Hazard Mitigation Plan

Pulaski County, Illinois

Adoption Date: -- _____ --

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Section 1 - Public Planning Process

1.1 Narrative Description

Hazard Mitigation is defined as any sustained action to reduce or eliminate long-term risk to human life and property from hazards. The Federal Emergency Management Agency (FEMA) has made reducing hazards one of its primary goals; hazard mitigation planning and the subsequent implementation of resulting 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 a requirement 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 has created HAZUS-MH (**Haz**ards **US**A **M**ulti-**H**azard) a powerful geographic information system (GIS)-based disaster risk assessment tool. This tool enables communities of all sizes to predict the estimated losses from floods, hurricanes, earthquakes, and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses. The Illinois Emergency Service Disaster Agency (IEMA) has determined that HAZUS-MH should play a critical role in the risk assessments in Illinois. Southern Illinois University at Carbondale (SIUC) and The Polis Center at Indiana University Purdue University Indianapolis (IUPUI) are assisting Pulaski County planning staff with performing the hazard risk assessment.

1.2 Planning Team Information

The Pulaski County Multi-Hazard Mitigation Planning team is made up of representatives from each of the incorporated areas within the county as well as local business leaders, community leaders, and fire and police departments. The committee decided to hold six meetings to develop the plan. The meetings are as follows:

> **Meeting 1**: Initial Meeting held on October 28, 2008 at the Southern Five Planning Commission Office in Ullin to discuss the development of the plan and to identify key infrastructure and facilities within the county.
>
> **Meeting 2**: Hazard Identification meeting was held on December 11, 2008 at the Southern Five Planning Commission Office in Ullin to prioritize and profile hazards for modeling.
>
> **Meeting 3**: PUBLIC meeting was held on July 7, 2009 at the Shawnee Community College for a presentation of historical disasters and hazard modeling results. A draft risk assessment was presented and mitigation actions were presented and prioritized.

Meeting 4: The planning team met on September 21, 2009 at the Southern Five Planning Commission Office in Ullin to develop the mitigation strategies for each of the hazards that they had previously determined. These strategies were then ranked by importance. These strategies will be the top priority for the plan.

M**eeting 5**: The planning team met on January 26, 2010 at the Southern Five Planning Commission Office in Ullin and did a final review of the plan prior to its submission to IEMA. The group made revisions to the plan and provided feedback for the plan to be submitted.

The Pulaski County Multi-Hazard Mitigation Planning Team is headed by Ken Kerley, whom is the primary point of contact. Members of the planning team including jurisdictions within the county and state representatives. Table 1-1 below identifies the planning team individuals and the organizations they represent.

Table 1-1: Multi-Hazard Mitigation Planning Team Members

Name	Title	Organization	Jurisdiction
Randy Kern	Sheriff	County of Pulaski	Pulaski County
Rex Wilburn	County Commissioner	County of Pulaski	Pulaski County and Village of Pulaski
Monte Russell	County Commissioner	County of Pulaski	Pulaski County
Ken Kerley	Director	ESDA	Pulaski County, Mounds City
Anthony Dover	Assistant Director	ESDA	Pulaski County
Matt Barnhill	Lt. ESDA	F.D./ESDA	Grand Chain
Janice Wright	Mayor	Village of Karnak	Karnak
Terry Riddle	Assistant Fire Chief	Mound City F.D.	Mound City
Tom Haynes	Director	Pulaski EMS	Pulaski County, Mounds
Bruce Newbolds	Telecommunicator	Pulaski County 911	Mounds
Curtis Marshall	Mayor	Village of Olmested	Olmsted
Tony Jackson		Village of Ullin	Ullin
Tina Bracken		Village of Ullin	Ullin

The Disaster Mitigation Act (DMA) planning regulations and guidance stress that planning team members must be active participants. The Pulaski County MHMP committee members were actively involved on the following components:

- Attending the MHMP meetings
- Providing available Geographic Information System (GIS) 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

An MHMP kickoff meeting was held at the Shawnee Community College in Ullin, IL on April 14, 2008. Representatives of Pulaski County attended the meeting. Lisa Thurston Director of Southern Five Regional Planning Commission explained the rationale behind the MHMP program and answered questions from the participants. Nicholas Pinter from SIU, provided an introduction to hazards, and John Buechler, from The Polis Center, provided an overview of HAZUS-MH. Nicholas described the timeline and the process of the mitigation planning project and presented Pulaski County with a Memorandum of Understanding (MOU) for sharing data and information.

The Pulaski County Multi-Hazard Mitigation Planning Team met on October 28, 2008, December 11, 2008, July 7, 2009, September 21, 2009, and January 26, 2010. Meetings one, two, four, and five were held at the Southern Five Regional Planning Commission Office in Ullin. Meeting three was held at Shawnee Community College. Each meeting was approximately two hours in length. The meeting minutes and attendance sheets are included in Appendix A. 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, and assisted with preparation of the public participation information.

1.3 Public Involvement in Planning Process

The planning process commenced on January 29, 2008 when Southern Illinois University-Carbondale held a news conference to advise the general public that FEMA had approved funding of proposed planning activities for natural disaster preparedness. It was explained that the university would collaborate with members of The Polis Center as well as the five regional planning commissions. The news conference was attended by representatives of the local papers, radio, and television.

Pulaski County conducted presentations for the public to give an overview of the planning process, inform them of the benefits of completing the plan, and discuss natural hazards affecting the county. The public meeting was held on July 7, 2009. Appendix A contains the minutes from the public meeting. Appendix B contains articles published by the local newspaper throughout the public input process.

1.4 Neighboring Community Involvement

The Pulaski County planning team invited participation from various representatives of neighboring counties and local, city, and town governments. The initial planning meeting at SIUC on March 19, 2008 included representatives from the adjacent Southern Five Regional Planning Commission counties of Johnson, Alexander, Massac, Union, and Pulaski. In the meeting, the county board chairmen and their EMA/ESDA directors discussed creating county planning teams, scheduling meetings throughout the planning process, and ways to ensure public involvement in the plan. The county board chairmen also agreed to allow university research staff to have access to county GIS data from the supervisor of the assessment.

Pulaski County is located along the Ohio River within southern tip of Illinois and bounded by Union County to the North, Johnson County to the Northeast, the Ohio River to the South, Massac County to the East and Alexander County to the West. Pulaski County has working relationships and cooperation with these counties through regional partnerships. Details of how neighboring stakeholders were involved are summarized in Table 1-2.

Table 1-2: Neighboring Community Participation

Person Participating	Neighboring Jurisdiction	Organization	Participation Description
Martha Nicholson	Alexander County	Alexander County Emergency Service and Disaster Agency and 911	Mailed draft copy and asked for suggestions
Jim Haney	Johnson County	Johnson County ESDA	Mailed draft copy and asked for suggestions
Keith Davis	Massac County	Massac County 911	Mailed draft copy and asked for suggestions
Dana Pearson	Union County	Union County ESDA	Mailed draft copy and asked for suggestions

1.5 Review of Technical and Fiscal Resources

The MHMP planning team has identified representatives from key agencies to assist in the planning process. Technical data, reports, and studies were obtained from these agencies. The organizations and their contributions are summarized in Table 1-3.

Table 1-3: Key Agency Resources Provided

Agency Name	Resources Provided
Illinois Environmental Protection Agency	Illinois 2008 Section 303(d) Listed Waters and watershed maps
U.S. Census	County Profile Information such as Population and Physical Characteristics
Department of Commerce and Economic Opportunity	Community Profiles
Illinois Department of Employment Security	Industrial Employment by Sector
NOAA National Climatic Data Center	Climate Data
Illinois Emergency Management Agency	2007 Illinois Natural Hazard Mitigation Plan
Illinois Water Survey (State Climatologist Office)	Climate Data
United States Geological Survey	Physiographic/Hill Shade Map, Earthquake Information, Hydrology
Illinois State Geological Survey	Geologic, Karst Train, Physiographic Division and Coal Mining Maps

1.6 Review of Existing Plans

Pulaski County and its associated local communities utilize a variety of planning documents to direct community development. These documents include land use plans, master plans, emergency response plans, municipal ordinances, and building codes. The MHMP planning process incorporated the existing natural hazard mitigation elements from these previous planning efforts. Table 1-4 lists the plans, studies, reports, and ordinances used in the development of the plan.

Table 1-4: Planning Documents Used for MHMP Planning Process

Author(s)	Year	Title	Description	Where Used
Illinois Emergency Management Agency	2007	Illinois Natural Hazard Mitigation Plan	The Illinois Natural Hazard Mitigation Plan (INHMP) establishes a process for identifying and mitigating the effects of natural hazards in the State of Illinois as required under the Disaster Mitigation Act of 2000.	Mitigation Actions/Projects
Southern Five RPC	2007 – 2010	Comprehensive Economic Development Strategy (CEDS)	Lists economic and community projects for local governments. Includes mitigation to prevent developing in floodplain and building safer structures to withstand a potential earthquake.	Background and Mitigation Actions/ Projects

Section 2 - Jurisdiction Participation Information

The jurisdictions included in this multi-jurisdictional plan are listed in Table 2-1.

Table 2-1: Participating Jurisdictions

Jurisdiction Name
Pulaski County
Village of Grand Chain
Village of Karnak
City of Mound City
City of Mounds
Village of Olmsted
Village of Pulaski
Village of Ullin

2.1 Adoption by Local Governing Body

The draft plan was made available to the planning team and other agencies on *<data made available>*, for review and comments. The Pulaski County Hazard Mitigation Planning team presented and recommended the plan to *<the officials responsible for adopting>*, who adopted the Pulaski County Hazard Mitigation Plan on *<date adopted>*. Resolution adoptions are included in Appendix C of this plan.

2.2 Jurisdiction Participation

It is required that each jurisdiction participates in the planning process. Each of the incorporated communities within Pulaski County was invited to participate on the planning team. Table 2-2 lists each jurisdiction and describes its participation in the construction of this plan.

Table 2-2: Jurisdiction Participation

Jurisdiction Name	Participating Member	Participation Description
Village of Grand Chain	Matt Barnhill	Member, MHMP planning committee
Village of Karnak	Janice Wright	Member, MHMP planning committee
City of Mound City	Terry Riddle, Ken Kerley	Member, MHMP planning committee
City of Mounds	Tom Haynes, Bruce Newbolds	Member, MHMP planning committee
Village of Olmsted	Curtis Marshall	Member, MHMP planning committee
Village of Pulaski	Rex Wilburn	Member, MHMP planning committee
Village of Ullin	Tony Jackson	Member, MHMP planning committee
County of Pulaski	Randy Kerns, Ken Kerley Monte Russell, Anthony Dover, Rex Wilburn	Member, MHMP planning committee

All members of the MHMP planning committee were actively involved in attending the MHMP meetings, providing available Geographic Information System (GIS) data and historical hazard information, reviewing and providing comments on the draft plans, coordinating and participating in the public input process, and coordinating the county's formal adoption of the plan. Each meeting culminated with an open forum to invite questions and input from the council members. Appendix A provides further description of the meetings, including dates.

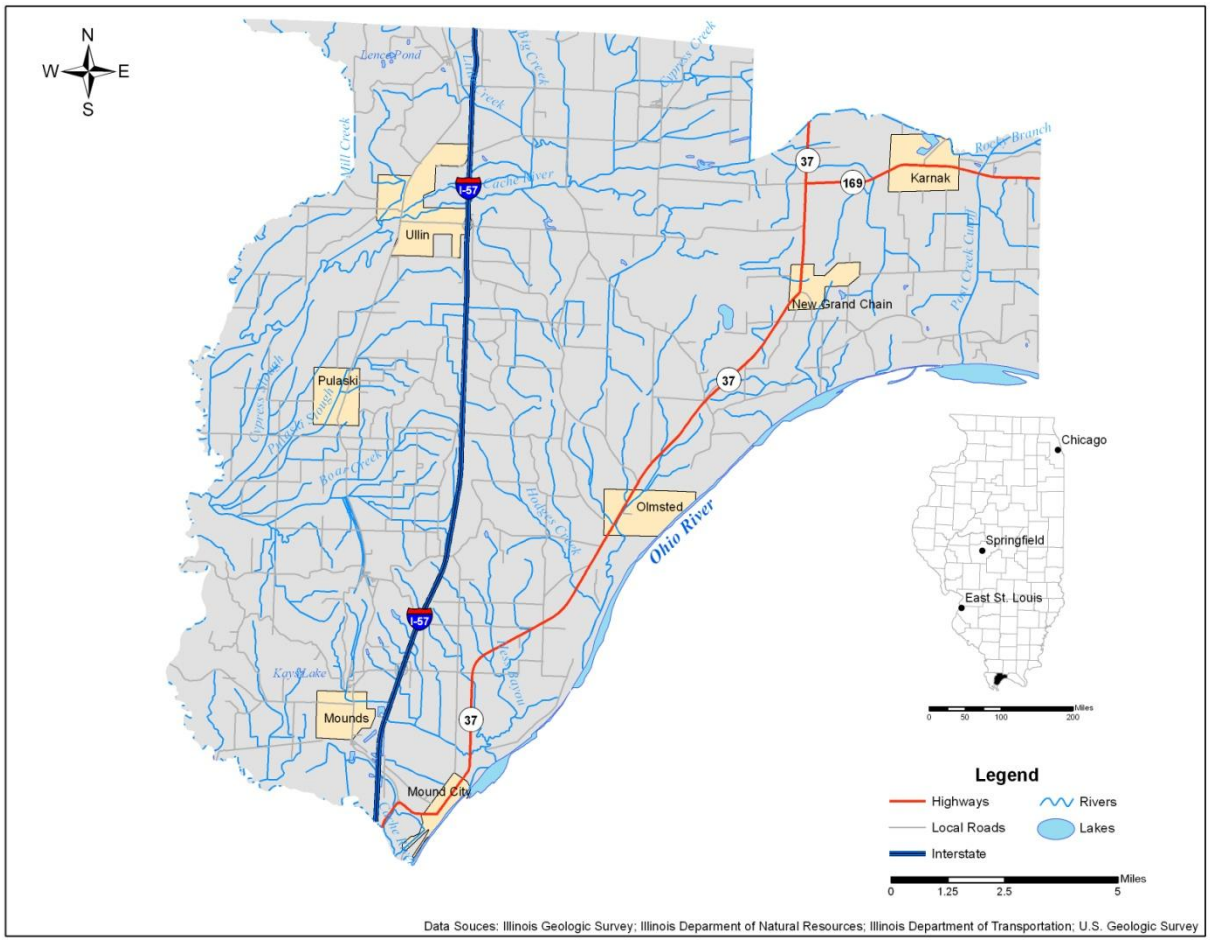
Section 3 - Jurisdiction Information

Pulaski County was formed out of Union County in 1843 when the state of Illinois was formed. Pulaski County was named in honor of Count Casimir Pulaski, a Polish nobleman, born in Warsaw, Poland in 1745. He took a conspicuous part in the war for the liberation of Poland. When further resistance became hopeless, he went to Turkey and then on to France, where he offered his services to Benjamin Franklin, our then representative at the court of Louis XVI. Count Pulaski arrived in Philadelphia in the summer of 1777 and entered the service of the United States as a volunteer. He was soon made a Brigadier General by Congress and appointed to a command of cavalry, serving under General George Washington.

The first County seat was Caledonia, which was located on the banks of the Ohio River near Olmsted. The County Seat was moved in 1861 to Mound City after the Illinois State Legislature passed an act authorizing the change in venue. Soon after the removal of the County seat from Caledonia to Mound City the town of Caledonia was deserted.

Pulaski County is located along the Ohio River within southern tip of Illinois and bounded by Union County to the North, Johnson County to the Northeast, the Ohio River to the South, Massac County to the East and Alexander Count to the West. It relates to major urban areas as follows: 125 miles southeast of St. Louis, Missouri; 185 miles south of Springfield, Illinois; 330 miles south-southwest of Chicago, Illinois. Figure 3-1 shows the location of Pulaski County.

Figure 3-1: Map of Pulaski County



The major sources of economic activity in Pulaski County include manufactures such as Oil-Dri Mound Production Company which makes geo-textiles for the construction industry and public administration. The towns and villages in Pulaski County also offer amenities, such as restaurants, entertainment, and shopping on a rural community scale.

Sources: Illinois State Archives Depository, Pulaski County Fact Sheet, 4/17/09, http://www.ilsos.net/departments/archives/irad/Pulaski.html

State of Illinois, Origin and Evolution of Illinois Counties, 1982.

Pulaski County History, 5/27/2009, http://www.pulaskicountyil.net/county-history.php

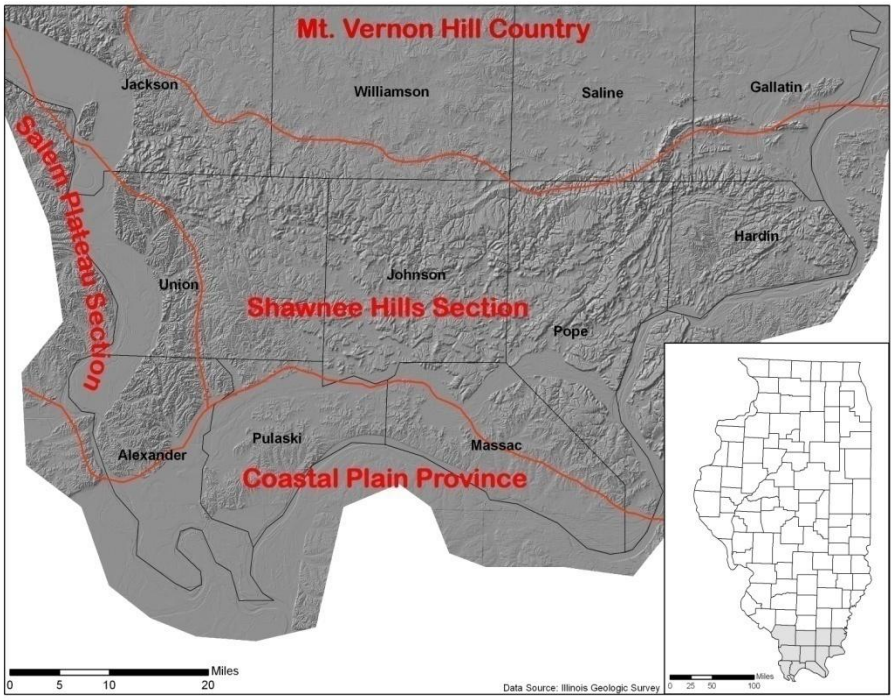
3.1 Physical Setting (Topography)

Pulaski County is located within two physiographic proveniences the Interior Low Plateaus Province (Shawnee Hills) which is found within the northern fifth of the County and the Coastal Plain Province which encompasses the southern four-fifths of the County. The Low Plateaus Province or Shawnee Hills are underlain by sandstone and limestone bedrock. In areas of sandstone bedrock the topography is characterized by bluffs, steep-sided ridges, and hills with narrow to broad valleys. In areas of limestone bedrock the terrain tends to be similar in character but the slopes tend to be less-step with broader valleys. Because of the limestone bedrock sinkhole and caves are commonly found in these areas.

The Coastal Plain Province is underlain by unconsolidated sediments (Cretaceous, Tertiary and Quaternary in age). The Coastal Plain Province can be dived into to sub-sections, the Cretaceous Hills and Mississippi/Ohio River Bottom Lands. The bottom lands are characterized broad by river valleys with alluvial terrace and recent fluvial landforms related to movement of the Ohio, Mississippi and Cache rivers. The Cretaceous hills are gently rolling hills located between the Cache and Ohio River Floodplains.

The highest elevation (~560 feet above sea level) in Pulaski County is found along Wetaug Road located in the northwestern portion of the County. The lowest elevation(s) (~280 feet above sea level) are found in the southwestern corner of the county along Ohio River. Figure 3-2 depicts the physiographic division within Pulaski County and it characteristics.

Figure 3-2: Physiographic Divisions of Pulaski County



Sources: Illinois Geologic Survey, 1998, The Physiographic divisions of Illinois, including Provinces, Sections, and Divisions. http://www.isgs.illinois.edu/nsdihome/webdocs/st-geolq.html.

Leighton, M.M., Ekblaw, G.E., Horberg, L., 1948, Physiographic Divisions of Illinois. Journal of Geology. v. 56, n. 1, p. 16-33.

3.2 Climate

Pulaski County climate is typical 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 69.2° F and average high is 87.5° 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 late September and early May. The average low and high temperatures in winter are 30.0° F and 45.5° F, respectively. Average annual precipitation is 44.6 inches (IL State Climatologist Data from 1901 to 2008 at Cairo, IL). 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.

3.3 Demographics

According to U.S. Census, the population of Pulaski County in 2008 was estimated to be 6,362. The population of Pulaski County has decreased by 13.4% (from 7,348 to 6,362) between 2000 and 2008. The largest town in Pulaski County is the City of Mounds with a population of 1,117. The breakdown of population by incorporated areas is included in Table 3-1.

Table 3-1: Population by Community

Community	2000 Population	% of County
Village of New Grand Chain	233	3.2
Village of Karnak	619	8.4
City of Mound City	692	9.4
City of Mounds	1,117	15.2
Village of Olmsted	299	4.1
Village of Pulaski	274	3.7
Village of Ullin	779	10.6
Rural Population	3,335	45.4

Source: American FactFinder, 2009 and Illinois MapStats, 2009

3.4 Economy

Illinois MapStats and Illinois Department of Employment Security report for 2008 state that 55.1% of the workforce in Pulaski County was employed in the private sector. The breakdown is included in Table 3-2. Public administration was the largest sector, employing 44.9% of the workforce and the majority of the workforce earnings 38.2%. The US Census 2006 annual per capita income (inflation adjusted) in Pulaski County is $ 22,367 compared to an Illinois average of $ 38,409.

Table 3-2: Industrial Employment by Sector

Industrial Sector	% of County Workforce (2008)
Agriculture, Forestry, Fishing, Hunting, and Mining	0.4%
Construction	1.5%
Manufacturing	9.6%
Wholesale Trade	6.8%

Retail Trade	4.9%
Transportation, Warehousing and Utilities	9.2%
Information	0.0%
Finance, Insurance, Real Estate, and Rental/Leasing	2.1%
Professional and Business Services	10.8%
Educational, Health, and Social Services	7.4%
Arts, Entertainment, Recreation, Accommodation and Food Services	2.4%
Other Services (except Public Administration)	0.0%
Public Administration	44.9%

Source: Illinois Department of Employment Security 2008 and Illinois MapStats, 2009

3.5 Industry

Pulaski County's major employers and number of employees are listed in Table 3-3. The largest employers in Pulaski County are Oil-Dri Mound Production Company, Shawnee Community College, Southern Seven Health Department, and Shawnee Development Council. Public administration, professional services, manufacturing, and transportation and warehousing are the largest employment sectors in the county.

Table 3-3: Major Employers

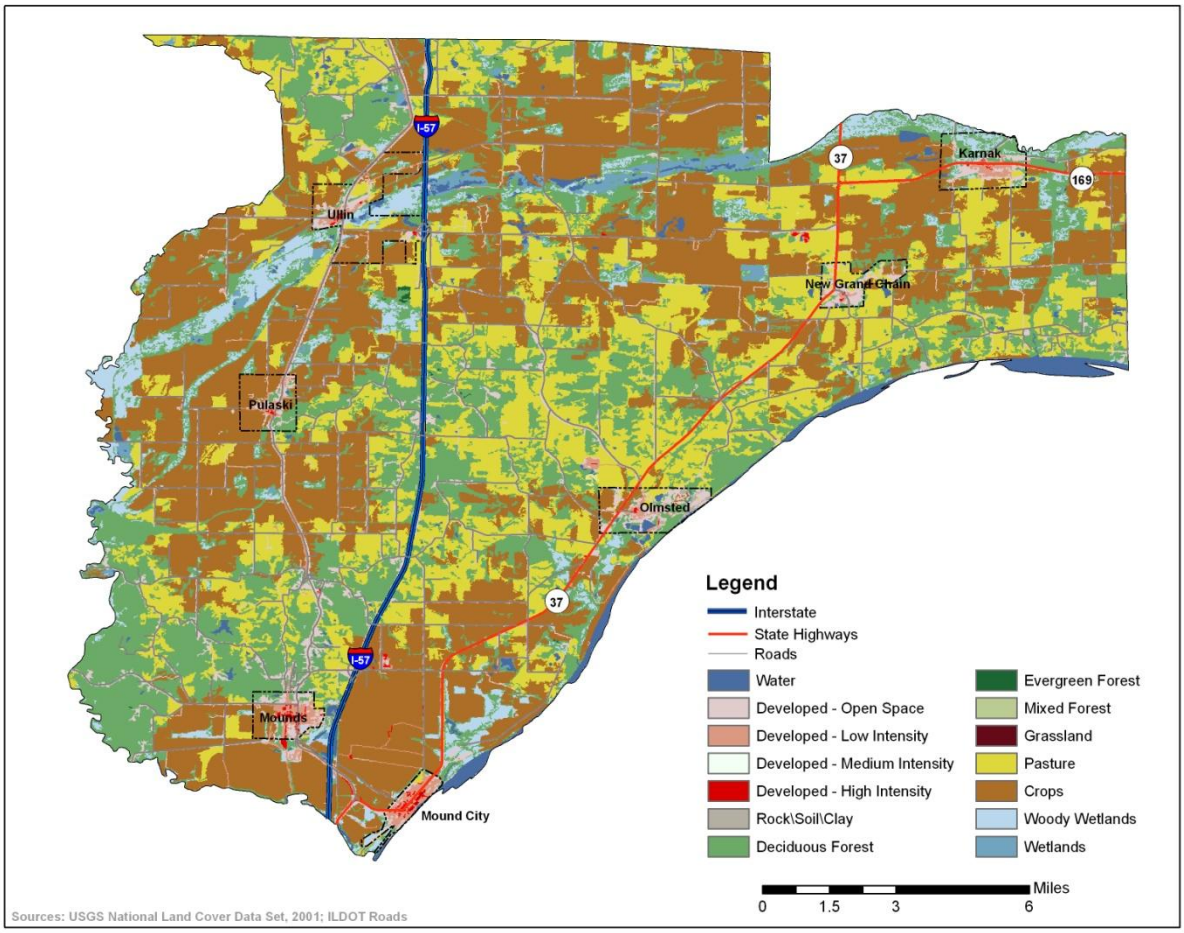
Manufacturing				
Company Name	**Location**	**Established**	**Employees**	**Type of Business**
Oil-Dri Mound Production Company	Mounds		50-99	Manufacturing of geo-textiles
Educational, Health, and Social Services				
Shawnee Community College	Ullin	1967	100 – 249	Education
Southern Seven Health Department	Ullin		100 – 249	Public Health
Meridian School District	Mounds		100 - 249	Primary and Secondary Education
Century School Distinct	Ullin		50-99	Primary and Secondary Education
Public Administration				
Shawnee Development Council	Karnak		100 - 249	Government Services

Source: Department of Commerce and Economic Opportunity, Community Profiles 2007; and Direct Contact

3.6 Land Uses and Development Trends

Pre-European settlement, Pulaski County was a land of dense upland and floodplain forests. Since settlement, agriculture, logging, and urbanization have dramatically altered the county's land cover. Today, the land use is primarily for agriculture. However, some of the uplands and the riparian buffers along many rivers and streams in Pulaski County remain forested because the soils found in these areas are not well suited to agriculture (Figure 3-3). Currently in Pulaski County, there are no substantial developments taking place and no substantial growth is expected within the next five years.

Figure 3-3: Land Cover of Pulaski County



3.7 Major Lakes, Rivers, and Watersheds

Pulaski County is located on the divide between two major surface-water basins. Streams along the north and western portion of the county are located within the Cache River Basin. The upper portion of the Cache River is drained into the Ohio through a man made diversion channel known as the Post Creek Cutoff. The majority of the lower portion of the Cache River is drained into the Mississippi River via diversion channel through Alexander County. Water which collects in the old Cache River Chanel south of Mounds is pumped over the Ohio River Levee at Mound City. Streams located in the south and eastern portion of the county drain directly into the Ohio River. Other larger streams in the County include the Big Creek, Cypress Creek, Mill Creek, and Pulaski Slough. There are also four significant water bodies in Pulaski County, Davis Lake, Kays Lake, Lence Pond, and Ulrich Lake (Figure 3-1).

Section 4 - Risk Assessment

The goal of mitigation is to reduce the future impacts of a hazard including loss of life, property damage, disruption to local and regional economies, and the expenditure of public and private funds for recovery. Sound mitigation must be based on sound risk assessment. 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 of the community could be affected by a disaster, and the impact on community assets. A risk assessment consists of three components: hazard identification, vulnerability analysis, and risk analysis.

4.1 Hazard Identification/Profile

4.1.1 Existing Plans

The previous Pulaski County Comprehensive Emergency Management Plan (CEMP) did not contain a risk analysis. Additional local planning documents were reviewed to identify historical hazards and help identify risk. To facilitate the planning process, digital flood insurance rate maps (DFRIM) were used for the flood analysis.

4.1.2 Planning Team

During Meeting #2, which occurred on December 11, 2008, the planning team developed and ranked a list of hazards that affect the county. The team identified 1) flooding which occurs on an annual basis during the spring, 2) severe thunderstorms with tornadoes, 3) earthquakes, and 4) winter storms. The plan also identified Pulaski County's principal technological hazards (in order of likelihood): 1) dam or levee failure and 2) land transportation accidents with hazardous material release.

4.1.3 National Hazard Records

In addition to these identified hazards, the MHMP planning committee reviewed the list of natural hazards prepared by FEMA. To assist the planning team, historical storm event data was compiled from the National Climatic Data Center (NCDC; http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll). This NCDC data included 241 reported events in Pulaski County between April 3, 1957 and April 2, 2008. A summary table of events related to each hazard type is included in the hazard profile sections that follow. List of the events, including additional sources that identify specific occurrences, are included as Appendix D. In addition to NCDC data, Storm Prediction Center (SPC) data associated with tornadoes, strong winds, and hail were plotted using SPC recorded latitude and longitude. These events are plotted and included as Appendix E. The list of NCDC hazards is included in Table 4-1.

Table 4-1: Climatic Data Center Historical Hazards

Hazard
Tornadoes
Severe Thunderstorms
Drought/Extreme Heat
Winter Storms
Flood/Flash flood

4.1.4 Hazard Ranking Methodology

Based on planning team input, national datasets, and existing plans, Table 4-2 lists the hazards Pulaski County will address in this multi-hazard mitigation plan. In addition, these hazards ranked the highest based on the Risk Priority Index discussed in section 4.1.5.

Table 4-2: Planning Team Hazard List

Hazard
Flooding
Tornado
Earthquakes
Dam or Levee Failure
Thunderstorms/ High Winds/Hail/ Lightning
Winter Storms
Transportation Hazardous Material Release

4.1.5 Calculating the Risk Priority Index

The first step in determining the Risk Priority Index (RPI) was to have the planning team members generate a list of hazards which have befallen or could potentially befall their community. Next, the planning team members were asked to assign a likelihood rating based on the criteria and methods described in the following table. Table 4-3 displays the probability of the future occurrence ranking. This ranking was based upon previous history and the definition of hazard. Using the definitions given, the likelihood of future events is "Quantified" which results in the classification within one of the four "Ranges" of likelihood.

Table 4-3: Future Occurrence Ranking

Probability	Characteristics
4 - *Highly Likely*	Event is probable within the calendar year. Event has up to 1 in 1 year chance of occurring. (1/1=100%) History of events is greater than 33% likely per year.
3 - *Likely*	Event is probable within the next three years. Event has up to 1 in 3 years chance of occurring. (1/3=33%) History of events is greater than 20% but less than or equal to 33% likely per year.
2 - *Possible*	Event is probable within the next five years. Event has up to 1 in 5 years chance of occurring. (1/5=20%) History of events is greater than 10% but less than or equal to 20% likely per year.
1 - *Unlikely*	Event is possible within the next ten years. Event has up to 1 in 10 years chance of occurring. (1/10=10%) History of events is less than or equal to 10% likely per year.

Next, planning team members were asked to consider the potential magnitude/severity of the hazard according to the severity associated with past events of the hazard. Table 4-4 gives four classifications of magnitude/severity.

Table 4-4: Hazard Magnitude

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.

Finally, the RPI was calculated by multiplying the probability by the magnitude/severity of the hazard. Using these values, the planning team member where then asked to rank the hazards. Table 4-5 identifies the RPI and ranking for each hazard facing Pulaski County.

Table 4-5: Pulaski County Hazards (RPI)

Hazard	Probability	Magnitude/Severity	Risk Priority Index	Rank
Flooding	4 - Highly Likely	8 - Catastrophic	32	1
Tornado	3 - Likely	8 - Catastrophic	24	2
Earthquakes	2 - Possible	8 - Catastrophic	16	3
Dam or Levee Failure	2 - Likely	8 - Critical	16	4
Thunderstorms/ High Winds/Hail/ Lightning	4 - Highly Likely	2 - Limited	8	5
Winter Storms	3 - Likely	2 - Limited	6	6
Transportation Hazardous Material Release	2 - Possible	2 - Limited	8	7

4.1.6 Jurisdictional Hazard Ranking

Because the jurisdictions in Pulaski County differ in their susceptibilities to certain hazards—for example, the village of Ullin located on the Cache River Floodplain is more likely to experience significant flooding than New Grand Chain which is located on the uplands outside of any large stream's or river's floodplain which could potentially cause significant flooding—the hazards identified by the planning team were ranked by SIUC for each individual jurisdiction using the methodology outlined in Section 4.1.5. The SIUC rankings were based on input from the planning team members, available historical data, and the hazard modeling results described within this hazard mitigation plan. During the five-year review of the plan this table will be updated by the planning team 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).

Table 4-6: Hazard Rankings by Jurisdiction

Jurisdiction	Hazard						
	Tornado	HAZMAT	Earthquake	Thunderstorms	Flooding	Winter Storms	Levee Failure
Village of New Grand Chain	1	6	2	3	5	4	NA
Village of Karnak	2	6	3	4	1	5	NA
City of Mound City	3	7	4	5	1	6	2
City of Mounds	3	7	4	5	2	6	1
Village of Olmsted	2	6	3	4	1	5	NA
Village of Pulaski	2	6	3	4	1	5	NA
Village of Ullin	2	6	3	4	1	5	NA

NA = Not applicable

4.1.7 GIS and HAZUS-MH

The third step in this assessment is the risk analysis, which quantifies the risk to the population, infrastructure, and economy of the community. Where possible, the hazards were quantified using GIS analyses and HAZUS-MH. This process reflects a level two approach to analyzing hazards as defined for HAZUS-MH. The approach includes substitution of selected default data with local data. Level two analysis significantly improves the accuracy of the model predictions.

HAZUS-MH generates a combination of site-specific and aggregated loss estimates depending upon the analysis options that are selected and upon the input that is provided by the user. Aggregate inventory loss estimates, which include building stock analysis, are based upon the assumption that building stock is evenly distributed across census blocks/tracts. Therefore, it is possible that overestimates of damage will occur in some areas while underestimates will occur in other areas. With this in mind, total losses tend to be more reliable over larger geographic areas than for individual census blocks/tracts. It is important to note that HAZUS-MH is not intended to be a substitute for detailed engineering studies. Rather, it is intended to serve as a planning aid for communities interested in assessing their risk to flood-, earthquake-, and hurricane-related hazards. This documentation does not provide full details on the processes and procedures completed in the development of this project. It is only intended to highlight the major steps that were followed during the project.

Site-specific analysis is based upon loss estimations for individual structures. For flooding, analysis of site-specific structures takes into account the depth of water in relation to the structure. HAZUS-MH also takes into account the actual dollar exposure to the structure for the costs of building reconstruction, content, and inventory. However, damages are based upon the assumption that each structure falls into a structural class, and that structures in each class will respond in similar fashion to a specific depth of flooding. Site-specific analysis is also based upon a point location rather than a polygon; therefore the model does not account for the percentage of a building that is inundated. These assumptions suggest that the loss estimates for site-specific structures as well as for aggregate structural losses need to be viewed as approximations of losses that are subject to considerable variability rather than as exact engineering estimates of losses to individual structures.

The following events were analyzed. The parameters for these scenarios were created using GIS, HAZUS-MH, and historical information to predict which communities would be at risk.

Using HAZUS-MH

1. 100-year overbank flooding
2. Earthquake

Using GIS

1. Tornado
2. Hazardous Material Release

4.2 Vulnerability Assessment

4.2.1 Asset Inventory

4.2.1.1 Processes and Sources for Identifying Assets

The HAZUS-MH data is based on best available national data sources. The initial step involved updating the default HAZUS-MH data using State of Illinois data sources. At Meeting #1, the planning team members were provided with a plot and report of all HAZUS-MH critical facilities. The planning team took GIS data provided by SIU-Polis, verified the datasets using local knowledge, and allowed SIU-Polis to use their local GIS data for additional verification. SIU-Polis GIS analysts made these updates and corrections to the HAZUS-MH data tables prior to performing the risk assessment. These changes to the HAZUS-MH inventory allow a level two analysis. This update process improved the accuracy of the model predictions.

The default HAZUS-MH data has been updated as follows:

- The HAZUS-MH defaults, critical facilities, and essential facilities have been updated based on most recent available data sources. Critical and essential point facilities have been reviewed, revised, and approved by local subject matter experts at each county.
- The essential facility updates (schools, medical care facilities, fire stations, police stations, and EOCs) have been applied to the HAZUS-MH model data. HAZUS-MH reports of essential facility losses reflect updated data.
- Parcels with assessment improvements (buildings) values were used to estimate the number of buildings in the flood-prone areas.
- The analysis is restricted to the county boundaries. Events that occur near the county boundary do not contain damage assessments from the adjacent county.

4.2.1.2 Essential Facilities List

Table 4-7 identifies the essential facilities that were added or updated for the analysis. A complete list of the critical facilities is included as Appendix C. A map of all the critical facilities is included as Appendix D.

Table 4-7: Essential Facilities List

Facility	Number of Facilities
Care Facilities	0
Emergency Centers	2
Fire Stations	7
Police Stations	6
Schools	12

4.2.1.3 Facility Replacement Costs

Default HAZUS-MH building stock data were used for the HAZUS-MH analyses. Facility replacement costs and total building exposure are identified in Table 4-8. Table 4-8 also includes the estimated numbers of buildings within each occupancy class.

Table 4-8: Building Exposure (default HAZUS-MH) for Pulaski County

General Occupancy	Estimated Total Buildings	Total Building Exposure (X 1000)
Agricultural	44	$7,637
Commercial	138	$45,254
Education	12	$25,506
Government	19	$7,460
Industrial	38	$12,829
Religious/Non-Profit	26	$15,828
Residential	4,283	$299,026
Total	**4,560**	**$413,540**

Pulaski County provided parcel boundaries with assessed values. The parcel data was used to estimate the actual number of buildings within the flood-prone areas. The parcel data identified parcels with building improvements, which were then converted into centroid point locations. The parcels with improvements are summarized by occupancy class in Table 4-9.

Table 4-9: Parcels with Improvements by Occupancy Class for Pulaski County

Occupancy Class	Count
Residential	2,075
Commercial	263
Industrial	101
Agriculture	609
Total	**3,048**

4.3 Future Development

Pulaski County is subject to a variety of natural disasters. County government, in partnership with State government, must make a commitment to prepare for those types of disasters. Likewise, the Pulaski County manufacturing base leaves the county vulnerable to major hazardous materials events and other technological threats. However, as the county-elected and appointed officials become better informed on the subject of community hazards, they will be better able to set and direct policies that will enable emergency management and county response agencies to effectively plan, train, and exercise. The end result will be a stronger community and a better place in which to work, live, and grow.

4.4 Hazard Profiles

4.4.1 Tornado Hazard

Hazard Definition for Tornado Hazard

Tornadoes pose a great risk to the State of Illinois and its citizens. Tornadoes historically have occurred during any month of the year. The unpredictability of tornadoes makes them one of Illinois' most dangerous hazards. Their extreme winds are violently destructive when they touch down in the region's developed and populated areas. Current estimates place the maximum velocity at about 300 mph, but higher and lower values can occur. A wind velocity of 200 mph will result in a wind pressure of 102.4 pounds per square foot of surface area, a load that exceeds the tolerance limits of most buildings. Considering these factors, it is easy to understand why tornadoes can be so devastating for the communities they hit.

Tornadoes are defined as 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 very quickly and become a tornado. If the funnel cloud picks up and blows around debris, it has reached the ground and is a tornado.

Tornadoes are classified according to the Enhanced Fujita tornado intensity scale. The tornado scale ranges from low intensity F0, with effective wind speeds of 40 to 70 mph, to F5 tornadoes with effective wind speeds of over 260 mph. The Fujita intensity scale is included in Table 4-10.

Table 4-10: Fujita Tornado Rating

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, sign boards 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 for Tornado Hazard

There have been several occurrences of tornadoes within Pulaski County during recent decades. The NCDC database reported 5 tornadoes/funnel clouds in Pulaski County since 1957. These

tornados have been attributed with one death, 15 injuries, and $3.9 million dollars in property damage within Pulaski and adjacent counties. The most recent significant tornado touchdown occurred on May 6, 2003. This violent tornado began near Grand Chain and reached its maximum intensity of 210 MPH as it neared the Massac County line. A 53-year-old man was killed when the chimney of his house collapsed on him. The man, who was in his basement, was protecting his son by lying on top of him when the collapse occurred. The son received broken bones. Their house was impaled by some nearby large trees that prevented it from being swept farther away. Along the Pulaski County portion of the tornado path, six single family homes and ten mobile homes were destroyed. Another ten single family homes and a mobile home had major damage. A few dozen other residences received some type of minor damage. A few dozen outbuildings, two businesses, and a campground were destroyed or had major damage. Approximately 13 persons were injured, but only a few of those required hospitalization. All roads in the damage area were impassable due to large numbers of trees and building debris on them. The area of most intense destruction was along Tick Ridge Road, a county road that follows the bluff along the Ohio River.

Pulaski County tornadoes recorded in the NCDC database are identified in Table 4-11. Additional details for NCDC events are included in Appendix D.

Table 4-11: Pulaski County Tornadoes*

Location	Date	Magnitude	Deaths	Injuries	Property Damage
Pulaski	4/3/1957	F2	0	0	250K
Pulaski	6/21/1967	F2	0	0	25K
Pulaski	4/21/1972	F2	0	2	25K
Grand Chain	5/6/2003	F4	1	13	3.5M
Pulaski	1/13/2005	F1	0	0	70K

Source: NCDC

* 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 for occurrence of tornadoes. They can occur at any location within the county.

Hazard Extent for Tornado Hazard

The historical tornadoes listed previously generally move from west to east across the county—although many other tracks are possible—from more southerly to northerly. The extent of the hazard varies both in terms of the extent of the path and the wind speed.

Calculated Risk Priority Index for Tornado Hazard

Based on historical information, the probability of future tornadoes in Pulaski County is likely. Tornadoes with varying magnitudes are expected to happen. According to the RPI, tornadoes ranked as the number two hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
3	x	8	=	**24**

Vulnerability Analysis for Tornado Hazard

Tornadoes can occur within any area of the county; therefore, the entire county population and all buildings are vulnerable to tornadoes. To accommodate this risk, this plan will consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Pulaski County are discussed in types and numbers in Table 4-9.

Critical Facilities

All critical facilities are vulnerable to tornadoes. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts will vary based on the magnitude of the tornado, but can include structural failure, debris (trees or limbs) causing damage, 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 numbers of all of the essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

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

Infrastructure

During a tornado the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a tornado. 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 fail or become impassable causing risk to traffic.

An example scenario is described as follows to illustrate the anticipated impacts of tornadoes in the county in terms of numbers and types of buildings and infrastructure.

Pulaski County Tornado Analysis

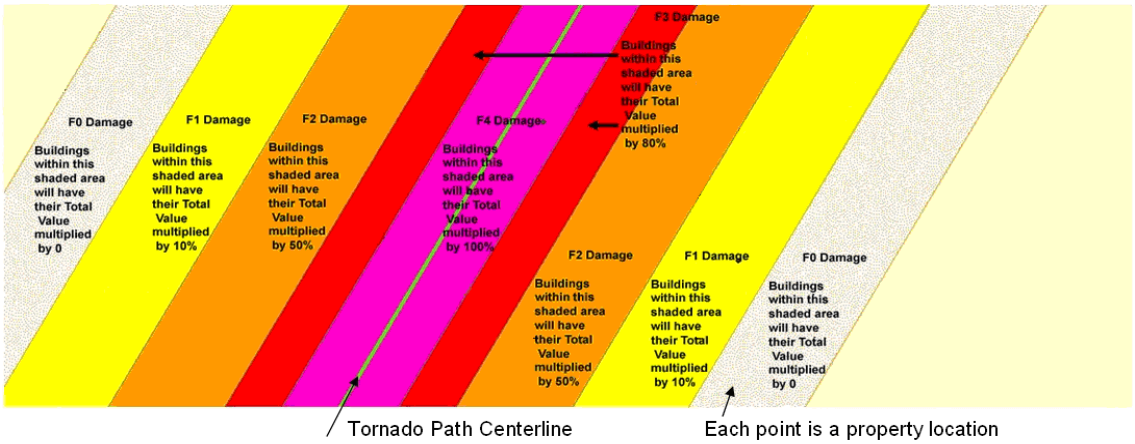
GIS overlay modeling was used to determine the potential impacts of an F4 tornado. The analysis used a hypothetical path based upon an EF4 tornado event that ran for 19 miles along the eastern part of the county. This hypothetical tornado had direct impacts in the communities of Mound City, Olmsted, New Grand Chain, and Karnak. The selected widths were modeled after a recreation of the Enhanced Fujita-Scale guidelines based on conceptual wind speeds, path widths, and path lengths. There is no guarantee that every tornado will fit exactly into one of these six categories. Table 4-12 depicts tornado damage curves as well as path widths.

Table 4-12: Tornado Path Widths and Damage Curves

Fujita Scale	Path Width (feet)	Maximum Expected Damage
F5	3,000	100%
F4	2,400	100%
F3	1,800	80%
F2	1,200	50%
F1	600	10%
F0	300	0%

Within any given tornado path there are degrees of damage. The most intense damage occurs within the center of the damage path with a decreasing amount of damage away from the center of the path. This natural process was modeled in GIS by adding damage zones around the tornado path. Figure 4-1 and Table 4-13 describe the zone analysis.

Figure 4-1: GIS Analysis Using Tornado Buffers



Once the hypothetical route is digitized on the map, several buffers are created to model the damage functions within each zone.

An F4 tornado has four damage zones. Total devastation is estimated within 150 feet of the tornado path (the darker-colored Zone 1). The outer buffer is 900 feet from the tornado path (the lightest colored Zone 4), within which 10% of the buildings will be damaged.

Table 4-13: Tornado Zones and Damage Curves

Fujita Scale	Zone	Buffer (feet)	Damage Curve
F4	4	600-900	10%
F4	3	300-600	50%
F4	2	150-300	80%
F4	1	0-150	100%

The selected hypothetical tornado path is depicted in Figure 4-2, and the damage curve buffers are shown in Figure 4-3.

Figure 4-2: Hypothetical EF4 Tornado Path in Pulaski County

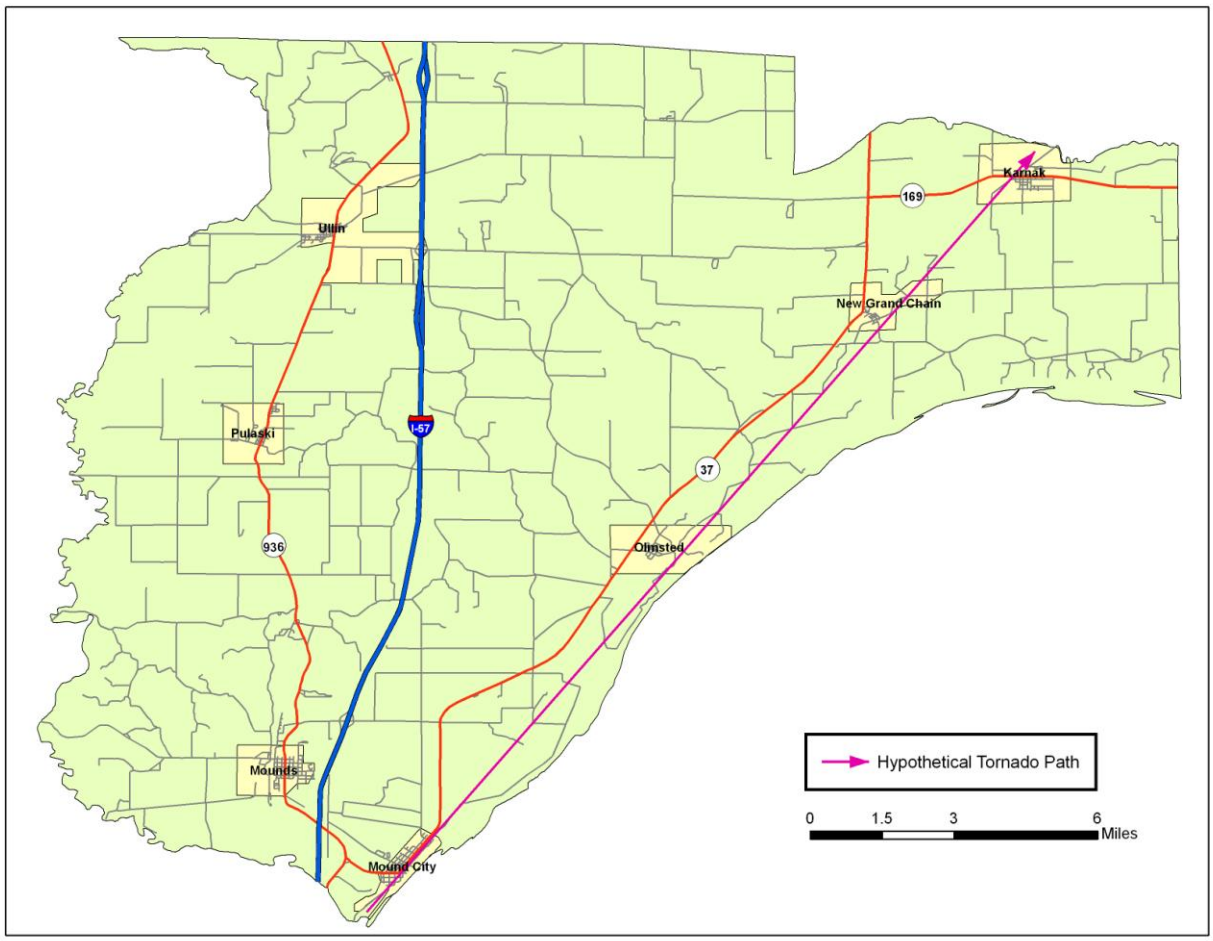
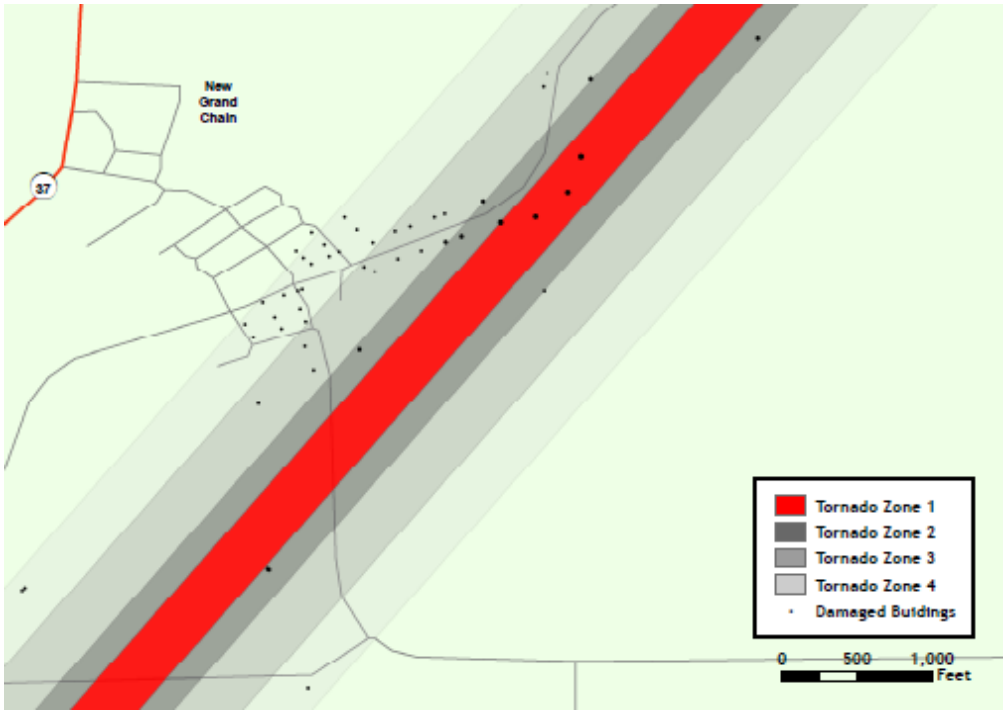


Figure 4-3: Modeled EF4 Tornado Damage Buffers in Pulaski County



The results of the analysis are depicted in Tables 4-14 and 4-15. The GIS analysis estimates that 422 buildings will be damaged. The estimated building losses were $18.8 million. The building losses are an estimate of building replacement costs multiplied by the percentages of damage. The overlay was performed against parcels provided by Pulaski County that were joined with Assessor records showing property improvement.

Table 4-14: Estimated Numbers of Buildings Damaged by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	49	37	91	105
Commercial	36	3	21	12
Industrial	34	5	14	4
Agriculture	1	4	3	3
Total	**120**	**49**	**129**	**124**

Table 4-15: Estimated Building Losses by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$1,207,791	$841,740	$1,868,472	$2,610,792
Commercial	$460,104	$81,354	$563,391	$297,183
Industrial	$7,140,810	$297,966	$3,051,384	$99,501
Agriculture	$7,434	$91,947	$168,285	$41,421
Total	**$8,816,139**	**$1,313,007**	**$5,651,532**	**$3,048,897**

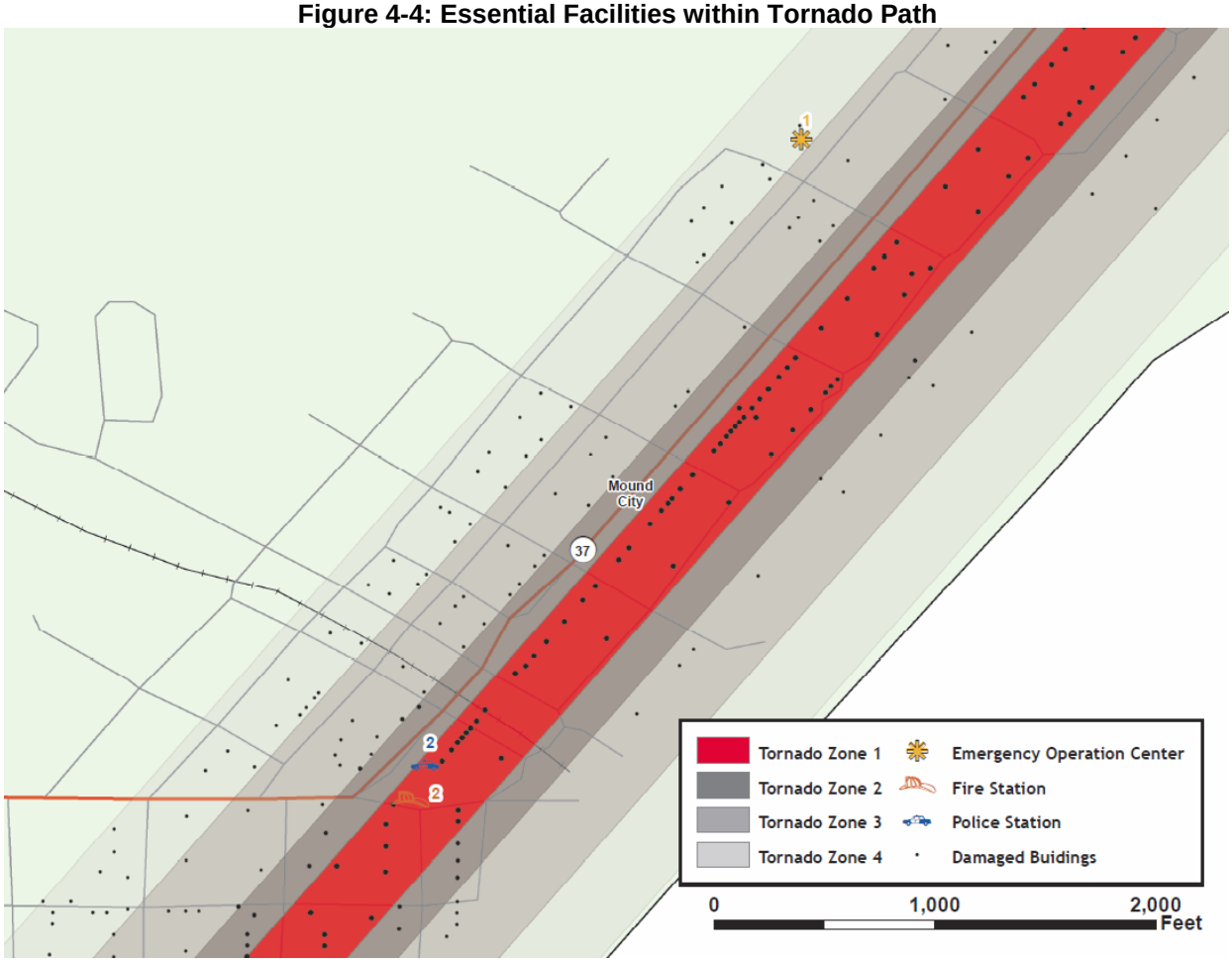
Essential Facilities Damage

There are 4 essential facilities located within 900 feet of the hypothetical tornado path. The model predicts that 2 fire departments and 2 police departments would experience damage. The affected facilities are identified in Table 4-16, and their geographic locations are shown in Figure 4-4.

Table 4-16: Estimated Essential Facilities Affected

Name
Pulaski County Sheriff EOC
Mound City Fire Department
Grand Chain Fire Department
Mound City Police Department

Figure 4-4: Essential Facilities within Tornado Path



Vulnerability to Future Assets/Infrastructure for Tornado Hazard

The entire population and buildings have been identified as at risk because tornadoes can occur anywhere within the State of Illinois, at any time of the day, and during any month of the year. Furthermore, any future development in terms of new construction within the county will be at risk. The building exposure for Pulaski County is included in Table 4-8.

All critical facilities in the county and its communities are at risk. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Analysis of Community Development Trends

Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures should be built with sturdier construction, and existing structures should be hardened to lessen the potential impacts of severe weather. Community sirens to warn of approaching storms are also vital to ensuring the safety of Pulaski County residents.

4.4.2 Flood 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 amount and distribution of precipitation over a given area, the rate at which precipitation infiltrates into the ground, the geometry and hydrology of the catchment, and flow dynamics and conditions in and along the river channel. Floods can be classified as one of two types: 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 eighteen inches might carry off a car. Generally, upstream floods cause damage over relatively localized areas, but they can be quite severe in the local areas where they occur. Urban flooding is a type of upstream flood. Urban flooding involves the overflow of storm drain systems and can be the result of inadequate drainage combined with heavy rainfall or rapid snowmelt. Upstream or flash floods can occur at anytime 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.

Hazard Definition for Dam and Levee Failure

Dams are structures that retain or detain water behind a large barrier. When full or partially full, the difference in elevation between the water above the dam and below creates large amounts of potential energy, creating the potential for failure. The same potential exists for levees when they serve their purpose, which is to confine flood waters within the channel area of a river and exclude that water from land or communities land-ward of the levee. Dams and levees can fail due to either: 1) water heights or flows above the capacity for which the structure was designed; or 2) deficiencies in the structure such that it cannot hold back the potential energy of the water. If a dam or levee fails, issues of primary concern include loss of human life/injury, downstream property damage, lifeline disruption (of concern would be transportation routes and utility lines required to maintain or protect life), and environmental damage.

Many communities view both dams and levees as permanent and infinitely safe structures. This sense of security may well be false, leading to significantly increased risks. Both downstream of dams and on floodplains protected by levees, security leads to new construction, added infrastructure, and increased population over time. Levees in particular are built to hold back flood waters only up to some maximum level, often the 100-year (1% annual probability) flood event. When that maximum is exceeded by more than the design safety margin, then the levee will be overtopped or otherwise fail, inundating communities in the land previously protected by that levee. It has been suggested that climate change, land-use shifts, and some forms of river engineering may be increasing the magnitude of large floods and the frequency of levee-failure situations.

In addition to failure that results from extreme floods above the design capacity, levees and dams can fail due to structural deficiencies. Both dams and levees require constant monitoring and regular maintenance to assure their integrity. Many structures across the U.S. have been under-funded or otherwise neglected, leading to an eventual day of reckoning in the form either of realization that the structure is unsafe or, sometimes, an actual failure. The threat of dam or levee failure may require substantial commitment of time, personnel, and resources. Since dams and levees deteriorate with age, minor issues become larger compounding problems, and the risk of failure increases.

Previous Occurrences for Riverine and Flash Flooding

The NCDC database reported 58 flood events in Pulaski County since 1995. These flood events have been attributed with nearly $4.3 million in property damage. A recent example of flooding in Pulaski County occurred in May of 2002 when major flooding of the Ohio River occurred. The Ohio River was above flood stage for virtually the entire month from Grand Chain to the confluence of the Mississippi River at Cairo. The severity of the flooding in this area was due partly to very high levels on the Mississippi River, which caused water to back into the already swollen Ohio River. The crest at Cairo was 55.0 feet, which is the 7th highest on record. Flooding of farmland was extensive, and farmers were forced to delay the planting of crops.

Corn is normally planted by mid May. The main consequence was numerous flooded secondary roads. There was extensive flooding of farmland and parks near the river, and at least one mobile home was evacuated.

Significant Pulaski County floods recorded by the NCDC are shown in Table 4-17. A complete list of flood events and additional information about the significant flood events are included in Appendix D. Historical flood crests and discharges at hydrologic monitoring stations are summarized in Appendix H.

Table 4-17: Pulaski County Previous Occurrences of Flooding*

Location	Date	Type	Deaths	Injuries	Property Damage
Extreme South Il	4/9/1995	Flash Flood	0	0	50K
Pulaski	1/26/1996	Flood	0	0	5K
Pulaski	2/1/1996	Flood	0	0	0
Pulaski	4/26/1996	Flood	0	0	40K
Pulaski	5/1/1996	Flood	0	0	80K
Pulaski	6/1/1996	Flood	0	0	0
Grand Chain	6/8/1996	Flash Flood	0	0	0
Pulaski	12/4/1996	Flood	0	0	0
Pulaski	12/19/1996	Flood	0	0	0
Pulaski	1/30/1997	Flood	0	0	0
Pulaski	2/1/1997	Flood	0	0	0
Mounds	3/1/1997	Flash Flood	0	0	20K
Pulaski	3/1/1997	Flood	0	0	2.5M
Pulaski	6/1/1997	Flood	0	0	0
Pulaski	1/11/1998	Flood	0	0	0
Pulaski	3/22/1998	Flood	0	0	0
Pulaski	4/1/1998	Flood	0	0	0
Pulaski	5/1/1998	Flood	0	0	0
Pulaski	6/15/1998	Flood	0	0	0
Pulaski	7/3/1998	Urban/sml Stream Fld	0	0	10K
Pulaski	1/22/1999	Flood	0	0	0
Pulaski	2/1/1999	Flood	0	0	30K
Pulaski	3/9/1999	Flood	0	0	0
Mounds	6/6/1999	Flash Flood	0	0	0
Pulaski	2/19/2001	Flood	0	0	0
Pulaski	3/1/2001	Flood	0	0	0
Olmsted	7/26/2001	Flash Flood	0	0	25K
Pulaski	10/13/2001	Urban/sml Stream Fld	0	0	0
Pulaski	12/1/2001	Flood	0	0	0
Pulaski	12/17/2001	Flash Flood	0	0	10K
Pulaski	12/17/2001	Flood	0	0	8K
Pulaski	12/18/2001	Flood	0	0	0
Pulaski	1/23/2002	Flood	0	0	30K
Pulaski	1/24/2002	Flood	0	0	0
Pulaski	1/26/2002	Flood	0	0	0
Pulaski	2/1/2002	Flood	0	0	0
Pulaski	3/20/2002	Flood	0	0	3K
Pulaski	4/1/2002	Flood	0	0	0
Pulaski	4/24/2002	Flood	0	0	0
Pulaski	5/1/2002	Flood	0	0	762K
Pulaski	5/17/2002	Flash Flood	0	0	0
Pulaski	6/1/2002	Flood	0	0	0
Pulaski	2/18/2003	Flood	0	0	0
Pulaski	3/1/2003	Flood	0	0	0
Pulaski	5/4/2003	Flash Flood	0	0	0

Location	Date	Type	Deaths	Injuries	Property Damage
Pulaski	5/7/2003	Flood	0	0	0
Pulaski	1/5/2004	Flood	0	0	0
Pulaski	2/8/2004	Flood	0	0	0
Pulaski	3/9/2004	Flood	0	0	0
Pulaski	5/28/2004	Flood	0	0	0
Pulaski	6/1/2004	Flood	0	0	0
Olmsted	11/1/2004	Flash Flood	0	0	0
Pulaski	12/3/2004	Flood	0	0	0
Pulaski	1/5/2005	Flood	0	0	700K
Pulaski	4/1/2005	Flood	0	0	0
Grand Chain	1/14/2007	Flood	0	0	0K
Pulaski	1/8/2008	Flood	0	0	0K
New Grand Chain	2/10/2008	Flood	0	0	0K

Source: NCDC

* 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.

Previous Occurrences for Dam and Levee Dam Failure

Prior to 1938, large flood events along the Ohio River within Pulaski County often overwhelmed the levees inundating the floodplain and its communities. Since the completion of the larger levees constructed by the Federal Government in the 1940 and 1950s, no levee failures have occurred along the Ohio River within Pulaski County.

In 1952 a Federal Government constructed a levee (Karnak Levee) along the Cache River to keep it from inundating the Karnak and the Cache River Valley. This levee was designed to only protect up to the 50-year flood event. In 2002 the Karnak Levee failed just east of Karnak resulting in the flooding of portions of the Village and Cache River Valley. As of November 2009, this levee had not been repaired leaving portions of Karnak and the Cache River Valley susceptible to inundation.

There are no records or local knowledge of any dam or any other certified levee failure in the county.

Repetitive Loss Properties

FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the National Flood Insurance Program (NFIP), which 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.

Illinois Emergency Management was contacted to determine the location of repetitive loss structures in Pulaski County. Records show that there are no repetitive loss structures within the county.

Geographic Location for Flooding

Most riverine floods in Illinois occur during either the spring or summer and are the result of excessive rainfall and/or the combination of rainfall and snowmelt. Flash flooding in Illinois can occur during anytime 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 Pulaski County are the Ohio River, Cache River and the Cache River's major tributaries. The major tributaries of the Cache River in Pulaski County include Big Creek, Cypress Creek, Cypress Slough, Little Creek, and Mill Creek. Flooding along the Ohio River can inundate portions of Olmsted and Mounds and potential close State Routes 37 and several secondary roads. Flooding along the Cache River and its major tributaries inundate portions of Mounds, Pulaski, and Ullin.

Flash flooding in Pulaski County typically occurs or is best documented in urban/developed areas. For example, on July 26, 2001 flash flooding Slow-moving thunderstorms dumped torrential rains over Pulaski County. An engineer with the county highway department measured 3.5 inches of rain during the early morning hours. Rushing floodwater blocked Illinois Route 37 in two places for more than 4 hours near Olmsted. An Olmsted convenience store was flooded by 5 inches of water and the heavy rain damaged the roof of the Olmsted Library and leaked into the building, damaging books.

A digital file of the FIRM maps was used to identify specific stream reaches for analysis. The areas of riverine flooding are depicted on the map in Appendix E.

Geographic Location for Dam and Levee Failure

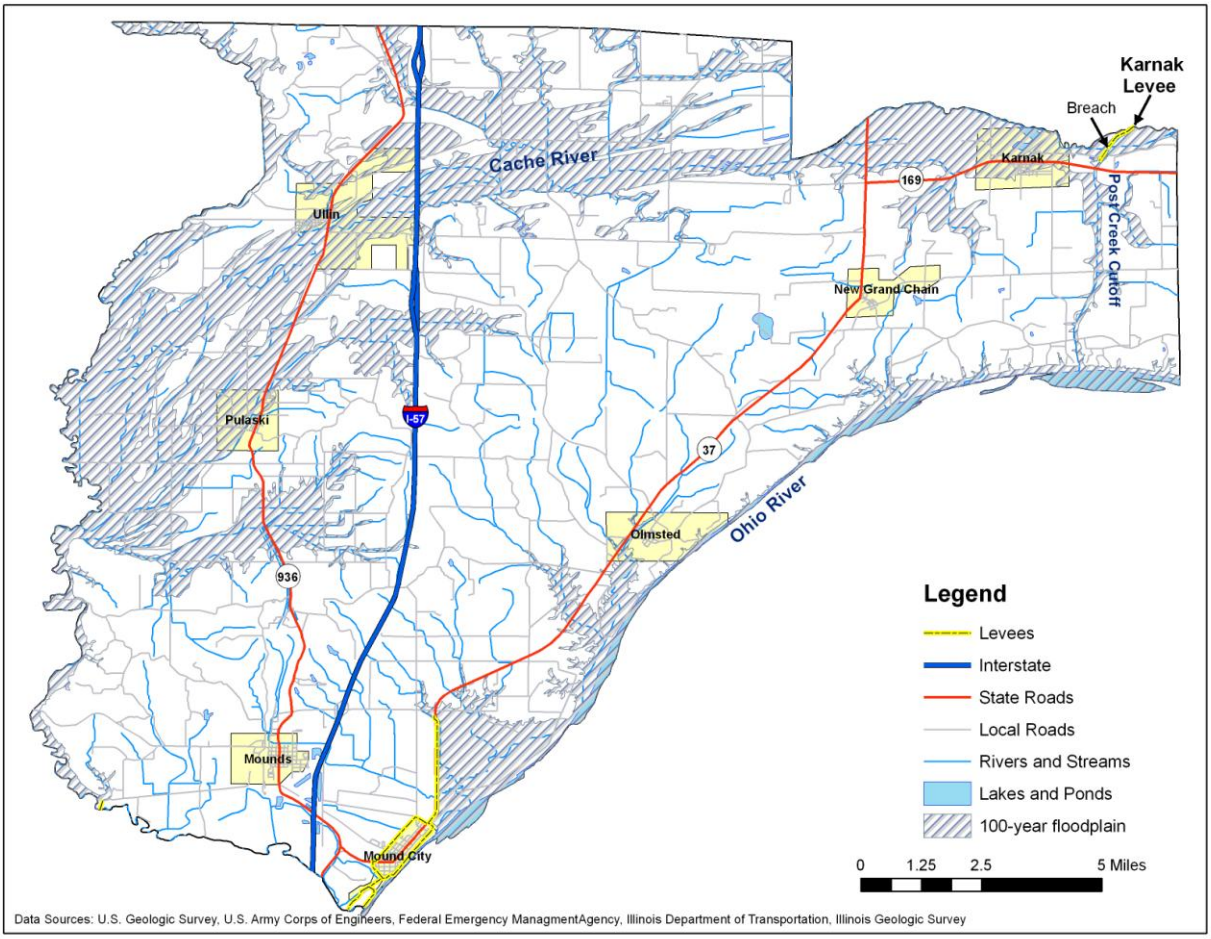
The National Inventory of Dams identified three dams in Pulaski County. The map in Appendix G illustrates the location of Pulaski County dams. Table 4-18 summarizes the National Inventory of Dams information.

Table 4-18: National Inventory of Dams

Name	River	Hazard	EAP
Ulrich Lake Dam	Tributary to Cache River	L	N
Kays Lake Dam	Tributary to Cache River	L	N
Davis Lake Dam #1	Tributary to Boar Creek	L	N

A review of the United States Army Corps of Engineers and IDNR records revealed three levees within Pulaski County. Two of these levees protect Mounds and Mound City from inundation by the Ohio and Cache Rivers up to at least the 100-year flood level. The third is an agricultural levee to protect the Village of Karnak and surrounding areas from inundation by the Cache River up to approximately the 50-year flood level. This levee was breached in 2001 and remained unrepaired as of December 2009. The approximate locations of these levees and the location of the breach are shown on Figure 4-5.

Figure 4-5: Pulaski County Levees Map



Hazard Extent for Flooding

The HAZUS-MH flood model is designed to use a flood depth grid and flood boundary polygon from the DFIRM data. HAZUS-MH was used to model the Base Flood Elevation (BFE). The BFE is defined as the area that has a 1% chance of flooding in any given year. Planning team input and a review of historical information provided additional information on specific flood events.

Hazard Extent for Dam and Levee Failure

Dams assigned the low (L) hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property. Dams assigned the significant (S) hazard classification are those dams where failure or mis-operation results in no probable loss of human life but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns. Dams classified as significant hazard potential dams are often located in predominantly rural or agricultural areas, but could be located in populated areas with a significant amount of infrastructure. Dams assigned the high (H) hazard potential classification

are those dams where failure or mis-operation has the highest risk to cause loss of human life and significant damage to buildings and infrastructure.

According to the IDNR and the National Inventory of Dams, there are three dams in Pulaski County. None of these dams are classified as a high hazard dams. Nor do any of these dams have an Emergency Action Plan (EAP; Table 4-18). An EAP is not required by the State of Illinois but is recommended by the Illinois Department of Natural Resources.

Accurate mapping of the risks of flooding behind levees depends on knowing the condition and level of protection the levees actually provide. FEMA and the U.S. Army Corps of Engineers are working together to make sure that flood hazard maps better reflect the flood protection capabilities of levees and that the maps accurately represent the flood risks posed to areas situated behind them. Levee owners—usually states, communities, or private individuals or organizations such as local levee districts—are responsible for ensuring that the levees they own are maintained to their original design level and condition. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove that the levee meets design, operation, and maintenance standards for protection against the 1% annual probability (100-year) flood.

Calculated Risk Priority Index for Flooding

Based on historical information and the HAZUS-MH flooding analysis results, the probability of flooding in Pulaski County is likely. According to the Risk Priority Index (RPI), flooding ranked as the number one hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
4	x	8	=	32

Calculated Risk Priority Index for Dam and Levee Failure

Based on operation and maintenance requirements and local knowledge of the dams in Pulaski County, the probability of failure is possible. However, if a high hazard dam were to fail, the magnitude and severity of the damage could be great. The warning time and duration of the dam failure event would be very short. According to the RPI, dam and levee failure ranked as the number four hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
2	x	8	=	16

HAZUS-MH Analysis Using 100-Year Flood Boundary and County Parcels

HAZUS-MH generated the flood depth grid for a 100-year return period and made calculations by clipping the USGS One-Arc-Second DEM to the flood boundary. Next, HAZUS-MH utilized a user-defined analysis of Pulaski County with site-specific parcel data provided by the county.

HAZUS-MH estimates the 100-year flood would damage 618 buildings at a replacement cost of $13.2 million. The total estimated numbers of damaged buildings are given in Table 4-19. Figure 4-6 depicts the Pulaski County parcel points that fall within the 100-year floodplain. Figures 4-7 and 4-8 highlight damaged buildings within the floodplain areas in Karnak and Ullin.

Table 4-19: Pulaski County HAZUS-MH Building Damage

General Occupancy	Number of Buildings Damaged	Total Building Damage
Residential	290	$3,429,086
Commercial	30	$1,069,089
Industrial	7	$371,438
Agricultural	98	$4,945,488
Exempt	193	$3,429,086
Total	**618**	**$13,244,187**

Figure 4-6: Pulaski County Buildings in Floodplain (100-Year Flood)

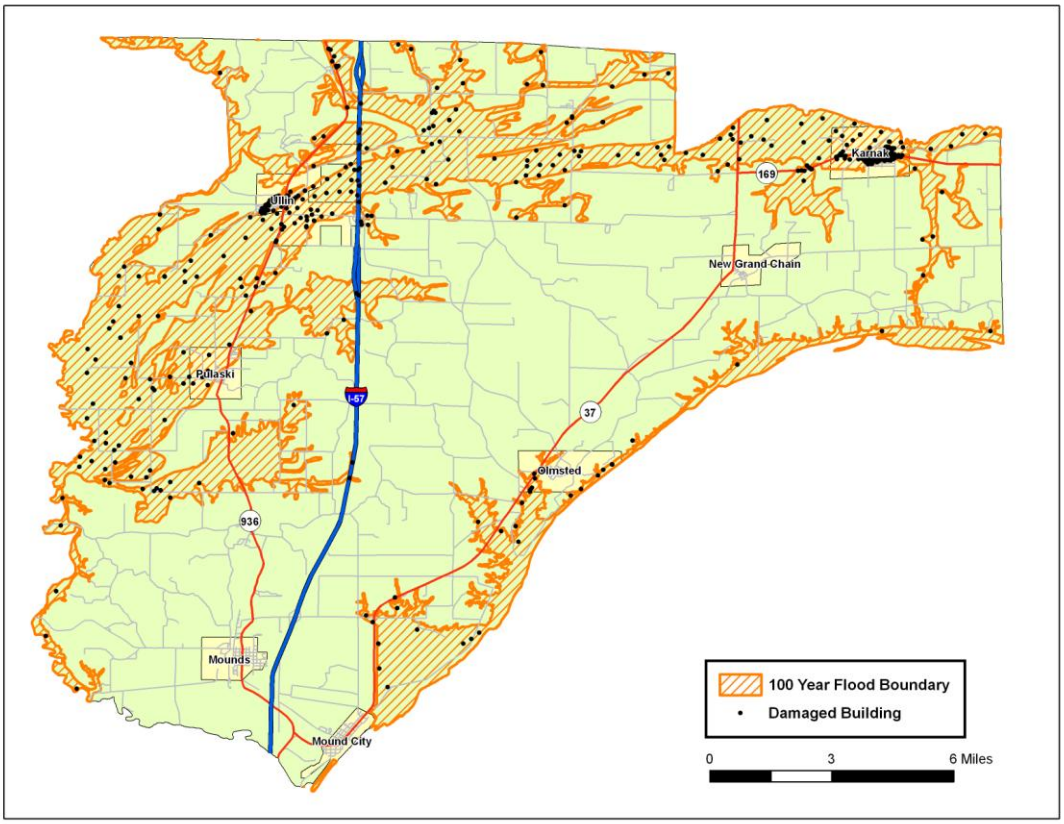
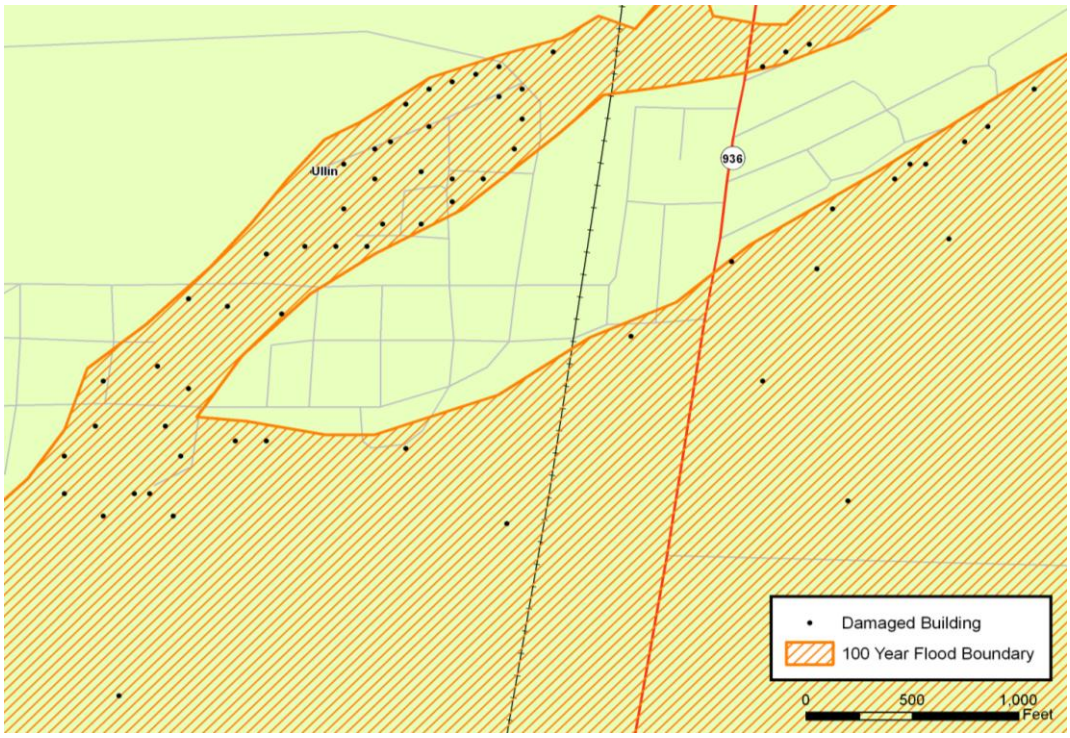


Figure 4-7: Pulaski County Urban Areas (Karnak) Flood-Prone Areas (100-Year Flood)

Figure 4-8: Pulaski County Urban Areas (Ullin) Flood-Prone Areas (100-Year Flood)



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Essential Facilities

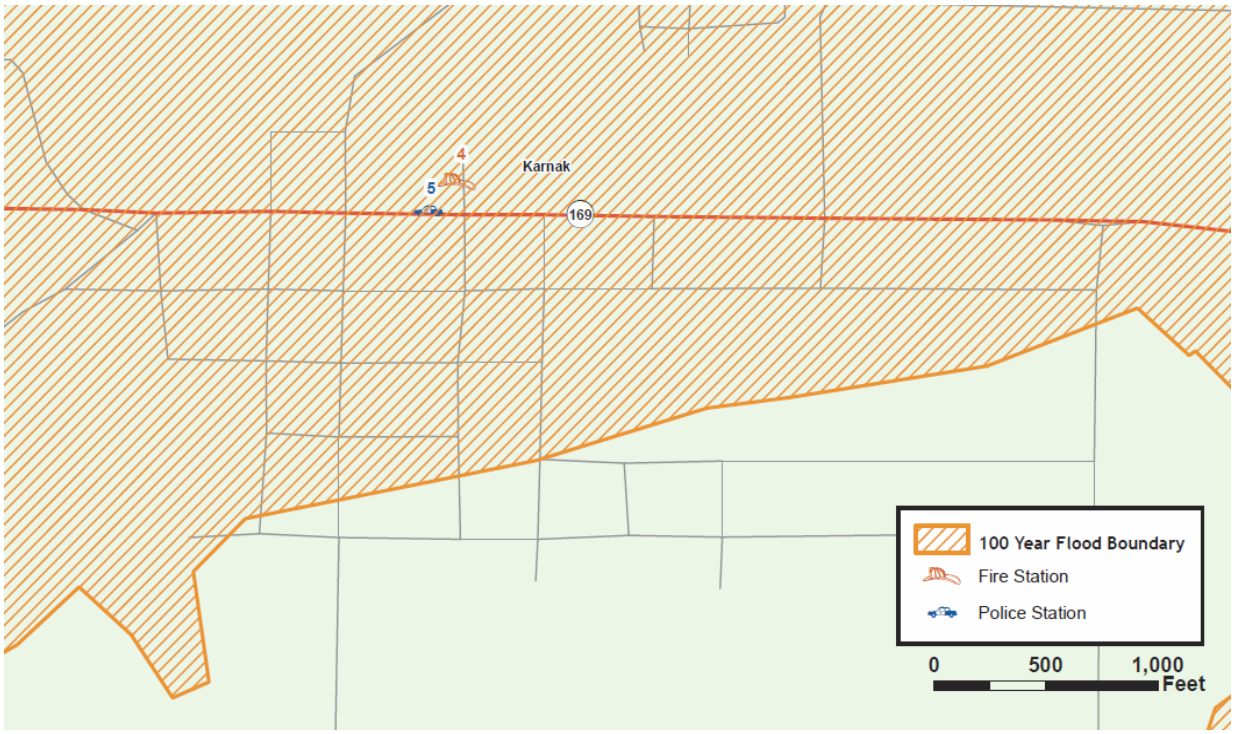
An essential facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). A complete list of all the critical facilities, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

The HAZUS-MH analysis identified 1 emergency operations center, 1 fire department and 1 police department that may be subject to flooding. A list of the essential facilities within Pulaski County is given in Table 4-20. A map of essential facilities potentially at risk to flooding is shown in Figure 4-9.

Table 4-20: Pulaski County Damaged Essential Facilities

Facility Name
Illinois State Police EOC
Karnak City Fire Department
Village of Karnak Police Department

Figure 4-9: Boundary of 100-Year Flood Overlaid with Essential Facilities



Infrastructure

The types of infrastructure that could be 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 any number of these items could become damaged in the event of a flood. 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 fail or become impassable, causing a traffic risk.

Vulnerability Analysis for Flash Flooding

Flash flooding could affect any low lying location within this jurisdiction; therefore, a significant portion of the county's population and buildings are vulnerable to a flash flood. These structures can expect the same impacts as discussed in a riverine flood.

Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Vulnerability Analysis for Dam and Levee Failure

An EAP is required to assess the effect of dam failure on these communities. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove the levee meets design, operation and maintenance standards for protection against the 1% annual probability flood.

Vulnerability to Future Assets/Infrastructure for Flooding

Flash flooding may affect nearly any location within the county; therefore all buildings and infrastructure are vulnerable to flash flooding. Currently, the municipality zoning boards review new development for compliance with local zoning ordinances. The Pulaski County Floodplain Manager administers the floodplain for the county. At this time no construction is planned within the area of the 100-year floodplain. Therefore, there is no new construction, which will be vulnerable to a 100-year flood.

Vulnerability to Future Assets/Infrastructure for Dam and Levee Failure

Municipal Planning Departments/Commissions review new developments for compliance with local zoning ordinances.

Analysis of Community Development Trends

Areas with recent development within the county may be more vulnerable to drainage issues. Storm drains and sewer systems are usually most susceptible, which can cause the 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. Controlling floodplain development is the key to reducing flood-related damages.

4.4.3 Earthquake Hazard

Hazard Definition for Earthquake Hazard

An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, plate tectonics has shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. At their boundaries, the plates typically are locked together and unable to release the accumulating energy. When this energy grows strong enough, the plate boundary breaks free and causes the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates, as is the case for seismic zones in the Midwestern United States. The most seismically active area in the Midwest U.S. is the New Madrid Seismic Zone. Scientists have learned that the New Madrid fault system may not be the only fault system in the Central U.S. capable of producing damaging earthquakes. The Wabash Valley fault system in Illinois and Indiana manifests evidence of large earthquakes in its geologic history, and there may be other, as yet unidentified, faults that could produce strong earthquakes.

Ground shaking from strong earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated materials and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths, injuries, and extensive property damage. Magnitude measures the energy released at the source of the earthquake. Magnitude is determined from measurements on seismographs, and a single earthquake will have a single magnitude to quantify its strength. Earthquake intensity measures the strength of shaking produced by the earthquake at a certain location. Intensity is determined from effects on people, human structures, and the natural environment, and a single earthquake will have a wide range of intensity values at different locations around the epicenter. Table 4-21 is a description of earthquake intensity using an abbreviated Modified Mercalli Intensity scale, and Table 4-22 lists earthquake magnitudes and their corresponding intensities.
(Source: *http://earthquake.usgs.gov/learning/topics/mag_vs_int.php*)

Table 4-21: 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 motor cars 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 motor cars 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.

Mercalli Intensity	Description
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, 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.

Table 4-22: Earthquake Magnitude vs. Modified Mercalli Intensity Scale

Earthquake Magnitude	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

Historical Earthquakes that have Affected Pulaski County

Numerous instrumentally measured earthquakes have occurred in Illinois. In the past few decades, with many precise seismographs positioned across Illinois, measured earthquakes have varied in magnitude from very low microseismic events of M=1-3 to larger events up to M=5.4. Microseismic events are usually only detectable by seismographs and rarely felt by anyone. The most recent earthquake in Illinois—as of the date of this report—occurred on August 30, 2008 at 0:46:00 local time about 2.4 km (1.5 miles) southeast of Gale, IL and measured 2.6 in magnitude.

The consensus of opinion among seismologists working in the Midwest is that a magnitude 5.0 to 5.5 event could occur virtually anywhere at any time throughout the region. Earthquakes occur in Illinois all the time, although damaging quakes are very infrequent. Illinois earthquakes causing minor damage occur on average every 20 years, although the actual timing is extremely variable. Most recently, a magnitude 5.2 earthquake shook southeastern Illinois on April 18, 2008, causing minor damage in the Mt Carmel, IL area. Earthquakes resulting in more serious damage have occurred about every 70 to 90 years.

First on the list of historical earthquakes that have affected Illinois and first on the list on continuing earthquake threats at present and into the future is seismic activity on the New Madrid Seismic Zone of southeastern Missouri. On December 16, 1811 and January 23 and February 7 of 1812, three earthquakes struck the central U.S. with magnitudes estimated to be 7.5-8.0. These earthquakes caused violent ground cracking and volcano-like eruptions of sediment *(sand blows)* over an area of >10,500 km^2, and uplift of a 50 km by 23 km zone (the Lake County uplift). The shaking collapsed scaffolding on the Capitol in Washington, D.C., and was felt over a total area of over 10 million km^2 (the largest felt area of any historical

earthquake). Of all the historical earthquakes that have struck the U.S., an 1811-style event would do the most damage if it recurred today.

The New Madrid earthquakes are especially noteworthy because the seismic zone is in the center of the North American Plate. Such intraplate earthquakes are felt, and do damage, over much broader areas than comparable earthquakes at plate boundaries. The precise driving force responsible for activity on the New Madrid seismic zone is not known, but most scientists infer that it is compression transmitted across the North American Plate. That compression is focused on New Madrid because it is the site of a Paleozoic structure—the Reelfoot Rift—which is a zone of weakness in the crust.

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 (magnitude 7.5–8.0) is 7%–10% over the next 50 years (*USGS Fact Sheet 2006-3125*.) Frequent large earthquakes on the New Madrid seismic zone are geologically puzzling because the region shows relatively little deformation. Three explanations have been proposed: 1) recent seismological and geodetic activity is still a short-term response to the 1811–12 earthquakes; 2) activity is irregular or cyclic; or 3) activity began only in the recent geologic past. There is some dispute over how often earthquakes like the 1811–12 sequence occur. Many researchers estimate a recurrence interval of between 550 and 1100 years; other researchers suggest that either the magnitude of the 1811–12 earthquakes have been over-stated, or else the actual frequency of these events is less. It is fair to say, however, that even if the 1811–12 shocks were just magnitude ~7 events, they nonetheless caused widespread damage and would do the same if another such earthquake or earthquake sequence were to strike today.

[Above: New Madrid earthquakes and seismic zone modified from N. Pinter, 1993, Exercises in Active Tectonic history adapted from *Earthquake Information Bulletin*, 4(3), May-June 1972. *http://earthquake.usgs.gov/regional/states/illinois/history.php*]

The earliest reported earthquake in Illinois was in **1795**. This event was felt at Kaskaskia, IL for a minute and a half and was also felt in Kentucky. At Kaskaskia, subterranean noises were heard. Due to the sparse frontier population, an accurate location is not possible, and the shock may have actually originated outside the state.

An intensity VI-VII earthquake occurred on **April 12, 1883**, awakening several people in Cairo, IL. One old frame house was significantly damaged, resulting in minor injuries to the inhabitants. This is the only record of injury in the state due to earthquakes.

On **October 31, 1895** a large M6.8 occurred at Charleston, Missouri, just south of Cairo. Strong shaking caused eruptions of sand and water at many places along a line roughly 30 km (20 mi) long. Damage occurred in six states, but most severely at Charleston, with cracked walls, windows shattered, broken plaster, and chimneys fallen. Shaking was felt in 23 states from Washington, D.C. to Kansas and from southernmost Canada to New Orleans, LA.

A Missouri earthquake on **November 4, 1905**, cracked walls in Cairo. Aftershocks were felt over an area of 100,000 square miles in nine states. In Illinois, it cracked the wall of the new education building in Cairo and a wall at Carbondale, IL.

Among the largest earthquakes occurring in Illinois was the **May 26, 1909** shock, which knocked over many chimneys at Aurora. It was felt over 500,000 square miles and strongly felt in Iowa and Wisconsin. Buildings swayed in Chicago where there was fear that the walls would collapse. Just under two months later, a second Intensity VII earthquake occurred on **July 18, 1909**, damaged chimneys in Petersburg, IL, Hannibal, MO, and Davenport, IA. Over twenty windows were broken, bricks loosened and plaster cracked in the Petersburg area. This event was felt over 40,000 square miles.

On **November 7, 1958**, a shock along the Indiana border resulted in damage at Bartelso, Dale and Maunie, IL. Plaster cracked and fell, and a basement wall and floor were cracked.

On **August 14, 1965**, a sharp but local shock occurred at Tamms, IL, a town of about 600 people. The magnitude 5 quake damaged chimneys, cracked walls, knocked groceries from the shelves, and muddied the water supply. Thunderous earth noises were heard. This earthquake was only felt within a 10 mile radius of Tamms, in communities such as Elco, Unity, Olive Branch, and Olmsted, IL. Six aftershocks were felt.

An earthquake of Intensity VII occurred on **November 9, 1968**. This magnitude 5.3 shock was felt over an area of 580,000 square miles in 23 states. There were reports of people in tall buildings in Ontario and Boston feeling the shock. Damage consisted of bricks being knocked from chimneys, broken windows, toppled television antenna, and cracked plaster. There were scattered reports of cracked foundations, fallen parapets, and overturned tombstones. Chimney damage was limited to buildings 30 to 50 years old. Many people were frightened. Church bells rang at Broughton and several other towns. Loud rumbling earthquake noise was reported in many communities.

Dozens of other shocks originating in Missouri, Arkansas, Kansas, Nebraska, Tennessee, Indiana, Ohio, Michigan, Kentucky, and Canada have been felt in Illinois without causing damage. There have been three earthquakes slightly greater than magnitude 5.0 and Intensity level VII which occurred in 1968, 1987 and 2008 and that were widely felt throughout southern Illinois and the midcontinent.

Above text adapted from *http://earthquake.usgs.gov/regional/states/illinois/history.php* and from *Seismicity of the United States, 1568-1989 (Revised), C.W. Stover and J.L. Coffman, U.S. Geological Survey Professional Paper 1527, United States Government Printing Office, Washington: 1993.*

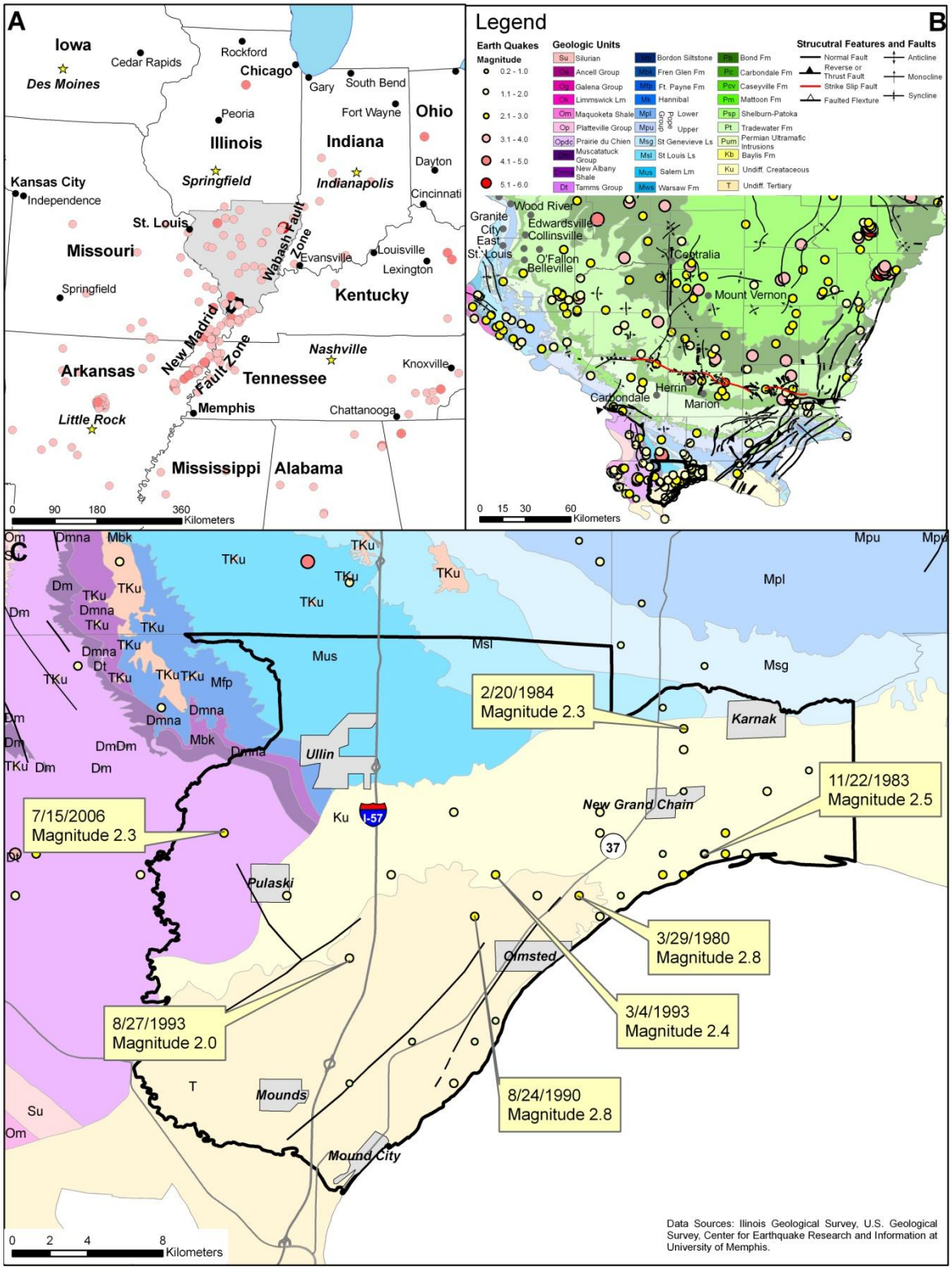
Geographic Location for Earthquake Hazard

Pulaski County occupies a region susceptible to earthquakes. Regionally, the two most significant zones of seismic activity are the New Madrid Seismic Zone and the Wabash Valley Fault System. The epicenters of 30 small earthquakes (M1.0–2.8) have been recorded in Pulaski County since 1974 (Figure 4-10). The geologic mechanism related to the minor earthquakes is poorly understood. 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. The USGS and the Center for Earthquake Research and Information estimate the probability of a repeat of the 1811–1812 type earthquakes (magnitude 7.5–8.0) at 7%–10% and the probability of a magnitude 6.0 or larger at 25%–40% within the next 50 years.

Figure 4-10 depicts the following: a) Location of notable earthquakes in the Illinois region with inset of Pulaski County; b) Generalized geologic bedrock map with earthquake epicenters, geologic structures, and inset of Pulaski County; c) Geologic and earthquake epicenter map of Pulaski County.

Figure 4-10 a, b, c: Pulaski County Earthquakes



Hazard Extent for Earthquake Hazard

The extent of the earthquake is countywide.

Calculated Risk Priority Index for Earthquake Hazard

Based on historical information as well as current USGS and SIU research and studies, future earthquakes in Pulaski County are possible. According to the RPI, earthquake is ranked as the number three hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
2	x	8	=	16

Vulnerability Analysis for Earthquake Hazard

This hazard could impact the entire jurisdiction equally; therefore, the entire county's population and all buildings are vulnerable to an earthquake and can expect the same impacts within the affected area. To accommodate this risk this plan will consider all buildings located within the county as vulnerable.

Critical Facilities

All critical facilities are vulnerable to earthquakes. A critical facility would encounter many of the same impacts as any other building within the county. These impacts include structural failure and loss of facility functionality (e.g. damaged police station will no longer be able to serve the community). A complete list of all of the critical facilities, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

Table 4-8 shows building exposure 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 and loss of building function, which could result in indirect impacts (e.g. damaged homes will no longer be habitable, causing residence to seek shelter).

Infrastructure

During an earthquake, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since a full inventory of infrastructure is not available for this plan, 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 fail or become impassable causing

risk to traffic. Typical scenarios are described to gauge the anticipated impacts of earthquakes in the county in terms of number and types of buildings and infrastructure.

The SIU-Polis team reviewed existing geological information and recommendations for earthquake scenarios. Three earthquake scenarios—two based on USGS modeled scenarios and one based on deterministic scenarios were developed to provide a reasonable basis for earthquake planning in Pulaski County. The two USGS analyses were a M7.7 event on the New Madrid fault zone and M7.1 earthquake on the Wabash Valley Seismic Zone. Shake maps provided by FEMA were used in HAZUS-MH to estimate losses for Pulaski County based on these events. The final scenario was a Moment Magnitude of 5.5 with the epicenter located in Pulaski County. Note that a deterministic scenario, in this context, refers to hazard or risk models based on specific scenarios without explicit consideration of the probability of their occurrences. This scenario was selected based upon a rupture of the an unnamed fault which parallels the Ohio River between Mound City and Olmsted, IL that presents a realistic earthquake scenario for planning purposes.

Modeling a deterministic scenario requires user input for a variety of parameters. One of the most critical sources of information that is required for accurate assessment of earthquake risk is soils data. Illinois Geologic Survey provided a NEHRP (National Earthquake Hazards Reduction Program) soil classification map for southern Illinois (Bauer and Su, 2007). NEHRP soil classifications portray the degree of shear-wave amplification that can occur during ground shaking.

Earthquake hypocenter depths in southern Illinois range from less than 1.0 to ~25.0 km. The average hypocenter depth, ~10.0 km, was used for the deterministic earthquake scenario. For this scenario type HAZUS-MH also requires the user to define an attenuation function. To maintain consistency with the USGS's (2006) modeling of strong ground motion in the central United States, the Toro et al. (1997) attenuation function was used for the deterministic earthquake scenario.

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

Results for 7.7 Magnitude Earthquake New Madrid Scenario

The results of the 7.7 New Madrid earthquake are depicted in Table 4-23, 4-24, and Figure 4-11. HAZUS estimates that approximately 3,165 buildings will be at least moderately damaged. This is more than 98% of the total number of buildings in the region. It is estimated that 1,233 buildings will be damaged beyond repair.

The total building-related losses totaled $328.9 million; 9% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which comprised more than 60% of the total loss.

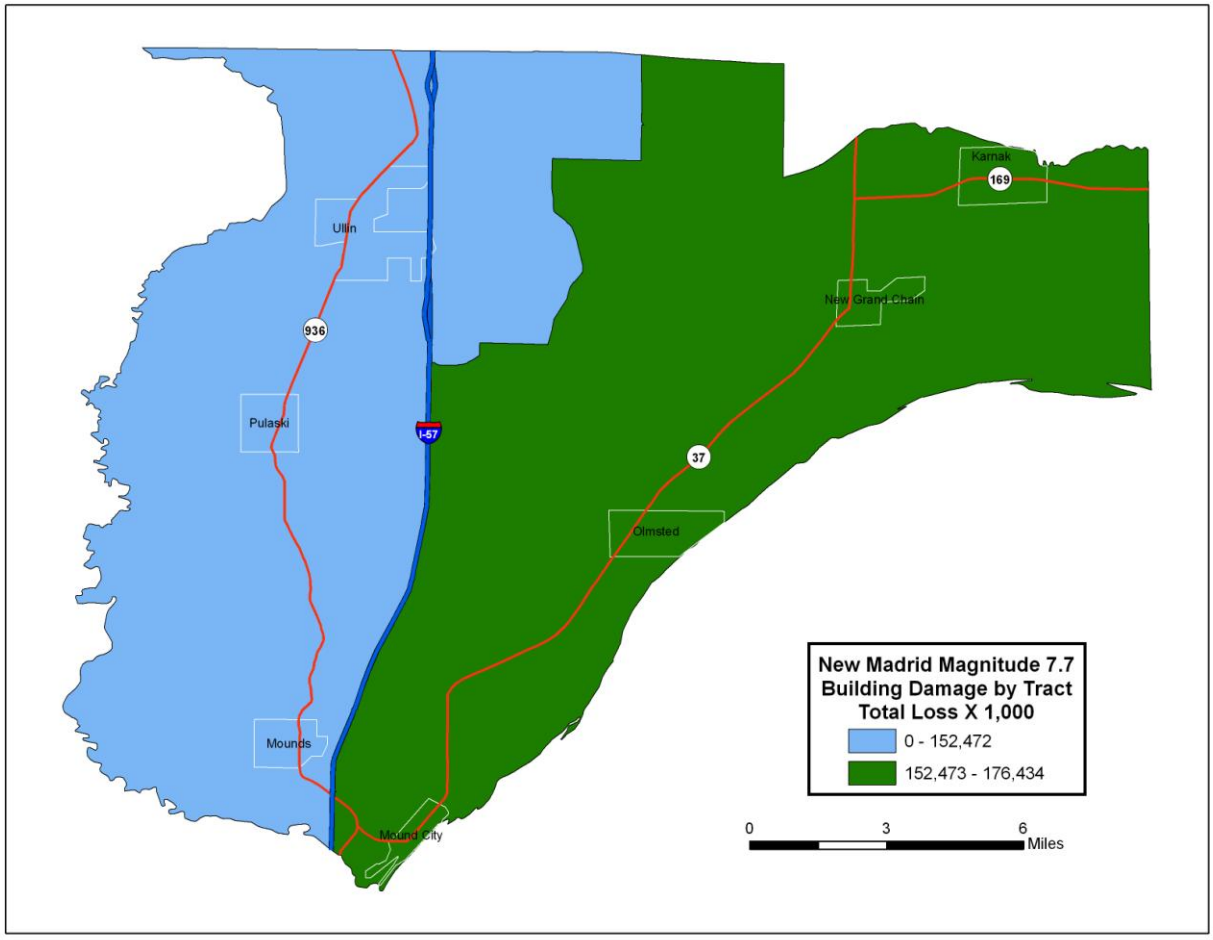
Table 4-23: New Madrid Scenario-Damages Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.04	0	0.02	0	0.03	1	0.11	3	0.21
Commercial	0	0.58	0	0.43	4	0.43	8	0.89	20	1.63
Education	0	0.06	0	0.03	0	0.04	1	0.13	3	0.27
Government	0	0.07	0	0.04	1	0.06	2	0.18	4	0.30
Industrial	0	0.09	0	0.04	1	0.06	2	0.23	5	0.42
Other Residential	0	3.50	2	3.49	42	4.24	191	20.55	618	50.13
Religion	0	0.15	0	0.13	1	0.13	2	0.19	4	0.31
Single Family	1	95.49	61	95.82	952	95.01	723	77.72	576	46.72
Total	1		63		1,002		930		1,233	

Table 4-24: New Madrid Scenario-Building Economic losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.61	6.15	0.22	2.49	9.48
	Capital-Related	0.00	0.27	5.19	0.16	0.73	6.35
	Rental	4.92	2.87	2.75	0.06	1.08	11.69
	Relocation	0.58	0.16	0.15	0.01	0.37	1.26
	Subtotal	**5.49**	**3.91**	**14.24**	**0.45**	**4.68**	**28.77**
Capital Stock Losses							
	Structural	24.04	9.51	6.45	1.58	8.78	50.36
	Non_Structural	87.46	36.25	24.45	6.96	31.92	187.04
	Content	20.86	8.25	11.29	4.29	16.72	61.42
	Inventory	0.00	0.00	0.29	0.65	0.37	1.30
	Subtotal	**132.36**	**54.01**	**42.49**	**13.49**	**57.79**	**300.13**
	Total	**137.85**	**57.92**	**56.73**	**13.94**	**62.47**	**328.90**

Figure 4-11: New Madrid Scenario-Building Economic Losses in Thousands of Dollars



Results for 7.1 Magnitude Earthquake Wabash Valley Scenario

The results of the 7.1 Wabash Valley earthquake are depicted in Table 4-25, Table 4-26, and Figure 4-12. HAZUS estimates that approximately 1 building will be at least moderately damaged. It is estimated that there will be no buildings damaged beyond repair.

The total building related losses totaled $9.64 million; none of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which made up more than 54% of the total loss.

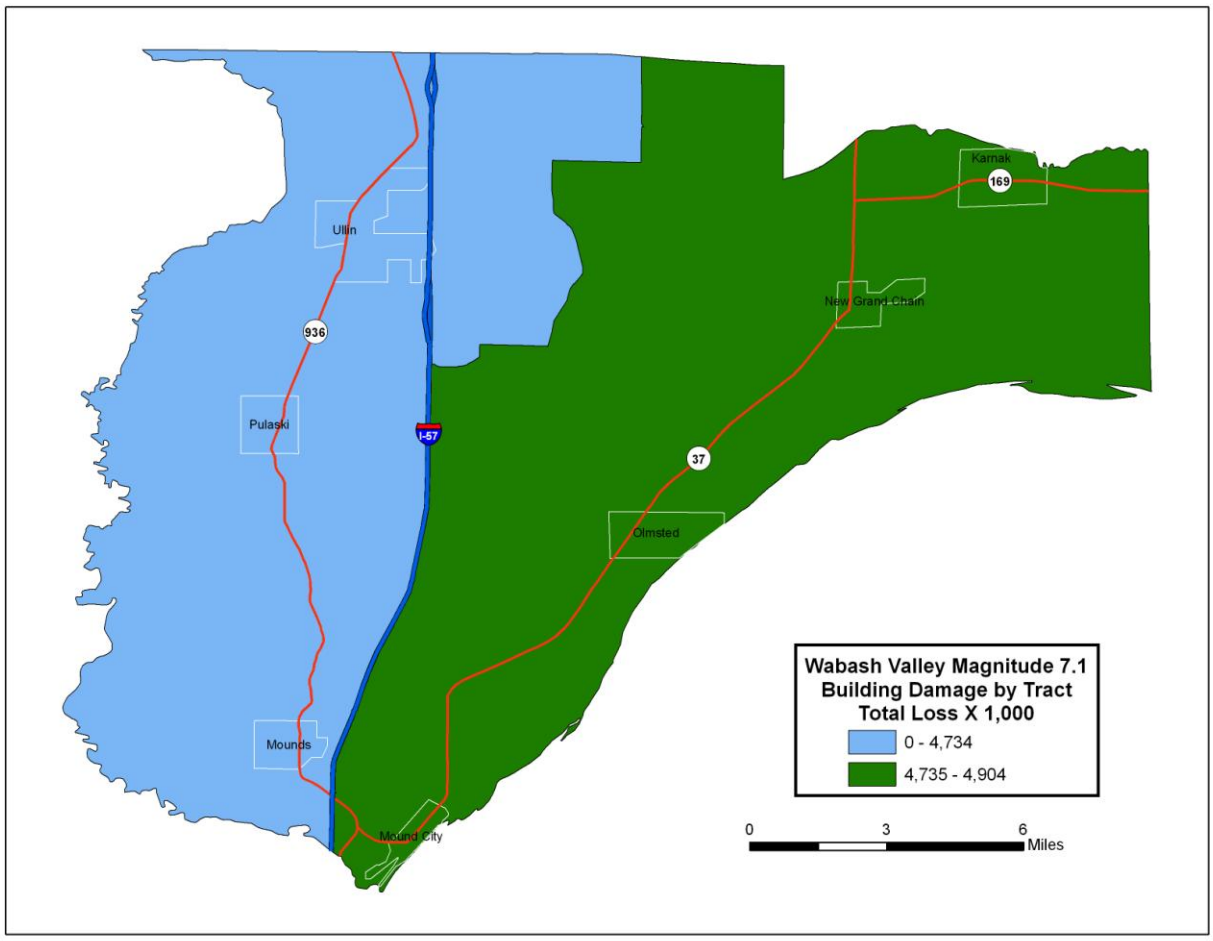
Table 4-25: Wabash Valley Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	4	0.12	0	0.12	0	0.15	0	0.00	0	0.00
Commercial	33	1.02	0	0.94	0	1.07	0	0.00	0	0.00
Education	5	0.15	0	0.17	0	0.19	0	0.00	0	0.00
Government	6	0.19	0	0.18	0	0.19	0	0.00	0	0.00
Industrial	8	0.25	0	0.20	0	0.25	0	0.00	0	0.00
Other Residential	842	26.24	11	59.65	1	59.92	0	0.00	0	0.00
Religion	7	0.22	0	0.24	0	0.28	0	0.00	0	0.00
Single Family	2,304	71.81	7	38.50	0	37.95	0	0.00	0	0.00
Total	**3,209**		**19**		**1**		**0**		**0**	

Table 4-26: Wabash Valley Scenario-Building Economic losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.00	0.00	0.00	0.00	0.00
	Capital-Related	0.00	0.00	0.00	0.00	0.00	0.00
	Rental	0.00	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Capital Stock Loses							
	Structural	0.00	0.00	0.00	0.00	0.00	0.01
	Non_Structural	2.04	0.99	0.86	0.35	0.90	5.14
	Content	1.64	0.52	0.79	0.28	1.17	4.40
	Inventory	0.00	0.00	0.02	0.04	0.02	0.09
	Subtotal	**3.68**	**1.51**	**1.67**	**0.67**	**2.10**	**9.63**
	Total	**3.68**	**1.51**	**1.67**	**0.67**	**2.11**	**9.64**

Figure 4-12: Wabash Valley Scenario-Building Economic Losses in Thousands of Dollars



Results for 5.5 Magnitude Earthquake in Pulaski County

The results of the initial analysis, the 5.5 magnitude earthquake with an epicenter south west of Olmsted in Pulaski County, are depicted in Table 4-27 and 4-28 and Figure 4-13. HAZUS estimates that approximately 535 buildings will be at least moderately damaged. This is more than 17% of the total number of buildings in the region. It is estimated that 14 buildings will be damaged beyond repair.

The total building related losses totaled $30.53 million; 7% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which comprised more than 60% of the total loss.

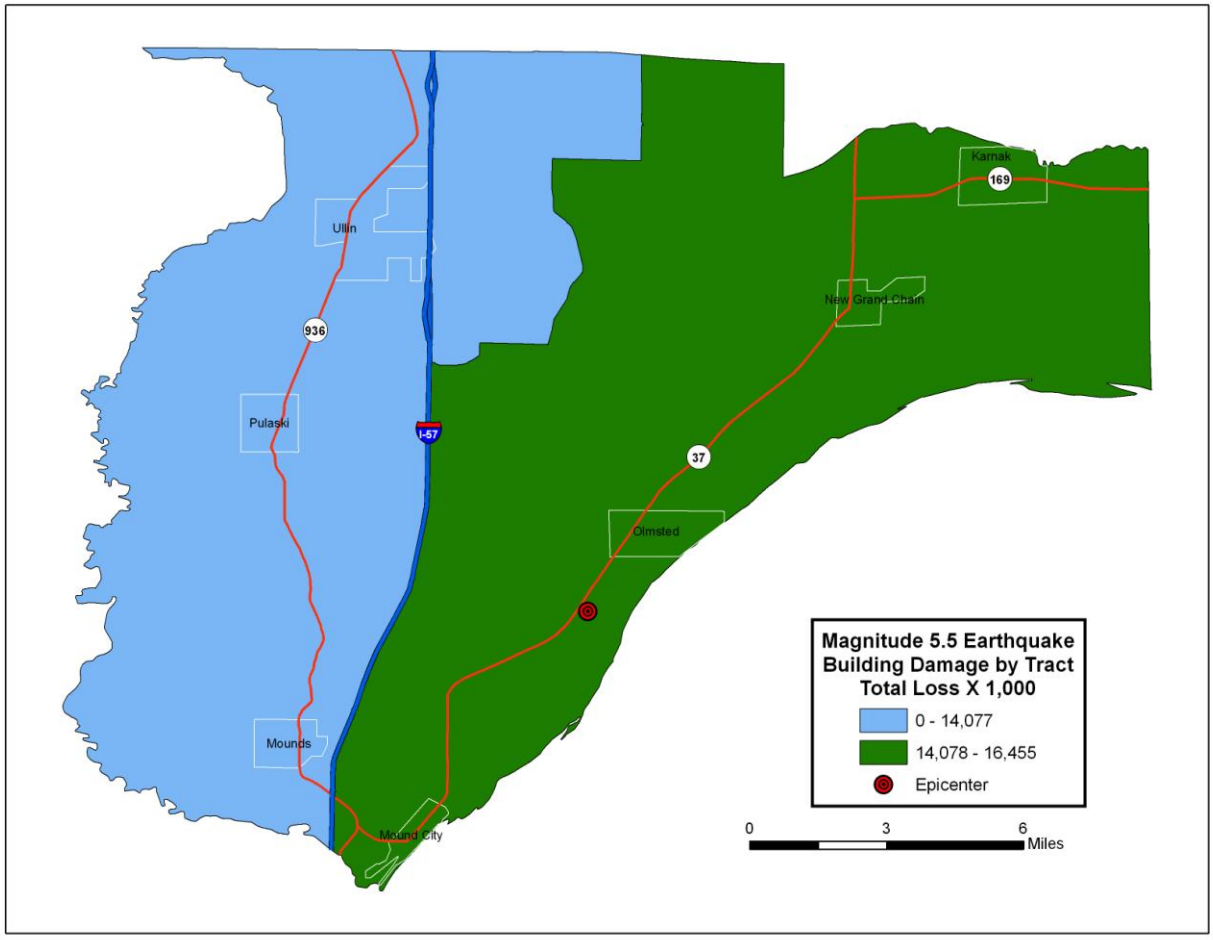
Table 4-27: Pulaski County 5.5M Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	2	0.12	1	0.10	1	0.15	0	0.24	0	0.21
Commercial	19	1.05	7	0.83	5	1.15	1	1.72	0	1.61
Education	3	0.16	1	0.12	1	0.18	0	0.28	0	0.33
Government	4	0.20	1	0.14	1	0.20	0	0.28	0	0.35
Industrial	5	0.25	2	0.19	1	0.30	0	0.45	0	0.32
Other Residential	430	23.71	215	24.49	175	39.74	32	39.47	2	11.50
Religion	4	0.21	2	0.19	1	0.25	0	0.39	0	0.46
Single Family	1,349	74.31	649	73.93	255	58.02	47	57.16	12	85.22
Total	**1,815**		**878**		**439**		**82**		**14**	

Table 4-28: Pulaski County 5.5M Scenario-Building Economic Losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.05	0.47	0.01	0.20	0.73
	Capital-Related	0.00	0.02	0.40	0.01	0.05	0.49
	Rental	0.37	0.22	0.27	0.01	0.08	0.94
	Relocation	0.04	0.01	0.01	0.00	0.03	0.09
	Subtotal	**0.41**	**0.29**	**1.16**	**0.03**	**0.35**	**2.25**
Capital Stock Loses							
	Structural	1.73	0.53	0.41	0.10	0.59	3.38
	Non_Structural	8.04	2.82	2.00	0.65	2.53	16.02
	Content	3.68	0.95	1.41	0.50	2.19	8.72
	Inventory	0.00	0.00	0.04	0.08	0.04	0.16
	Subtotal	**13.44**	**4.30**	**3.86**	**1.32**	**5.35**	**28.28**
	Total	**13.86**	**4.59**	**5.02**	**1.35**	**5.71**	**30.53**

Figure 4-13: Pulaski County 5.5M Scenario-Building Economic Losses in Thousands of Dollars



Vulnerability to Future Assets/Infrastructure for Earthquake Hazard

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

Analysis of Community Development Trends

Community development will occur outside of the low-lying areas in floodplains with a water table within five feet of grade which are susceptible to liquefaction. Furthermore, Pulaski County will continue to provide training to county officials, implement public education, and institute leaders who are proactive in mapping and studying the risks of earthquakes in the county.

4.4.4 Thunderstorm Hazard

Hazard Definition for Thunderstorm Hazard

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

- Hail of diameter 1.0 inches or higher
- Frequent and dangerous lightning
- Wind speeds equal to or greater than 58 mph

Hail

Hail can be a product of a strong thunderstorm. Hail usually falls near the center of a storm; however strong winds occurring at high altitudes in the thunderstorm can blow the hailstones away from the storm center, resulting in a broader distribution. Hailstones range from pea-sized to baseball-sized, but hailstones larger than softballs have been reported on rare occasions.

Lightning

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

Severe Winds (Straight-Line Winds)

Straight-line winds from thunderstorms are a fairly common occurrence across 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 for Thunderstorm Hazard

The NCDC database reported 32 hailstorms in Pulaski County since 1980. Hailstorms occur nearly every year in the late spring and early summer months. The most recent significant occurrence was in February 2007 when a cold front pressed southeast across the region during the afternoon as a wave of low pressure shifted east along the front into the Ozarks of northern Arkansas. Southerly flow ahead of the low brought warm moist air northward as temperatures reached the 60s. The atmosphere destabilized enough by late afternoon to allow for the development of thunderstorms. These storms were prolific hail producers as they crossed into southern Illinois.

Pulaski County hailstorms are listed in Table 4-29; additional details for NCDC events are included in Appendix D.

Table 4-29: Pulaski County Hailstorms*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Pulaski	5/13/1980	Hail	1.75 in.	0	0	0
Pulaski	6/20/1981	Hail	0.75 in.	0	0	0
Pulaski	4/3/1989	Hail	0.75 in.	0	0	0
Pulaski	5/5/1989	Hail	0.75 in.	0	0	0
Pulaski	7/4/1992	Hail	1.00 in.	0	0	0
America	4/12/1993	Hail	1.50 in.	0	0	0
Dixon Springs	4/20/1995	Hail	1.50 in.	0	0	0
Mounds	6/9/1995	Hail	0.75 in.	0	0	0
Olmsted	6/9/1995	Hail	1.00 in.	0	0	0
Ullin	3/28/1997	Hail	1.75 in.	0	0	0
Mound City	4/13/1998	Hail	0.88 in.	0	0	0
Mound City	1/3/2000	Hail	0.75 in.	0	0	0
Mound City	4/16/2000	Hail	1.75 in.	0	0	0
Ullin	4/27/2000	Hail	0.75 in.	0	0	0
Grand Chain	5/23/2000	Hail	1.75 in.	0	0	0
Ullin	9/11/2000	Hail	1.75 in.	0	0	0
Ullin	9/22/2000	Hail	1.00 in.	0	0	0
Pulaski	4/25/2003	Hail	0.75 in.	0	0	0
Olmsted	5/4/2003	Hail	0.75 in.	0	0	0
Olmsted	5/26/2004	Hail	0.75 in.	0	0	0
Villa Ridge	6/8/2005	Hail	1.00 in.	0	0	0
Perks	4/2/2006	Hail	1.00 in.	0	0	0
Karnak	4/2/2006	Hail	1.75 in.	0	0	0
Pulaski	5/2/2006	Hail	0.88 in.	0	0	0
Grand Chain	5/3/2006	Hail	0.88 in.	0	0	0
Ullin	5/25/2006	Hail	1.75 in.	0	0	0
Ullin	5/25/2006	Hail	1.00 in.	0	0	0
Ullin	9/10/2006	Hail	0.75 in.	0	0	0
Ullin	2/20/2007	Hail	1.75 in.	0	0	0
Mounds	2/20/2007	Hail	1.00 in.	0	0	0
Karnak	2/20/2007	Hail	0.88 in.	0	0	0
Grand Chain	2/20/2007	Hail	0.75 in.	0	0	0

Source: NCDC

* 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 identified 62 wind storms reported since 1958. On multiple occasions in the past 50 years trees have been uprooted by severe winds in Pulaski County. These storms have been attributed with nearly a half million dollars in property damage in Pulaski and adjacent counties.

As shown in Table 4-30, wind storms have historically occurred year-round with the greatest frequency and damage in April through August.

Table 4-30: Pulaski County Wind Storms*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Pulaski	6/14/1958	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	6/14/1958	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	7/16/1962	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	5/1/1967	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	5/11/1967	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	5/9/1970	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	6/20/1970	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	7/5/1975	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	8/27/1988	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	9/7/1990	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	7/14/1992	Thunderstorm Winds	Not Recorded	0	0	0
Many Areas	4/18/1995	Thunderstorm Winds	Not Recorded	0	0	0
Ullin	5/17/1995	Thunderstorm Winds	Not Recorded	0	0	0
Wetaug	5/18/1995	Thunderstorm Winds	Not Recorded	0	0	0
Grand Chain	6/7/1995	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	6/8/1995	Thunderstorm Winds	Not Recorded	0	0	100K
Western	6/20/1995	Thunderstorm Winds	Not Recorded	0	0	0
Pulaski	11/11/1995	High Winds	Not Recorded	0	0	0
Wetaug	1/18/1996	Thunderstorm Winds	Not Recorded	0	0	10K
Pulaski	5/5/1996	Thunderstorm Winds	Not Recorded	0	0	50K
Mounds	10/22/1996	Thunderstorm Winds	50 kts.	0	0	0
Karnak	4/20/1997	Thunderstorm Winds	50 kts.	0	0	0
Pulaski	4/30/1997	High Wind	52 kts.	0	0	20K
Mounds	6/13/1997	Thunderstorm Winds	52 kts.	0	0	0
Villa Ridge	7/8/1997	Thunderstorm Winds	52 kts.	0	0	0
Pulaski	7/14/1997	Thunderstorm Winds	50 kts.	0	0	4K
Mound City	6/12/1998	Thunderstorm Winds	50 kts.	0	0	4K

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Pulaski	2/7/1999	Strong Winds	Not Recorded	0	0	23K
Mounds	5/17/1999	Thunderstorm Winds	56 kts.	0	0	40K
Mounds	6/6/1999	Thunderstorm Winds	50 kts.	0	0	3K
Pulaski	4/20/2000	Wind	Not Recorded	0	0	0
Ullin	9/22/2000	Thunderstorm Winds	65 kts.	0	0	0
Ullin	2/24/2001	Thunderstorm Winds	52 kts.	0	0	3K
Mounds	8/9/2001	Thunderstorm Winds	52 kts.	0	0	5K
Mounds	10/24/2001	Thunderstorm Winds	52 kts.	0	0	8K
Pulaski	3/9/2002	Wind	Not Recorded	0	0	3K
Pulaski	5/4/2003	Thunderstorm Winds	52 kts.	0	0	0
Pulaski	5/4/2003	Thunderstorm Winds	52 kts.	0	0	0
Ullin	5/10/2003	Thunderstorm Winds	55 kts.	0	0	0
Grand Chain	5/10/2003	Thunderstorm Winds	50 kts.	0	0	0
Mounds	7/18/2003	Thunderstorm Winds	50 kts.	0	0	0
Villa Ridge	7/28/2003	Thunderstorm Winds	50 kts.	0	0	0
Pulaski	5/30/2004	Thunderstorm Winds	52 kts.	0	0	0
Mound City	6/9/2004	Thunderstorm Winds	50 kts.	0	0	0
Villa Ridge	6/12/2004	Thunderstorm Winds	50 kts.	0	0	3K
Perks	3/30/2005	Thunderstorm Winds	50 kts.	0	0	0
Pulaski	5/13/2005	Thunderstorm Winds	50 kts.	0	0	2K
Pulaski	6/8/2005	Thunderstorm Winds	52 kts.	0	0	0
Pulaski	1/8/2006	Strong Wind	Not Recorded	0	0	19K
Pulaski	1/19/2006	Strong Wind	Not Recorded	0	0	19K
Pulaski	2/16/2006	Strong Wind	Not Recorded	0	0	14K
Pulaski	3/9/2006	Thunderstorm Winds	52 kts.	0	0	7K
Karnak	3/9/2006	Thunderstorm Winds	50 kts.	0	0	0
Ullin	3/12/2006	Thunderstorm Winds	78 kts.	0	0	100K
Villa Ridge	5/25/2006	Thunderstorm Winds	51 kts.	0	0	0
Ullin	8/10/2006	Thunderstorm Winds	50 kts.	0	0	0
Mound City	9/22/2006	Thunderstorm Winds	50 kts.	0	0	2K
Pulaski	12/1/2006	Strong Wind	Not Recorded	0	0	1K
Perks	5/15/2007	Thunderstorm Wind	Not Recorded	0	0	4K
Mounds	10/18/2007	Thunderstorm Wind	Not Recorded	0	0	6K
Ullin	1/29/2008	Thunderstorm Wind	Not Recorded	0	0	100K

Source: NCDC

* 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 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 historical thunderstorms listed previously varies in terms of the extent of the storm, the wind speed, and the size of hailstones. Thunderstorms can occur at any location within the county.

Calculated Risk Priority Index for Thunderstorm Hazard

Based on historical information, the probability of future high wind damage is highly likely. High winds with widely varying magnitudes are expected to happen. According to the RPI, thunderstorms and high wind damage ranked as the number five hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
4	x	2	=	8

Vulnerability Analysis for Thunderstorm Hazard

Severe thunderstorms are an evenly distributed threat across the entire jurisdiction; therefore, the entire county's population and all buildings are susceptible to severe thunderstorms and can expect the same impacts. This plan will therefore consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Pulaski County are discussed in types and numbers in Table 4-9.

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, debris (trees or limbs) causing damage, roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of function of the facility (e.g. a damaged police station will no longer be able to serve the community). Table 4-7 lists the types and numbers of all essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

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

Infrastructure

During a severe thunderstorm, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a severe thunderstorm. 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 fail or become impassable causing risk to traffic.

Vulnerability to Future Assets/Infrastructure for Thunderstorm Hazard

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

Analysis of Community Development Trends

Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures need to be built with more sturdy construction, and those structures already in place need to be hardened to lessen the potential impacts of severe weather. Community warning sirens to provide warning of approaching storms are also vital to preventing the loss of property and ensuring the safety of Pulaski County residents.

4.4.5 Winter Storm Hazard

Hazard Definition for Winter Storm Hazard

Severe winter weather consists of various forms of precipitation and strong weather conditions. This may include one or more of the following conditions: 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, and death.

Ice (glazing) and Sleet Storms

Ice or sleet, even in small quantities, can result in hazardous driving conditions and can cause property damage. Sleet involves frozen raindrops that bounce when they hit the ground or other objects. 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.

The most damaging winter storms in southern Illinois have been ice storms. Ice storms occur when moisture-laden gulf air converges with the northern jet stream causing strong winds and heavy precipitation. This precipitation takes the form of freezing rain coating power and communication lines and trees with heavy ice. The winds will then cause the overburdened limbs and cables to snap; leaving large sectors of the population without power, heat, or communication. In the past few decades, including the winter of 2007–09, numerous ice storm events have occurred in southern Illinois.

Snow Storms

Significant snow storms are characterized by the rapid accumulation of snow, often accompanied by high winds, cold temperatures, and low visibility. A blizzard is categorized as a snow storm with winds of 35 miles per hour or greater and/or visibility of less than ¼ mile for three or more hours. Blizzards are the most dramatic and perilous of all winter storm events. Most snow within a blizzard is in the form of fine, powdery particles, which are wind-blown in such great quantities that visibility is reduced to only a few feet. Blizzards have the potential to result in property damage.

Illinois has repeatedly been struck by blizzards, although they are less common in the southern part of the state. Blizzard conditions can cause power outages, loss of communication, and make transportation impossible. The blowing of snow can reduce visibility to less than ¼ mile, resulting in disorientation that can make even travel by foot dangerous.

Severe Cold

Severe cold is characterized by the ambient air temperature that may drop to 0°F or below. These extreme temperatures can increase the likelihood of frostbite and hyperthermia. 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), which can lower the time it takes for frostbite and hypothermia to affect a person's body.

Previous Occurrences for Winter Storm Hazard

The NCDC database identified 45 winter storm and extreme cold events for Pulaski County since 1994. These storms have been attributed with three deaths, one injury, and $1.75 million in property damage in Pulaski and surrounding counties. A recent example a severe winter storm occurred in February 2008, low pressure developed over the southern Plains, spreading widespread heavy precipitation across southern Illinois. At the same time, high pressure over the upper Ohio Valley produced a cold easterly wind flow. The result was a crippling ice storm.

Approximately one inch of ice caused extensive damage across far southern Illinois, along and south of a line from Carbondale and Marion to Harrisburg and Carmi. Many of those same areas received three to six inches of sleet and snow. The most destructive icing occurred in an east to west band across Alexander, Johnson, Pulaski, and Pope Counties. The state designated most counties in southern Illinois as a disaster area. Numerous trees and power lines were brought down, knocking out power to many thousands of homes. Power outages lasted up to a week.

The NCDC winter storms for Pulaski County are listed in Table 4-31. Additional details for NCDC events are included in Appendix D.

Table 4-31: Winter Storm Events*

Location or County	Date	Type	Deaths	Injuries	Property Damage
Southern Illinois	3/8/1994	Heavy Snow	0	0	500K
Pulaski	9/24/1995	Frost	0	0	0
Pulaski	12/8/1995	Snow	0	0	0
Pulaski	12/9/1995	Cold Wave	0	0	0
Pulaski	1/2/1996	Winter Storm	0	0	0
Pulaski	1/6/1996	Winter Storm	0	0	0
Pulaski	2/2/1996	Extreme Cold	0	0	0
Pulaski	1/8/1997	Winter Storm	0	0	0
Pulaski	1/10/1997	Extreme Wind chill	1	0	0
Pulaski	1/15/1997	Ice Storm	0	0	0
Karnak	3/28/1997	Funnel Cloud	0	0	0
Pulaski	4/18/1997	Frost	0	0	0
Perks	7/8/1997	Funnel Cloud	0	0	0
Pulaski	1/17/1998	Freezing Drizzle	0	0	0
Pulaski	12/21/1998	Freezing Rain	0	0	0
Pulaski	12/23/1998	Snow	0	0	0
Pulaski	1/1/1999	Ice Storm	0	0	150K

Location or County	Date	Type	Deaths	Injuries	Property Damage
Pulaski	1/8/1999	Ice Storm	0	0	0
Pulaski	3/14/1999	Heavy Snow	0	0	0
Pulaski	1/22/2000	Snow	0	0	0
Pulaski	4/9/2000	Frost	0	0	0
Pulaski	10/9/2000	Frost	0	0	0
Pulaski	12/12/2000	Extreme Cold	0	0	0
Pulaski	12/13/2000	Winter Storm	0	0	0
Pulaski	1/1/2001	Extreme Cold	0	0	0
Pulaski	1/26/2001	Freezing Rain	0	0	0
Pulaski	2/21/2001	Winter Storm	0	0	0
Pulaski	4/18/2001	Frost	0	0	0
Pulaski	1/19/2002	Heavy Snow	0	0	0
Pulaski	12/4/2002	Winter Storm	0	0	0
Pulaski	1/16/2003	Winter Storm	0	0	0
Pulaski	1/22/2003	Winter Weather/mix	0	0	0
Pulaski	1/23/2003	Extreme Cold/wind Chill	0	0	0
Pulaski	2/6/2003	Heavy Snow	0	0	0
Pulaski	2/16/2003	Winter Storm	0	0	0
Pulaski	1/25/2004	Ice Storm	0	0	0
Pulaski	12/22/2004	Winter Storm	1	1	100K
Pulaski	12/23/2004	Extreme Cold/wind Chill	1	0	0
Pulaski	10/28/2005	Frost/freeze	0	0	0
Pulaski	12/8/2005	Winter Weather/mix	0	0	0
Pulaski	2/18/2006	Winter Weather/mix	0	0	0
Pulaski	2/19/2006	Winter Weather/mix	0	0	0
Grand Chain	5/25/2006	Funnel Cloud	0	0	0
Pulaski	2/3/2007	Winter Weather	0	0	0
Pulaski	2/11/2008	Winter Storm	0	0	1.0M

Source: NCDC

* 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 Winter Storm Hazard

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

Hazard Extent for Winter Storm Hazard

The extent of the historical winter storms listed previously varies in terms of storm extent, temperature, and ice or snowfall. Severe winter storms affect the entire jurisdiction equally.

Calculated Risk Priority Index for Winter Storm Hazard

Based on historical information, the probability of future winter storms is likely. Winter storms of varying magnitudes are expected to happen. According to the RPI, winter storms were ranked as the number sixth.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
3	x	2	=	6

Vulnerability Analysis for Winter Storm Hazard

Winter storm impacts are evenly distributed across the jurisdiction; therefore the entire county is vulnerable to winter storms and can expect the same impacts within the affected area. The building exposure for Pulaski County, as determined from the building inventory, is included in Table 4-9.

Critical Facilities

All critical facilities are vulnerable to a winter storm. A critical facility will encounter many of the same impacts as any other buildings within the jurisdiction. These impacts include loss of gas or electricity from broken or damaged utility lines, roads and railways damaged or impassable, broken water pipes, and roof collapse from heavy snow. Table 4-7 lists the types and numbers of the essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

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 building stock within the county are similar to the damages expected to the critical facilities, including loss of gas of electricity from broken or damaged utility lines, roads and railways damaged or impassable, broken water pipes, and roof collapse from heavy snow.

Infrastructure

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

Vulnerability to Future Assets/Infrastructure for Winter Storm Hazard

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

Analysis of Community Development Trends

Because the winter storm events are regional in nature, future development will be impacted across the county. Rural areas in Pulaski County are particularly vulnerable due to the likely hood of long term power outages. Human service agencies, volunteer organizations, the Pulaski County Health Department, medical and health care facilities, and schools have definite roles to play in public education, planning, and response to extreme winter conditions.

4.4.6 Hazardous Materials Storage and Transport Hazard

Hazard Definition for Hazardous Materials Storage and Transport Hazard

Explosions result from the ignition of volatile materials such as petroleum products, natural gas and other flammable gases, hazardous materials/chemicals and dust, and explosive devices. 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 for Hazardous Materials Storage and Transport Hazard

Pulaski County has not experienced a significant or large-scale hazardous material incident at a fixed site or transportation route that has resulted in multiple deaths or serious injuries.

Geographic Location for Hazardous Materials Storage and Transport Hazard

The hazardous material hazards are countywide and are primarily associated with the transport of materials via highway or rail.

Hazard Extent for Hazardous Materials Storage and Transport 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.

Calculated Risk Priority Index for Hazardous Materials Storage and Transport Hazard

The possibility of a hazardous materials accident is likely, based on input from the planning team. According to the RPI, Hazardous Materials Storage and Transport ranked as the number seven hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
2	x	2	=	4

Vulnerability Analysis for Hazardous Materials Storage and Transport Hazard

Hazardous material impacts are evenly distributed across the jurisdiction; therefore the entire county is vulnerable to a release associated with hazardous materials storage or transport and can expect the same impacts within the affected area. The building exposure for Pulaski County, as determined from building inventory, is included in Table 4-8. This plan will therefore consider all buildings located within the county as vulnerable.

Critical Facilities

All critical facilities and communities within the county are at risk. A critical facility, if vulnerable, will encounter many of the same impacts as other buildings 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 will no longer be able to serve the community). Table 4-7 lists the types and numbers of all essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

Table 4-8 lists the building exposure in terms of type and number 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 due to fire or explosion or debris and loss of function of the building (e.g. a damaged home will no longer be habitable causing residence to seek shelter).

Infrastructure

During a hazardous materials release, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since a full inventory of infrastructure is not available for this plan, it is important to emphasize that any number of these items could become damaged in the event of a hazardous material release. 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 fail or become impassable causing risk to traffic.

The U.S. EPA's ALOHA (Areal Locations of Hazardous Atmospheres) model was utilized to assess the area of impact for a Chlorine release along the Canadian Northern Railway tracks on the west side of Mounds, Illinois.

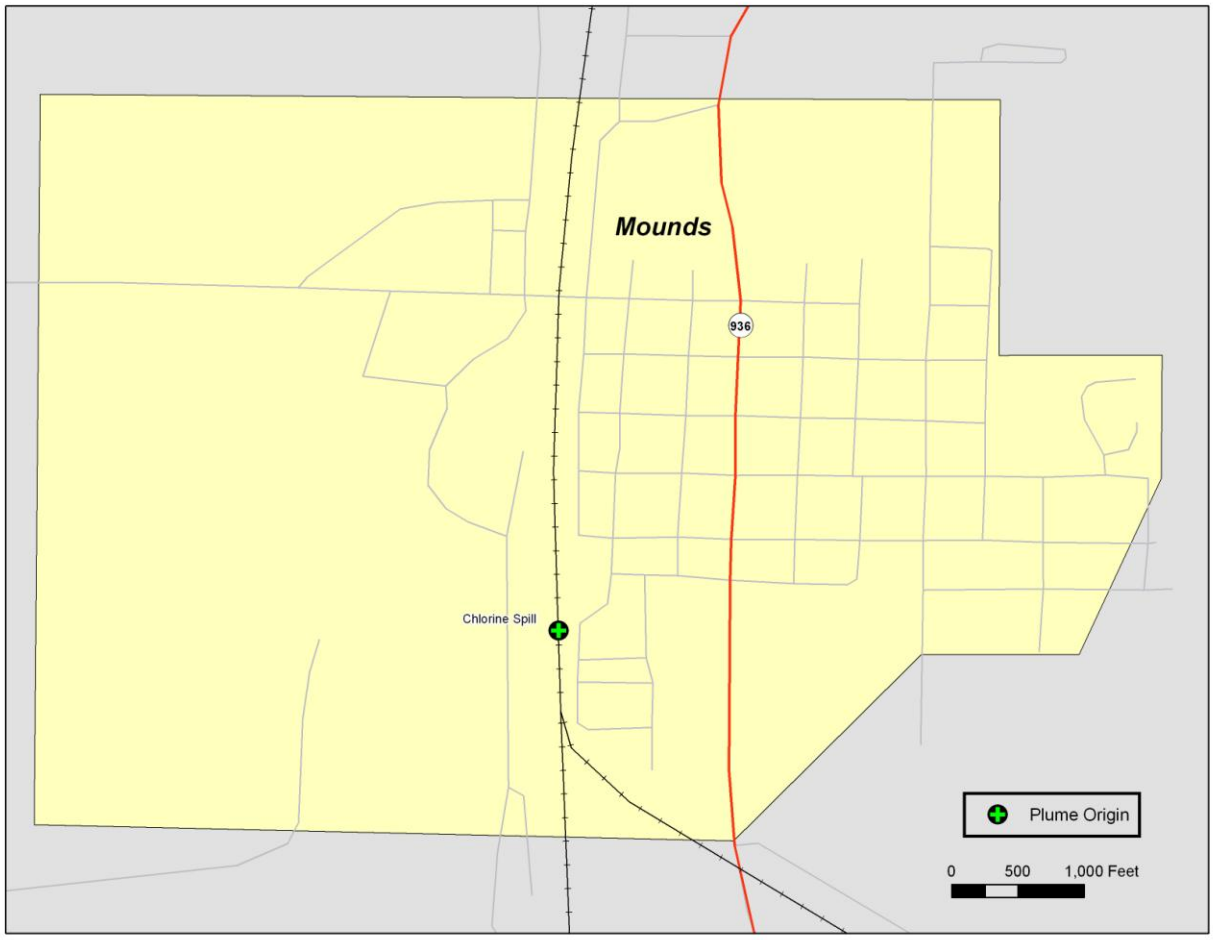
Chlorine is a greenish yellow gas with a pungent suffocating odor. The gas liquefies at -35°C and room pressure or will liquefy from pressure applied at room temperature. Contact with unconfined liquid chlorine can cause frostbite from evaporative cooling. Chlorine does not burn, but, like oxygen, supports combustion. The toxic gas can have adverse health effects from either long-term inhalation of low concentrations of vapors or short-term inhalation of high concentrations. Chlorine vapors are much heavier than air and tend to settle in low areas. Chlorine is commonly used to purify water, bleach wood pulp, and make other chemicals.

Source: http://cameochemicals.noaa.gov/chemical/2862

For this scenario, moderate atmospheric and climatic conditions with a slight breeze from the ALOHA is a computer program designed especially for use by people responding to chemical west were assumed. The target area was chosen due to its proximity to residential and commercial interests in the community.

The geographic area covered in this analysis is depicted in Figure 4-14.

Figure 4-14: Location of Chemical Release



Analysis

The ALOHA atmospheric modeling parameters, depicted in Figure 4-15, were based upon a south westerly wind speed of 5 mph. The temperature was 68°F with 75% humidity and partly cloudy skies.

The source of the chemical spill is a horizontal, cylindrical-shaped tank. The diameter of the tank was set to 9.81 feet and the length set to 53 feet (30,000 gallons). At the time of its release, it was estimated that the tank was 100% 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.

Figure 4-15: ALOHA Plume Modeling Parameters

```
SITE DATA:
  Location: MOUNDS, ILLINOIS
  Building Air Exchanges Per Hour: 0.40 (unsheltered single storied)
  Time: June 4, 2009  1044 hours CDT (using computer's clock)

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: -29.7° 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: 5 miles/hour from SW at 10 meters
  Ground Roughness: open country         Cloud Cover: 5 tenths
  Air Temperature: 68° F                 Stability Class: B
  No Inversion Height                    Relative Humidity: 75%

SOURCE STRENGTH:
  Leak from hole in horizontal cylindrical tank
  Non-flammable chemical is escaping from tank
  Tank Diameter: 9.81 feet               Tank Length: 53 feet
  Tank Volume: 30,000 gallons
  Tank contains liquid                   Internal Temperature: 68° F
  Chemical Mass in Tank: 176 tons        Tank is 100% full
  Circular Opening Diameter: 2.5 inches
  Opening is 12 inches from tank bottom
  Release Duration: 40 minutes
  Max Average Sustained Release Rate: 10,500 pounds/min
     (averaged over a minute or more)
  Total Amount Released: 337,920 pounds
  Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
  Model Run: Heavy Gas
  Red   : 5.4 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))
```

Acute Exposure Guideline Levels (AEGLs) are intended to describe the health effects on humans due to once-in-a-lifetime or rare exposure to airborne chemicals. The National Advisory Committee for AEGLs is developing these guidelines to help both national and local authorities, as well as private companies, deal with emergencies involving spills or other catastrophic exposures.

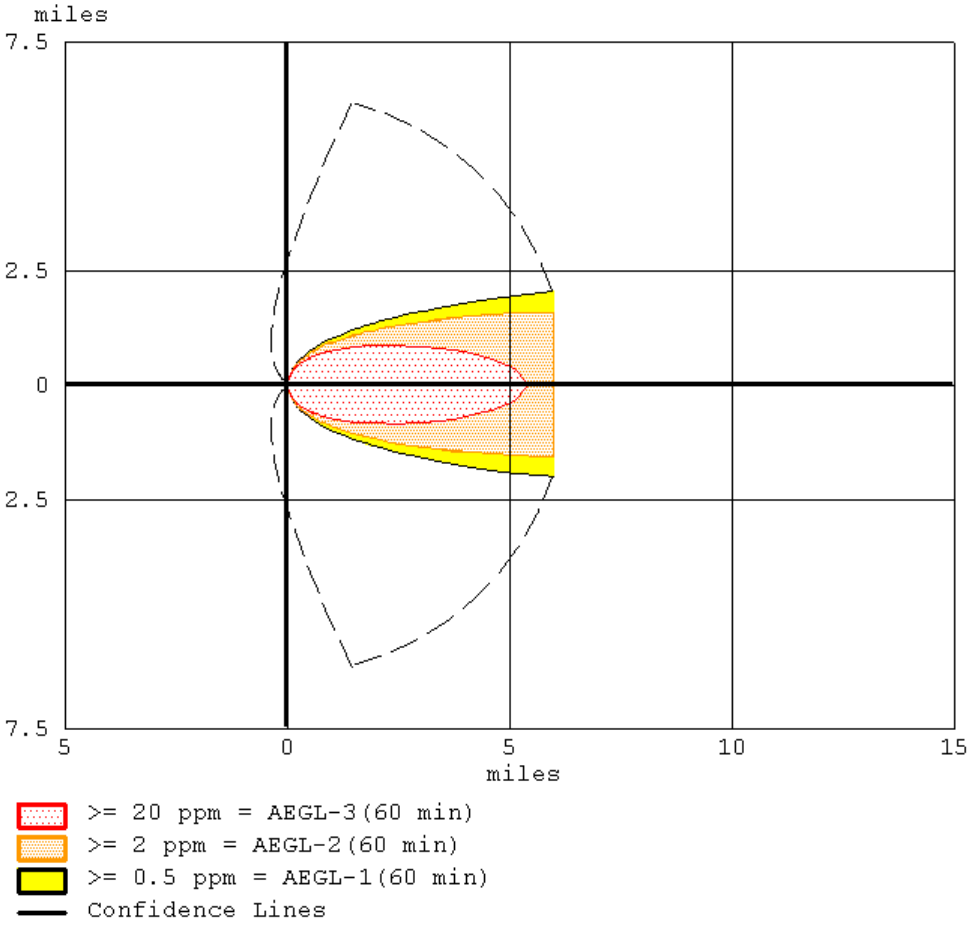
- AEGL 1: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

- AEGL 2: Above this airborne concentration of a substance, 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: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

According to the ALOHA parameters, approximately 10,500 pounds of material would be released per minute. The image in Figure 4-16 depicts the plume footprint generated by ALOHA.

Figure 4-16: Plume Footprint Generated by ALOHA



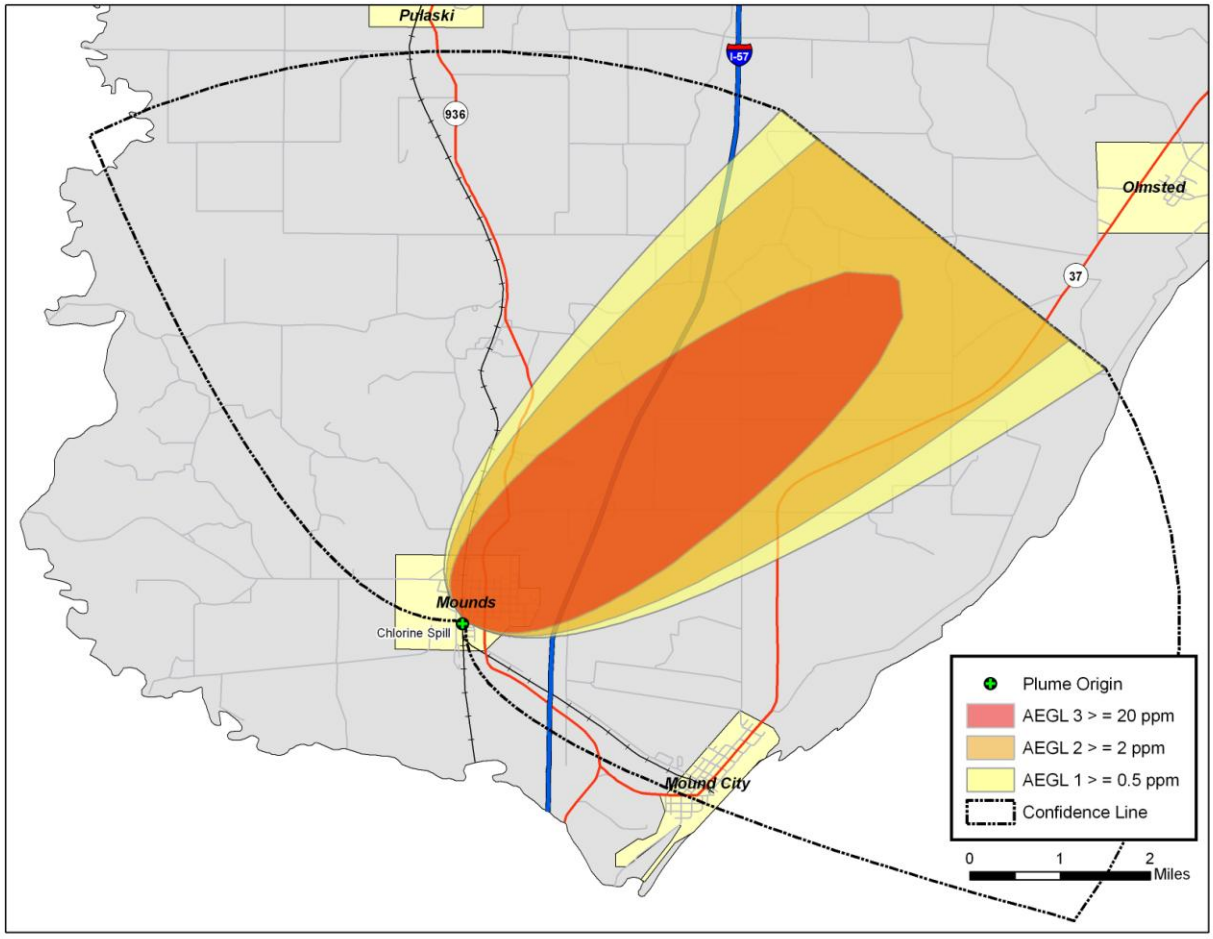
As the substance moves away from the source, the level of substance concentration decreases. Each color-coded area depicts a level of concentration measured in parts per million (ppm). For the purpose of clarification, this report will designate each level of concentration as follows.

- **AEGL-3**: The red buffer (≥20 ppm) extends no more than 4.8 miles from the point of release after one hour.
- **AEGL-2**: The orange buffer (≥2 ppm) extends no more than six miles from the point of release after one hour.

- **AEGL-1**: The yellow buffer (≥0.5 ppm) extends more than six miles from the point of release after one hour.
- **Confidence Lines**: The dashed lines depict the level of confidence in which the exposure zones will be contained. The ALOHA model is 95% confident that the release will stay within this boundary.

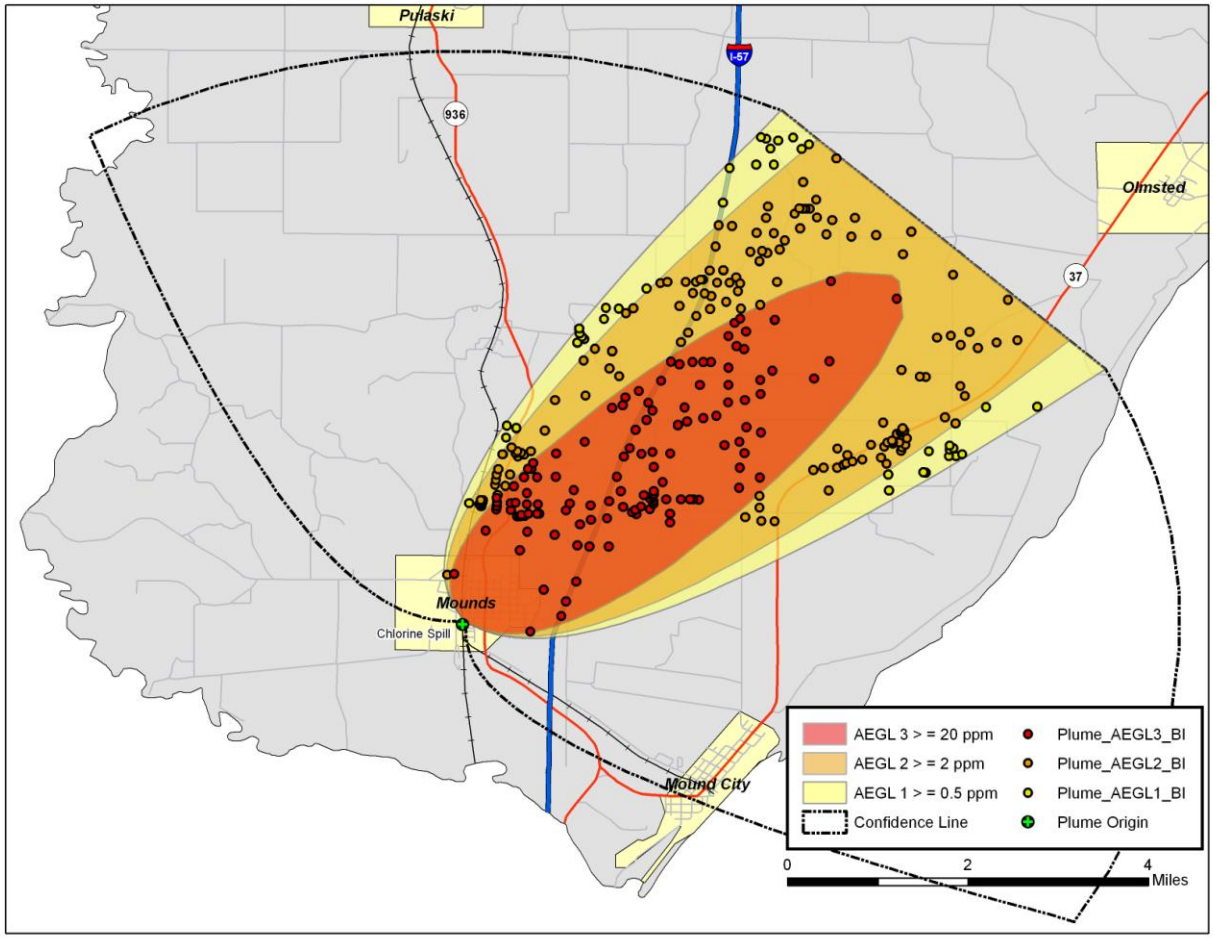
The image in Figure 4-17 depicts the plume footprint generated by ALOHA.

Figure 4-17: ALOHA Plume Footprint Overlaid in ArcGIS



The Pulaski County Building Inventory was added to ArcMap and overlaid with the plume footprint. The Building Inventory was then intersected with each of the four footprint areas to classify each point based upon the plume footprint in which it is located. Figure 4-18 depicts the Pulaski County Building Inventory after the intersect process.

Figure 4-18: Pulaski County Building Inventory Classified By Plume Footprint



Results

By summing the building inventory within all AEGL Level (AEGL 3 ≥20 ppm, AEGL 2 ≥2 ppm, AEGL 1 ≥0.5 ppm,), the GIS overlay analysis predicts that as many as 327 buildings could be exposed at a replacement cost of $18.5 million. If this event were to occur, approximately 395 people would be affected.

Building Inventory Damage

The results of the analysis against the Building Inventory points are depicted in Tables 4-33 through 4-57. Table 4-33 summarizes the results of the chemical spill by combining all AEGL Levels.

Table 4-33: Estimated Exposure for all AEGL Levels

Occupancy	Population	Building Counts	Building Exposure
Residential	395	158	$10,504,578
Commercial	0	5	$308,148
Industrial	0	1	$234,555
Agriculture	0	101	$6,524,160
Exempt*	704	62	$893,949
Total	**395**	**327**	**$18,465,390**

* Assumes School is in Session

Tables 4-34 through 4-36 summarize the results of the chemical spill for each Level separately.

Table 4-34: Estimated Exposure for AEGL 3 (≥20 ppm)

Occupancy	Population	Building Counts	Building Exposure
Residential	123	49	$3,686,109
Commercial	0	2	$176,661
Industrial	0	1	$234,555
Agriculture	0	42	$2,747,706
Exempt*	704	35	$528,741
Total	**123**	**129**	**$7,373,772**

* Assumes School is in Session

Table 4-35: Estimated Exposure for AEGL 2 (≥2.0ppm)

Occupancy	Population	Building Counts	Building Exposure
Residential	205	82	$4,980,741
Commercial	0	3	$131,487
Industrial	0	0	$0
Agriculture	0	47	$3,128,487
Exempt	0	24	$326,283
Total	**205**	**156**	**$8,566,998**

Table 4-36: Estimated Exposure for AEGL 1 (≥0.5 ppm)

Occupancy	Population	Building Counts	Building Exposure
Residential	68	27	$1,837,728
Commercial	0	0	$0
Industrial	0	0	$0
Agriculture	0	12	$647,967
Exempt	0	3	$38,925
Total	**68**	**42**	**$2,524,620**

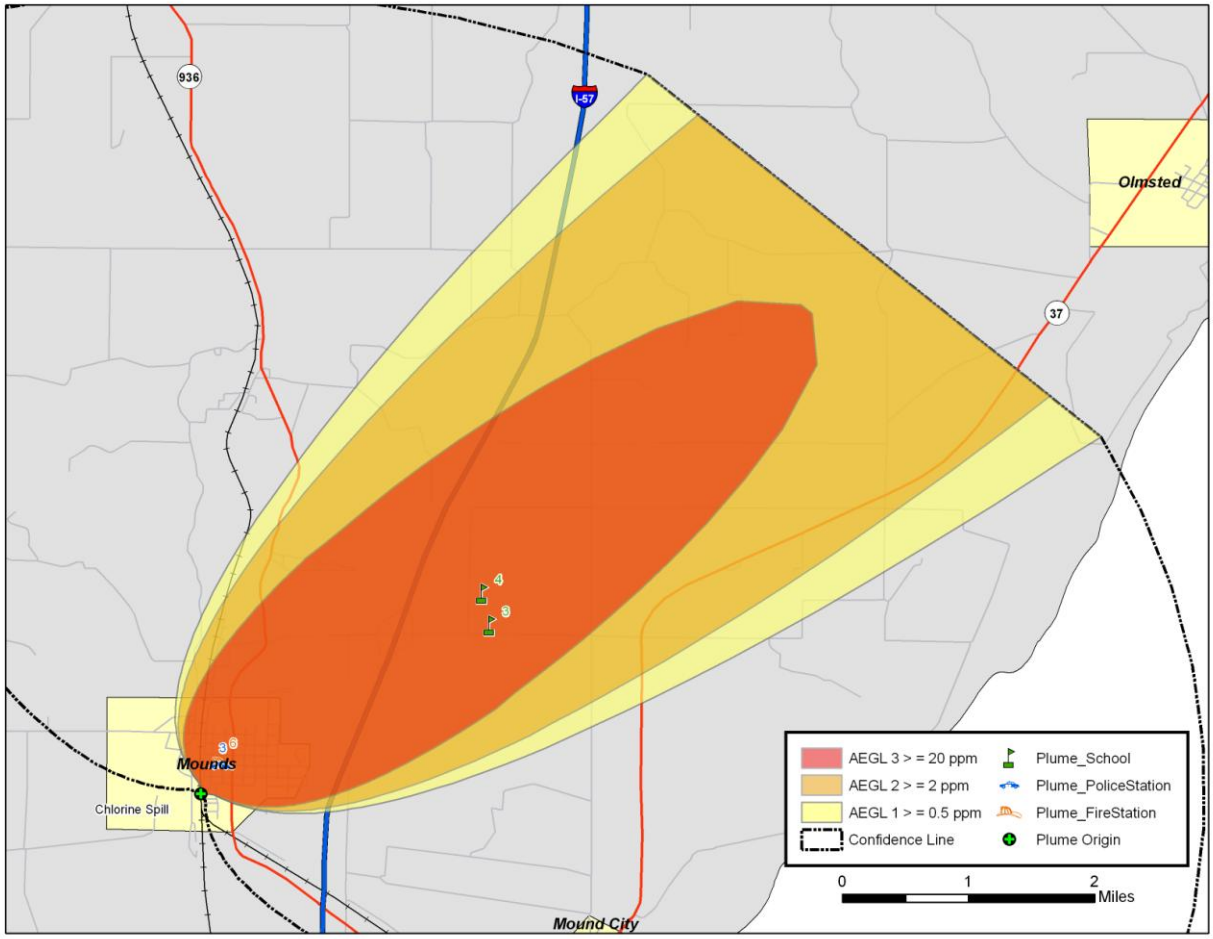
Essential Facilities Damage

There are four essential facilities within the limits of the chemical spill plume. The affected facilities are identified in Table 4-37. Their geographic locations are depicted in Figure 4-19.

Table 4-37: Essential Facilities within Plume Footprint

Name
Meridian High School
Meridian Elementary School
Mounds Fire Department
Mounds Police Department

Figure 4-19: Essential Facilities within Plume Footprint



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

A significant portion of the Pulaski County's population lives in close proximity to transportation corridors, such as the Canadian National Rail Road Line, Interstate 57, U.S. 51, Illinois State Route 37, and 169. These areas are particularly vulnerable to chemical releases because of transportation of hazardous materials.

Analysis of Community Development Trends

Because of the concentration of Pulaski County's Population to the transportation network, future development is likely to be vulnerable. The major transportation routes in Pulaski County pose a threat of dangerous chemicals and hazardous materials release Pulaski County will continue to provide a comprehensive means to mitigate, prepare for, respond to, and recover from hazards relating to hazardous materials releases.

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Section 5 - Mitigation Strategy

The goal of mitigation is to reduce a hazard's future impacts including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist with recovery. The goal of mitigation is to build disaster-resistant communities. Mitigation actions and projects should be based on a well-constructed risk assessment; Pulaski County's is provided in Section 4 of this plan. Mitigation should be an ongoing process that adapts over time to accommodate the community's needs.

5.1 Community Capability Assessment

The capability assessment identifies current activities used to mitigate hazards. The capability assessment identifies the policies, regulations, procedures, programs, and projects that contribute to the lessening of disaster damages. The assessment also provides an evaluation of these capabilities to determine whether the activities can be improved in order to more effectively reduce the impact of future hazards. The following sections identify existing plans and mitigation capabilities within all of the communities listed in Section 2 of this plan.

5.1.1 National Flood Insurance Program (NFIP)

The county and all of its communities are members of the NFIP. HAZUS-MH estimates that approximately 620 households were located in the Pulaski County Special Flood Hazard Area; as of June 18, 2007, the Federal Emergency Management Agency NFIP Insurance Report for Illinois stated that 51 households paid flood insurance, insuring $7,412,200 in property value. The total premiums collect amounted to $50,878, which on average was $998 annually. From 1978 to 2007, 26 claims were filed, totaling $33,308. The average claim was $1,281.

The county and incorporated areas do not participate in the National Flood Insurance Program's (NFIP) Community Rating System (CRS). 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 meeting the three goals of the CRS: 1) reduce flood losses; 2) facilitate accurate insurance rating; and 3) promote the awareness of flood insurance. Table 5-1 identifies each community and the date each participant joined the NFIP.

Table 5-1: Additional Information on Communities Participating in the NFIP

Community	Participation Date	FIRM Date	CRS Date	CRS Rating	Flood Plain Zoning Ordinance Adopted Last
County of Pulaski	05/17/1974	11/15/1984	NA	NA	6/28/2006
Village of Grand Chain	NA	NA	NA	NA	NA
Village of Karnak*	5/7/1976	11/06/1991	NA	NA	7/5/2006
City of Mound City	11/23/1973	3/5/1990	NA	NA	3/5/1990
City of Mounds	4/4/1977	7/1/2007	NA	NA	12/22/1990
Village of Olmsted	8/30/1974	6/15/1983	NA	NA	6/15/1983
Village of Pulaski	5/17/1974	11/15/1984	NA	NA	6/12/2006
Village of Ullin	4/12/1974	2/19/1986	NA	NA	7/10/2006

* *Not Mapped*

The Village of Grand Chain has no identified flood hazard boundaries; therefore, the community does not participate in the NFIP.

5.1.2 Storm water Management Stream Maintenance Ordinance

Pulaski County nor its cities or villages have a storm water management plan or ordinances.

5.1.3 Zoning Management Ordinance

Pulaski County nor its cities or villages have land use planning or zoning ordinances.

5.1.4 Erosion Management Program/ Policy

Pulaski County utilizes the Illinois Administrative Code Title 35 and the Illinois Environmental Protection Act, administered by the Illinois Environmental Protection Agency. This requires the submission of a storm water pollution prevention plan (SWPPP) for projects involving more than one acre of land disturbance.

5.1.5 Fire Insurance Rating Programs/ Policy

Table 5-2 lists the fire departments in Pulaski County, as well as the ISO rating and the number of members in each department.

Table 5-2: Listing of Fire Departments, Ratings, and Number of Firefighters

Fire Department	Fire Insurance Rating	Number of Firefighters
Grand Chain Fire Dept	10	15
Karnak Fire Dept	8	16
Mound City Fire Dept	6	15
Mounds Fire Dept	7	20
Olmsted Fire Dept	5	20
Pulaski Fire Dept	7	12
Ullin Fire Dept	6	25

5.1.6 Land Use Plan

There are not any Comprehensive Land Use Plans within Pulaski County.

5.1.7 Building Codes

Pulaski County nor its cities or villages have building codes.

5.2 Mitigation goals

The Pulaski County Emergency Services and Disaster Agency, Southern Illinois University-Carbondale Geology Department, the Polis Group of IUPUI, and the Southern Five Regional Planning Commission assisted the Pulaski County Multi-Hazard Mitigation Planning Team in the formulation of mitigation strategies and projects for Pulaski County. The goals and objectives set forth were derived through participation and discussion of the views and concerns of the Pulaski County Multi-Hazard Mitigation Team members and related public input. The MHMP will focus on these goals, with a great deal of public input, to ensure that the priorities of the communities are represented.

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 which will assist the communities to attain the listed goals. Table 5-5 lists mitigation actions, which are defined projects that will help to complete the defined goals and objectives.

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

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

(b) Objective: Equip public facilities and communities to guard against damage caused by hazards.

(c) Objective: Minimize the amount of infrastructure exposed to hazards.

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

(e) Objective: Improve emergency sheltering in Pulaski County.

Goal 2: Create new or revise existing plans/maps related to hazards affecting Pulaski County

(a) Objective: Support compliance with the NFIP for each jurisdiction in Pulaski County.

(b) Objective: Review and update existing community plans and ordinances to support hazard mitigation.

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

Goal 3: Develop long-term strategies to educate the public on the hazards affecting Pulaski County

(a) Objective: Raise public awareness on hazard mitigation.

(b) Objective: Improve education of emergency personnel and public officials.

5.3 Mitigation Actions/Projects

Upon completion of the risk assessment and development of the goals and objectives, the Planning Committee was provided with a list of the six mitigation measure categories from the *FEMA State and Local Mitigation Planning How to Guides*. The measures are listed as follows.

- **Prevention:** Government, administrative, or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.

- **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, structural retrofits, storm shutters, and shatter-resistant glass.

- **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

- **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.

- **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

After Meeting #3, held February 4, 2009, MHMP members were presented with the task of individually listing potential mitigation activities using the FEMA evaluation criteria. The MHMP members brought their mitigation ideas to Meeting #4, which was held February 25, 2009. The evaluation criteria (STAPLE+E) involved the following categories and questions.

Social:

- Will the proposed action adversely affect one segment of the population?
- Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?

Technical:

- How effective is the action in avoiding or reducing future losses?
- Will it create more problems than it solves?
- Does it solve the problem or only a symptom?
- Does the mitigation strategy address continued compliance with the NFIP?

Administrative:

- Does the jurisdiction have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
- Can the community provide the necessary maintenance?
- Can it be accomplished in a timely manner?

Political:

- Is there political support to implement and maintain this action?
- Is there a local champion willing to help see the action to completion?
- Is there enough public support to ensure the success of the action?

- How can the mitigation objectives be accomplished at the lowest cost to the public?

Legal:

- Does the community have the authority to implement the proposed action?
- Are the proper laws, ordinances, and resolution in place to implement the action?
- Are there any potential legal consequences?
- Is there any potential community liability?
- Is the action likely to be challenged by those who may be negatively affected?
- Does the mitigation strategy address continued compliance with the NFIP?

Economic:

- Are there currently sources of funds that can be used to implement the action?
- What benefits will the action provide?
- Does the cost seem reasonable for the size of the problem and likely benefits?
- What burden will be placed on the tax base or local economy to implement this action?
- Does the action contribute to other community economic goals such as capital improvements or economic development?
- What proposed actions should be considered but be "tabled" for implementation until outside sources of funding are available?

Environmental:

- How will this action affect the environment (land, water, endangered species)?
- Will this action comply with local, state, and federal environmental laws and regulations?
- Is the action consistent with community environmental goals?

The development of the MHMP is the first step in a multi-step process to implement projects and policies to mitigate hazards in the county and its communities.

5.3.1 Completed or Current Mitigation Actions/Projects

Since this is the first mitigation plan developed for Pulaski County, there are no deleted or deferred mitigation items. The following tables will refer to completed, ongoing, or future mitigation actions. Table 5-4 presents the completed and ongoing mitigation actions and projects in the county.

Table 5-4: Completed or Current Mitigation Actions

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Comments
Complete the following public education tasks: designate weather spotters, disseminate basic weather information, distribute publications	Goal: Develop long-term strategies to educate Pulaski County residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Thunderstorm	Pulaski County, Grand Chain, Karnak, Mound City, Mounds, Olmsted, Pulaski, Ullin	This project has been implemented and is ongoing.
Distribute weather radios to schools, government facilities, and areas with large populations	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm	Pulaski County	This project is complete.
Procure generators with back-up power supplies for critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm	Pulaski County	This project is complete.
Construct/Establish backup communication centers	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.	Tornado, Thunderstorm	Pulaski County	This project is complete.
Build earthquake-resistant buildings	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Earthquake	Pulaski County, Mounds, Ullin	The following structures are earthquake-resistant: Century Elementary School, Meridian Elementary, Shawnee Community College, County Ambulance Base

5.4 Implementation Strategy and Analysis of Mitigation Projects

Implementation of the mitigation plan is critical to the overall success of the mitigation planning process. The first step is to decide based upon many factors, which action will be undertaken initially. In order to pursue the top priority first, an analysis and prioritization of the actions is important. Some actions may occur before the top priority due to financial, engineering, environmental, permission, and/or 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.

In Meeting #4, the planning team prioritized mitigation actions based on a number of factors. A rating of High, Medium, or Low was assessed for each mitigation item and is listed next to each item in Table 5-6. The factors were the STAPLE+E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria listed in Table 5-5.

Table 5-5: STAPLE+E planning factors

S – 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.
T – Technical	Mitigation actions are technically most effective if they provide a long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – 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.
L – Legal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – 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.
E – 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.

For each mitigation action related to infrastructure, new and existing infrastructure was considered. Additionally, the mitigation strategies address continued compliance with the NFIP. While an official cost benefit review was not conducted for any of the mitigation actions, the estimated costs were discussed. The overall benefits were considered when prioritizing mitigation items from High to Low. An official cost benefit review will be conducted prior to the implementation of any mitigation actions. Table 5-6 presents mitigation projects developed by the planning team.

Table 5-6: Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Implement a mass notification system to include temporary AM public warning radios	Goal: Lessen the impacts of hazards to county residence and infrastructure Objective: Improve emergency communication throughout the county.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Pulaski County, Grand Chain, Karnak, Mound City, Mounds, Olmsted, Pulaski, Ullin	High	The ESDA Director will oversees the implementation of the project. Local resources will be used to evaluate, install, and maintain the warning systems. Additional funding will be sought from other funding sources, e.g. PDM program, to expand the warning system coverage area. Implementation, if funding is available, is forecasted to begin within one year.
Implement new plans for public education including distribution of first aid kits and pamphlets that address the importance of planning	Goal: Develop long-term strategies to educate Pulaski County residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Pulaski County, Grand Chain, Karnak, Mound City, Mounds, Olmsted, Pulaski, Ullin	High	The ESDA Director will work with area schools, healthcare facilities, and businesses to implement this project. Funding will be sought from local sources. Implementation, if funding is available, will begin within one year.
Install permanent signage and flood gates on Modglin Road	Goal: Warn the public of potential hazard. Objective: Reduce exposure of public to flood hazards.	Flood	Pulaski County	Medium	The ESDA Director and County Engineer will oversee the implementation of this project. Local resources will be used to research options for signage. Funding has not been secured as of 2009, but the pre-disaster mitigation program, local resources, and ILDOT are possible funding sources. If funding is available, this project is forecasted to begin within three years.
Elevate State Route 956, State Route 37, and Olmstead Road	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Pulaski County	Medium	The ESDA Director will oversee this project, working with the county highway department. ILDOT and IEMA are potential funding sources. If funding is available, implementation will begin within three years.
Detail Flood Rate Insurance maps	Goal: Create new or revise existing plans/maps for Pulaski County Objective: Support compliance with the NFIP for each jurisdiction in Pulaski County.	Flood	Pulaski County	High	The county floodplain manager will work with IDNR and FEMA to on this project.. Federal, State, and Local Governmental resources will be used to update the maps. Implementation will begin within one year.
Install inertial valves at critical facilities	Goal: Lessen the impacts of hazards to existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Earthquake	Pulaski County, Grand Chain, Karnak, Mound City, Mounds, Olmsted, Pulaski, Ullin	Medium	The ESDA Director and County Engineer will oversee implementation of this project. Funding has not been secured as of 2009, but the PDM program and community grants are an option. If funding is available, implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Construct safe houses/warming centers in key areas within the county	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in Pulaski County.	Winter Storm	Karnack, Pulaski, Mounds City, Ullin, Olmsted	Low	The ESDA Director will work with local shelters and Red Cross to complete this project. The PDM program or local resources are funding options. If funding is available, implementation will begin within five years.
Develop a county website to disseminate safety information and weather updates	Goal: Develop long-term strategies to educate Pulaski County residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm, Hazmat, Fire	Pulaski County	Low	The ESDA director will oversee this project. Local resources will be used to develop the site. If resources are available, the project will be implemented within five years.
Establish winter storm routes for road treatment	Goal: Create new or revise existing plans/maps for Pulaski County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Winter Storm	Pulaski County	High	The ESDA Director will work with the County Highway department and IDOT on the implementation of this project. Working with state and local resources, the county will develop a plan. If resources are available, implementation will begin within one year.
Establish an LEPC	Goal: Develop long-term strategies to educate Pulaski County residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire, Drought	Pulaski County	Low	The ESDA Director will work with local first responders to research training opportunities. The county will request funding for training and equipment from IEMA. The county will try to establish a bi-county LEPC with Alexander County. If funding is available, implementation will begin within one year.
Increase hazmat training for first responders to include field exercises and drills	Goal: Develop long-term strategies to educate Pulaski County residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Hazmat	Pulaski County	Low	The ESDA Director, working with the LEPC, will use local resources to evaluate training needs. Local resources will be sought to fund this project. Implementation, if funding is available, will begin within five years.
Conduct a commodity flow study	Goal: Create new or revise existing plans/maps for Pulaski County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Pulaski County	Medium	Community planners and local government leaders will coordinate this study. Funding will be requested from community grants or IEMA. Implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Install street lights and warning lights at the following intersections: State Route 37 and Mounds Road; State Route 37 and 169 Karnak	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Hazmat	Pulaski County, Mounds, Karnak	Low	The county highway department will oversee this project. Funding will be sought from ILDOT. If funding is available, implementation will begin within five years.

The Pulaski County Emergency Services and Disaster Agency will be the local champions for the mitigation actions. The county commissioners and the city and town councils will be an integral part of the implementation process. Federal and state assistance will be necessary for a number of the identified actions. Southern Five Regional Planning Commission is qualified to provide technical grant writing services to assist the county in seeking resources to achieve the recommended mitigation action.

5.5 Multi-Jurisdictional Mitigation Strategy

As a part of the multi-hazard mitigation planning requirements, at least two identifiable mitigation action items have been addressed for each hazard listed in the risk assessment and for each jurisdiction covered under this plan.

Each of the eight jurisdictions, including Pulaski County, were 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 this plan. The county planning team used FEMA's evaluation criteria to gauge the priority of all items. A final draft of the disaster mitigation plan was presented to all members to allow for final edits and approval of the priorities.

Section 6 - Plan Maintenance

6.1 Monitoring, Evaluating, and Updating the Plan

Throughout the five-year planning cycle, the Pulaski County Emergency Services and Disaster Agency Director will reconvene the MHMP planning committee to monitor, evaluate, and update the plan on an annual basis. Additionally, a meeting will be held during January 2015 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 arises, due to new developments or a declared disaster, the team will meet as necessary to update mitigation strategies. Depending on grant opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

The committee 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 committee will also review the risk assessment portion of the plan to determine if this information should be updated or modified. 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 county commissioners.

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, this updated data will be used for future risk assessments and vulnerability analyses.

6.2 Implementation through Existing Programs

The results of this plan will be incorporated into ongoing planning efforts. Many of the mitigation projects identified as part of this planning process are ongoing. Where needed, modifications will be made to the county and community planning documents and ordinances as part of regular updates. The mitigation plan will be used to help guide building code changes and land use planning.

6.3 Continued Public Involvement

Continued public involvement is critical to the successful implementation of the MHMP. Comments from the public on the MHMP will be received by Pulaski County Emergency Services and Disaster Agency and forwarded to the MHMP planning committee for discussion. Education efforts for hazard mitigation will be ongoing through the local television stations, brochures, and yearly public meetings. Once adopted, a copy of this plan will be posted in the library and on the county website.

Glossary of Terms

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

B

BFE – Base Flood Elevation

C

CAMEO – Computer-Aided Management of Emergency Operations
CEMA – County Emergency Management Agency
CEMP – Comprehensive Emergency Management Plan
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

E

EAP – Emergency Action Plan
ERPG – Emergency Response Planning Guidelines
EMA – Emergency Management Agency
EPA – Environmental Protection Agency

F

FEMA – Federal Emergency Management Agency
FIRM – Flood Insurance Rate Maps
FIS – Flood Information Study

G

GIS – Geographic Information System

H

HAZUS-MH – **Ha**zards **US**A **M**ulti-**H**azard
HUC – Hydrologic Unit Code

I

IDNR – Illinois Department of Natural Resources
IEMA – Illinois Emergency Management Agency

M

MHMP – Multi-Hazard Mitigation Plan

N

NCDC – National Climatic Data Center
NEHRP – National Earthquake Hazards Reduction Program
NFIP – National Flood Insurance Program
NOAA – National Oceanic and Atmospheric Administration

P

PPM – Parts Per Million

R

RPI – Risk Priority Index

S

SPC – Storm Prediction Center
SWPPP – Storm water Pollution Prevention Plan

U

USGS – United States Geological Survey

Appendix A – Minutes of the Multi-Hazard Mitigation Planning Team Meetings

IEMA Pre-Disaster Mitigation Plan

Assembly of the Pulaski County Planning Team Meeting 1:
Chairman: Kenneth Kerley, Pulaski County ESDA
Plan Directors: Southern Five Regional Planning Commission, SIUC Geology Department, and IUPUI - Polis

Meeting Date: Tuesday, October 28, 2008

Meeting Time: 6 pm

Place: Southern Five RPC Office, Ullin, IL

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
Andy Flor	SIUC Geology
Sara Murphy	Southern Five Regional Planning Commission
Tom Haynes	Pulaski County Ambulance
Bruce Newbolds	Pulaski County 911
Randy Kern	Pulaski County Sheriff
Kenneth Kerley	Pulaski County ESDA Director
Anthony Dover	Pulaski County EMA
Terry Riddle	Mound City Fire Dept
Matt Barnhill	Pulaski County EMA

Introduction to the Pre-Disaster Mitigation Planning Process

The meeting is called to order

Narrative: A power-point presentation was given by Jonathan Remo. He explained that this project is in response to the Disaster Mitigation Act of 2000. The project is funded by a grant awarded by FEMA. A twenty-five percent match will be required from the county to fund this project. The county match will be met by sweat equity and GIS data acquired from the County Assessor's Office. The sweat equity will be an accumulation of time spent at the meetings, on research assignments, surveys, along with the time spent reviewing and producing the planning document.

Jonathan Remo introduced the Pre-Disaster Mitigation Website to the planning team. A username and password was given to the planning team, which will grant them access to the web site. The web site is used to schedule meetings, post contact information and download material pertaining to the planning process.

Jonathan Remo divided the planning project into five to six meetings. At the 1st meeting, the planning team will review critical facility maps. The planning team will be asked to research and verify the location of all critical facilities within the county. Jonathan stated that public participation is very important throughout the planning process. He explained that all of the meetings are open to the public but there will be a particular effort made to invite the public to the 3rd meeting. At that meeting, the SIUC Geology Department will present historic accounts of natural disasters that have affected this area. At the 2nd meeting the discussion will focus on natural disasters that are relevant to this area. These hazards will be given a probability rating and ranked by their occurrence and potential level of risk. Polis and SIUC Geology will research these hazards and present them to the planning team. The 3rd meeting is publicized in order to encourage public participation. Polis and SIUC Geology will produce a risk assessment in draft form; each planning team member will get a copy. Also they will present strategies and projects that FEMA and other counties have undertaken for the planning team to review. The 4th meeting consists of a brain storming session focused on disasters that were analyzed in the risk assessment report. The Planning Team will list strategies and projects that could be implemented to mitigate the potential hazards that threaten the county. FEMA requires that for every identified hazard, a strategy to mitigate the loss and damage must be in place. The strategies may range from educational awareness to hardening a building or building a levee. After the 4th meeting the plan will be in its final draft form. At the 5th meeting the planning team will need to review the plan prior to sending it to IEMA. IEMA will review the plan and will make recommendation to it as they see fit, then it is submitted to FEMA for review and approval. Once the plan has been submitted to FEMA, local governments are eligible to apply for grants to mitigate these established hazards. After FEMA approves the plan, it is sent back to the Planning Team. At the 6th meeting the Planning Team will present the Pre-Disaster Mitigation Plan to the County Board for adoption. Incorporated communities must either adopt the county plan or prepare its own plan, in order to access mitigation assistance from FEMA. The communities are encouraged to participate and contribute to development of the plan. Once the County Board has adopted the plan, each incorporated community will have the opportunity to adopt the plan as well.

Jonathan Remo then introduced Andy Flor of SIUC. Andy Flor presented three maps that identified critical facilities in the county. He asked the planning team to come up to review the maps to identify any corrections that need to be made to the maps. He assigned research homework arranged by categories to individual planning team members to locate missing or incorrect critical facilities.

Narrative: A few clarifications were made about the planning process and the participation needed to complete the plan along with dialog between the Planning Team members and Andy and Jonathan about the critical facilities maps. There was discussion about the communities that were not represented and how to contact those communities for the meetings. It was also made

known by Sara Murphy of Southern Five Regional Planning Commission that all of the planning team members would be notified of the next meeting time and place.

Meeting was adjourned.

TUES, OCT 28
6pm

PULASKI CO PRE DISASTER MIT MTG #1

Thomas Haynes	697-2394 845-9048		Thaynes@pulaskicountyil.net
Bruce Newbolds	697-2782 (leave message)		bnewbolds@yahoo.com.
RANDY KERN	CELL-559-0758	WORK 748-9374	PCS771@YAHOO.COM
Kenneth Korley	618-303-0493		Pulaski_Co_IL_ESDA@mail.com
Anthony Dover	618-534-1942		aldover@yahoo.com
Terry Riddle	618 303-3586		MCFDR302@msn.com
Matt Barnhill	618-638-4895		Tireman_510@YAHOO.COM
Sara Murphy	618-634-2284		Sbmurphy@southernfive.org

IEMA Pre-Disaster Mitigation Plan

Assembly of the Pulaski County Planning Team Meeting 2:
Chairman: Kenneth Kerley, Pulaski County ESDA
Plan Directors: Southern Five Regional Planning Commission, SIUC Geology Department, and IUPUI - Polis

Meeting Date: Thursday, December 11, 2008

Meeting Time: 5pm

Place: Southern Five RPC Office, Ullin, IL

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
Andy Flor	SIUC Geology
Lisa Thurston	Southern Five Regional Planning Commission
Kenneth Kerley	Pulaski County ESDA Director
Anthony Dover	Pulaski County EMA
Monte Russell	Pulaski County Commissioner
Matt Barnhill	Pulaski County EMA

The meeting was called to order.

Jonathan Remo began the meeting by re-introducing the objectives of the PDM Planning document. The planning document is mandated as a result of the "Disaster Mitigation Act of 2000". Jonathan stated that the objective of the meeting was to prioritize a list of disasters that are relevant to Pulaski County.

Jonathan Remo provided the planning team with a handout to direct the focus of the meeting discussion. As Jonathan began to conduct the prioritizing process, he described the risk assessment ranking that FEMA has established.

Narrative: The Planning Team was then asked to assess a risk level to each disaster that was identified in Pulaski County. The risk level is ranked as followed:

#1: Flooding
#2: Tornado
#3: Earthquake
#4: Dam or Levee Failure
#5: Thunderstorms/High Winds/Hail/Lightening
#6: Winter Storms
#7: Transportation of Hazardous Material Release

Narrative: The planning team was then asked to analyze the historical weather events that have been plotted on a map of the county and communities therein. No corrections were noted by the planning team.

The planning team agreed to complete any missing information pertaining to critical facilities by the next meeting.

Meeting was adjourned.

Pulaski Co
Pre Disaster Mitigation Mtg #2
12-11-08

Name	Affiliation	Phone / Email
Andy Flor	SIUC	618 453 7370 flojoe@siu.edu
Jonathan Remo	SIUC	618 453 7370 diamict@siu.edu
Kenneth Kerley	Pulaski Co EMA	6183030493 Pulaski_Co_IL_ESDA@mail.com
Anthony Dover	Pulaski Co EMA	6185341942 adover@lazernetwireless.net
Monte Russell	Pulaski Co. Board	618 748 9185 mcrussell@midwest.Net
Matt Barnhill	Pulaski Co. EMA	618 638 4895 fireman_510@Yahoo.com

IEMA Pre-Disaster Mitigation Plan

Assembly of the Pulaski County Planning Team Meeting 3:
Chairman: Kenneth Kerley, Pulaski County ESDA
Plan Directors: Southern Five Regional Planning Commission, SIUC Geology Department, and IUPUI – Polis

Meeting Date: Tuesday, July 7, 2009

Meeting Time: 6 pm

Place: Shawnee Community College – River Room, Ullin, IL

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
John Buechler	IUPUI – Polis
Tammy Juncker	Southern Five Regional Planning Commission
Monte Russell	Pulaski County Commissioner
Terry Riddle	Mound City Fire Dept
Tom Haynes	Pulaski County Ambulance
Matt Barnhill	Pulaski County EMA
Anthony Dover	Pulaski County EMA
Dudley Kesler	Private Citizen – Dongola
Kenneth Kerley	Pulaski County ESDA Director
Rex Wilburn	Pulaski County Commissioner
Randy Kern	Pulaski County Sheriff
Janice Wright	Mayor, Village of Karnak
Curtis Marshall	Mayor, Village of Olmsted

The meeting was called to order.

Jonathan Remo opened the meeting with an overview of the planning process and the roles of SIU and the Polis Center. Then he went on to explain the topics and objectives of the current meeting. Jonathan first presented the planning team with the list of hazards that the team had ranked by their level of risk from the previous meeting. He also presented a power point presentation of the history of Pulaski County's past disasters. This included covering each hazard that the County had focused on, the history of each and then the mitigation strategies. He defined mitigation as the act of avoidance and preparedness.

A copy of Mitigation Idea, produced by FEMA Region 5 in July 2002, was given to each of the planning team members for review. It was explained by Jonathan the contents of the booklet and that each of the planning team members should return to meeting 4 with three mitigation strategies for each of the hazards identified by the planning team.

Jonathan Remo then asked the audience for questions or comment. After some discussion about the plan and how it would affect the community and its residents, he thanked those who came and a closed the presentation.

Meeting was adjourned.

SIGN IN SHEET

PLACE: *Shawnee Community College - River Room*

DATE: *July 7, 2009*

TIME: *6:00 pm*

PURPOSE: *Public Hearing for Multi-Hazard Mitigation Plan - Pulaski County* (#3)

NAME	ADDRESS
Monte Russell	Villa Ridge IL
Tony Rastetter	Mound City IL
[illegible]	Ayer Lumber
[illegible]	Grand Chain
Anthony Dover	Villa Ridge IL
Dudley Kesler	Dongola IL
Pamela Pyerley	Mounds, IL
[illegible]	Pulaski, IL
Randy Kern	Villa Ridge, IL
Janice Wright	Karnak, IL
Tim Lee Marshall	Olmsted IL
Bonny Juncker	SRRPC

IEMA Pre-Disaster Mitigation Plan

Assembly of the Pulaski County Planning Team Meeting 4:
Chairman: Kenneth Kerley, Pulaski County ESDA
Plan Directors: Southern Five Regional Planning Commission, SIUC Geology Department, and IUPUI – Polis

Meeting Date: Monday, September 21, 2009

Meeting Time: 6pm

Place: Southern Five RPC office, Ullin, IL

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
John Buechler	IUPUI – Polis
Lisa Thurston	Southern Five Regional Planning Commission
Tom Haynes	Pulaski County Ambulance
Randy Kern	Pulaski County Sheriff
Anthony Dover	Pulaski County EMA
Bruce Newbolds	Pulaski County EMA
Kenneth Kerley	Pulaski County ESDA Director
Tony Jackson	Village Board – Ullin
Curtis Marshall	Mayor, Village of Olmsted
Amanda Wilkins	Chamnes Care, Inc

The meeting was called to order.

Jonathan Remo thanked everyone for attending the meeting and stated that if the planning team members needed extra mitigation strategy handbooks that they were available upon request. He introduced John Buechler from the Polis Center that was in attendance that day also.

John Buechler began by explaining that today's meeting would cover mitigation strategies that the planning team believed would prevent or eliminate the loss of life and property. He explained that the planning team should not make any reservations in the form of money or resources when developing this list. Also whenever possible, the planning team was directed to be specific about the location or focus area of a strategy, in respect to being within a municipality or county wide. Each hazard was addressed one at a time. The planning team listed new and current on-going mitigation strategies in respect to each hazard. The planning team prioritized mitigation actions based on a number of factors. A rating of High, Medium, or Low was assessed for each mitigation item. Listed below are the New Mitigation Strategies that the Planning Team came up with:

Mitigation Item	Hazards Addressed	Jurisdictions Covered	Priority
Implement a mass notification system to include temporary AM public warning radios	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Pulaski County, Grand Chain, Karnak, Mound City, Mounds, Olmsted, Pulaski, Ullin	High
Implement new plans for public education including distribution of first aid kits and pamphlets that address the importance of planning	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Pulaski County, Grand Chain, Karnak, Mound City, Mounds, Olmsted, Pulaski, Ullin	High
Install permanent signage and flood gates on Modglin Road	Flood	Pulaski County	Medium
Elevate State Route 956, State Route 37, and Olmstead Road	Flood	Pulaski County	Medium
Detail Flood Rate Insurance maps	Flood	Pulaski County	High
Install inertial valves at critical facilities	Earthquake	Pulaski County, Grand Chain, Karnak, Mound City, Mounds, Olmsted, Pulaski, Ullin	Medium

Mitigation Item	Hazards Addressed	Jurisdictions Covered	Priority
Construct safe houses/warming centers in key areas within the county	Winter Storm	Karnack, Pulaski, Mounds City, Ullin, Olmsted	Low
Develop a county website to disseminate safety information and weather updates	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm, Hazmat, Fire	Pulaski County	Low
Establish winter storm routes for road treatment	Winter Storm	Pulaski County	High
Establish an LEPC	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire, Drought	Pulaski County	Low
Increase hazmat training for first responders to include field exercises and drills	Hazmat	Pulaski County	Low
Conduct a commodity flow study	Hazmat	Pulaski County	Medium

Mitigation Item	Hazards Addressed	Jurisdictions Covered	Priority
Install street lights and warning lights at the following intersections: State Route 37 and Mounds Road; State Route 37 and 169 Karnak	Hazmat	Pulaski County, Mounds, Karnak	Low

Listed below are the current Mitigation Strategies already being implemented by the County or its municipalities:

Mitigation Item	Hazards Addressed	Jurisdictions Covered
Complete the following public education tasks: designate weather spotters, disseminate basic weather information, distribute publications	Tornado, Thunderstorm	Pulaski County, Grand Chain, Karnak, Mound City, Mounds, Olmsted, Pulaski, Ullin
Distribute weather radios to schools, government facilities, and areas with large populations	Tornado, Thunderstorm	Pulaski County
Procure generators with back-up power supplies for critical facilities	Tornado, Thunderstorm	Pulaski County
Construct/Establish backup communication centers	Tornado, Thunderstorm	Pulaski County
Build earthquake-resistant buildings	Earthquake	Pulaski County, Mounds, Ullin

After prioritizing these items, the **meeting was adjourned**.

SIGN IN SHEET

PLACE: *Southern Five RPC office, Rustic Campus of SCC*

DATE: *September 21, 2009*

TIME: *6:00 pm*

PURPOSE: *Pulaski Co Pre Disaster Mitigation Committee Meeting #4*

NAME	ORGANIZATION	EMAIL or PHONE
Thomas Haynes	Pulaski Co Amb	Thaynes@pulaskicounty.il.net
RANDY KERN	PULASKI CO. SHERIFF	
Anthony Dover	Pulaski Co. EMA/ESDA	agdover@gmail.com
Bruce Newbolds	Pulaski Co EMA/ESDA	bnewbolds@yahoo.com
KENNETH KERLEY	PULASKI CO ESDA/EMA	kenmcpd1@isp.com
Tony Jackson	Ullin Village Board	jackson2@pngusa.net
Curtis MARSHALL	Village president	618-7428183
Amanda Wilkins	Chamless Care Inc.	618-833-4774/618-634-2032
LISA THURSTON	SFRPC	
JONATHAN REMO	SIU-C	
JOHN BUECHLER	IN-POLIS	

IEMA Pre-Disaster Mitigation Plan

Assembly of the Pulaski County Planning Team Meeting 5:
Plan Directors: Southern Five Regional Planning Commission, SIUC Geology Department, and IUPUI – Polis

Meeting Date: Tuesday, January 26, 2010

Meeting Time: 6 pm

Place: Southern Five RPC office, Ullin, IL

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
Crystal Davenport	Southern Five Regional Planning Commission
Tina Bracken	Village of Ullin
Randy Kern	Pulaski County Sheriff
Matt Barnhill	Pulaski Co. ESDA
Kenneth Kerley	Pulaski Co. ESDA
Anthony Dover	Pulaski Co. ESDA
Monte Russell	Pulaski Co. Commissioner
Bruce Newbolds	Pulaski Co. ESDA
Tom Haynes	Pulaski Co. Ambulance

The meeting was called to order.

Jonathan Remo opened the meeting with an overview of what was to happen from this point on with the plan. He stated that the plan could be reviewed by the Planning Team members for about 2 weeks so everyone would have ample amount of time look at and review the plan for any discrepancies. He also stated that in approximately 3 weeks the plan would be sent to IEMA/FEMA. They would then review it and if everything is OK with the plan, then we should hear back from IEMA/FEMA around mid-March or early April for their approval.

Jonathan then explained that once it comes back approved, then a Resolution will have to be passed by all municipalities. He stated that **Crystal Davenport of Southern Five RPC** will have an example of this resolution that she will give to the municipalities in order for them to pass it at their board/council meetings. After they are passed, Jonathan stated that they needed to be returned to Crystal and she will forward them on to FEMA. Once FEMA gets the Resolutions, they will send notification that the municipality has a completed and approved plan.

He also explained that once the plan is submitted to IEMA/FEMA for their review, the municipalities can begin formulating and putting together their projects for funding. There is a pool of funds from FEMA that these lower five counties can access that was allowed for the ’08 winter/ice storm that is earmarked just for the lower counties of IL. The projects must be related

to the affects of this storm. He stated that if individuals wanted more specific information of this funding, they could go to the IEMA website.

It was also explained to the planning team that FEMA will require a five-year update to the plan. Jonathan told the planning team that in another five years, the members should come together again, most likely under the direction of the ESDA Director, to review the plan and make any necessary changes to it. He explained that FEMA will probably send out a reminder as to when this is supposed to take place.

After Jonathan explained the above process, he pointed out specific tables and places in the plan that needed clarification from the team members. After discussing a few changes, the planning team members looked at the plan for a while longer.

Since there were no more comments about the plan, **the meeting was adjourned.**

SIGN IN SHEET

PLACE: *Southern Five RPC Office, Ullin, IL*

DATE: *January 26, 2010*

TIME: *6 pm*

PURPOSE: *Pulaski County Pre-Disaster Mitigation Committee Meeting #5*

NAME	AFFILIATION	PHONE & EMAIL
Jonathan Reno	SIUC	
TINA Bracken	Village of Ullin	village of ullin@yahoo.com
RANDY KERN	Pulaski County SHERIFF	618-748-9374
Matt Gantin	ESDA	618-634-2369
Kenneth Kerley	P.C. ESDA	618-303-0493
Anthony Dover	PC. ESDA	618-534-1942
Monte Russell	Pulaski County Board	
Bruce Newbolds	P.C ESDA	618 697-2782
Tom Haynes	Pulaski Co Amb	618-342-6209
CRYSTAL DAVENPORT	SFRPC	

Appendix B - Articles Published by Local Paper

Throughout May, SDC employees participated in Community Action Month activities.

May 1, a fundraising bake sale was held in conjunction with a community yard sale in Karnak.

May 2, the Pope County Hunger CROP Walk provided an opportunity to increase supplies in the local food pantry.

During the first week of May, SDC staff attended the Illinois awards recognition program, "Tools for Change," all were held in May.

SDC employees assisted in the removal of flags at the national cemetery in Mound City. They hosted a table at Shawnee Community College's Senior Fest.

May's celebration of Community Action Month ended with a gathering of employees at SDC's administrative office in Karnak. A potluck meal was held to celebrate SDC's many accomplishments.

Post offices plan to close early on July 3

Area post offices have announced that they plan to close early on Friday, July 3.

The change in schedules comes in anticipation of the Independence Day holiday on Saturday, July 4.

The Cobden Post Office is scheduled to close at noon on Friday, July 3.

The Carbondale, Murphysboro and Marion post offices have announced plans to close at 3 p.m. Friday.

All collection points that have a regularly scheduled collection time prior to noon Friday will be collected as usual.

Regular mail delivery on July 3 will be unaffected by the change.

Retail counters at the post offices will be closed for the holiday.

Disaster plan focus of meeting

The Pulaski County pre-disaster mitigation committee plans to host a public meeting Tuesday, July 7.

The meeting will be at 6 p.m. in the River Room on the campus of Shawnee Community College near Ullin.

Southern Illinois University Carbondale faculty members will be the presenters.

The purpose of the meeting is to inform the public about potential disasters that could strike the county, the losses expected from those disasters and how to reduce vulnerability to such events.

FEMA/IEMA is the funding agency for the county's mitigation plan.

erly Wilson prepared a huge breakfast for all the men of the church in honor of Father's Day. Thank you to Beverly for the breakfast.

We still have a lot of people sick or on vacation, so we only had about 15 in services on Sunday morning. Bro. Randy brought the message. We had Bible study Sunday night.

Sherry's mother has been sick. Keep her in your prayers. Also pray for the men and women who are overseas fighting for the nation's freedom. Pray for all the missionaries around the world.

Worship times: Sunday School 10 a.m. Sunday morning worship 11 a.m. Sunday evening worship 6 p.m. Wednesday evening worship 7 p.m.

Read The Classifieds

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Appendix C - Adopting Resolution

Appendix D - Pulaski County Historical Hazards

Pulaski County Photo Index

Included in this document are the photos, date of events, type of events and description. In the addition to this document there should be attachments to the email with a pdf or jpg form of each of the pictures. Note: the size of the picture seen in this index is usually not the actual size of the photo.

Floods

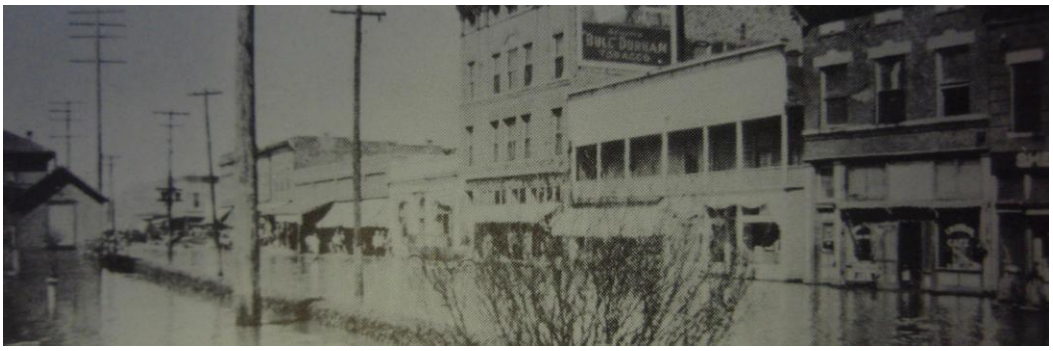
File: Flood_Mar_2008
Date: March 18, 2008
Description: Karnak, IL flooding on March 18, 2008
Source: http://community.wpsdtv.com/photos/storm_photos/category1824.aspx

File: Flood_Apr_1927
Date: April 1927
Source: Mounds Public Library, Mounds, IL

File: Flood2_Apr_1927
Date: April 1927
Source: Mounds Public Library, Mounds, IL

File: Flood3_Apr_1927
Date: April 1927
Source: Mounds Public Library, Mounds, IL

File: Flood4_Apr_1927
Date: April 1927
Source: Mounds Public Library, Mounds, IL



File: Flood5_1927
Date: April 1927
Description: Looking at Front Street from rail car in 1927 flood.
Source: Pulaski County Illinois 1819-1987

File: Flood_Feb_1937
Date: February 10, 1937
Description: Red Cross Emergency Headquarters in Mounds, IL
Source: Mounds Public Library, Mounds, IL

File: Flood_Jan_1937
Date: January, 1937
Description: Going west on First in Mounds, IL
Source: Mounds Public Library, Mounds, IL

File: Flood2_Jan_1937
Date: January, 1937
Description: Looking East at First Street
Source: Mounds Public Library, Mounds, IL

File: Flood3_Jan_1937
Date: January, 1937
Description: Corner of Blanche and First Streets
Source: Mounds Public Library, Mounds, IL

File: Flood4_Jan_1937
Date: January, 1937
Source: Mounds Public Library, Mounds, IL

File: Flood5_Jan_1937
Date: January, 1937
Description: Old Methodist Church
Source: Mounds Public Library, Mounds, IL

File: Flood6_Jan_1937
Date: January, 1937
Description: Looking South at Front Street in Mounds, IL
Source: Mounds Public Library, Mounds, IL

File: Flood7_Jan_1937
Date: January, 1937
Source: Mounds Public Library, Mounds, IL

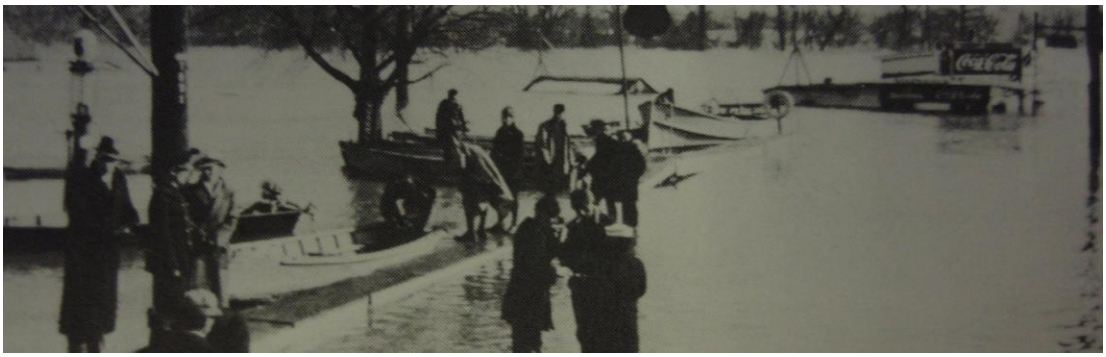
File: Flood8_Jan_1937
Date: January, 1937
Description: In expectation of possibly the worst flood of all time, levees and retaining walls along the Mississippi River are being strengthened. Workers are shown here building a three-foot addition to the flood walls in Cairo, IL.
Source: Central Press via the Mounds Public Library, Mounds, IL.

File: Flood9_Jan_1937
Date: January, 1937
Description: View of the explosion which broke open the levee at Birdspoint, MO, to relieve the water pressure of the Ohio River at Cairo, IL, where there is grave fear that the flood waters may invade the city.
Source: Central Press via the Mounds Public Library, Mounds, IL

File: Flood10_Jan_1937
Date: January, 1937
Description: Left to right: Hobart Jenkins, Dr. Crosson, unknown, unkown
Source: Mounds Public Library, Mounds, IL

File: Flood11_1937
Date: January 1937
Description: Train cut off by water in 1937 flood between Grand Chain and Olmsted.
Source: Pulaski County Illinois 1819-1987

File: Flood12_1937
Date: January 1937
Description: Omer Fisher with truck on ramp in 1937 flood.
Source: Pulaski County Illinois 1819-1987



File: Flood13_1937
Date: January 1937
Description: Porkey's in the 1937 flood.
Source: Pulaski County Illinois 1819-1987

File: Flood14_1937
Date: January 1937
Description: The Chache River Bridge at Ullin in 1937.
Source: Pulaski County Illinois 1819-1987

File: Flood15_1937
Date: January 1937
Description: 1937 Flood street scene in Mound City.
Source: Pulaski County Illinois 1819-1987

File: Flood16_1937
Date: January 1937
Description: Downtown Karnak in 1927 Flood.
Source: Pulaski County Illinois 1819-1987

File: Flood17_1937
Date: January 1937
Description: 1937 Flood – Route 169 west of Karnak.
Source: Pulaski County Illinois 1819-1987

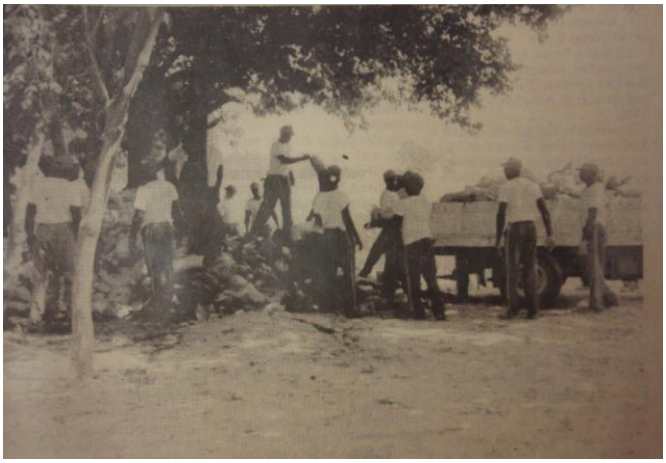
File: Flood18_1937
Date: January 1937
Description: The Cache River takes total control of Ullin during the flood of 1937.
Source: Paul Echols, Ullin 50 Years: A pictorial history – Ullin's Sesquicentennial. Published by The Dongola Tri-County Record.

File: Flood19_1937
Date: January 1937
Description: The Cache River takes total control of Ullin during the flood of 1937.
Source: Paul Echols, Ullin 50 Years: A pictorial history – Ullin's Sesquicentennial. Published by The Dongola Tri-County Record.

File: Flood20_1937
Date: January 1937
Description: The Cache River takes total control of Ullin during the flood of 1937.
Source: Paul Echols, Ullin 50 Years: A pictorial history – Ullin's Sesquicentennial. Published by The Dongola Tri-County Record.

File: Flood21_1937
Date: January 1937
Description: The Cache River takes control of Ullin during the flood of 1937.
Source: Paul Echols, Ullin 50 Years: A pictorial history – Ullin's Sesquicentennial. Published by The Dongola Tri-County Record

File: Flood_Aug_1993
Date: Thursday, August 12, 1993
Description: Water from the flood swollen Mississippi River continues to pour through the break in the levee south of Fayville near Miller City. The gap has widened to over 2,000 feet wide and it is estimated that approximately one fourth of the river's flow is coming through the gap. This picture of the break was taken Sunday morning from a helicopter. **Source:** *The Cairo Citizen*. Vol. 106, No. 30.



File: Flood2_Aug_1993
Date: August, 1993
Description: Flood cleanup continues
Source: Mounds Public Library, Mounds, IL

Severe Thunderstorms

File: Winter_Jan_2008
Date: January 29, 2008
Description: Storm damage in Mound City, IL on January 29, 2008.
Source: http://community.wpsdtv.com/photos/storm_photos/category1798/picture2461338.aspx

File: Winter2_Jan_2008
Date: January 29, 2008
Description: Storm damage in Mounds, IL on January 29, 2008..
Source: http://community.wpsdtv.com/photos/storm_photos/category1798/picture2461338.aspx

Winter Storms

File: Winter_Jan_2009
Date: January 26, 2009
Description: Mound City, IL Ice Storm
Source: http://www.camvista.com/users-photo-gallery/il-7/1004.html

File Name: Winter_Jan_2009
Date: January 28, 2009
Description: CHUCK NOVARA / THE SOUTHERN U.S. 45 South of Vienna in Pulaski was turned into a one-lane road all the way to Belknap on Wednesday, Jan. 28.
Source: The Southern
http://gallery.pictopia.com/thesouthern/gallery/73527/photo/7580349/

File Name: Winter2_Jan_2009
Data: January 28, 2009
Description: CHUCK NOVARA / THE SOUTHERN Power crews were lined on on many streets in Karnak on Wednesday, Jan. 28, trying to restore power to the Pulaski County residents.
Source: The Southern
http://gallery.pictopia.com/thesouthern/gallery/73527/photo/7580351/?o=39

File Name: Winter3_Jan_2009
Data: January 28, 2009
Description: CHUCK NOVARA / THE SOUTHERN A power pole is bent down with a large tree that fhad fallen near Illinois 169 east of Karnac on Wednesday, Jan. 28.
Source: The Southern
http://gallery.pictopia.com/thesouthern/gallery/73527/photo/7580352/?o=38

File Name: Winter4_Jan_2009
Data: January 28, 2009
Description: CHUCK NOVARA / THE SOUTHERN A tree fell across U.S. 51 south of Vienna, the highway was reduced to a one lane road from Vienna to Belknap.
Source: The Southern
http://gallery.pictopia.com/thesouthern/gallery/73527/photo/7580354/?o=37

Tornados

File: Tornado_Mar_2006
Date: March 12, 2006
Description: Photo of tornado damage to a gas station canopy in Ullin, IL in Pulaski County. Other structures were damaged in Ullin very early on March 12, 2006.

Source:
http://www.crh.noaa.gov/pah/?n=mar06gallery

File: Tornado_May_2003
Date: May 6, 2003
Description: The Ohio Chapel Methodist Church in Pulaski County survived, but the wind knocked over the sign and blew off roofing. The heavy rain then soaked the interior of the building.
Source: Terror in the Night: The May 6, 2003 Southern Illinois Tornado.

File: Tornado2_May_2003
Date: May 6, 2003
Source: Terror in the Night: The May 6, 2003 Southern Illinois Tornado.

Appendix D - Historic Hazards: National Climatic Data Center U.S. Storm Event Database for Pulaski , Illinois

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	12/9/1995	Cold Wave	N/A	0	0	0	0	An arctic air mass swept across southern Illinois in the wake of the snowstorm a day earlier. Temperatures during the early morning hours of the 9th plunged to near zero. Wind chill indicies ranged from 20 to 30 below zero for a short while.
Pulaski	8/15/1996	Drought	N/A	0	0	0	0	The drought severity index indicated extreme drought conditions over parts of southern Illinois the last week of August. Only 0.11 inches of rain fell at Paducah during the month. This was the second driest month since 1962 at Paducah, and it was the driest August on record. River levels dropped well below normal, but no serious navigation problems were reported.
Pulaski	9/1/1998	Drought	N/A	0	0	0	0	September, 1998 was one of the driest Septembers on record in southern Illinois. Across the Ohio River at Paducah, Kentucky, where the monthly rainfall total was only 0.12 inch, it was the driest September on record. The dry weather was costly to farmers of certain crops, especially soybeans. The drought reduced yields for soybeans and late-planted corn by 25 to 30 percent in some counties. The drought, which was classified as "mild," began in early August. The lack of rainfall late in the summer was mitigated by one of the wettest springs on record.
Pulaski	8/1/1999	Drought	N/A	0	0	0	0	After one of the wettest Junes on record, the rest of the summer was quite dry. By the end of August, parts of Southern Illinois were in a moderate drought, according to the Palmer Drought Index. There was a wide range in drought conditions. Places close to the Ohio River bordered on severe drought, while farther northwest from Mount Vernon to Carbondale, the drought was mild. A couple of times during August, thunderstorms produced heavy rain west and north of Carbondale but dissipated before reaching the Ohio River. The effect of the drought on crops was greatest for soybeans, which rely more heavily on summer rainfall. The corn crop fared relatively well because it matured in the late spring, when abundant rains fell. The dry weather raised the fire danger into the very high category at times. During one of the larger grass fires about 10 miles northeast of Carbondale, a fire truck was destroyed by fire. Drinking water supplies were threatened in the Marion area, mainly because Marion's water supply depends on a fairly small lake. As a precautionary measure, Marion began pumping
Pulaski	9/1/1999	Drought	N/A	0	0	0	0	The moderate to severe summer drought took a considerable toll on crops across southern Illinois. The worst drought conditions were along the Ohio River, where Paducah, KY, received only 1.5 inches of rain in the three-month period from July to September. Carbondale received much more generous rainfall, with a three-month total of 5.5 inches. The soybean crop suffered the greatest effects from the drought, with yields in most areas only near 20 percent of normal. Corn yields were much closer to normal due to plentiful rains in June and early July, when the corn crop matures most rapidly. Small ponds and reservoirs became very low. The city of Marion, which relies on a small lake for its drinking water supply, was forced to siphon water from its neighboring city of Herrin. Low water levels in Union and Jackson Counties forced some cattle farmers to haul water to their herds. The fire danger reached extreme levels at times. The Illinois Department of Natural Resources issued a wildfire alert for southern Illinois due to the combination of drying grasses, brisk winds, and low

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	10/1/1999	Drought	N/A	0	0	0	0	The moderate to severe summer-long drought conditions were greatly alleviated by heavy rain on October 8th and 9th. Rainfall totals were mainly between 2 and 4 inches during a 24-hour time frame. Even though the rain was too late for most crops, it replenished ponds used for watering cattle. Bans on open burning were lifted after the rain fell. No rain fell during the rest of the month, which renewed drought
Pulaski	11/1/1999	Drought	N/A	0	0	0	0	The unseasonably warm and dry fall allowed drought conditions to worsen. The Palmer Drought Index fell deeper into the moderate drought category during the month. Total rainfall for the month of November at Carbondale was about a quarter of an inch, which is about 3.5 inches below normal. Since the official growing season was over, crop damage was no longer a major concern. As a result of temperatures in the 70s, gusty winds, and low humidity, wildfire activity was above normal. Burning bans were imposed across much of southern Illinois, including the counties of Jackson, Union, Alexander, Pulaski, Johnson, Pope, Saline, and Hardin. A rash of grass and brush fires occurred early in the month, keeping area fire departments busy. A controlled trash fire near West Salem, in Edwards County, got out of hand and burned down a storage shed and all of its
Pulaski	12/1/1999	Drought	N/A	0	0	0	0	Moderate drought conditions continued to plague parts of southern Illinois into early winter. Heavy rainfall at mid-month brought significant relief. Before then, the dry weather caused unusually high wildfire activity. Campfires and other outdoor burning was banned in several counties, including Alexander, Hardin, Jackson, Johnson, Pope, Pulaski, and Union.
Pulaski	8/1/2002	Drought	N/A	0	0	0	0	Moderate drought conditions developed over southern Illinois during August as a result of persistent dryness that began in June. At Carbondale, no measurable rainfall was reported during the entire month of July, and August rainfall was just over half an inch. This dry period came on the heels of a very wet first half of the year, when 24 t0 30 inches fell from January through May. The main effect of the drought was on agriculture. Farmers anticipated substantial crop losses at harvest time. Heavy spring rains delayed planting of many crops until late May, which made them especially susceptible to the summer heat and
Pulaski	9/1/2002	Drought	N/A	0	0	0	53.0M	A prolonged summer drought gradually worsened, becoming severe by early September. Many parts of southern Illinois received little or no measurable rainfall in July. At Paducah, Kentucky, the three-month period from June through August of 2002 was the second driest such period on record. The main effect of the drought was on agriculture. Crop loss estimates totalled around 53 million dollars in southern Illinois. The corn crop, which was especially susceptible to the combined effects of heat and drought, took the biggest hit. About 33 million dollars in corn was lost in southern Illinois. Another 20 million dollars was lost in soybean production. Some trees and shrubs died in the drought, especially newly planted ones with shallow root systems. A few outdoor fires broke out, including a 20-acre blaze in Saline County, several miles west of Eldorado. The remnants of Tropical Storm Isidore provided much-needed heavy rainfall late in September. One to three inches of rain fell over

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	6/1/2005	Drought	N/A	0	0	0	0	Southern Illinois was classified in a moderate drought as June became the fourth consecutive month of below normal rainfall. Some locations received heavy rainfall in June from thunderstorms, but the storms were rather short-lived and infrequent. Farmers faced a variety of significant problems. Hay growth and production was halted, prompting concern about a hay shortage. Other crops, such as corn and soybeans, were slowed or stunted by the dry weather. Some yield reductions were anticipated, depending on July rainfall amounts. Levels of smaller rivers and creeks
Pulaski	7/1/2005	Drought	N/A	0	0	0	0	Moderate drought conditions persisted over southern Illinois until the remnants of Hurricane Dennis arrived, producing from 2 to 5 inches of rain. Although the rain was beneficial, it came too late for some crops. All of southern Illinois except for Alexander County was designated as an agricultural disaster area by the U.S. Department of Agriculture. A local newspaper in the lower Wabash Valley reported that the local corn and soybean crop would suffer a 50 percent yield reduction due to the drought. Final crop figures will not
Pulaski	8/1/2005	Drought	N/A	0	0	0	0	Drought conditions eased considerably during early and mid August as thunderstorm activity increased to typical levels for mid-summer. Timely rainfall offset the potentially devastating agricultural impacts of this drought. River levels on the Ohio and Mississippi Rivers continued to drop through the middle of the month. At Cairo, the Ohio River stage fell as low as 7.2 feet. The effects on Ohio River traffic were comparable to those observed in the 1997 and 1988 droughts. Barges ran aground, forcing the Coast Guard to close a seven-mile stretch of the Ohio River from Mound City to Olmsted for almost a week. Several hundred barges were reportedly waiting to pass through the bottleneck. The U.S. Army Corps of Engineers conducted emergency dredging operations to reopen the river. A casino riverboat in Metropolis was closed due to complications from the low water, only eight months after having been closed by high water. Along the Mississippi River, a power generation plant in Grand Tower (Jackson County) closed for a
Pulaski	7/2/1997	Excessive Heat	N/A	1	0	0	0	Temperatures rose well into the 90s, and high humidity raised the heat index to between 105 and 110 degrees. Near Carmi, a 32-year-old male construction worker died as a result of the heat. The man's body temperature was 106 degrees. The coroner ruled that the man, who alternated between digging and operating a backhoe, was primarily a victim of the heat and humidity. The heat index at Evansville at the time of death was 105 degrees.
Pulaski	7/25/1997	Excessive Heat	N/A	0	12	0	0	High temperatures rose well into the 90s, with even a few 100 degree readings. High humidity pushed heat index values to between 105 and 115 degrees. A heat advisory was issued for the potentially hazardous conditions. Area hospitals reported at least a half dozen cases of dehydration or other heat-related illnesses. An increase in the number of disabled
Pulaski	6/22/1998	Excessive Heat	N/A	1	0	0	0	Temperatures exceeded 90 degrees for at least 7 consecutive days. Oppressive humidity produced heat indicies as high as 110 degrees. The prolonged heat and humidity resulted in the death of an elderly man in Johnston City, near Marion. The coroner measured the temperature in his apartment, where his body was found, at 110 degrees. M83PH

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	7/18/1999	Excessive Heat	N/A	4	0	0	0	Prolonged heat and humidity during the latter half of July took its toll on the unprepared. Four fatalities were blamed on the heat, including two in Wayne County. Near Fairfield, a 78-year-old man died after driving his riding lawn mower to a trucking firm to gather landscape rocks. The man was found near a pile of rocks he had been gathering in 95-degree heat. Near Mount Erie, an 85-year-old man was found dead in his home. The windows were closed, and there was no air conditioning. Elsewhere in southern Illinois, a 53-year-old migrant worker died while laboring in a field near Shawneetown in Gallatin County. The man died at an Evansville hospital after suffering a heat stroke. The fourth death occurred in the Ohio River city of Metropolis, where an 82-year-old woman was found dead in her bathroom. This was the first time in his tenure as Massac County coroner that the cause of death was ruled as heat exhaustion. The woman did not use a fan in the house, and the indoor temperature was measured at 98 degrees. Daily highs were near 100 degrees on the 29th and 30th, with
Pulaski	7/7/2001	Excessive Heat	N/A	0	0	0	0	Daytime high temperatures in the mid to upper 90's, combined with dew points in the mid 70's, resulted in heat indices from 105 to 112 degrees. Nighttime heat indices only fell to around 80.
Pulaski	8/3/2002	Excessive Heat	N/A	0	8	0	0	High temperatures reached 100 degrees for three consecutive days in parts of southern Illinois. At Carbondale, the high was 100 degrees on the 3rd and 4th, and 101 on the 5th. Humidity contributed to the problem, with afternoon heat indices peaking near 105 degrees. Area hospitals reported surprisingly few cases of heat exhaustion, and no heat-related fatalities occurred. Hospitals reported seeing many people with pre-existing health conditions that were aggravated by the heat and humidity.
Pulaski	7/21/2005	Excessive Heat	N/A	0	62	0	0	Several days of excessive heat and humidity caused a significant increase in heat-related illnesses. Hospitals reported that a majority of those treated were outdoor workers. The heat index peaked around 110 degrees each afternoon, and dropped to only around 80 degrees at night. True air temperatures reached the mid 90's, with overnight lows in the mid 70's. At Carbondale, the heat index topped out at 112 degrees on the 21st and the 22nd, 105 on the 23rd, 115 on the 24th, 106 on the 25th, and 109 on the 26th. These heat indices were representative of the rest of southern Illinois. The heat wave was the result of an expansive surface high pressure system extending from the Gulf of Mexico to the Great Lakes. A light southerly wind flow, combined with moist ground from the remnants of Hurricane Dennis earlier in the month,
Pulaski	8/19/2005	Excessive Heat	N/A	0	0	0	0	The heat index exceeded 105 degrees on two consecutive afternoons across most of southern Illinois. At Carbondale, the peak heat index was 111 degrees on the 19th and 106 on the 20th.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	2/2/1996	Extreme Cold	N/A	0	0	0	0	The most severe cold snap of the 1995-96 winter season caused many problems with burst pipes and overworked furnaces. Calls to one heating system specialist were up 30 to 40 percent. Central Illinois Public Service Co. broke its winter electric peak record. Residents of Pinckneyville were asked to conserve natural gas due to dwindling supplies. The shortage was partly the result of gas wells that were freezing up. The overflow valve on the water tower in DeSoto froze up, causing thousands of gallons of water to escape from the top. Many cities dealt with water main breaks as the cold weather put stress on the pipes. Wind chills were occasionally as low as minus 40 degrees. Actual daytime highs on the third were in the single digits, with overnight lows from minus 6 to minus 11. The extreme cold significantly damaged the peach crop, which is vulnerable to
Pulaski	12/12/2000	Extreme Cold	N/A	0	0	0	0	An invasion of arctic air occurred on December 12. The arctic air became permanently entrenched over the region for the remainder of the month, resulting in the coldest December on record at Paducah, KY. The average monthly temperature of 25.9 degrees was 11.4 below normal. On the coldest day of the month, the 17th, the high was 17 and the low was 6. Unusually high energy prices, combined with the record cold, caused homeless shelters to fill to capacity. The usual problems associated with frigid temperatures, such as frozen pipes and water main breaks, were common during the latter half of the month. At Brookport, across the river from Paducah, the pipe extending down from the water tower froze, causing it to burst. As a result, Brookport temporarily had no water supply until emergency wells were dug. Heavy ice on the Mississippi River prompted the
Pulaski	1/1/2001	Extreme Cold	N/A	0	0	0	0	The prolonged arctic freeze that began during the second week of December finally ended by January 4. During the first few days of the new year, temperatures averaged 15 to 25 degrees below normal. Overnight lows were around zero. As a result, ice continued to be a problem on the Mississippi River. The combination of ice and low river levels made navigation for barges very hazardous. About 10 miles north of Cape Girardeau, MO, 15 barges loaded with coal went aground.
Pulaski	1/23/2003	Extreme Cold/wind Chill	N/A	0	0	0	0	Wind chills fell to between minus 10 and minus 15 across southern Illinois during the morning. This cold snap was just one of many cases of harsh winter weather during January. At Paducah, KY, preliminary figures indicate January of 2003 was the eighth coldest January on record, and the coldest since 1985. After the relatively mild winters of the past several years, the bitter mid-winter cold came as a shock to many. Temperatures fell below zero at many locations for the first time in several years. At Carbondale, the low temperature on January 24 was minus 6. The prolonged cold weather resulted in numerous frozen pipes, as well as problems with heating systems. A number of house fires were blamed on overtaxed heating systems. At least one ice rescue was conducted when children fell through thin ice on a pond in Fort Massac State Park in

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	12/23/2004	Extreme Cold/wind Chill	N/A	1	0	0	0	Bitterly cold temperatures arrived in the wake of a paralyzing snowstorm. In Murphysboro, an 84-year-old woman died from hypothermia after venturing outdoors to locate her pet dog on the evening of December 22. The woman apparently became disoriented and collapsed from hypothermia. Although she was located about an hour after venturing outdoors from the assisted living facility, she was pronounced dead shortly after midnight on December 23. The low temperature on Christmas morning was 11 degrees below zero at Carbondale. Co-operative observers reported Christmas morning lows of 6 below at Grayville and 2 below zero at Cairo. Winds were light during the coldest weather, which reduced the wind chill hazard somewhat. F85OU
Pulaski	1/10/1997	Extreme Windchill	N/A	1	0	0	0	Arctic air blew into the region in the wake of a departing snowstorm. A wind chill advisory was issued for wind chills as low as minus 30. A woman in her 60s froze to death after she slipped and fell outside her home near Orient in Franklin County. The city of Murphysboro recommended letting faucets drip to prevent pipes from freezing. F65OU
Extreme South II	4/9/1995	Flash Flood	N/A	0	0	50K	0	A slow-moving line of thunderstorms dumped up to two inches of rain per hour along the Ohio River. At Dixon Springs, 1.70 inches fell in 20 minutes. Counties adjacent to the Ohio River experienced widespread flooding of roads and low-lying fields. One home was evacuated in Joppa.
Grand Chain	6/8/1996	Flash Flood	N/A	0	0	0	0	A nearly stationary thunderstorm caused local flooding of roads and highways. The intersection of state highways 37 and 169 was impassable to some
Mounds	3/1/1997	Flash Flood	N/A	0	0	20K	0	This final round of thunderstorms caused widespread flooding of roads and streams. No injuries or evacuations were reported.
Mounds	6/6/1999	Flash Flood	N/A	0	0	0	0	Thunderstorms produced torrential downpours, enough to cover some roads with water. Trained spotters reported water over West Mounds Blacktop
Olmsted	7/26/2001	Flash Flood	N/A	0	0	25K	0	Slow-moving thunderstorms dumped torrential rains over Pulaski County. An engineer with the county highway department measured 3.5 inches of rain during the early morning hours. Rushing floodwater blocked Illinois Route 37 in two places for more than 4 hours near Olmsted and just south of America Road. An Olmsted convenience store was flooded by 5 inches of water. More than 20 county roads were closed. Four culverts were washed away by erosion and fast-moving debris. The hardest hit areas were in the central parts of the county, between New Grand Chain and America. Heavy rain damaged the roof of the Olmsted library and leaked into the building, damaging books.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	12/17/2001	Flash Flood	N/A	0	0	10K	0	Heavy rain falling on saturated ground caused water levels to rise quickly. After the initial rapid rises, a prolonged period of flooding set in as light to moderate rain continued to fall. In Williamson County, water was 3 feet deep over the Saline River bridge on a county road, and roads were washed out. In Hardin County, some bridges were washed out. Illinois Route 146 was closed near Anna, and Route 145 was barricaded north of Route 146 in Pope County. Pulaski County reported 15 to 20 road closures. Water entered at least two businesses in Vienna. A car dealership and a city park in Vienna were flooded by the Little Cache Creek. In Johnson County, a total of 20 road closures were reported, and the community of Flatwoods was completely cut off for a short time. Near Elba in Gallatin County, several families were forced from their homes due to backwater flooding. Water entered an elementary school in Metropolis. Water also entered a warehouse in Metropolis used to store Christmas toys for needy local children. Several
Pulaski	5/17/2002	Flash Flood	N/A	0	0	0	0	Water was over several roads in each county. In Union County, Highway 127 in Jonesboro and Highway 146 just west of Jonesboro were flooded.
Pulaski	5/4/2003	Flash Flood	N/A	0	0	0	0	Very heavy rain from thunderstorms produced estimated rainfall rates of 1 to 2.5 inches per hour across parts of southern Illinois. Water covered some roads. Several roads were closed in southern Johnson County. Several roads in Saline County experienced flash flooding, and snow plows were used to remove debris and corn stalks washed onto roads.
Olmsted	11/1/2004	Flash Flood	N/A	0	0	0	0	A county road was barricaded due to flooding. A broad area of heavy rain produced average rainfall from three quarters to one inch an hour.
Pulaski	1/26/1996	Flood	N/A	0	0	5K	0	The Blizzard of '96 that fell in New England and the Mid-Atlantic around the 6th began to melt towards the middle of the month, sending a flood wave down the Ohio River. This in turn sent backwater up many of the smaller rivers that feed into the Ohio. The lower Ohio River crested 3 to 5 feet above flood stage. At Lock and Dam 52 near Brookport, IL, the river crested at 43.8 feet on the 31st. Flood stage there is 37 feet. Most of the flooding was confined to bottomlands. Portions of Fort Massac State Park were underwater, including some roads and recreational equipment.
Pulaski	2/1/1996	Flood	N/A	0	0	0	0	Minor to moderate flooding of the Ohio River continued from the end of January into the first week of February. At Paducah, KY, the river dropped from 41.5 feet on the 1st to 39 feet on the 6th. Flood stage is 39 feet. This flooding was enough to submerge parts of Fort Massac State Park at Metropolis, IL, as well as a few roads in bottomland areas.
Pulaski	4/26/1996	Flood	N/A	0	0	40K	20K	The Ohio River rose above flood stage at Cairo on the 26th. Between 5 and 8 inches of rain over parts of southern Illinois and southwest Indiana pushed the river over its banks at a few other locations, including Shawneetown and Grand Chain. Mainly low-lying unprotected farmland was affected through the end of April.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	5/1/1996	Flood	N/A	0	0	80K	0	The Ohio River was above flood stage all month at Cairo and Brookport (Lock and Dam 52). The river crested around mid month at both places. At Cairo, the crest was 53.5 feet, 13.5 feet above flood stage. Brookport crested at 46.6 feet, 9.6 feet over flood stage. Crop damage estimates were not yet available. Thousands of acres of Ohio River bottomlands were under as much as 12 feet of water. This delayed planting of some crops, or forced farmers to change the crop they planned to grow. The ferry from Cave In Rock, Illinois to the Kentucky shore was closed for well over a week because of water over Kentucky route 91. The flood gates were closed at Rosiclare, Illinois for the second time this year. Although most of the damage was to cropland, some property damage
Pulaski	6/1/1996	Flood	N/A	0	0	0	0	The Ohio River remained above flood stage at several points well into June. The first crest, on June 3 and 4, was up to 9 feet above flood stage at Cairo. A second crest around June 15 was 7 feet above flood stage at Cairo. The river finally fell below flood stage at all points by June 22. Thousands of acres of agricultural bottomland were flooded, and some roads closest to the river were water covered. The primary effect of the bottomland flooding was to delay the planting of crops. For the most part, the river receded in time for corn to
Pulaski	12/4/1996	Flood	N/A	0	0	0	0	The Ohio River crested 2 to 3 feet above flood stage at several locations. At Cairo, where the flood stage is 40 feet, the Ohio crested at 42.93 feet on the 9th. At Shawneetown, where flood stage is 33 feet, the river crested at 36.1 feet on the 8th. The river was above flood stage for about a week at both locations. Flooding was confined mainly to parks and agricultural bottomlands. Fort Defiance State Park near Cairo was closed due to flooding of roads.
Pulaski	12/19/1996	Flood	N/A	0	0	0	0	The Ohio River once again exceeded flood stage late in the month. Two heavy precipitation events on already saturated ground from the 11th through the 19th caused secondary crests between the 19th and 22nd. The Ohio crested about 2 feet above flood stage at Brookport and Shawneetown, and 3 inches over flood stage at Cairo. Minor flooding of agricultural
Pulaski	1/30/1997	Flood	N/A	0	0	0	0	Heavy rain and snowmelt late in the month sent the Ohio River above flood stage at Shawneetown, Brookport, and Grand Chain on the 30th, and at Cairo on the 31st. The flooding was very minor. No damage
Pulaski	2/1/1997	Flood	N/A	0	0	0	0	Snowmelt and thunderstorms producing heavy rainfall in January sent the Ohio River rising and cresting during the first half of February. The Ohio River crested at 35.8 feet at Shawneetown on the 2nd and again on the 10th. Flood stage there is 33 feet. At Brookport and Cairo, the Ohio River crested between 1 and 3 feet above flood stage on the 1st. Minor flooding of bottomland occurs at these stages. No

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	3/1/1997	Flood	N/A	0	0	2.5M	0	A massive flood crest moved down the Ohio River during the first few weeks of March. Around 10 inches of rain fell in the middle Ohio River Valley from the Louisville area to Cincinnati within a one to three day period. This resulted in the worst river flood in about 30 years along the Illinois shore, and one of the five worst on record. Riverfront neighborhoods in Metropolis were evacuated, and the riverboat casino was briefly shut down. Smaller communities protected by levies or floodwalls, such as Brookport and Old Shawneetown, fared better. A mechanical problem with a valve in Brookport allowed Ohio River water to back into the town, causing tens of thousands of dollars in property damage there. Massive sandbag levees were constructed by volunteers in most unprotected riverfront communities, including Metropolis, Ridgway, Elizabethtown, and Omaha. A towboat struck the Shawneetown bridge, prompting its closure until it could be inspected. A voluntary evacuation of Old Shawneetown was conducted. The levee protecting the town developed a few seeps, but
Pulaski	6/1/1997	Flood	N/A	0	0	0	0	The Ohio River crested above flood stage twice during the month at a few points. The flooding was considered to be minor bottomland flooding, except where farmers had planted crops. Bottomland cropland flooding destroyed or damaged thousands of
Pulaski	1/11/1998	Flood	N/A	0	0	0	0	Due to heavy rains in the upper Ohio River Basin, the Ohio River rose slightly above flood stage at many locations. The river exceeded flood stage at Shawneetown, Brookport, Grand Chain, and Cairo. At most of these locations, the crests were about 2 feet above flood stage. The exception was at Shawneetown, where the crest was four feet over flood stage. The minor flooding affected primarily agricultural bottomlands.
Pulaski	3/22/1998	Flood	N/A	0	0	0	0	The Ohio River crested just above flood stage at several locations. This resulted in some minor flooding of agricultural bottomlands and river access roads. The river crested right at the 37 foot flood stage at Brookport, 3 feet above the 33-foot flood stage at Shawneetown, and 4.6 feet above the 40-foot flood
Pulaski	4/1/1998	Flood	N/A	0	0	0	0	The Ohio River crested 8 to 10 feet above flood stage at some locations, causing moderate agricultural bottomland flooding. Some roads near the river were flooded, and parts of Fort Massac State Park were underwater. The river crested at 51.3 feet at Cairo, where flood stage is 40 feet. At Shawneetown, where flood stage is 33 feet, the river crested at 41.9 feet. Minor flooding occurred in the Hall Town area near Golconda, where the river crested at 42.7 feet. Flood
Pulaski	5/1/1998	Flood	N/A	0	0	0	0	Moderate flooding of the lower Ohio River continued into mid May. The river crested 6 to 8 feet above flood stage at Shawneetown, Brookport, and Grand Chain. The crest at Cairo was 10 feet over the 40-foot flood stage due partly to backwater from the swollen Mississippi River. The dates of the crest were on the 5th or 6th at Brookport, Grand Chain, and Cairo. The crest date upstream at Shawneetown was on the 12th. Flooding of low-lying agricultural areas, riverside parks, and river access roads was significant.
Pulaski	6/15/1998	Flood	N/A	0	0	0	0	The Ohio River crested 2 to 4 feet above flood stage at Shawneetown, Grand Chain, and Cairo between June 21 and 25. This resulted in minor agricultural bottomland flooding.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	1/22/1999	Flood	N/A	0	0	0	0	Repeated heavy rainfall events from a succession of March-like storm systems caused the Ohio River to rise 5 to 10 feet above flood stage. At Shawneetown, where flood stage is 33 feet, the river crested at 43.5 feet on the 30th. At Brookport, where flood stage is 37 feet, the river crested at 45.9 feet on the 27th. Further downstream, the river crested 8 feet above flood stage at both Grand Chain and Cairo by early on the 28th. At these stages, flooding is minor, but approaches the moderate category. Considerable flooding of farmland occurs, and some county roads are closed. Riverside parks become inundated and
Pulaski	2/1/1999	Flood	N/A	0	0	30K	0	The Ohio River remained well above flood stage into early February. The river crested at Shawneetown in late January, but did not crest from Golconda downriver to Cairo until the first few days of February. At Golconda, where flood stage is 40 feet, the crest was 45.38 feet. At Brookport, where flood stage is 37 feet, the crest was 46.50 feet. At Grand Chain, where flood stage is 42 feet, the crest was 51.10 feet. Cairo crested at 49.47 feet, nearly 10 feet over flood stage. All points fell below flood stage by mid month. The crests between 5 and 10 feet over flood stage produced minor to moderate flooding. The primary affected areas were agricultural bottomlands. Roads and parks along the river were also affected, including Fort Massac State Park in Metropolis. At Cairo, a stage of 50 feet prompts the closure of the first flood
Pulaski	3/9/1999	Flood	N/A	0	0	0	0	Two organized storm systems moved out of the southern Plains on the 5th and 6th and the 8th and 9th. Total rainfall from these two storms averaged between 1 and 2 inches. Although not excessive, this was enough rainfall to cause minor flooding of the Ohio River at most points on the Illinois shore. At Shawneetown, where flood stage is 33 feet, the crest of 36.5 feet occurred on March 12. Crests at Brookport, Grand Chain, and Cairo were all less than a foot and a half above flood stage. Some agricultural
Pulaski	2/19/2001	Flood	N/A	0	0	0	0	The Ohio RIver rose above its flood stage at several points along the Illinois shore. The crests were 2 to 3 feet above flood stage, which resulted in minor to moderate flooding of low-lying agricultural bottomland. The locations which exceeded flood stage were Shawneetown, Brookport, Grand Chain, and Cairo. All locations crested on February 23. Cairo and Grand Chain remained slightly above flood stage into early March, while locations upriver fell below flood stage by
Pulaski	3/1/2001	Flood	N/A	0	0	0	0	Minor flooding on the Ohio River continued from late February. The early March flooding was downriver from Metropolis and Paducah to Cairo. The river fell below flood stage at Grand Chain on March 2, and at Cairo on March 4. Crests at both locations were on February 23. The river was held above flood stage longer at Cairo due to some backwater effects from the flooding Mississippi River. A secondary crest of 43.24 feet occurred at Cairo on March 1. The flood stage at Cairo is 40 feet.
Pulaski	12/1/2001	Flood	N/A	0	0	0	0	The Ohio River crested one to two feet above flood stage at Grand Chain and Brookport early in December. The crest at Brookport was on the 2nd and at Grand Chain on the 3rd. Minor flooding of bottomland and low-lying areas occurred.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	12/17/2001	Flood	N/A	0	0	8K	0	Numerous roads were flooded in most southern Illinois counties, including a few primary routes. In Hamilton County, Route 142 was closed south of Mcleansboro. In Alexander County, a residence near Tamms was evacuated. Rainfall amounts for December 16-17 were commonly 3 to 5 inches in the flooded areas. In Union County, 4.35 inches was measured at Anna. Flooding blocked railroad tracks in Union County. An Amtrak train was forced to make an unplanned stop at the Anna station, and all 75 passengers found alternate means of travel.
Pulaski	12/18/2001	Flood	N/A	0	0	0	0	The Ohio River crested one to two feet above flood stage at Shawneetown, Brookport, Grand Chain, and Cairo on December 20 or early on December 21. Minor flooding of bottomland and low-lying areas occurred. This flood crest was the second of the month for Brookport and Grand Chain. This flooding was due to a series of heavy rainfall events that began in late November and ended around December 17. The heaviest rainfall event produced between 4
Pulaski	1/23/2002	Flood	N/A	0	0	30K	0	Thunderstorms repeatedly moved over the same corridor from Scott County, Missouri northeast across Alexander and Pulaski Counties in Illinois. Rainfall totals were 3 to 5 inches in a few hours' time. In Johnson County, the sheriff's office in Vienna reported 3 inches. Two vehicles were involved in flooding incidents in Johnson County, but no injuries were reported. One of the incidents was in Vienna and the other was southeast of Reevesville. Pulaski County officials reported flooding at State Highways 37 and 169 near Karnak. Numerous other smaller roads were flooded, and at least one was washed out by a creek. Several vehicles and a house were flooded in Mounds.
Pulaski	1/24/2002	Flood	N/A	0	0	0	0	Flooding of the Cache River prompted the closure of U.S. Highway 51 between Ullin and Pulaski.
Pulaski	1/26/2002	Flood	N/A	0	0	0	0	The Ohio River rose above flood stage along the Illinois side late in January. Flood stage was exceeded downriver from the confluence of the Tennessee River at Paducah. At Brookport, where flood stage is 37 feet, the river crested at 41.1 feet on January 31. This resulted in minor flooding of lowlands, including portions of Fort Massac State Park, where an access road was closed. Further downriver at Grand Chain and Cairo, the crest did not occur before the end of the month.
Pulaski	2/1/2002	Flood	N/A	0	0	0	0	The Ohio River was already above flood stage from Brookport Dam to Cairo at the beginning of the month. The river had already crested 4.1 feet above flood stage at Brookport on January 31. Grand Chain crested 3.4 feet above flood stage on February 1. The crest finally reached Cairo on February 3. Minor flooding was observed at all points, with no property damage reported. Mainly agricultural low-lying areas and bottomlands near the river were flooded.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	3/20/2002	Flood	N/A	0	0	3K	0	The Ohio River rose above flood stage at most locations along the Illinois shore on March 20th or 21st. At Shawneetown, where flood stage is 33 feet, the river crested at 43.70 feet on the morning of the 29th. At Golconda, where flood stage is 40 feet, the river crested at 44.12 feet on the 28th. Crests at Brookport, Grand Chain, and Cairo were all 7 to 8 feet above flood stage on the 26th and 27th. The impact of this flooding was minor to moderate. Several county roads were closed near Shawneetown. Water reached the power house at Lock and Dam 53 near Grand Chain. Low-lying agricultural bottomlands were flooded, but planting season had not yet begun.
Pulaski	4/1/2002	Flood	N/A	0	0	0	0	The Ohio River fell back below flood stage between April 6th and 9th at all gage sites on the Illinois side of the river. The crest occurred in late March, about 10 feet above flood stage at Shawneetown, and 4 to 8 feet above flood stage elsewhere. The April flooding was minor, consisting mostly of agricultural
Pulaski	4/24/2002	Flood	N/A	0	0	0	0	The Ohio River rose above flood stage toward the end of the month at Shawneetown, Grand Chain, and Cairo. Through May 1, only minor flooding of low-lying agricultural bottomland occurred.
Pulaski	5/1/2002	Flood	N/A	0	0	762K	0	The Ohio River was above flood stage for virtually the entire month from Grand Chain to the confluence of the Mississippi River at Cairo. Major flooding occurred from Grand Chain to Cairo, where flooding was the worst since the Flood of 1997. The severity of the flooding in this area was due partly to very high levels on the Mississippi River, which caused water to back into the already swollen Ohio River. The crest at Cairo was 55.0 feet, which is the 7th highest on record. The community of Urbandale, just upriver from Cairo, was almost completely flooded. Despite levy protection there, flooding occurred either due to the failure of pumps or the failure of a gate in the levy. Most of the residents evacuated their homes, and about 25 homes were flooded. Many of those that were affected had been flooded in recent years and were generally low dollar-value buildings. Flooding of farmland was extensive, and farmers were forced to delay the planting of crops. Corn is normally planted by mid May. In the Cairo area, property not protected by
Pulaski	6/1/2002	Flood	N/A	0	0	0	0	The Ohio River fell below flood stage at Cairo and Grand Chain for the first time since late April.
Pulaski	2/18/2003	Flood	N/A	0	0	0	0	The Ohio River rose above flood stage on the Illinois side around the 20th, and crested at most locations on the last day of the month. The flooding was minor to moderate in intensity. The crest was 6 to 10 feet above flood stage at Brookport, Grand Chain, and Cairo. Upriver from Brookport, the river had not crested as of month's end. Across the river from Paducah, KY, the crest of 46.8 feet at Brookport was almost 10 feet over the 37-foot flood stage. Riverside parks and campgrounds were inundated. Extensive flooding of low-lying woods and fields occurred. Some rural county roads were closed. Very few if any

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	3/1/2003	Flood	N/A	0	0	0	0	The Ohio River remained above flood stage from late February. Below the confluence with the Tennessee River, the river had already crested in February. Above the Tennessee River at Paducah, including Golconda and Shawneetown, the river crested on March 2. The crest was exactly 10 feet above the 33-foot flood stage at Shawneetown, and about 4 feet above the 40-foot flood stage at Golconda. This resulted in extensive flooding of low-lying woods and fields. Some rural county roads were closed. Very few if any structures were directly affected. The river fell
Pulaski	5/7/2003	Flood	N/A	0	0	0	0	The Ohio River rose above flood stage in response to repeated very heavy thunderstorms. The flooding was more significant downriver from the confluence of the Tennessee and Cumberland Rivers. Flood crests were generally 7 to 10 feet above flood stage. The flooding had a major impact on farming operations in the flood plain, causing some farmers to lose planted crops. Flooding of riverside parks and recreational facilities occurred. A few side roads near the river were flooded. At Shawneetown, where flood stage is 33 feet, the crest of 40 feet was on May 17. At Brookport Lock, across from Paducah, the crest of 46.5 feet was on May 14. Flood stage at Brookport is 37 feet. At Grand Chain, where flood stage is 42 feet, the crest of 52 feet was on May 14. The river crested at 50.6 feet
Pulaski	1/5/2004	Flood	N/A	0	0	0	0	The Ohio River rose above flood stage in response to heavy rains from Illinois to Ohio at the end of December. These heavy rains continued into the first days of January. The Ohio River first reached flood stage on the 5th at Shawneetown, and last fell below flood stage on the 20th at Shawneetown. Other points in Illinois that rose above flood stage were Golconda, Brookport, Grand Chain, and Cairo. The river crested at all these points on the 14th and 15th. Shawneetown crested at 44.7 feet, well above the flood stage of 33 feet. The crests were two to three feet above flood stage from Golconda to Grand Chain, and just inches above flood stage at Cairo. These river stages resulted in minor flooding. The flooding was confined mostly to low-lying woods and fields near the river.
Pulaski	2/8/2004	Flood	N/A	0	0	0	0	The Ohio River rose above flood stage in southern Illinois for about a week and a half. The flooding was minor, with only bottomland and surrounding low-lying areas affected. This included some parks and recreational grounds near the river, as well as agricultural land that was dormant this time of year. At Shawneetown, where flood stage is 33 feet, the river crested at 39.6 feet on the 15th. At Golconda, where flood stage is 40 feet, the river crested at 40.4 feet on the 15th. The crests at Brookport and Grand Chain were 4 to 5 feet above flood stage on the 13th. The crest at Cairo was about a foot above flood stage on the 15th.
Pulaski	3/9/2004	Flood	N/A	0	0	0	0	Minor flooding of the Ohio River occurred along most of the Illinois side. The flooding consisted mostly of inundated agricultural bottomland, along with some parks and recreational areas. The agricultural land was dormant for the most part, so crop losses were minimal. The crest at Shawneetown was 37.90 feet on the 14th, almost 5 feet above flood stage. At Brookport, where flood stage is 37 feet, the river crested at 40.10 feet on the 11th. Crests at Grand Chain and Cairo were 4 to 6 feet above flood stage. Flood stage is 42 feet at Grand Chain and 40 feet at

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	5/28/2004	Flood	N/A	0	0	0	0	Minor flooding of the Ohio River occurred at the end of the month. The river rose above flood stage at Shawneetown on the 28th, at Grand Chain on the 31st, and at Cairo on the 30th. Minor flooding of low-lying bottomlands near the river occurred. The flood crest was in June. The river did not reach flood stage at gage sites between Shawneetown and Grand
Pulaski	6/1/2004	Flood	N/A	0	0	0	0	Minor to moderate flooding of the Ohio River continued from late May into early June. The river crested above flood stage at all gage points on the Illinois side. Crests were only about a foot or two above flood stage at Brookport and Golconda. At Grand Chain and Cairo, the river crested 3 to 5 feet above flood stage. Flood stage at Grand Chain is 42 feet, and at Cairo flood stage is 40 feet. The crest at Shawneetown was 42.1 feet, well above the 33-foot flood stage. Flooding of bottomlands and low-lying fields near the river was considerable in some areas. A few river access roads were flooded, and some riverside parks were partially inundated.
Pulaski	12/3/2004	Flood	N/A	0	0	0	0	The Ohio River rose above flood stage along most of the Illinois shore. The flooding was minor as far downriver as the confluence with the Tennessee River at Paducah. Primarily bottomland fields and woodlands were affected in these areas. From Paducah to the confluence with the Mississippi River at Cairo, the flooding was moderate. Some river access roads, boat ramps, and park facilities near the river were under water. The flood crest was only two feet above flood stage at Shawneetown, and 7 feet above flood stage at Brookport, Grand Chain, and
Pulaski	1/5/2005	Flood	N/A	0	0	700K	0	Moderate to major flooding of the Ohio River and some of its tributaries occurred. A state disaster declaration included Massac, Pope, Hardin, and Gallatin Counties. Floodfighting activities included the construction of temporary sandbag levees. Isolated evacuations of some lowland residents were conducted. In the city of Metropolis in Massac County, several streets were closed, a few residences were evacuated, and a casino riverboat was closed for several days. The closure of the casino had a major impact on the local economy. Flooding of the casino's parking lot and entrance prompted the closure. There was very little property damage to the casino itself. In Gallatin County, the community of Old Shawneetown was threatened, resulting in extensive sandbagging and levee patrols. Very little if any structural flooding was reported in Old Shawneetown. In Hardin County, cabins at a campground at Saline Landing were flooded, and Front Street was flooded in Elizabethtown. There was sandbagging around homes in Elizabethtown and Cave-In-Rock. Several mobile
Pulaski	4/1/2005	Flood	N/A	0	0	0	0	Minor flooding of the Ohio River occurred. At Shawneetown, where flood stage is 33 feet, the river crested at 37.8 feet on April 8. At Brookport, where flood stage is 37 feet, the river crested at 38.2 feet on the 10th. At Grand Chain, where flood stage is 42 feet, the crest of 43.0 feet occurred on the 11th. At Cairo, where flood stage is 40 feet, the crest of 40.7 feet was on the 12th. Minor flooding of low-lying fields and

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Grand Chain	1/14/2007	Flood	N/A	0	0	0K	0K	At Grand Chain, where flood stage is 42 feet, the Ohio River crested at 44.4 feet on the 16th. This resulted in minor flooding. Bottomland fields and woodlands were flooded, along with some remote access roads.Several smaller rounds of rainfall during the first week of January set the stage for a heavy rain event about mid-month. The Ohio River responded quickly. Minor flooding occurred along the river.
Pulaski	1/8/2008	Flood	N/A	0	0	0K	0K	A strengthening warm front over far southern Illinois and western Kentucky became the focus for strong thunderstorms on the 8th. As this warm front moved slowly north, dew points in the upper 50's spread north from Tennessee. Heavy rain caused flooding of the Cache River. At least two roads across the river were closed or impassable.
New Grand Chain	2/10/2008	Flood	N/A	0	0	0K	0K	The Ohio River crested at 44.70 feet at Grand Chain Lock and Dam on the 19th. Flood stage is 42 feet. Minor flooding of low-lying bottomlands and fields occurred.Numerous thunderstorms on the 5th accompanied a strong storm system that tracked northeast across southeast Missouri and southern Illinois. Heavy rainfall on ground that was already moist from January storms caused flooding of the Ohio River.
Pulaski	12/21/1998	Freezing Rain	N/A	0	0	0	0	Rain changed to freezing rain and sleet late in the afternoon as a sharp cold front moved across the region. Temperatures plummeted from the upper 50s during the morning into the upper 20s by early nightfall. The wintry precipitation lasted for only a few hours, but was sufficient to cause numerous accidents. Most involved vehicles spinning out of control and sliding into ditches, but one accident was fatal. In Williamson County, a vehicle left the road and
Pulaski	1/26/2001	Freezing Rain	N/A	0	0	0	0	Light freezing rain overspread southern Illinois just before the early morning commute time. The precipitation, which amounted to less than a tenth of an inch, lasted a few hours. Along and north of Interstate 64, there was more sleet than ice. Vehicle wrecks were most numerous from the Marion and Carbondale area north. State police reported several jack-knifed semis on Interstate 57, mainly from Marion to Benton.
Pulaski	9/24/1995	Frost	N/A	0	0	0	0	An early frost caused some minor damage to crops and gardens. Since most corn and soybeans were harvested, and because shelter-level temperatures stayed above freezing in some areas, financial losses were generally not severe.
Pulaski	4/18/1997	Frost	N/A	0	0	0	0	An unseasonably cold April caused problems for growers, especially fruit growers. The peach crop was especially vulnerable because above normal temperatures in March caused peach trees to blossom early. Lows on April 18 were in the upper 20s in some of the colder valleys. A fruit grower in Union County estimated nearly half of his peach crop was
Pulaski	4/9/2000	Frost	N/A	0	0	0	0	A freeze caused some damage to fruit tree blossoms, mainly in low-lying areas. The peach blossoms were most heavily impacted. Estimates of peach losses at one orchard in Massac County ranged up to 50 percent. Warmer than normal temperatures in January and February caused peach trees to blossom too early, as early as the first part of March.
Pulaski	10/9/2000	Frost	N/A	0	0	0	0	A widespread killing frost and freeze affected southern Illinois, bringing an end to the growing season. Low temperatures were in the middle 20s.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	4/18/2001	Frost	N/A	0	0	0	0	An unusually late frost damaged unprotected crops and gardens. The low temperature at Carbondale was 27 degrees, and Mcleansboro in Hamilton County got down to 24 degrees. At an orchard 10 miles northeast of Metropolis, about half the peach and nectarine crop was killed.
Karnak	3/28/1997	Funnel Cloud	N/A	0	0	0	0	A fire chief reported the funnel cloud. The storm producing this funnel cloud tracked across northern Massac and Pope Counties, producing more funnel clouds and large hail.
Perks	7/8/1997	Funnel Cloud	N/A	0	0	0	0	A funnel cloud was observed at Perks.
Grand Chain	5/25/2006	Funnel Cloud	N/A	0	0	0	0	None Reported
Pulaski	5/13/1980	Hail	1.75 in.	0	0	0	0	None Reported
Pulaski	6/20/1981	Hail	0.75 in.	0	0	0	0	None Reported
Pulaski	4/3/1989	Hail	0.75 in.	0	0	0	0	None Reported
Pulaski	5/5/1989	Hail	0.75 in.	0	0	0	0	None Reported
Pulaski	7/4/1992	Hail	1.00 in.	0	0	0	0	None Reported
America	4/12/1993	Hail	1.50 in.	0	0	0	0	
Dixon Springs	4/20/1995	Hail	1.50 in.	0	0	0	0	A slow-moving line of thunderstorms dumped up to two inches of rain per hour along the Ohio River. At Dixon Springs, 1.70 inches fell in 20 minutes. Counties adjacent to the Ohio River experienced widespread flooding of roads and low-lying fields. One
Mounds	6/9/1995	Hail	0.75 in.	0	0	0	0	The hail covered the ground to a depth of three
Olmsted	6/9/1995	Hail	1.00 in.	0	0	0	0	The hail covered the ground to a depth of three
Ullin	3/28/1997	Hail	1.75 in.	0	0	0	0	State police reported golf ball size hail at the Ullin headquarters.
Mound City	4/13/1998	Hail	0.88 in.	0	0	0	0	Nickel size hail occurred near the Alexander County
Mound City	1/3/2000	Hail	0.75 in.	0	0	0	0	None Reported
Mound City	4/16/2000	Hail	1.75 in.	0	0	0	0	Golf ball hail was reported on Interstate 57 at the Alexander/Pulaski County line, just south of the Mounds exit.
Ullin	4/27/2000	Hail	0.75 in.	0	0	0	0	None Reported
Grand Chain	5/23/2000	Hail	1.75 in.	0	0	0	0	None Reported
Ullin	9/11/2000	Hail	1.75 in.	0	0	0	0	None Reported
Ullin	9/22/2000	Hail	1.00 in.	0	0	0	0	None Reported
Pulaski	4/25/2003	Hail	0.75 in.	0	0	0	0	None Reported
Olmsted	5/4/2003	Hail	0.75 in.	0	0	0	0	A long-lived supercell thunderstorm crossed the Mississippi River about 10 miles northwest of Cairo, then moved east along the Ohio River. While crossing the southernmost tip of Illinois, this storm was responsible for three tornadoes, large hail up to the size of golf balls, and damaging winds.
Olmsted	5/26/2004	Hail	0.75 in.	0	0	0	0	Another round of severe thunderstorms affected southern Illinois during the afternoon and evening hours, following the late morning round of storms. This round began with a swath of large hail near the western Perry/Jackson County line. Numerous trees were blown down near Galatia. The final severe storm of this episode was a long-lived storm cluster that tracked east from the Mount Vernon area to the Wabash River. This storm produced golf-ball hail west of Mount Vernon, then downed trees and power lines in Crossville in White County. A mobile home was unroofed one mile southeast of Crossville, and its contents were damaged by rain. Otherwise, most of
Villa Ridge	6/8/2005	Hail	1.00 in.	0	0	0	0	None Reported
Perks	4/2/2006	Hail	1.00 in.	0	0	0	0	None Reported
Karnak	4/2/2006	Hail	1.75 in.	0	0	0	0	None Reported
Pulaski	5/2/2006	Hail	0.88 in.	0	0	0	0	None Reported
Grand Chain	5/3/2006	Hail	0.88 in.	0	0	0	0	None Reported
Ullin	5/25/2006	Hail	1.75 in.	0	0	0	0	None Reported
Ullin	5/25/2006	Hail	1.00 in.	0	0	0	0	None Reported
Ullin	9/10/2006	Hail	0.75 in.	0	0	0	0	None Reported

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Ullin	2/20/2007	Hail	1.75 in.	0	0	0K	0K	The first severe weather episode of 2007 occurred across southern Illinois during the evening. A cold front pressed southeast across the region during the afternoon as a wave of low pressure shifted east along the front into the Ozarks of northern Arkansas. Southerly flow ahead of the low brought warm moist air northward as temperatures reached the 60s. The atmosphere destabilized enough by late afternoon to allow for the development of thunderstorms over southeast Missouri. These storms were prolific hail producers as they crossed into southern Illinois.
Mounds	2/20/2007	Hail	1.00 in.	0	0	0K	0K	The first severe weather episode of 2007 occurred across southern Illinois during the evening. A cold front pressed southeast across the region during the afternoon as a wave of low pressure shifted east along the front into the Ozarks of northern Arkansas. Southerly flow ahead of the low brought warm moist air northward as temperatures reached the 60s. The atmosphere destabilized enough by late afternoon to allow for the development of thunderstorms over southeast Missouri. These storms were prolific hail producers as they crossed into southern Illinois.
Karnak	2/20/2007	Hail	0.88 in.	0	0	0K	0K	The first severe weather episode of 2007 occurred across southern Illinois during the evening. A cold front pressed southeast across the region during the afternoon as a wave of low pressure shifted east along the front into the Ozarks of northern Arkansas. Southerly flow ahead of the low brought warm moist air northward as temperatures reached the 60s. The atmosphere destabilized enough by late afternoon to allow for the development of thunderstorms over southeast Missouri. These storms were prolific hail producers as they crossed into southern Illinois.
Grand Chain	2/20/2007	Hail	0.75 in.	0	0	0K	0K	The first severe weather episode of 2007 occurred across southern Illinois during the evening. A cold front pressed southeast across the region during the afternoon as a wave of low pressure shifted east along the front into the Ozarks of northern Arkansas. Southerly flow ahead of the low brought warm moist air northward as temperatures reached the 60s. The atmosphere destabilized enough by late afternoon to allow for the development of thunderstorms over southeast Missouri. These storms were prolific hail producers as they crossed into southern Illinois.
Pulaski	7/19/2006	Heat	N/A	0	0	0	0	The heat index peaked between 105 and 110 across southern Illinois for up to three consecutive afternoons. At Carbondale, the heat index rose to 105 degrees on the 19th and 20th, and fell just shy of 105 on the 21st. At Mount Vernon, the heat index rose to 105 on the 19th, but did not reach that threshold on the 20th or 21st. At Cairo, the heat index peaked at 108 degrees on the 19th and 20th, and 105 on the 21st. The only three counties that did not register heat indices of at least 105 degrees were in the Lower
Pulaski	8/1/2006	Heat	N/A	0	0	0	0	The heat index peaked between 105 and 113 degrees across southern Illinois on August 1st. Hourly measurements of the heat index peaked as high as 113 degrees at Harrisburg and Fairfield, 110 at Mount Vernon, 108 at Marion, 107 at Carbondale, and 105 at Cairo. Heat indices were a little lower in most areas the next day, but still peaked at or above 105 degrees in the Wabash Valley and near Cairo. The highest heat indices on August 2nd were 110 degrees at Fairfield, 108 at Harrisburg, and 105 at Cairo and

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	8/19/2006	Heat	N/A	0	0	0	0	The heat index peaked between 105 and 110 degrees across far southern Illinois, mainly along and south of a line from Carbondale to Harrisburg. The highest hourly heat index readings were 109 degrees at Harrisburg, 107 at Carbondale, and 105 at Metropolis.
Pulaski	8/6/2007	Heat	N/A	0	0	0K	0K	Surface high pressure located over the Deep South remained nearly stationary. A persistent hot and humid southwest wind flow around this high brought an extended period of dangerously high heat indices, ranging from 105 to 110 degrees on several afternoons. A number of persons were treated for heat exhaustion, including 37 at a Carbondale hospital. Several counties opened a cooling shelter.
Pulaski	7/7/1995	Heat Wave	N/A	0	0	0	50K	Highs rose into the 90s with lows in the 70s for about two weeks. High humidity resulted in heat index values approaching 115 degrees. The prolonged heat caused parts of Interstate 57 to buckle. Illinois State Police diverted traffic from a badly damaged lane seven miles north of Cairo. At least one utility company reported that its all-time record for power
Pulaski	8/10/1995	Heat Wave	N/A	0	1	0	0	Temperatures climbed well into the 90s with heat indicies peaking around 115 degrees on some afternoons. This resulted in severe heat stress to livestock and crops. Many schools dismissed students early in the afternoon, and extra water coolers were brought in by some schools. At least one heat-related illness occurred at an elementary school. A student in Frankfort fainted after an outdoor recess, but she was
Southern Illinois	3/8/1994	Heavy Snow	N/A	0	0	500K	0	Four to 12 inches of snow fell across southern Illinois. The heaviest snow fell in the far south tip near the Ohio River. Many schools and businesses were closed. There were many traffic accidents due to slick, snow-covered roads. Some older barns and homes suffered roof damaged from the weight of the snow in far southern Illinois.
Pulaski	3/14/1999	Heavy Snow	N/A	0	0	0	0	A major snowstorm dumped as much as a foot of snow over parts of far southern Illinois. The hardest hit area was the Marion-Carbondale area, where 11 to 12 inches was measured. Because most of the precipitation fell as rain further south, little if any snow occurred from Metropolis to Shawneetown along the Ohio River. There was a sharp division between no snow and heavy snow. For example, in Johnson County (between Metropolis and Carbondale), accumulations ranged from 1 inch in the southeast corner to 7 inches in the northwest corner of the county. The swath of heaviest snow extended from Carbondale to Mount Carmel, where 9 to 12 inches fell. Other totals included 8 inches in Mount Vernon and Du Quoin, and 4 inches between Cairo and Anna. Snowfall rates were 1 to 2 inches per hour for several hours. This overtaxed the ability of most road crews to keep up with removal efforts. Interstate 57 was closed in the vicinity of Interstate 24 for several hours Sunday due to stranded tractor trailer rigs. In Johnson County, at least 30 vehicles slid off roads near

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	1/19/2002	Heavy Snow	N/A	0	0	0	0	Around four inches of snow fell across extreme southern Illinois, generally south of a line from Carbondale to Carmi. Lesser amounts of two to four inches fell north of there. Most of the snow fell in just a few hours time, when visibility was only around one quarter mile. Since surface temperatures were right near freezing during the event, snow removal was relatively easy. Traffic problems were relatively light because of the late night timing on a weekend. Some of the highest snowfall reports included: 4.5 inches at Grand Chain in Pulaski County, 4.3 inches at Carbondale, and 4 inches at Dixon Springs in Pope
Pulaski	2/6/2003	Heavy Snow	N/A	0	0	0	0	A two-part winter storm dropped an average of 3 to 5 inches of heavy wet snow across extreme southern Illinois, mainly south of the Marion and Carbondale areas. The first round of snow occurred during the early morning and dropped 1 or 2 inches. The second round during the evening produced another 2 to 3 inches. Temperatures during the event were very close to freezing, and most of the accumulation was on grassy areas. Slushy roads were a concern at times, but the impact on travel was relatively minor. The snow was caused by an upper level disturbance moving east northeast from the Four Corners region. The highest reported snowfall amounts were along the Ohio River, including 4.5 inches at Metropolis and 4 inches at Cairo. Up to 3 inches of snow were reported as far north as Harrisburg, West Frankfort, and parts
Pulaski	4/30/1997	High Wind	52 kts.	0	0	20K	0	Strong southwest winds, not related to thunderstorms, gusted between 50 and 60 MPH during the late afternoon. Scattered reports of downed trees and power lines were received. Large sections of Murphysboro were without power, as were parts of Marion, Carbondale, Anna, and Harrisburg.
Pulaski	11/11/1995	High Winds	0 kts.	0	0	0	0	A very strong cold front moved through southern Illinois, causing temperatures to fall 20 degrees in 30 minutes. Strong winds behind the cold front caused some isolated power outages and minor tree damage. Power outages were reported in Williamson County, and a small tractor shed was blown over two miles north of Carterville.
Pulaski	1/15/1997	Ice Storm	N/A	0	0	0	0	Freezing rain coated surfaces with around a half inch of ice. Travel became very difficult in a short period of time. The weather prompted Southern Illinois University in Carbondale to shut down for the fourth time in 30 years. The freezing rain virtually shut down several counties, closing schools, government offices, and health facilities. Franklin County was nearly paralyzed by the storm. Most Franklin County businesses and public offices closed for the day. A large number of vehicle accidents occurred, but no serious injuries were reported. State Route 13 in Jackson County and some county roads in Johnson, Pulaski, and Union Counties were closed because vehicles were unable to climb hills. The Southern Illinois Airport was closed for two hours. Hospitals brought in extra staff to handle an overload due to weather-related injuries. Mail delivery was cancelled in

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	1/1/1999	Ice Storm	N/A	0	0	150K	0	Significant ice accumulations caused travel problems across southern Illinois beginning late on New Years Day and continuing through the night. Traffic volume was especially light because it was a holiday weekend. Those who had to be out found roads extremely difficult to navigate. The hardest hit areas, from Carbondale to Benton and West Frankfort, experienced numerous power outages due to snapped tree limbs and power lines. A rural electric co-op reported slow progress in restoring power because of treacherous roads and fallen trees. Estimates of the number of residences without power were around 10,000, primarily in Franklin and Jackson Counties. Ice accumulations were estimated to be one-half to one inch thick in the area from Carbondale to DuQuoin and Mt. Vernon. Shelters were set up for those without heat, but few people took advantage of them. Local emergency rooms reported a sharp increase in slip-and-fall injuries.Dozens of vehicle accidents or mishaps occurred, including a fatal wreck on Interstate 57 about 4 miles south of Mt. Vernon.
Pulaski	1/8/1999	Ice Storm	N/A	0	0	0	0	Freezing rain coated surfaces with around a quarter inch of ice in most areas. The exception was in the vicinity of the Ohio River from Massac County to Hardin County, where locally one half inch of ice was observed. Many schools cancelled classes again, only a day after re-opening in the wake of an ice storm on January 2. A semi-trailer overturned on Interstate 57 just south of Marion. A total of 25 ice-related falls were recorded at Union County Hospital. This ice storm was considerably less serious than the ice storm of January 1 and 2, which hit the Carbondale and West Frankfort areas worst.
Pulaski	1/25/2004	Ice Storm	N/A	0	0	0	0	The areas hardest hit by this ice storm were along and north of a line from Harrisburg to Carbondale, where about one half inch of ice glazed all surfaces. Numerous accidents were reported. At least one overturned vehicle and a jackknifed semi were reported on Interstate 57 between West Frankfort and Mount Vernon. Scattered power outages occurred as brisk winds downed ice-laden trees and power lines. One of the largest utility companies in southern Illinois reported about 1,500 customers without power. In Saline County, a downed power line blocked Illinois Route 34 near West End and U.S. Route 45 near Ledford. Most schools were closed for at least a day following the ice storm, which occurred on a Sunday. To the south of a line from Carbondale to Harrisburg, around one quarter inch of ice coated trees and power lines, but roads were mainly wet with scattered icy spots. There were some ice-laden tree limbs and power lines brought down by gusty winds. Illinois Route 145 in Massac County was one of a number of roads partially blocked by downed limbs.
Pulaski	12/8/1995	Snow	N/A	0	0	0	0	Between three and four inches of snow fell across most of southern Illinois. At least two dozen traffic accidents occurred, including a fatal crash near Mt. Vernon. A vehicle slid across the median of Interstate 57, colliding head on with another vehicle. Two people were killed. The snow closed one of the regional airports in the Carbondale area for most of the day.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	12/23/1998	Snow	N/A	0	0	0	0	A light snowfall, the first of the season in some areas, provided a one-inch coating. Road surfaces became extremely slippery, and numerous accidents were reported. Two of the accidents left drivers with major injuries and traffic backups stretching several miles. A tractor-trailer rig northbound on Interstate 57 near Marion jackknifed and crossed the median into the southbound lanes. The driver of a car that was struck by the truck was seriously injured. Traffic on Interstate 57 was detoured onto side roads until the accident could be cleared. Another accident on U.S. 51 about 8 miles south of Carbondale closed that road for a while. Three vehicles were involved in that wreck, and one person was seriously injured. Numerous other accidents were reported across the region, mostly
Pulaski	1/22/2000	Snow	N/A	0	0	0	0	Snow began during the morning hours and continued intermittently through the afternoon. Accumulations averaged only an inch or two, but roads still became quick slick. Slick roads may have contributed to a single-car accident in northern Pope County that critically injured a man.
Pulaski	1/8/2006	Strong Wind	N/A	0	0	19K	0	Strong southwest winds were sustained from 30 to 35 MPH during the peak of this wind event. Measured wind gusts were as high as 45 MPH at the Carbondale
Pulaski	1/19/2006	Strong Wind	N/A	0	0	19K	0	Strong southwest winds were sustained around 30 MPH. Gusts were measured up to 48 MPH at
Pulaski	2/16/2006	Strong Wind	N/A	0	0	14K	0	Strong winds gusted to between 40 and 50 MPH across most of southern Illinois except the Wabash Valley. At the Carbondale airport, the peak wind gust was measured at 49 MPH. Other airports recorded gusts from 40 to 45 MPH.
Pulaski	12/1/2006	Strong Wind	N/A	0	0	1K	0K	A deepening low pressure system moved north across the Lower Ohio Valley. In the wake of the low, strong and gusty winds occurred. At airports near Cairo, Carbondale, Metropolis, and Harrisburg, highest sustained wind speeds were around 30 MPH, with peak wind gusts around 40 MPH. Winds were even higher in the Lower Wabash Valley, where peak wind gusts to 49 MPH were measured at Mount Carmel.
Pulaski	2/7/1999	Strong Winds	N/A	0	0	23K	0	Strong winds ahead of an approaching cold front gusted to 55 MPH at times across all of southern Illinois. These winds were sufficient to bring down some tree limbs and even a few rotted or older trees. In McLeansboro in Hamilton County, a tree fell on a nursing home and damaged the roof. In Massac County, damage occurred at Joppa High School, where a light pole at the baseball field became

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Perks	5/15/2007	Thunderstorm Wind	N/A	0	0	4K	0K	Four large trees were blown down.A line of thunderstorms along a strong cold front reached southeast Missouri by mid-afternoon. As this line of storms approached the Mississippi River, new thunderstorm development occurred over western Kentucky and southern Illinois. These new storms formed in a very warm and unstable atmosphere heated by almost unabated sunshine. The new storms turned out to produce most of the severe weather reports, consisting mostly of marginally severe hail and wind gusts to around 60 MPH. The initial line of storms over southeast Missouri weakened as it moved east, crossing into cooler air that was stabilized by the new thunderstorms. Winds in the mid and upper levels of the atmosphere were marginally favorable for organized storm structures. Some of the storms evolved into small lines capable of damaging winds. The wind shear, or change of wind speed and direction with height, was not supportive of storm rotation. As a result, all of the reported wind damage
Mounds	10/18/2007	Thunderstorm Wind	N/A	0	0	6K	0K	Two trees were down on Highway 936 just south of Villa Ridge. Trees were down across U.S. Highway 51 between Mounds and Villa Ridge.The first of two rounds of severe weather occurred during the early morning hours. This first round was associated with strong low level southwest winds ahead of a deep low pressure center along the Missouri/Nebraska border. Most of the severe weather during the early morning hours was damaging wind associated with short lines
Ullin	1/29/2008	Thunderstorm Wind	N/A	0	0	100K	0K	Numerous trees were blown down across the county, especially from Ullin north. The roof was partially blown off a high school just east of Ullin. In Mound City, trees penetrated the roofs of two homes. A roof was damaged in Olmsted. Several vehicles were damaged by falling trees around the county.A powerful cold front moved rapidly southeast across southern Illinois during the late afternoon hours. An organized line of severe thunderstorms developed along the front as it approached southern Illinois. Widespread damaging winds accompanied the line of storms. Temperatures fell about 30 degrees in less than one hour when the very strong cold front passed through.
Many Areas	4/18/1995	Thunderstorm Winds	N/A	0	0	0	0	
Ullin	5/17/1995	Thunderstorm Winds	N/A	0	0	0	0	
Wetaug	5/18/1995	Thunderstorm Winds	N/A	0	0	0	0	
Grand Chain	6/7/1995	Thunderstorm Winds	N/A	0	0	0	0	
Pulaski	6/8/1995	Thunderstorm Winds	N/A	0	0	100K	0	Numerous trees and power lines were downed, making some roads impassable. A few of the hardest hit communities were Karnak, Olmsted, and Mounds. Winds at these places were estimated by weather service employees to have been around 80 mph. Many homes were damaged by falling trees. A couple of house roofs were blown off in Mounds and four miles north of Olmsted. A truck was blown off the road just south of Mounds. Power was out for days in the
Western	6/20/1995	Thunderstorm Winds	N/A	0	0	0	0	
Pulaski	4/3/1957	Tornado	F2	0	0	250K	0	None Reported
Pulaski	6/21/1967	Tornado	F2	0	0	25K	0	None Reported
Pulaski	4/21/1972	Tornado	F2	0	2	25K	0	None Reported

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Grand Chain	5/6/2003	Tornado	F4	1	13	3.5M	0	This violent tornado began near Grand Chain and reached its maximum intensity of 210 MPH as it neared the Massac County line. A 53-year-old man was killed when the chimney of his house collapsed on him. The man, who was in his basement, was protecting his son by lying on top of him when the collapse occurred. The son received broken bones. Their house was impaled by some nearby large trees that prevented it from being swept farther away. Along the Pulaski County portion of the tornado path, six single family homes and ten mobile homes were destroyed. Another ten single family homes and a mobile home had major damage. A few dozen other residences received some type of minor damage. A few dozen outbuildings, two businesses, and a campground were destroyed or had major damage. Approximately 13 persons were injured, but only a few of those required hospitalization. All roads in the damage area were impassable due to large numbers of trees and building debris on them. Many of the tornado victims in this county had no insurance on their residences. The area of most intense destruction
Pulaski	1/13/2005	Tornado	F1	0	0	70K	0	A grain bin was blown over, and about a half dozen sheds and outbuildings were damaged or destroyed. Numerous trees and large limbs were blown down. An older mobile home was destroyed 3 to 4 miles west of Grand Chain. Peak winds were estimated near 75 MPH. Structural damage was minimal due to the very rural nature of the area. Thunderstorms produced isolated wind damage and a tornado across southern Illinois. The tornado and most of the wind damage was produced by a thunderstorm cell that entered southern Illinois near Cairo, then tracked northeast across Pulaski and Johnson Counties.
Pulaski	6/14/1958	Tstm Wind	0 kts.	0	0	0	0	None Reported
Pulaski	6/14/1958	Tstm Wind	0 kts.	0	0	0	0	None Reported
Pulaski	7/16/1962	Tstm Wind	0 kts.	0	0	0	0	None Reported
Pulaski	5/1/1967	Tstm Wind	0 kts.	0	0	0	0	None Reported
Pulaski	5/11/1967	Tstm Wind	0 kts.	0	0	0	0	None Reported
Pulaski	5/9/1970	Tstm Wind	0 kts.	0	0	0	0	None Reported
Pulaski	6/20/1970	Tstm Wind	0 kts.	0	0	0	0	None Reported
Pulaski	7/5/1975	Tstm Wind	0 kts.	0	0	0	0	None Reported
Pulaski	8/27/1988	Tstm Wind	0 kts.	0	0	0	0	None Reported
Pulaski	9/7/1990	Tstm Wind	0 kts.	0	0	0	0	None Reported
Pulaski	7/14/1992	Tstm Wind	0 kts.	0	0	0	0	None Reported
Wetaug	1/18/1996	Tstm Wind	0 kts.	0	0	10K	0	A machine shed was blown across a road. Debris from the shed damaged a house trailer.
Pulaski	5/5/1996	Tstm Wind	0 kts.	0	0	50K	0	Scattered tree damage occurred throughout the county. A mobile home's roof was damaged in Pulaski. Two barns were blown down in New Grand Chain. A National Weather Service survey team investigated damage throughout Pulaski County.
Mounds	10/22/1996	Tstm Wind	50 kts.	0	0	0	0	Trees were blown down.
Karnak	4/20/1997	Tstm Wind	50 kts.	0	0	0	0	Power lines were down.
Mounds	6/13/1997	Tstm Wind	52 kts.	0	0	0	0	Trees were down.
Villa Ridge	7/8/1997	Tstm Wind	52 kts.	0	0	0	0	A large tree was blown across railroad tracks near Villa Ridge. A couple of trees were down east of
Pulaski	7/14/1997	Tstm Wind	50 kts.	0	0	4K	0	Trees were down at scattered locations.
Mound City	6/12/1998	Tstm Wind	50 kts.	0	0	4K	0	Several trees were blown down.
Mounds	5/17/1999	Tstm Wind	56 kts.	0	0	40K	0	A semi trailer rig were blown over on Interstate 57 near Mounds. In Mounds, 25 to 30 trees were blown down, shingles were torn off a few roofs, and windows were blown out. Several roofs were blown off in
Mounds	6/6/1999	Tstm Wind	50 kts.	0	0	3K	0	Power lines were blown down.
Ullin	9/22/2000	Tstm Wind	65 kts.	0	0	0	0	None Reported

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Ullin	2/24/2001	Tstm Wind	52 kts.	0	0	3K	0	A utility pole was snapped in Mounds. Gusts were estimated near 60 MPH at Ullin.
Mounds	8/9/2001	Tstm Wind	52 kts.	0	0	5K	0	Numerous trees were blown down at Mounds. A couple of houses were damaged by falling trees.
Mounds	10/24/2001	Tstm Wind	52 kts.	0	0	8K	0	Wind damage occurred to grain bins and farm
Pulaski	5/4/2003	Tstm Wind	52 kts.	0	0	0	0	Several homes sustained minor damage. Some trees were blown down across roadways. A long-lived supercell thunderstorm crossed the Mississippi River about 10 miles northwest of Cairo, then moved east along the Ohio River. While crossing the southernmost tip of Illinois, this storm was responsible for three tornadoes, large hail up to the size of golf
Pulaski	5/4/2003	Tstm Wind	52 kts.	0	0	0	0	Several homes sustained minor damage. Some trees were blown down across roadways.
Ullin	5/10/2003	Tstm Wind	55 kts.	0	0	0	0	Roof damage occurred to a restaurant in Ullin, and a power pole was broken near Perks.
Grand Chain	5/10/2003	Tstm Wind	50 kts.	0	0	0	0	Several trees were blown down.
Mounds	7/18/2003	Tstm Wind	50 kts.	0	0	0	0	Trees were reported down in the community of Mounds. A cluster of thunderstorms became severe over the Carbondale area, producing wind gusts near 60 MPH. The storms continued to produce isolated reports of tree damage as they organized into a line
Villa Ridge	7/28/2003	Tstm Wind	50 kts.	0	0	0	0	Large tree limbs and a tree were blown down on U.S. Highway 51.
Pulaski	5/30/2004	Tstm Wind	52 kts.	0	0	0	0	Widespread damaging winds raked all of southern Illinois. The storms were in the form of short lines or bows as they moved through Jefferson, Perry, and Jackson Counties, including Mount Vernon and Carbondale. A couple of tornadoes were spawned in those areas. As the storms moved east, they evolved into an intense squall line, producing widespread damaging gusts around 60 MPH with isolated higher gusts to 90 MPH. Numerous trees were blown down in nearly every county. Some of the trees fell on roads and power lines. In Wayne County, trees and utility poles were down in Sims, but the northwest part of the county from Orchardville to Johnsonville was hardest hit with utility damage. In Hamilton County, the whole city of Mcleansboro was without power after numerous trees fell. Several of the trees landed on houses, causing severe damage to at least one house. Trees fell on vehicles in Mount Carmel, where gusts were reported to 68 MPH. At least two occupied vehicles were struck by falling trees, one on Route 34 north of Harrisburg, and another north of Old Shawneetown. In both cases, the occupants were freed by rescue
Mound City	6/9/2004	Tstm Wind	50 kts.	0	0	0	0	Large tree limbs were downed.
Villa Ridge	6/12/2004	Tstm Wind	50 kts.	0	0	3K	0	Trees and power lines were down across portions of the community.
Perks	3/30/2005	Tstm Wind	50 kts.	0	0	0	0	Trees were blown down. Severe thunderstorms moved northeast across the southern tip of Illinois, passing south and east of the Marion/Carbondale area. The storms produced numerous reports of large
Pulaski	5/13/2005	Tstm Wind	50 kts.	0	0	2K	0	Power lines were blown down on Sandusky Road southwest of Pulaski. Trees were down between Pulaski and Villa Ridge along U.S. Highway 51. Scattered thunderstorms developed during the midday hours and continued through the evening. Several storms reached severe levels for a brief time, producing hail up to one inch in diameter and wind
Pulaski	6/8/2005	Tstm Wind	52 kts.	0	0	0	0	Numerous trees were blown down, including 12 that landed across roadways.
Pulaski	3/9/2006	Tstm Wind	52 kts.	0	0	7K	0	Two barns were damaged, sheds were demolished, and the roof of a trailer addition was blown off.
Karnak	3/9/2006	Tstm Wind	50 kts.	0	0	0	0	Two large trees were down.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Ullin	3/12/2006	Tstm Wind	78 kts.	0	0	100K	0	A continuous path of damage began near the Ullin exit of Interstate 57, which is exit 18. The damage swath was about one mile wide and extended eastward to the Massac County border. Dozens of trees were snapped or uprooted. Near Ullin, a gas station canopy was blown down, and the gas station sustained roof damage. Debris was blown over 100 yards from the gas station. The metal roof was torn off a barbeque stand and blown to Interstate 57. At a car dealership near Ullin, several cars were moved, and one camper was pushed into a ditch. A pickup truck with an attached camper was reportedly overturned at a local motel. A grain silo was blown in, and its roof was blown 100 yards away. A carport and a barn were destroyed. Peak winds were estimated near 90 MPH.
Villa Ridge	5/25/2006	Tstm Wind	51 kts.	0	0	0	0	Trees were down on Old U.S. Highway 51.
Ullin	8/10/2006	Tstm Wind	50 kts.	0	0	0	0	Trees were blown down in and around Ullin. A downed tree blocked the southbound lane of Interstate 57 at mile marker 18 near Ullin. Another tree blocked U.S. Highway 51 north of Ullin.
Mound City	9/22/2006	Tstm Wind	50 kts.	0	0	2K	0	Numerous medium-size tree limbs were down. A tree limb went through the roof of a house.
Pulaski	7/3/1998	Urban/sml Stream Fld	N/A	0	0	10K	0	A slow-moving area of thunderstorms dumped very heavy rain across the county. A spotter reported up to 5 inches of rain in the Mound City area.
Pulaski	10/13/2001	Urban/sml Stream Fld	N/A	0	0	0	0	An extended period of showers and thunderstorms caused minor flooding of some roadways. Problem spots were on Illinois Routes 37 and 169. The roads
Pulaski	4/20/2000	Wind	N/A	0	0	0	0	Strong gusty west winds in the wake of a cold front caused scattered reports of minor wind damage. Peak gusts were measured around 50 MPH. There were several reports of downed trees and power lines. In Albion in Edwards County, a large oak tree was uprooted and smashed onto a trailer. Although the trailer was badly dented, the roof did not collapse.
Pulaski	3/9/2002	Wind	N/A	0	0	3K	0	Minor property damage was caused by strong west winds around the back side of an intense low pressure system. Winds gusted to around 45 MPH for several hours. Some exact wind measurements from automated observing sites included: 45 MPH at Harrisburg and Mount Vernon, and 42 MPH at Carbondale. Just west of Pinckneyville, gusts to 48 MPH occurred. A couple of power lines were blown
Pulaski	1/2/1996	Winter Storm	N/A	0	0	0	0	A major winter storm affected parts of southern Illinois. Snowfall amounts increased from south to north, with up to 8 inches reported at Mount Vernon. Warmer temperatures closer to the Kentucky border resulted in a mixture of precipitation types. Only an inch of snow was measured in northern Pope County, less than 20 miles from the Ohio River. Benton reported 5 inches, Anna had 3 inches, and Pinckneyville reported 4 inches. In the most affected areas, including Mount Vernon, hotels were booked with holiday travelers seeking to avoid dangerous travel conditions. In Jefferson County alone, 36 weather-related accidents occurred, none with serious injuries. A school bus carrying 30 students slid into a ditch, but nobody was hurt. Most schools cancelled classes the following day. Gusty winds and very cold temperatures hampered snow removal efforts. Winds

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	1/6/1996	Winter Storm	N/A	0	0	0	0	A moderate snowfall, averaging 3 to 4 inches, affected all of southern Illinois. Strong gusty winds piled the dry, powdery snow into waist-high drifts in some spots. This contributed to dozens of auto accidents, including a van that slid into a guard rail on Interstate 57 near Mount Vernon. Several people were injured in this mishap. A man in Benton suffered a fatal heart attack while he was shovelling snow. Five people were treated for slip-and-fall injuries, including three fractures. The deep drifts were over car roofs in open farm country of one southeast Illinois county. Several vehicles became stuck. State Highway 161 was reduced to one lane of travel in spots due to drifts.
Pulaski	1/8/1997	Winter Storm	N/A	0	0	0	0	A low pressure system moved northeast across the Tennessee River Valley, producing up to 7 inches of snow in southern Illinois. Generally 5 or 6 inches fell north of Marion and Carbondale to Mt. Vernon and Fairfield. South of the Marion-Carbondale area and in the Wabash River Valley, snowfall amounts were 3 to 4 inches. Most schools closed due to the storm.
Pulaski	12/13/2000	Winter Storm	N/A	0	0	0	0	A major winter storm produced 4 to 7 inches of snow across southern Illinois, followed by 1/4 to 1/2 inch of ice. The snow began during the early morning hours, falling at rates near one inch per hour. By midday, the snow changed to freezing rain after a brief period of sleet. Light to occasionally moderate freezing rain fell during the afternoon and early evening hours. The heavy precipitation was caused by a strong upper level disturbance that tracked east-northeast from the southern Rockies, across the southern Plains, and then over the lower Mississippi Valley. A strong southerly flow of milder air just above ground level was unable to scour out very cold air right at the surface, which produced an extended period of snow and ice. The liquid equivalent of all the frozen and freezing precipitation was between three quarters of an inch and one inch. Numerous accidents occurred, most of which were minor. The most significant accident was at the junction of Interstates 57 and 64 near Mount Vernon, where a jack-knifed semi-trailer held up traffic for more than an hour. Schools were
Pulaski	2/21/2001	Winter Storm	N/A	0	0	0	0	Several hours of moderate to heavy sleet and freezing rain occurred, sometimes accompanied by thunder and lightning. The precipitation was mainly in the form of sleet in most areas, with up to an inch of sleet accumulation. In the southernmost tip of Illinois, from Cairo to Metropolis, freezing rain was more prevalent. Freezing rain glazed some surfaces, mainly trees and power lines, with up to one quarter inch of ice. On the day following the storm, numerous schools were closed. The liquid equivalent of the precipitation ranged from one quarter inch at Carbondale to just under an inch over the southern tip of Illinois near

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	12/4/2002	Winter Storm	N/A	0	0	0	0	A major winter storm brought significant snow and ice accumulations to all of southern Illinois. The precipitation was mostly snow, except in counties bordering the Ohio River, where the snow changed to an extended period of freezing rain. Ice accumulations were around one quarter inch from Cairo to Metropolis and Golconda. Snow accumulations across southern Illinois were generally six to eight inches. Freezing rain kept amounts down to near 4 inches in counties bordering the Ohio River. From Pinckneyville and Mount Vernon to the Wabash Valley, the snow fell in two distinct bursts, with two to three inches during the midday hours, followed by another two or three inches during the late night hours. The spotty 8-inch snowfall amounts were reported in a band between Illinois Route 13 and the Shawnee National Forest. Travel was heavily impacted by the winter storm. Numerous vehicle accidents occurred. Schools were closed for the remainder of the week in some counties. The winter storm began during the early morning hours and ended late the following night.
Pulaski	1/16/2003	Winter Storm	N/A	0	0	0	0	The storm hit during the morning commute time on a weekday, so it had a major impact on traffic. The snow fell at the rate of 1 to 2 inches per hour around the morning drive time. Many schools cancelled classes. By noon, most of the accumulating snow had ended, leaving a blanket of 3 to 4 inches in most places. Cold temperatures limited the effectiveness of salt used by road crews, and some minor blowing and drifting occurred. Temperatures were in the 20's during the snowstorm, and around 10 by the morning of the 17th. Refreezing of moisture occurred after dark, causing another round of accidents after the snow had ended. The snow was caused by a moderately strong upper level disturbance that moved east from the Plains, then across Tennessee. A weak low pressure system followed about the same path, passing just south of Missouri and Kentucky. Some specific snowfall amounts included: 4 inches at Cairo and Mound City, and 3 inches at Anna (Union County) and Eddyville (Pope County). Only the southern tip of Illinois received these heavier snow totals. Carbondale and
Pulaski	2/16/2003	Winter Storm	N/A	0	0	0	0	A long-lasting sleet storm affected southern Illinois. The precipitation was almost all sleet south of the Marion/Carbondale area, where an inch or two was reported. Along and north of a Carbondale to Harrisburg line, there was more snow, with total accumulations of sleet and snow in the 3 to 6 inch range. Specific reports included: 6 inches at Pinckneyville in Perry County, 5.5 inches near Mount Carmel in Wabash County, 4.5 inches at West Frankfort in Franklin County, 4 inches at Carbondale, and 2.4 inches at Harrisburg in Saline County. The storm occurred on the Presidents Day weekend. Most schools and businesses scheduled to be open on Presidents Day were closed. Franklin County officials reported about 25 accidents in that county alone,

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	12/22/2004	Winter Storm	N/A	1	1	100K	0	A major winter storm dumped from 10 to 20 inches of snow across most of southern Illinois, clogging interstates and shutting down most businesses near the peak of the Christmas shopping season. The heaviest snowfall, from 14 to 20 inches, occurred along an axis from Anna (Union County) through Harrisburg (Saline County) to the lower Wabash Valley. Snowfall was not quite as heavy from Fairfield (in Wayne County) west across Mount Vernon to Du Quoin (Perry County), where amounts were mostly from 6 to 9 inches. On the north side of Anna in Union County, a man was killed and another man was injured when an awning on a VFW Post collapsed on them. The two men were standing under the 12-by-30 foot awning when it collapsed. The weight of the compacted snow, which fell several days earlier, caused the metal roof to totally collapse over the men. The other end of the awning remained partially standing. A crew of 15 to 20 rescuers took about 30 minutes to extricate the men. In Johnson County, the roof of a hardware store and a horse arena collapsed
Pulaski	2/11/2008	Winter Storm	N/A	0	0	1.0M	0K	Low pressure developed over the southern Plains, spreading widespread heavy precipitation across southern Illinois. At the same time, high pressure over the upper Ohio Valley produced a cold easterly wind flow. The result was a crippling ice storm. Around one inch of ice caused extensive damage across far southern Illinois, along and south of a line from Carbondale and Marion to Harrisburg and Carmi. Many of those same areas received three to six inches of sleet and snow. The most destructive icing occurred in an east to west band across Union, Johnson, Massac, and Pope Counties. The state designated most counties in southern Illinois as a disaster area. Numerous trees and power lines were brought down, knocking out power to many thousands of homes. Power outages lasted up to a week. An indirect fatality occurred in Carbondale, where an elderly man died of carbon monoxide poisoning while operating a gasoline generator in his garage. Three carbon monoxide poisonings were reported in Christopher. All three victims, who were from the
Pulaski	1/22/2003	Winter Weather/mix	N/A	0	0	0	0	One to three inches of snow fell across southern Illinois during the afternoon and early evening. Roads became very slick and hazardous.
Pulaski	12/8/2005	Winter Weather/mix	N/A	0	0	0	0	One to three inches of snow fell across much of southern Illinois. The lowest amounts were about an inch near Metropolis, along the Ohio River. The three-inch amounts extended from Pinckneyville eastward to Benton and Harrisburg. Amounts were even higher along the Interstate 64 corridor and in the Lower Wabash Valley. The precipitation started as sleet and freezing rain, especially along and east of a Cairo to Harrisburg line. Roads were very slippery, resulting in numerous accidents. Over 50 accidents occurred in Franklin County in just a few hours. Traffic on Interstate 57 was partially blocked by a jackknifed semi-trailer in Franklin County south of Benton. At the Benton interchange of I-57, a northbound exit ramp was shut down. Some of the accidents on Interstate
Pulaski	2/18/2006	Winter Weather/mix	N/A	0	0	0	0	One to two inches of snow fell across southern Illinois. Isolated amounts of 3 inches occurred in Fairfield (Wayne County), Pinckneyville (Perry County), and Mount Carmel (Wabash County). Roads were snow-

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Pulaski	2/19/2006	Winter Weather/mix	N/A	0	0	0	0	Two inches of snow fell over far southern Illinois, mainly south of the Marion/Carbondale area and in counties bordering the Ohio River. Roads were initially wet, then became ice and snow-covered as the precipitation continued.
TOTALS:				10	99	10.443 M	53.070 M	

Appendix E - Pulaski County Historical Hazard Maps

Please see attached map or pdf files.

Appendix F - Critical Facilities

Communication Facilities Report

ID	Name	Address	City	Class	Owner	Function	ReplaCost
1	KNKN477	3.8 MILES NNE OF VILLA RIDGE	VILLA	CBR	Cellco Partnership		0
2	KNKN477	1150 East washington	Karnak	CBR	Cellco Partnership		0
3	WPHN456	201 N 3RD ST	MOUND	CBR	CGB		0
4	WPHN456		MOUND	CBR	CGB		0
5	KNJM391	201 NE 3RD ST	MOUND	CBR	CONSOLIDATED		0
6	KNJM391		MOUND	CBR	CONSOLIDATED		0
7	WQDZ700	5 KM E	NEW	CBR	CONTINENTAL		0
8	WQDZ700		NEW	CBR	CONTINENTAL		0
9	WPGG810	201 N THIRD	MOUND	CBR	Crain Enterprises,		0
10	WPGG810		MOUND	CBR	Crain Enterprises,		0
11	WPDX489	APPX 8 MI NNW	OLMSTED		CBR	CURRY, TERRY J	0
12	WPDX489		OLMSTED		CBR	CURRY, TERRY J	0
13	WPPW548	401 LACKEY RD	VILLA	CBR	EDWARDS,		0
14	WPPW548		VILLA	CBR	EDWARDS,		0
15	WLT387	PEARL & RAILROAD STREET	MOUND	CBR	ILLINOIS BELL		0
16	WLU436	FRONT ST. & CALEDONIA AVE	OLMSTED		CBR	ILLINOIS BELL	0
17	WQBB572	ICRR Microwave site 1.3 miles SSW of	Levings	CBR	Illinois Centrail		0
18	WQCW494	West side ICRR Adj SR51 1 Mi N	Villa Ridge		CBR	Illinois Centrail	0
19	WQCW494		Villa Ridge		CBR	Illinois Centrail	0
20	WPCC838	E SIDE ICRR TRKS W SIDE SR 51 .6 MI	WETAUG	CBR	ILLINOIS		0
21	WNTT297	1.3 MI SSW OF	LEVINGS	CBR	ILLINOIS		0

ID	Name	Address	City	Class	Owner	Function	ReplaCost
22	KSG291	D22 HDQTRS I57 INTERCHANGE EXIT 18	ULLIN		CBR	ILLINOIS, STATE	0
23	WQFS545	I-57 @ milepost 18 North	Ullin	CBR	Illinois, State of		0
24	WQFU338	53 Wessenburg Road	Villa Ridge		CBR	Illinois, State of	0
25	WQFU338		Villa Ridge		CBR	Illinois, State of	0
26	WPAC875	2 MI NE	GRAND	CBR	INMAN, ROBERT		0
27	WPAC875		GRAND	CBR	INMAN, ROBERT		0
28	WPZZ245		KARNAK	CBR	JEFF'S		0
29	WNWD409	306 WASHINGTON ST	KARNAK	CBR	KARNAK,		0
30	WNWD409		KARNAK	CBR	KARNAK,		0
31	WQGS445	I57 MILEPOST 18 N	ULLIN	CBR	MOTOROLA, INC.		0
32	WNHY201	204 MAIN ST	MOUND	CBR	MOUND CITY,		0
33	WNHY201		MOUND	CBR	MOUND CITY,		0
34	WNSB368	215 FIRST ST	MOUNDS	CBR	MOUNDS, CITY OF		0
35	WNSB368		MOUNDS	CBR	MOUNDS, CITY OF		0
36	WPLB953	4 MI N OF US 51 & I57	MOUNDS	CBR	NEXTEL LICENSE		0
37	WPLB953		MOUNDS	CBR	NEXTEL LICENSE		0
38	WPXN416	130 RICHLAND TERR	MOUNDS	CBR	PULASKI		0
39	WPXN416		MOUNDS	CBR	PULASKI		0
40	KFN551	ON MUNICIPAL WATER TWR	OLMSTED		CBR	PULASKI,	0
41	KNJK591	500 ILLINOIS AVE	MOUND	CBR	PULASKI,		0
42	KNJK591		MOUND	CBR	PULASKI,		0
43	WPKP985	201 3RD ST	MOUND	CBR	PULASKI,		0
44	WPKP985		MOUND	CBR	PULASKI,		0

ID	Name	Address	City	Class	Owner	Function	ReplaCost
45	WPNR373	MUNICIPAL WATER TOWER	OLMSTE	CBR	PULASKI,		0
46	WPNR373	215 1ST ST	MOUNDS	CBR	PULASKI,		0
47	WPNR373	307 WALNUT ST	MOUND	CBR	PULASKI,		0
48	WPNR373	1026 SHAWNEE COLLEGE RD	ULLIN	CBR	PULASKI,		0
49	WPNR373	1154 SHAWNEE COLLEGE RD	ULLIN	CBR	PULASKI,		0
50	WPNR373	125 N RAILROAD ST	ULLIN	CBR	PULASKI,		0
51	WPNR373		OLMSTE	CBR	PULASKI,		0
52	WXF735	COUNTY GARAGE	VILLA	CBR	PULASKI,		0
53	WQAA729	16302 STATE HWY 37	GRAND	CBR	REICHERT,		0
54	WQAA729		GRAND	CBR	REICHERT,		0
55	WPMM337	5 KM E	NEW	CBR	ROY WALKER		0
56	WPMM337		NEW	CBR	ROY WALKER		0
57	WPTX415	3 MILES EAST OF Grand Chain	NEW	CBR	ROY WALKER		0
58	WPTX415		NEW	CBR	ROY WALKER		0
59	WPUB753	SHAWNEE COLLEGE ROAD	ULLIN	CBR	SHAWNEE		0
60	WPUB753		ULLIN	CBR	SHAWNEE		0
61	WPMX695	0.9 KM FROM VILLA RIDGE	PULASKI	CBR	SOUTH WATER		0
62	WPMX696	0.1 KM SW OF US 51 & CR 8	MOUNDS	CBR	SOUTH WATER		0
63	WPMX696	0.4 KM OF ROSEHILL & US 51	PULASKI	CBR	SOUTH WATER		0
64	KOL260	6.4 KM E	GRAND	CBR	SOUTHERN		0
65	WIA546	ULLIN SUBSTATION	ULLIN	CBR	SOUTHERN		0
66	WQGB452	Ullin Substation, 0.2 miles W of	Ullin	CBR	Southern Illinois		0
67	KNKN506	1800 FEET WEST OF INTERSTATE 57,	PULASKI	CBR	Southern Illinois		0

ID	Name	Address	City	Class	Owner	Function	ReplaCost
68	KOL534	US 51 1/4 MI S	VILLA	CBR	SPAULDING,		0
69	KOL534		VILLA	CBR	SPAULDING,		0
70	WNYN569	201 N THIRD ST	MOUND	CBR	TEL LINK		0
71	WPWC586	1026 SHAWNEE COLLEGE RD	ULLIN	CBR	TRI COUNTY		0
72	WPWC586		ULLIN	CBR	TRI COUNTY		0
73	WPUG432	CITY HALL	ULLIN	CBR	ULLIN FIRE		0
74	WPUG432		ULLIN	CBR	ULLIN FIRE		0
75	WQBY937	171 RAILROAD ST	ULLIN	CBR	ULLIN POLICE		0
76	WQBY937		ULLIN	CBR	ULLIN POLICE		0
77	WNZD685	100 COMMERCIAL LANE	MOUND	CBR	ADM Growmark		0
78	WNZD685		MOUND	CBR	ADM Growmark		0
79	WPPC599			CBR	ADM Growmark		0
80	WBM559	0.5 MI NW OF	MOUND	CBR	Ameren Services		0
81	WPYK331	5 KM E	NEW	CBR	AMERICAN		0
82	WPYK331		NEW	CBR	AMERICAN		0
83	WLK629	.4 MI S OF PULASKI HWY 51	PULASKI	CBR	BIG RIVER		0
84	WLU381	HWY 51	Mounds	CBR	BIG RIVER		0
85	WNRG672	INT OF CALEDONIA & CEDAR ST EXT	OLMSTE	CBR	CAIRO, CITY OF		0
86	WNRG672		OLMSTE	CBR	CAIRO, CITY OF		0
87	KNKN477	3.8 MILES NNE OF VILLA RIDGE	VILLA	CBR	Cellco Partnership		0
88	WPON598	497 THURSTON LAKE ROAD	VILLA	CBR	Cellco Partnership		0
89	WPQN762	3586 HWY 51	MOUNDS	CBR	Cellco Partnership		0
90	KNKN477	3.8 MILES NNE OF VILLA RIDGE	VILLA	CBR	Cellco Partnership		0

Dams Report

ID	Name	River	City	Owner	Purpose	Height (ft)	ReplaCost
1	ULRICH LAKE DAM	TRIB CACHE RIVER	ULLIN	Unknown	R	13	
2	KAYS LAKE DAM	TRIB CACHE RIVER	GOLDEN CITY	Virginia Humphrey	P	16	
3	DAVIS LAKE DAM #1	TRIB-BOAR CREEK	MOUNDS	ROBERT & EDNA	RF	18	

EOC Facilities Report

ID	Name	Address	City	Class	YearBuilt	ShelterCap	Stories	ReplaCost
1	Pulaski Co Sheiffs	500 Illinois Ave	Mound City	EDFLT				$1,000
2	Illinois State Police			EDFLT				$5,000

FireStation Facilities Report

ID	Name	Address	City	Class	Stories	YearBuilt	ReplaCost
1	Pulaski Fire Station	170 Market	Pulaski	EFFS			666
2	Mound City Fire Dept	307 Walnut St	Mound City	EFFS			666
3	Ullin Fire Dept	125 N Railroad St	Ullin	EFFS			666
4	Karnak City Fire Dept	242 E. Washington St	Karnak	EFFS			666
5	Grand Chain Fire Dept	620 S. Main St	Grand Chain	EFFS			666
6	Mounds Fire Dept	216 First St	Mound	EFFS			666
7	Olmsted Fire Dept	200 Front St	Olmsted	EFFS			666

Hazardous Materials

ID	Name	Address	City	Class	EPAID	ChemicalName
1	Southern FS Inc	285 E. Cache Ave	Ullin	HDFLT		
2	Crain Enterprises	100 Ohio Ave	Mound City	HDFLT		Styrene

Police Station Facilities Report

ID	Name	Address	City	Class	Stories	ShelterCap	YearBuilt	ReplaCost
1	Olmsted Police Dept	150 N Front	Olmsted	EFPS				1554
2	Mound City Police Dept	204 Main St	Mound City	EFPS				1554
3	Mounds Police Dept	217 1st St	Mounds	EFPS				1554
4	Pulaski County Sheriff	500 Illinois Ave # A	Mound City	EFPS				1554
5	Village of Karnak PD	242 Washington St	Karnak	EFPS				1554
6	Village of Ullin PD	171 Railroad St	Ullin	PDFLT				1554

Port Facilities Report

ID	Name	Address	City	Class	Function	Berths	YearBuilt	ReplaCost
1	Consolidated Grain and Barge. Co.,		Mound City	PDFLT				2245.4
2	Consolidated Grain and Barge Co.	201 Third Street.	Mound City	PDFLT	60			2245.4
3	Archer Daniels Midland Co., Mound	100 Commercial Avenue	Mound City	PDFLT	60			2245.4
4	CGB Marine Services Mound City		Mound City	PDFLT				2245.4
5	Louisiana Dock Co., Mound City		Mound City	PDFLT				2245.4

Potable Water Facilities Report

ID	Name	Address	City	Class	Function	Stories	YearBuilt	ReplaCost
1	KARNAK WTP	ROUTE 169	KARNAK					36963

Rail Facilities Report

ID	Name	Address	City	Class	Function	DailyTraffic	YearBuilt	ReplaCost
1	CG&B Grain Elevator:			RDF	Cargo			2419.8
2	ADM/Growmark Elevator:			RDF	Cargo			2419.8

School Facilities Report

ID	Name	Address	City	Class	Students	Stories	YearBuilt	ReplaCost
1	FIVE COUNTY REGIONAL	17 RUSTIC CAMPUS DR	ULLIN	EFS1	85			555
2	SAFE SCHOOL ROE2	17 RUSTIC CAMPUS DR	ULLIN	EFS1	11			555
3	MERIDIAN HIGH SCHOOL	1401 MOUNDS RD	MOUNDS	EFS1	311			555
4	MERIDIAN ELEMENTARY	208 VALLEY RD	MOUNDS	EFS1	607			555
5	Century Elementary	4721 Shawnee College Rd	Ullin	EFS1	263			555
6	Century Jr-Sr High	4721 Shawnee College Rd	Ullin	EFS1	195			555
7	Caledonia Christian Academy	10076 St Hwy 37	Olmsted	EFS1	26			
8	St John Praise & Worship	371 N Chestnut St	Pulaski	EFS1	15			
9	JAMP Special Education	251 W 2nd St	Grand Chain	EFS1	34			
10	Shawnee Comuunity College	8364 Shawnee College Rd	Ullin	EFS2	1000			
11	Living Hope Fellowship	344 St Hwy 169	Karnak	EFS1	21			
12	MAP Training Center	504 E 7th St	Karnak	EFS2	0			

WasteWater Facilities Report

ID	Name	Address	City	Function	Class	Stories	YearBuilt	ReplaCost
1	MOUND CITY STP	204 MAIN STREET	MOUND CITY		WDF			73926
2	NEW GRAND CHAIN	VILLAGE HALL	NEW GRAND CHAIN		WDF			73926
3	OLMSTED STP	P.O. BOX 188	OLMSTED		WDF			73926
4	PULASKI STP	U.S. ROUTE 51 NORTH	PULASKI		WDF			73926
5	TAMMS STP	ROUTE 127	TAMMS		WDF			73926
6	ULLIN STP	WEST OF KENTUCKY &	ULLIN		WDF			73926

Appendix G - Map of Critical Facilities

Please see attached pdf file or map.

Appendix H - NOAA Flood Data: USGS Stream Gauge Data

County	Pulaski County		Pulaski County		McCracken County	
Station	Wetaug, IL		Mound City, IL		Paducah, KY	
River	Big Creek		Hess Bayou Tributary		Ohio River	
Period of Record	1942-2007		1959-1972		1867-2009	
Latitude	37.33306		37.13639		37.08900	
Longitude	89.13139		89.14194		88.59400	
Rank	**Year**	**Discharge (cfs)**	**Year**	**Discharge (cfs)**	**Date**	**Historical Crests (ft)**
1	1943	7,200	1966	754	02/02/1937	60.00
2	1944	4,350	1972	732	04/07/1913	54.30
3	1945	3,800	1971	693	03/23/1884	54.30
4	1950	3,620	1961	649	02/13/1950	53.30
5	1946	3,260	1970	474	03/21/1867	52.00
6	1973	3,180	1969	470	03/11/1997	51.79
7	1955	2,830	1965	438	04/03/1975	51.40
8	1983	2,830	1964	422	03/25/1897	50.90
9	1964	2,790	1967	382	02/25/1883	50.70
10	1982	2,720	1962	366	04/17/1886	50.40

County	Massac County		Pulaski county		Pope County	
Station	Brookport Lock & Dam, IL		Grand Chain Lock & Dam, IL		Smithland Lock & Dam, IL	
River	Ohio River		Ohio River		Ohio River	
Period of Record	1936-2009		1927-2009		1983-2009	
Latitude	37.13300		37.20400		37.16700	
Longitude	88.65000		89.04200		88.43300	
Rank	**Date**	**Historical Crests (ft)**	**Date**	**Historical Crests (ft)**	**Date**	**Historical Crests (ft)**
1	02/02/1937	62.30	02/02/1937	64.00	03/12/1997	51.44
2	01/13/1950	55.10	03/15/1997	57.80	01/08/1991	49.80
3	03/12/1997	53.60	04/03/1975	57.60	01/16/2005	47.20
4	04/02/1975	53.30	04/19/1927	56.40	05/14/1984	47.10
5	02/15/1950	53.20	03/11/1945	56.30	05/25/1983	46.40
6	03/10/1945	52.30	03/09/1979	55.40	02/24/1989	46.10
7	01/07/1991	51.60	03/26/1973	55.40	02/19/1990	45.80
8	03/19/1963	51.60	05/28/1995	55.10	04/23/1994	45.20
9	03/17/1979	51.20	05/14/1984	55.00	03/28/2008	45.17
10	04/15/1936	50.90	01/02/1991	54.90	04/11/2008	44.93