Hazard Mitigation Plan

Johnson 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 Management 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 Johnson County planning staff with performing the hazard risk assessment.

1.2 Planning Team Information

The Johnson 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 five meetings to develop the plan. The meetings are as follows:

Meeting 1: Initial Meeting held on October 28, 2008 at the Jumbos Restaurant in Vienna 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 10, 2008 at the Jumbos Restaurant in Vienna to prioritize and profile hazards for modeling.

Meeting 3: PUBLIC meeting was held on June 28, 2009 at the Johnson County Library 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 Johnson County Clerk's Office in the Commissioners Meeting Room 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.

Meeting 5: The planning team met on January 28, 2010 at the Johnson County Commissioner's Meeting Room 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 Johnson County Multi-Hazard Mitigation Planning Team is headed by Jim Haney, who 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
Jim Haney	ESDA Coordinator	Johnson County ESDA	Johnson County
Wendi Bailey	Ambulance Director	Johnson County	Johnson County
Jim Cuff	911 Coordinator	Johnson County	Johnson County
Dannel Mott	County Assessor	Johnson County	Johnson County
Kathy Meyers	Village Board Member	Village of Belknap	Belknap
Dee Barnes	Village Clerk and Treasure	Village of Belknap	Belknap
Robert Pippins	Citizen	Village of Buncombe	Buncombe
Jeff Jordon	Deputy Sheriff & ESDA Liaison	Village of Buncombe	Buncombe
Lance West	Fire Fighter	Village of Cypress	Cypress
Ron Schultz	Fire Chief	Village of Cypress	Cypress
Jim Miller	Police Chief	City of Vienna	Vienna
Tim Gage	Fire Chief	Village of Goreville	Goreville
Steve Webb	School Superintendent	Goreville Community School District	Goreville
Fred Heaton	Water Dist Board Member	New Burnside Water District	New Burnside
Jon Teutrine	Fire Management Officer	U.S. Forest Service	Federal

The Disaster Mitigation Act (DMA) planning regulations and guidance stress that planning team members must be active participants. The Johnson 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 Johnson 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 Johnson County with a Memorandum of Understanding (MOU) for sharing data and information.

The Johnson County Multi-Hazard Mitigation Planning Team met on October 28, 2008, December 10, 2008, June 29, 2009, September 21, 2009 and January 28, 2010. Meetings one and two were held at the Jumbos Char and Grill in Vienna. Meeting three was held at the Vienna Public Library. Meetings four and five were held in the Johnson County Board Room in the County Clerk's office in Vienna. 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.

Johnson 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 June 29, 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 Johnson 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, Johnson, Pulaski, and Johnson. In the meeting, the county board chairmen and their EMA 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.

Johnson County is located within southern tip of Illinois and bounded by Williamson County to the North, Massac County to the South, Pulaski County to the southeast, and Pope County to the East. Johnson 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
Keith Davis	Massac County	Massac County 911	Mailed draft copy and asked for suggestions
Chris Hahn	Pope County	Pope County EMA Director	Mailed draft copy and asked for suggestions
Ken Kerley	Pulaski County	Pulaski County ESDA	Mailed draft copy and asked for suggestions
Dana Pearson	Union County	Union County ESDA	Mailed draft copy and asked for suggestions
Alan Gower	Williamson County	Williamson County EMA	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

Johnson County and its associated local communities utilize a variety of planning documents to direct community development. These documents include land use plans, comprehensive 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
Johnson County
Village of Buncombe
Village of Cypress
Village of Goreville
Village of New Burnside
City of Vienna

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 Johnson County Hazard Mitigation Planning team presented and recommended the plan to *<the officials responsible for adopting>*, who adopted the Johnson 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 Johnson 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
Johnson County	Jim Haney	Head of MHMP planning committee and ESDA Director Johnson County
Village of Belknap	Kathy Meyers, Dee Barnes	Member, MHMP planning committee
Village of Buncombe	Robert Pippins, Jeff Jordon	Member, MHMP planning committee
Village of Cypress	Ron Schultz, Lance West	Member, MHMP planning committee
Village of Goreville	Tim Gage, Steve Webb	Member, MHMP planning committee
Village of New Burnside	Fred Heaton	Member, MHMP planning committee
City of Vienna	Jim Miller	Member, MHMP planning committee

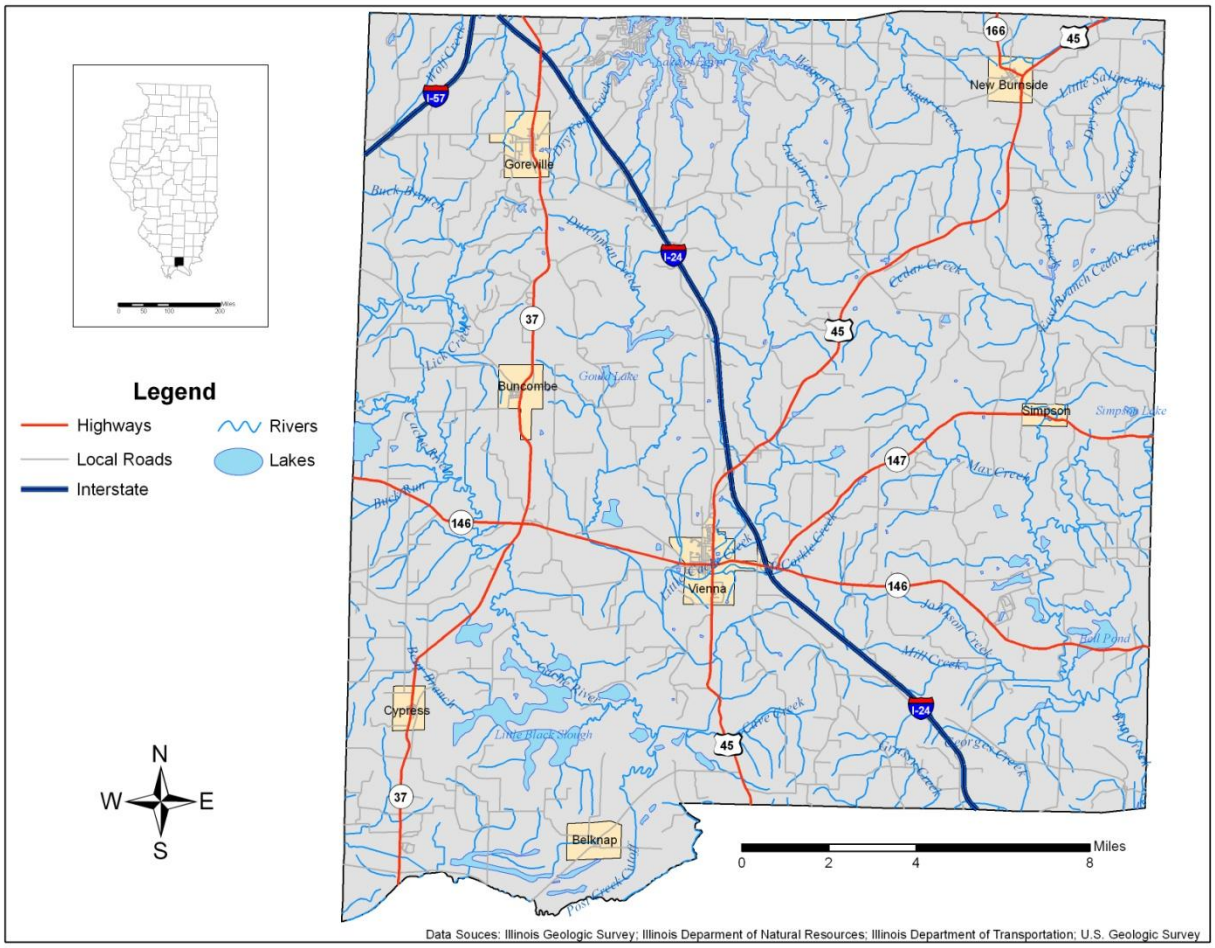
All members of the MHMP planning committee were actively involved in attending the MHMP meetings, providing available Geographic Information System (GIS) data and historical hazard information, reviewing and providing comments on the draft plans, coordinating and participating in the public input process, 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

Johnson County was organized out of Randolph County in 1812. The County was named for the Richard M. Johnson, who was a Kentucky Congressman at the time Johnson County was organized. Richard Johnson later became the 9th Vice President of the United States serving in the administration of Martin Van Buren. The Johnson County seat is Vienna.

Johnson County is located in southern tip of Illinois. It is bounded on the north by Williamson County, on the south by Massac and Pulaski Counties, on the west by Union County and on the east by the Pope County. It relates to major urban areas as follows: 110 miles southeast of St. Louis, Missouri; 170 miles south of Springfield, Illinois; 315 miles south-southwest of Chicago, Illinois. Figure 3-1 shows the location of Johnson County.

Figure 3-1: Map of Johnson County



The major sources of economic activity in Johnson County include public administration, health care, and tourism. The Shawnee National Forest offer tourists and the resident population opportunities for fishing, hunting, boating, camping, and hiking. The towns and villages in Johnson County also offer amenities, such as restaurants, entertainment, and shopping on a rural community scale.

Sources: Illinois State Archives Depository, Johnson County Fact Sheet, 5/20/09, http://www.ilsos.net/departments/archives/irad/Johnson.html

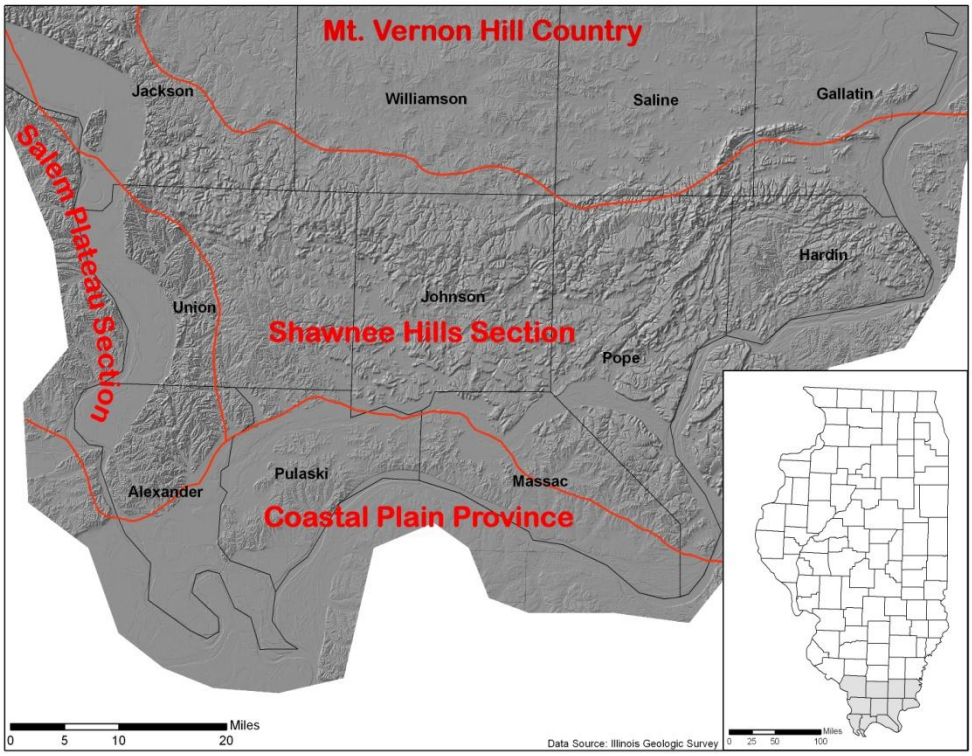
State of Illinois, Origin and Evolution of Illinois Counties, 1982

3.1 Physical Setting (Topography)

Johnson County is located within the Interior Low Plateaus Province (Shawnee Hills). 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 highest elevation(s) (~870 feet above sea level) in Johnson County are found in the northwest corner of the County, east of Goreville. The lowest elevation(s) (~295 feet above sea level) are found in the southwest corner within the Cache River Valley. Figure 3-2 depicts the physiographic division within Johnson County.

Figure 3-2: Physiographic Divisions of Johnson 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

Johnson County climate is typical of Southern Illinois and generally characterized by hot dry summers and cool wet winters. The variables of temperatures, precipitation, and snowfall can vary greatly from one year to the next. In summer, the average low is 65.0° F and average high is 87.9° 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 January are 27.0° F and 45.3° F, respectively. Average annual precipitation is 47.4 inches (IL State Climatologist Data from 1928 to 2008 at Anna, 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 the U.S. Census of 2006, Johnson County is estimated to have a population of 13,360. The population of Johnson County has increased by 3.3% between 2000 and 2006. The largest town in Johnson County is Vienna with a population of approximately 1,200. 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 Belknap	133	1.0%
Village of Buncombe	186	1.4%
Village of Cypress	271	2.1%
Village of Goreville	938	7.3%
Village of New Burnside	242	1.9%
City of Vienna	1,234	9.6%
Rural Population	9,874	77.0%

Source: American FactFinder, 2009 and Illinois MapStats, 2009

3.4 Economy

Illinois MapStats and Illinois Department of Employment Security report for 2008 state that 52.4% of the workforce in Johnson County was employed in the private sector. The breakdown is included in Table 3-2. Public administration was the largest sector, employing approximately 52.4% of the workforce and the majority of the workforce earnings, approximately 65.5%. The US Census 2005 annual per capita income (inflation adjusted) in Johnson County is $ 19,994 compared to an Illinois average of $ 36,264.

Table 3-2: Industrial Employment by Sector

Industrial Sector	% of County Workforce (2008)
Agriculture, Forestry, Fishing, Hunting, and Mining	1.6%
Construction	4.5%
Manufacturing	2.5%
Wholesale Trade	3.2%
Retail Trade	8.2%
Transportation, Warehousing and Utilities	1.0%
Information	0.0%
Finance, Insurance, Real Estate, and Rental/Leasing	4.8%
Professional and Business Services	4.5%
Educational, Health, and Social Services	7.5%
Arts, Entertainment, Recreation, Accommodation and Food Services	7.4%
Other Services (except Public Administration)	2.4%
Public Administration	52.4%

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

3.5 Industry

Johnson County's major employers and number of employees are listed in Table 3-3. The largest employers in Johnson County are Family Counseling Center, Inc., Camp Ondessonk and Conference Center, Shawnee and Vienna Correctional Centers. Public administration, health and social services, and education are the largest employment sectors in the county.

Table 3-3: Major Employers

Company Name	Location	Established	Employees	Type of Business
Public Administration				
Shawnee Correctional Center	Vienna		250-449	Correctional Center
Vienna Correctional Center	Vienna		250-449	Correctional Center
Tourism				
Camp Ondessonk and Conference Center	Ozark		250-499	Arts, Entertainment, Recreation, Accommodation and Food Services
Educational, Health, and Social Services				
Family Counseling Center, Inc	Vienna		100 – 249	Clinic
Goreville Community Unit School District	Goreville		100 – 249	Education

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

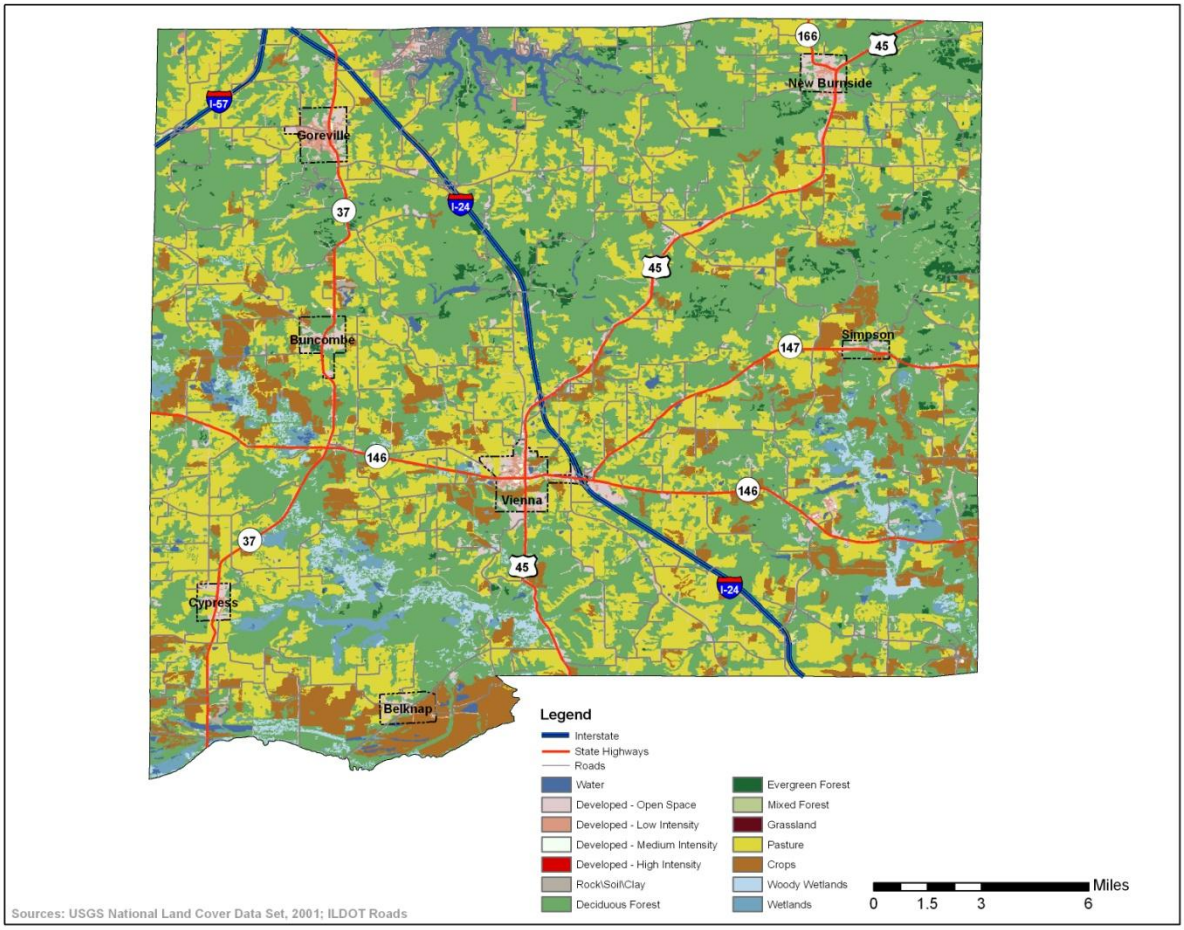
3.6 Land Uses and Development Trends

Pre-European settlement, Johnson 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 cover is a mix of three-fourths agriculture and one-third forest. A significant portion of the uplands and wetland bottoms in Johnson County remain forested in part because of the Shawnee National Forest and the soils found in these areas are not well suited to

agriculture. Agriculture land use is generally found along the stream bottomlands and within the limestone hills section portion of the Shawnee Hills Province. Low to medium intensity development is found within the boundaries of the larger incorporated communities and in the Lake of Egypt area (Figure 3-3).

Recent developments in Johnson County have been mostly on the eastside of Vienna and the Lake of Egypt Area. The recent development in Vienna is attributed to transportation, accommodation, and food services. The residential development in the Lake of Egypt Area is driven by developers providing lake-front and adjacent vacation and year-round homes to individual that desire properties with lakeside amenities. Any significant growth in Johnson County within the next five years is expected to be in or near these areas.

Figure 3-3: Land Cover of Johnson County



3.7 Major Lakes, Rivers, and Watersheds

Johnson County is located on the divide between four major surface-water basins. Streams along the northern third of the County drain into the Saline River drainage basin. Along the eastern third of the county the streams drain into the Ohio River. The western third of the County drains

into the Cache River drainage basin and the far northwestern corner of the County drains into the Big Muddy River drainage basin. The rivers and larger streams in the county include the Cache River, Little Cache Creek, and Cedar Creek. There are three significant lakes in Johnson County Lake of Egypt, Little Black Slough, and Bell Pond (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 Johnson 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 10, 2008, the planning team developed and ranked a list of hazards that affect the county. The team identified 1) severe thunderstorms with tornadoes, 2) earthquakes, 3) flooding which occurs on an annual basis during the spring, and 4) winter storms, The plan also identified Johnson County's principal technological hazards (in order of likelihood): 1) land transportation accidents with hazardous material release, and 2) fire/explosion.

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 250 reported events in Johnson County between December 18, 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 Johnson 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
Tornado
Earthquakes
Transportation Hazardous Material Release
Thunderstorms/ High Winds/Hail/ Lightning
Flooding
Winter Storms
Fire/Explosion

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 Johnson County.

Table 4-5: Johnson County Hazards (RPI)

Hazard	Probability	Magnitude/Severity	Risk Priority Index	Rank
Tornado	3 - Likely	8 - Catastrophic	24	1
Earthquakes	2 - Possible	8 - Catastrophic	16	2
Transportation Hazardous Material Release	3 - Likely	4 - Critical	12	3
Thunderstorms/ High Winds/Hail/ Lightning	3 - Likely	2 - Limited	6	4
Flooding	3 - Likely	2 - Limited	6	5
Winter Storms	2 - Possible	2 - Limited	4	6
Fire/Explosion	1 –Unlikely	2 - Limited	2	7

4.1.6 Jurisdictional Hazard Ranking

Because the jurisdictions in Johnson County differ in their susceptibilities to certain hazards—for example, the village of Belknap located within the Cache River floodplain is more likely to experience significant flooding than the Village of New Burnside which is located a substantial distance away from any large stream or river 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	Tornado	HAZMAT	Earthquake	Thunderstorms	Flooding	Winter Storms	Fire/Explosion
Village of Belknap	1	4	2	5	3	6	7
Village of Buncombee	1	4	2	3	6	5	7
Village of Cypress	1	4	2	3	6	5	7
Village of Goreville	1	3	2	4	6	5	7
Village of Simpson	1	4	2	3	5	6	7
City of Vienna	1	3	2	4	5	6	7

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

Table 4-7: Essential Facilities List

Facility	Number of Facilities
Care Facilities	4
Emergency Centers	1
Fire Stations	7
Police Stations	5
Schools	9

4.2.1.3 Facility Replacement Costs

Default HAZUS-MH general building stock data was 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 Johnson County

General Occupancy	Estimated Total Buildings	Total Building Exposure (X 1000)
Agricultural	40	$5,728
Commercial	209	$71,661
Education	13	$20,225
Government	22	$9,288
Industrial	19	$17,397
Religious/Non-Profit	68	$21,829
Residential	6,272	$501,636
Total	**6,659**	**$647,764**

4.3 Future Development

Johnson 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 Johnson 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 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 4-9.

Table 4-9: 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 Johnson County during recent decades. The NCDC database reported 15 tornadoes/funnel clouds in Johnson County since 1957. These tornados have been attributed with 13 injuries and $3.8 million dollars in property damage within Johnson and adjacent counties. As of April 2008, the most recent tornado touchdown occurred on October 18, 2004. The tornado turned east-southeast from Williamson County back into Johnson County. The bulk of the damage and injuries occurred in a neighborhood on the southern half of the Lake of Egypt. The two injured persons were mobile home residents whose homes were demolished. One of the mobile homes was swept clean off its foundation. The demolished home was deposited 50 to 100 yards away. The 32-year-old male occupant of the mobile home, who was ejected from the home, received numerous bruises and cuts. A female resident of another mobile home was injured. In total, three mobile homes were destroyed, and dozens of mobile homes, barns, and sheds were damaged. Rescue efforts were hampered by a large amount of tree debris on roads. Peak winds in the Lake of Egypt neighborhood were estimated near 120 MPH. The tornado lifted as it reached the southeast side of the Lake of Egypt.

Johnson County tornadoes recorded in the NCDC database are identified in Table 4-10. Additional details for NCDC events are included in Appendix D.

Table 4-10: Johnson County Tornadoes*

Location	Date	Magnitude	Deaths	Injuries	Property Damage
Johnson	12/18/1957	F2	0	0	25K
Johnson	4/14/1972	F2	0	5	25K
Johnson	4/14/1972	F2	0	0	25K
Johnson	6/22/1974	F2	0	0	0K
Johnson	3/28/1975	F0	0	0	0K
Johnson	5/15/1986	F1	0	0	25K
Cypress	4/13/1998	F1	0	1	60K
Tunnel Hill	6/14/1998	F0	0	0	5K
Cypress	4/28/2002	F2	0	2	3.0M
Vienna	4/28/2002	F2	0	2	100K
Cypress	5/6/2003	F0	0	0	0
Reevesville	5/6/2003	F0	0	0	0
Goreville	10/18/2004	F1	0	1	10K
Goreville	10/18/2004	F2	0	2	500K
Tunnel Hill	10/18/2004	F1	0	0	50K

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 Johnson County is likely. Tornadoes with varying magnitudes are expected to happen. According to the RPI, tornadoes ranked as the number one 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 Johnson 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.

Johnson County Tornado Analysis

Vulnerability to Future Assets/Infrastructure for Tornado Hazard

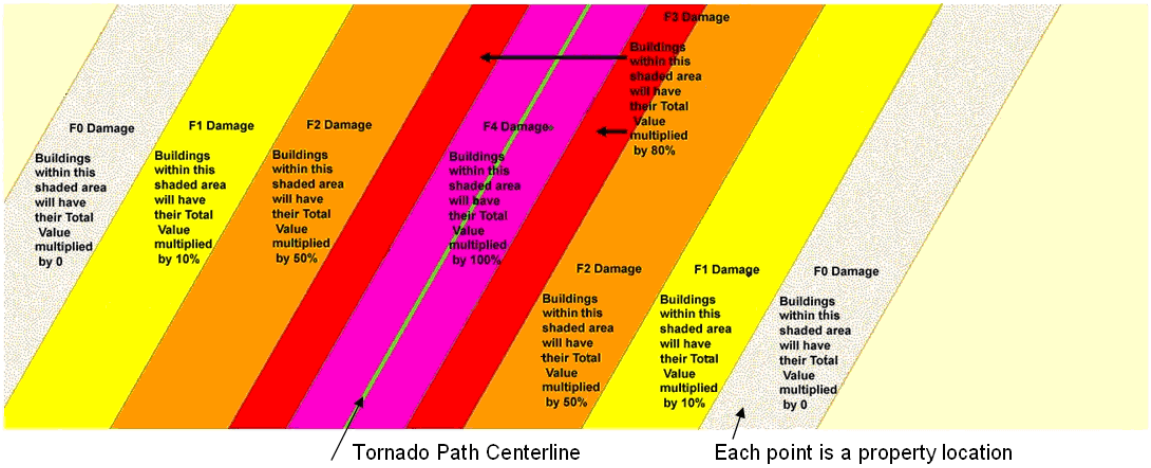
GIS overlay modeling was used to determine the potential impacts of an F4 tornado. The analysis used a hypothetical path for an F4 tornado event that ran for 15 miles across Johnson County. The modeled event began south west of Cypress moving in a north easterly direction through Cypress to Vienna where it turned in a south easterly direction. The selected widths were modeled after a recreation of the 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 4-11 depicts tornado damage curves as well as path widths.

Table 4-11: 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 4-12 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 4-12: 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 F4 Tornado Path in Johnson County

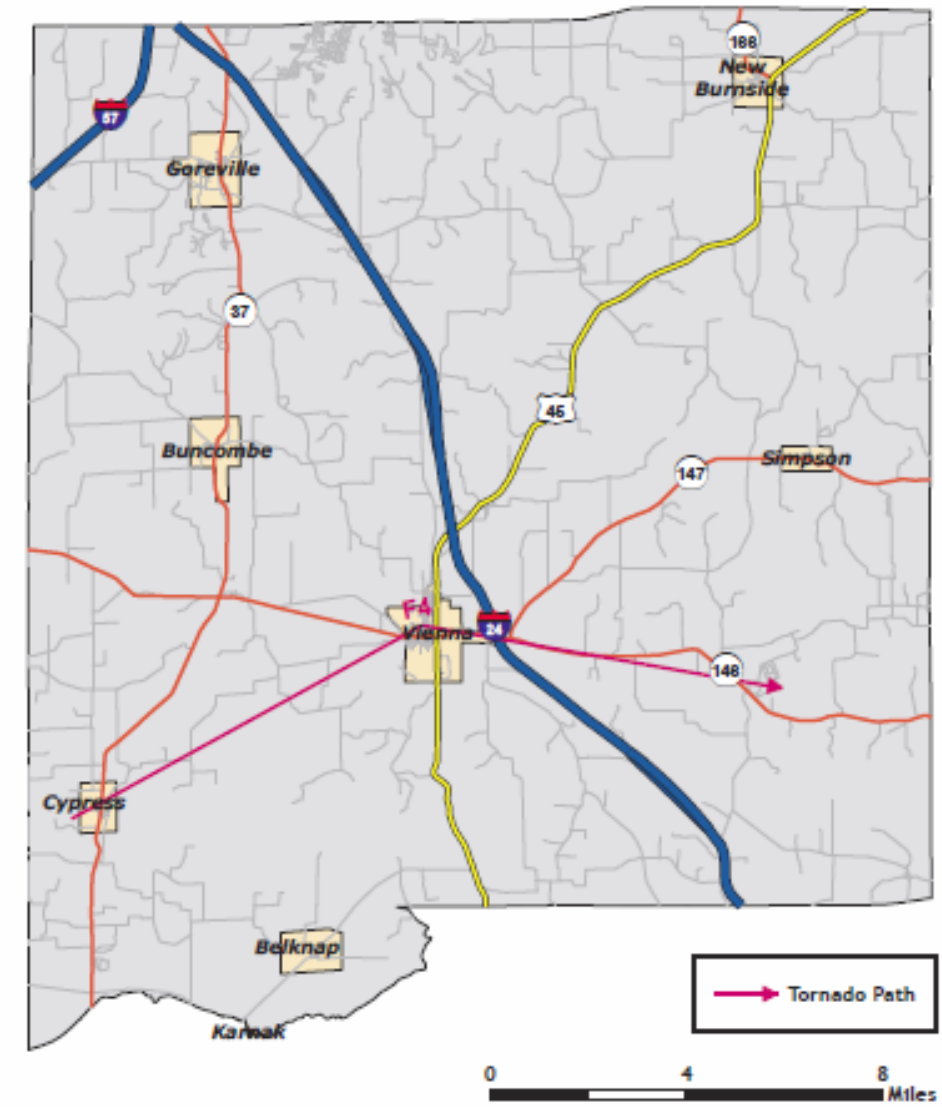
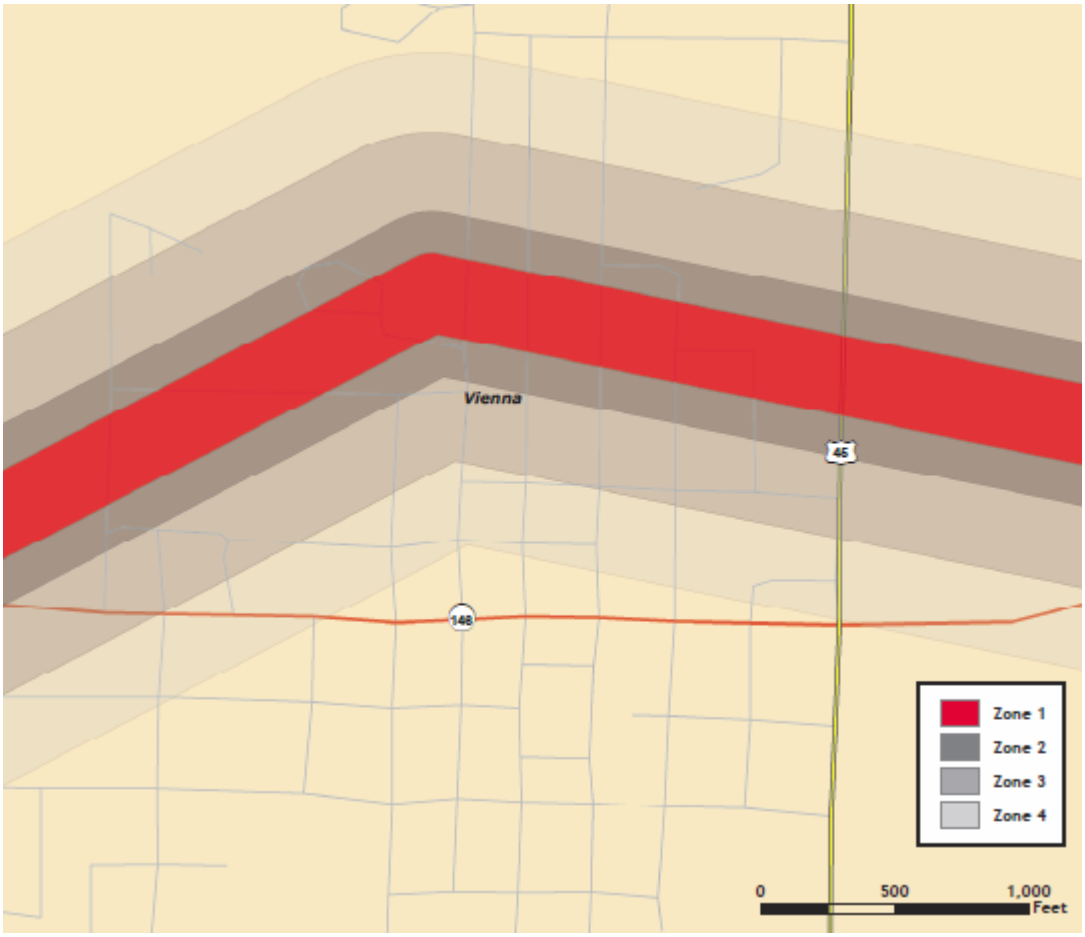


Figure 4-3: Modeled F4 Tornado Damage Buffers in Johnson County (Vienna)



The results of the analysis are depicted in Table 4-13. The estimated building losses were $69.7 million. The building losses are an estimate of building replacement costs multiplied by the percentages of damage. HAZUS-MH default data was used to determine the estimated loss amounts.

Table 4-13: Estimated Building Losses by Occupancy Type (X 1000)

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$6,451	$6,851	$13,862	$12,285
Commercial	$1,865	$1,909	$4,378	$4,977
Industrial	$89	$92	$267	$351
Agriculture	$41	$39	$86	$78
Religious	$193	$185	$295	$3,409
Government	$274	$315	$849	$1,559
Education	$454	$494	$3,101	$4,925
Total	**$9,367**	**$9,885**	**$22,838**	**$27,584**

Essential Facilities Damage

There are nine essential facilities located within 900 feet of the hypothetical tornado path. The model predicts that 1 medical care facilities, 2 fire departments, 1 police station, 3 schools and a prison would experience damage. The affected facilities are identified in Table 4-14, and their geographic locations are shown in Figures 4-4 and 4-5.

Table 4-14: Estimated Essential Facilities Affected

Name
Hillview Health Care Center
Cypress Fire Department
Vienna Fire Department
City of Vienna Police Department
Vienna High School
Cypress Elementary School
Vienna Elementary School
Shawnee Correctional Facility

Figure 4-4: Essential Facilities within Tornado Path (Vienna)

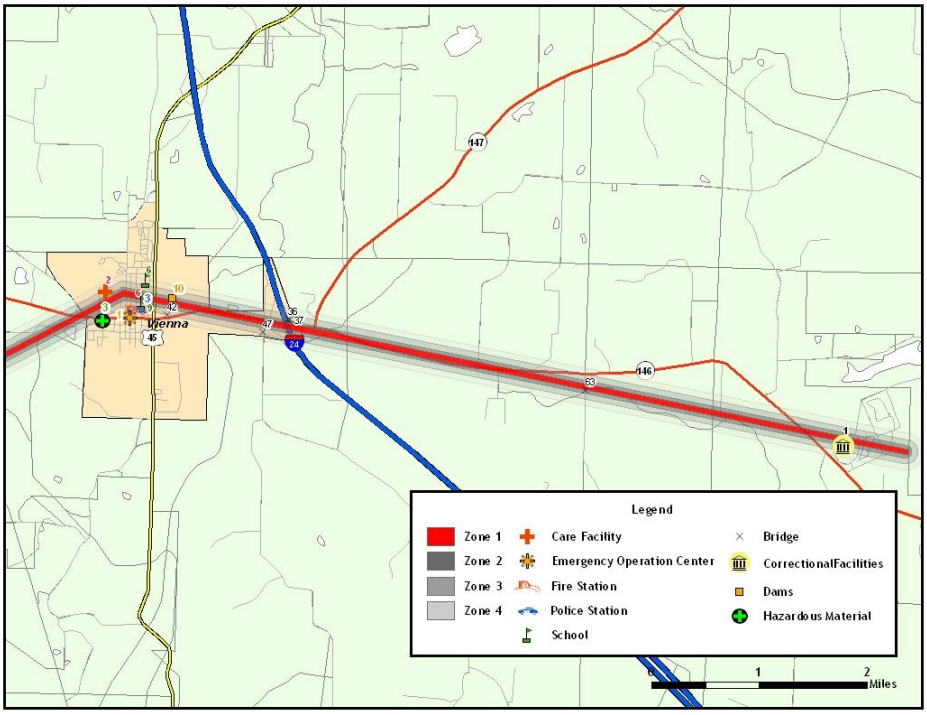
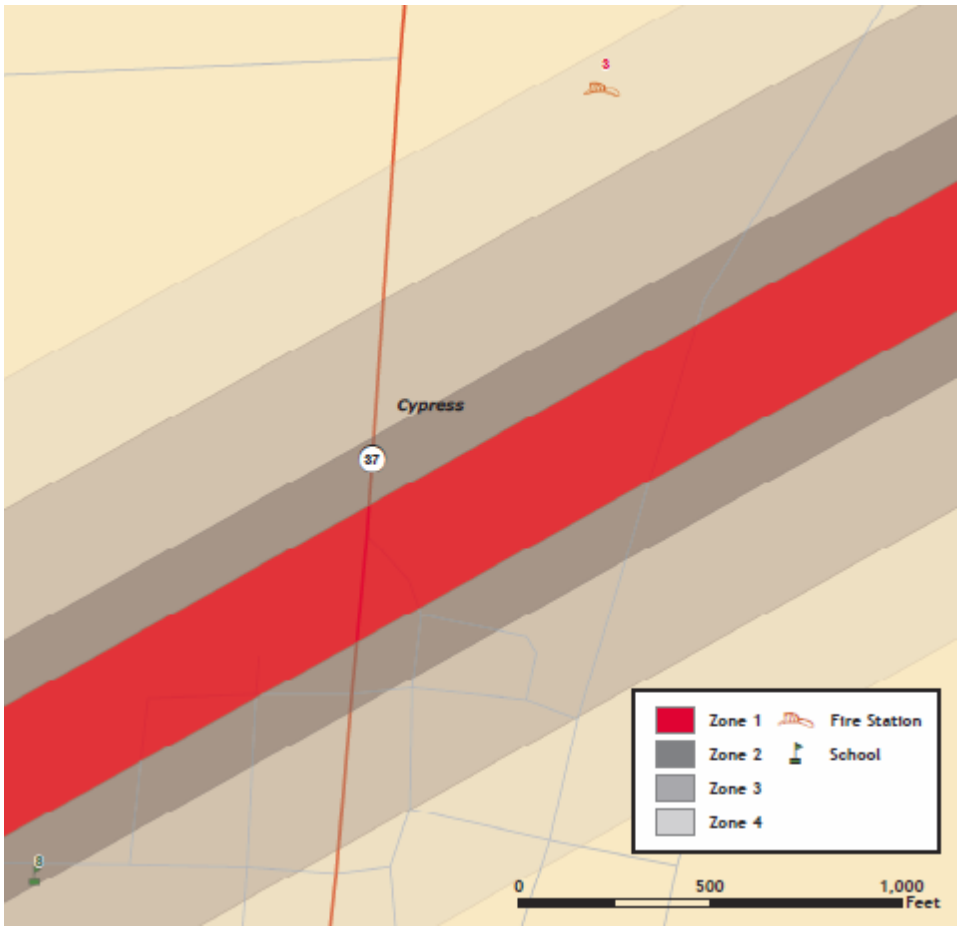


Figure 4-5: Essential Facilities within Tornado Path (Cypress)



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 Johnson 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 Johnson 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.

Previous Occurrences for Riverine and Flash Flooding

The NCDC database reported 16 flood events in Johnson County since 1996. These flood events have been attributed with $160,000 in property damage. A recent example of flooding in Johnson County occurred in January 2001 when thunderstorms repeatedly moved over the same corridor from Scott County, Missouri northeast across Alexander and Johnson 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.

Significant Johnson County floods recorded by the NCDC are shown in Table 4-15. 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 4-15: Johnson County Previous Occurrences of Flooding*

Location	Date	Type	Deaths	Injuries	Property Damage
Tunnel Hill	4/29/1996	Flash Flood	0	0	50K
Vienna	5/10/1996	Flash Flood	0	0	0
Vienna	3/1/1997	Flash Flood	0	0	20K
Vienna	6/29/1998	Flash Flood	0	0	0
Vienna	6/2/1999	Urban/sml Stream Fld	0	0	0
Johnson	1/3/2000	Flash Flood	0	0	10K
Cypress	8/10/2001	Urban/sml Stream Fld	0	0	0
Johnson	12/17/2001	Flash Flood	0	0	40K
Johnson	12/17/2001	Flood	0	0	8K
Johnson	1/23/2002	Flood	0	0	30K
Johnson	5/17/2002	Flash Flood	0	0	0
South Portion	5/4/2003	Flash Flood	0	0	0
South Portion	5/6/2003	Flash Flood	0	0	0
Buncombe	11/15/2005	Flash Flood	0	0	0
Johnson	3/9/2006	Flash Flood	0	0	0
Buncombe	8/19/2006	Flash Flood	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.

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 Johnson 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 Johnson County are the Cache River, Little Cache Creek, and Cedar Creek. Flooding along the Cache River in Johnson County can inundate portions of Belknap, and State Route 37. Little Cache Creek and its tributaries can inundate portions of Vienna and US Route 45. Cedar Creek can indurate portions of Simpson and State Routes 147 and 146.

Flash flooding in Johnson County typically occurs or is best documented in urban/developed areas. For example on August 10, 2001 flash flooding struck the small community of Cypress causing minor flooding. In a few cases the water was over a foot deep across secondary roads.

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.

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.

Calculated Risk Priority Index for Flooding

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

RPI = Probability x Magnitude/Severity.

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

Vulnerability Analysis for Flooding (HAZUS-MH Analysis Using 100-Year Flood Boundary and Default General Building Stock)

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 estimated the damages for Johnson County by utilizing default aggregate General Building Stock data.

General Building Stock

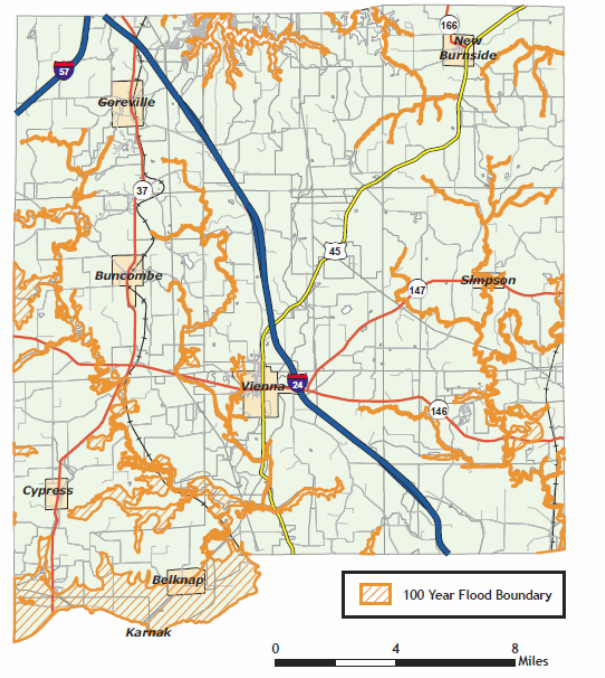
The building replacement costs for the facilities identified in the flood areas are listed in Table 4-16. These buildings can expect impacts similar to those discussed for the critical facilities. These include structural failure, extensive water damage to the facility, and loss of facility functionality (i.e. residential buildings may no longer be able to provide shelter to their inhabitants).

Table 4-16: Johnson County HAZUS-MH Analysis Total Economic Loss (100-Year Flood)

General Occupancy	Building Loss (X 1000)	Total Economic Loss (X 1000)
Agricultural	$68	$201
Commercial	$838	$2,318
Education	$40	$325
Government	$7	$60
Industrial	$212	$749
Religious/Non-Profit	$283	$1,285
Residential	$10,284	$16,107
Total	**$11,732**	**$21,045**

Figure 4-6 depicts the flood boundary from the HAZUS-MH analysis. HAZUS-MH estimates the 100-year flood would damage 59 buildings, totaling over $21 million in building losses and $11.7 million in economic losses.

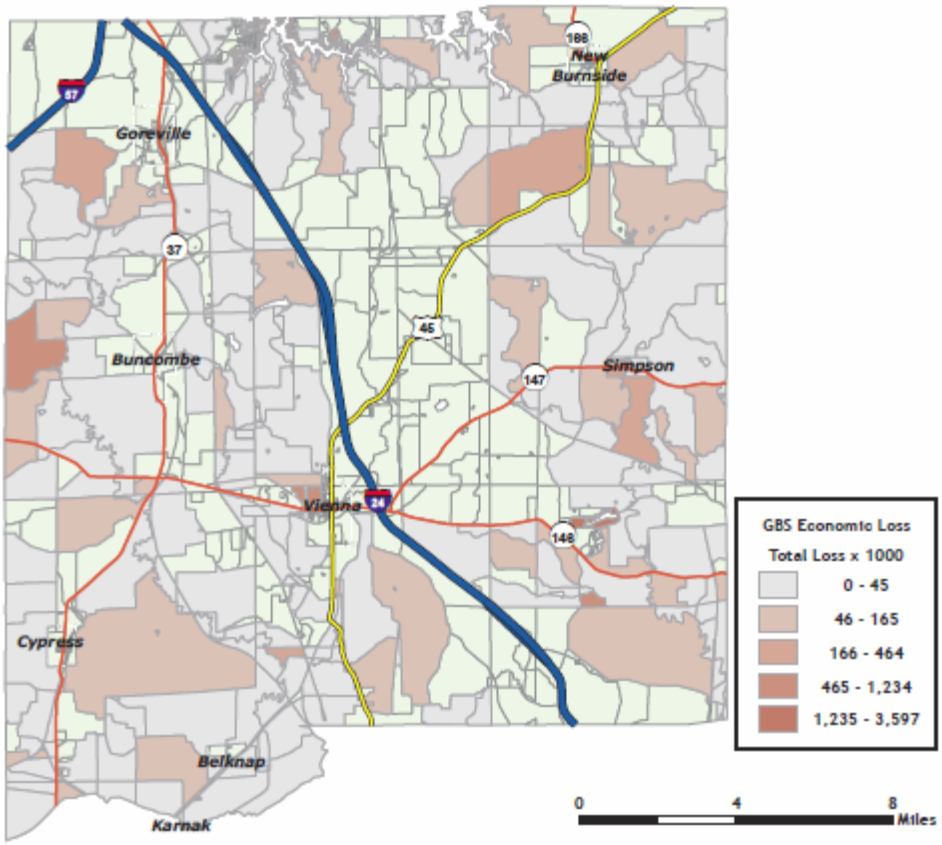
Figure 4-6: Johnson County HAZUS-MH Analysis (100-Year Flood)



HAZUS-MH estimates four census blocks affected by the modeled flood event, with losses exceeding $1 million. The distribution of losses is shown in Figure 4-7.

HAZUS-MH aggregate loss analysis is evenly distributed across a census block. Census blocks of concern should be reviewed in more detail to determine the actual percentage of facilities that fall within the flood hazard areas. The aggregate losses reported in this study may be overstated.

Figure 4-7: Johnson County Total Economic Loss (100-Year Flood)



Essential Facilities

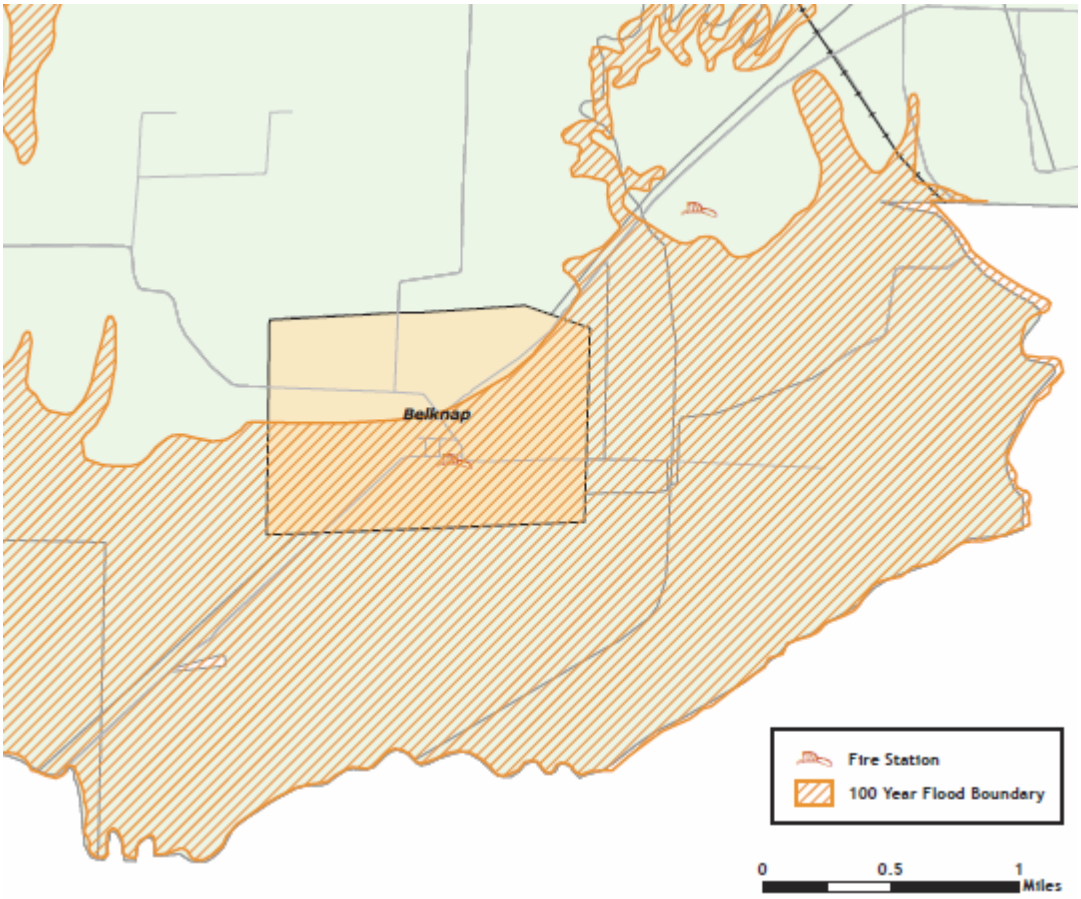
An essential facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). 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 a fire station that may be subject to flooding; this facility is listed in Table 4-17. A map of the facility potentially at risk to flooding is shown in Figure 4-8.

Table 4-17: Johnson County Damaged Essential Facilities

Facility Name
Belknap Fire Department

Figure 4-8: 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 to Future Assets/Infrastructure for Flooding

Flash flooding may affect nearly any low lying 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 Johnson County and other local floodplain mangers administer the floodplain ordnances in 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.

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 4-18 is a description of earthquake intensity using an abbreviated Modified Mercalli Intensity scale, and Table 4-19 lists earthquake magnitudes and their corresponding intensities.
(Source: *http://earthquake.usgs.gov/learning/topics/mag_vs_int.php*)

Table 4-18: 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.
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 4-19: 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 Johnson 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.

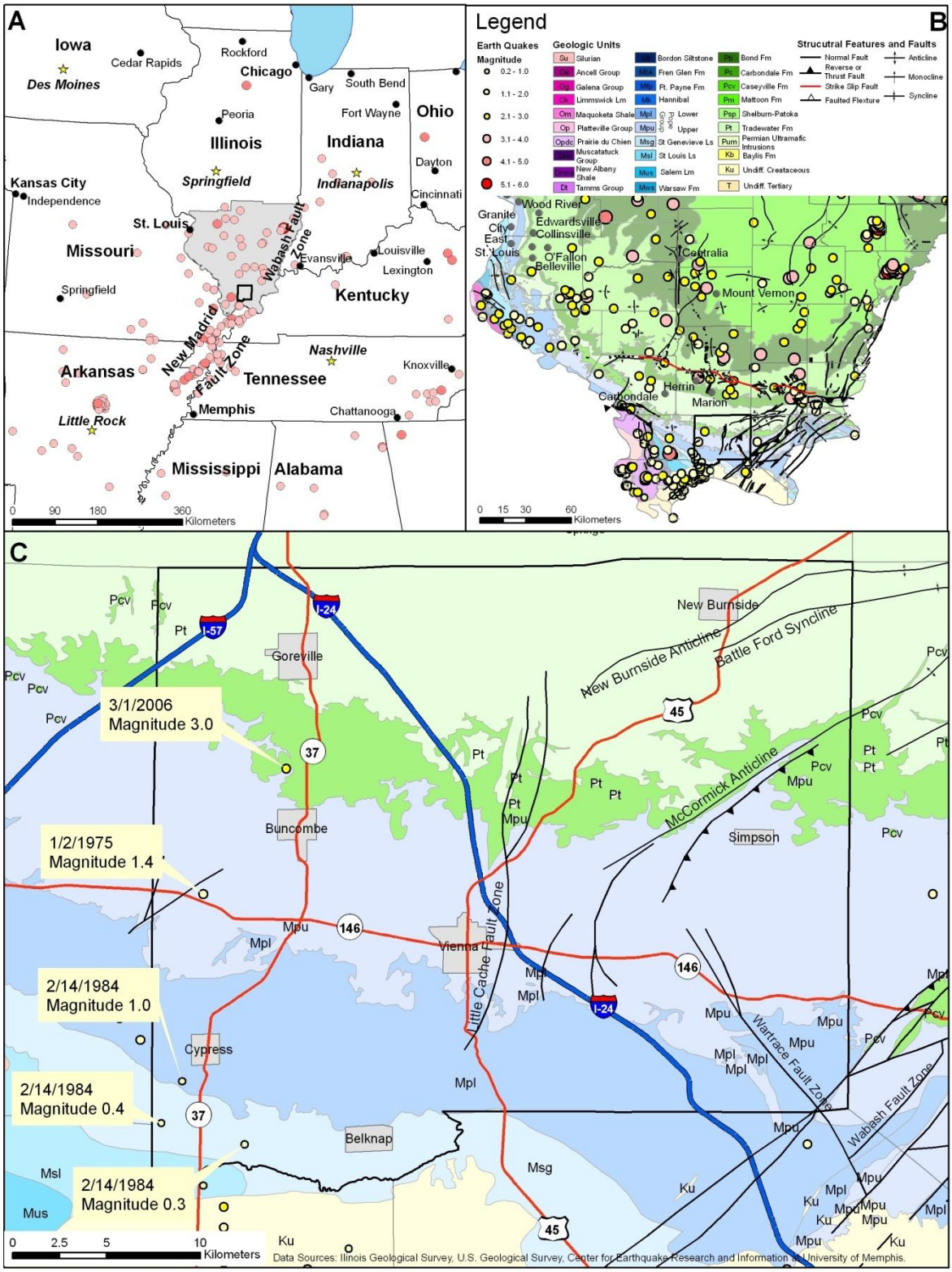
Above text adapted from *http://earthquake.usgs.gov/regional/states/illinois/history.php* and from *Seismicity of the United States, 1568-1989 (Revised), C.W. Stover and J.L. Coffman, U.S. Geological Survey Professional Paper 1527, United States Government Printing Office, Washington: 1993.*

Geographic Location for Earthquake Hazard

Johnson 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 five small earthquakes (M0.3–3.0) have been recorded in Johnson County since 1974 (Figure 14-3). 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 4-9 depicts the following: a) Location of notable earthquakes in the Illinois region with inset of Johnson County; b) Generalized geologic bedrock map with earthquake epicenters, geologic structures, and inset of Johnson County; c) Geologic and earthquake epicenter map of Johnson County.

Figure 4-9 a, b, c: Johnson 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 Johnson County are possible. According to the RPI, earthquake is ranked as the number two 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 Johnson 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 Johnson County based on these events. The final scenario was a Moment Magnitude of 5.5 with the epicenter located in Johnson 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 near the intersection of the Wartrace Fault Zone and the Wabash Valley Fault Zone in the southeastern corner of Johnson County, IL. This scenario represents 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 for the 7.7 New Madrid Earthquake are depicted in Table 4-20, 4-21, and Figure 4-10. HAZUS estimates that approximately 1,093 buildings will be at least moderately damaged. This is more than 22% of the total number of buildings in the region. It is estimated that 42 buildings will be damaged beyond repair.

The total building-related losses totaled $78.5 million; 10% 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 56% of the total loss.

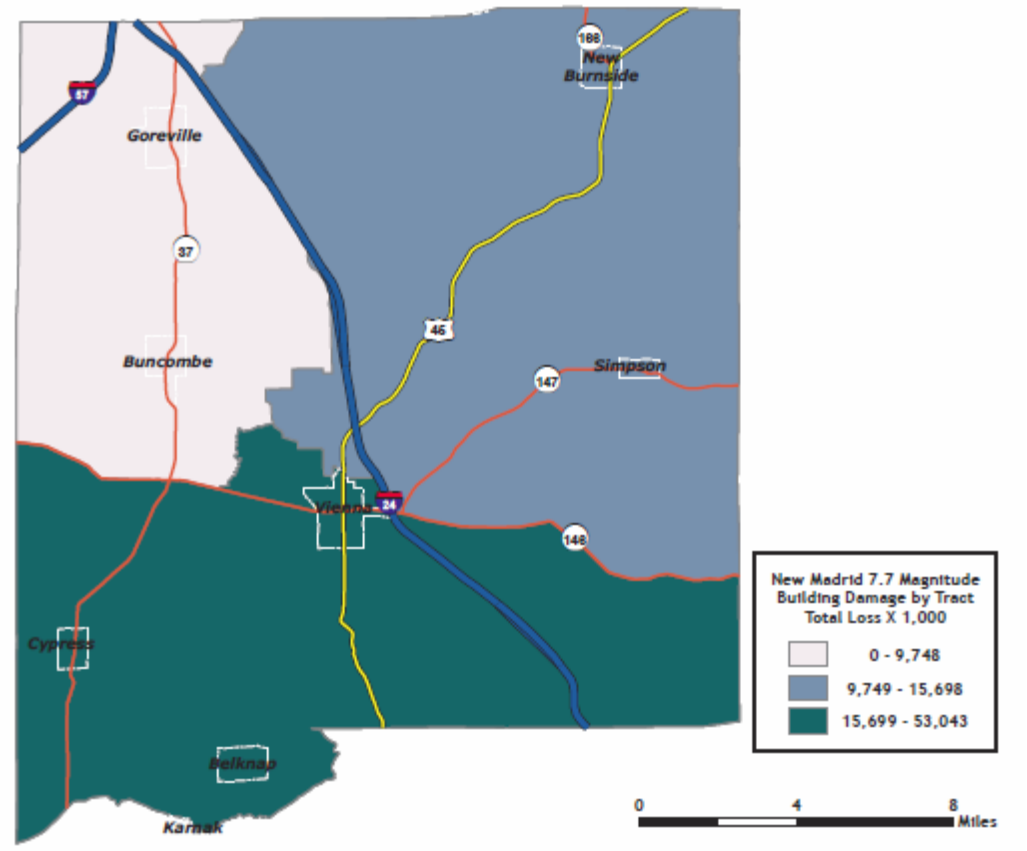
Table 4-20: New Madrid Scenario-Damages Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	1	0.05	1	0.05	1	0.08	0	0.17	0	0.24
Commercial	15	0.58	10	0.71	13	1.60	8	3.23	2	4.52
Education	2	0.08	1	0.08	1	0.15	1	0.29	0	0.33
Government	5	0.18	2	0.14	2	0.19	1	0.31	0	0.36
Industrial	5	0.21	3	0.21	3	0.38	2	0.89	1	1.30
Other Residential	459	18.52	447	31.96	358	44.04	131	55.02	21	50.01
Religion	3	0.14	2	0.17	2	0.29	1	0.60	0	0.77
Single Family	1,989	80.24	932	66.68	433	53.27	94	39.48	18	42.47
Total	**2,479**		**1,397**		**813**		**239**		**42**	

Table 4-21: New Madrid Scenario-Building Economic losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.27	2.32	0.10	0.42	3.11
	Capital-Related	0.00	0.11	1.89	0.06	0.14	2.20
	Rental	0.65	0.55	1.18	0.03	0.25	2.65
	Relocation	0.08	0.03	0.07	0.00	0.08	0.25
	Subtotal	**0.72**	**0.96**	**5.46**	**0.18**	**0.90**	**8.22**
Capital Stock Loses							
	Structural	3.03	1.67	2.06	0.41	1.64	8.81
	Non_Structural	16.95	7.73	6.92	1.78	5.55	38.94
	Content	9.84	2.69	4.35	1.27	3.84	21.99
	Inventory	0.00	0.00	0.14	0.33	0.06	0.53
	Subtotal	**29.82**	**12.08**	**13.48**	**3.80**	**11.08**	**70.27**
	Total	**30.55**	**13.04**	**18.94**	**3.98**	**11.98**	**78.49**

Figure 4-10: 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 4-22, Table 4-23, and Figure 4-11. HAZUS estimates that approximately 4 buildings will be at least moderately damaged. This is less than 1% of the total number of buildings in the region. It is estimated that there will be no buildings damaged beyond repair.

The total building related losses totaled $18.3 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 65% of the total loss.

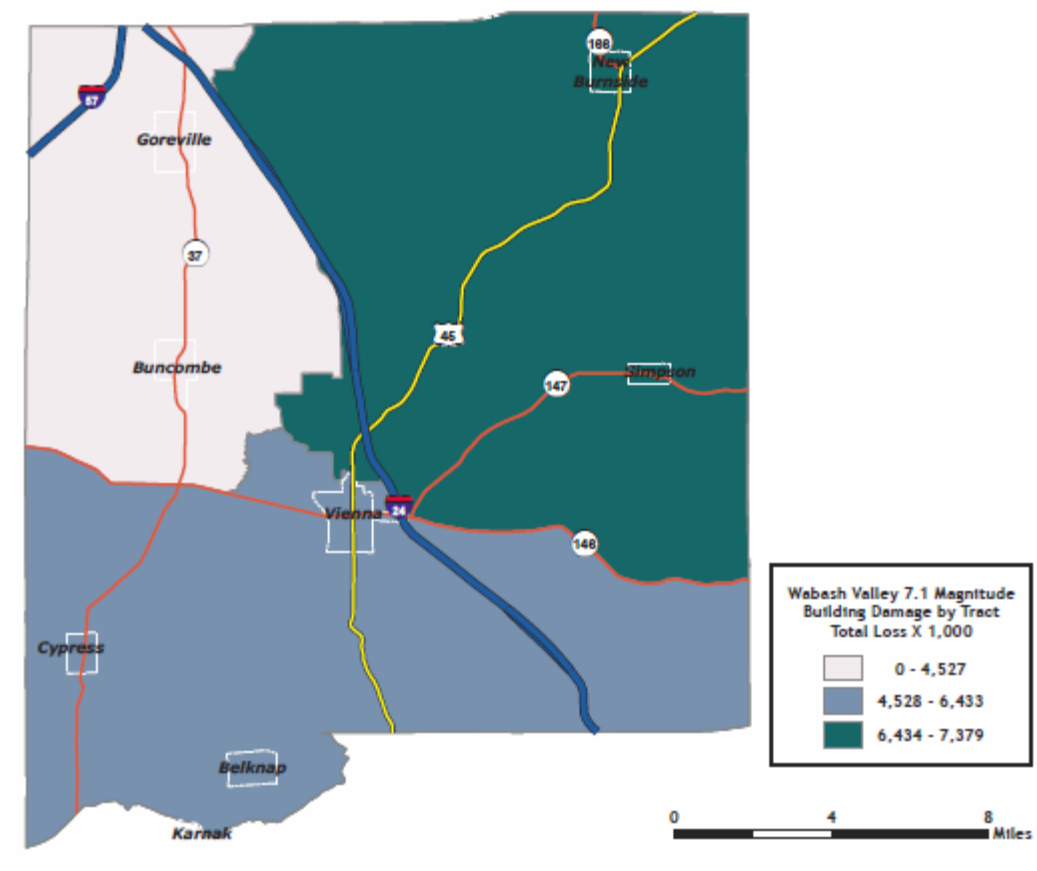
Table 4-22: Wabash Valley Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	3	0.06	0	0.05	0	0.07	0	0.00	0	0.00
Commercial	47	0.95	0	0.74	0	0.89	0	0.00	0	0.00
Education	5	0.10	0	0.11	0	0.13	0	0.00	0	0.00
Government	9	0.18	0	0.16	0	0.19	0	0.00	0	0.00
Industrial	14	0.28	0	0.19	0	0.26	0	0.00	0	0.00
Other Residential	1,375	28.02	39	66.04	2	63.20	0	0.00	0	0.00
Religion	10	0.20	0	0.20	0	0.25	0	0.00	0	0.00
Single Family	3,446	70.21	19	32.51	1	35.01	0	0.00	0	0.00
Total	**4,908**		**59**		**4**		**0**		**0**	

Table 4-23: Wabash Valley Scenario-Building Economic losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	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	0.01
	Relocation	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.01**
Capital Stock Losses							
	Structural	0.01	0.01	0.00	0.00	0.00	0.03
	Non_Structural	4.72	2.11	1.50	0.52	1.13	9.97
	Content	3.90	1.13	1.41	0.40	1.31	8.15
	Inventory	0.00	0.00	0.05	0.10	0.02	0.17
	Subtotal	**8.63**	**3.25**	**2.97**	**1.01**	**2.46**	**18.32**
	Total	**8.63**	**3.25**	**2.97**	**1.01**	**2.47**	**18.34**

Figure 4-11: Wabash Valley Scenario-Building Economic Losses in Thousands of Dollars



Results for 5.5 Magnitude Earthquake in Johnson County

The results of the initial analysis, for a 5.5 magnitude earthquake with an epicenter in the south east corner of Johnson County, are depicted in Table 4-24 and 4-25 and Figure 4-12. HAZUS estimates that approximately 47 buildings will be at least moderately damaged. This is over 1% of the total number of buildings in the region. It is estimated that there will be no buildings damaged beyond repair.

The total building related losses totaled $4.1 million; 4% 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 62% of the total loss.

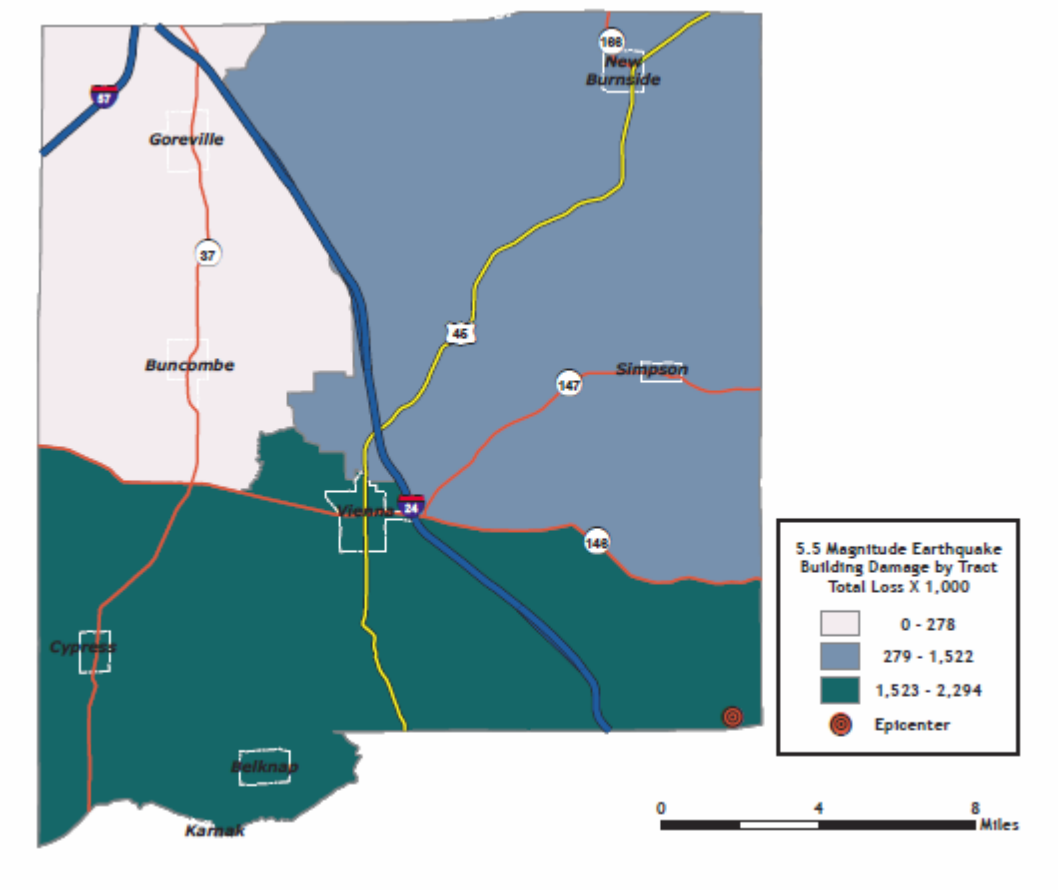
Table 4-24: Johnson County 5.5M Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	3	0.06	0	0.07	0	0.08	0	0.18	0	0.11
Commercial	45	0.94	2	1.07	1	1.19	0	2.52	0	1.96
Education	5	0.10	0	0.12	0	0.13	0	0.28	0	0.32
Government	9	0.18	0	0.16	0	0.17	0	0.34	0	0.37
Industrial	13	0.28	0	0.28	0	0.33	0	0.68	0	0.34
Other Residential	1,313	27.48	75	52.72	27	60.29	1	20.58	0	2.27
Religion	10	0.20	0	0.24	0	0.29	0	0.64	0	0.64
Single Family	3,382	70.76	65	45.34	17	37.51	2	74.80	0	93.98
Total	**4,780**		**143**		**44**		**3**		**0**	

Table 4-25: Johnson 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	0.00	0.04	0.00	0.01	0.06
	Capital-Related	0.00	0.00	0.03	0.00	0.00	0.04
	Rental	0.02	0.02	0.03	0.00	0.00	0.07
	Relocation	0.00	0.00	0.00	0.00	0.00	0.01
	Subtotal	**0.02**	**0.03**	**0.10**	**0.00**	**0.02**	**0.17**
Capital Stock Loses							
	Structural	0.11	0.07	0.04	0.01	0.03	0.25
	Non_Structural	0.99	0.48	0.34	0.10	0.28	2.20
	Content	0.63	0.19	0.27	0.07	0.27	1.44
	Inventory	0.00	0.00	0.01	0.02	0.00	0.03
	Subtotal	**1.73**	**0.75**	**0.66**	**0.20**	**0.58**	**3.92**
	Total	**1.75**	**0.78**	**0.76**	**0.20**	**0.60**	**4.09**

Figure 4-12: Johnson 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, Johnson 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 0.75 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 56 hailstorms in Johnson County since 1956. These storms have been attributed with $7.1 million in property damage. Hailstorms occur nearly every year in the late spring and early summer months. The most recent occurrence was in May 15, 2007 when a line of severe thunderstorms produced hail at several locations though out the County. Johnson County hailstorms are listed in Table 4-26; additional details for NCDC events are included in Appendix D.

Table 4-26: Johnson County Hailstorms*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Johnson	11/26/1965	Hail	3.00 in.	0	0	0
Johnson	7/5/1975	Hail	3.00 in.	0	0	0
Johnson	7/5/1975	Hail	0.75 in.	0	0	0
Johnson	7/4/1982	Hail	0.75 in.	0	0	0
Johnson	6/3/1983	Hail	0.75 in.	0	0	0
Johnson	4/3/1989	Hail	1.00 in.	0	0	0
Johnson	4/9/1991	Hail	1.75 in.	0	0	0
Johnson	4/9/1991	Hail	0.75 in.	0	0	0
Johnson	6/25/1992	Hail	1.75 in.	0	0	0
Johnson	6/25/1992	Hail	2.00 in.	0	0	0
Vienna	5/18/1995	Hail	0.75 in.	0	0	0
Belknap	6/9/1995	Hail	0.75 in.	0	0	0
Reevesville	3/28/1997	Hail	1.75 in.	0	0	0
Goreville	6/14/1998	Hail	0.75 in.	0	0	0
Goreville	2/27/1999	Hail	0.75 in.	0	0	0
Goreville	5/5/1999	Hail	1.00 in.	0	0	0
New Burnside	6/2/1999	Hail	1.00 in.	0	0	0
Cypress	3/26/2000	Hail	0.75 in.	0	0	0
Cypress	4/27/2000	Hail	0.75 in.	0	0	0
Goreville	5/23/2000	Hail	2.75 in.	0	0	7.0M
Goreville	5/18/2001	Hail	0.75 in.	0	0	0
Cypress	8/18/2001	Hail	0.75 in.	0	0	0
Goreville	8/29/2001	Hail	0.75 in.	0	0	0
Goreville	10/23/2001	Hail	0.75 in.	0	0	0
New Burnside	5/2/2002	Hail	1.75 in.	0	0	100K
Goreville	5/25/2002	Hail	0.75 in.	0	0	0
Tunnel Hill	5/25/2002	Hail	0.88 in.	0	0	0
Goreville	11/9/2002	Hail	1.00 in.	0	0	0
Vienna	4/4/2003	Hail	0.75 in.	0	0	0
Vienna	4/25/2003	Hail	1.75 in.	0	0	0
Vienna	4/29/2003	Hail	1.00 in.	0	0	0
Tunnel Hill	5/1/2003	Hail	0.75 in.	0	0	0
Cypress	5/6/2003	Hail	0.75 in.	0	0	0
Belknap	5/6/2003	Hail	1.75 in.	0	0	0
Vienna	5/6/2003	Hail	1.75 in.	0	0	0
Vienna	3/20/2004	Hail	0.75 in.	0	0	0
Tunnel Hill	5/26/2004	Hail	0.88 in.	0	0	0
Goreville	6/1/2004	Hail	1.00 in.	0	0	0
Cypress	6/18/2004	Hail	2.75 in.	0	0	0
Vienna	7/6/2004	Hail	1.00 in.	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Goreville	10/18/2004	Hail	0.75 in.	0	0	0
West Vienna	3/30/2005	Hail	1.75 in.	0	0	0
West Vienna	4/12/2005	Hail	0.75 in.	0	0	0
Tunnel Hill	4/22/2005	Hail	1.00 in.	0	0	0
Vienna	3/11/2006	Hail	0.75 in.	0	0	0
Belknap	3/12/2006	Hail	0.75 in.	0	0	0
Cypress	4/2/2006	Hail	1.00 in.	0	0	0
Vienna	4/2/2006	Hail	1.00 in.	0	0	0
Vienna	5/25/2006	Hail	1.00 in.	0	0	0
Cypress	8/10/2006	Hail	0.75 in.	0	0	0
Vienna	9/27/2006	Hail	0.75 in.	0	0	0
Cypress	2/20/2007	Hail	1.75 in.	0	0	0
Vienna	2/20/2007	Hail	1.75 in.	0	0	0
Simpson	2/20/2007	Hail	1.00 in.	0	0	0
Vienna	5/15/2007	Hail	1.00 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 70 wind storms reported since 1974. On multiple occasions in the past 50 years trees have been uprooted by severe winds in Johnson County. These storms have been attributed with two injuries and $750,000 in property damage in Johnson and adjacent counties.

As shown in Table 4-27, wind storms have historically occurred year-round with the greatest frequency and damage in April through August.

Table 4-27: Johnson County Wind Storms*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Johnson	10/22/1996	High Wind	Not Recorded	0	0	28K
Johnson	4/30/1997	High Wind	52 kts.	0	0	20K
Johnson	11/11/1995	High Winds	Not Recorded	0	0	0
Johnson	1/8/2006	Strong Wind	Not Recorded	0	0	19K
Johnson	1/19/2006	Strong Wind	Not Recorded	0	0	19K
Johnson	2/16/2006	Strong Wind	Not Recorded	0	0	14K
Johnson	12/1/2006	Strong Wind	Not Recorded	0	0	1K
Johnson	2/7/1999	Strong Winds	Not Recorded	0	0	23K

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Vienna	5/15/2007	Tstm Wind	Not Recorded	0	0	5K
Cypress	8/3/2007	Tstm Wind	Not Recorded	0	0	2K
Goreville	1/29/2008	Tstm Wind	Not Recorded	0	0	150K
Vienna	11/14/1993	Tstm Winds	Not Recorded	0	1	50K
Johnson	4/15/1994	Tstm Winds	Not Recorded	0	0	50K
Many Areas	4/18/1995	Tstm Winds	Not Recorded	0	0	0
Vienna	5/17/1995	Tstm Winds	Not Recorded	0	0	0
Vienna	5/18/1995	Tstm Winds	Not Recorded	0	0	0
Vienna	6/7/1995	Tstm Winds	Not Recorded	0	0	0
Johnson	6/8/1995	Tstm Winds	Not Recorded	0	0	100K
Johnson	6/20/1995	Tstm Winds	Not Recorded	0	0	0
Vienna	6/21/1995	Tstm Winds	Not Recorded	0	0	10K
Johnson	9/28/1974	Tstm Winds	Not Recorded	0	0	0
Johnson	7/10/1981	Tstm Winds	Not Recorded	0	0	0
Johnson	7/20/1981	Tstm Winds	Not Recorded	0	0	0
Johnson	3/22/1991	Tstm Winds	Not Recorded	0	0	0
Johnson	7/2/1991	Tstm Winds	Not Recorded	0	0	0
Johnson	11/30/1991	Tstm Winds	Not Recorded	0	0	0
Johnson	6/25/1992	Tstm Winds	Not Recorded	0	0	0
Vienna	1/18/1996	Tstm Winds	Not Recorded	0	0	0
Goreville	4/21/1996	Tstm Winds	50 kts.	0	0	0
Vienna	5/5/1996	Tstm Winds	50 kts.	0	0	0
Belknap	6/23/1996	Tstm Winds	Not Recorded	0	0	5K
Vienna	3/1/1997	Tstm Winds	52 kts.	0	0	0
Vienna	4/20/1997	Tstm Winds	52 kts.	0	0	0
New Burnside	5/25/1997	Tstm Winds	52 kts.	0	0	0
Belknap	6/13/1997	Tstm Winds	52 kts.	0	0	0
Buncombe	6/13/1997	Tstm Winds	50 kts.	0	0	0
New Burnside	7/14/1997	Tstm Winds	52 kts.	0	0	7K
Goreville	5/21/1998	Tstm Winds	50 kts.	0	0	0
New Burnside	6/14/1998	Tstm Winds	55 kts.	0	0	60K
Vienna	1/17/1999	Tstm Winds	52 kts.	0	0	4K
Simpson	1/22/1999	Tstm Winds	50 kts.	0	0	3K
Cypress	5/17/1999	Tstm Winds	70 kts.	0	0	75K

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Vienna	1/3/2000	Tstm Winds	Not Recorded	0	0	5K
Belknap	5/23/2000	Tstm Winds	Not Recorded	0	0	10K
Vienna	6/2/2000	Tstm Winds	Not Recorded	0	1	10K
Cypress	9/20/2000	Tstm Winds	50 kts.	0	0	2K
Cypress	9/22/2000	Tstm Winds	53 kts.	0	0	10K
Goreville	2/24/2001	Tstm Winds	Not Recorded	0	0	5K
New Burnside	7/18/2001	Tstm Winds	50 kts.	0	0	0
Simpson	7/23/2001	Tstm Winds	50 kts.	0	0	0
Cypress	8/25/2001	Tstm Winds	50 kts.	0	0	0
Vienna	9/7/2001	Tstm Winds	50 kts.	0	0	3K
Johnson	10/24/2001	Tstm Winds	50 kts.	0	0	10K
Goreville	11/9/2002	Tstm Winds	50 kts.	0	0	0
Johnson	5/10/2003	Tstm Winds	50 kts.	0	0	0
Vienna	7/18/2003	Tstm Winds	50 kts.	0	0	0
Vienna	4/30/2004	Tstm Winds	50 kts.	0	0	0
Johnson	5/30/2004	Tstm Winds	52 kts.	0	0	0
Cypress	6/12/2004	Tstm Winds	50 kts.	0	0	0
Belknap	1/13/2005	Tstm Winds	55 kts.	0	0	3K
Cypress	5/13/2005	Tstm Winds	50 kts.	0	0	2K
Simpson	8/14/2005	Tstm Winds	52 kts.	0	0	0
Vienna	8/26/2005	Tstm Winds	50 kts.	0	0	0
Tunnel Hill	11/15/2005	Tstm Winds	56 kts.	0	0	2K
Vienna	3/9/2006	Tstm Winds	55 kts.	0	0	5K
Vienna	3/9/2006	Tstm Winds	60 kts.	0	0	5K
Vienna	5/25/2006	Tstm Winds	50 kts.	0	0	0
West Vienna	7/21/2006	Tstm Winds	50 kts.	0	0	0
Johnson	4/20/2000	Wind	Not Recorded	0	0	0
Johnson	3/9/2002	Wind	Not Recorded	0	0	3K
Johnson	10/22/1996	High Wind	Not Recorded	0	0	28K
Johnson	4/30/1997	High Wind	52 kts.	0	0	20K
Johnson	11/11/1995	High Winds	Not Recorded	0	0	0
Johnson	1/8/2006	Strong Wind	Not Recorded	0	0	19K
Johnson	1/19/2006	Strong Wind	Not Recorded	0	0	19K
Johnson	2/16/2006	Strong Wind	Not Recorded	0	0	14K

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Johnson	12/1/2006	Strong Wind	Not Recorded	0	0	1K
Johnson	2/7/1999	Strong Winds	Not Recorded	0	0	23K
Vienna	5/15/2007	Tstm Wind	Not Recorded	0	0	5K
Cypress	8/3/2007	Tstm Wind	Not Recorded	0	0	2K
Goreville	1/29/2008	Tstm Wind	Not Recorded	0	0	150K

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 four hazard.

RPI = Probability x Magnitude/Severity.

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

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 Johnson County are discussed in types and numbers in Table 4-8.

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 Johnson 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 51 winter storm and extreme cold events for Johnson County since 1994. These storms have been attributed with three deaths and four injury, and $600,000 million in property damage in Johnson 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. 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. Emergency shelters were established for those without power for extended periods. Schools were closed for a week in some counties. Trees and tree limbs fell across roads, complicating recovery efforts. A number of houses and other structures were damaged by falling trees. Ferne Clyffe State Park, Tunnel Hill State Bike Trail, and the Trail of Tears State Forest were closed for the remainder of the month due to widespread tree damage. Minor damage occurred to facilities and buildings in Ferne Clyffe State Park.

The NCDC winter storms for Johnson County are listed in Table 4-28. Additional details for NCDC events are included in Appendix D.

Table 4-28: Winter Storm Events*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Johnson	12/9/1995	Cold Wave	N/A	0	0	0
Johnson	3/8/1994	Heavy Snow	N/A	0	0	500K
Johnson	9/24/1995	Frost	N/A	0	0	0
Johnson	12/8/1995	Snow	N/A	0	0	0
Johnson	1/2/1996	Winter Storm	N/A	0	0	0
Johnson	1/6/1996	Winter Storm	N/A	0	0	0
Johnson	2/2/1996	Extreme Cold	N/A	0	0	0
Johnson	1/8/1997	Winter Storm	N/A	0	0	0
Johnson	1/10/1997	Extreme Wind chill	N/A	1	0	0
Johnson	1/15/1997	Ice Storm	N/A	0	0	0
Johnson	4/18/1997	Frost	N/A	0	0	0
Johnson	1/17/1998	Freezing Drizzle	N/A	0	0	0
Johnson	12/21/1998	Freezing Rain	N/A	0	0	0
Johnson	12/23/1998	Snow	N/A	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Johnson	1/1/1999	Ice Storm	N/A	0	0	150K
Johnson	1/8/1999	Ice Storm	N/A	0	0	0
Johnson	3/14/1999	Heavy Snow	N/A	0	0	0
Johnson	1/22/2000	Snow	N/A	0	0	0
Johnson	4/9/2000	Frost	N/A	0	0	0
Vienna	10/9/2000	Frost	N/A	0	0	0
Southern Illinois	12/12/2000	Extreme Cold	N/A	0	0	0
Johnson	12/13/2000	Winter Storm	N/A	0	0	0
Johnson	12/15/2000	Freezing Rain	N/A	0	0	0
Johnson	1/1/2001	Extreme Cold	N/A	0	0	0
Johnson	1/26/2001	Freezing Rain	N/A	0	0	0
Johnson	2/21/2001	Winter Storm	N/A	0	0	0
Johnson	4/18/2001	Frost	N/A	0	0	0
Johnson	1/19/2002	Heavy Snow	N/A	0	0	0
Johnson	12/4/2002	Winter Storm	N/A	0	0	0
Johnson	12/23/2002	Winter Storm	N/A	0	0	0
Johnson	1/16/2003	Winter Storm	N/A	0	0	0
Johnson	1/22/2003	Winter Weather/mix	N/A	0	0	0
Johnson	1/23/2003	Extreme Cold/wind Chill	N/A	0	0	0
Johnson	2/6/2003	Heavy Snow	N/A	0	0	0
Johnson	2/16/2003	Winter Storm	N/A	0	0	0
Johnson	2/23/2003	Heavy Snow	N/A	0	0	0
Johnson	10/3/2003	Frost/freeze	N/A	0	0	0
Johnson	1/25/2004	Ice Storm	N/A	0	0	0
Johnson	1/29/2004	Winter Weather/mix	N/A	0	0	0
Johnson	2/5/2004	Heavy Snow	N/A	0	0	0
Johnson	12/22/2004	Winter Storm	N/A	1	1	100K
Johnson	12/23/2004	Extreme Cold/wind Chill	N/A	1	0	0
Johnson	5/4/2005	Frost/freeze	N/A	0	0	0
Johnson	10/28/2005	Frost/freeze	N/A	0	0	0
Johnson	12/8/2005	Winter Weather/mix	N/A	0	0	0
Johnson	2/18/2006	Winter Weather/mix	N/A	0	0	0
Johnson	2/19/2006	Winter Weather/mix	N/A	0	0	0
Johnson	4/2/2006	Funnel Cloud	N/A	0	0	0
Johnson	2/3/2007	Winter Weather	N/A	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage
Johnson	12/15/2007	Winter Weather	N/A	0	0	0
Johnson	2/11/2008	Winter Storm	N/A	0	3	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.

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 sixth hazard.

RPI = Probability x Magnitude/Severity.

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

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 Johnson County, as determined from the building inventory, is included in Table 4-8.

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 Johnson County are particularly vulnerable due to the likely hood of long term power outages. Human service agencies, volunteer organizations, the Johnson 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.

4.4.7 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

Johnson 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 three hazard.

RPI = Probability x Magnitude/Severity.

Probability	x	Magnitude /Severity	=	RPI
3	x	4	=	12

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 Johnson 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 4-8 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 at the intersection of State Highway 146 and Interstate 24 in Vienna.

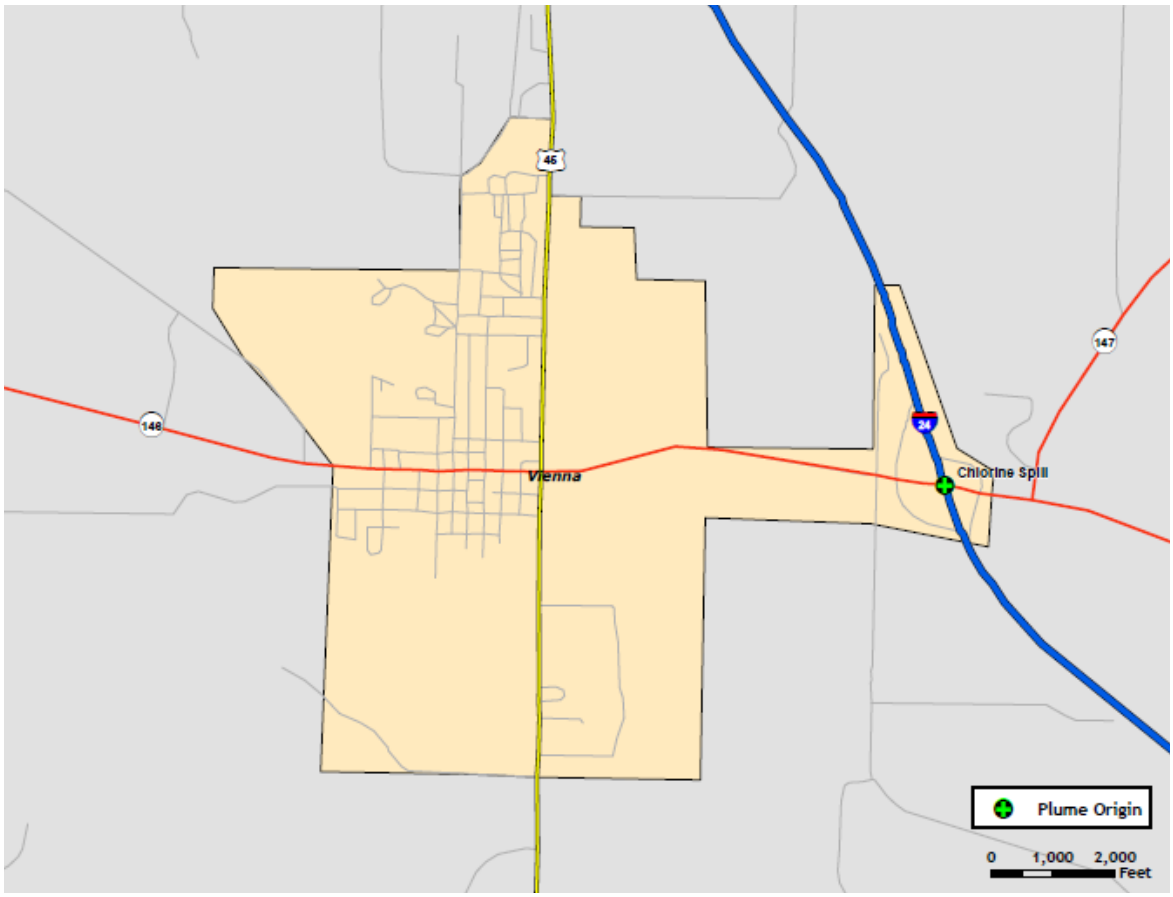
Chlorine is a greenish yellow gas with a pungent suffocating odor. The gas liquefies at -35°C and room pressure or will liquefy from pressure applied at room temperature. Contact with unconfined liquid chlorine can cause frostbite from evaporative cooling. Chlorine does not burn, but, like oxygen, supports 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 (NOAA Reactivity 2007).

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

ALOHA is a computer program designed especially for use by people responding to chemical accidents, as well as for emergency planning and training. Chlorine is a common chemical used in industrial operations and can be found in either liquid or gas form. Rail and truck tankers commonly haul Chlorine to and from facilities.

For this scenario, moderate atmospheric and climatic conditions with a slight breeze from the east were assumed. The target area was selected for three primary reasons: 1) the high volume traffic, 2) the area is highly populated and 3) proximity to several critical facilities. The geographic area covered in this analysis is depicted in Figure 4-13.

Figure 4-13: Location of Chemical Release



Analysis

The ALOHA atmospheric modeling parameters, depicted in Figure 4-14, were based upon a 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 10.3 feet and the length set to 48 feet (30,000 gallons). At the time of its release, it was estimated that the tank was 80% 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 4-14: ALOHA Plume Modeling Parameters

```
SITE DATA:
  Location: VIENNA, ILLINOIS
  Building Air Exchanges Per Hour: 0.40 (unsheltered single storied)
  Time: May 5, 2009  1446 hours CDT (user specified)

CHEMICAL DATA:
  Chemical Name: CHLORINE                 Molecular Weight: 70.91 g/mol
  AEGL-1(60 min): 0.5 ppm   AEGL-2(60 min): 2 ppm   AEGL-3(60 min): 20 ppm
  IDLH: 10 ppm
  Ambient Boiling Point: -29.7° 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 E 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: 10.3 feet                Tank Length: 48 feet
  Tank Volume: 30000 gallons
  Tank contains liquid                    Internal Temperature: 68° F
  Chemical Mass in Tank: 142 tons         Tank is 80% full
  Circular Opening Diameter: 2.5 inches
  Opening is 12 inches from tank bottom
  Release Duration: 45 minutes
  Max Average Sustained Release Rate: 10,400 pounds/min
     (averaged over a minute or more)
  Total Amount Released: 270,746 pounds
  Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).
```

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.

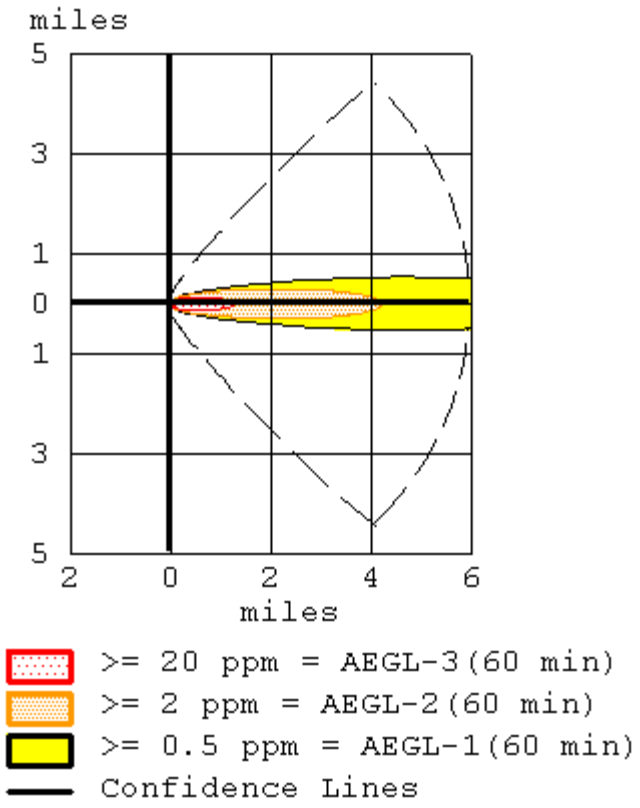
- AEGL 1: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible 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 10,400 pounds of material would be released per minute. The image in Figure 4-15 depicts the plume footprint generated by ALOHA.

Figure 4-15: Plume Footprint Generated by ALOHA



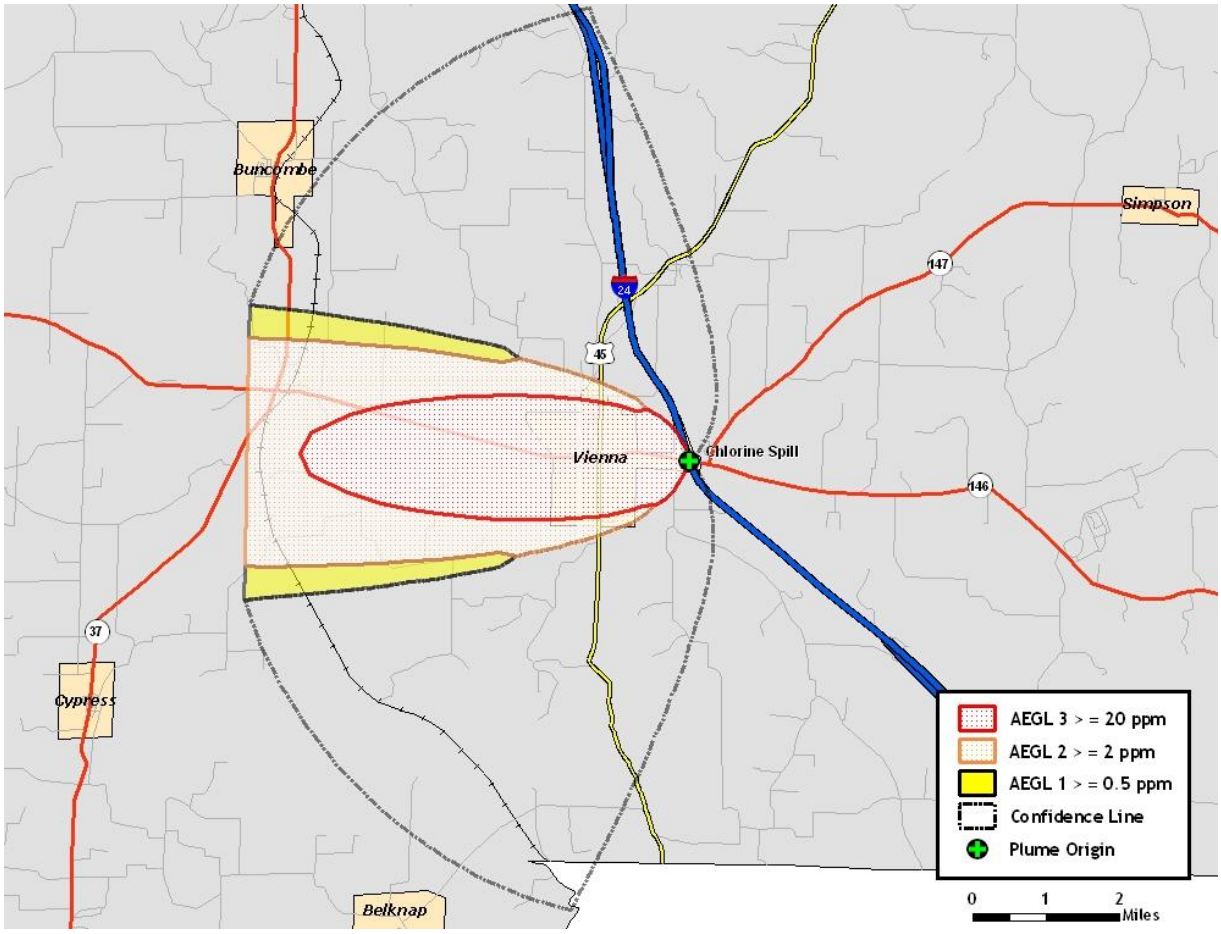
As the substance moves away from the source, the level of substance concentration decreases. Each color-coded area depicts a level of concentration measured in parts per million (ppm). For the purpose of clarification, this report will designate each level of concentration as a specific zone. The zones are 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 4-16 depicts the plume footprint generated by ALOHA.

Figure 4-16: ALOHA Plume Footprint Overlaid in ArcGIS



Building Inventory Damage (HAZUS-MH Default Data)

HAZUS-MH estimates the exposure for the chlorine spill will be $125 million. The result of the analysis against the HAZUS-MH building inventory is depicted in Table 4-29.

Table 4-29: Estimated Exposure for all Zones (x1000)

Occupancy	Zone 1	Zone 2	Zone 3
Residential	$63,359	$7,940	$854
Commercial	$23,518	$890	$72
Industrial	$3,051	$1,187	$2
Agriculture	$410	$45	$19
Religious	$9,267	$1,181	$0
Government	$2,012	$4	$0
Education	$10,932	$680	$0
Total	**$112,549**	**$11,927**	**$947**

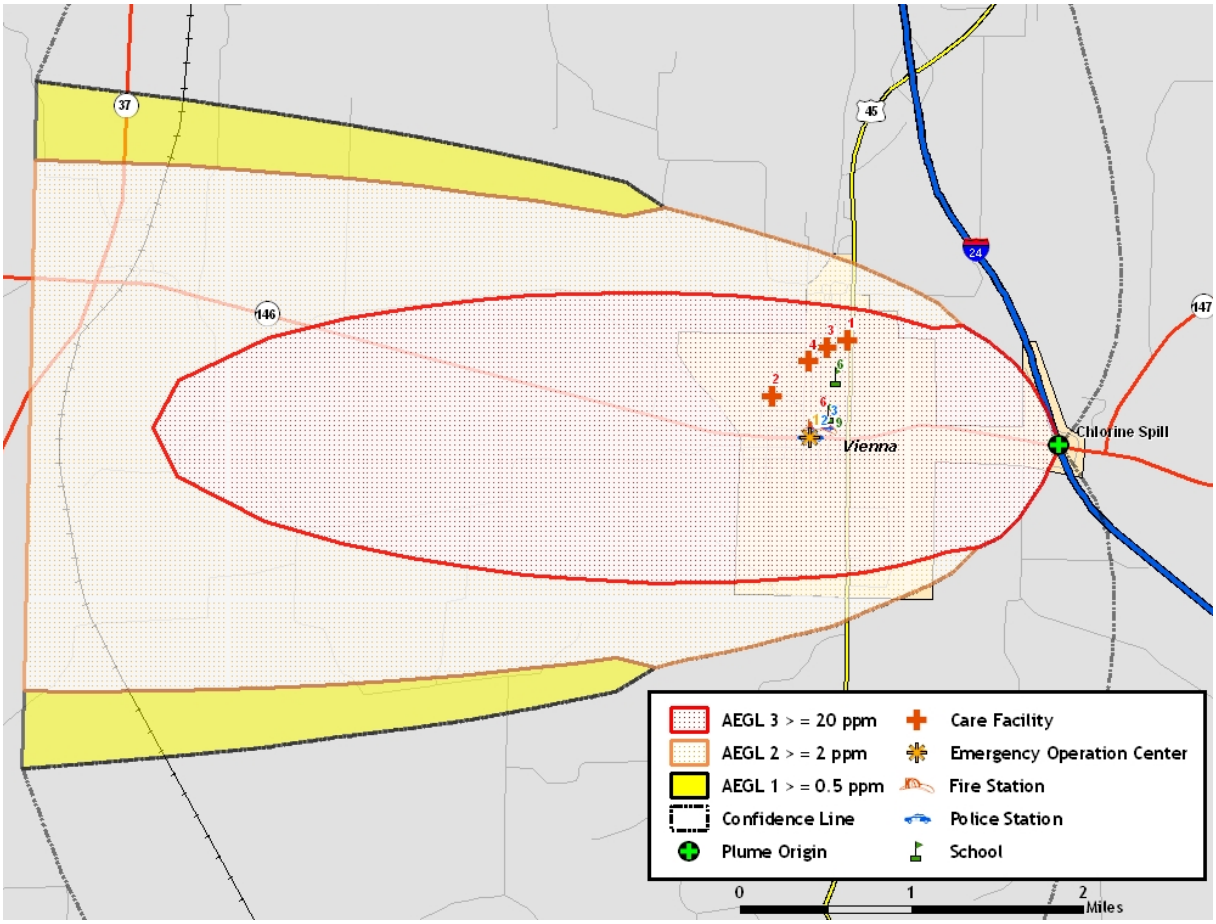
Essential Facilities Damage

There are 10 essential facilities within the limits of the chemical spill plume. The affected facilities are identified in Table 4-30. Their geographic locations are depicted in Figure 4-17.

Table 4-30: Essential Facilities within Plume Footprint

Name
Johnson County 911 Office
Glen Brook Nursing Center
Hillview Health Care Center
Autumn Ridge Supported Living
Garden Apartments
Vienna Fire Department
Johnson County Sheriff
City of Vienna Police Department
Vienna High School
Vienna Elementary School

Figure 4-17: Essential Facilities within Plume Footprint



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

A significant portion of the Johnson County's population lives in close proximity to transportation corridors, such as Interstate 24, U.S. Route 45, Illinois State Route 37, 146, and 166. These areas are particularly vulnerable to chemical releases because of transportation of hazardous materials.

Analysis of Community Development Trends

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

4.4.8 Fire\Explosion

Hazard Definition for Fire\Explosion Hazard

The Johnson County has identified three major categories of fires within the county. These include structure fires, wildland fires, and other fires. A structure fire is any fire involving an assembly of materials for occupancy or use to serve a specific purpose. This includes buildings, open platforms, bridges, or roof assemblies over open storage or process areas. A wildland fire is any fire involving vegetative fuels that occurs in the wildland or urban-wildland interface areas. The other category captures all other fires not covered by wildland or structure fire. Examples of such fires included vehicle fires, trash or rubbish fires, and outside gas or vapor combustion.

Previous Occurrences of Fire\Explosion

Record of all fires in Johnson County between January 1, 2007 and February 8, 2009 were obtained from the Illinois State Fire Marshal. In addition to these data, wildland fire data were obtained for the Shawnee National Forest and adjacent areas from the U.S. Forest Service for the period January 1986 through December 2008.

Johnson County has not experienced a significant or large-scale explosion at a fixed site or transportation route that has resulted in multiple deaths or serious injuries.

Structural Fires

In terms of average annual loss property, structural fires are by far one of the most significant hazards facing Johnson County. Between January 2007 and February 2009 17 structure fires were attributed with over $1.0 million in property damage. Table 4-31 presents the number of fires, causes, estimated losses and casualties attributed to these fires by jurisdiction.

Wildland Fires

Forested areas cover approximately half of Johnson County's total land base (Figure 3-3). When conditions are right, forests may become vulnerable to wildfires. Between January 2007 and February 2009 seven wildland fires occurred in Johnson County outside the Shawnee National Forest (Table 4-31). Between 1986 and 2008, U.S. Forest Service Records revealed the occurrence of 43 wildland fires within and near the Shawnee Nation Forest within Johnson County. These fires range in size from less than 1 up to 95 acres. However, most (67%) of these fires are less than 10 acres in size. These fires generally occur near roads, railroad, campgrounds, and the urban wildland interface. Figure 4-18 shows the location of the Shawnee Nation Forest in Southern Illinois and the wildland fire density within and near the Forest.

Other Fires

Other Fires in Johnson County include vehicle fires, dumpster fires, and the burning of rubbish (e.g., house hold trash, construction debris, tires, or old railroad ties). Between January 2007 and

February 2009, 27 such fires occurred resulting in $209,000 in property damage. Most of the property damage was to vehicles and their contents (Table 4-31). Figure 4-18 shows the wildland fire density in the Shawnee National Forest.

Table 4-31 Johnson County Fires 2007 to 2009

Structure Fires

Jurisdiction	Cause						Estimated Losses		Injuries	Deaths
	Accidental	Intentional	Natural	Un-determined	Under Investigation	Total	Property	Total		
Johnson County	6	0	1	0	0	7	$174,000	$267,450	0	0
Belknap	0	0	0	0	0	0	$0	$0	0	0
Buncombe	2	0	0	0	0	2	$40,000	$50,000	0	0
Cypress	2	0	0	0	0	2	$60,000	$80,000	0	0
Goreville	6	0	0	0	0	6	$381,000	$513,000	0	0
Simpson	0	0	0	0	0	0	$0	$0	0	0
Vienna	7	0	0	0	0	7	$86,000	$123,100	0	0
Total	23	0	1	0	0	17	$741,000	$1,033,550	0	0

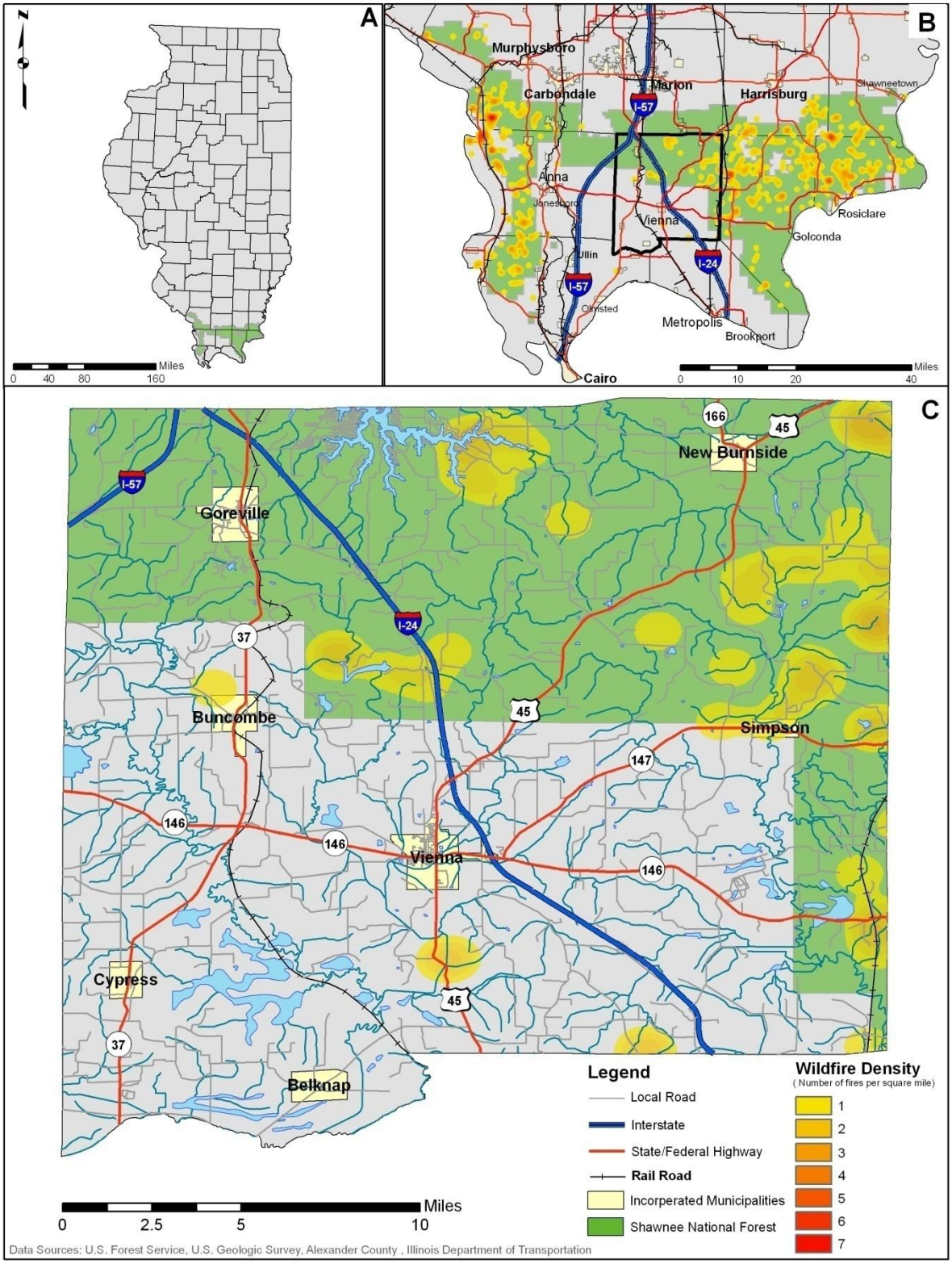
Wildland Fires

Jurisdiction	Cause						Estimated Losses		Injuries	Deaths
	Accidental	Intentional	Natural	Un-determined	Under Investigation	Total	Property	Total		
Johnson County	1	0	1	0	0	2	$0	$0	0	0
Belknap	1	0	0	0	0	1	$5,000	$5,000	0	0
Buncombe	0	0	0	0	0	0	$0	$0	0	0
Cypress	0	0	0	0	0	0	$0	$0	0	0
Goreville	3	0	0	0	0	3	$0	$0	0	0
Simpson	1	0	0	0	0	1	$0	$0	0	0
Vienna	2	0	0	0	0	0	$0	$0	0	0
Total	8	0	1	0	0	7	$5,000	$5,000	0	0

Other Fires

Jurisdiction	Cause						Estimated Losses		Injuries	Deaths
	Accidental	Intentional	Natural	Un-determined	Under Investigation	Total	Property	Total		
Johnson County	11	0	0	0	0	11	$53,100	$86,500	0	0
Belknap	0	0	0	0	0	0	$0	$0	0	0
Buncombe	2	0	0	0	0	2	$8,000	$8,000	0	0
Cypress	1	0	0	0	0	1	$0	$0	0	0
Goreville	3	0	0	0	0	3	$22,900	$22,900	0	0
Simpson	0	0	0	0	0	0	$0	$0	0	0
Vienna	10	0	0	0	0	10	$90,700	$92,200	0	0
Total	27	0	0	0	0	27	$174,700	$209,600	0	0

Figure 4-18: Shawnee National Forest Wildland Fire Density



Geographic Location for Fire Hazard

The structure and other fire hazards are countywide. Wildland Fires are limited to forested areas located in the north-central portion of the county.

Hazard Extent for Fire Hazard

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

Calculated Priority Risk Index for Fire Hazard

Based on historical data and input from the Johnson County ESDA and U.S. National Forest Service large damaging structure fires, wildland fires and explosions are not likely. However, the magnitude of the damage from such an event at the county level will likely be limited. According to the RPI, Hazardous fires are ranked as the number seven hazard in the county.

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

Vulnerability Analysis for Fire\Explosion Hazard

Fires and explosions are local phenomena. A large fire or explosion can possibly occur in Johnson County and the damage maybe locally severe. However, the extent of damage to county as a whole is likely to be negligible. Johnson County has a well-established network of fire departments with equipment capacities that enable an effective response. However for wildland fires, Johnson County fire services and private land owners near the National Forest should work with the U.S. Forest Service to reduce fuel loads and developed the necessary wildland urban interface buffers to limit potential property damage from such fires.

Analysis of Community Development Trends

Vulnerable of Johnson County to fires and explosions is countywide. Mitigation of the structure fire and explosions is depended on property and business owners to properly maintain their structures and machinery / equipment contained within. New development may occur within the wildland urban interface potentially increasing the risk of property damage due to wildland fire. Planned construction in these areas should be reviewed so proper protective measures are taken to minimize the wildland risk to these properties.

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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; Johnson 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 the City of Vienna are members of the NFIP. HAZUS-MH estimates that approximately 52 households were located in the Johnson County Special Flood Hazard Area; as of June 18, 2007, the Federal Emergency Management Agency NFIP Insurance Report for Illinois stated that 6 households paid flood insurance, insuring $653,000 in property value. The total premiums collect amounted to $1,642, which on average was $274 annually. From 1978 to 2007, 4 claims were filed, totaling $10,052. The average claim was $2,513.

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
Johnson County	6/17/1977	08/24/1984	NA	NA	8/24/1984
Village of Belknap	NA	NA	NA	NA	NA
Village of Buncombe	NA	NA	NA	NA	NA
Village of Cypress	NA	NA	NA	NA	NA
Village of Goreville	NA	NA	NA	NA	NA
Village of New Burnside	NA	NA	NA	NA	NA
City of Vienna	3/29/1974	7/18/1983	NA	NA	7/8/2004

The villages of Buncombe, Goreville, Cypress, and New Burnside have no identified flood hazard boundaries; therefore, the communities do not participate in the NFIP. The Village of Belknap does have identified flood boundaries but have previously chosen not to participate in the program due to lack of interest or perceived need. The County will continue to educate this jurisdiction on the benefits of the program.

5.1.2 Storm water Management Stream Maintenance Ordinance

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

5.1.3 Zoning Management Ordinance

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

5.1.4 Erosion Management Program/ Policy

Johnson 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 5-3 lists the fire departments in Johnson County, as well as the ISO rating and the number of members in each department.

Table 5-3: Listing of Fire Departments, Ratings, and Number of Firefighters

Fire Department	Fire Insurance Rating	Number of Firefighters
Belknap Fire Department	7	12
Cypress Fire Department	9/10	13
Goreville Fire Department	7	16
New Burnside Fire Department	8	20
Vienna Fire Department	7/9	30

5.1.6 Land Use Plan

Johnson County does not have a land use plan.

5.1.7 Building Codes

Johnson County and some of its communities have adopted the National Building Code and used Illinois Capital Development Board's Building Codes as its guide for public building standards.

5.2 Mitigation goals

The Johnson County Emergency Management Agency, Southern Illinois University-Carbondale Geology Department, the Polis Group of IUPUI, and the Southern Five Regional Planning Commission assisted the Johnson County Multi-Hazard Mitigation Planning Team in the formulation of mitigation strategies and projects for Johnson County. The goals and objectives set forth were derived through participation and discussion of the views and concerns of the Johnson 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 Johnson County.

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

(a) Objective: Support compliance with the NFIP for each jurisdiction in Johnson 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 Johnson 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 storm water 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 June 29, 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 September 21, 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 Johnson 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
Repair the culvert under railroad near Belknap	**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.	Flood	Johnson County	The project is complete.
Begin prescribed burns in Little Cache/Dutchman Lake Area	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Minimize the amount of infrastructure exposed to hazards.	Fire	Johnson County	This project is in progress.
Establish fire departments as members of MABAS mutual aid box system	**Goal:** Develop long-term strategies to educate Johnson County residents on the hazards affecting their county **Objective:** Improve education and training of emergency personnel and public officials	Fire	Johnson County	This project has been implemented.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Comments
Update the U.S. Forest service building to be earthquake-proof and have a communication tower	**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	Vienna	This project is complete.
Establish Johnson County as a Storm-Ready Community	**Goal:** Develop long-term strategies to educate Johnson County residents on the hazards affecting their county **Objective:** Raise public awareness on hazard mitigation.	Tornado, Thunderstorm	Johnson County	This project is complete.
Distribute weather radios to schools, nursing homes, and businesses	**Goal:** Lessen the impacts of hazards to individuals and infrastructure **Objective:** Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm	Johnson County	This project is complete.
Establish warming centers/shelters in the county	**Goal:** Lessen the impacts of hazards to individuals **Objective:** Improve emergency sheltering in Johnson County.	Winter Storm	Johnson County	The county established a winter storm volunteer planning committee that helped to accomplish this project. Red Cross approved three churches to serve as warming centers/shelters.
Trim trees to mitigate damage from winter storms	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Johnson County	Power companies in the county have begun to do this. This project is ongoing.

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
Develop a public education program to inform residents of potential hazards and emergency plans	**Goal:** Develop long-term strategies to educate Johnson County residents on the hazards affecting their county **Objective:** Raise public awareness on hazard mitigation.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Johnson County, Buncombe, Cypress, Goreville, New Burnside, Vienna	High	The ESDA Director will oversee this project. Local resources will be used to develop educational literature and present to each jurisdiction at public events or in schools. If resources are available, the project will be implemented within one year.
Harden and upgrade shelter facilities (Goreville School, Fellowship Baptist Church , Buncombe City Hall) in Johnson County	**Goal:** Upgrade shelter facilities in Johnson County. Objective: Increase the capability of the shelter during long term power interruptions and improve/increase the service these shelters can provide	All Hazards	Johnson County, Buncombe, Goreville, Vienna	High	The ESDA Director in cooperation the shelter managers and local leaders will work to enhance these shelters capabilities. Additional funding will be sought from other funding sources, e.g. PDM program. Implementation, if funding is available, is forecasted to begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Procure warning sirens	**Goal:** Lessen the impacts of hazards to individuals and infrastructure **Objective:** Evaluate and strengthen the communication of emergency services throughout the county.	Tornado, Thunderstorm	Johnson County, Buncombe, Cypress, New Burnside, Vienna	High	The ESDA director will oversee the implementation of the project. Currently, only Goreville has a siren. Local resources will be used to install and maintain the system. Additional funding will be sought from other funding sources, e.g. PDM program. Implementation, if funding is available, is forecasted to begin within one year.
Establish an LEPC	**Goal:** Develop long-term strategies to educate Johnson 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	Johnson County	High	The ESDA director will work with local first responders to research training opportunities. The county will request funding for training and equipment from IEMA. If funding is available, implementation will begin within one year.
Launch a public outreach program to educate communities and residents on the benefits of belonging to the NFIP	**Goal:** Create new or revise existing plans for Johnson County **Objective:** Support compliance with the NFIP for each jurisdiction in Johnson County.	Flood	Buncombe, Cypress, Goreville, New Burnside	High	The county floodplain manager will oversee the implementation of the project. Local resources will be used to gather NFIP information and disseminate at public events, e.g. county fairs. Implementation, if resources are available, is forecasted to begin within one year.
Construct safe houses/warming centers in each community within the county	**Goal:** Lessen the impacts of disaster to individuals **Objective:** Improve emergency sheltering in Johnson County.	Tornado, Thunderstorm	Johnson County, Buncombe, Cypress, Goreville, New Burnside, Vienna	Medium	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 three years.
Develop a fuel distribution plan for generators	**Goal:** Create new or revise existing plans/maps for Johnson County **Objective:** Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Tornado, Thunderstorm, Winter Storm, Earthquake	Johnson County	Medium	The ESDA director will oversee this project and will work with IEMA on the planning aspects. If necessary, the county will seek a planning grant from community improvement programs. If funding is available, implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Clear trees and debris from rivers, creeks, and/or ditches, especially around Max Creek on Shawnee Correctional Facility Property	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Minimize the amount of infrastructure exposed to hazards.	Flood	Johnson County	Medium	The ESDA director will work with IDOT, IDNR, U.S. Army Corps of Engineers and the IL Department of Corrections to evaluate the current conditions of the county's waterways and develop a plan. Funding has not been secured as of 2009, but county, state, and federal funding will be sought. Implementation will begin within three years.
Review public buildings for structural safety and to determine where and when to use measures such as bolting bookshelves and medicine cabinets to walls	**Goal:** Lessen the impacts of hazards to individuals and infrastructure **Objective:** Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Earthquake	Johnson County, Buncombe, Cypress, Goreville, New Burnside, Vienna	Medium	The ESDA director will oversee this project. Local resources will be used to determine and implement new safety measures. If resources are available, implementation will begin within three years.
Procure a new generator for the water treatment plant and transfer switches for existing generators	**Goal:** Lessen the impacts of hazards to individuals and infrastructure **Objective:** Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Fire	Johnson County, Buncombe, Cypress, Goreville, New Burnside, Vienna	Medium	The ESDA director will oversee the implementation of this project. Funding has not been secured as of 2009, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within three years.
Install inertial valves at critical facilities	**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	Johnson County, Buncombe, Cypress, Goreville, New Burnside, Vienna	Medium	The ESDA director 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.
Designate more Storm Spotters in the county	**Goal:** Lessen the impacts of hazards to individuals and infrastructure **Objective:** Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm	Johnson County	Low	The ESDA director will work with local first responders and IEMA on this project. Local resources will be used to designate volunteer spotters. If funding and resources are available, the project will begin within five years.
Secure funding for improved modes of communication, e.g. Ham Radios	**Goal:** Lessen the impacts of hazards to individuals and infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.	Earthquake, Winter Storm, Tornado, Thunderstorm	Johnson County	Low	The ESDA director will oversee this project. Local resources will be used to determine specific costs and resources necessary for the project. Funding has not yet been secured, but local resources and community grants are an option. If funding is available, the project will begin within five years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Determine if there are critical power lines in the county that could be buried	**Goal:** Create new or revise existing plans/maps for Johnson County **Objective:** Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Winter Storm, Tornado, Thunderstorm	Johnson County	Low	The ESDA director will oversee this project and work with local power companies. Local resources will be used to document the results of the study. If resources are available, implementation will begin within five years.

The Johnson County Emergency Service 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 six jurisdictions, including Johnson 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 Johnson 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 Johnson 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
IDOT - Illinois Department of Transportation

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 Johnson County Planning Team Meeting 1:
Chairman: Jim Haney, Johnson County ESDA
Plan Directors: Southern Five Regional Planning Commission, SIUC Geology Department, and IUPUI - Polis

Meeting Date: Wednesday, October 29, 2008

Meeting Time: 9 am

Place: Jumbo's Char & Grill Restaurant, Vienna, IL

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
Andy Flor	SIUC Geology
Nicholas Pinter	SIUC Geology
John Beuchler	IUPUI – Polis
Crystal Davenport	Southern Five Regional Planning Commission
Danell Mott	Johnson County Assessor
Wendi Bailey	Johnson County Ambulance Director
Steve Webb	Goreville School Superintendent
Floyd Koehler	Vienna Fire Department
Jim Miller	Vienna Police Chief
Charles Casper	Private Citizen – Vienna
Frederick Heaton	New Burnside Water District
Jim Haney	Johnson County ESDA Director
Elry Faulkner	Johnson County Sheriff

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 Crystal Davenport 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.

IEMA Pre-Disaster Mitigation Plan

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

Meeting Date: Wednesday, December 10, 2008

Meeting Time: 9 am

Place: Jumbo's Char & Grill Restaurant, Vienna, IL

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
Megan Carlson	SIUC Geology
Lisa Thurston	Southern Five Regional Planning Commission
Danell Mott	Johnson County Assessor
Wendi Bailey	Johnson County Ambulance Director
Steve Webb	Goreville School Superintendent
Floyd Koehler	Vienna Fire Department
Jim Miller	Vienna Police Chief
Charles Casper	Private Citizen – Vienna
Fred Heaton	New Burnside Water District
Jim Haney	Johnson County ESDA Director
David Rockwell	Johnson County Coroner
Lula Ann Mount	Private Citizen – Vienna
Jon Teutrine	US Forest Service, Fire Management Officer
Max Hutchison	Private Citizen – Belknap
Donald Hutchison	Private Citizen – Belknap
Chesley Williams	Mayor, Vienna
Steve Kelley	Johnson County Highway Engineer
James Cuff	Johnson County 911 Coordinator

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 Johnson 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 Johnson County. The risk level is ranked as followed:

#1: Tornado
#2: Earthquake
#3: Transportation Hazardous Material Release
#4: Thunderstorms/High Winds/Hail/Lightening
#5: Flooding
#6: Winter Storms
#7: Fire/Explosion

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.

IEMA Pre-Disaster Mitigation Plan

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

Meeting Date: Monday, June 29, 2009

Meeting Time: 6 pm

Place: Vienna Public Library Meeting Room, Vienna, IL

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
John Buechler	IUPUI – Polis
Crystal Davenport	Southern Five Regional Planning Commission
Neal Watkins	Johnson County Circuit Clerk
Carol Watkins	Johnson County Housing Authority
Tim Gage	Goreville Fire Department
Lula Ann Mount	Private Citizen – Vienna
Noah Haney	Private Citizen – Vienna
Jim Haney	Johnson County ESDA
John McCuan	Johnson County ESDA
Charles Casper	Private Citizen – Vienna
Jean Casper	Private Citizen – Vienna
Jon Simmons	Mayor – Vienna
Aaron Goldenstein	Asst Fire Chief – Vienna
Floyd Koehler	Fire Chief – Vienna
Roy Street	Private Citizen – Vienna
Paula Street	Private Citizen – Vienna
Justin Francis	Goreville Police Department

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 Johnson 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.

IEMA Pre-Disaster Mitigation Plan

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

Meeting Date: Monday, September 21, 2009

Meeting Time: 10 am

Place: Johnson County Commissioner's Meeting Room, Vienna, IL

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
John Buechler	IUPUI – Polis
Crystal Davenport	Southern Five Regional Planning Commission
Danell Mott	Johnson County Assessor
Wendi Bailey	Johnson County Ambulance Director
Floyd Koehler	Vienna Fire Department
Jim Miller	Vienna Police Chief
Charles Casper	Private Citizen – Vienna
Jim Haney	Johnson County ESDA Director
Lula Ann Mount	Private Citizen – Vienna
Jon Teutrine	US Forest Service, Fire Management Officer
Kathy Meyers	Private Citizen – Belknap
Dee Barnes	Private Citizen – Belknap

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	Hazard	Jurisdictions Covered	Priority
Develop a public education program to inform residents of potential hazards and emergency plans	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Johnson County, Buncombe, Cypress, Goreville, New Burnside, Vienna	High
Procure warning sirens	Tornado, Thunderstorm	Johnson County, Buncombe, Cypress, New Burnside, Vienna	High
Establish an LEPC	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire, Drought	Johnson County	High
Launch a public outreach program to educate communities and residents on the benefits of belonging to the NFIP	Flood	Buncombe, Cypress, Goreville, New Burnside	High
Construct safe houses/warming centers in each community within the county	Tornado, Thunderstorm	Johnson County, Buncombe, Cypress, Goreville, New Burnside, Vienna	Medium
Develop a fuel distribution plan for generators	Tornado, Thunderstorm, Winter Storm, Earthquake	Johnson County	Medium
Clear trees and debris from rivers, creeks, and/or ditches, especially around Max Creek on Shawnee Correctional Facility Property	Flood	Johnson County	Medium
Review public buildings for structural safety and to determine where and when to use measures such as bolting bookshelves and medicine cabinets to walls	Earthquake	Johnson County, Buncombe, Cypress, Goreville, New Burnside, Vienna	Medium
Procure a new generator for the water treatment plant and transfer switches for existing generators	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Fire	Johnson County, Buncombe, Cypress, Goreville, New Burnside, Vienna	Medium
Install inertial valves at critical facilities	Earthquake	Johnson County, Buncombe, Cypress, Goreville, New Burnside, Vienna	Medium
Designate more Storm Spotters in the county	Tornado, Thunderstorm	Johnson County	Low

Mitigation Item	Hazard	Jurisdictions Covered	Priority
Secure funding for improved modes of communication, e.g. Ham Radios	Earthquake, Winter Storm, Tornado, Thunderstorm	Johnson County	Low
Determine if there are critical power lines in the county that could be buried	Winter Storm, Tornado, Thunderstorm	Johnson County	Low

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

Current Strategy	Hazards Addressed	Jurisdictions Covered
Repair the culvert under railroad near Belknap	Flood	Johnson County
Begin prescribed burns in Little Cache/Dutchman Lake Area	Fire	Johnson County
Establish fire departments as members of MABAS mutual aid box system	Fire	Johnson County
Update the U.S. Forest service building to be earthquake-proof and have a communication tower	Earthquake	Vienna
Establish Johnson County as a Storm-Ready Community	Tornado, Thunderstorm	Johnson County
Distribute weather radios to schools, nursing homes, and businesses	Tornado, Thunderstorm	Johnson County
Establish warming centers/shelters in the county	Winter Storm	Johnson County
Trim trees to mitigate damage from winter storms	Winter Storm	Johnson County

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

IEMA Pre-Disaster Mitigation Plan

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

Meeting Date: Thursday, January 28, 2010

Meeting Time: 10 am

Place: Johnson County Commissioners Room, Vienna, IL

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
Crystal Davenport	Southern Five Regional Planning Commission
Jeff Jordan	Johnson County Sheriff's office/Buncombe
Kathy Meyers	Village of Belknap
Delores Barnes	Village of Belknap
Jean Casper	Johnson County Private Citizen
Fred Heaton	Village of New Burnside
Floyd Koehler	Vienna Fire Dept & Police Dept
Jim Miller	Vienna Police Dept
Charles Casper	Johnson County
Lance West	Village of Cypress
Ronald Schultz	Village of Cypress Fire Dept
Bob Pippins	Buncombe Private Citizen
Steve Webb	Goreville Schools
Jim Haney	Johnson County ESDA
Wendi Bailey	Johnson County Ambulance
Lula Ann Mount	Johnson County Private Citizen

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.

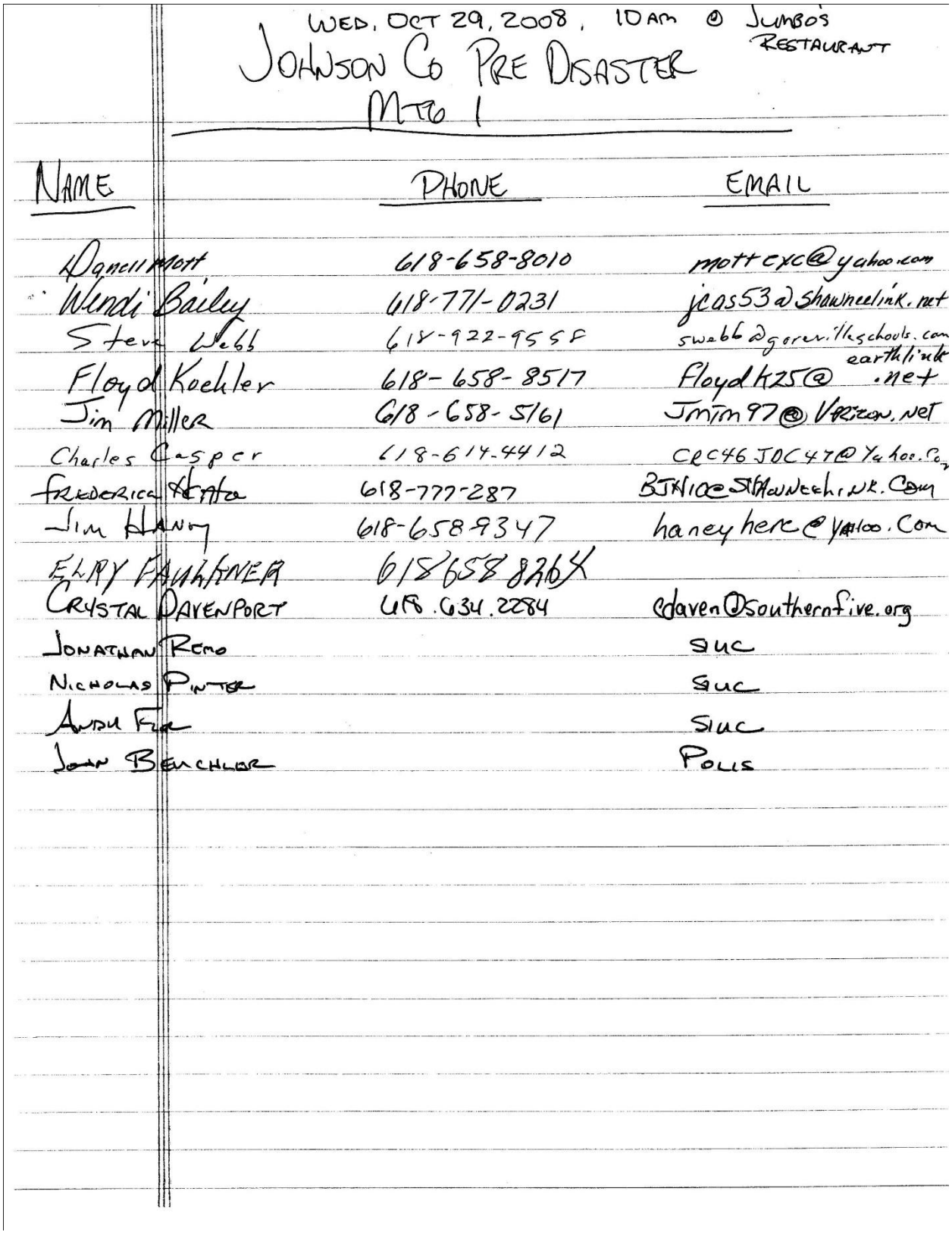
He also explained that once the plan is submitted to IEMA/FEMA for their review, the municipalities can begin formulating and putting together their projects for funding. There is a pool of funds from FEMA that these lower five counties can access that was allowed for the '08 winter/ice storm that is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

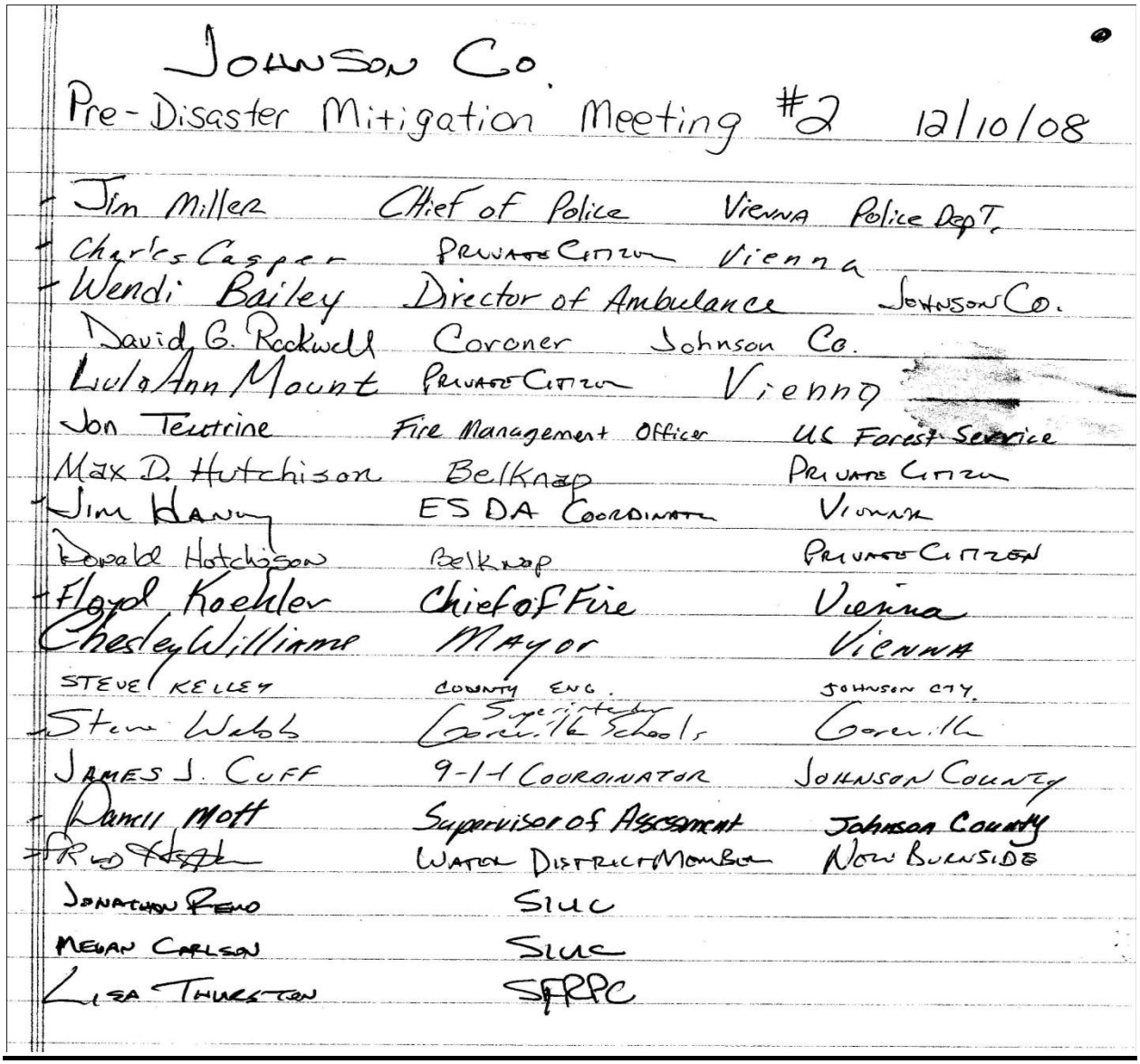
Appendix A – Meeting Sign in Sheets



WED. OCT 29, 2008, 10AM @ JUMBO'S RESTAURANT

JOHNSON CO PRE DISASTER MTG 1

NAME	PHONE	EMAIL
Donell Mott	618-658-8010	mottexc@yahoo.com
Wendi Bailey	618-771-0231	jcas53@shawneelink.net
Steve Webb	618-922-9555	swebb@goreville.k12schools.com
Floyd Koehler	618-658-8517	Floyd425@earthlink.net
Jim Miller	618-658-5161	Jmjm97@Verizon.net
Charles Casper	618-614-4412	CRC46JOC47@Yahoo.Com
FREDERICA HEATH	618-777-287	BJHICE@SHAWNEELINK.COM
Jim Haney	618-658-9347	haneyhere@yahoo.com
ELRY FAULKNER	6186588264	
CRYSTAL DAVENPORT	618.634.2284	cdaven@southernfive.org
JONATHAN REMO		SIUC
NICHOLAS PINTER		SIUC
ANDY FOX		SIUC
JOHN BEECHLER		POLIS



JOHNSON CO.

Pre-Disaster Mitigation Meeting #2 12/10/08

Jim Miller	Chief of Police	Vienna Police Dept.
Charles Casper	Private Citizen	Vienna
Wendi Bailey	Director of Ambulance	Johnson Co.
David G. Rockwell	Coroner	Johnson Co.
Lula Ann Mount	Private Citizen	Vienna
Jon Teutrine	Fire Management Officer	US Forest Service
Max D. Hutchison	Belknap	Private Citizen
Jim Haney	ES DA Coordinator	Vienna
Donald Hutchison	Belknap	Private Citizen
Floyd Koehler	Chief of Fire	Vienna
Chesley Williams	Mayor	Vienna
Steve Kelley	County Eng.	Johnson City
Steve Webb	Superintendent Cobden Schools	Cobden
James J. Cuff	9-1-1 Coordinator	Johnson County
Darrell Mott	Supervisor of Assessment	Johnson County
Rod Hoffe	Water District Member	New Burnside
Jonathon Reno	SIUC	
Megan Carlson	SIUC	
Lisa Thurston	SIRPC	

SIGN IN SHEET

PLACE: *Vienna Public Library*

DATE: *June 29, 2009*

TIME: *6:00 pm*

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

NAME	ADDRESS	
Neal Watkins	390 Hensley Hills	Johnson Co Circuit Clerk
Carol Watkins	" "	Housing Auth Johnson Co.
Jim Gage	Box 251 Goreville	Goreville Fire Dept.
Paula Ann Mount	2240 Crescent Loop Vienna	Committee Member
Noah Maney	1505 Old Rou. 146	Public Citizen
Jim HANEY	1505 old RT 146 Vienna	Jo. Co ESDA
John McCann	285 Carr Rd Vienna	Jo Co ESDA
Chuck Casper	150 Tulip Ln, Vienna, IL	public citizen
Jean Casper	150 Tulip Ln, Vienna, IL	public citizen
JON Simmons	Box 421 Vienna IL	MAYOR
John Tuecheer	Police Center	IUPUI
Aaron S Goldenstein	260 Buckhorn Ridge Ln. Vienna IL	Asst Fire Chief
Floyd Koehler	POB1303 Vienna IL	Fire Chief VPD
Roy A. Street	PO Box 1321 Vienna, Ill.	
Paula J. Street	P.O. Box 1321 Vienna IL	Interested Citizen
Justin Francis	1120 Francis Ln Goreville IL	GOREVILLE POLICE
CRYSTAL DAVENPORT	SIRPC	
JONATHON REED	SIUC	

SIGN IN SHEET

PLACE: *Johnson County Commissioner's Room, Vienna, IL*

DATE: *September 21, 2009*

TIME: *10:00 am*

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

NAME	ORGANIZATION	EMAIL or PHONE
Jim Haney	Johnson Co ESDA	559-9678
Lula Ann Mount	Member	695-3371
Kathy Meiers	Village of Belknap P.O. 47	634-9017
Dee Barnes	Village of Belknap	634-9333
Charles Cagper	Vienna	614-4412
Jim Miller	Vienna Police Dept.	658-6038
Floyd Koehler	Vienna Fire Dept	658-8517 771 0226
Wendi Bailey	Johnson Co Amb	jcass3@verizon.net
Jon Teutrine	US Forest Service	jteutrine@fs.fed.us
Dana Mott	Supervisor of Assessment	mottexc@yahoo.com
CRYSTAL DAVENPORT	SIRPC	
John Buechler	Polls	
Jon Remo	SIU	
CRYSTAL DAVENPORT	SIRPC	

SIGN IN SHEET

PLACE: *Johnson County Commissioner's Room (in Annex), Vienna, IL*

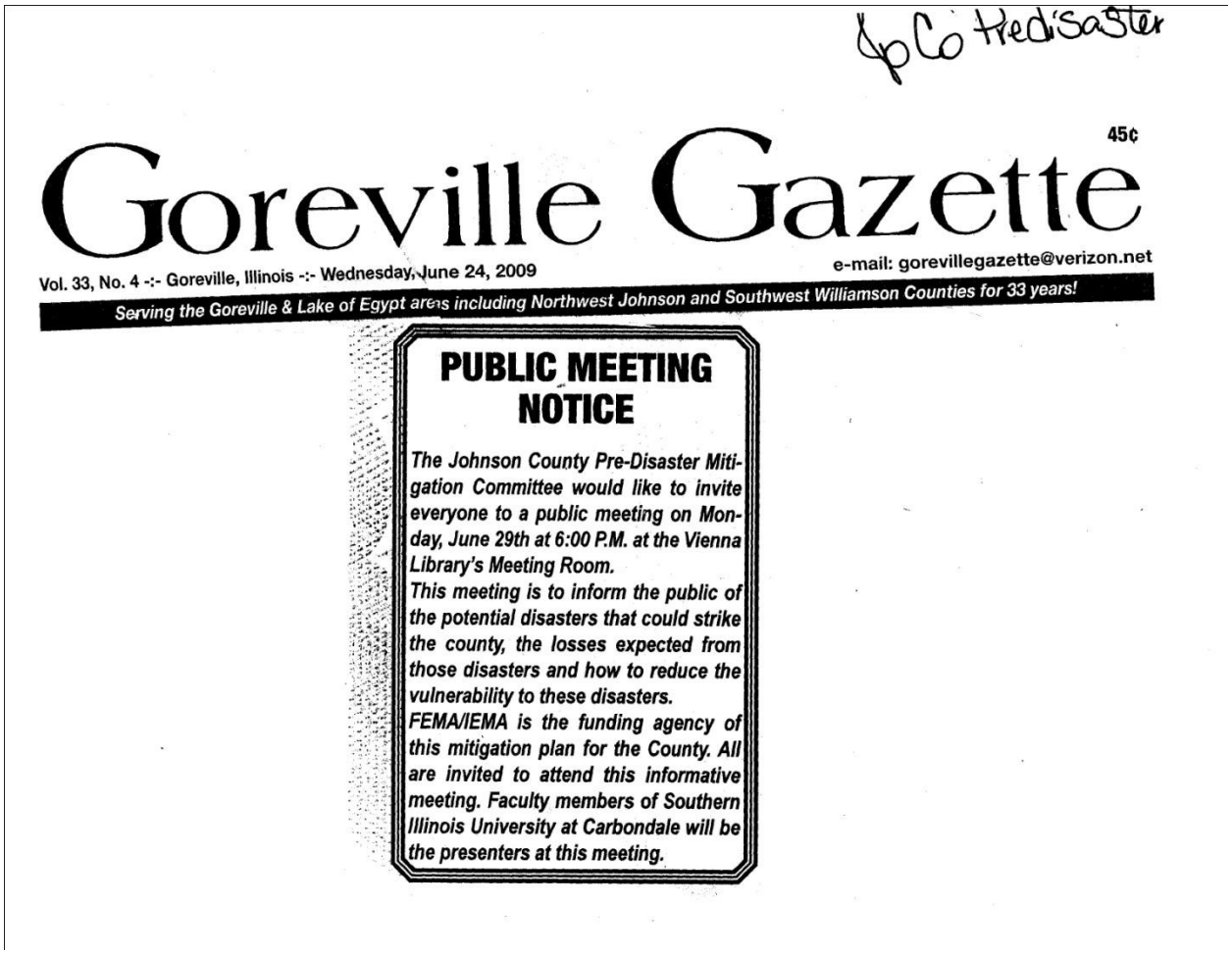
DATE: *January 28, 2010*

TIME: *10 am*

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

NAME	AFFILIATION	PHONE & EMAIL
Jeff Jordan	Johnson Co SO	J. Jordan 55 @ Hotmail.c
Kathy Meyers	Village of Belknap	634-9017
Dolores Barnes	Village of Belknap	658-0670
Jean Casper	Johnson County Assessor	
Frederick Hatton	Village of New Burnside	777-2878
Floyd Koehler	Vienna Fire & Police	771-0226
Jim Miller	Vienna Police Dept.	658-6088 JmTm97@ Verizon.net
Charles Casper	Johnson County	614-4412
Lance West	Village of Cypress	657-2658
Ralph Schutte	Cypress Fire Dept	634-2504 Schuttemay@aol.com
Bob Pippins	Buncombe	458-9549
Steve Webb	Carrier Mills	922-9558 swebb2@carrier.mills.sch
Jim Haney	Johnson County	559-9676 haneyfire@yahoo.com
Wendi Bailey	Johnson Co Amb	771-0231 jcas53@verizon.net
Livia Ann Mount	Johnson Co Citizen	695-3371 —
CRYSTAL DAVENPORT	SIUC	
JONATHAN REMO	SIUC	

Appendix B - Articles published by Local Newspaper



Jo Co Hazdisaster

45¢

Goreville Gazette

Vol. 33, No. 4 -:- Goreville, Illinois -:- Wednesday, June 24, 2009

e-mail: gorevillegazette@verizon.net

Serving the Goreville & Lake of Egypt areas including Northwest Johnson and Southwest Williamson Counties for 33 years!

PUBLIC MEETING NOTICE

The Johnson County Pre-Disaster Mitigation Committee would like to invite everyone to a public meeting on Monday, June 29th at 6:00 P.M. at the Vienna Library's Meeting Room.

This meeting is to inform the public of the potential disasters that could strike the county, the losses expected from those disasters and how to reduce the vulnerability to these disasters.

FEMA/IEMA is the funding agency of this mitigation plan for the County. All are invited to attend this informative meeting. Faculty members of Southern Illinois University at Carbondale will be the presenters at this meeting.

Southern Five

Thursday, June 25, 2009 -:- Page 11 The Vienna Times

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Appendix C - Adopting Resolution

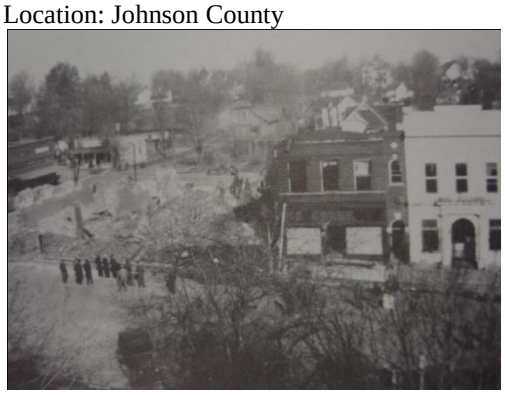
Appendix D - Johnson County Historical Hazards

Johnson 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.

Fire

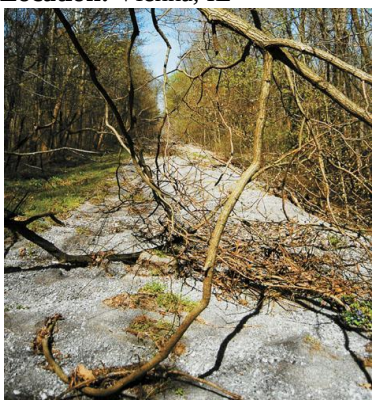
Date: Winter 1936-1937
Location: Johnson County



Description: Fire in the winter of 1936-1937, north side of square. The standing white building in First National building.
File Name: Fire_1937
Source: Johnson County, Illinois: History and Families, Volume 1

Winter Storm

Date: April 17, 2008
Location: Vienna, IL



Description: "Fallen trees block the path of Tunnel Hill Trail Wednesday near Vienna. The trail was damaged during this year's ice storms and flooding, and is currently being repaired"
File Name: Winter_Apr_2008
Source: The Southern (http://www.southernillinoisan.com/articles/2008/04/17/outdoors/24089013.txt)

Date: Winter 1979
Location: Vienna, IL

Description: "Blizzard of 79", Vienna
File Name: Winter_1979
Source: Johnson County, Illinois: History and Families, Volume 1

Description: "Blizzard of 79", Vienna
File Name: Winter2_1979
Source: Johnson County, Illinois: History and Families, Volume 1

Date: Winter 1917-1918
Location: Johnson County

Description: Snow fall January 11, 1918, 22 inches. This followed one previously large snowfall on December 7, 1917 and was followed by another January 14, 1918
File Name: Winter_Jan_1918
Source: Johnson County, Illinois: History and Families, Volume 1

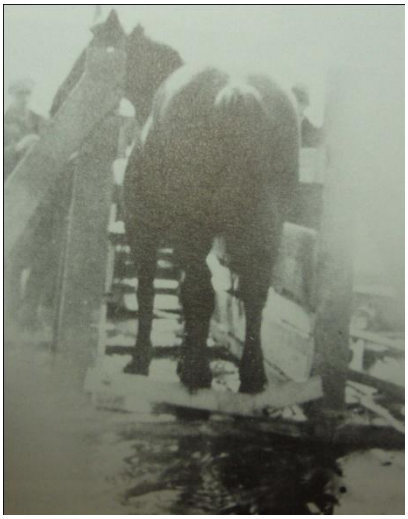
Flooding

Date: March 19, 2008
Location: Belknap, IL

Description: Flooding in Belknap, IL
File: Flooding_Mar_2008
Source:
http://community.wpsdlocal6.com/photos/viewCategory.aspx?App=storm_photos&CategoryID=1829

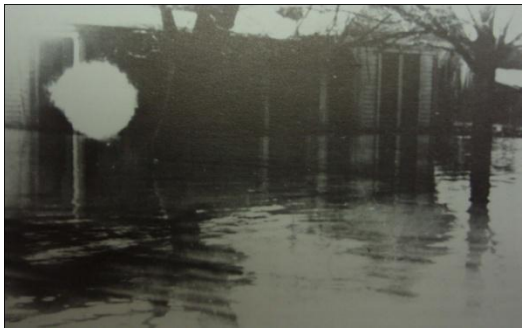
Date: Winter 1937
Location: Johnson County

Description: Walter Smith's house on Main St., Vienna, 1937 flood. After Walter's death this house was owned several years by Pat and Virginia Patterson.
File Name: Flood_1937
Source: Johnson County, Illinois: History and Families, Volume 1



Description: Flood of 1937 – rescuing livestock in Belknap
File Name: Flood2_1937
Source: Johnson County, Illinois: History and Families, Volume 1

Description: Aldrich Café – Flood of 1937
File Name: Flood3_1937
Source: Johnson County, Illinois: History and Families, Volume 1



Description: Flood of 1937 – Belknap home.
File Name: Flood4_1937
Source: Johnson County, Illinois: History and Families, Volume 1

Description: White Hill Road – Flood of 1937
File Name: Flood5_1937
Source: Johnson County, Illinois: History and Families, Volume 1

Description: Miflin's house at intersection Vienna – flood of 1937
File Name: Flood6_1937
Source: Johnson County, Illinois: History and Families, Volume 1

Tornado

Date: April 28, 2002
Location: Johnson County, IL

Description: Union and Johnson County, IL Storm Assessment photos
File Name: Tornado_Apr_2002
Source: http://www.crh.noaa.gov/pah/storm/union/damage.php

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

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	2/1/1998	1:00 AM	Abnormal Warmth	N/A	0	0	0	0	The month of February was one of the six warmest Februarys on record at both Paducah and Evansville. The mild temperatures provided area residents with unusual opportunities for outdoor recreation. Many trees and plants, including daffodils and forsynthia, blossomed early. Unfortunately, the premature blossoms were vulnerable to
Johnson	12/9/1995	0	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
Johnson	8/8/2005	1:00 AM	Dense Fog	N/A	0	0	0	0	Dense fog blanketed southern Illinois for several hours, reducing visibility to a quarter mile or less in many areas.
Johnson	2/10/2006	9:00 PM	Dense Fog	N/A	0	0	0	0	Widespread dense fog reduced visibility to one quarter mile or less, mainly to the south of Interstate 64.
Johnson	11/8/2006	2:00 AM	Dense Fog	N/A	0	0	0K	0K	Clearing skies and calm winds caused formation of widespread dense fog. Visibility was less than one quarter mile.
Johnson	3/29/2007	3:00 AM	Dense Fog	N/A	0	0	0K	0K	Widespread dense fog occurred during the early morning hours. A light east to southeast wind flow around high pressure over the southern Appalachians brought increased humidity. The dense fog was south of the Marion, Carbondale, and Harrisburg areas. Visibility was frequently below one-quarter mile.
Johnson	12/11/2007	6:00 AM	Dense Fog	N/A	0	0	0K	0K	Widespread dense fog blanketed southern Illinois during the morning hours. Visibility was reduced to one-quarter mile or less. A very light southerly wind flow of moist air contributed to the dense fog.
Johnson	8/15/1996	2:00 AM	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
Johnson	9/1/1998	12:01 AM	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
Johnson	8/1/1999	12:01 AM	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

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	9/1/1999	12:01 AM	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
Johnson	10/1/1999	12:01 AM	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 concerns by the end of October.
Johnson	11/1/1999	12:01 AM	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
Johnson	12/1/1999	12:01 AM	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.
Johnson	8/1/2002	12:01 AM	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
Johnson	9/1/2002	12:01 AM	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

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	6/1/2005	12:00 AM	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
Johnson	7/1/2005	12:00 AM	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
Johnson	8/1/2005	12:01 AM	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
Johnson	7/2/1997	12:00 PM	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.
Johnson	7/25/1997	11:00 AM	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 vehicles was reported, as well.
Johnson	6/22/1998	9:00 AM	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
Johnson	7/18/1999	1:00 PM	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-yearold 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
Johnson	7/7/2001	3:00 PM	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

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	8/3/2002	8:00 AM	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
Johnson	7/21/2005	11:00 AM	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
Johnson	8/19/2005	10:00 AM	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.
Johnson	2/2/1996	1:00 AM	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
Johnson	12/12/2000	12:01 AM	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
Johnson	1/1/2001	12:01 AM	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
Johnson	1/23/2003	4:00 AM	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

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	12/23/2004	12:00 AM	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. Cooperative observers reported Christmas morning lows of 6 below at Grayville and 2 below zero at Cairo. Winds were
Johnson	1/10/1997	10:00 AM	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
Tunnel Hill	4/29/1996	4:00 AM	Flash Flood	N/A	0	0	50K	0	About 5 inches of rain fell on saturated ground in less than 24 hours. Rising floodwaters made nine county roads impassable. Sink holes and washouts on roads made travel hazardous. Floodwaters surrounded a restaurant.
Vienna	5/10/1996	11:00 PM	Flash Flood	N/A	0	0	0	0	Heavy rainfall amounts up to 3 inches in 3 hours caused ponding of water in low-lying areas. Some roads were damaged by runoff, and a vacant restaurant near Vienna
Vienna	3/1/1997	5:30 PM	Flash Flood	N/A	0	0	20K	0	Significant flooding of roads and streams was caused by a series of thunderstorms over a 2-day period.
Vienna	6/29/1998	11:45 PM	Flash Flood	N/A	0	0	0	0	Thunderstorms that caused major flash flooding to the northwest, especially Franklin and Perry Counties, moved southeast across parts of southeast Illinois. There were reports of flooded roads and near bankful conditions.
Johnson	1/3/2000	3:00 PM	Flash Flood	N/A	0	0	10K	0	Up to five inches of rain during an eighteen-hour period raised creek levels and closed a number of county roads. Up to seven county roads were closed by rising flood water. A number of other county roads were damaged to varying degrees by erosion.
Johnson	12/17/2001	9:05 AM	Flash Flood	N/A	0	0	40K	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
Johnson	5/17/2002	1:12 AM	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
South Portion	5/4/2003	8:48 PM	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
South Portion	5/6/2003	10:55 PM	Flash Flood	N/A	0	0	0	0	Thunderstorms with very heavy rain dumped estimated rainfall amounts of 2 to 4 inches in a few hours across parts of southern Illinois. Water was reported over many roads. Parts of U.S. Highway 51 were flooded between Du Quoin and Tamaroa in Perry County. In Hardin County, many county roads were closed after being flooded or washed out. A motorist was stranded in high water along a street in Anna in Union County. A weather observer in Anna measured nearly 7 inches of rain during the week
Buncombe	11/15/2005	4:15 AM	Flash Flood	N/A	0	0	0	0	Some roads were flooded, primarily in northern and western portions of the county. A spotter measured 4.63 inches of rain near Buncombe, with 3.40 inches of rain falling in four hours.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	3/9/2006	3:00 PM	Flash Flood	N/A	0	0	0	0	Several inches of water covered a section of U.S. Route 45 South.
Buncombe	8/19/2006	4:45 PM	Flash Flood	N/A	0	0	0	0	Lick Creek Road was closed due to water running across the roadway.
Johnson	12/17/2001	2:00 AM	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
Johnson	1/23/2002	9:15 PM	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
Johnson	12/21/1998	3:00 PM	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 flipped over, killing the driver.
Johnson	12/15/2000	10:00 AM	Freezing Rain	N/A	0	0	0	0	Freezing rain spread across most of southern Illinois during the late morning hours. Most of the icing was north and west of the counties bordering the Ohio River. The thin layer of ice, less than a quarter inch thick, caused some hazardous travel conditions. By late afternoon, the precipitation became too patchy and light to be a
Johnson	1/26/2001	6:00 AM	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,
Vienna	4/2/2006	5:36 PM	Funnel Cloud	N/A	0	0	0	0	A funnel cloud was reported by a trained spotter near mile marker 13 on Interstate 24.
Johnson	11/26/1965	1942	Hail	3.00 in.	0	0	0	0	None Reported
Johnson	7/5/1975	1600	Hail	3.00 in.	0	0	0	0	None Reported
Johnson	7/5/1975	1615	Hail	0.75 in.	0	0	0	0	None Reported
Johnson	7/4/1982	1845	Hail	0.75 in.	0	0	0	0	None Reported
Johnson	6/3/1983	1803	Hail	0.75 in.	0	0	0	0	None Reported
Johnson	4/3/1989	1845	Hail	1.00 in.	0	0	0	0	None Reported
Johnson	4/9/1991	345	Hail	1.75 in.	0	0	0	0	None Reported
Johnson	4/9/1991	420	Hail	0.75 in.	0	0	0	0	None Reported
Johnson	6/25/1992	1740	Hail	1.75 in.	0	0	0	0	None Reported
Johnson	6/25/1992	1800	Hail	2.00 in.	0	0	0	0	None Reported
Vienna	5/18/1995	1345	Hail	0.75 in.	0	0	0	0	
Belknap	6/9/1995	1700	Hail	0.75 in.	0	0	0	0	
Reevesville	3/28/1997	5:59 PM	Hail	1.75 in.	0	0	0	0	A supercell thunderstorm tracked east along the Massac/Johnson County line. Large hail occurred on the north and northeast side of the storm, including extreme southern Johnson County.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Goreville	6/14/1998	4:25 PM	Hail	0.75 in.	0	0	0	0	None Reported
Goreville	2/27/1999	3:00 PM	Hail	0.75 in.	0	0	0	0	Hail up to three-quarters of an inch in diameter occurred in the Vienna and Goreville areas.
Goreville	5/5/1999	1:40 PM	Hail	1.00 in.	0	0	0	0	The storm intensified rapidly into a supercell as it moved northward through northern Johnson County. Although only one-inch hail was reported at Goreville, hail up to baseball size fell just over the Williamson County line near Lake of Egypt.
New Burnside	6/2/1999	1:10 AM	Hail	1.00 in.	0	0	0	0	None Reported
Cypress	3/26/2000	10:40 PM	Hail	0.75 in.	0	0	0	0	None Reported
Cypress	4/27/2000	1:33 PM	Hail	0.75 in.	0	0	0	0	A cluster of strong to severe thunderstorms moved southeast from Perry County, Missouri down the Mississippi River through the Cape Girardeau area to the southern tip of Illinois. A few storms occasionally
Goreville	5/23/2000	8:45 PM	Hail	2.75 in.	0	0	7.0M	0	A supercell thunderstorm produced baseball size hail from northwest to southeast across parts of Johnson County. The total damage costs for dented cars, smashed windows, and damaged roofs in Vienna was estimated near 7 million dollars. The city's two car dealers sustained about 800,000 dollars damage to a total of 280 cars. At the Johnson County courthouse, the hail broke about 20 windows on the north side of the building and extensively damaged the roof. A funeral home reported hail wrecked the garage, siding, and windows of the funeral home, along with three personal vehicles, for a total damage estimate of 50,000 dollars. Fellowship Baptist Church sustained 15,000 dollars damage. One building contractor estimated 90 percent of all the houses in Vienna needed a
Goreville	5/18/2001	4:48 PM	Hail	0.75 in.	0	0	0	0	None Reported
Cypress	8/18/2001	10:09 PM	Hail	0.75 in.	0	0	0	0	None Reported
Goreville	8/29/2001	3:47 PM	Hail	0.75 in.	0	0	0	0	None Reported
Goreville	10/23/2001	12:00 PM	Hail	0.75 in.	0	0	0	0	None Reported
New Burnside	5/2/2002	5:56 AM	Hail	1.75 in.	0	0	100K	0	A severe thunderstorm produced very large hail as it moved east across Jackson and Williamson Counties. The largest hail, which was between golf ball and tennis ball size, occurred in a swath parallel to and just south of Illinois Route 13. Large hail up to half-dollar size was reported as far north as Desoto and Johnston City. The hailstorm clipped the northeast corner of Johnson County, producing hail up to golf ball size. Extensive damage occurred to vehicles and some building exteriors. Windshields were broken. One insurance company
Goreville	5/25/2002	3:05 PM	Hail	0.75 in.	0	0	0	0	Thunderstorms produced large hail at several locations in southern Illinois. The most intense hailstorm occurred at Marion, where hailstones were up to the size of golf balls. The hail dented numerous vehicles and broke mirrors and tail lights. Leaves were stripped off trees, and some limbs were down. The hail damaged vinyl siding, broke house windows, and caused some roof damage. Other hail reports in southern Illinois were quarter-size or smaller. The hail lasted long enough to cover the ground at Alto
Tunnel Hill	5/25/2002	3:44 PM	Hail	0.88 in.	0	0	0	0	Thunderstorms produced large hail at several locations in southern Illinois. The most intense hailstorm occurred at Marion, where hailstones were up to the size of golf balls. The hail dented numerous vehicles and broke mirrors and tail lights. Leaves were stripped off trees, and some limbs were down. The hail damaged vinyl siding, broke house windows, and caused some roof damage. Other hail reports in southern Illinois were quarter-size or smaller. The hail lasted long enough to cover the ground at Alto
Goreville	11/9/2002	10:25 PM	Hail	1.00 in.	0	0	0	0	None Reported
Vienna	4/4/2003	8:38 PM	Hail	0.75 in.	0	0	0	0	A thunderstorm tracked east across southern Illinois, beginning near Anna and exiting into Kentucky from Hardin County. The storm produced sporadic reports of
Vienna	4/25/2003	8:25 AM	Hail	1.75 in.	0	0	0	0	Golf ball size hail occurred at the state prison east of Vienna. Dime size hail fell in Vienna.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Vienna	4/29/2003	5:57 PM	Hail	1.00 in.	0	0	0	0	Severe thunderstorms developed over Massac County and southern Johnson County, producing dime to nickel size hail at New Columbia and just east of Round Knob. Quarter size hail fell a few miles south of Vienna.
Tunnel Hill	5/1/2003	10:55 AM	Hail	0.75 in.	0	0	0	0	Thunderstorms produced several reports of dime to nickel size hail across southern Illinois. The thunderstorms began to organize into a squall line as they entered western Kentucky and southwest Indiana. A roof was peeled back off a business in Cairo, and some nearby trees were blown down.
Cypress	5/6/2003	8:23 PM	Hail	0.75 in.	0	0	0	0	A severe thunderstorm produced damaging winds in Cairo that downed numerous trees. Outside of Cairo, the storm produced a weak tornado and dime size hail.
Belknap	5/6/2003	8:46 PM	Hail	1.75 in.	0	0	0	0	The deadliest and most destructive storm of the night tracked within 10 miles of the Ohio River across extreme southern Illinois. The storm produced a 33-mile long tornado that killed two and injured about 33. A small but very damaging downburst occurred several miles south of the tornado track. A swath of large hail occurred north of the tornado track. Hailstones up to 2 inches in diameter were reported at and near the intersection of Highways 145 and 147, near the community of Glendale in Pope
Vienna	5/6/2003	9:38 PM	Hail	1.75 in.	0	0	0	0	None Reported
Vienna	3/20/2004	9:38 AM	Hail	0.75 in.	0	0	0	0	A severe thunderstorm moved across the Marion area of Williamson County, producing dime size hail and some minor wind damage. Many shingles were blown off the roof of a residence in Marion. Another severe thunderstorm tracked east across Union and Johnson Counties, producing a couple reports of dime to quarter
Tunnel Hill	5/26/2004	1:10 PM	Hail	0.88 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 the events during
Goreville	6/1/2004	3:45 PM	Hail	1.00 in.	0	0	0	0	A thunderstorm intensified to severe levels over northern Johnson County, producing hail up to quarter size over northeast parts of the county. Numerous thunderstorms developed over southern Illinois during the late afternoon, producing lots of hail from dime to quarter size. A few storms produced even larger hail around the size of golf balls. The severe storms were most concentrated across Saline and Gallatin Counties, where storms repeatedly moved from west to east across the same areas. This resulted in some flash flooding. A storm that moved east across Saline and Gallatin Counties displayed rotational
Cypress	6/18/2004	6:05 PM	Hail	2.75 in.	0	0	0	0	Reported on Highway 37 near Cypress. A supercell severe thunderstorm moved across the Mississippi River southwest of Carbondale, passing southeast across Union County and southwest Johnson County, before reaching the Ohio River near Metropolis. The storm produced large hail up to baseball size, along with isolated damaging wind gusts that downed trees.
Vienna	7/6/2004	12:21 PM	Hail	1.00 in.	0	0	0	0	Dime-size hail was reported in Vienna, and quarter-size hail was reported 4 miles east of Vienna. Scattered thunderstorms formed ahead of a cold front during the heat of the day. Isolated storms produced marginally severe wind and hail for relatively short periods of time.
Goreville	10/18/2004	12:07 PM	Hail	0.75 in.	0	0	0	0	None Reported
West Vienna	3/30/2005	9:04 PM	Hail	1.75 in.	0	0	0	0	Golf-ball size hail was reported at the intersection of Highways 146 and 37 and in Buncombe. Severe thunderstorms moved northeast across the southern tip of Illinois, passing south and east of the Marion/Carbondale

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
West Vienna	4/12/2005	3:48 PM	Hail	0.75 in.	0	0	0	0	Very cold temperatures in the upper levels of the atmosphere promoted the development of hail in numerous storms. Copious amounts of hail covered the ground in some cases. Most of the hail was no larger than dimes. A couple of funnel clouds were observed by sheriff personnel and trained spotters. Two of the most intense storms tracked slowly north across Jefferson County, producing hail up to the size of quarters in the southern
Tunnel Hill	4/22/2005	1:15 PM	Hail	1.00 in.	0	0	0	0	Strong to severe thunderstorms developed west through southwest of Mount Vernon, then tracked eastward across southern Illinois. Some of the storms produced large hail and damaging wind. One of the most intense storms tracked from Perry County northeast across the Mount Vernon area. Another particularly severe storm tracked northeast from near the Johnson/Williamson County line across the Harrisburg area. These storms formed along a cold front and very close to an upper level low pressure
Vienna	3/11/2006	3:20 AM	Hail	0.75 in.	0	0	0	0	None Reported
Belknap	3/12/2006	5:45 AM	Hail	0.75 in.	0	0	0	0	None Reported
Cypress	4/2/2006	6:09 PM	Hail	1.00 in.	0	0	0	0	Nickel to quarter size hail covered the ground in Cypress. Dime size hail covered the ground several miles south of Vienna.
Vienna	4/2/2006	6:16 PM	Hail	1.00 in.	0	0	0	0	None Reported
Vienna	5/25/2006	5:25 PM	Hail	1.00 in.	0	0	0	0	None Reported
Cypress	8/10/2006	1:16 PM	Hail	0.75 in.	0	0	0	0	None Reported
Vienna	9/27/2006	5:28 PM	Hail	0.75 in.	0	0	0	0	None Reported
Cypress	2/20/2007	19:00 PM	Hail	1.75 in.	0	0	0K	0K	Hail covered the ground. The largest hail was reported to be golf-ball size about two miles north of town.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
Vienna	2/20/2007	19:25 PM	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
Simpson	2/20/2007	19:34 PM	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

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Vienna	5/15/2007	16:55 PM	Hail	1.00 in.	0	0	0K	0K	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
Johnson	7/19/2006	1:00 PM	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
Johnson	8/1/2006	11:00 AM	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
Johnson	8/19/2006	1:00 PM	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.
Johnson	8/9/2007	12:00 PM	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
Johnson	7/7/1995	0	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
Johnson	8/10/1995	0	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 not taken to a hospital.
Johnson	5/10/2003	10:00 PM	Heavy Rain	N/A	0	0	0	0	Thunderstorms containing very heavy rain caused some road flooding. In Pope County, water was over Routes 145 and 146. Numerous streets and county roads in Johnson County had water over them. Street flooding was reported in Alexander County.
Vienna	1/15/2007	6:00 AM	Heavy Rain	N/A	0	0	0K	0K	Some secondary roads were underwater.Heavy rain from a slow-moving low pressure system caused some minor water problems. About 2.25 inches fell at the Carbondale airport from the 13th through the 15th.
Southern Illinois	3/8/1994	1600	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.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	10/22/1996	5:00 PM	High Wind	0 kts.	0	0	28K	0K	High winds in the wake of a passing cold front caused isolated damage in southern Illinois. The most notable damage occurred at a farmstead near West Frankfort, where a steel grain bin was blown over and a large
Johnson	4/30/1997	1:00 PM	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.
Johnson	11/11/1995	30	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.
Johnson	1/15/1997	4:00 AM	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 some areas due to
Johnson	1/1/1999	5:00 PM	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-
Johnson	1/8/1999	6:00 AM	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 semitrailer 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
Johnson	1/25/2004	7:00 AM	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

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	12/8/1995	1000	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
Johnson	12/23/1998	1:00 PM	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
Johnson	1/22/2000	8:00 AM	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
Johnson	1/8/2006	10:00 AM	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 airport.
Johnson	1/19/2006	10:00 AM	Strong Wind	N/A	0	0	19K	0	Strong southwest winds were sustained around 30 MPH. Gusts were measured up to 48 MPH at Carbondale.
Johnson	2/16/2006	4:00 PM	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.
Johnson	12/1/2006	5:00 AM	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
Johnson	2/7/1999	2:30 AM	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
Vienna	5/15/2007	16:57 PM	Thunderstorm Wind	N/A	0	0	5K	0K	Several trees were blown down across roads, including Highway 37.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
Cypress	8/3/2007	14:50 PM	Thunderstorm Wind	N/A	0	0	2K	0K	A few trees were blown down.A cluster of thunderstorms produced isolated wind damage as it tracked south to southwest through southern Illinois. The storms developed during the heat of the day along an inverted trough of low pressure extending northward from the Lower Mississippi Valley.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Goreville	1/29/2008	16:30 PM	Thunderstorm Wind	N/A	0	0	150K	0K	An old house was blown completely off its foundation and destroyed. A boat, camper, and large pole barn were destroyed. Roofs were damaged nearby, and trees were blown down in the area.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
Vienna	11/14/1993	1130	Thunderstorm Winds	N/A	0	1	50K	0	There was damage to several homes and two correctional facilities near Vienna. One home had a garage and barn destroyed along with part of the house and carport roof. A tied-down mobile home was overturned and completely destroyed. A 25 year old man inside was injured.
Johnson	4/15/1994	620	Thunderstorm Winds	N/A	0	0	50K	0	Several grain bins and farm equipment buildings were destroyed. Trees were damaged.
Many Areas	4/18/1995	530	Thunderstorm Winds	N/A	0	0	0	0	A line of severe thunderstorms moved northeast from Missouri through the lower Ohio River Valley. These storms brought scattered tree and power line damage to counties along the Ohio River. |
Vienna	5/17/1995	520	Thunderstorm Winds	N/A	0	0	0	0	
Vienna	5/18/1995	1345	Thunderstorm Winds	N/A	0	0	0	0	
Vienna	6/7/1995	1530	Thunderstorm Winds	N/A	0	0	0	0	
Johnson	6/8/1995	1815	Thunderstorm Winds	N/A	0	0	100K	0	Trees and power lines were downed, especially in the southern two thirds of the county. Many large trees were uprooted in and near Vienna. The debris took several days to clean up. About two thirds of the county was without electrical power at one point. A number of houses were damaged by falling trees. Trees completely blocked many roads and highways including U.S. 45 South and Illinois 37 in a number of places. Crews worked well into the night to reopen all streets and highways. The city of Vienna was without power through at least the afternoon
Johnson	6/20/1995	2130	Thunderstorm Winds	N/A	0	0	0	0	
Vienna	6/21/1995	1745	Thunderstorm Winds	N/A	0	0	10K	0	Numerous trees were blown down. A tree fell on a mobile home.
Johnson	12/18/1957	1800	Tornado	F2	0	0	25K	0	None Reported
Johnson	4/14/1972	352	Tornado	F2	0	5	25K	0	None Reported
Johnson	4/14/1972	406	Tornado	F2	0	0	25K	0	None Reported
Johnson	6/22/1974	1600	Tornado	F2	0	0	0K	0	None Reported
Johnson	3/28/1975	1625	Tornado	F0	0	0	0K	0	None Reported
Johnson	5/15/1986	1735	Tornado	F1	0	0	25K	0	None Reported
Cypress	4/13/1998	8:09 PM	Tornado	F1	0	1	60K	0	A short-lived tornado began along the Union County line, just southwest of Cypress, and tracked east along a rural road before dissipating at State Route 37. A small barn, about 150 square feet in area, was blown across the road. Some pieces of wood were stuck in the ground at an angle up to 200 feet away. One house sustained siding damage. Another house had a portion of its roof lifted up and placed back down again. A bedroom in the house was damaged. In addition, very minor damage occurred to a greenhouse, an abandoned house, and a couple of mobile homes. Trees, power lines, and power poles were down along the path of the tornado. Large trees, two feet in diameter, were blown down in between two mobile homes. Along Route 37, six power poles were snapped off about two feet above the ground. A female motorist was injured when her moving vehicle was struck by a falling
Tunnel Hill	6/14/1998	4:35 PM	Tornado	F0	0	0	5K	0	The brief touchdown occurred just east of Tunnel Hill. Numerous trees were down, and a garage was damaged.
Cypress	4/28/2002	12:35 AM	Tornado	F2	0	2	3.0M	0	The tornado entered Johnson County near Cypress and was on the ground for only a few miles in Johnson County. Cypress was impacted directly, where about 50 structures were damaged, including a school. The school lost portions of upper story walls and the roof. Two trailers were destroyed.
Vienna	4/28/2002	12:46 AM	Tornado	F2	0	2	100K	0	This tornado was produced by the same supercell thunderstorm that spawned a long-track tornado over southern Union and southwest Johnson Counties. This tornado touched down along U.S. Highway 45, about 3 miles south of Vienna. The tornado moved east across Interstate 24, and then dissipated about 1.5 miles.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Cypress	5/6/2003	9:27 PM	Tornado	F0	0	0	0	0	The tornado was reported at the community of Whitehill, near the intersection of Perk and Whitehill Roads. Tree damage and some downed trees were the main effect of this tornado.
Reevesville	5/6/2003	9:47 PM	Tornado	F0	0	0	0	0	Tree damage and some downed trees were the main effect of this tornado.
Goreville	10/18/2004	6:19 PM	Tornado	F1	0	1	10K	0	From Union County, the tornado crossed into extreme northwest Johnson County, only about a half mile south of the Williamson County line. The tornado then moved northeast into Williamson County where Interstate 57 crosses the county line. A semi was overturned on Interstate 57 less than a mile south of the Interstate 24 interchange. The driver was injured. Peak winds along this portion of the tornado path were around 75 MPH. A supercell thunderstorm organized over southern Jackson County, then spawned a tornado as it moved east along the Union/Williamson County line. This supercell continued east-southeast across northern Johnson and northern Pope Counties, producing two significant tornadoes and large hail. Although the storm exhibited
Goreville	10/18/2004	6:28 PM	Tornado	F2	0	2	500K	0	The tornado turned east-southeast from Williamson County back into Johnson County. The bulk of the damage and injuries occurred in a neighborhood on the southern half of the Lake of Egypt. The two injured persons were mobile home residents whose homes were demolished. One of the mobile homes was swept clean off its foundation. The demolished home was deposited 50 to 100 yards away. The 32-year-old male occupant of the mobile home, who was ejected from the home, received numerous bruises and cuts. A female resident of another mobile home was injured. In total, three mobile homes were destroyed, and dozens of mobile homes, barns, and sheds were damaged. Rescue efforts were hampered by a large amount of tree debris on roads. Peak winds in the Lake of Egypt neighborhood were estimated near 120 MPH. The tornado lifted as it reached the southeast side of the Lake of Egypt. The parent thunderstorm produced another tornado in northern
Tunnel Hill	10/18/2004	6:43 PM	Tornado	F1	0	0	50K	0	This tornado touched down less than ten minutes after an earlier tornado in northern Johnson County lifted. Both tornadoes were produced by the same supercell thunderstorm. The tornado tracked entirely across Shawnee National Forest land, causing extensive tree damage. Near the touchdown point, a mobile home was destroyed, and another mobile home was damaged. In the community of Ozark, the general store received extensive roof damage. Branches were blown down in the community, and large trees were down 1 to 2 miles east of Ozark. The tornado strengthened to F-2 intensity after crossing into Pope County. A supercell thunderstorm organized over southern Jackson County, then spawned a tornado as it moved east along the Union/Williamson County line. This supercell continued east-southeast across northern Johnson and northern Pope Counties, producing two significant tornadoes and large hail.
Johnson	9/28/1974	1745	Tstm Wind	0 kts.	0	0	0	0	None Reported
Johnson	7/10/1981	1120	Tstm Wind	0 kts.	0	0	0	0	None Reported
Johnson	7/20/1981	1620	Tstm Wind	0 kts.	0	0	0	0	None Reported
Johnson	3/22/1991	11	Tstm Wind	0 kts.	0	0	0	0	None Reported
Johnson	7/2/1991	1120	Tstm Wind	0 kts.	0	0	0	0	None Reported
Johnson	11/30/1991	38	Tstm Wind	0 kts.	0	0	0	0	None Reported
Johnson	6/25/1992	1830	Tstm Wind	0 kts.	0	0	0	0	None Reported
Vienna	1/18/1996	10:15 AM	Tstm Wind	0 kts.	0	0	0	0	Trees and power lines were down near Vienna.
Goreville	4/21/1996	5:00 PM	Tstm Wind	50 kts.	0	0	0	0	None Reported

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Vienna	5/5/1996	1:58 PM	Tstm Wind	50 kts.	0	0	0	0	A tree fell on a car, and power lines were down.
Belknap	6/23/1996	7:45 PM	Tstm Wind	0 kts.	0	0	5K	0	Trees, power lines, and power poles were down. The damage was caused by a very brief, isolated microburst.
Vienna	3/1/1997	6:05 PM	Tstm Wind	52 kts.	0	0	0	0	Trees were down along Interstate 24.
Vienna	4/20/1997	10:33 PM	Tstm Wind	52 kts.	0	0	0	0	A wind gust to 60 MPH was estimated by the county sheriff department.
New Burnside	5/25/1997	10:44 PM	Tstm Wind	52 kts.	0	0	0	0	A spotter reported trees over the road.
Belknap	6/13/1997	7:45 PM	Tstm Wind	52 kts.	0	0	0	0	Large tree limbs were blown down.
Buncombe	6/13/1997	10:55 AM	Tstm Wind	50 kts.	0	0	0	0	The county sheriff reported trees down across Route 37.
New Burnside	7/14/1997	6:10 PM	Tstm Wind	52 kts.	0	0	7K	0	Trees and power lines were blown down.
Goreville	5/21/1998	2:40 PM	Tstm Wind	50 kts.	0	0	0	0	A few trees were down in northwest Johnson County.
New Burnside	6/14/1998	4:28 PM	Tstm Wind	55 kts.	0	0	60K	0	Numerous trees were down across northern and eastern parts of the county. Two garages were heavily damaged, along with some structural damage to five homes. Trees blocked twelve county roads and U.S. Highway 45.
Vienna	1/17/1999	6:02 PM	Tstm Wind	52 kts.	0	0	4K	0	Trees were downed across parts of Johnson County, including Route 146 just west of Vienna and U.S. 45 near the Massac County line.
Simpson	1/22/1999	12:55 AM	Tstm Wind	50 kts.	0	0	3K	0	A few trees and large limbs were blown down.
Cypress	5/17/1999	2:20 PM	Tstm Wind	70 kts.	0	0	75K	0	Numerous trees and power lines were down near Cypress. One tree fell on a house. Several miles northwest of Vienna, winds unroofed a double wide mobile home and downed trees, one of which landed on the corner of the mobile home. Four miles northeast of Vienna, numerous large trees were uprooted, and a house received shingle damage. One of the downed trees landed on a house, causing minor damage. A television antenna was toppled, and the latticework was torn off the patio of the house. Several other houses received minor roof damage 6 miles east of Vienna. Downed trees closed
Vienna	1/3/2000	9:38 AM	Tstm Wind	0 kts.	0	0	5K	0	Trees were blown down.
Belknap	5/23/2000	11:40 PM	Tstm Wind	0 kts.	0	0	10K	0	The roof was blown off a barn and into a house.
Vienna	6/2/2000	12:40 PM	Tstm Wind	0 kts.	0	1	10K	0	Large tree limbs were blown down, knocking down some power lines. One person who was injured by a falling tree limb was taken to a hospital.
Cypress	9/20/2000	3:05 PM	Tstm Wind	50 kts.	0	0	2K	0	Trees were down on Route 37.
Cypress	9/22/2000	5:32 PM	Tstm Wind	53 kts.	0	0	10K	0	Trained spotters estimated wind gusts between 60 and 65 MPH. Trees were uprooted along Route 37 a few miles north of Buncombe, blocking the road. The high winds took portions of a roof off a house and caused an
Goreville	2/24/2001	9:00 PM	Tstm Wind	0 kts.	0	0	5K	0	A transformer was damaged by wind on the north edge of Goreville, causing a power outage. At the Lake of Egypt Recreation Area, a tree was blown across the road.
New Burnside	7/18/2001	2:09 PM	Tstm Wind	50 kts.	0	0	0	0	Trees were down, mainly in northeast Johnson County around New Burnside.
Simpson	7/23/2001	6:30 PM	Tstm Wind	50 kts.	0	0	0	0	Three trees were blown down across county roads.
Cypress	8/25/2001	1:54 PM	Tstm Wind	50 kts.	0	0	0	0	A tree top was blown out by winds estimated up to 60 MPH.
Vienna	9/7/2001	11:15 AM	Tstm Wind	50 kts.	0	0	3K	0	Several trees and power lines were blown down on U.S. Highway 45.
Johnson	10/24/2001	3:00 PM	Tstm Wind	50 kts.	0	0	10K	0	Trees were blown down across the county. There was structural damage to a barn near Simpson.
Goreville	11/9/2002	11:55 PM	Tstm Wind	50 kts.	0	0	0	0	Several trees were blown down near Lake of Egypt and Goreville.
Johnson	5/10/2003	9:25 PM	Tstm Wind	50 kts.	0	0	0	0	A few trees were blown down at scattered locations around the county.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Vienna	7/18/2003	10:50 AM	Tstm Wind	50 kts.	0	0	0	0	About a dozen trees were blown down in Ferne Clyffe State Park, according to a park ranger. 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 and moved south.
Vienna	4/30/2004	3:37 PM	Tstm Wind	50 kts.	0	0	0	0	A line of thunderstorms intensified as it moved east across southern Illinois. East of Interstate 57, there were scattered reports of wind damage. All reports of wind damage consisted of trees and power lines blown down. At least one tree fell onto a house in Metropolis. Trees were blown down across Highway 145 in two places: about 8 miles south of Harrisburg in Saline County and between Eddyville and Delwood in Pope County.
Johnson	5/30/2004	6:20 PM	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,
Cypress	6/12/2004	4:20 PM	Tstm Wind	50 kts.	0	0	0	0	Trees were down near the intersection of Route 37 and Cypress Road.
Belknap	1/13/2005	3:15 AM	Tstm Wind	55 kts.	0	0	3K	0	Large amounts of siding were torn off a house, and the garage door was blown off. 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
Cypress	5/13/2005	7:15 PM	Tstm Wind	50 kts.	0	0	2K	0	Trees were blown down in Cypress. Power lines were down in Vienna. 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 gusts to around 60 MPH.
Simpson	8/14/2005	4:42 PM	Tstm Wind	52 kts.	0	0	0	0	Several trees were blown down.
Vienna	8/26/2005	2:45 PM	Tstm Wind	50 kts.	0	0	0	0	Numerous trees were blown down in the Vienna area.
Tunnel Hill	11/15/2005	3:20 PM	Tstm Wind	56 kts.	0	0	2K	0	State police estimated winds of 60 to 70 MPH. A tree was blown onto power lines on U.S. Route 45. One mile south of Ozark, the roof of an older commercial garage was damaged.
Vienna	3/9/2006	7:00 PM	Tstm Wind	55 kts.	0	0	5K	0	A barn was blown away near Belknap. A fence and trees were down 7 miles east of Vienna. Trees were down on U.S. Highway 45 3 to 4 miles south of Vienna.
Vienna	3/9/2006	12:46 PM	Tstm Wind	60 kts.	0	0	5K	0	A garage was blown off its foundation. A barn roof was blown off, and a tree was uprooted.
Vienna	5/25/2006	5:35 PM	Tstm Wind	50 kts.	0	0	0	0	Numerous large tree limbs were down.
West Vienna	7/21/2006	1:15 PM	Tstm Wind	50 kts.	0	0	0	0	A couple of trees were down near Route 146.
Vienna	6/2/1999	1:00 AM	Urban/sml Stream Fld	N/A	0	0	0	0	Thunderstorms produced very heavy rain that flooded small streams and creeks. At one residence near the confluence of two small creeks near Herod, the driveway was under 2 feet of water. In the Vienna area, minor street flooding occurred.
Cypress	8/10/2001	2:30 AM	Urban/sml Stream Fld	N/A	0	0	0	0	Thunderstorms produced very heavy rain that caused some minor flooding. A foot of water was over a parking lot in Cypress.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	4/20/2000	12:30 PM	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
Johnson	3/9/2002	9:00 AM	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
Johnson	1/2/1996	10:00 AM	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
Johnson	1/6/1996	4:00 AM	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
Johnson	1/8/1997	1:00 PM	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.
Johnson	12/13/2000	8:00 AM	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
Johnson	2/21/2001	8:00 PM	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

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	12/4/2002	7:00 AM	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
Johnson	12/23/2002	8:00 PM	Winter Storm	N/A	0	0	0	0	A winter storm over parts of southern Illinois occurred in two parts. The first round consisted of a band of sleet and snow during the evening of the 23rd. Two to four inches of sleet and snow accumulated in a band from Carbondale to Harrisburg and Carmi. The precipitation was mainly sleet east of the Marion and Carbondale area, where amounts were close to two inches. The second part, on the afternoon of the 24th, consisted of several hours of heavy snow in much the same area. Three to six inches of snow fell along and north of a line from Carbondale to Harrisburg. This brought storm total accumulations to 7 inches in places such as Pinckneyville, Murphysboro, and West Frankfort. The snowfall diminished rapidly to the south, with only a dusting along the Ohio River between Cairo, IL and Paducah, KY. On the south side of the heavy snow area, significant ice accumulations occurred over much of the Shawnee National Forest region, roughly
Johnson	1/16/2003	5:00 AM	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
Johnson	2/16/2003	1:00 AM	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

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	12/22/2004	1:00 AM	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
Johnson	2/11/2008	11:00 AM	Winter Storm	N/A	0	3	0K	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
Johnson	2/3/2007	23:00 PM	Winter Weather	N/A	0	0	0K	0K	An upper level storm system swept southeast from Missouri across the Tennessee Valley. A very dry and powdery inch of snow fell across the southern tip of Illinois, mostly south and southeast of the Marion/Carbondale area. Roads were snow-covered and
Johnson	12/15/2007	2:00 AM	Winter Weather	N/A	0	0	0K	0K	A low pressure system moved northeast across the Tennessee Valley, bringing a period of snow, sleet, and freezing rain. The highest accumulations of snow and sleet were along and north of Interstate 64. One to three inches fell in those areas. Mount Vernon reported about an inch of snow and sleet before a change to rain. Mount Carmel reported snow-covered roads due to 3 inches of snow and sleet. A narrow band of freezing rain produced up to a tenth of an inch of ice from about Benton eastward. Some vehicles spun out or slid into ditches along Interstate 57 from Benton northward to Mount Vernon. A period of sleet over the hills of Johnson, Pope,
Johnson	1/22/2003	2:00 PM	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.
Johnson	1/29/2004	3:00 PM	Winter Weather/mix	N/A	0	0	0	0	One to two inches of snow fell across most of southern Illinois, except for the southern tip from Metropolis to Cairo and Anna. A thin layer of ice formed on some surfaces just prior to the snowfall. Roads were reportedly very slick and hazardous.
Johnson	12/8/2005	8:00 AM	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

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Johnson	2/18/2006	2:00 AM	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-covered and slippery.
Johnson	2/19/2006	1:00 PM	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:					9	102	12.553 M	53.050 M	

Appendix E - Hazard Map

Please see attached file or map.

Appendix F - Critical Facilities

Please see attached pdf file.

Airport Facilities Report

ID	Name	Address	City	Class	Function	Capacity	YearBuilt	ReplaCost
1	COVEY-SIMPSON		SIMPSON	ADFL	Private			6049.5
2	KELLUMS		GOREVILLE	ADFL	Private			6049.5

Communication Facilities Report

ID	Name	Address	City	Class	Owner	Function	ReplaCost
1	WQIV788	Shawnee Correctional Ctr	Vienna	CBR	Ameren Services		
2	KNKK555	ROUTE 146 EAST	VIENNA	CBR	Arch Wireless		
3	KNGY591	WATER TWR	CYPRESS		CBR	BELKNAP	
4	KWE588	C & E I TWR .5 MI S	WEST	CBR	BNSF Railway		
5	WNYV226	AT UPRR TRACKS AND E JONES ST	GOREVIL	CBR	BNSF Railway		
6	WNYV226		GOREVIL	CBR	BNSF Railway		
7	KNKN477	420 Ganntown Lane	GRANTSB		CBR	Cellco Partnership	
8	KNKN477	Tunnel Hill Road & Parrish Ridge Road	Goreville	CBR	Cellco Partnership		
9	WLV466	2880 GOREVILLE RD	GOREVIL	CBR	Cellco Partnership		
10	WLV470	420 GANNTOWN LANE	GANNTO	CBR	Cellco Partnership		
11	WQID404	2910 Goreville Road	Goreville	CBR	Cellco Partnership		
12	KNKN477	420 Ganntown Lane	GRANTSB		CBR	Cellco Partnership	
13	KNKN477	Tunnel Hill Road & Parrish Ridge Road	Goreville	CBR	Cellco Partnership		
14	KNKN477	420 Ganntown Lane	GRANTSB		CBR	Cellco Partnership	
15	KNKN477	Tunnel Hill Road & Parrish Ridge Road	Goreville	CBR	Cellco Partnership		
16	WNZL630	500 NW OF CO MARKER JTS 145O N &	VIENNA	CBR	EMERYS 2 WAY		
17	WPBY736	2.1 MI SE	CYPRESS		CBR	FRUIT BELT	
18	WPBY736		CYPRESS		CBR	FRUIT BELT	
19	WPWU676	17200 MONROE RD.	JOHNSON		CBR	GALATIA, VILLAGE	
20	WNVV805	COR OF FERNE CLYFFE & COLLINS STS		GOREVIL	CBR	GOREVILLE	
21	WNVV805		GOREVIL	CBR	GOREVILLE		

ID	Name	Address	City	Class	Owner	Function	ReplaCost
22	WQHJ515	201 S. FERNE CLYFFE RD	GOREVIL	CBR	GOREVILLE		
23	WQHJ515		GOREVIL	CBR	GOREVILLE		
24	KKE570	1 BLK E RT 37 BEHIND SUNOCO STATION	GOREVIL	CBR	GOREVILLE		
25	WQBG320	I57 INTERCHANGE 4.8 KM W	GOREVIL	CBR	GREEN, FRED L		
26	WQBG320		GOREVIL	CBR	GREEN, FRED L		
27	KNDT681	5 MI E OF US HWY 45 4.7 MI SE	OZARK	CBR	ILLINOIS CENTRAL		
28	KIS22	2.5 MI W OF	GOREVIL	CBR	ILLINOIS CENTRAL		
29	WNTT296	2.5 MI W OF	GOREVIL	CBR	ILLINOIS CENTRAL		
30	KLP836	FERNE CLYFFE STATE PK 2 MI SW	GOREVIL	CBR	ILLINOIS, STATE OF		
31	KNDW210	VIENNA CORRECTIONAL CENTER IL RT 146	VIENNA	CBR	ILLINOIS, STATE OF		
32	KNDW211	SHAWNEE CORRECTIONAL CTR 8 MI E	VIENNA	CBR	ILLINOIS, STATE OF		
33	KNDW211		VIENNA	CBR	ILLINOIS, STATE OF		
34	KNHD243	VIENNA II CORRECTIONAL CTR	VIENNA	CBR	ILLINOIS, STATE OF		
35	KUA774	VIENNA CORRECTIONAL CENTER IL RT 146	VIENNA	CBR	ILLINOIS, STATE OF		
36	KYW823	GEORGE BLUFF 3 MI E	CYPRESS	CBR	ILLINOIS, STATE OF		
37	WBH451	GEORGE BLUFF 3 MI SE	CYPRESS	CBR	ILLINOIS, STATE OF		
38	WCP820	ON GEORGE BLUFF 3 MI E	CYPRESS	CBR	ILLINOIS, STATE OF		
39	WDW59	FERNE CLYFFE STATE PARK BOX 120	GOREVIL	CBR	ILLINOIS, STATE OF		
40	WNCS205	SHAWNEE CORRECTIONAL CENTER RT 146	VIENNA	CBR	ILLINOIS, STATE OF		
41	WPFF638	GEORGE BLUFF 3 MI E	CYPRESS	CBR	ILLINOIS, STATE OF		
42	WPKP524	930 SUNFLOWER LN	BELKNAP	CBR	ILLINOIS, STATE OF		
43	WPMH616	SHAWNEE CORRECTIONAL CENTER	VIENNA	CBR	ILLINOIS, STATE OF		
44	WPPF210	IL RT 146 E	VIENNA	CBR	ILLINOIS, STATE OF		

ID	Name	Address	City	Class	Owner	Function	ReplaCost
45	WQDE401	1460 GEORGE BLUFF LOOP	CYPRESS		CBR	ILLINOIS, STATE OF	
46	WQDE401		CYPRESS		CBR	ILLINOIS, STATE OF	
47	WQFS546	3 mi SE of Cypress @ George Bluff	Cypress	CBR	Illinois, State of		
48	WSL590	VIENNA CORRECTIONAL CENTER ON IL RT	VIENNA	CBR	ILLINOIS, STATE OF		
49	WNWT585	3 MI W OF I57 & GOREVILLE INTERCHANGE	GOREVIL	CBR	J & O		
50	WNWT585		GOREVIL	CBR	J & O		
51	WNWT586	3 MI W OF I57 & GOREVILLE INTERCHANGE	GOREVIL	CBR	J & O		
52	WNWT586		GOREVIL	CBR	J & O		
53	WNYH618	3 MI W OF I57 & GOREVILE INTERCHANGE	GOREVIL	CBR	J & O		
54	WNYH618		GOREVIL	CBR	J & O		
55	WBS688	5TH & VINE ST	VIENNA	CBR	J W REYNOLDS		
56	WDM548	3 MI W OF GOREVILLE INTERCHANGE & I 57	GOREVIL	CBR	J W REYNOLDS		
57	WPKN385	220 TAYLOR RIDGE LN	VIENNA	CBR	JOHNSON COUNTY		
58	WPKN385		VIENNA	CBR	JOHNSON COUNTY		
59	WPEY832	COR OF HUBBARD & JONES ST	GOREVIL	CBR	JOHNSON COUNTY		
60	WPEY832	113 1/2 N 5TH ST	VIENNA	CBR	JOHNSON COUNTY		
61	WPEY832		GOREVIL	CBR	JOHNSON COUNTY		
62	KNCV714	605 W MAIN ST	GOREVIL	CBR	JOHNSON		
63	KDS994	1 MI N US RT 45 FROM INT OF RT 146	VIENNA	CBR	JOHNSON,		
64	KNDU272	COR OF HUBBARD AND JONES ST	GOREVIL	CBR	JOHNSON,		
65	KNDU272	CTY COURTHOUSE	VIENNA	CBR	JOHNSON,		
66	WPGJ713	113 1/2 N 5TH ST	VIENNA	CBR	JOHNSON,		
67	WPGS700	113 1/2 N 5TH ST	VIENNA	CBR	JOHNSON,		

ID	Name	Address	City	Class	Owner	Function	ReplaCost
68	WPGS700		VIENNA	CBR	JOHNSON,		
69	WPZQ680	COUNTY COURTHOUSE	VIENNA	CBR	JOHNSON,		
70	WPZQ680		VIENNA	CBR	JOHNSON,		
71	WQAE304	104 RED BUD ROAD	VIENNA	CBR	KAJ, LLC DBA		
72	WPDA375			CBR	LAKE EGYPT FIRE		
73	WQCI357	100 TERRY LANE	GOREVIL	CBR	LAKE EGYPT		
74	WQCI357	3 MI N OF TUNNEL HILL RD., ON PARRISH	TUNNEL	CBR	LAKE EGYPT		
75	WQCI357	400 TUNNEL HILL RD.	TUNNEL	CBR	LAKE EGYPT		
76	WQCI357	550 JACKSON RD.	TUNNEL	CBR	LAKE EGYPT		
77	WQCI357	2801 GOREVILLE RD.	GOREVIL	CBR	LAKE EGYPT		
78	WQCI358	2575 ST. RT. 37 NORTH	BUNCOM	CBR	LAKE EGYPT		
79	WQCI358	401 TUNNEL HILL ROAD	TUNNEL	CBR	LAKE EGYPT		
80	WQCI358	5351 TUNNEL HILL ROAD	TUNNEL	CBR	LAKE EGYPT		
81	WQCI358	EST - 1651 EAGLE POINT BAY ROAD	GOREVIL	CBR	LAKE EGYPT		
82	WQCI358	50 EAGLE POINT BAY PUMP	GOREVIL	CBR	LAKE EGYPT		
83	WQCI359	170 ST RT 37	GOREVIL	CBR	LAKE EGYPT		
84	WQCI359	1650 SULLIVAN ROAD	GOREVIL	CBR	LAKE EGYPT		
85	WPXU254	C&E 1 Twr; 5 mi. S	West	CBR	MCC Holdings		
86	WPOB791			CBR	MCDONALD S #		
87	KUS652	.75 MI E OF INT HWY 146 & HWY 45	VIENNA	CBR	MELLER, J		
88	KUS652		VIENNA	CBR	MELLER, J		
89	KNNU475	RENSHAW E SIDE	REEVESVI		CBR	MILLSTONE WATER	
90	WPKI426	WATER TREATMENT PLANT	REEVESVI		CBR	MILLSTONE WATER	

ID	Name	Address	City	Class	Owner	Function	ReplaCost
91	WQCK284	6195 TUNNEL HILL ROAD	GOREVIL	CBR	NEXTEL WIP		
92	WQCK284		GOREVIL	CBR	NEXTEL WIP		
93	WQCK285	80 BALLOWE CHURCH RD	VIENNA	CBR	NEXTEL WIP		
94	WQCK285		VIENNA	CBR	NEXTEL WIP		
95	KEF461	.5KM W OF I57 & GOREVILLE	GOREVIL	CBR	OIL FIELD ELECTRIC		
96	KEF461		GOREVIL	CBR	OIL FIELD ELECTRIC		
97	WNZF996	3 MI W OF I57 INT	GOREVIL	CBR	Overturf, Patricia		
98	WNZF996		GOREVIL	CBR	Overturf, Patricia		
99	WPOU205	VARIOUS LOCATIONS	PAINTSVI	CBR	PAINTSVILLE, CITY		
100	WPDE310	NORTH EDGE	NEW	CBR	SALINE VALLEY		
101	WPQA764	COR ST RT 166 & VINE ST	NEW	CBR	SALINE VALLEY		
102	WQGF451	305 PALOPINTO LANE	VIENNA	CBR	SAMSON		
103	WQGF451		VIENNA	CBR	SAMSON		
104	WPTH857	6413 E. Yale Street	Woodlaw	CBR	SBA Broadband		
105	WPTH861	1550 W Blair	Salem	CBR	SBA Broadband		
106	WPTH862	724 Highway 50.	Sandoval	CBR	SBA Broadband		
107	WPTH864	2527 Barton Road	Sandoval	CBR	SBA Broadband		
108	WPTH869	440 Duncan Lane	Mount	CBR	SBA Broadband		
109	WPTH877	2050 CR1 N, Mill Shoals	Mill Shoals		CBR	SBA Broadband	
110	WPTH879	19221 East Lynchburg Road	Opdyke	CBR	SBA Broadband		
111	WQFM568	Goreville	Goreville	CBR	SOUTHEASTERN		
112	WNGA913	NEAR EXIT 40 I57	GOREVIL	CBR	SOUTHEASTERN		
113	WNGA913		GOREVIL	CBR	SOUTHEASTERN		

ID	Name	Address	City	Class	Owner	Function	ReplaCost
114	WNXW702	NEAR EXIT 40 I57	GOREVIL	CBR	SOUTHEASTERN		
115	WNXW702		GOREVIL	CBR	SOUTHEASTERN		
116	KOL260	152 METERS SW OF I57 INT 6 KM W	GOREVIL	CBR	SOUTHERN		
117	KOL260		GOREVIL	CBR	SOUTHERN		
118	KNJM401	4 1/2 MI S GOREVILLE ON RT 37	BUNCOM	CBR	Southern Illinois		
119	KNJM401		BUNCOM	CBR	Southern Illinois		
120	WRB337	4 1/2 MI S OF GOREVILLE ON RT 37	BUNCOM	CBR	Southern Illinois		
121	WIA550	NEAR EXIT 40 I-57	GOREVIL	CBR	SOUTHERN		
122	KNKN506	1/2 MILE EAST OF INTERSTATE 57, EXIT	GOREVIL	CBR	Southern Illinois		
123	KNKN506	601 N. FIRST STREET	VIENNA	CBR	Southern Illinois		
124	WML307	3.54 KM W	GOREVIL	CBR	Southern Illinois		
125	WML609	21 W POPLAR ST	HARRISB	CBR	Southern Illinois		
126	WPHY707	US 45 1 KM N OF IL 146	VIENNA	CBR	State of Illinois		
127	KPG715	WTCT TV TRANSMITER SITE W OF	GOREVIL	CBR	TRI-STATE		
128	KDJ867	NEAR US HWY 45 APPROX 3 MI SW	OZARK	CBR	Trunkline Gas		
129	KSC35	3 MI SW OF	OZARK	CBR	Trunkline Gas		
130	WNTQ893	NEAR HWY 45 3 MI SW	OZARK	CBR	Trunkline Gas		
131	KTH925	I57 INTERCHANGE 3 MI W	GOREVIL	CBR	TWIN COUNTY		
132	KLH975	120 E JONES ST	GOREVIL	CBR	UNION PACIFIC		
133	WQEV285	386' NE OF RAILROAD ST & W VIENNA ST	WEST	CBR	Union Pacific		
134	WPYW733	6995 STATE ROUTE 146 EAST	VIENNA	CBR	VIENNA		
135	WPYW733	6995 STATE ROUTE 146 EAST	VIENNA	CBR	VIENNA		
136	WPYW733	6995 STATE ROUTE 146 EAST	VIENNA	CBR	VIENNA		

ID	Name	Address	City	Class	Owner	Function	ReplaCost
137	KNNK229	310 N 3RD ST	VIENNA	CBR	VIENNA GRADE		
138	KNNK229		VIENNA	CBR	VIENNA GRADE		
139	WPPD569			CBR	VIENNA HIGH		
140	WPPG248			CBR	VIENNA HIGH		
141	WPFU710	N 2 MI & E 3 MI	VIENNA	CBR	VIENNA, CITY OF		
142	WPFU710		VIENNA	CBR	VIENNA, CITY OF		
143	WPNG804	OAK GROVE RD	VIENNA	CBR	WDKA		
144	WPMR962	4 MI N OF I24 ON HWY 45	VIENNA	CBR	WOOD		
145	WPMP404	4 MI N OF I24 ON HWY 45	VIENNA	CBR	WOOD		
146	WPMP404		VIENNA	CBR	WOOD		
147	WPKY674	GOREVILLE HILL BETWEEN I57/I24	GOREVIL	CBR	WOOD, ROBIN		
148	WPKY679	1 NW OF INT 24	VIENNA	CBR	WOOD, ROBIN		
149	WQAJ555		VIENNA	CBR	YUM RESTAURANT		

Dams Report

ID	Name	River	City	Owner	Purpose	Height (ft)	ReplaCost		
1	LAKE ECHON DAM	TRIB OZARK CREEK	SIMPSON	Camp Ondessock	R	16			
2	LITTLE CACHE STRUCTURE 8 DAM		TRIB LITTLE CACHE CREEK		VIENNA	Vienna Drainage	RC	21	
3	VIENNA CORRECTIONAL CENTER		TRIB BAY CREEK		GRANTSBURG	Illinois Department of		SR	29
4	FERNE CLYFFE LAKE DAM	TRIB BUCK BRANCH	BELKNAP	Illinois Department of	R	33			
5	TALL TREE LAKE DAM	TRIB BLUE BRANCH	KARNAK	Audis Gould	R	29			
6	FETTER LAKE DAM	TRIB SUGAR CREEK	CEREAL	Jim Fetters	P	24			
7	LAKE COMO DAM	TRIB MIDDLE WOLF CREEK	CARBONDALE	Como Acre	R	41			
8	SIMPSON LAKE DAM	TRIB BAY CREEK	ROBBS-	Levi Simpson	R	23			
9	LAKE THUNDERHAWK DAM	LITTLE SALINE RIVER	MITCHELLSVILLE		Frank Nutty	R	31		
10	VIENNA RESERVOIR DAM	TRIB LITTLE CACHE CREEK	VIENNA	City of Vienna	S	13			
11	AUTUMN ROSE LAKE DAM	LITTLE CACHE CREEK	BLOOMFIELD	Golden Hawk	R	32			
12	STRUCTURE NO. 12	DUTCHMAN CREEK	NONE	FOREST SERVICE	RS	54			
13	LITTLE CACHE CREEK	LITTLE CACHE CREEK	NONE	FOREST SERVICE	R	48			
14	BAY CREEK WATERSHED-STR 4	MILL CREEK-TRIB. JOHNSON	REEVESVILLE	BAY CREEK CONS.	C	32			
15	LITTLE CACHE WATERSHED-STR		E. TRIB-LITTLE CACHE CREEK		VIENNA	CITY OF VIENNA	CS	35	
16	LITTLE CACHE WATERSHED-STR 5		EAST TRIB-LITTLE CACHE		BLOOMFIELD	VIENNA DRAINAGE		C	37
17	CEDAR LAKE DAM	TRIB-MAX CREEK	GRANTSBURG	H.L. MC CORMICK	RPF	21			

EOC Facilities Report

ID	Name	Address	City	Class	YearBuilt	ShelterCap	Stories	ReplaCost
1	Johnson County 911 Office	115 N. 5th St	Vienna	EDFLT				

FireStation Facilities Report

ID	Name	Address	City	Class	Stories	YearBuilt	ReplaCost
2	Belknap Fire Dept	210 East Main	Belknap	EFFS	1		666
3	Cypress Fire Dept	7790 Main St	Cypress	EFFS	1		666
4	Goreville Fire Dept	106 W. Collins St	Goreville	EFFS	1		666
5	New Burnside Fire Dept	80 West 2nd St	New Burnside	EFFS	1		666
6	Vienna Fire Dept	205 N. 4th St	Vienna	EFFS	1		666
7	Buncombe Fire Dept	195 Cache Ave, PO Box 1	Buncombe	FDFLT	1		666

Hazardous Materials Report

ID	Name	Address	City	Class	EPAID	ChemicalName
1	Southern F/S	old rt 146 Loop	Vienna	HDFLT		liquid petroleum
2	Southern F/S	west Vienna	Vienna	HDFLT		anhydrous ammonia
3	Ferrell Gas	1003 W Vine St	Vienna	HDFLT		

Medical Care Facilities Report

ID	Name	Address	City	Class	Function	Beds	Stories	ReplaCost
1	Glen Brook	801 N. 1st St	Vienna	MDFLT	Nursing Ho		1	
2	Hillview Health Care Center	512 N. 11th St	Vienna	MDFLT	Nursing Ho		1	
3	Autumn Ridge Supported	1000 Galeener	Vienna	MDFLT	Assisted L		1	
4	Garden Apartments	706 N 6th St	Vienna	MDFLT	Assisted L		1	

Natural Gas Facilities Report

ID	Name	Address	City	Class	Function	Stories	YearBuilt	ReplaCost
1	TRUNKLINE GAS CO.-JOPPA		SEC 3 T13S R3E	VIENNA				GDFLT 1209.9

Police Station Facilities Report

ID	Name	Address	City	Class	Stories	ShelterCap	YearBuilt	ReplaCost
1	Goreville Police Dept	106 W Collins St	Goreville	EFPS				1554
2	Johnson County Sheriff	113 1/2 N 5th St	Vienna	EFPS				1554
3	City of Vienna PD	205 N. 4th St	Vienna	PDFLT				1554
4	Buncombe Police Dept	125 Main St	Buncombe	PDFLT				
5	Cypress Police Dept	7720 Main St	Cypress	PDFLT				

Potable Water Facilities Report

ID	Name	Address	City	Class	Function	Stories	YearBuilt	ReplaCost
1	BELKNAP WTP	SOUTHEAST EDGE OF BELKNAP	BELKNAP					36963
2	MILLSTONE WATER DISTRICT	P.O. BOX 39	EDDYVILLE					36963
3	VIENNA WTP	U.S. ROUTE 45	VIENNA					36963
4	Devil's Kitchen Water Tower 2		N/A					200

School Facilities Report

ID	Name	Address	City	Class	Students	Stories	YearBuilt	ReplaCost
1	GOREVILLE HIGH SCHOOL	201 S FERNE CLYFFE	GOREVILLE	EFS1	178			555
2	GOREVILLE ELEMENTARY	201 S FERNE CLYFFE	GOREVILLE	EFS1	415			555
3	LICK CREEK ELEM SCHOOL	7355 LICK CREEK RD	BUNCOMBE	EFS1	131			555
4	NEW BURNSIDE CENTER	95 TUNNEL HILL RD	TUNNEL HILL	EFS1	112			555
5	TUNNEL HILL CENTER	95 TUNNEL HILL ROAD	TUNNEL HILL	EFS1	151			555
6	VIENNA HIGH SCHOOL	601 NORTH FIRST ST	VIENNA	EFS1	363			555
7	Buncombe Elementary	164 Main Street	BUNCOMBE	SDFLT				555
8	Cypress Elementary	165 Carter Street	Cypress	SDFLT				555
9	Vienna Elementary	310 N. 3rd Street	Vienna	SDFLT				555

User Defined Facilities Report

ID	Name	Address	City	Class	Function	Stories	YearBuilt	ReplaCost
1	Hospitality House	504 W. Vine St	Vienna		Halfway			
2	Shawnee Correctional Center	6665 State Rt 146 E	Vienna		Correction	2	1984	
3	Vienna Correctional Center	1895 State Rt 146 E	Vienna		Correction	3	1970	
4	US Forest Hidden Spring Station	602 N 1st St	Vienna		Forest			

WasteWater Facilities Report

ID	Name	Address	City	Function	Class	Stories	YearBuilt	ReplaCost
1	BUNCOMBE STP	WEST OF MAIN STREET	BUNCOMBE		WDFL			73926
2	CYPRESS STP	VILLAGE HALL	CYPRESS		WDFL			73926
3	GOREVILLE STP	VILLAGE HALL	GOREVILLE		WDFL			73926
4	VIENNA STP	RT. 45 SOUTH	VIENNA		WDFL			73926

Appendix G - Map of Critical Facilities

Please see attached pdf file or map.

Appendix H - NOAA Flood Data: USGS Stream Gauge Data

County	**Johnson County**	
Station	**Forman, IL**	
River	**Cache River**	
Period of Record	**1923-2007**	
Latitude	**37.33639**	
Longitude	**88.92389**	
Rank	**Year**	**Discharge (cfs)**
1	1935	9,630
2	1929	8,950
3	1950	8,860
4	1937	8,620
5	1957	8,250
6	1927	8,140
7	1964	8,040
8	1943	7,840
9	1945	7,680
10	1982	7,280