL-3: the airborne concentration (expressed as ppm or mg/m3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Airborne concentrations below the AEGL-1 represent exposure levels that can produce mild and progressively increasing but transient and non-disabling odor, taste, and sensory irritation or certain asymptomatic, non-sensory effects. With increasing airborne concentrations above each AEGL, there is a progressive increase in the likelihood of occurrence and the severity of effects described for each corresponding AEGL. Although the AEGL values represent threshold levels for the general public, including susceptible subpopulations, such as infants, children, the elderly, persons with asthma, and those with other illnesses, it is recognized that individuals, subject to unique or idiosyncratic responses, could experience the effects described at concentrations below the corresponding AEGL.

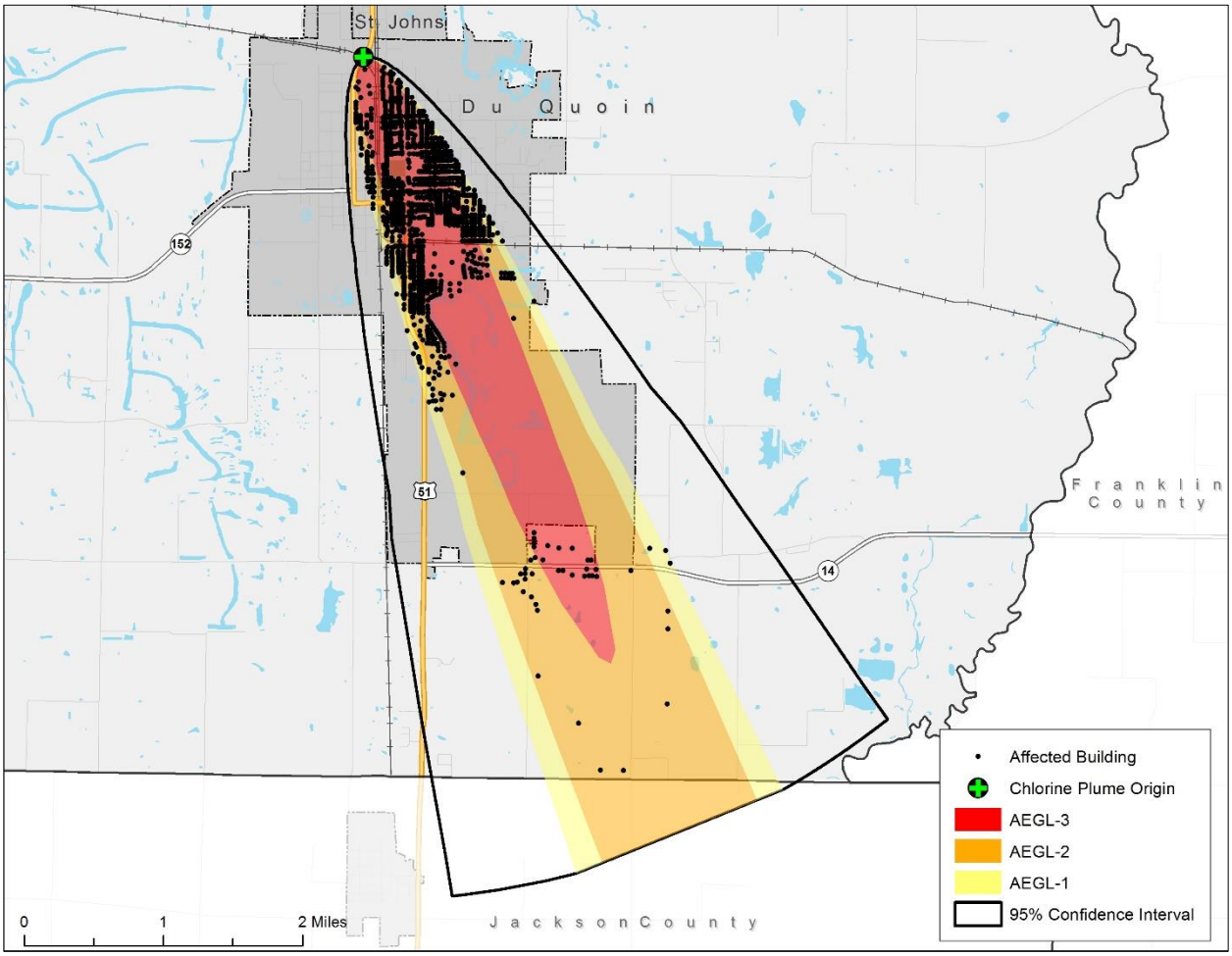
Results for Chlorine Release

An estimate of property exposed to the chlorine spill was calculated by using the building inventory and intersecting these data with each of the AEGL levels (AEGL 3: ≥ 20.0 ppm, AEGL 2: ≥ 2.0 ppm and AEGL 1: ≥ 0.5 ppm). The Perry County assessment and parcel data was utilized for this analysis. There are 1,441 building within the chlorine plume. It should be noted that the results should be interpreted as potential degrees of loss rather than exact number of buildings damaged to the chlorine release. Table 4-16 lists the total amount of building exposure to each AEGL zone. Figure 4-10 depicts the chlorine spill footprint and location of the buildings exposed. The GIS overlay analysis estimates that the full replacement cost of the buildings exposed to the chlorine plume is approximately $130 million.

Table 4-16. Estimated Building Exposure as a Result of the Chlorine Release

Occupancy	Building Exposure			Number of Buildings		
	AEGL 1	AEGL 2	AEGL 3	AEGL 1	AEGL 2	AEGL3
Residential	$7,318,944	$26,644,232	$63,219,012	118	358	779
Agriculture	$0	$0	$0	0	0	0
Commercial	$6,406,284	$8,779,386	$16,809,510	27	41	116
Industrial	$0	$0	$1,026,420	0	0	2
Total:	**$13,725,228**	**$35,423,618**	**$81,054,942**	**145**	**339**	**897**

Figure 4-10. ALOHA Plume Footprint and Buildings Exposed to Chlorine Release



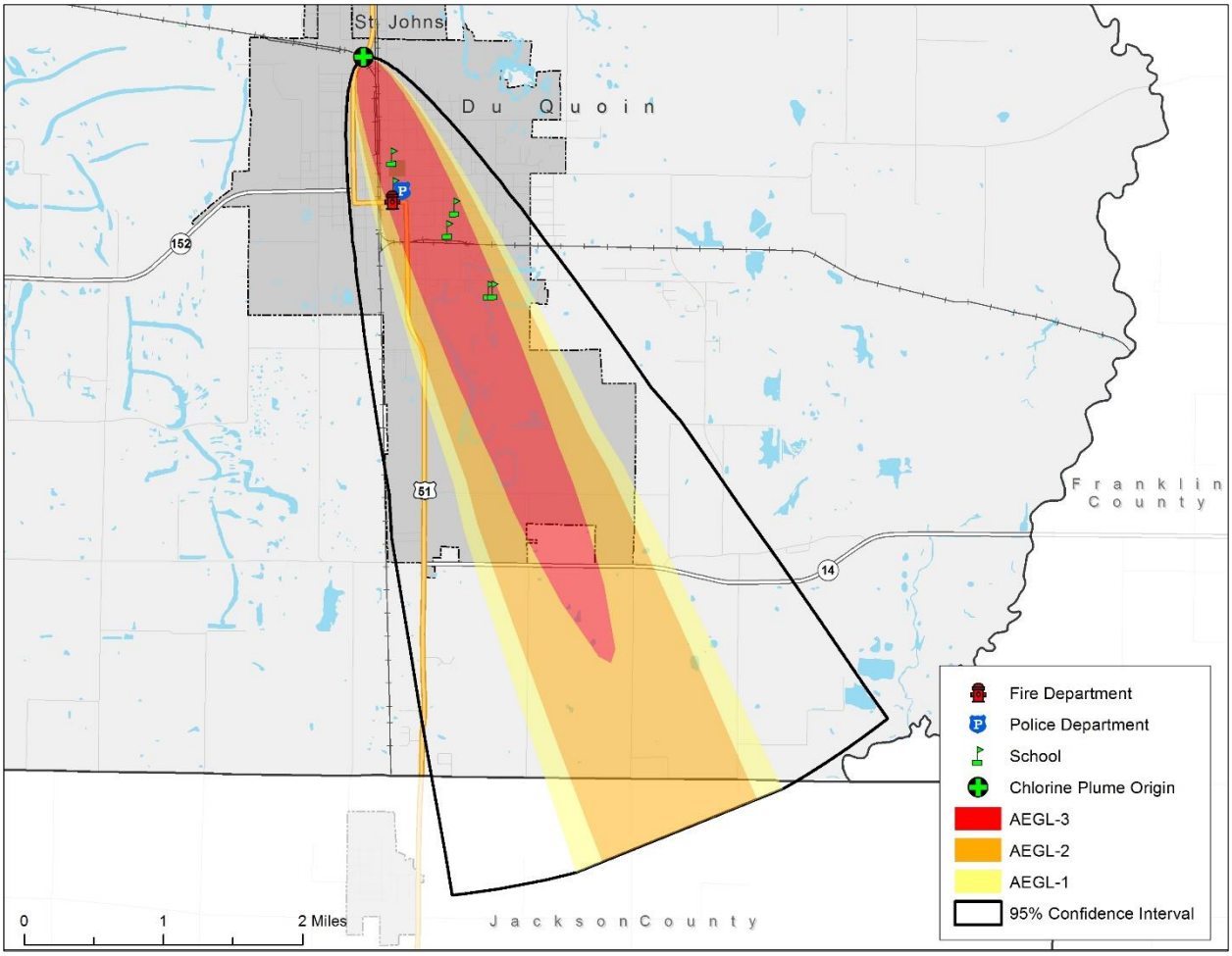
Essential Facilities Damage

There are seven essential facilities within the limits of the chlorine scenario. Most are located in the confines of the AEGL-3 with ≥ 20 ppm concentration level. Table 4-17 and Figure 4-11 identifies the affected facilities.

Table 4-17. Essential Facilities within the Chlorine Plume Footprint

Critical Facility	Facility Name
Schools	Tri-County Special Education at Ward
	Du Quoin High School
	Du Quoin Middle School
	Du Quoin Elementary School
Fire Department	Du Quoin Fire Department
Police Department	Du Quoin Police Department

Figure 4-11. Map of Essential Facilities within the Chlorine Plume Footprint



Vulnerability to Future Assets/Infrastructure for Hazardous Materials Storage and Transportation Hazard

Perry County is expect to see future economic expansion within the city limits of Pinckneyville and Du Quoin. These areas are particularly vulnerable to chemical releases because of transportation of hazardous materials along railways, U.S. Highway 51 and State Route 127.

Suggestion for Community Development Trends

Because the hazardous material hazard events may occur anywhere within the county, future development is susceptible to the hazard. The major transportation routes and the industries located in Perry County pose a threat of dangerous chemicals and hazardous materials release.

4.3.4 Earthquake Hazard

Hazard Definition

An earthquake is the shaking of the earth caused by the energy released when large blocks of rock slip past each other in the earth's crust. Most earthquakes occur at tectonic plate boundaries; however, some earthquakes occur in the middle of plates, for example the New Madrid Seismic Zone or the Wabash Valley Fault System. Both of these seismic areas have a geologic history of strong quakes, and an earthquake from either seismic area could possibly affect Illinois counties. There may be other, currently unidentified faults in the Midwest also capable of producing strong earthquakes.

Strong earthquakes can collapse buildings and infrastructure, disrupt utilities, and trigger landslides, avalanches, flash floods, fires, and tsunamis. When an earthquake occurs in a populated area, it may cause death, injury, and extensive property damage. An earthquake might damage essential facilities, such as fire departments, police departments, and hospitals, disrupting emergency response services in the affected area. Strong earthquakes may also require mass relocation; however, relocation may be impossible in the short-term aftermath of a significant event due to damaged transportation infrastructure and public communication systems.

Earthquakes are usually measured by two criteria: intensity and magnitude (M). Earthquake intensity qualitatively measures the strength of shaking produced by an earthquake at a certain location and is determined from effects on people, structures, and the natural environment. Earthquake magnitude quantitatively measures the energy released at the earthquake's subsurface source in the crust, or epicenter. Magnitude in the earthquake hazard analysis. Table 4-18 provides a comparison of magnitude and intensity, and Table 4-19 provides qualitative descriptions of intensity, for a sense of what a given magnitude might feel like.

Table 4-18. Comparison of Earthquake Magnitude and Intensity

Magnitude (M)	Typical Maximum Modified Mercalli Intensity
1.0 – 3.0	I
3.0 – 3.9	II – III
4.0 – 4.9	IV – V
5.0 – 5.9	VI – VII
6.0 – 6.9	VII – IX
7.0 and higher	VIII or higher

Table 4-19. Abbreviated Modified Mercalli Intensity Scale

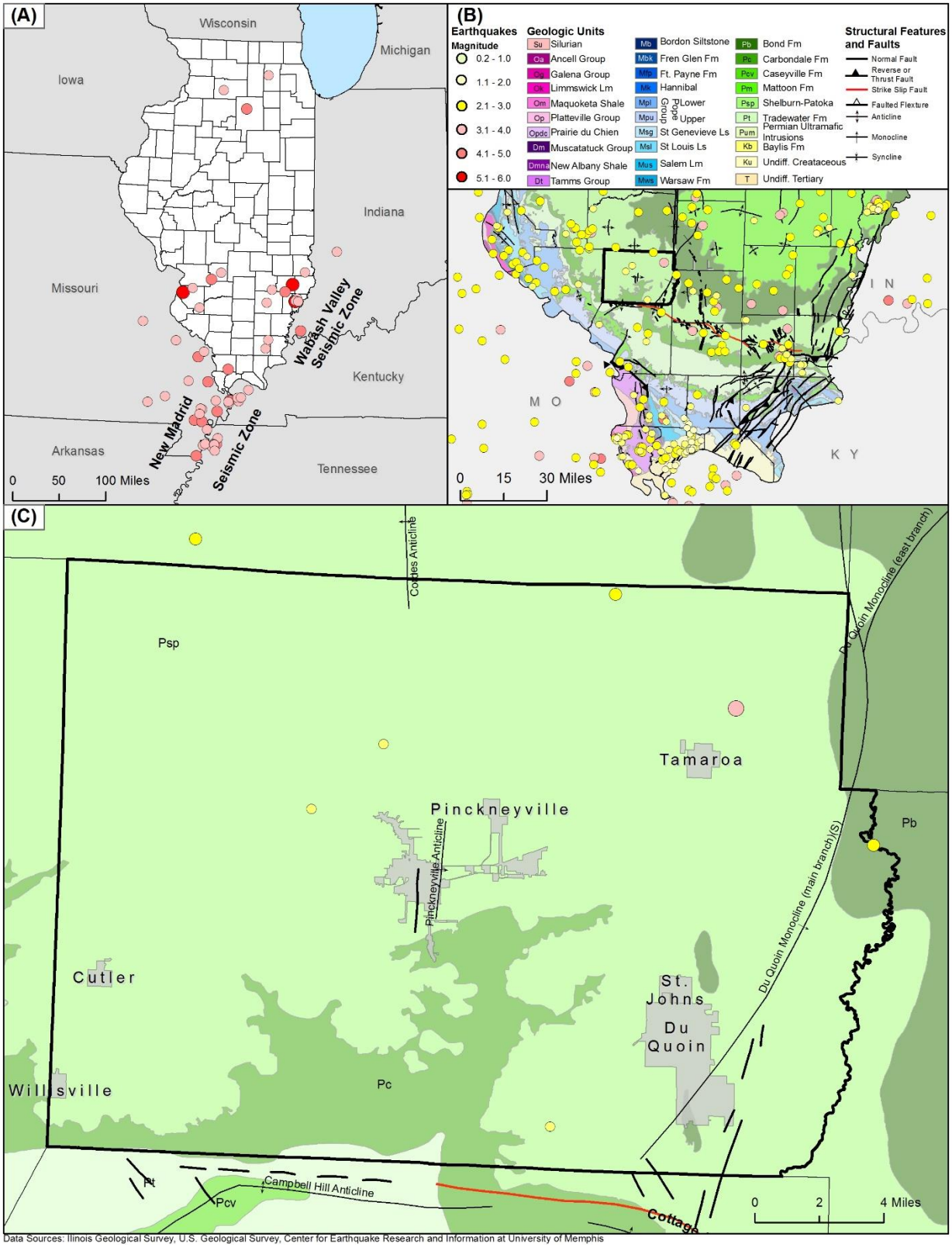
Mercalli Intensity	Description
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motorcars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, and walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Previous Occurrences for Earthquakes

Historically, the most significant seismic activity in Illinois is associated with New Madrid Seismic Zone. The New Madrid Seismic Zone produced three large earthquakes in the central U.S. with magnitudes estimated between 7.0 and 7.7 on December 16, 1811, January 23, 1812, and February 7, 1812. These earthquakes caused violent ground cracking and volcano-like eruptions of sediment (sand blows) over an area >10,500 km^2, and uplifted a 50 km by 23 km zone (the Lake County uplift). The shaking was felt over a total area of over 10 million km^2 (the largest felt area of any historic earthquake). The United States Geological Survey (USGS) and the Center for Earthquake Research and Information (CERI) at the University of Memphis estimate the probability of a repeat of the 1811-1812 type earthquakes (M7.5-8.0) is 7%-10% over the next 50 years (USGS Fact Sheet 2006-3125).

Earthquakes measured in Illinois typically vary in magnitude from very low microseismic events of M=1-3 to larger events up to M=5.4. Figure 4-12 depicts the following: (A) location of notable earthquakes in Illinois region; (B) generalized geologic bedrock map with earthquake epicenters and geologic structures; (C) geologic and earthquake epicenter map of Perry County. The most recent earthquake in Illinois—as of the date of this report—was a M2.3 event in February 2014, approximately 6 miles NNW of Mound City in Pulaski County. The last earthquake in Illinois to cause minor damage occurred on April 18, 2008 near Mt. Carmel, IL and measured 5.2 in magnitude. Earthquakes resulting in more serious damage have occurred about every 70 to 90 years and are historically concentrated in southern Illinois.

Figure 4-12. Notable Earthquakes in Illinois with Geologic and Earthquake Epicenters in Perry County

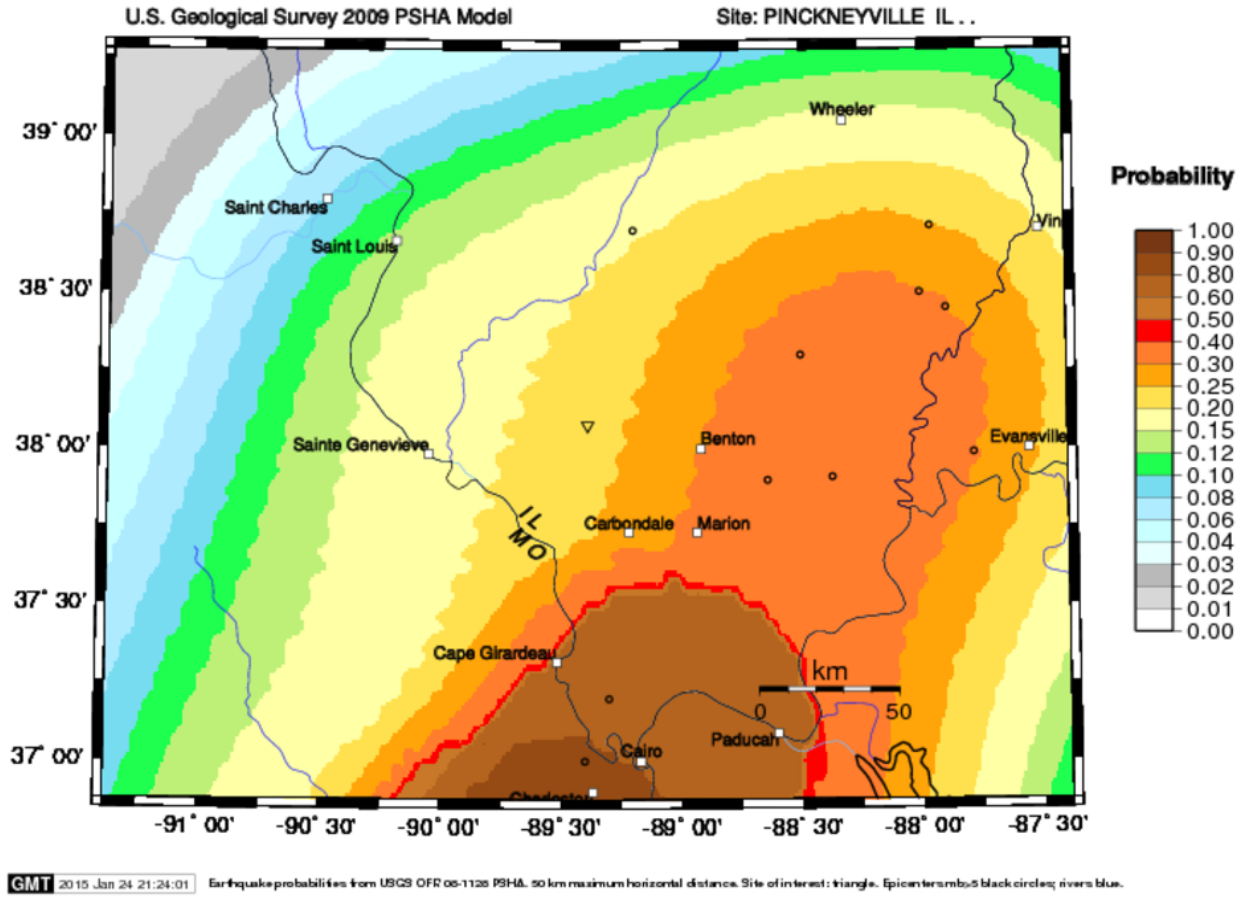


Data Sources: Illinois Geological Survey, U.S. Geological Survey, Center for Earthquake Research and Information at University of Memphis

Geographic Location for Earthquake Hazard

Perry County is situated in a region susceptible to earthquakes. Since 1974, the epicenters of six small earthquakes (M1.3-M3.2) have been recorded in Perry County (see Figure 4-12(C)). The two most significant zones of seismic activity in Illinois are the New Madrid Seismic Zone and the Wabash Valley Fault System. Return periods for large earthquakes within the New Madrid System are estimated to be ~500–1000 years; moderate quakes between magnitude 5.5 and 6.0 can recur within approximately 150 years or less. The Wabash Valley Fault System extends nearly the entire length of southern Illinois and has the potential to generate an earthquake of sufficient strength to cause damage between St. Louis, MO and Indianapolis, IN. While large earthquakes (>M7.0) experienced during the New Madrid Events of 1811 and 1812 are unlikely in Perry County, moderate earthquakes (≤ 6.0M) in or in the vicinity of Perry County are probable. The USGS estimates the probability of a moderate M5.5 earthquake occurring in Perry County within the next 500-years at approximately 20-25% (see Figure 4-13).

Figure 4-13. Probability of M5.5 Earthquake occurring in Perry County within the next 500 years



Hazard Extent for Earthquake Hazard

Earthquake effects are possible anywhere in Perry County. One of the most critical sources of information that is required for accurate assessment of earthquake risk is soils data. The National Earthquake Hazards Reduction Program (NEHRP) compliant soils map was provided by FEMA for the analysis. This map identifies the soils most susceptible to failure.

Risk Identification for Earthquake Hazard

Based on historical information and current USGS and SIU research and studies, future earthquakes in Perry County are possible, but large (>M7.0) earthquakes that cause catastrophic damage are unlikely. According to the Perry County Planning Team's assessment, earthquakes are ranked as the number three hazard.

Risk Priority Index

Probability	x	Magnitude	=	RPI
2	x	6	=	12

Vulnerability Analysis for Earthquake Hazard

Earthquakes could impact the entire county equally; therefore, the entire county's population and all buildings are vulnerable to an earthquake. To accommodate this risk, this plan considers all buildings located within the county as vulnerable. Tables 4-7 and 4-8 display the existing buildings and critical infrastructure in Perry County.

Critical Facilities

All critical facilities are vulnerable to earthquakes. Critical facilities are susceptible to many of the same impacts as any other building within the jurisdiction. These impacts include structural failure and loss of facility functionality (e.g., a damaged police station will no longer be able to serve the community). Table 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

Table 4-8 lists the building exposure in terms of types and numbers of buildings for the entire county. The buildings within the county can expect similar impacts to those discussed for critical facilities. These impacts include structural failure and loss of building function which could result in indirect impacts (e.g., damaged homes will no longer be habitable causing residents to seek shelter).

Infrastructure

During an earthquake, the types of infrastructure that shaking could impact include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure was not available for use in the earthquake models, it is important to emphasize that any number of these items could become damaged in the event of an earthquake. The impacts to these items include broken, failed, or impassable roadways, broken or failed utility lines (e.g., loss of power or gas to community), and railway failure from broken or impassable railways. Bridges could also fail or become impassable, causing risk to motorists.

Hazus-MH Earthquake Analyses

Existing geological information was reviewed prior to the Planning Team selection of earthquake scenarios. A Magnitude 5.5 arbitrary earthquake scenario was performed to provide a reasonable basis for earthquake planning in Perry County. The other two scenarios included a Magnitude of 7.7 with the epicenter located on the New Madrid Fault Zone and a Magnitude 7.1 with the epicenter located on the Wabash Fault Zone.

The earthquake-loss analysis for the probabilistic scenario was based on ground-shaking parameters derived from U.S. Geological Survey probabilistic seismic hazard curves for the earthquake with the 500-year return period. This scenario evaluates the average impacts of a multitude of possible earthquake epicenters with a magnitude typical of that expected for a 500-year return period. The New Madrid Fault Zone runs along the Mississippi River through Arkansas, Tennessee, Missouri, Kentucky and Southern Illinois. The Wabash Valley Fault Zone runs through Southeastern Illinois, Western Kentucky and Southwest Indiana. This represents a realistic scenario for planning purposes.

The earthquake hazard modeling scenarios performed:

- Magnitude 5.5 arbitrary earthquake epicenter in Perry County
- Magnitude 7.7 event along the New Madrid Fault Zone
- Magnitude 7.1 event along the Wabash Valley Fault Zone

This report presents two types of building losses: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

Results for M5.5 Earthquake Scenario

The results of the M5.5 arbitrary earthquake scenario are depicted in Tables 4-20, 4-21, and Figure 4-14. Hazus-MH estimates that approximately 1,076 buildings will be at least moderately damaged. This is 10% of the total number of buildings in the Perry County. It is estimated that 16 buildings would be damaged beyond repair.

The building related economic losses are approximately $49 million dollars. It is estimated that 21% of the losses are related to the business interruption of the region. By far, the largest loss is sustained by the residential occupancies which make up over 57% of the total loss.

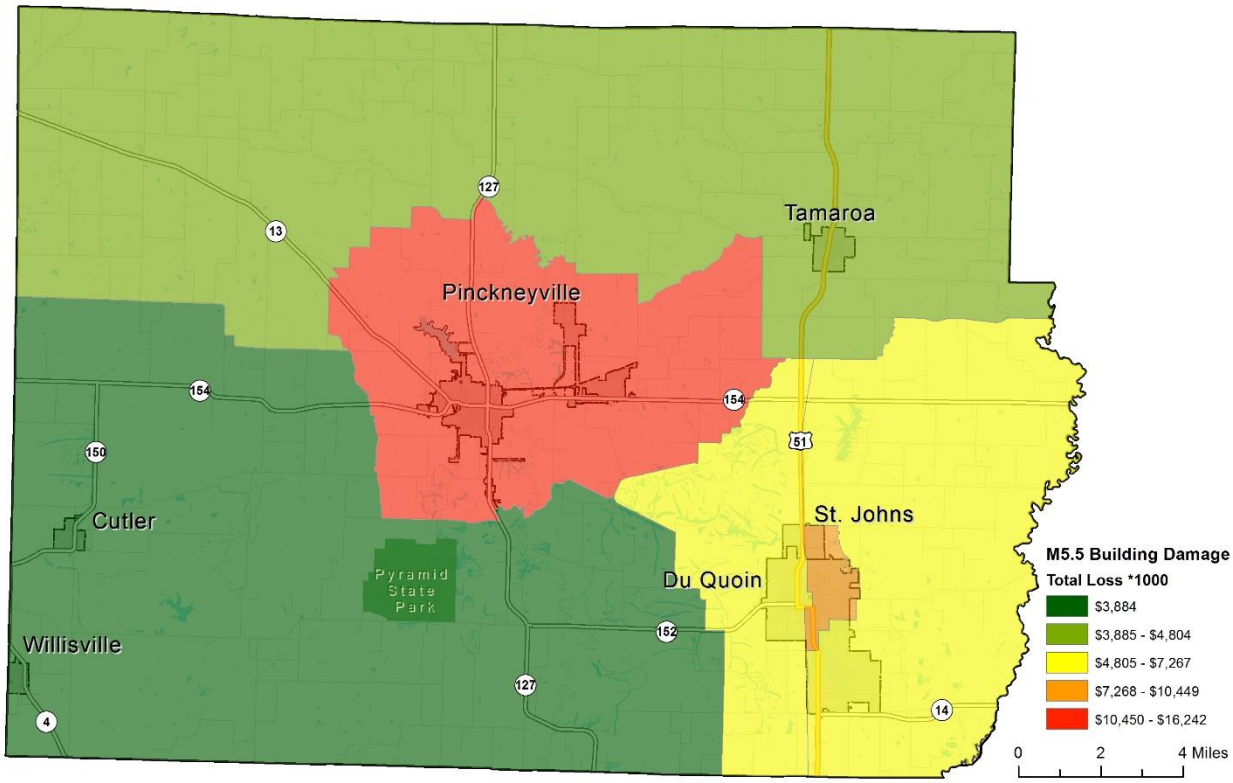
Table 4-20. M5.5 Earthquake Damage Estimates by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	79	0.96	22	1.10	17	1.85	4	2.73	0	2.11
Commercial	278	3.38	84	4.20	53	5.91	13	8.04	1	7.20
Educational	13	0.16	3	0.17	2	0.25	0	0.29	0	0.39
Government	16	0.19	4	0.21	3	0.29	0	0.29	0	0.40
Industrial	78	0.95	23	1.15	16	1.84	4	2.63	0	2.06
Other Residential	2,308	28.06	635	31.86	368	40.99	65	39.67	5	29.09
Religion	46	0.56	12	12	7	0.81	2	1.13	0	1.18
Single Family	5,409	65.76	1,210	1,210	432	48.08	74	45.23	10	57.57
Total:	**8,227**		**1,993**		**898**		**162**		**16**	

Table 4-21. M5.5 Earthquake Estimates of Building Economic Losses (in Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Other	Total
Income Losses	Wage	$0.00	$0.05	$1.69	$0.16	$0.17	$2.07
	Capital-Related	$0.00	$0.02	$1.18	$0.11	$0.04	$1.35
	Rental	$0.61	$0.39	$0.64	$0.07	$0.08	$1.79
	Relocation	$2.26	$0.63	$1.27	$0.29	$0.60	$5.05
	Subtotal:	**$2.87**	**$1.09**	**$4.78**	**$0.63**	**$0.89**	**$10.26**
Capital Stock Losses	Structural	$3.15	$1.01	$1.19	$0.75	$0.78	$6.88
	Non-Structural	$11.43	$3.81	$3.46	$2.06	$1.75	$22.51
	Content	$3.96	$0.95	$1.98	$1.43	$1.00	$9.32
	Inventory	$0.00	$0.00	$0.05	$0.30	$0.03	$0.38
	Subtotal:	**$18.54**	**$5.77**	**$6.68**	**$4.54**	**$3.56**	**$39.09**
	Total:	**$21.41**	**$6.86**	**$11.46**	**$5.17**	**$4.45**	**$49.35**

Figure 4-14. Perry County M5.5 Earthquake Building Economic Losses



Results for M7.7 New Madrid Earthquake

The results of the M7.7 New Madrid earthquake scenario are depicted in Tables 4-22, 4-23, and Figure 4-15. Hazus-MH estimates that approximately 392 buildings will be at least moderately damaged. This is over 3% of the total number of buildings in the Perry County. It is estimated that 3 buildings would be damaged beyond repair.

The building related economic are approximately $33 million dollars. It is estimated that 10% of the losses are related to the business interruption of the region. By far, the largest loss is sustained by the residential occupancies which make up over 55% of the total loss.

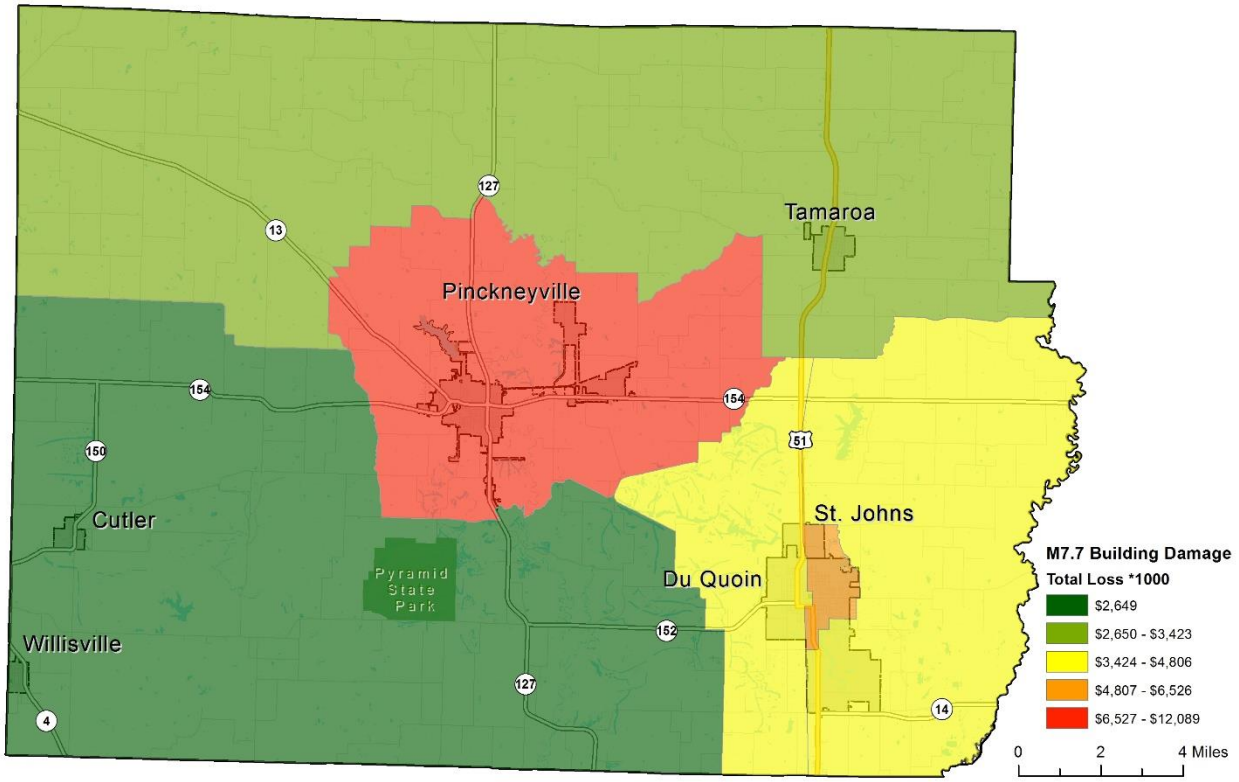
Table 4-22. New Madrid M7.7 Earthquake Damage Estimates by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	86	0.93	26	1.50	10	2.64	1	3.35	0	2.09
Commercial	314	3.42	86	5.02	27	7.36	2	7.40	0	2.56
Educational	15	0.16	4	0.21	1	0.24	0	0.14	0	0.06
Government	18	0.19	4	0.24	1	0.28	0	0.16	0	0.06
Industrial	87	0.95	25	1.47	9	2.53	1	2.50	0	0.57
Other Residential	2,471	26.87	689	40.24	210	57.58	10	41.75	1	37.46
Religion	51	0.56	12	0.70	3	0.92	0	0.75	0	0.18
Single Family	6,152	66.91	867	50.63	104	28.45	10	43.96	2	57.01
Total:	**9,194**		**1,713**		**365**		**24**		**3**	

Table 4-23. New Madrid M7.7 Earthquake Estimates of Building Economic Losses (in Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Other	Total
Income Losses	Wage	$0.00	$0.01	$0.58	$0.07	$0.07	$0.73
	Capital-Related	$0.00	$0.00	$0.41	$0.05	$0.02	$0.48
	Rental	$0.14	$0.11	$0.26	$0.03	$0.02	$0.56
	Relocation	$0.47	$0.28	$0.44	$0.13	$0.17	$1.49
	Subtotal:	**$0.61**	**$0.40**	**$1.69**	**$0.28**	**$0.28**	**$3.26**
Capital Stock Losses	Structural	$0.98	$0.44	$0.43	$0.31	$0.27	$2.43
	Non-Structural	$7.57	$2.97	$2.81	$2.14	$1.04	$16.53
	Content	$4.54	$1.11	$2.22	$1.66	$1.14	$10.67
	Inventory	$0.00	$0.00	$0.05	$0.35	$0.04	$0.44
	Subtotal:	**$13.09**	**$4.52**	**$5.51**	**$4.46**	**$2.49**	**$30.07**
	Total:	**$13.70**	**$4.92**	**$7.20**	**$4.74**	**$2.77**	**$33.33**

Figure 4-15. New Madrid M7.7 Earthquake Building Economic Losses



Results M7.1 Magnitude Wabash Valley Earthquake – General Building Stock

The results of the Wabash Valley M7.1 earthquake scenario are depicted in Tables 4-24, 4-25, and Figure 4-16. Hazus-MH estimates that approximately 17 buildings will be at least moderately damaged. Two buildings would be damaged beyond repair.

The building related economic are approximately $5 million dollars. It is estimated that 3% of the losses are related to the business interruption of the region. By far, the largest loss is sustained by the residential occupancies which make up over 56% of the total loss.

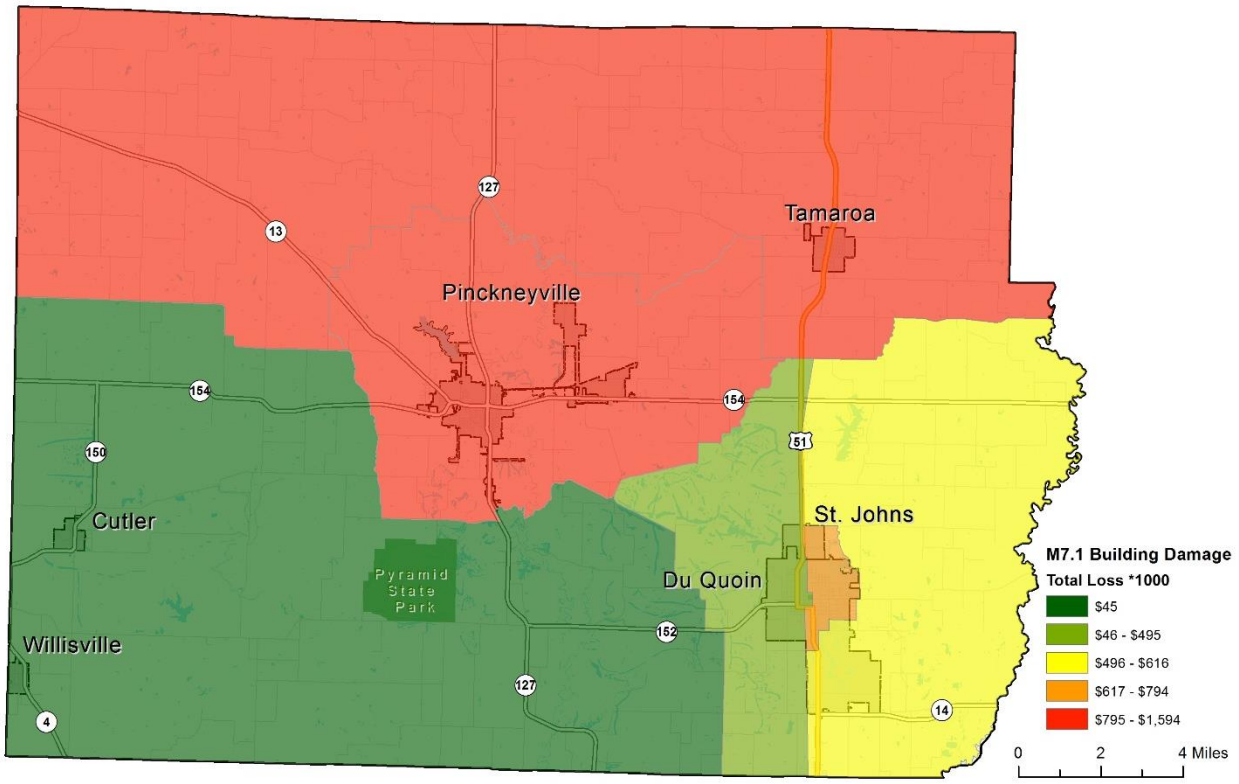
Table 4-24. Wabash Valley 7.1 Magnitude Earthquake Damage Estimates by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	121	1.08	1	1.44	0	2.22	0	2.06	0	2.06
Commercial	426	3.79	2	4.62	0	4.82	0	2.43	0	2.43
Educational	19	0.17	0	0.22	0	0.16	0	0.05	0	0.05
Government	23	0.20	0	0.19	0	0.14	0	0.05	0	0.05
Industrial	121	1.08	1	1.34	0	1.41	0	0.53	0	0.53
Other Residential	3,352	29.84	22	46.94	2	42.05	4	37.83	1	37.83
Religion	67	0.59	0	0.78	0	0.61	0	0.16	0	0.16
Single Family	7,105	63.24	21	44.46	2	48.59	6	56.88	1	56.88
Total:	**11,234**		**47**		**4**		**10**		**2**	

Table 4-25. Wabash 7.1 Magnitude Earthquake Estimates of Building Economic Losses (in Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Other	Total
Income Losses	Wage	$0.00	$0.00	$0.01	$0.00	$0.00	$0.01
	Capital-Related	$0.00	$0.00	$0.01	$0.00	$0.00	$0.01
	Rental	$0.02	$0.01	$0.01	$0.00	$0.00	$0.04
	Relocation	$0.08	$0.01	$0.01	$0.00	$0.00	$0.10
	Subtotal:	**$0.10**	**$0.02**	**$0.04**	**$0.00**	**$0.00**	**$0.16**
Capital Stock Losses	Structural	$0.14	$0.02	$0.02	$0.00	$0.02	$0.20
	Non-Structural	$1.20	$0.40	$0.47	$0.39	$0.20	$2.66
	Content	$0.70	$0.17	$0.40	$0.31	$0.18	$1.76
	Inventory	$0.00	$0.00	$0.01	$0.06	$0.01	$0.08
	Subtotal:	**$2.04**	**$0.59**	**$0.90**	**$0.76**	**$0.41**	**$4.70**
	Total:	**$2.14**	**$0.61**	**$0.94**	**$0.76**	**$0.41**	**$4.86**

Figure 4-16. Wabash Valley M7.1 Scenario Building Economic Losses



Vulnerability to Future Assets/Infrastructure for Earthquake Hazard

New construction, especially critical facilities, should accommodate earthquake mitigation design standards.

Suggestions for Community Development Trends

Community development should occur outside of the low-lying areas in floodplains with a water table within five feet of grade that is susceptible to liquefaction. It is important to harden and protect future and existing structures against the possible termination of public services and systems including power lines, water and sanitary lines, and public communication.

4.3.5 Thunderstorm Hazard

Hazard Definition

Severe thunderstorms are weather events with one or more of the following characteristics: strong winds, large and damaging hail, and frequent lightning. Severe thunderstorms most frequently occur in Illinois during the spring and summer months, but can occur at any time. A severe thunderstorm's impacts can be localized or can be widespread in nature. A thunderstorm is classified as severe when it meets one or more of the following criteria:

Hail 0.75 inches or greater in diameter

Hail is a possible product of a strong thunderstorm. Hail usually falls near the center of a storm, but strong winds occurring at high altitudes in the thunderstorm can blow the hailstones away from the storm center, resulting in damage in other areas near the storm. Hailstones range from pea-sized to baseball-sized, and some reports note hailstones larger than softballs.

Frequent and dangerous lightning

Lightning is a discharge of electricity from a thunderstorm. Lightning is often perceived as a minor hazard, but lightning damages many structures and kills or severely injures numerous people in the United States each year.

Wind speeds greater than or equal to 58 miles per hour

Straight-line winds from thunderstorms are fairly common in Illinois. Straight-line winds can cause damage to homes, businesses, power lines, and agricultural areas, and may require temporary sheltering of individuals who are without power for extended periods of time.

Previous Occurrences of Thunderstorm Hazards

The National Climatic Data Center (NCDC) database reported fifty-one hailstorms in Perry County since 1950. Hailstorms occur nearly every year in the late spring and early summer months. The most recent reported occurrence was in April of 2014, when storms formed near a warm front that was draped across southeast Missouri, Southern Illinois, and Kentucky. The storms occurred within a moist and moderately unstable air mass along and behind the warm front. The strong moisture feed contributed to torrential downpours that produced flash flooding in a number of counties. Hail was reported in Du Quoin. Table 4-26 lists the significant hail storms (such as those that cause death, damage or injury) in Perry County.

Table 4-26. Selected NCDC-Recorded Hail that Caused Damage, Death, or Injury in Perry County

Location or County*	Date	Deaths	Injuries	Property Damage
Pinckneyville	4/3/2007	0	0	$6,000
Pinckneyville	3/28/1997	0	0	$10,000
Perry County	4/21/2002	0	0	$25,000
	Total:	**0**	**0**	**$41,000**

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

The NCDC database reported two lightning events in Perry County. The most recent reported event was in February 1999 in Du Quoin when lightning struck a house setting it ablaze. Table 4-27 identifies NCDC-recorded lightning that caused damage, death, or injury in Perry County.

Table 4-27. Selected NCDC-Recorded Lightning that Caused Damage, Death, or Injury in Perry County

Location or County*	Date	Deaths	Injuries	Property Damage
Pinckneyville	7/19/1996	0	0	$50,000
Du Quoin	2/27/1999	0	0	$50,000
	Total:	**0**	**0**	**$100,000**

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

The NCDC database reported 147 severe thunder and wind storms in Perry County. The most damaging event in Perry County's history occurred in June 2009 when thunderstorms rapidly developed along a surface frontal boundary from central Illinois into southern Missouri. Extreme instability and favorable wind shear ahead of the activity promoted organized and isolated supercell storms. Downburst winds affected a swath of eastern and southern Perry County. The heart of the damage swath cut a path through the northeast and east sides of Du Quoin. The average path width was three-quarters of a mile. The damage path length was about six miles long. Many dozens to hundreds of trees were down on homes, vehicles, power lines, and other structures. Eight homes received major damage, and 82 others had minor damage. Nine vehicles were destroyed. A large portion of the metal roof was blown off a large industrial building. A semitrailer was overturned. Approximately 40 power poles were destroyed. Up to 1200 citizens were without power. There were two minor injuries due to falling debris. Peak winds were estimated near 75 mph. Table 4-28 identifies selected NCDC-recorded wind storms that caused major damage (over $100,000), death, or injury in Perry County.

Table 4-28. Selected NCDC-Recorded Thunder and Wind Storms that Caused Major Damage (over $100,000), Death, or Injury in Perry County

Location or County*	Date	Deaths	Injuries	Property Damage
Perry County	10/17/2012	0	0	$100,000
Perry County	6/8/2009	0	2	$1,030,000
Perry County	4/19/2011	0	2	$1,000,000
	Total:	**0**	**4**	**$2,130,000**

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Geographic Location of Thunderstorm Hazard

The entire county has the same risk for occurrence of thunderstorms. They can occur at any location within the county.

Hazard Extent for Thunderstorm Hazard

The extent of the hypothetical thunderstorms depends upon the extent of the storm, the wind speed, and the size of hail stones. Thunderstorms can occur at any location within the county.

Risk Identification for Thunderstorm Hazard

Based on historical information, the occurrence of future high winds, hail, and lightning is highly likely. The County should expect high winds, hail, and lightning of widely varying magnitudes in the future. According to the Perry County Planning Team's assessment, severe thunderstorms are ranked as the number four hazard.

Risk Priority Index

Probability	x	Magnitude	=	RPI
4	x	2	=	8

Vulnerability Analysis for Thunderstorm Hazard

The entire county's population and all buildings are vulnerable to a severe thunderstorm and can expect the same impacts within the affected area. To accommodate this risk, this plan considers all buildings located within the county as vulnerable. Tables 4-7 and 4-8 display the existing buildings and critical infrastructure in Perry County.

Critical Facilities

All critical facilities are vulnerable to severe thunderstorms. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality (e.g., a damaged police station cannot serve the community). Table 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

Table 4-8 lists the building exposure in terms of types and numbers of buildings for the entire county. The buildings within the county can expect impacts similar to those discussed for critical facilities. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality (e.g., a person cannot inhabit a damaged home, causing residents to seek shelter).

Infrastructure

A severe thunderstorm could impact roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is vulnerable, it is important to emphasize that a severe thunderstorm could damage any number of these structures. The impacts to these structures include broken, failed, or impassable roadways; broken or failed utility lines (e.g., loss of power or gas to community); or impassable railways. Bridges could become impassable causing risk to motorists.

Potential Dollar Losses from Thunderstorm Hazard

According to the NDCD, Perry County has incurred approximately $4 million in damages relating to thunderstorms, including hail, lightning, and high winds since 1950. NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event. As a result, the potential dollar losses for

a future event cannot be reliably constrained; however, based on average property damage in the past decade, SIU estimates that Perry County incurs property damages of approximately $60,000 per year related to severe thunderstorms.

Vulnerability to Future Assets/Infrastructure for Thunderstorm Hazard

All future development within the county and all communities will remain vulnerable to severe thunderstorm events.

Suggestions for Community Development Trends

Local officials should enhance severe storm preparedness by sponsoring a wide range of programs and initiatives to address the overall safety of county residents. It is suggested that the county should build new structures with more sturdy construction, and harden existing structures to lessen the potential impacts of severe weather. This is particularly important where the future economic expansion is expected to take place within the city limits of Pinckneyville and Du Quoin. Additional warning sirens can warn the community of approaching storms to ensure the safety of Perry County residents and minimizing property damage.

4.3.6 Winter Storm Hazard

Hazard Definition of Winter Storm Hazard

Severe winter weather consists of various forms of precipitation and weather conditions. This may include one or more of the following: freezing rain, sleet, heavy snow, blizzards, icy roadways, extreme low temperatures, and strong winds. These conditions can cause human health risks such as frostbite, hypothermia, or death and cause property damage and disrupt economic activity.

Ice or sleet, even in small quantities, can result in hazardous driving conditions and can cause property damage. Sleet involves raindrops that freeze completely before reaching the ground. Sleet does not stick to trees and wires. Ice storms, on the other hand, involve liquid rain that falls through subfreezing air and/or onto sub-freezing surfaces, freezing on contact with those surfaces. The ice coats trees, buildings, overhead wires, and roadways, sometimes causing extensive damage.

Ice storms are some of the most damaging winter storms in Illinois. Ice storms occur when moisture-laden Gulf air converges with the northern jet stream causing freezing rain that coats power and communication lines and trees with heavy ice. Strong winds can cause the overburdened limbs and cables to snap; leaving large sectors of the population without power, heat, or communication.

Rapid accumulation of snow, often accompanied by high winds, cold temperatures, and low visibility, characterize significant snowstorms. A blizzard is categorized as a snow storm with winds of 35 miles per hour or greater and/or visibility of less than one-quarter mile for three or more hours. Strong winds during a blizzard blow falling and fallen snow, creating poor visibility and impassable roadways. Blizzards potentially result in property damage.

Blizzards repeatedly affect Illinois. Blizzard conditions cause power outages, loss of communication, and transportation difficulties. Blizzards can reduce visibility to less than one-quarter mile, and the resulting disorientation makes even travel by foot dangerous if not deadly.

Severe cold involves ambient air temperatures that drop to 0˚F or below. These extreme temperatures can increase the likelihood of frostbite and hypothermia. High winds during severe cold events can

enhance the air temperature's effects. Fast winds during cold weather events can lower the wind chill factor (how cold the air feels on your skin). As a result, the time it takes for frostbite and hypothermia to affect a person's body will decrease.

Previous Occurrences of Winter Storm Hazard

The NCDC database reported 155 winter storm and extreme cold events for Perry County since 1950. The most recent reported event occurred in April 2014 when a high pressure system moved east across the Ohio Valley bringing unseasonably cold air and widespread freezing temperatures. Lows were from 28 to 32 degrees at many locations in Southern Illinois. The coldest observed temperature was 28 degrees at the Mount Vernon airport. Other lows included 31 degrees at the Carbondale airport and at Metropolis. Table 4-29 identifies NCDC-recorded winter storm events that caused damage, death, or injury in Perry County.

Table 4-29. NCDC-Recorded Winter Storms that Caused Damage, Death, or Injury in Perry County

Location or County*	Date	Deaths	Injuries	Property Damage
Perry County	1/5/2014	1	0	$0
Perry County	1/26/2009	0	0	$40,000
Perry County	3/3/2008	0	0	$75,000
	Total:	**1**	**0**	**$115,000**

Geographic Location of Winter Storm Hazard

Severe winter storms are regional in nature. Most of the NCDC data are calculated regionally or in some cases statewide.

Hazard Extent of Winter Storm Hazard

The extent of the historical winter storms varies in terms of storm location, temperature, and ice or snowfall. A severe winter storm can occur anywhere in the county.

Risk Identification of Winter Storm Hazard

Based on historical information, the probability of future winter storms in Perry County is likely. The county should expect winter storms with varying magnitudes to occur in the future. Winter storms ranked as the number five hazard according to the Perry County Planning Team's risk assessment.

Risk Priority Index

Probability	x	Magnitude	=	RPI
3	x	2	=	6

Vulnerability Analysis of Winter Storm Hazard

Winter storm impacts are equally likely across the entire county; therefore, the entire county is vulnerable to a winter storm and can expect impacts within the affected area. To accommodate this risk, this plan considers all buildings located within the county as vulnerable. Tables 4-7 and 4-8 display the existing buildings and critical infrastructure in Perry County.

Critical Facilities

All critical facilities are vulnerable to winter storms. A critical facility will encounter many of the same impacts as other buildings within the county. These impacts include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse

from heavy snow. Table 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

Table 4-8 lists the building exposure in terms of types and numbers of buildings for the entire county. The impacts to the general buildings within the county are similar to the damages expected to the critical facilities. These include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow.

Infrastructure

During a winter storm, the types of potentially impacted infrastructure include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is vulnerable, it is important to emphasize that a winter storm could impact any structure. Potential impacts include broken gas and/or electricity lines or damaged utility lines, damaged or impassable roads and railways, and broken water pipes.

Potential Dollar Losses from Winter Storm Hazard

According to the NDCD, Perry County has incurred approximately $100,000 in damages relating to winter storms since 1950. NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event. As a result, the potential dollar losses for a future event cannot be reliably constrained; however, based on average property damage in the past decade, SIU estimates that Perry County incurs property damages of approximately $2,000 per year related to winter storms, including sleet/ice and heavy snow.

Vulnerability to Future Assets/Infrastructure for Winter Storm Hazard

Any new development within the county will remain vulnerable to these events.

Suggestions for Community Development Trends

Because winter storm events are regional in nature, future development across the county will also face winter storms.

4.3.7 Flooding Hazard

Hazard Definition for Flooding

Flooding is a significant natural hazard throughout the United States. The type, magnitude, and severity of flooding are functions of the magnitude and distribution of precipitation over a given area, the rate at which precipitation infiltrates the ground, the geometry and hydrology of the catchment, and flow dynamics and conditions in and along the river channel. Floods are classified as one of two types in this plan: upstream floods or downstream floods. Both types of floods are common in Illinois.

Upstream floods, also called flash floods, occur in the upper parts of drainage basins and are generally characterized by periods of intense rainfall over a short duration. These floods arise with very little warning and often result in locally intense damage, and sometimes loss of life, due to the high energy of the flowing water. Flood waters can snap trees, topple buildings, and easily move large boulders or other structures. Six inches of rushing water can upend a person; another 18 inches might carry off a car. Generally, upstream floods cause severe damage over relatively localized areas. Urban flooding is a type of upstream flood. Urban flooding involves the overflow of storm drain systems and can result from

inadequate drainage combined with heavy rainfall or rapid snowmelt. Upstream or flash floods can occur at any time of the year in Illinois, but they are most common in the spring and summer months.

Downstream floods, sometimes called riverine floods, refer to floods on large rivers at locations with large upstream catchments. Downstream floods are typically associated with precipitation events that are of relatively long duration and occur over large areas. Flooding on small tributary streams may be limited, but the contribution of increased runoff may result in a large flood downstream. The lag time between precipitation and time of the flood peak is much longer for downstream floods than for upstream floods, generally providing ample warning for people to move to safe locations and, to some extent, secure some property against damage. Riverine flooding on the large rivers of Illinois generally occurs during either the spring or summer.

Previous Occurrences of Flooding

The NCDC database reported 28 flooding events in Perry County. The most recent recorded event was in January 2013 when a narrow line of thunderstorms moved quickly northeast across southeast Illinois. The storms were located in a region of strong warm advection near a low level jet in excess of 50 knots. Marginal instability developed as a surface warm front lifted northward. Isolated wind damage events occurred in association with this line of storms. More widespread showers and storms over a large area produced heavy rain and isolated flooding. In Cutler, a mobile home was evacuated, and a couple of streets were closed. Table 4-30 identifies NCDC-recorded flooding events that caused damage, death, or injury in Perry County.

Table 4-30. NCDC-recorded Flooding Events that caused Death, Damage (over $20,000) or Injury in Perry County

Location or County*	Date	Deaths	Injuries	Property Damage
Pinckneyville	4/28/1996	0	0	$22,000
Du Quoin	6/29/1998	0	0	$50,000
Perry County	3/18/2008	0	0	$250,000
Perry County	5/1/2011	0	0	$30,000
	Total:	**0**	**0**	**$352,000**

*NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

There has been several structures in Perry County that has experienced repetitive losses due to flooding. FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the NFIP that has suffered flood loss damage on two or more occasions during a 10-year period that ends on the date of the second loss, in which the cost to repair the flood damage is ≥ 25% of the market value of the structure at the time of each flood loss.

The Illinois Emergency Management Agency and Illinois Department of Natural Resources was contacted to determine the location of repetitive loss structures in Perry County. Records indicate that there are two repetitive loss structures within the county. The total amount paid for building replacement and building contents for damage to these repetitive loss structures is $25,648. Table 4-31 describes the repetitive loss structures for each jurisdiction.

Table 4-31. Repetitive Loss Structures for each Jurisdiction in Perry County

Jurisdiction	Number of Losses	Total Paid
Pinckneyville	2	$9,903.14
Pinckneyville	2	$15,744.49
Total:	**8**	**$25,647.63**

Geographic Location of Flooding

Most riverine flooding in Illinois occurs during either the spring or summer and is the result of excessive rainfall and/or the combination of rainfall and snowmelt. Flash flooding of low-lying areas in Illinois can occur during any time of the year, but tends to be less frequent and more localized between mid-summer and early winter.

The primary sources of river flooding in Perry County are the Beaucoup Creek and Little Muddy River. Beaucoup Creek flows through the central portion of Perry County and can potential inundate portions of Pinckneyville. Galum Creek, a major tributary to Beaucoup Creek, can potentially inundate a significant area between Union School Road and State Route 127 in the south central portion of the county. These areas are mostly agricultural. However, flooding along Beacoup Creek and its tributaries has closed important transportation routes such as State Routes 127, 152, and 154. The flooding along Little Muddy River generally inundates agricultural areas in the extreme eastern portion of the county. However, a major tributary to the Little Muddy River, Reese Creek, can impact a small area in northeast corner of Du Quoins. Flooding along the Little Muddy River and its tributaries has resulted in the closure of State Routes 14 and 154.

Flash flooding in Perry County typically occurs or is best documented in urban/developed areas. For example flash flooding has resulted in the closure of US 51 through Du Quoin and several side streets in the towns of Du Quoin and Pinckneyville.

Hazard Extent for Flooding

All floodplains are susceptible to flooding in Perry County. The floodplain of concern is for the 100-year flood event which is defined as areas that have a 1% chance of flooding in any given year. However, flooding is dependent on various local factors including, but not limited to, impervious surfaces, amount of precipitation, river-training structures, etc. The 100-year flood plain covers approximately 11% of Perry County

Vulnerability Analysis for Flooding

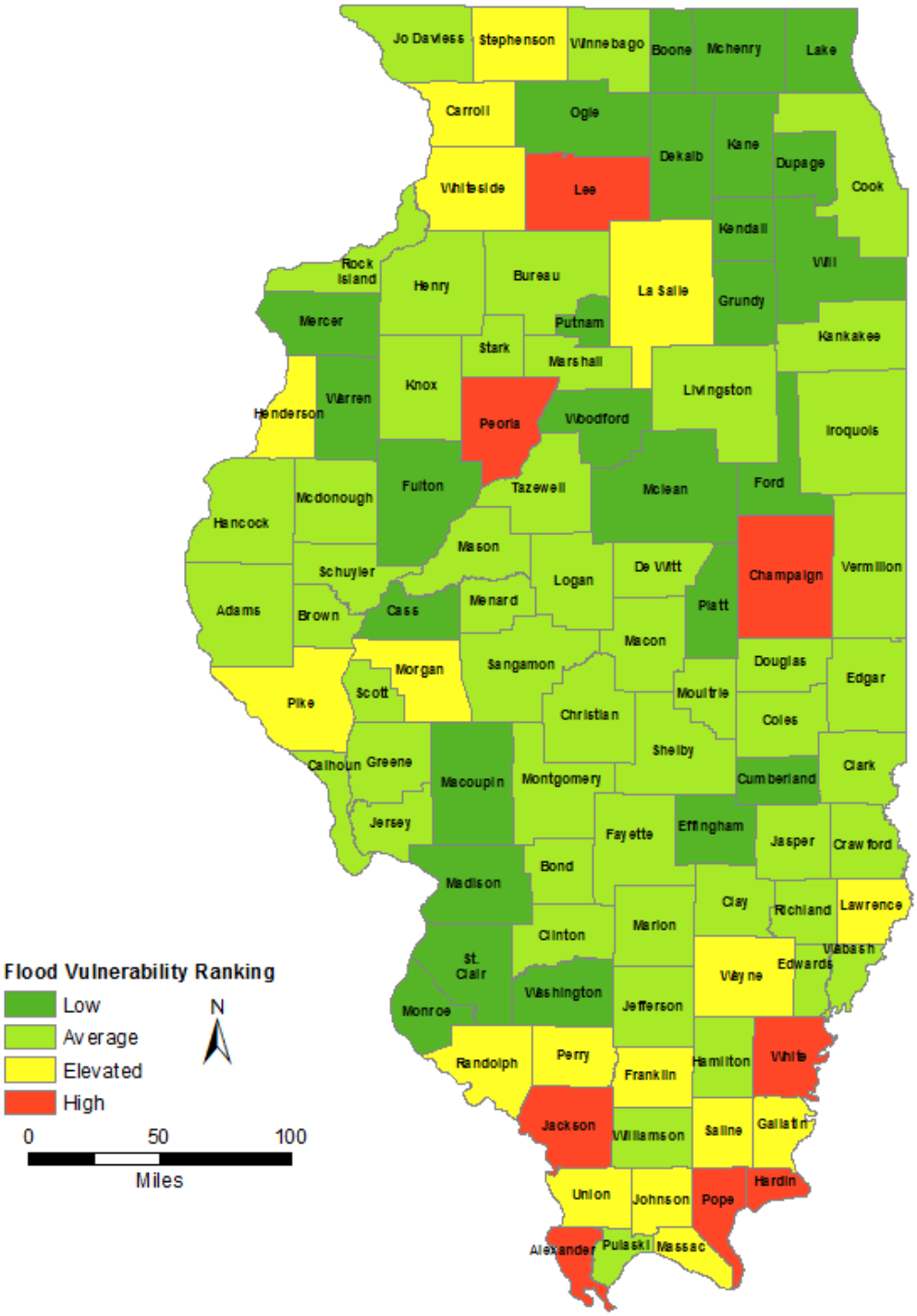
The 2013 Illinois Hazard Mitigation Plan analyzed a variety potential natural hazards including vulnerability to flooding. A Flood Vulnerability Index (FVI) was calculated for all counties and jurisdictions in Illinois. FVI combines Hazus-based estimates of flood exposure and loss with the widely utilized Social Vulnerability Index (SoVI). The highest vulnerability scores and vulnerability ratings were generally in rural counties and communities located along Illinois's large rivers (i.e., Mississippi, Green, Illinois, Kaskaskia, Rock and Ohio Rivers). Figure 4-17 displays the Flood Vulnerability Ratings for the 102 Counties in Illinois. The vulnerability ratings are categorical representations (low, average, elevated, or high) of the flood vulnerability index. Perry County has an Elevated Flood Vulnerability Rating and ranks 13 out of the 102 Counties in Illinois in terms of loss estimation according to Hazus-MH for floods.

Table 4-32 lists the jurisdictional Flood Vulnerability Ratings for Perry County. The jurisdictions of Perry County with mapped floodplains all surpass an average Flood Vulnerability Rating.

Table 4-32. Jurisdictional Flood Vulnerability Ranking for Perry County

Jurisdiction	State Ranking	Flood Vulnerability Rating
Pinckneyville	119	Elevated
Du Quoin	157	Elevated

Figure 4-17. County Flood Vulnerability Rating for Illinois



All floodplains are susceptible to flooding in Perry County; therefore, the population and all buildings located within the floodplain are vulnerable to flooding. To accommodate this risk, this plan considers all buildings located within 100-year flood plain as vulnerable.

Risk Identification for Flood Hazard

Based on historical information and the Flood Vulnerability Rating, future occurrence of flooding in Perry County is likely. According to the Risk Priority Index (RPI) and County input, flooding is ranked as the number six hazard.

Risk Priority Index

Probability	x	Magnitude	=	RPI
2	x	2	=	4

Critical Facilities

All critical facilities within the floodplain are vulnerable to floods. An essential facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility, and loss of facility functionality (e.g., a damaged police station cannot serve the community). Appendix E include a list of the critical facilities in Perry County and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

All buildings within the floodplain are vulnerable to floods. These impacts can include structural failure, extensive water damage to the facility, and loss of facility functionality (e.g., damaged home will no longer be habitable, causing residents to seek shelter). This plan considers all buildings located within 100-year flood plain as vulnerable.

Infrastructure

The types of infrastructure potentially impacted by a flood include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available for this plan, it is important to emphasize that a flood could damage any number of these items. The impacts to these items include: broken, failed, or impassable roadways; broken or failed utility lines (e.g., loss of power or gas to community); or railway failure from broken or impassable railways. Bridges could also fail or become impassable, causing risk to motorists.

Hazus-MH Flood Analysis

Hazus-MH was utilized to generate the flood depth grid for a 100-year return period and made calculations by clipping the USGS one-third-arc-second DEM (~10 m) to the flood boundary. Next, Hazus-MH was used to estimate the damages for Perry County by utilizing a detailed building inventory database created from assessor and parcel data.

According to this analysis, there are 228 buildings located in the Perry County 100-year floodplain. The estimated damage to these structures is $4 million. It should be noted that the results should be interpreted as degrees of loss rather than exact number of buildings exposed to flooding. Figure 4-18 depicts the building inventory within the 100-year floodplain and Table 4-33 shows the loss estimates by occupancy class.

Figure 4-18. Building Inventory Located within the 100-year Floodplain in Perry County

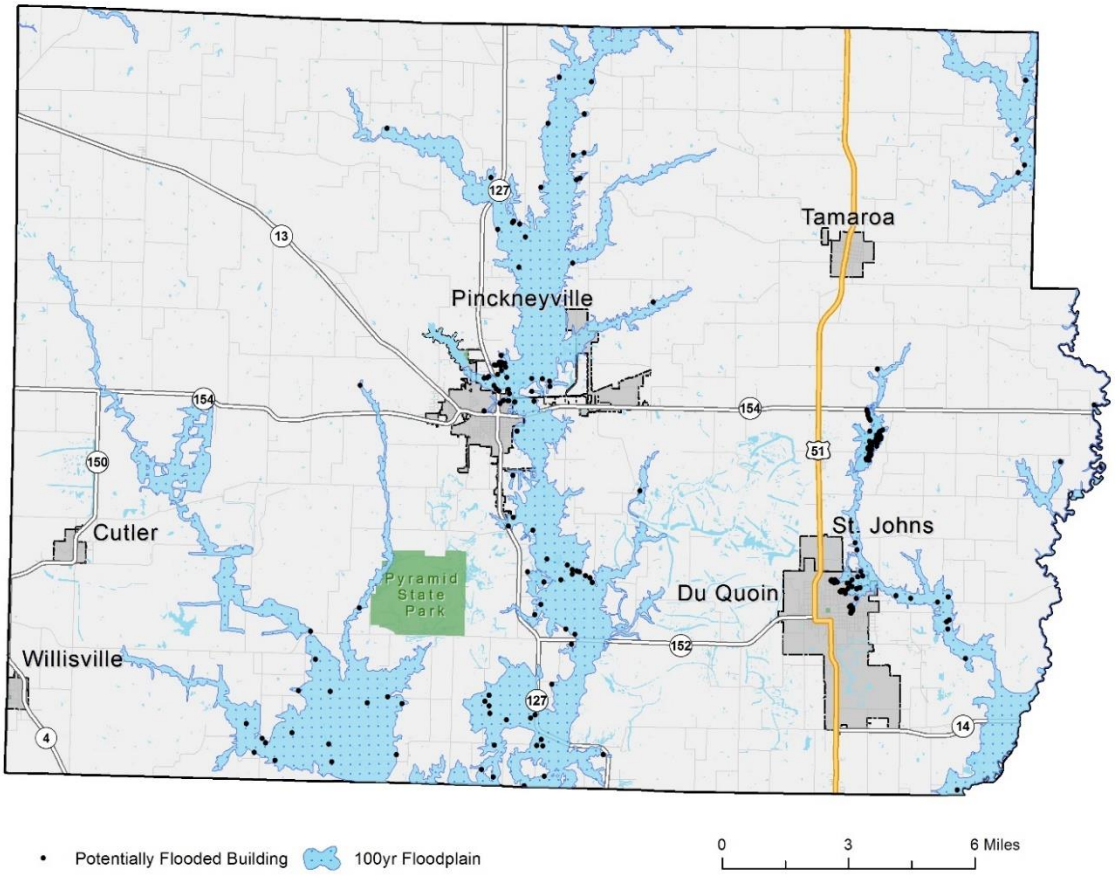


Table 4-33. Estimated Flood Losses within the 100-year Floodplain

Occupancy Class	Number of Structures	Estimated Building Related Losses
Residential	228	$3,758,018
Total:	**228**	**$3,758,018**

Essential Facilities Damage

The analysis identified zero essential facilities that are subject to flooding.

Vulnerability Analysis to Future Assets/Infrastructure

Flooding may affect nearly any location within the county; therefore all buildings and infrastructure are vulnerable. Table 4-8 includes the building exposure for Perry County. All essential facilities in the county are at risk. Appendix E include a list of the essential facilities in Perry County and Appendix F displays a large format map of the locations of all critical facilities within the county. Currently, the municipal planning commission reviews new developments for compliance with the local flood zoning ordinance. At this time no new construction is planned with the 100-year floodplain.

Suggestions for Community Development Trends

Reducing floodplain development is crucial to reducing flood-related damages. Areas with recent development may be more vulnerable to drainage issues. Storm drains and sewer systems are usually

most susceptible to drainage issues. Damage to these can cause back-up of water, sewage, and debris into homes and basements, causing structural and mechanical damage as well as creating public health hazards and unsanitary conditions.

4.3.8 Wildfire Hazard

Hazard Definition

A wildfire is any fire involving vegetative fuels that occurs in the wildland or urban-wildland interface areas. Wildfires are characterized in terms of the cause of ignition, their physical properties such as speed of propagation, the combustible material present, and the effect of weather on the fire. A wildfire differs from other fires by its extensive size, the speed at which it can spread out from its original source, its potential to change direction unexpectedly, and its ability to jump gaps such as roads, rivers and fire breaks. The spread of wildfires varies based on the flammable material present and can be generally characterized by their fuels as follows:

- Ground - subterranean roots, duff and other buried organic matter
- Crawling or surface - low-lying vegetation such as leaf and timber litter, debris, grass, and low-lying shrubbery
- Ladder –low-level vegetation and tree canopies, such as small trees, downed logs, and vines
- Crown, canopy, or aerial –suspended material at the canopy level, such as tall trees, vines, and mosses

According to the United State Department of Agriculture over the last 10 years, nationwide there have been an average of 75,000 fires per year and an average of 7.2 million acres burned. While sometimes caused by lightning, nine out of ten wildfires are human-caused. The Forest Service and its partners suppress more than 98 percent of wildfires on initial attack, keeping unwanted fires small and costs down.

In the Midwest, particularly in Illinois, the tallgrass prairie ecosystems depends on periodic fires to maintain the habitats which make up the ecosystem. Fire in tall grass prairies acts to burn aboveground biomass, killing woody plants, allowing sunlight to reach the soil, and changing the soil pH and nutrient availability. Growth of native species such as big bluestem, little bluestem, and Indian grass all increase significantly following a fire. When fire is removed from a prairie ecosystem, woody shrubs and trees eventually replace grasses and forbs. Controlled burns/prescribed fires is one of the most effective tools in preventing the outbreak and spread of wildfires and doing so safely reduces the amount of fuel for fires.

The Shawnee National Forest, located in the Ozarks and Shawnee Hills of Southern Illinois consists of approximately 280,000 acres of federally managed lands. The National Forest spans nine counties: Pope, Jackson Union, Hardin, Alexander, Saline, Gallatin, Johnson, and Massac. Unlike many of the western national forests, the Shawnee National Forest does not have large contiguous blocks of forested lands. Much of the Shawnee land base consists of small tracts of land intermingled with state and privately owned lands. Wildland fires often burn on multiple ownerships and in multiple jurisdictions with Forest firefighters working alongside many of the local fire departments in southern Illinois when fighting wildfires. Wildland fires typically occur in the fall, winter and spring months during “leaf-off” but can occur anytime during periods of drought. The Forest Service conducts prescribed burns on 5,000 to 10,000 acres of Shawnee National Forest annually to restore and improve the quality of forested and non-forested habitats by maintaining and/or increasing biodiversity and maintain the oak-dominated ecosystem.

Previous Occurrences of Wildfire

Federal Fire Occurrence Website is an official Department of the Interior Website provided by the United States Geological Survey and maintains over 677,000 fire records collected by Federal land management agencies for wildfires that occurred from 1980 to 2013 in the United States.

The Federal Fire Occurrence Website database reported 965 wildland fires in Illinois since 1980. The Federal Fire Occurrence Website reported zero wildland fires for Perry County. Table 4-34 identifies recorded wildfires that claimed over 400 acres in the State of Illinois. Additional details of individual hazard events are on the Federal Fire Occurrence website.

Table 4-34. Recorded Wildland Fires that claimed over 400 acres in the State of Illinois

Location (County)	Start Date	Control Date	Out Date	Cause	Total Number of Acres Burned at Time of Fire Control
Mercer	3/23/2003	3/25/2003	N/A	Human	1,200
Mercer	3/9/2000	3/9/2000	N/A	Human	832
Mercer	4/12/2003	4/15/2003	N/A	Human	820
Mercer	3/26/2003	3/27/2003	N/A	Human	630
Jackson	11/8/2010	11/8/2010	11/25/2010	Human	409

Geographic Location for Wildfire

Wildland Fires are limited to forested areas and tallgrass prairie ecosystems located in the county.

Hazard Extent for Wildfire

The extent of the fire hazard varies both in terms of the extent of the fire and the type of material being ignited.

Risk Identification for Wildfire

Based on historical information of Perry County, the occurrence of future wildfire that is a hazard to homes and infrastructures is low. According to the Perry County Planning Team's assessment, wildfire is ranked as the number seven hazard.

Risk Priority Index

Probability	x	Magnitude	=	RPI
2	x	1	=	2

Vulnerability Analysis for Wildfire

A wildfire is any fire involving vegetative fuels that occurs in the wildland or urban-wildland interface areas. This study excludes structure fires, vehicle fires, trash or rubbish fires, and outside gas or vapor combustion. Although wildland fires have ability to jump gaps such as roads, rivers and fire breaks this plan only considers the wildland-urban interface as vulnerable. To accommodate this risk, only buildings located within the wildland-urban interface portion of the county are considered as vulnerable. Tables 4-7 and 4-8 display the existing buildings and critical infrastructure in Perry County.

Critical Facilities

All critical facilities and communities within the wildland-urban interface are at risk. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include

structural failure due to fire or explosion and loss of function of the facility (e.g., a damaged police station can no longer serve the community). Table 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

Table 4-8 lists the building exposure in terms of types and numbers of buildings for the entire county. The buildings within the county can expect similar impacts to those discussed for critical facilities. These impacts include structural failure due to fire or explosion or debris, and loss of function of the building (e.g., a person cannot inhabit a damaged home, causing residents to seek shelter).

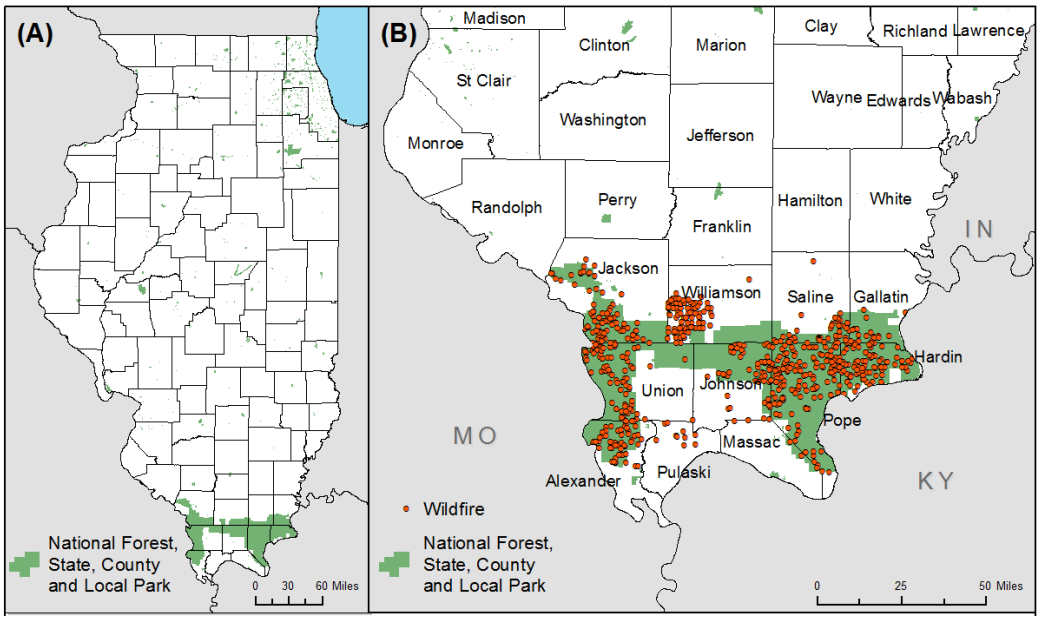
Infrastructure

During a wildland fire, the types of potentially impacted infrastructure include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan, it is important to emphasize that a wildland fire could damage any number of these items. The impacts to these items include: impassable roadways; broken or failed utility lines (e.g., loss of power or gas to community); and railway failure from broken or impassable railways. Bridges could become impassable causing risk to motorists.

GIS-based Analysis of Wildfire

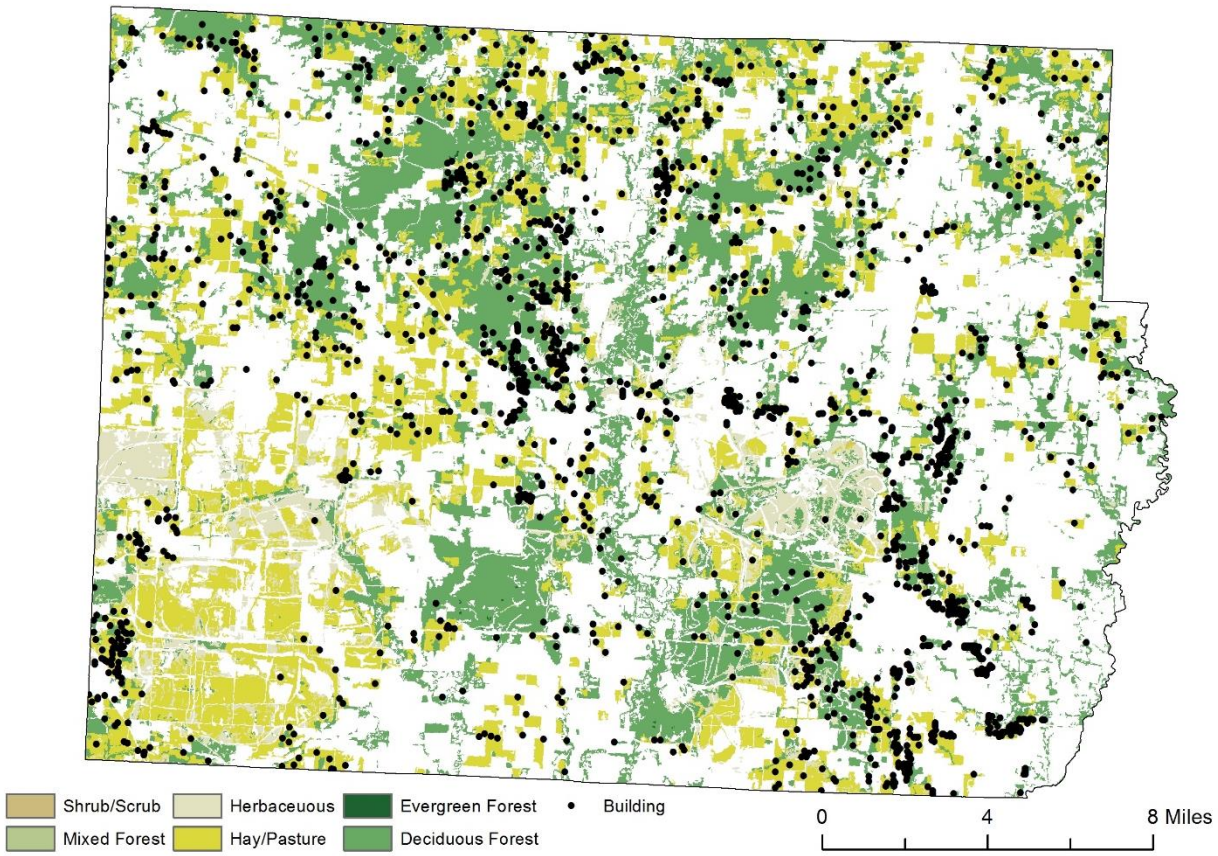
This section provides an overview of the wildfire hazards in Illinois in general and a discussion of the potential subsidence risk for Perry County. Wildland fires in Illinois occur in forested or prairieland areas and are associated with either human or natural causes (such as lightening). Figure 4-19(A) displays the distribution of National Forests, State, County and Local parks within Illinois. Southern Illinois is home to the 280,000 acres of federally managed Shawnee National Forest (see Figure 4-19(B)). Between 1980 and 2013, Department of the Interior revealed the occurrence of 856 wildland fires within and near the Shawnee Nation Forest. These fires range in size from >1 to 409 acres. However, most (75%) of these fires are less than 10 acres in size. These fires generally occur near roads, railroad, campgrounds, and the urban wildland interface.

Figure 4-19. Illinois Forests and Parks and Reported Southern Illinois Wildfires



The wildland-urban interface areas of Perry County are particularly vulnerable to wildland fires. Areas at risk for wildfire in Perry County can be determined from detailed mapping of land cover (Figure 4-20). Analysis of the 2011 National Land Cover Database revealed that 535 km^2 out of Perry County's total 1,158 km^2 (46%) falls within the wildland-urban interface. This analysis revealed that 1,955 out of 8,842 (22%) of the buildings in the county are located above within the wildland-urban interface.

Figure 4-20. Perry County Building Inventory Located within the Wildland-Urban Interface



Vulnerability to Future Assets/Infrastructure for Wildfire

Perry County has a well-established network of fire departments with equipment capacities and mutual aid agreements that enable an effective response in the event of wildfires. However, Perry County fire services and private land owners near the Pyramid State Park should work with the Illinois Department of Natural Resources to reduce fuel loads and developed the necessary wildland urban interface buffers to limit potential property damage from such fires.

Suggestions of Community Development Trends

New development may occur within the wildland-urban interface potentially increasing the risk of property damage due to wildland fire. Planned construction in these areas should be reviewed so proper protective measures are taken to minimize the wildland risk to these properties.

4.3.9 Ground Failure Hazard

Hazard Definition

According to the USGS, the term ground failure is generally referred to landslides, liquefaction, lateral spreads, and any other consequence of shaking that affects the stability of the ground. In Illinois, ground failure is typically associated with subsidence of the land surface related to soluble rock (karst), sink holes, or underground mining.

Subsidence Related to Karst Features

Subsidence can occur on land located over soluble bedrock. The land over such bedrock often has topography characteristic of past subsidence events. This topography is termed "karst." Karst terrain has unique landforms and hydrology found only in these areas. Bedrock in a karst areas are typically limestone, dolomite, or gypsum. In Illinois, limestone and dolomite (carbonate rocks) are the principle karst rock types. 9% of Illinois has carbonate rock types close enough to the ground surface to have a well-developed karst terrain. The area in Illinois in which the karst terrain is most developed is the southern and southwestern part of the state (Panno, et al., 1997). The karst feature most associated with subsidence is the sinkhole.

Sinkhole Formation and Collapse

A sinkhole is an area of ground that has no natural external surface drainage—when it rains, all of the water stays inside the sinkhole and typically drains into the subsurface. Sinkholes can vary from a few feet to hundreds of acres and from less than one to more than 100 feet deep. Typically, sinkholes form slowly, so that little change is seen during a lifetime, but they also can form suddenly when a collapse occurs. Such a collapse can have a dramatic effect if it occurs in a populated setting.

Sinkholes form where rainwater moves through the soil and encounters soluble bedrock. The bedrock begins to dissolve along horizontal and vertical cracks and joints in the rock. Eventually, these cracks become large enough to start transporting small soil particles. As these small particles of soil are carried off, the surface of the soil above the conduit slump down gradually, and a small depression forms on the ground surface. This depression acts like a funnel and gathers more water, which makes the conduit still larger and washes more soil into the conduit.

Sudden collapse of a sinkhole occurs where the soil close to the ground surface does not initially slump down, but instead forms a bridge. Beneath that surface cover, a void forms where the soil keeps washing into the conduit. These voids are essentially shallow caves. Over time, the void enlarges enough that the weight of the overlying bridge can no longer be supported. The surface layer then suddenly collapses into the void, forming a sinkhole.

The process of forming a conduit and a soil bridge usually takes years to decades. However this natural process can be aggravated and expedited by human activities. Since the process of forming a sinkhole depends on water to carry soil particle down into the karst bedrock, anything that increases the amount of water flowing into the subsurface can accelerate sinkhole formation process. Parking lots, streets, altered drainage from construction, and roof drainage are a few of the things that can increase runoff.

Collapses are more frequent after intense rainstorms. However, drought and altering of the water table can also contribute to sinkhole collapse. Areas where the water table fluctuates or has suddenly been lowered are more susceptible to sinkhole collapse. (White, 1988)

Underground Mining and Subsidence

Underground mines have been used extensively in Illinois to extract coal, lead, zinc, fluorites, shale, clay stones, limestone, and dolomite. When mining first began in Illinois, land over mined areas was sparsely populated. If the ground subsided, homes or other structures were seldom damaged. As towns and cities expanded over mined-out areas, subsidence damage to structures became increasingly more common. The most common underground mines in Illinois are coal mines. A recent study in Illinois has found that about 333,100 housing units were located over or adjacent to 839,000 acres mined for coal (Bauer, 2008).

Illinois has abundant coal resources. All or parts of 86 of 102 counties in the state have coal-bearing strata. As of 2007, about 1,050,400 acres (2.8% of the state) have been mined. Of that total, 836,655 acres are underground mines (Bauer, 2008). Illinois ranks first among all U.S. states for reserves of bituminous coal (Illinois Coal Association, 1992).

There are two fundamental underground mining methods used in Illinois: high-extraction methods such as long-wall and low-extraction room-and pillar mining. High-extraction methods remove almost all of the coal in localized areas. For modern mining practices, subsidence associated with high-extraction methods is planned and regulated by state and federal authorities. The subsurface subsides above the mine within several days or weeks after the coal has been removed. Subsidence of the over-burden above the mined-out area can continue up to seven years after subsurface removal, depending on the local geologic conditions (Bauer, 2008). The initial ground movements associated with this mining, which tend to be the largest, diminish rapidly after a few months. After subsidence has decreased to a level that no longer causes damage to structures, the land may be suitable for development. The maximum amount of subsidence is proportional to the amount of material extracted and the depth between the mining and the surface. In general, over the centerline of the mine panel, subsidence can be 60 to 70% of the extracted material (e.g., 10ft of material extracted would cause a maximum subsidence of six to seven feet; Bauer, 2006).

For low-extraction techniques such a room-and-pillar mining, miners create openings (rooms) as they work. Enough of the coal layer is left behind in the pillars to support the ground surface. In Illinois this system of mining extracts 40% to 55% of the coal resources in modern mines and up to 75% of some older mines. Based on current state regulations, room-and-pillar mines in operation after 1983 that do not include planned subsidence must show that they have a stable design. Although these permitting requirements have improved overall mine stability, there are no guarantees that subsidence will not occur above a room-and-pillar mine in the future. In general, if coal or other mined resources have been removed from an area, subsidence of the overlying material is always a possibility (Bauer, 2006).

In Illinois, subsidence of the land surface related to underground mining undertakes two forms: pit subsidence or trough (sag) subsidence. Pit subsidence structures are generally six to eight feet deep and range from two to 40 feet in diameter. Pit subsidence mostly occurs over shallow mines that are <100 feet deep and where the overlying bedrock is <50 feet thick and composed of weak rock materials such as shale. The pit is produced when the mine roof

collapses and the roof fall void works its way to the surface. These structures form rapidly. If the bedrock is only a few feet thick and the surface material are unconsolidated (loose), these material may fall into adjacent mine voids, producing a surface hole deeper than the height of the collapse mine void. Pit subsidence can cause damage to a structure if it develops under the corner a building or support post of a foundation or other critical location. Subsidence pits should be filled to ensure that people or animals don't fall into these structures (Bauer, 2006).

Trough (or "sag") subsidence forms a gentle depression over a broad area. Some trough subsidence may be as large as a whole mine panel (i.e. several hundred feet long and a few hundred feet wide). Several acres of land may be affected by a single trough event or feature. As discussed above, the maximum vertical settlement is 60% to 70% of the height of material removed (e.g., two to six feet). Significant troughs may develop suddenly (in a few hours or days) or gradually over a period of years. Troughs originate over places in mines where pillar have collapsed, producing downward movement at the ground surface. These failures can develop over mines of any depth. Trough subsidence produces an orderly pattern of tensile features (tension cracks) surrounding a central area of possible compression features. The type and extent of damage to surface structures relate to their orientation and position within a trough. In the tension zone, the downward-bending movements that develop in the ground may damage buildings, roads, sewer and water pipes, and other utilities. The downward bending of the ground surface causes the soil to crack, forming the tension cracks that pull structures apart. In the relatively smaller compression zone, roads my buckle and foundation walls may be pushed inward. Buildings damaged by compressional forces typically need their foundations rebuilt and leveled (Bauer, 2006).

Previous Occurrences of Ground Failure

In Perry County, undermined areas are generally located near Du Quoin, Pinckneyville, Cutler, Willisville, and along IL Route 13 in the northwest corner of the County. Mine subsidence incidents that have impacted the residents of Southern Illinois and have been documented in the local and regional press for several decades. One example in adjacent Jackson County was a reported sudden mine subsidence that caused a portion of U.S. Route 51 to sink up eight feet, causing an injury accident on December 24, 2001. An Illinois Department of Transportation field maintenance technician reported that similar collapses have occurred along other state roads throughout the region (Homan, 2001).

Geographic Location for Ground Failure

Illinois is usually associated with either underground mining or collapse of soil into crevice in underling soluble bedrock. Areas at risk for subsidence can be determined from detailed mapping of geologic conditions or detailed mine maps.

Hazard Extent for Ground Failure

The extent of ground failure hazard in Perry County is a function of where current development is located relative to (1) areas of past and present underground mining, and (2) areas of soluble bedrock.

Risk Identification for Ground Failure

Based on historical information and the underlying geology of Perry County, the occurrence of future ground failure is likely. According to the Perry County Planning Team's assessment, ground failure is ranked as the number eight hazard.

Risk Priority Index

Probability	x	Magnitude	=	RPI
2	x	1	=	2

Vulnerability Analysis for Ground Failure

The Southern Illinois region has a rich history in coal mining. Nearly all of Perry County is underlain by insoluble bedrock and undermined areas are generally located near Du Quoin, Pinckneyville, Cutler, Willisville, and along IL Route 13 in the northwest corner of the County. To accommodate this risk, this plan considers all buildings located within the county as vulnerable. Tables 4-7 and 4-8 display the existing buildings and critical infrastructure in Perry County.

Critical Facilities

Any critical facility built above highly soluble bedrock could be vulnerable to ground failure. A critical facility will encounter the same impacts as any other building within the affected area. These impacts include damages ranging from cosmetic to structural. Buildings may sustain minor cracks in walls due to a small amount of settling, while in more severe cases, the failure of building foundations can cause cracking of critical structural elements. Table 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

Table 4-8 lists the building exposure in terms of types and numbers of buildings for the entire county. The buildings within the county can expect similar impacts to those discussed for critical facilities, ranging from cosmetic to structural. Buildings may sustain minor cracks in walls due to a small amount of settling, while in more severe cases, the failure of building foundations causes cracking of critical structural elements.

Infrastructure

In the area of Perry County potentially affected by ground failure, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. The risk to these structures is primarily associated with land collapsing directly beneath them in a way that undermines their structural integrity. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (i.e. loss of power or gas to community); and railway failure from broken or impassable railways. In addition bridges could fail or become impassable causing risk to traffic.

GIS-based Analysis of Ground Failure

This section provides an overview of the ground failure hazards in Illinois in general and a discussion of the potential subsidence risk for Perry County. Ground failure in Illinois is usually associated with either underground mining or collapse of soil into crevice in underling soluble bedrock. Areas at risk for ground failure can be determined from detailed mapping of geologic conditions or detailed mine maps. Figure 4-21 displays data sources compiled from the Illinois State Geologic Survey (ISGS) and Illinois Department of Natural Resources (IDNR) to assess the risk of ground failure in Perry County.

Figure 4-21. Distribution of Bedrock with Potential Coal Bearing Strata, Karst, Sinkholes and Mining Efforts

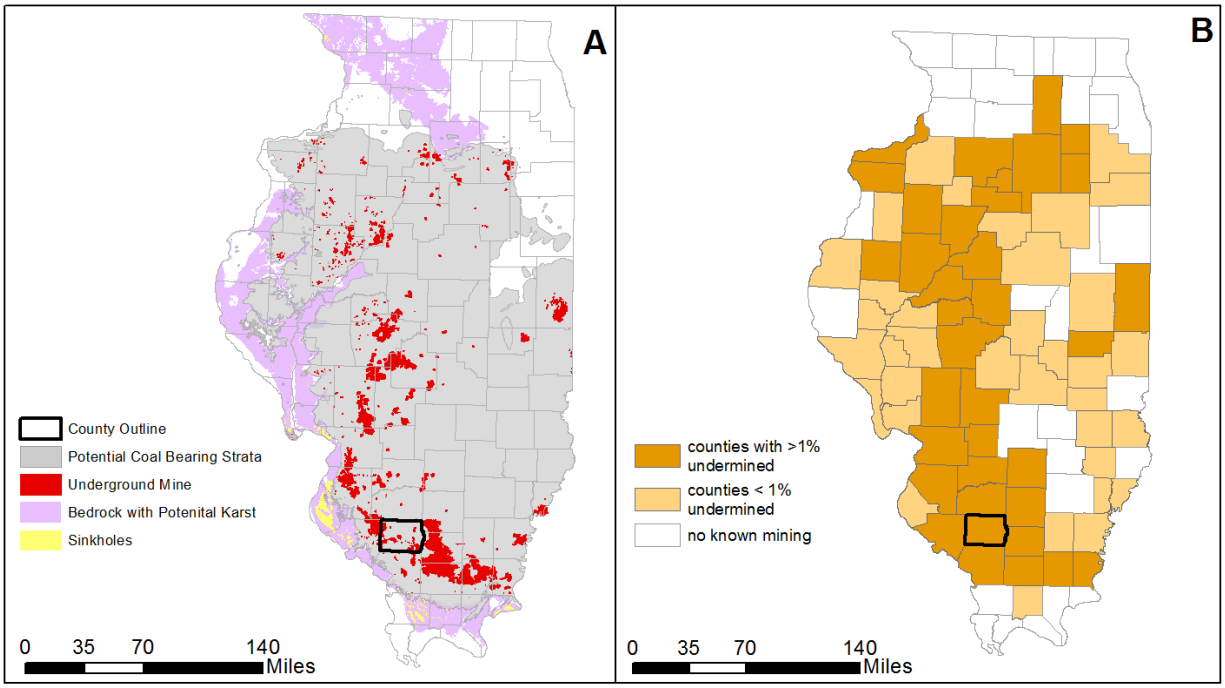
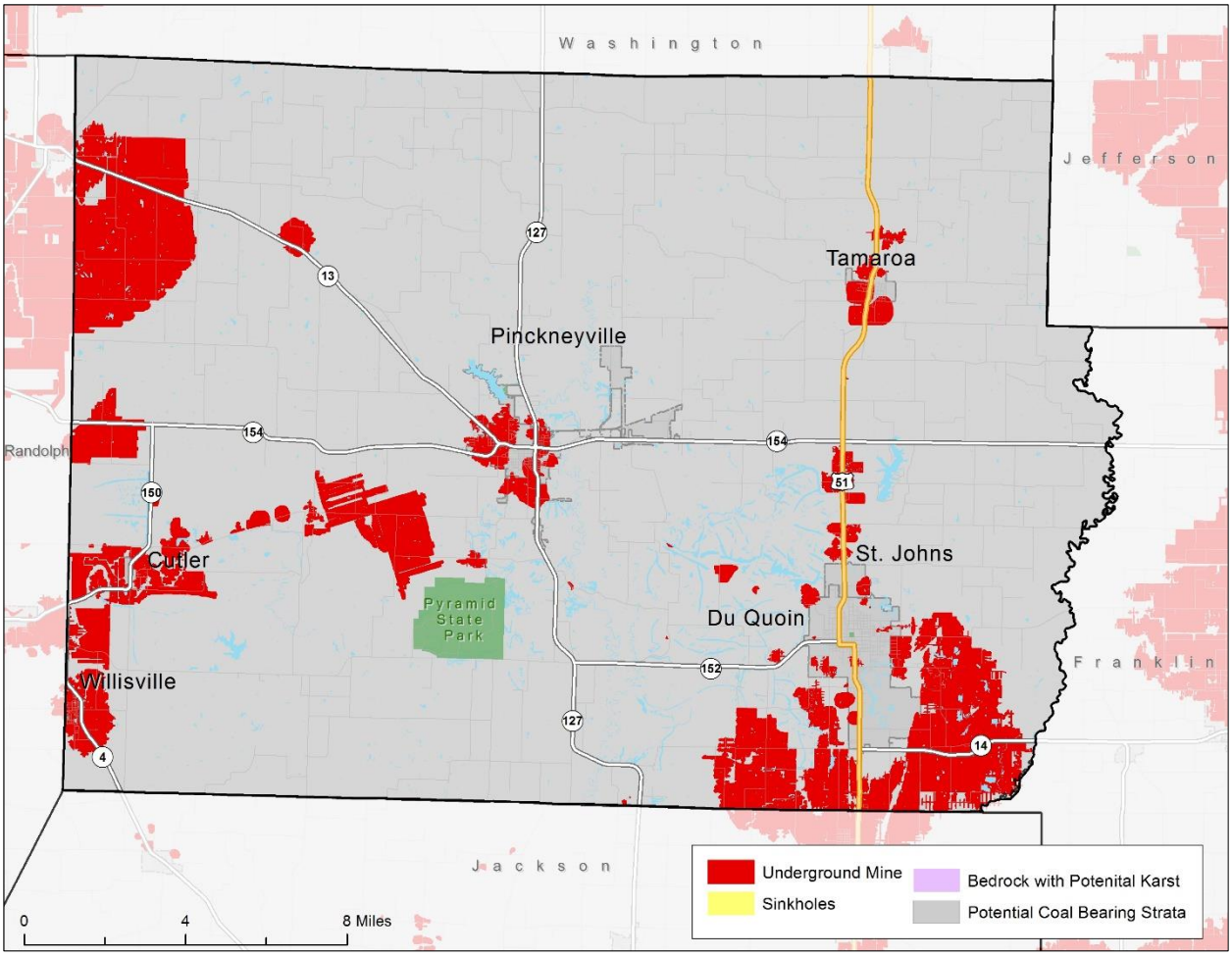


Figure 4-21(A) shows statewide distribution of bedrock with karst potential, coal bearing strata, sink holes. Figure 4-21(B) shows the counties which are 0, <1% and >1% undermined. Nearly all of Perry County is underlain by rock units which contain coal and is >1% undermined. The Mine Subsidence Insurance Act of 1979 created subsidence insurance as part of an Illinois homeowner's policy. Homeowners in any of the Illinois counties undermined by approximately 1% or more automatically have mine subsidence insurance as a part of their policy, unless coverage is waived in writing. Mine subsidence insurance is especially important for homes located near or over mines that operated before the 1977 Surface Mine Control and Reclamation Act. The companies that operated these mines may no longer be in business (Bauer, 2006).

Figure 4-22 shows the distribution of bedrock with karst potential, coal bearing strata, sink holes, and underground mines in Perry County. Analysis of the GIS data layer of active and abandoned coal mines in Illinois obtained from the IDNR revealed that 119 km^2 out of Perry County's total 1,158 km^2 (10%) have been undermined. The undermined areas general are in the area of Du Quoin, Pinckneyville, Cutler, Willisville, and along Illinois Route 13 in the northwest corner of the County. Comparison of Perry County local assessment and parcel data with IDNR GIS layer of active and abandoned underground-coal mines was performed. This analysis revealed that 2,118 out of the 8,842 or ~24% of the buildings in the county are located above undermined areas.

In addition to mine subsidence, subsidence can also occur on land located over soluble bedrock. The land over such bedrock is termed "karst." The karst feature most associated with subsidence is the sinkhole. Nearly all of Perry County is insoluble bedrock, and therefor subsidence from this mechanism should not be a concern.

Figure 4-22. Distribution of potential karst bedrock, sinkholes, and underground mines in Perry County



Vulnerability to Future Assets/Infrastructure for Ground Failure

New buildings and infrastructure placed on undermined land or on highly soluble bedrock will be vulnerable to ground failure.

Suggestions of Community Development Trends

Abandoned underground mine subsidence may affect several locations within the county; therefore buildings and infrastructure are vulnerable to subsidence. Continued development will occur in many of these areas. Currently, Perry County reviews new development for compliance with the local zoning ordinance. Newly planned construction should be reviewed with the historical mining maps to minimize potential subsidence structural damage.

Section 5. Mitigation Strategies

The goal of mitigation is to reduce the future impacts of a hazard, including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist with recovery. Throughout the planning process, the Perry County Planning Team worked to identify existing hazard mitigation policies, develop mitigation goals, and create a comprehensive range of mitigation strategies specific to each jurisdiction. This work provides a blueprint for reducing the potential losses identified in the risk assessment (section 4).

5.1 Existing Hazard Mitigation Policies, Programs and Resources

This section documents each jurisdiction's existing authorities, policies, programs and resources related to hazard mitigation and the ability to improve these existing policies and programs. It is important to highlight the work that has been completed in Perry County that pertains to hazard mitigation. In addition, the following information also provides an evaluation of these abilities to determine whether they can be improved in order to more effectively reduce the impact of future hazards.

5.1.1 Successful Mitigation Projects

To be successful, mitigation must be a recurrent process that is continually striving to lessen the impact of natural hazards within the county. The following are projects that have been successfully completed after Perry County's 2009 Multi-Hazard Mitigation Plan was formally adopted.

Delta Regional Authority

The Delta Regional Authority (DRA) works to improve regional economic opportunity by helping to create jobs, build communities, and improve the lives in the 252 counties and parishes of the eight-state Delta region. The main investment tool used by the DRA is the States' Economic Development Assistance Program (SEDAP). SEDAP funds projects in four categories: Public Infrastructure, Transportation Infrastructure, Business Development, and Workforce Development. In 2014, Pinckneyville received a DRA investment of $130,384 for the installation of 2000 linear feet of PVC waterline to improve fire flow protection at the Cooper B-Line plant. The City of Du Quoin also received a DRA investment of $100,000 for storm sewer upgrades.

Community Development Assistance Program

Community Development Assistance Program (CDAP) grants are awarded to units of local government with populations of 50,000 or less that are not located within one of the six large urban counties that receive funds directly from the U.S. Department of Housing and Urban Development. The CDAP is a grant program that assists Illinois communities by providing grants to local governments to help them in financing economic development projects, public facilities and housing rehabilitation. Since 2009, Perry County has received seven CDAP grants totaling $1,501,425. The following communities utilized the CDAP grants to complete the following hazard mitigation projects:

- The City of Du Quoin used CDAP funds to (1) rehabilitate approximately 9,800 linear feet of existing 8, 10 and 12 inch sanitary sewer line through cured-in-place concrete in a targeted low income neighborhood in the northeast quadrant of the community and (2) design the replacement of approximately 30,000 linear feet of 2" sewer main and 6,000 linear feet to loop the Old Du Quoin water system.

- Willisville, used a CDAP grants to design a water system improvement project which consists of replacing the transmission main that feeds the village from the Kincaid Water District, replacing leaking and undersized water mains, and replacing inoperable valves and hydrants.
- Pinckneyville made sewer systems improvements.
- The Village of Cutler designed a radium removal system for the village's public water supply in order to achieve compliance with EPA mandated radium limits.

Community Renewable Energy Program

The Illinois Community Renewable Energy Program provides funding to support the development and implementation of solar thermal, solar photovoltaic, and wind energy systems in Illinois. The goal is to develop and implement community-scale renewable energy facilities in Illinois. Since 2009, Perry County received one energy grant for the installation of a 75 kW solar photovoltaic system at the Du Quoin Industrial Park to provide power to the industrial park business occupants and to the City of Du Quoin sanitary sewer lift station located at the industrial park.

Grant Management Program

The Illinois Grant Management Program provides grants to specific local governments, units of government, educational facilities and not-for-profit organizations by members of the General Assembly and the Governor for specific purposes to bolster the State's economy, promote a clean environment and improve the overall quality of life throughout the State of Illinois. Since 2009, Perry County received nine grants under the Grant Management Program totaling $695,000. The following communities utilized the Grant Management Program funds to complete the following hazard mitigation projects:

- The Village of Cutler used grant funds for all Equipment/Material/Labor costs associated with the purchase and installation of new fire hydrants and the replacement of non-working water valves.
- The City of Du Quoin used grant funds for (1) a portion of the Paving/Concrete/Masonry costs associated with replacing over 4,420 linear feet of PVC water mains in Du Quoin and (2) costs associated with roadway and sidewalk infrastructure improvements to Main Street.
- The City of Pinckneyville used grant funds for costs associated with the rehabilitation and replacement of the sanitary sewer system along Walnut Street.
- The Village of Tamaroa used the grant funds for costs associated with the purchase and installation of two new sewage lift stations and related hardware for installation at the Sewer Lagoon Lift Station in Tamaroa.
- The Village of Willisville used the grant funds for costs associated with the removal of sludge deposits from the Grantee's sewage lagoon

5.1.2 National Flood Insurance Program (NFIP)

In 1968, Congress created the National Flood Insurance Program (NFIP) to help provide a means for property owners to financially protect themselves. The NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the NFIP. Participating communities agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding. This section covers the County’s NFIP status, flood insurance policy and claim statistics, repetitive loss structures, and Community Rating System status.

NFIP Status

In Perry County, all communities with mapped floodplains participate in the NFIP. Table 5-1 includes a summary of information for Perry County participation in the NFIP.

Table 5-1. Information on Perry County's Participation in the NFIP

Community	Participate in the NFIP	Initial Flood Hazard Boundary Map Identified	Initial FIRM Identified	Current Effective FIRM Date
Perry County	Yes	12/13/74	08/08/10	08/05/10
Du Quoin	Yes	12/13/74	07/02/87	08/05/10(M)
Pinckneyville	Yes	03/22/74	09/16/82	08/05/10

NFIP status and information are documented in the Community Status Book Report updated on 06/06/2015.
(M) – No Elevation Determined – All Zone A, C and X

Flood Insurance Policy and Claim Statistics

As of April 2015, 40 households paid flood insurance, insuring $3,396,600 in property value. The total premiums collected for the policies amounted to $18,960. Since the establishment of the NFIP in 1978, eight flood insurance claims were filed in Perry County, totaling in $30,974.63 in total payments. Table 5-2 summarizes the claims since 1978.

Table 5-2. Flood Insurance Claim Statistics for Perry County

Community	Total Losses	Closed Losses	Open Losses	CWOP Losses	Payments
Perry County	4	4	0	0	$20,213.52
Du Quoin	2	1	0	1	$857.97
Pinckneyviile	2	2	0	0	$9,903.14

NFIP policy and claim statistics since 1978 until the most recently updated date of 03/31/2015. Closed Losses refer to losses that are paid; open losses are losses that are not paid in full; CWOP losses are losses that are closed without payment; and total losses refers to all losses submitted regardless of status. Lastly, total payments refer to the total amount paid on losses.

Repetitive Lose Structures

There are several structures in Perry County that have experienced repetitive losses due to flooding. FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the NFIP that has suffered flood loss damage on two or more occasions during a 10-year period that ends on the date of the second loss, in which the cost to repair the flood damage is ≥ 25% of the market value of the structure at the time of each flood loss. Currently there are over 122,000 Repetitive Loss properties nationwide.

The Illinois Emergency Management Agency and Illinois Department of Natural Resources was contacted to determine the location of repetitive loss structures in Perry County. Records indicate that there are two repetitive loss structures within the county. The total amount paid for building replacement and building contents for damage to these repetitive loss structures is $25,648. Table 5-3 describes the repetitive loss structures for each jurisdiction.

Table 5-3. Repetitive Loss Structures for each Jurisdiction in Perry County

Jurisdiction	Number of Properties	Number of Losses	Total Paid
Pinckneyville	2	$9,903.14	Pinckneyville
Pinckneyville	2	$15,744.49	Pinckneyville
Total:	**8**	**$25,647.63**	**Total:**

Community Rating System Status

The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance. More than 1,200 communities from all 50 states participate in the CRS. In Illinois, 51 communities participate in the CRS. Although joining the CRS is free, completing CRS activities and maintain a CRS rating will require a degree of commitment from the community, including dedicating staff. Perry County does not have any communities that participate in the CRS Program.

5.1.3 Jurisdiction Ordinances

Hazard Mitigation related ordinances, such as zoning, burning, or building codes, have the potential to reduce the risk from known hazards. These types of regulations provide many effective ways to address resiliency to known hazards. Table 5-4 list Perry County's current ordinances that directly pertain, or can pertain, to hazard mitigation. It is important to evaluate the local building codes and ordinances to determine if they have the ability to reduce potential damages caused by future hazards. The Perry County Planning Team worked to identify gaps in the current list of ordinances and suggested changes/additions in Section 5.3.

Table 5-4: Perry County Jurisdictional Ordinances

Community	Building	Electrical	Stormwater	Flooding	Subdivision	Fire	Land Use	Zoning
Perry County	Building Standards (2007)	NFPA Electric Code (Current)	-	State Model (Current)	State Standard (Current)	Burning Ordinance (2008)	Comp. Plan (1965)	State Standard (Current)
Cutler	-	-	-	-	County Standard (Current)	State Standard (Current)	-	County Standard (Current)
Du Quoin	IBC (2006)	NFPA Electric Code (2005)	Stormwater Ordinance (2005)	-	State Standard (Current)	Burning Ordinance (2008)	Comp. Plan (2008)	State Standard (Current))
Pinckneyville	Building Standards (1953)		Stormwater Ordinance (1964)	State Model (Current)	Subdivision Control (1964)	Burning Ordinance (1969)	Comp. Plan (1965)	-
St. Johns	-	-	-	-	-	-	Comp. Plan (1964)	-
Tamaroa	-	NFPA Electric Code (Current)	-	-	County Standard (Current)	State Standard (Current)	-	County Standard (Current)
Willisville	-	NFPA Electric Code (Current)	State Standard (Current)	-	Subdivision Control (2000)	State Standard (Current)	-	Zoning Ordinance (2008)

The adoption of new ordinances, including the adoption of new development standards or the creation of hazard-specific overlay zones tied to existing zoning regulations, present opportunities to discourage hazardous construction and manage the type and density of land uses in areas of known natural hazards. Adopting and enforcing higher regulatory standards for floodplain management (i.e., those that go beyond the minimum standards of the NFIP) is another effective method for minimizing future flood losses, particularly if a community is experiencing growth and development patterns that influence flood hazards in ways that are not accounted for on existing regulatory floodplain maps. Revisions to existing building codes also present the opportunity to address safe growth. Many state and local codes are based

off national or industry standard codes which undergo routine evaluations and updates. The adoption of revised code requirements and optional hazard-specific standards may help increase community resilience.

5.1.4 Fire Insurance Ratings

By classifying communities' ability to suppress fires, the Insurance Service Office (ISO) Public Protection Classification Program helps communities evaluate their public fire-protection services. The program provides a countrywide standard that helps fire departments in planning and budgeting for facilities, equipment, and training. Information is collected on municipal fire-protection efforts in communities throughout the United States. In each of those communities, ISO analyzes the relevant data using a Fire Suppression Rating Schedule. Ratings are assigned from 1 to 10 where Class 1 generally represents superior property fire protection, and Class 10 indicates that the area's fire-suppression program doesn't meet ISO's minimum criteria. Table 5-5 displays each Fire Department's insurance rating and total number of employees.

Table 5-5: Perry County Fire Departments, Insurance Ratings, and Number of Employees/Volunteers

Fire Department	Fire Insurance Rating	Number of Employees
Cutler Fire Protection District	7/8	10
Du Quoin Fire Department	4 (9 outside of city)	25
Pinckneyville Fire Department	5	26
Pinckneyville Rural FPD	9	26
Tamaroa FPD/ Tamaroa FD	-	17
Willisville Fire Department	6 (8 outside of city)	14

5.2 Mitigation Goals

In Section 4 of this plan, the risk assessment identified Perry County as prone to several hazards. The Planning Team members understand that although they cannot eliminate hazards altogether, Perry County can work towards building disaster-resistant communities. Below is a generalized list of goals, objectives, and actions. The goals represent long-term, broad visions of the overall vision the county would like to achieve for mitigation. The objectives are strategies and steps that will assist the communities in attaining the listed goals.

Goal 1: Lessen the impacts of hazards to new and existing infrastructure

Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.

Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.

Objective: Minimize the amount of infrastructure exposed to hazards.

Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.

Objective: Improve emergency sheltering in Perry County.

Goal 2: Create new or revise existing plans/maps for Perry County

Objective: Support compliance with the NFIP for each jurisdiction in Perry County.

Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.

Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.

Goal 3: Develop long-term strategies to educate Perry County residents on the hazards

Objective: Raise public awareness on hazard mitigation.
Objective: Improve education and training of emergency personnel and public officials.

5.3 Multi-Jurisdictional Mitigation Strategies

After reviewing the Risk Assessment, the Mitigation Planning Team was presented with the task of individually listing potential mitigation activities using the FEMA STAPLEE evaluation criteria (see table 5-6). FEMA uses their evaluation criteria STAPLEE (stands for social, technical, administrative, political, legal, economic and environmental) to assess the developed mitigation strategies. Evaluating possible natural hazard mitigation activities provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. The Planning Team brought their mitigation ideas to Meeting 3.

Table 5-6. FEMA's STAPLEE Evaluation Criteria

Social	Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the community's social and cultural values.
Technical	Mitigation actions are technically most effective if they provide a long-term reduction of losses and have minimal secondary adverse impacts.
Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
Political	Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
Legal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
Economic	Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
Environmental	Sustainable mitigation actions that do not have an adverse effect on the environment, comply with federal, state, and local environmental regulations, and are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

Table 5-7 contains a comprehensive range of specific mitigation actions and projects for each jurisdiction, with an emphasis on new and existing buildings and infrastructure. At least two identifiable mitigation action items have been addressed for each hazard listed in the risk assessment. Each of the incorporated communities within and including Perry County was invited to participate in brainstorming sessions in which goals, objectives, and strategies were discussed and prioritized. Each participant in these sessions was armed with possible mitigation goals and strategies provided by FEMA, as well as information about mitigation projects discussed in neighboring communities and counties.

All potential strategies and goals that arose through this process are included in Table 5-7. The mitigation strategies are arranged by hazard they directly address. In some cases, certain mitigation strategies can address all hazards. If provided by the jurisdiction, each mitigation strategy contains specific details pertaining to the implementation, responsible and/or organizing agency, and potential funding source. Potential funding sources are identified by Federal, State, Local, or Private. A code is assigned to each mitigations strategy for ease of reference when reviewing the prioritization of each mitigations strategies in Section 5.4.

Table 5-7: Perry County Multi-Jurisdictional Mitigation Strategies

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
	ALL HAZARDS				
AH1	**Promote Disaster Resilience Through Workshops, Education Materials, and Planning Guides** *Various agencies have implemented forms of this strategy. Local resources have been used to target and inform the resident population. The Perry County Sheriff's office maintains books on natural hazards and updates the information on an annual basis. The County will work to enhance outreach, specifically targeting schools, area hospitals and the general public. Additional funding will be sought from the Local, State and Federal sources.*	All	Ongoing	L, S, F	Perry County EMA
AH2	**Develop Social Media Techniques to Provide Critical Information** *The Perry County EMA and Du Quoin ESDA utilizes various social media platforms (Facebook and Pinckneyville Press) to notify the public about hazard mitigation and potential threats. The County will work to enhance notification, specifically targeting schools, area hospitals and the general public. Currently the County and Du Quoin ESDA utilize Nixel, an open communication and engagement platform that connects public safety, municipalities, schools, businesses, and residents. Information distributed by the Nixel system is immediately available over cell phones by text message, email and over the web. All Perry County School Districts continue to work with local weather stations to provide up-to-date information for students and families.*	Perry County, Du Quoin, CCSD #204, Du Quoin CUSD #300, Pinckneyville CHSD #101, Pinckneyville SD #50, Tamaroa SD #5, Rend Lake College	Ongoing	L, S, F, P	Perry County EMA, Du Quoin ESDA, CCSD #204, Du Quoin CUSD #300, Pinckneyville CHSD #101, Pinckneyville SD #50, Tamaroa SD #5, Rend Lake College
AH3	**Establish Liaison/Groups that Meets Regularly to Discuss Hazard Mitigation and Disaster Risk Reduction** *Several groups meet on a regular basis to discuss hazard mitigation including: Perry County LEPC, Disaster Risk Reduction Group, Shawnee Preparedness and Response Coalition, Healthy Southern Illinois Delta Network.*	All	Ongoing	L	Various Agencies
AH4	**Establish Local Emergency Planning Committee** *The Perry County EMA heads the Local Emergency Planning Committee (established 2010) that complies with the Emergency Planning and Community Right to Know Act (EPCRA) and planning for hazardous materials (HAZMAT) incident response and notification. Christian Fellow School will assign specific duties to school personnel and distribute an incident response plan.*	All	Ongoing	L	Perry County EMA
AH5	**Enhance Emergency Communication System Infrastructure** *Perry County would like to develop and implement a region-wide back-up emergency communication system. The Perry County EMA will oversee the implementation of this project. Funding has not been secured, but additional funding will be sought from Local, State and Federal resources. Currently the County utilizes HAM radios at select public buildings and Reverse 911. Pinckneyville CHSD #101 will work with the Perry County EMA to enhance Emergency Response Communication System and Infrastructure by implementing IP devices to provide off-site access to school security cameras and facilities maps.*	Perry County, Du Quoin, Pinckneyville CHSD #101	Ongoing / Proposed	L, S, F	Perry County EMA, Du Quoin ESDA, Pinckneyville CHSD #101
AH6	**Improve Communication Between Utility Companies** *County and Local Agencies continue to maintain contact with utility companies (e.g., Ameren) before during and after hazardous events.*	All	Ongoing	L	Various Agencies
AH7	**Distribute/Program NOAA Weather Radios** *Perry County initiated a NOAA Weather Radio program utilizing ISEMA funding. Greater coverage will be sought throughout the county especially in the Village of Cutler*	Perry County, Village of Cutler	Ongoing	L, S, F, P	Perry County EMA Village of Cutler

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
AH8	**Improve EMA Training, Staff, Resources, And Equipment** *The Perry County EMA and the City of Du Quoin ESDA oversees the implementation of this project. Funding has not been secured for future training, but additional funding will be sought from Department of Homeland Security, state and local resources. The Christian Fellowship School would like to install an intercom system in the school, bell system in the gym and cafeteria, and upgrade their telephone system.*	Perry County, Du Quoin, Christian Fellowship School	Ongoing / Proposed	S, F	Perry County EMA, Du Quoin ESDA, Christian Fellowship School
AH9	**Maintain Centralized Geographical Database Including Natural Hazard/Risk Assessment** *The Perry County EMA oversees this project with the assistance of SIU. After each mitigation plan update, the geographical database is updated to include new information about hazard events and the number of structures within the 100-year floodplain.*	Perry County	Ongoing	L	Perry County EMA
AH10	**Develop/Maintain Comprehensive Plan to Incorporate Natural Hazards** *Perry County and its incorporated jurisdiction participate in the 5 year renewal of the Multi-Hazard Mitigation Plan. The next update process will take place in 2020 and the county will seek federal funds to update the plan.*	All	Ongoing / Proposed	L, F	Perry County EMA
AH11	**Develop Mutual Aid Agreements** *The Perry County EMA oversees this mitigation strategy. The County works with local emergency agencies to maintain mutual aid agreements between local communities, IPWMAN, MABAS and ILEAS. IPWMAN (Illinois Public Works Mutual Aid Network) is a statewide network of public works related agencies whose principal purpose is to provide mutual aid response and recovery assistance to each other when confronted with natural or man-made emergencies and disasters. The MABAS system defines a resource response plan to any location within the state when the Governor orders a Declaration of Disaster. Several law enforcement agencies in Perry County are members of ILEAS (Illinois Law Enforcement Alarm System) - a statewide law enforcement mutual aid system.*	All	Ongoing	L, S	Perry County EMA, Various Emergency Response Agencies
AH12	**Develop Alternative Traffic Routes** *The Perry County Emergency Operations Plan currently has emergency routes in place.*	Perry County	Ongoing	L	Perry County LEPC
AH13	**Create an Alternative Emergency Operations Center** *Within Perry County there are several alternate EOCs: Du Quoin EOC, Mobil Command Center Vehicle, Perry County Health Dept., Marshall Browning Hospital, and Pinckneyville Community Hospital. The County will investigate the potential for a future alternative EOC. Funding has not been secured, but additional funding will be sought from Federal, State, and Local resources.*	Perry County, Du Quoin, Marshall Browning Hospital, Pinckneyville Community Hospital	Ongoing / Proposed	L, S, F	Perry County EMA, Du Quoin ESDA
AH14	**Retrofit/Harden Critical Facilities and Utilities** *The County EMA and Du Quoin ESDA will oversee the implementation of this project. Funding has not been secured as of 2015. Implementation, if funding is available from PDM or HMGP, is forecasted to be initiated within approximately one year.*	All	Proposed	L, S, F	Perry County EMA, Du Quoin ESDA
AH15	**Identify and Procure Backup Potable Water Supplies** *Perry County will partner with Greater Egypt Regional Planning and Development Commission to seek out potential funding sources to procure a back-up potable water supply.*	Perry County, Cutler, Du Quoin, Pinckneyville, St. Johns, Tamaroa, Willisville, Rend Lake Conservancy District	Proposed	S, F	Perry County EMA, Greater Egypt Regional Planning Commission, Rend Lake Conservancy District

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
AH16	**Construct Additional Community Safe Rooms** *The Perry County EMA will oversee the implementation of this project. Five Star Industries would like to construct safe rooms at their residential facilities. Perry County Counseling would like to construct a safe room at their Day Program and Administration Location for staff and client safety during severe storms. Local resources will be used to evaluate the cost benefit of the shelters and define specific locations. Funding has not been secured as of 2015. Implementation, if HMA funding is available, is forecasted to be initiated within approximately 3-5 years.*	All	Proposed	L, S, F	Perry County EMA, Five Star Industries Inc., Perry County Counseling
AH17	**Create Additional Heating / Cooling Shelters** *Additional shelters are opened on an as need basis at various locations within the county.*	Perry County	Ongoing	L	Perry County EMA
AH18	**Equip Critical Facilities with Back-Up Generators** *The Perry County EMA will oversee the implementation of projects for County facilities. Funding has not been secured as of 2015. Implementation, if HMA funding is available, is forecasted to be initiated within approximately 3-5 years. Five Star Industries Inc. would like to equip group homes with generators to allow residents with serious mental illness to stay in their homes with necessary support staff during emergencies. Perry County Counseling would like a generator at one (or more) sites for residents with intellectual and development disabilities to remain in their homes with support staff.*	All	Proposed	L, S, F	Perry County EMA, Five Star Industries Inc.
AH19	**Equip Critical Facilities with Basic Survival Gear, Food, and Water** *Perry County maintains a directory that includes information about the type of supplies available at public and private sector facilities within the county.*	Perry County	Ongoing	L	Perry County EMA and LEPC
AH20	**Acquire Portable Lighting for Mass Casualty Preparation** *The Perry County EMA will oversee the implementation of this project. Funding has not been secured as of 2015. Implementation, if funding is available, is forecasted to be initiated within approximately 3-5 years.*	Perry County	Proposed	S, F	Perry County EMA and LEPC
TORNADO / SEVERE THUNDERSTROMS					
ST1	**Construct Additional Community Safe Rooms** *The Perry County EMA will oversee the implementation of this project. Five Star Industries would like to construct safe rooms at their residential facilities. Perry County Counseling would like to construct a safe room at their Day Program and Administration Location for staff and client safety during severe storms. The Village of Cutler would like to construct a safe room at the jurisdiction community center. Local resources will be used to evaluate the cost benefit of the shelters and define specific locations. Funding has not been secured as of 2015. Implementation, if HMA funding is available, is forecasted to be initiated within approximately 3-5 years.*	All	Proposed	L, S, F	Perry County EMA, Five Star Industries Inc., Perry County Counseling
ST2	**Retrofit Structures to Withstand High Winds** *The County EMA will oversee the implementation of this project. Funding has not been secured as of 2015. Implementation, if HMA funding is available, is forecasted to be initiated within approximately 3-5 years.*	All	Proposed	L, S, F	Perry County EMA
ST3	**Install Lightning Detection System** *All Perry County School Districts will seek funds to acquire and install lightening detection systems at school outdoor venues. Implementation, if HMA or state funding is available, is forecasted to be initiated within approximately 1-3 years.*	Community CSD #204, Du Quoin CUSD #300, Pinckneyville CHSD #101, Pinckneyville SD #50, Tamaroa SD #5	Proposed	S, F	School Superintendents
ST4	**Provide Jurisdiction-wide siren warning coverage** *The Village of Cutler will seek to improve the current siren warning system to increase its coverage and expand its effectiveness.*	Village of Cutler	Proposed	L, S, F, P	Village of Cutler
HAZARDOUS MATERIALS RELEASE					
HAZ1	**Develop/Update HAZMAT Emergency Response Plan** *The Perry County LEPC reviews and updates the emergency action plan on an annual basis.*	Perry County	Ongoing	L	Perry County LEPC

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
HAZ2	**Conduct a Hazardous Materials Commodity Flow Study** *The Perry County EMA will utilize neighboring county commodity flow studies (if available).*	Perry County	Ongoing	L	Perry County LEPC
HAZ3	**Equip Critical Facilities with Centralized Positive-Pressure HVAC Systems** *The Perry County EMA will oversee the implementation of this project. Funding has not been secured as of 2015. Implementation, if funding is available, is forecasted to be initiated within approximately 5 years.*	Perry County, Du Quoin, Pinckneyville, All School Districts, Marshall Browning Hospital, Pinckneyville Community Hospital, Village of Cutler	Proposed	L, S, F, P	Perry County EMA
HAZ4	**Acquire Protective Gear** *The Village of Cutler will seek to obtain adequate protective gear for possible HAZMAT needs.*	Village of Cutler	Proposed	L, S, F, P	Village of Cutler
	EARTHQUAKES				
EQ1	**Map And Assess Community Vulnerability to Seismic Hazards** *The Perry County EMA oversees this project with assistance from SIU. After each mitigation plan update, the geographical database is updated to include new information about earthquake hazard events.*	Perry County	Ongoing	L	Perry County EMA
EQ2	**Install Automatic Shutoff Valves** *Perry County will seek federal funding, if HMA funding is available, to install automatic shutoff values in the Perry County facilities including Marshall Browning Hospital and Pinckneyville Community Hospital.*	Perry County, Marshall Browning Hospital, Pinckneyville Community Hospital	Proposed	L, S, F	Perry County EMA
EQ3	**Retrofit Water Supply Systems** *The Perry County EMA would oversee this project. Implementation, If HMA funding is available, is forecasted to be initiated within approximately one- three years.*	Perry County, Cutler, Du Quoin, Pinckneyville, St. Johns, Tamaroa, Willisville, Rend Lake Conservancy District	Proposed	S, F	Perry County EMA
EQ4	**Retrofit/Harden Critical Facilities to Protect Against Damages from Earthquakes** *The Perry County EMA will oversee the implementation of this project. Funding has not been secured as of 2015. Implementation, if HMA funding is available, is forecasted to be initiated within approximately 3-5 years. SIH and The Pinckneyville Community Hospital and Marshall Browning Hospital would like to retrofit all hospitals and clinics with stabilization and back up equipment in the event of an earthquake. The Village of Cutler also has buildings it will seek to retrofit.*	All	Proposed	L, S, F, P	Perry County EMA
EQ5	**Provide Information to Residents on Structural and Non-Structural Retrofitting** *The Village of Cutler will oversee the implementation of a project to raise awareness of earthquake safety and preparedness.*	Village of Cutler	Proposed	L, S	Village of Cutler
	WINTER STORMS				
WS1	**Install Signs that Direct Traffic Towards Shelters and Safe Travel Routes** *The Perry County EMA install signs on an as-need basis at various locations within the county during critical times.*	Perry County	Ongoing	L	Perry County EMA
WS2	**Purchase Snow Fences and Deicing Chemicals** *The Perry County EMA will oversee the implementation of this project. Funding has not been secured as of 2015. Implementation, if funding is available, is forecasted to be initiated within approximately 3-5 years. The Christian Fellowship School and the Village of Cutler each maintain a stock-pile of ice-melt for driveways, parking-lots, and sidewalks.*	Perry County, Christian Fellowship School, Village of Cutler	Ongoing / Proposed	L, P	Perry County EMA, Christian Fellowship School, Village of Cutler

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
WS3	**Establish a network of 4WD/Off-road vehicles to access stranded people** *Five Star Industries Inc. and Perry County Counseling would like to acquire 4WD/Off-road vehicles to assist in allow staff to reach the residential facility and assist clients with intellectual and developmental disabilities in their own homes during winter storms. The Christian Fellowship School will develop available staff and parents with appropriate equipment and develop a contact network for those individuals.*	Five Star Industries Inc., Perry County Counseling, Christian Fellowship School	Proposed	S, F, P	Five Star Industries Inc., Perry County Counseling, Christian Fellowship School
WS4	**Purchase Snow Clearing Equipment/Vehicles** *The Village of Cutler does not have adequate snow clearing capabilities and will seek to improve their current situation.*	Village of Cutler	Proposed	L, S, P	Village of Cutler
	FLOODING				
F1	**Maintain Participating Status in the NFIP by Enforcing a Flood Damage Prevention Ordinance** *The Perry County EMA is responsible for the general administration of the Perry County Flood Damage Prevention Ordinance. Each participating jurisdiction has a representative responsible for the administration of the individual Flood Damage Prevention Ordinances.*	Perry County, Du Quoin, Pinckneyville	Ongoing	L	Perry County EMA
F2	**Improve Public Awareness on the NFIP, Buyout Programs, and Flood Mitigation** *The Perry County EMA Facebook page is used to notify the public about flood mitigation. Perry County will also continue to educate communities that do not participate in the NFIP on the benefits of joining.*	Perry County	Ongoing	L	Perry County EMA
F3	**Institute a Buyout Plan for Repetitive Loss Properties or Flood Prone Properties** *The Perry County EMA will oversee the implementation of buyout and relocation projects in the county. Currently there are several Repetitive Loss Structures in Pinckneyville. Future funding has not been secured, but additional funding will be sought from federal, state and local resources. Implementation is forecasted to begin within approximately 3-5 years.*	Perry County, Du Quoin, Pinckneyville	Proposed	S, F	Perry County EMA
F4	**Flood Proof or Elevate Critical Facilities and Utilities** *The Perry County EMA will oversee the implementation of this project in the county. Funding has not been secured, but additional funding will be sought from state and local resources. Implementation is forecasted to begin within approximately 3-5 years.*	Perry County, Du Quoin, Pinckneyville	Proposed	S, F	Perry County EMA
F5	**Culvert Replacement** *The Perry County Highway Dept. will oversee the implementation of projects on County roads and bridges. Village/Townships will be responsible for their respective projects. The Christian Fellowship school would like to install new culverts to allow access to playgrounds and widen drainage ditch. Funding has not been secured, but additional funding will be sought from state and local resources. Implementation is forecasted to begin within approximately 1-3 years.*	Perry County, Cutler, Du Quoin, Pinckneyville, St. Johns, Tamaroa, Willisville, Christian Fellowship School	Proposed	S, F	Perry County EMA, Perry County Highway Dept. or City/Village/Townships Street Depts., Christian Fellowship School
F6	**Elevate Low-Lying Roads** *The Perry County Highway Dept. will oversee the implementation of projects on County roads. Village/Townships will be responsible for their respective projects. Funding has not been secured, but additional funding will be sought from state and local resources. Implementation is forecasted to begin within approximately 1-3 years.*	Perry County, Cutler, Du Quoin, Pinckneyville, St. Johns, Tamaroa, Willisville	Proposed	S, F	Perry County EMA, Perry County Highway Dept. or City/Village/Townships Street Depts.
F7	**Retrofit Water Supply Systems** *The Perry County EMA would oversee this project. Implementation, If HMA funding is available, is forecasted to be initiated within approximately one- three years.*	Perry County, Cutler, Du Quoin, Pinckneyville, St. Johns, Tamaroa, Willisville, Rend Lake Conservancy District	Proposed	S, F	Perry County EMA

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
F8	**Maintain a List of Floodprone Structures** *The Perry County EMA oversees this project with the assistance of SIU. After each mitigation plan update, the geographical database is updated to include new information about hazard events and the number of structures within the 100-year floodplain.*	Perry County	Ongoing	L	Perry County EMA
DROUGHT / EXTREME HEAT / FIRE					
H1	**Develop/enforce water use restrictions and or burn ordinances during periods of drought** *The County and several jurisdictions currently have burn ordinances in place or enforce water restrictions during periods of drought to conserve water supplies.*	Perry County, Cutler, Du Quoin, Pinckneyville, Tamaroa, Willisville	Ongoing	L	County/ Village/City Board of Commissioners, Perry County Sheriff's Office
H2	**Retrofit Water Supply Systems and other at-risk structures** *The Perry County EMA would oversee this project. Implementation, If HMA funding is available, is forecasted to be initiated within approximately one- three years.*	Perry County, Cutler, Du Quoin, Pinckneyville, St. Johns, Tamaroa, Willisville, Rend Lake Conservancy District	Proposed	S, F	Perry County EMA
H3	**Establish fire/landslide/erosion preventative vegetation management techniques** *The Christian Fellowship School will monitor ground-keeping activities to prevent wildfire hazards and bare soil exposure.*	Christian Fellowship School	Proposed	L	Christian Fellowship School
GROUND FAILURE					
GF1	**Map and Assess Community Vulnerability to Ground Failure Hazards** *The Perry County EMA oversees this project with assistance from SIU. After each mitigation plan update, the geographical database is updated to include new information about ground failure hazard events.*	Perry County	Ongoing	L	Perry County EMA
GF2	**Maintain a List of Buildings Constructed Over Underground Mines** *The Perry County EMA oversees this project with assistance from SIU. After each mitigation plan update, the geographical database is updated to include new information about buildings located over underground mines. The Christian Fellowship School will work with the Perry County EMA to determine undermined areas on school property and develop a list of buildings vulnerable to ground failure.*	Perry County, Christian Fellowship School	Ongoing	L	Perry County EMA, Christian Fellowship School
GF3	**Stabilize Areas Vulnerable to Ground Failure** *The Perry County EMA would oversee this project. Implementation, If HMA funding is available, is forecasted to be initiated within approximately one- three years.*	Perry County, Cutler, Du Quoin, Pinckneyville, St. Johns, Tamaroa, Willisville	Proposed	L, S, F, P	Perry County EMA

*F – Federal, S – State, L – Local, P – Private

5.4 Prioritization of Multi-Jurisdictional Mitigation Strategies

Implementation of the mitigation strategies is critical to the overall success of the mitigation plan. It is important to decide, based upon many factors, which action will be undertaken first. In order to pursue the top priority first, an analysis and prioritization of the actions is vital. It is important to note that some actions may occur before the top priority due to financial, engineering, environmental, permitting, and site control issues. Public awareness and input of these mitigation actions can increase knowledge to capitalize on funding opportunities and monitoring the progress of an action. It is also critical to take into account the amount of time it will take the community to complete the mitigation project.

Table 5-8 displays the priority ranking for each mitigation strategy. Each code refers to a specific mitigations strategy listed in Table 5-7. For each participating jurisdiction a rating (high, medium, or low) was assessed for each mitigation item. The ranking is the result of the STAPLEE evaluation and the timeframe the community is interested in completing the strategy: H - High 1-3 years; M - Medium 3-5 years; and L - Low 5+years

Table 5-8. Prioritization of the Perry County Multi-Jurisdictional Mitigation Strategies

	Priority Ranking*																				
Code	**Perry County**	**Cutler**	**Du Quoin**	**Pinckneyville**	**St. Johns**	**Tamaroa**	**Willisville**	**Pinckneyville Com. Hospital**	**Marshall Browning Hospital**	**Perry Co. Counseling Center**	**Gold Plate Program**	**Five Star Industries, Inc.**	**Rend Lake Conservancy Dist.**	**Coulterville Com. FPD**	**CCSD #204**	**Du Quoin CUSD #30**	**Pinckneyville CHSD #101**	**Pinckneyville SD #50**	**Tamaroa SD #5**	**Rend Lake College**	**Christian Fellowship School**
AH1	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
AH2	H	-	H	-	-	-	-	-	-	-	-	-	-	-	H	H	H	H	H	H	H
AH3	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
AH4	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
AH5	H	-	H	-	-	-	-	-	-	-	-	-	-	-	-	-	H	-	-	-	-
AH6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
AH7	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AH8	H	-	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	H
AH9	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AH10	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
AH11	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
AH12	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AH13	L	-	L	-	-	-	-	L	L	-	-	-	-	-	-	-	-	-	-	-	-
AH14	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
AH15	H	H	H	H	H	H	H	-	-	-	-	-	H	-	-	-	-	-	-	-	-
AH16	H	H	H	H	H	H	H	H	H	H	H	H	-	H	H	H	H	H	H	H	H
AH17	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AH18	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
AH19	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AH20	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Code	Priority Ranking*																				
	Perry County	Cutler	Du Quoin	Pinckneyville	St. Johns	Tamaroa	Willisville	Pinckneyville Com. Hospital	Marshall Browning Hospital	Perry Co. Counseling Center	Gold Plate Program	Five Star Industries, Inc.	Rend Lake Conservancy Dist.	Coulterville Com. FPD	CCSD #204	Du Quoin CUSD #30	Pinckneyville CHSD #101	Pinckneyville SD #50	Tamaroa SD #5	Rend Lake College	Christian Fellowship School
EQ1	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EQ2	M	-	-	-	-	-	-	H	H	-	-	-	-	-	-	-	-	-	-	-	-
EQ3	H	H	H	H	H	H	H	-	-	-	-	-	H	-	-	-	-	-	-	-	-
EQ4	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
ST1	H	H	H	H	H	H	H	H	H	H	H	H	-	H	H	H	H	H	H	H	H
ST2	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
ST3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	M	H	M	M	M	M
WS1	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WS2	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M
WS3	-	-	-	-	-	-	-	-	-	H	-	H	-	-	-	-	-	-	-	-	M
F1	H	-	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F2	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F3	H	-	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F4	H	-	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F5	H	H	H	H	H	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-	M
F6	H	H	H	H	H	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F7	H	H	H	H	H	H	H	-	-	-	-	-	H	-	-	-	-	-	-	-	-
F8	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HAZ1	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HAZ2	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HAZ3	M	-	-	-	-	-	-	H	H	-	-	-	-	-	H	H	H	H	H	H	H
H1	M	M	M	M	-	M	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H2	H	H	H	H	H	H	H	-	-	-	-	-	H	-	-	-	-	-	-	-	-
H3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L
GF1	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GF2	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L
GF3	M	M	M	M	M	M	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Ranking based on STAPLEE evaluation and estimated timeframe: H – High, M – Medium, and L – Low

Section 6. Plan Implementation and Maintenance

6.1 Implementation through Existing Programs

Throughout the planning process, the Perry County Planning Team worked to identify existing hazard mitigation policies, develop mitigation goals, and a create a comprehensive range of mitigation strategies specific to each jurisdiction. This work provides a blueprint for reducing the potential loses identified in the Risk Assessment (Section 4). The ultimate goal of this plan is to incorporate the mitigation strategies proposed into ongoing planning efforts within the County. The Perry County Emergency Management Agency will be the local champion for the mitigation actions. The Perry County Board and the city and village councils will be an integral part of the implementation process. Federal and state assistance will be necessary for a number of the identified action.

Continued public involvement is also critical to the successful implementation of the MHMP. Comments from the public on the MHMP will be received by the Perry County Emergency Management Agency and forwarded to the Planning Team for discussion. Education efforts for hazard mitigation will be an ongoing effort of Perry County. The public will be notified of periodic planning meetings through notices in the local newspaper. Once adopted, a copy of the MHMP will be maintained in each jurisdiction and in the Perry County Emergency Management Agency.

6.2 Monitoring, Evaluation, and Updating the MHMP

Throughout the five-year planning cycle, the Perry County Emergency Management Agency will reconvene the Planning Team to monitor, evaluate, and update the plan on an annual basis. Additionally, a meeting will be held in 2020 to address the five-year update of this plan. Members of the planning committee are readily available to engage in email correspondence between annual meetings. If the need for a special meeting, due to new developments or the occurrence of a declared disaster in the county, the team will meet to update mitigation strategies. Depending on grant opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

As part of the update process, the Planning Team will review the county goals and objectives to determine their relevance to changing situations in the county. In addition, state and federal policies will be reviewed to ensure they are addressing current and expected conditions. The team will also review the risk assessment portion of the plan to determine if this information should be updated or modified. The plan revision will also reflect changes in local development and its relation to each hazard. The parties responsible for the various implementation actions will report on the status of their projects, and will include which implementation processes worked well, any difficulties encountered, how coordination efforts are proceeding, and which strategies should be revised.

Updates or modifications to the MHMP during the five-year planning process will require a public notice and a meeting prior to submitting revisions to the individual jurisdictions for approval. The plan will be updated via written changes, submissions as the committee deems appropriate and necessary, and as approved by the Perry County Board.

The GIS data used to prepare the plan was obtained from existing county GIS data as well as data collected as part of the planning process. This updated Hazus-MH GIS data has been returned to the county for use and maintenance in the county's system. As newer data becomes available, these updated data will be used for future risk assessments and vulnerability analyses.

Definitions

100-year Floodplain	Areas subject to inundation by the 1-percent-annual-chance flood event.
Critical Facility	A structure, because of its function, size, service area, or uniqueness, that has the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if it is destroyed or damaged or if its functionality is impaired. This includes, but are not limited to, water and wastewater treatment facilities, municipal buildings, educations facilities, and non-emergency healthcare facilities.
Community Rating System (CRS)	A voluntary program for National Flood Insurance Program (NFIP) participating communities. The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management.
Comprehensive Plan	A document, also known as a "general plan," covering the entire geographic area of a community and expressing community goals and objectives. The plan lays out the vision, policies, and strategies for the future of the community, including all the physical elements that will determine the community's future developments.
Disaster Mitigation Act of 2000 (DMA 2000)	The largest legislation to improve the planning process. It was signed into law on October 30, 2000. This new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur.
Critical Facility	A subset of essential facilities that represent a substantial hazard to human life in the event of failure. This includes (but not limited to) hospital and fire, rescue, ambulance, emergency operations centers, and police stations.
Federal Emergency Management Agency	An independent agency created in 1979 to provide a single point of accountability for all federal activities related to disaster mitigation and emergency preparedness, response, and recovery.
Hazard	A source of potential danger or adverse condition.
Hazard Mitigation	Any sustained action to reduce or eliminate long-term risk to human life and property from hazards.
Hazard Mitigation Grant Program (HMPG)	Authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, HMGP is administered by

	FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration.
Hazus-MH	A geographic information system (GIS)-based disaster risk assessment tool.
Multi-Hazard Mitigation Planning	Identify policies and actions that can be implemented over the long term to reduce risk and future losses from various hazardous events.
National Flood Insurance Program	Administered by the Federal Emergency Management Agency, which works closely with nearly 90 private insurance companies to offer flood insurance to property owners and renters. In order to qualify for flood insurance, a community must join the NFIP and agree to enforce sound floodplain management standards.
Planning Team	A group composed of government, private sector, and individuals with a variety of skills and areas of expertise, usually appointed by a city or town manager, or chief elected official. The group finds solutions to community mitigation needs and seeks community acceptance of those solutions.
Risk Priority Index	Quantifies risk as the product of hazard probability and magnitude so Planning Team members can prioritize mitigation strategies for high-risk-priority hazards.
Risk Assessment	Quantifies the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people.
Strategy	A collection of actions to achieve goals and objectives.
Vulnerability	Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions.

Acronyms

A B **C** **D** **E** **F** **G** **H** **I** J K L **M** **N** O **P** Q **R** **S** T **U** V W X Y Z

A

AEGL – Acute Exposure Guideline Levels
ALOHA – Areal Locations of Hazardous Atmospheres

C

CERI – Center for Earthquake Research and Information
CRS – Community Rating System

D

DEM – Digital Elevation Model
DFIRM – Digital Flood Insurance Rate Map
DMA – Disaster Mitigation Act of 2000

E

EAP – Emergency Action Plan
EMA – Emergency Management Agency
EPA – Environmental Protection Agency

F

FEMA – Federal Emergency Management Agency
FIRM – Flood Insurance Rate Map

G

GIS – Geographic Information System

H

Hazus-MH – Hazards USA Multi-Hazard
HMGP – Hazard Mitigation Grant Program
HUC – Hydrologic Unit Code

I

IA – Individual Assistance
IDNR – Illinois Department of Natural Resources
IDOT – Illinois Department of Transportation
IEMA – Illinois Emergency Management Agency
ISO – Insurance Service Office
ISGS – Illinois State Geological Survey
ISWS– Illinois State Water Survey

M MHMP – Multi-Hazard Mitigation Plan

N NCDC – National Climatic Data Center
NEHRP – National Earthquake Hazards Reduction Program
NFIP – National Flood Insurance Program
NID – National Inventory of Dams
NOAA – National Oceanic and Atmospheric Administration
NSFHA – Non-Special Flood Hazard Area

P PA – Public Assistance
PPM – Parts Per Million

R RPI – Risk Priority Index

S SIU – Southern Illinois University Carbondale
SPC – Storm Prediction Center
STAPLEE – Social, Technical, Administrative, Political, Legal, Economic, and Environmental

U USGS – United States Geological Survey

Appendices

Appendix A. MHMP Meeting Minutes 88
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Appendix A. MHMP Meeting Minutes

Formal Mitigation Planning Meetings

Meeting 1 – September 11th, 2014

Meeting 2 – January 26th, 2015

Meeting 3A – June 29th, 2015

Meeting 3B – July 10th, 2015

Meeting 4 – Month Date, Year

Outside Meetings

See Attached Outside Meeting Minutes

Meeting 1 – September 11th, 2014

IEMA Multi-Hazard Mitigation Plan

Assembly of the Perry County Planning Team Meeting 1
Chairman: David Searby
Plan Directors: Southern Illinois University and Greater Egypt Region Planning and Development Commission

Meeting Date: September 11th, 2014

Meeting Time: 3:30pm

Place: Pinckneyville Community Hospital, 101 N Walnut St, Pinckneyville, IL 62274

Planning Team/Attendance: 18

Introduction to the Multi-Hazard Mitigation Planning Process and Risk Assessment

The meeting is called to order

Amanda Damptz, Staff Researcher and Project Manager at SIU, opened the meeting by explaining that the planning team is here today to update the 2009 Perry County Multi-Hazard Mitigation Plan. She introduced the planning partners: Perry County, Southern Illinois University and Greater Egypt Regional Planning and Development Commission.

A PowerPoint presentation was given by Amanda. She explained that this project is in response to the Disaster Mitigation Act of 2000. The project is funded by a grant awarded by FEMA. Once the project is completed, it opens the County and its participating jurisdictions up to additional Hazard Mitigation Assistance Funds. Amanda divided the planning process into four meetings. During Meeting 1, the focus will be on natural disasters that are relevant to the County. As a group, the planning team will complete a hazard ranking exercise. Identified hazards will be given a probability rating and ranked by their occurrence and potential level of risk. At Meeting 2, the public meeting, SIU will present historic accounts of natural disasters that have affected the area. The results from the risk assessment report will also be presented. Meeting 3 will consist of a brain storming session focused on disasters that were analyzed in the risk assessment report. FEMA requires that for every identified hazard, two strategies to mitigate the loss and damage must be in place. At Meeting 4, the planning team will review the plan prior to sending it to IEMA. IEMA will review the plan and make recommendation to it as they see fit, then it is submitted to FEMA for review and approval. Once approved by FEMA, the Planning Team will present the Mitigation Plan to the County Board for adoption. Participating Jurisdictions must either adopt the county plan or prepare its own plan, in order to access mitigation assistance from FEMA.

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Amanda also presented historic accounts of natural disasters that have affected the County. During her presentation, she fielded any questions relevant to each hazard. She stressed that this information should help guide the planning team when completing the hazard ranking exercise.

Amanda provided the planning team with a Hazard Ranking Exercise handout. The Planning Team was then asked to assess and rank the hazards that could potentially befall Perry County using the risk priority index (RPI). The identified hazards were ranked as followed for Perry County:

1. Tornadoes
2. Hazmat
3. Earthquakes
4. Severe Storms (Thunderstorms, High Winds, Hail, Lightening)
5. Winter Storms
6. Flooding
7. Wildfire
8. Ground Failure

Finally, representative from each jurisdiction present at the meeting completed the Hazard Ranking Exercise for their respective jurisdiction.

Meeting was adjourned

Multi-Hazard Mitigation Planning Meeting Attendance

Name and Contact Information (email or phone)	Your Initials	Employment (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
Raymond D. Clark duquoinesdaeoc@gmail.com	ROC	☑ As a Public Employee ☐ As a Private Employee ☐ Volunteer	Coordinator	City of DuQuoin ESDA	20
Lisa D Smith Lisa.Smith-mbh@mbhdq.com	LS	☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer	Director of Cardiopulmonary Disaster	Marshall Browning Hospital	26
Andrew Neal 513-5228	AN	☒ As a Public Employee ☐ As a Private Employee ☐ Volunteer	GIS Mapping	Rend Lake Conservancy Dist.	40
ROBERT H. FOX 618-317-0813	AHF	☐ As a Public Employee ☐ As a Private Employee ☒ Volunteer	PRESIDENT rhf1004@frontier.com	COURTENVILLE FIRE DIST.	30
Krista Mulholland Kmulholland@live.com	KM	☒ As a Public Employee ☐ As a Private Employee ☐ Volunteer	Director of Environmental Health	Perry Co. Health Dept	2
Corey Robbins crobbins@duquoinschools.org	CSR	☑ As a Public Employee ☐ As a Private Employee ☐ Volunteer	District Business Manager	DuQuoin CUSD #300	24

(Month, Day, Year) Page 2

Multi-Hazard Mitigation Planning Meeting Attendance

Please print clearly

Name and Contact Information (email or phone)	Your Initials	Employment (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
JAMES GIELOW PVILLEFIRE@CTSWIRED.NET	JDG	☑ As a Public Employee ☐ As a Private Employee ☐ Volunteer	FIRE CHIEF	CITY OF PINCKNEYVILLE	1
Eric Lambert news@pinckneyvillepress.com	EAL	☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer	Local Newspaper Editor	Pinckneyville Press	1
Eva Hopp ehopp@pvillehosp.org	EH	☑ As a Public Employee ☐ As a Private Employee ☐ Volunteer	CNE	Pinckneyville Comm. Hospital	0
Richard A Loyd II raloyd1@yahoo.com	RL	☒ As a Public Employee ☐ As a Private Employee ☐ Volunteer	Firefighter	City of DuQuoin	20
Susan Engelhardt sengelhardt@5starind.com	SE	☐ As a Public Employee ☑ As a Private Employee ☐ Volunteer	Executive Director	Five Star Ind Inc Perry County Counseling	15
BRUCE REPPERT		☐ As a Public Employee ☐ As a Private Employee ☒ Volunteer	STOP MEMBER PERRY LMA	PERRY CO LMA	30

(Month, Day, Year) Page 1

Multi-Hazard Mitigation Planning Meeting Attendance

Name and Contact Information (email or phone)	Your Initials	Employment (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
Kevin Daugherty kdaugherty@pvillehosp.org	KD	☐ As a Public Employee ☑ As a Private Employee ☐ Volunteer	EVS Director	Pinckneyville Hosp	0
		☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer			
		☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer			
		☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer			
		☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer			
		☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer			

(Month, Day, Year) Page 4

Multi-Hazard Mitigation Planning Meeting Attendance

Name and Contact Information (email or phone)	Your Initials	Employment (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
Shane Malamy Smalamy96@gmail	S.M	☐ As a Public Employee ☑ As a Private Employee ☐ Volunteer	Administrator	Pville Ambulance	2.5
Joyce Reed Joyce@cedarbreezeconsultants.com	JR	☐ As a Public Employee ☒ As a Private Employee ☐ Volunteer	Owner	Cedar Breeze Consultants	6
SANDRA WEBSTER Sandra.webster@redcross.org	SKW	☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer	DIRECTOR	AMERICAN RED CROSS	54
		☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer		Little Egypt BRANCH	
Amanda Dauptz		☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer			
~~Amanda Dauptz~~ Tim Kropp		☐ As a Public Employee ☐ As a Private Employee ☐ Volunteer			

(Month, Day, Year) Page 3

Meeting 2 – January 26th, 2014

GREATER EGYPT REGIONAL PLANNING & DEVELOPMENT COMMISSION

IEMA Multi-Hazard Mitigation Plan

Assembly of the Perry County Planning Team Meeting 2
Chairman: David Searby
Plan Directors: Southern Illinois University and Greater Egypt Regional Planning and Development Commission.

Meeting Date: January 26th, 2015

Meeting Time: 5:30pm

Place: Pinckneyville City Hall, 104 S Walnut St, Pinckneyville, IL

Planning Team/Attendance: 28

Public Meeting and County Risk Assessment

The meeting is called to order

Prof. Nicholas Pinter opened the meeting by explaining that the planning team is here today to update the 2009 Perry County Multi-Hazard Mitigation Plan. He introduced the planning partners: Southern Illinois University and Greater Egypt Regional Planning and Development Commission. A PowerPoint presentation was present that included: historic accounts of natural disasters that have affected Perry County and the results from the risk assessment report.

A draft of the Perry County Mitigation Plan was also given to each planning team member for review. It was explained by Prof. Pinter that the each planning team member should review the plan and consider the risk assessment before attending the next meeting. The next meeting will take place in March/April. This meeting will involve developing mitigation strategies to address each ranked hazard.

Prof. Pinter then asked the audience for questions and comments. Project Manager Amanda Damptz noted any changes and promised to make all corrections before the next meeting. Prof. Pinter thanked those who came and closed the presentation.

Meeting was adjourned

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Perry County Multi-Hazard Mitigation Planning Meeting Attendance

Please print clearly

Name and Contact Information (email or phone)	Your Initials	Your Reason for Attending (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
STEVE WILLIAMSON		☐ As a Public Employee ☐ As a Private Employee ☒ As an Interested Citizen	STEVE WILLIAMSON 350@YAHOO.COM		
David H. Searby, Jr.	dh	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Perry County Emd Coordinator	Perry County	
Kelly Huddleston	KH	☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	US Emergency Management Coordinator	Williamson County	105
Robert H. Fox	RHF	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	President	Pinckneyville Fire Pro. Dist.	30
James D. Giezau	JDG	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Fire Chief	City of Pinckneyville	1
Lisa D Smith Lisa.smith@mbh.com	LDS	☑ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Director of Cardiopulmonary	Marshall Browning Hospital Du Quoin	30
Raymond D. Clark	RDC	☑ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Coordinator	City of Du Quoin EMA	30

Page 1

(January 26, 2015)

Perry County Multi-Hazard Mitigation Planning Meeting Attendance

Name and Contact Information (email or phone)	Your Initials	Your Reason for Attending (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
Martin Beltz, Perry Co. ASA (618) 357-6221 beltzasa@gmail.com	MB	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Assistant States Atty	Perry Co. SAO	1.5 mi.
Steve Bareis, P.C. Sheriff (618) 357-1606; stevebareis@perrycountysheriffsoffice.com	SB	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Sheriff	Perry Co Sheriff	1
Susan Engelhardt Director Five Star & PCCC (618) 790-2369 sengelhardt@5starinb.com	SE	☐ As a Public Employee ☒ As a Private Employee ☐ As an Interested Citizen	Executive Director	Five Star Ind. Inc. Perry County Counseling	26
Jeffrey D. Roberts ITMGR Pinckneyville Hosp (618) 571-0092 jroberts@pvillehosp.org	JR	☐ As a Public Employee ☐ As a Private Employee ☒ As an Interested Citizen	ITMGR	Pinckneyville Comm Hosp	3
Eva Hopp Pinckneyville Comm. Hospital ehopp@pvillehosp.org 618 357-5950	EH	☐ As a Public Employee ☒ As a Private Employee ☐ As an Interested Citizen	Director of Nursing	Pinckneyville Comm. Hospital	1/2 mile
Robert E. Giacomo (618) 357-8721 n9vkobdo@frontier.com	REG.	☐ As a Public Employee ☐ As a Private Employee ☒ As an Interested Citizen	Ham Radio Operator for Perry Cnty, EMA	Giacomo Auto Repair Pinckneyville	2
Matt Benson bpnsam.matthew@yahoo.com	MB	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Attorney, Village of St. Johns	Village of St. Johns	20

Perry County Multi-Hazard Mitigation Planning Meeting Attendance

Name and Contact Information (email or phone)	Your Initials	Your Reason for Attending (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
Tim O'Leary 357-9096	TOL	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Superintendent	Pinckneyville District #50	N/A
Kim Harris Kharris0970@yahoo.com	KH	☒ As a Public Employee ☒ As a Private Employee ☐ As an Interested Citizen	PHRN	Pinckneyville Ambulance	
Brittany Uhlwerd emt09@ymail.com	BU	☐ As a Public Employee ☒ As a Private Employee ☐ As an Interested Citizen	EMT	Pinckneyville Ambulance	
Shane Malawy smalawy96@gmail.com	SM	☐ As a Public Employee ☒ As a Private Employee ☐ As an Interested Citizen	Administrator Paramedic	Pinckneyville Ambulance	20 miles
Sherry Wertz sherry.wertz@mbhdg.com	SW	☐ As a Public Employee ☒ As a Private Employee ☐ As an Interested Citizen	Clinical Informatics	Marshall Browning Hospital	30 miles
Joyce Rhoel joyce@cedarbreezeconsultants.com	JR	☐ As a Public Employee ☒ As a Private Employee ☐ As an Interested Citizen	Business Owner	Cedar Breeze Consultants	12 miles
John Morgan 357-4531	JM	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Police Officer	City of Pinckneyville	0

Perry County Multi-Hazard Mitigation Planning Meeting Attendance

Name and Contact Information (email or phone)	Your Initials	Your Reason for Attending (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
Sgt. William Reagan PCSO 618-357-5212 bjreagan@Perrycountysheriffsoffice.com	WSR	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Sheriff Deputy Sgt.	Perry County S.O.	0
LARRY Galbraith PCSO larry.galbraith@perrycountysheriffsoffice.com		☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Deputy sheriff	Perry CO	0
John Mucha 618-559-7010 j-mucha@hotmail.com	JM	☒ As a Public Employee ☐ As a Private Employee ☒ As an Interested Citizen	Pinckneyville Fire Dept. Lieutenant		0
Eric Lambert 618-357-6397	EL	☐ As a Public Employee ☒ As a Private Employee ☒ As an Interested Citizen	Pinckneyville Press Editor	Pinckneyville, IL	0
Tyler Carpenter	YC.	☑ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Planner	Greater Egypt	–
Nicholas Pinto	NP	☑ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Prof.	SIU	
Amanda Dampfz	ALD	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Researcher II	SIU	Ø

(January 26, 2015)

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Meeting 3A – June 29th, 2015

GREATER EGYPT REGIONAL PLANNING & DEVELOPMENT COMMISSION

IEMA Multi-Hazard Mitigation Plan

Assembly of the Perry County Planning Team Meeting 3A
Chairman: David Searby
Plan Directors: Southern Illinois University and Greater Egypt Regional Planning and Development Commission

Meeting Date: June 29th, 2015

Meeting Time: 6:00pm

Place: Pinckneyville City Hall, 104 S Walnut Street, Pinckneyville, IL

Planning Team/Attendance: 8

Developing Mitigation Strategies

The meeting is called to order.

Amanda Damptz opened the meeting by explaining that the planning team is here today to update the 2009 Perry County Multi-Hazard Mitigation Plan. She introduced the planning partners: Southern Illinois University and Greater Egypt Regional Planning and Development Commission. A PowerPoint presentation was present that included: the current status of the mitigation planning efforts, FEMA's Hazard Mitigation Assistance Program, Hazard Mitigation Ideas and other potential funding sources.

During the PowerPoint, Ms. Damptz explained that regionally Southern Illinois has received $87 million in Hazard Mitigation Assistance Grants as a result of the Hazard Mitigation Planning Efforts. A few examples include: Jackson County's Reed Station Mobile Home Acquisition, SIH's Seismic Retrofit, Creal Springs School Hardening, Rend Lake Water Main Bypass, and West Frankfort Treatment Plant Relocation.

In addition to FEMA's HMA program, there are several granting agencies the County and its municipalities can investigate to help offset the cost of future hazard mitigation projects. A few examples include: USDA Rural Development Grants, Illinois Department of Commerce and Economic Opportunity, and Illinois Dept. of Natural Resources.

Finally, the County and its municipalities broke out into their respective groups to develop mitigation strategies specific to their jurisdiction. SIU will gather the information and compile it into the plan draft. At the next meeting, the planning team will be able to review and make any changes necessary to the listed mitigation strategies.

Meeting was adjourned.

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Coulterville + Sparta District + School District

Perry County Multi-Hazard Mitigation Planning Meeting Attendance

Please print clearly

Name and Contact Information (email or phone)	Your Initials	Your Reason for Attending (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
JAMES D. GIEGOW PWLLIEFIRE@CTS UNRED.NET	JDG	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	FIRE CHIEF	CITY OF PINCKNEYVILLE	2
Tyler Carpenter	TMC	☐ As a Public Employee ☒ As a Private Employee ☐ As an Interested Citizen	Planner	Greater Egypt	-
Amanda Damptz	AND	☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Research II	SIU	0
ROBERT TERRY FOX	RF	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	President	Rockfield/P Fire Dist.	30
DAVID H. SEARBY, JR.	[illegible]	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	EMA Coordinator	Perry County	
Raymond D. Clark	[illegible]	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	ESDA Coordinator	City of Duquoin	30
Shirley Weeks	[illegible]	☐ As a Public Employee ☒ As a Private Employee ☐ As an Interested Citizen	ESDA Member Marshall Browning Hosp.	Marshall Browning Hospital	30

(June 29, 2015)

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Perry County Multi-Hazard Mitigation Planning Meeting Attendance

Name and Contact Information (email or phone)	Your Initials	Your Reason for Attending (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
Eve Hopp ehopp@pville hosp.org	EH	☑ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	CNE	Pinckneyville Hospital	1/2 mile
		☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen			
		☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen			
		☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen			
		☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen			
		☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen			
		☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen			

(June 29, 2015)

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Meeting 3B – July 10th, 2015

GREATER EGYPT REGIONAL PLANNING & DEVELOPMENT COMMISSION

IEMA Multi-Hazard Mitigation Plan

Assembly of the Perry County Planning Team Meeting 3B
Chairman: David Searby
Plan Directors: Southern Illinois University and Greater Egypt Region Planning and Development Commission

Meeting Date: July 10th, 2015

Meeting Time: 1:00pm

Place: Pinckneyville City Hall, 104 S Walnut Street, Pinckneyville, IL

Planning Team/Attendance: 11

Developing Mitigation Strategies (Non-Profits & School Districts)

The meeting is called to order.

Amanda Damptz opened the meeting by explaining that the planning team is here today to update the 2009 Perry County Multi-Hazard Mitigation Plan. She introduced the planning partners: Southern Illinois University and Greater Egypt Regional Planning and Development Commission. A PowerPoint presentation was present that included: the current status of the mitigation planning efforts, FEMA's Hazard Mitigation Assistance Program, Hazard Mitigation Ideas and other potential funding sources.

During the PowerPoint, Ms. Damptz explained that regionally Southern Illinois has received $87 million in Hazard Mitigation Assistance Grants as a result of the Hazard Mitigation Planning Efforts. A few examples include: Jackson County's Reed Station Mobile Home Acquisition, SIH's Seismic Retrofit, Creal Springs School Hardening, Rend Lake Water Main Bypass, and West Frankfort Treatment Plant Relocation.

In addition to FEMA's HMA program, there are several granting agencies the County and its municipalities can investigate to help offset the cost of future hazard mitigation projects. A few examples include: USDA Rural Development Grants, Illinois Department of Commerce and Economic Opportunity, and Illinois Dept. of Natural Resources.

Finally, the County and its municipalities broke out into their respective groups to develop mitigation strategies specific to their jurisdiction. SIU will gather the information and compile it into the plan draft. At the next meeting, the planning team will be able to review and make any changes necessary to the listed mitigation strategies.

Meeting was adjourned.

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Perry County Multi-Hazard Mitigation Planning Meeting Attendance

Please print clearly

Name and Contact Information (email or phone)	Your Initials	Your Reason for Attending (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
Cris Pitts-Tamay Asbury [illegible]	[illegible]	☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Executive Director		14
Tyler Compton	[illegible]	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Regional Planner	Greater Egypt	
Heather Bauersachs bauersachsh@ric.edu 357-3772	[illegible]	☐ As a Public Employee ☐ As a Private Employee ☒ As an Interested Citizen	Campus Coordinator Student Activities	Rend Lake College	
Amanda Damptz		☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Research II	SIU	0
Keith Hegenne khegenne@pcksponthers.com	KH	☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Superintendent	Pinckneyville H.S.	0
James Gillow		☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Fire Chief	City of Pinckneyville	0
Nelle Frace@cristsaas.net	TDC	☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen			
David H. Yenney, Jr. pcemg@yahoo.com	[illegible]	☒ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	EMA Coordinator	Pinckneyville, IL	

(July 10, 2015)

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Perry County Multi-Hazard Mitigation Planning Meeting Attendance

Name and Contact Information (email or phone)	Your Initials	Your Reason for Attending (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
Tim O'Leary Perry Dist #50	TO	☑ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Supt	Riverway Dist #50	0
Cindy Opp copp@tgs5.com Tamaroa Grade School	CO	☑ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Ast. Principal teacher	Tamaroa Grade School	15 mi
Shane Malawy smalawy9@gmail.com	SM	☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen	Administrator	Pinckneyville Ambulance	1 mi
SUSAN Engelhardt Sengelhardt@essstarind.com	SE	☐ As a Public Employee ☑ As a Private Employee ☐ As an Interested Citizen	Executive Director	Fire Star Ind.	12 mi
		☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen			
		☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen			
		☐ As a Public Employee ☐ As a Private Employee ☐ As an Interested Citizen			

Meeting 4 –

IEMA Multi-Hazard Mitigation Plan

Assembly of the Perry County Planning Team Meeting 4A
Chairman: David Searby
Plan Directors: Southern Illinois University and Greater Egypt Regional Planning and Development Commission

Meeting Date: September 23rd, 2015

Meeting Time: 10:00 AM

Place: Du Quoin City Hall, 302 E Poplar St. Du Quoin, IL 62832

Planning Team/Attendance: 11

Developing Mitigation Strategies

The meeting is called to order.

Dr. James Conder opened the meeting by explaining that the planning team is here today to review the final draft of the 2015 Perry County Multi-Hazard Mitigation Plan Update. He introduced the planning partners: Southern Illinois University and Greater Egypt Regional Planning and Development Commission.

Planning members were given time to review the plan document and note any corrections that they want to be made for the final plan. SIU staff will make all changes and return the digital version of the plan to the County.

Meeting was adjourned.

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IEMA Multi-Hazard Mitigation Plan

Assembly of the Perry County Planning Team Meeting 4B
Chairman: David Searby
Plan Directors: Southern Illinois University and Greater Egypt Regional Planning and Development Commission

Meeting Date: September 23rd, 2015

Meeting Time: 1:00 PM

Place: Pinckneyville City Hall, 104 S Walnut St, Pinckneyville, IL 62274

Planning Team/Attendance: 14

Developing Mitigation Strategies

The meeting is called to order.

Timothy Kropp opened the meeting by explaining that the planning team is here today to review the final draft of the 2015 Perry County Multi-Hazard Mitigation Plan Update. He introduced the planning partners: Southern Illinois University and Greater Egypt Regional Planning and Development Commission.

Planning members were given time to review the plan document and note any corrections that they want to be made for the final plan. SIU staff will make all changes and return the digital version of the plan to the County.

Meeting was adjourned.

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IEMA Multi-Hazard Mitigation Plan

Assembly of the Perry County Planning Team Meeting 4C
Chairman: David Searby
Plan Directors: Southern Illinois University and Greater Egypt Regional Planning and Development Commission

Meeting Date: September 23rd, 2015

Meeting Time: 6:00 PM

Place: Pinckneyville City Hall, 104 S Walnut St, Pinckneyville, IL 62274

Planning Team/Attendance: 5

Developing Mitigation Strategies

The meeting is called to order.

Timothy Kropp opened the meeting by explaining that the planning team is here today to review the final draft of the 2015 Perry County Multi-Hazard Mitigation Plan Update. He introduced the planning partners: Southern Illinois University and Greater Egypt Regional Planning and Development Commission.

Planning members were given time to review the plan document and note any corrections that they want to be made for the final plan. SIU staff will make all changes and return the digital version of the plan to the County.

Meeting was adjourned.

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Perry County Multi-Hazard Mitigation Planning Meeting Attendance (Meeting 4C- Pinckneyville)

Please print clearly

Name and Contact Information (email or phone)	Your Initials	Your Reason for Attending (check only ONE box)	Job Title(s)	Employer(s)	Roundtrip Mileage to attend this meeting
Bo Brent H. Fox rbfcoe@frontier.com	BHF	As a Public Employee As a Private Employee As an Interested Citizen	President	Coulterville Elec. Dept.	30
David H. Searby Jr. perrycountyema@gmail.com	DHS	As a Public Employee As a Private Employee As an Interested Citizen	Consultant	Perry Co. EMA	-0-
Raymond D. Clark duffyinsuranceec@gmail.com	RC	As a Public Employee As a Private Employee As an Interested Citizen	Coordinator	Du Quoin EMA	28
Joshua M. Harsy jeaharsy@perrycountyemaillinois.com	JMH	As a Public Employee As a Private Employee As an Interested Citizen	Sgt. Sheriff's Office	PCSO	-
Tim Kropp tmkropp@siu.edu	TK	As a Public Employee As a Private Employee As an Interested Citizen	Graduate Student	SIU	-
		As a Public Employee As a Private Employee As an Interested Citizen			
		As a Public Employee As a Private Employee As an Interested Citizen			

(September 23, 2015) Page 1

Appendix B. Local Press Release and Newspaper Articles

DUQUOIN EVENING CALL

A-1 BUILDINGS
www.a1buildingsanddoors.com • a1buildings@mychoice.net
CALL TODAY 618.983.5909

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NEWS NOW Extended Weather Outlook Extended Weather Outlook

Postal routing makes Tamaroa water bills up to two weeks late

COMMENT 1 Recommend 0 Tweet 2

Posted Feb. 13, 2015 at 9:00 AM

Tamaroa, Ill.

The Tamaroa Village Board continued their Feb. 11 meeting for two weeks to discuss the billing cycle for water and sewer customers.

Village employee Tiffany Kujawa said the local post office was ordered to send all the water bills to the regional post office this month, but was guaranteed a two-day turn-around.

The quick turn-around didn't happen. Kujawa said she took the bills to the post office on Jan. 30. They were mailed out the following Monday. Many village water customers still haven't received their bills.

Customers who have post office boxes received their bills on time. Other customers called to find out what they owe and paid without a paper copy of their bill.

Kujawa said she will waive late fees and the board concurred.

Trustee Bill Place said the village operates on a 25-day cycle with bills going out the first of the month and customers having 10 days to pay. Following a short period where a late fee applies, customers who do not pay are then disconnected on the 25th day.

Place said the late billing will affect St. Johns, as well.

He suggested continuing the meeting and reconvening to discuss how to handle future postal delays, if necessary. If the delay was a one-time-thing, the board can adjourn the Feb. 11 meeting before opening their March meeting.

In other business, the council:

• heard from Christy Simpson who owns six lots in two different blocks on South Walnut Street which are separated by an unmaintained street leading to an unmaintained alley which provides access to a utility corridor. Simpson said she is trying to sell the properties and buyers want to all six lots to be connected. She asked the board to vacate the street between the properties. She was aware of the division when purchasing it. Trustee Bill Place said it has been the policy of the board not to vacate properties that lead to utility corridors and/or could be used for future expansion of the village. Trustees Lisa Haycraft and Betty Roberts agreed that the board has been in the practice of not vacating properties. Simpson offered an easement as a solution. Place said that an easement can be used to gain access to the alley, but vacating a street means the village loses motor fuel taxes. Simpson countered that the village would gain property taxes from vacating. The board declined to take any action. Place suggested that Simpson return after the municipal election in April and ask that board to vacate the property if it still hasn't sold.

• adopted the same potential hazard list that Perry County created as part of the five-year update to the multi-hazard mitigation plan for the county and all local municipalities. Amanda Damptz, Project Manager for the Natural Hazards Research and Mitigation Group at SIU, said the next step will be a meeting to strategize solutions for potential hazards, such as using the Community Center as a warming or cooling center during cold snaps or heat spells. The plan addresses mitigation to potential hazards, not emergency response. Perry County EMA Coordinator David Searby said he is working with the village to have the Community Center as a designated shelter approved by the Red Cross for use in emergencies. Damptz expects the new plan to be adopted in June. Once the new plan is in place, the participating municipalities may use it when applying for FEMA hazard mitigation grants. The grants require a matching share from the municipality. Tamaroa has $32,000 in a special fund for that use.

DUQUOIN EVENING CALL

BEN'S LAWN SERVICE
HUSTLER Raptor

HOME NEWS SPORTS ENTERTAINMENT LIFE OPINION OBITUARIES

FEATURED » PHOTOS VIDEOS GAMES TV GUIDE BUSINESS CALENDAR BRANDED CONT

NEWS NOW Extended Weather Outlook Extended Weather Outlook

City approves $25,000 grant to purchase Verizon building at corner of Water and Walnut

COMMENT 0 Recommend 1 Tweet 0

Posted Jan. 27, 2015 at 9:00 AM

Pinckneyville, Ill.

The Pinckneyville City Council unanimously approved a $25,000 grant to Martin Rentals LLC to purchase the building on the southwest corner of Walnut and Water Streets which currently houses Verizon. Mike and Jennifer Martin will purchase the building for $159,000 with a 20 percent down payment then do about $15,000 worth of improvements. They have a two-year commitment from Verizon to continue renting the space. Jennifer Martin will then open a Farmer's Insurance office in the remaining space in the building.

In other business, the council:

• agreed to begin the process of hiring a full-time police officer and a part-time police officer. The full-time officer will replace Gary Remer who died last week. Commissioner Kevin Hicks said the part-time officer is needed because the another full-time officer is on medical leave.

• passed a resolution authorizing the acceptance of bids for park maintenance. Jim Boyd has held the contract for the past several years. Commissioner David Stone said he will not renew his contract when it expires March 31.

• voted to renew the accounting software client care agreement with Zobrio for support services for Blackbaud Fund Ware for a year at a cost of $2,995.

• approved spending $8,390 to remove, service, rebuild and reinstall a high service pump and a low lift pump at the water treatment plant. The high-service pump is one of three that supplies water to the water towers. The low-lift pump is one of three that supply water to storage tanks.

• approved the IDOT Motor Fuel Tax funds audit for the city for 2012.

• granted permission for the Pinckneyville Optimist Club to collect funds around the four-way stop and the square on Saturday, May 23 from 7 to 11 a.m.

• granted permission for TLC of Southern and Central Illinois to collect funds around the four-way stop and the square on Saturday, May 2.

• heard from Commissioner Sam Fulk that bids on the square lighting project will be opened Feb. 17. He hopes to award the bids in March. The completion date for the project has been moved to July 31.

• heard a presentation from David Searby and Amanda Damptz of SIU Natural Hazards Research and Mitigation Group. Perry County Emergency Management Agency has received a grant to update their 2009 multihazard mitigation program. Searby said that all of the local municipalities have agreed to participate and will be eligible to use the plan created to apply for hazard mitigation grants on their own. The first step was to rank the hazards faced by Perry County. Several different groups worked on the ranking and agreed that tornadoes are the top hazard in Perry County and each of their jurisdictions. Other hazards include hazardous materials spills, strong storms, winter storms, earthquakes, flooding and ground failure.The remaining hazards were ranked differently by different participating agencies. Damptz said the varied rankings are fine. Informational meetings were held in the local municipalities to let the public know about the grant. The next step is to meet and work on mitigation strategies. That meeting will take place in two or three months. The completed plan will be submitted to FEMA in June. Once FEMA has received the plan, the participating municipalities can apply for FEMA grants to work on mitigating hazards as defined by the plan. The municipalities would be responsible for matching funds for those grants. Perry County is responsible for the matching portion of the hazard mitigation plan upgrade grant. Damptz said that the meetings allow Perry County to use 'sweat equity' as their matching portion of the grant.

MHMP Steering Committee to Host Public Meting

The Perry County Multi-Hazard Mitigation Plan (MHMP) Steering Committee will host a public information meeting at 5:30 p.m., January 26, 2015, at Pinckneyville City Hall, 104 S Walnut St. in Pinckneyville.

Through a grant funded by FEMA, the county has formed an alliance with SIU and the Greater Egypt Regional Planning and Development Commission to identify potential natural hazards and produce an update to the 2009 MHMP.

The public is invited to attend this meeting to learn about the MHMP process and provide input regarding natural hazards that occur in Perry County. For more information, please contact Perry County Emergency Management Agency at 357-6221.

Appendix C. Adopting Resolutions

See Attached Adopting Resolutions

Appendix D. Historical Hazards

See Attached Large Format Map and Newspaper Clippings

Appendix E. List of Essential Facilities

Not all data is available for every facility. Other facility specifics may be available upon request.

Emergency Operations Center Facilities

Facility Name	Address	City
Du Quoin Emergency Operations Center	900 North Division Street	Du Quoin

Fire Station Facilities

Facility Name	Address	City	Comments
Cutler Fire Protection District	111N Main Street	Cutler	
Du Quoin Fire Department	30 South Division Street	Du Quoin	
Du Quoin Fire Department Station 2	1534 S Washington Street	Du Quoin	
Pinckneyville Fire Department	110 South Walnut Street	Pinckneyville	
Pinckneyville Rural FPD	110 South Walnut Street	Pinckneyville	
Tamaroa FPD/ Tamaroa FD	11 East Water Street	Tamaroa	
Willisville Fire Department	407 Peach Street	Willisville	

Police Station Facilities

Facility Name	Address	City
Du Quoin Police Department	28 South Washington Street	Du Quoin
District 13 Headquarters- State Police	1391 South Washington Street	Du Quoin
Pinckneyville Police Department	104 South Walnut Street	Pinckneyville
Perry County Sheriff's Office	12 East Water Street	Pinckneyville

School Facilities

Facility Name	Address	City	Comments
Western Egyptian Head Start (Pinckneyville)	903 South Main Street	Pinckneyville	Grade PK
Western Egyptian Head Start (Tamaroa)	3747 Hitt Road	Tamaroa	Grade PK
Christian Fellowship School	616 South US Highway 51	Du Quoin	Grades K3-12; Private
Tri-County Ward School	120 Spring Street	Du Quoin	Special Education
Du Quoin High School	500 East South Street	Du Quoin	Grades 9-12; Du Quoin CUSD 300; 404 Students
Du Quoin Middle School	845 East Jackson Street	Du Quoin	Grades 5-8; Du Quoin CUSD 300; 458 Students
Du Quoin Elementary School	845 East Jackson Street	Du Quoin	Grades PK-4; Du Quoin CUSD 300; 642 Students
St. Bruno Catholic School	210 North Gordon Street	Pinckneyville	Grades PK-8; Private
Pinckneyville Christian Academy	310 South First Street	Pinckneyville	Private
Pinckneyville Elementary School	301 West Mulberry Street	Pinckneyville	Grades PK-4; Pinckneyville SD 50; 292 Students
Pinckneyville Junior High School	700 East Water Street	Pinckneyville	Grades 5-8; Pinckneyville SD 50; 276 Students
Community Consolidated School	6067 State Route 154	Pinckneyville	Grades K-8; CCSD 204; 170 Students
Pinckneyville Community High School	600 East Water Street	Pinckneyville	Grades PK, 9-12; PICKNEYVILLE CHSD 101; 442 Students
Tamaroa Elementary School	200 West Main Street	Tamaroa	Grades PK-8; Tamaroa SD 5; 107 Students

Medical Care Facilities

Facility Name	Address	City	Comments
Marshall Browning Hospital	900 North Washington Street	Du Quoin	20 beds
Pinckneyville Community Hospital	5383 State Route 154	Pinckneyville	17 beds

Appendix F. Critical Facilities Map

See Attached Large Format Map of Critical Facilities.