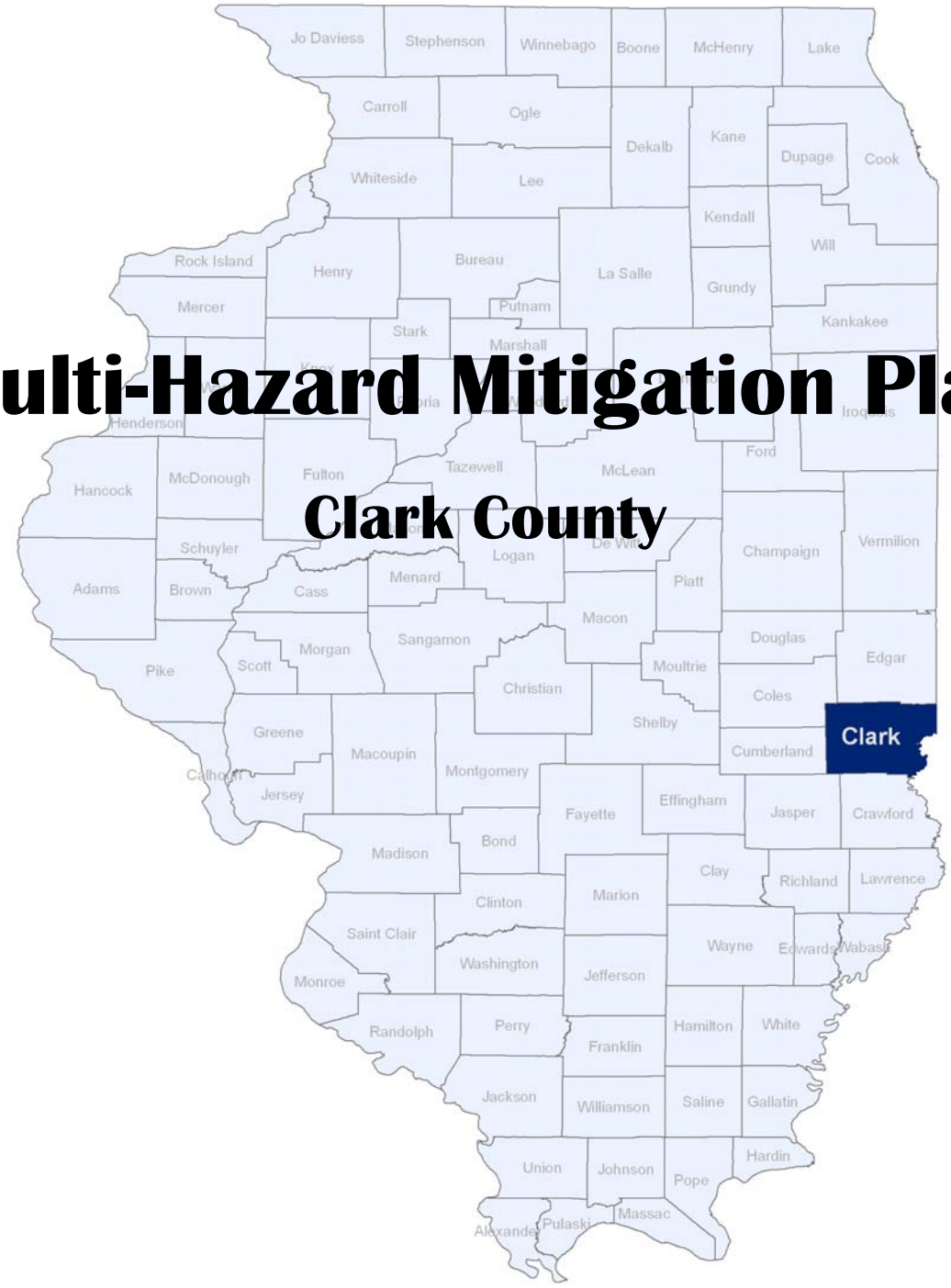


Multi-Hazard Mitigation Plan

Clark County

The Polis Center
IUPUI
1200 Waterway Boulevard
Suite 100
Indianapolis, IN 46202

Clark County
Emergency
Management Agency
207 North 5th Street
Marshall, IN 62441

Southern Illinois University
Carbondale
Department of Geology
206 Parkinson Laboratory
Carbondale, IL 62901

Multi-Hazard Mitigation Plan

Clark County, Illinois

Adoption Date: -- _____ --

Primary Point of Contact

Jerry Lorton
Chief Deputy/Coordinator
Clark County Sheriff's Office/Emergency Management Agency
207 North 5th Street
Marshall, IL 62441
Phone: 217-826-6393
Fax: 217-826-2214
jlorton@marshall.k12.il.us

Secondary Point of Contact

Steve Turpin
Clark County Assessor
217-826-5815

Prepared by:

The Polis Center
1200 Waterway Boulevard, Suite 100
Indianapolis, IN 46202
317-274-2455

and

Department of Geology
Southern Illinois University
Carbondale, Illinois 62901

Table of Contents

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 required in order to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs. In order for the National Flood Insurance Program (NFIP) communities to be eligible for future mitigation funds, they must adopt an MHMP.

In recognition of the importance of planning in mitigation activities, FEMA created **Ha**zards **US**A **M**ulti-**H**azard (HAZUS-MH), a powerful geographic information system (GIS)-based disaster risk assessment tool. This tool enables communities of all sizes to predict 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 has determined that HAZUS-MH should play a critical role in Indiana's risk assessments. The Polis Center (Polis) at Indiana University Purdue University Indianapolis (IUPUI) and Southern Illinois University at Carbondale (SIU) are assisting Clark County planning staff with performing the hazard risk assessment.

1.2 Planning Team Information

The Clark County Multi-Hazard Mitigation Planning Team is headed by Jerry Lorton, who is the primary point of contact. Members of the planning team include representatives from various county departments, cities and towns, and public and private utilities. Table 1-1 identifies the planning team individuals and the organizations they represent.

Table 1-1: Multi Hazard Mitigation Planning Team Members

Name	Title	Organization	Jurisdiction
Jerry Lorton	Chief Deputy/ Coordinator	Sheriff's Office/EMA	Clark County
Steve Turpin	Assessor	Assessor's Office	Clark County
Todd Kuhn	Board Member	County Board	Clark County
Herman Davidson	Chief of Police	Martinsville Police Dept	City of Martinsville
Dick Wheeler	Superintendent	Utilities	Village of Westfield
Shelby Biggs	Superintendent	Utilities	City of Casey
Dallas Richardson	County Engineer	County Highway Dept	Clark County
Pete Manuel	Principal	Marshall High School	City of Marshall
Rick Manuell	Superintendent	Marshall School District	City of Marshall
Rob Crumrin	Senior Technician	Marshall Public Works	City of Marshall
Bradley Burson	President/Manager	Marathon Pipeline, LLC	City of Martinsville

Name	Title	Organization	Jurisdiction
Cory Sheehy	Director	Marshall Public Works	City of Marshall
Phil Reeds	Mayor	City of Martinsville	City of Martinsville

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

- Attending the MHMP meetings
- Providing available 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 Clark County Highway Department building on December 8, 2009. Representatives from The Polis Center explained the rationale behind the MHMP program and answered questions from the participants. The Polis Center also provided an overview of HAZUS-MH, described the timeline and the process of the mitigation planning project, and presented Clark County with a Memorandum of Understanding (MOU) for sharing data and information.

The Clark County Multi-Hazard Mitigation Planning Committee met on December 8, 2009, January 6, 2010, February 24, 2010, March 24, 2010, and May 4, 2010. Each meeting was approximately two hours in length. The meeting minutes 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

An effort was made to solicit public input during the planning process, and a public meeting was held on February 24, 2010 to review the county's risk assessment. 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 Clark County planning team invited participation from various representatives of county government, local city and town governments, community groups, local businesses, and universities. The team also invited participation from adjacent counties to obtain their involvement in the planning process. Details of neighboring stakeholders' involvement are summarized in Table 1-2.

Table 1-2: Neighboring Community Participation

Person Participating	Neighboring Jurisdiction	Organization	Participation Description
Tom Watson	Coles County	Coles County EMA	Reviewed plan; offered comments
Webb Timm	Cumberland County	Cumberland County EMA	Reviewed plan; offered comments
Doug Long	Jasper County	Jasper County EMA	Reviewed plan; offered comments
Ken Pryor	Crawford County	Crawford County EMA	Reviewed plan; offered comments
Duane Fidler	Edgar County	Edgar County ESDA	Reviewed plan; offered comments

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, e.g. 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

Clark County and its local communities utilized 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 planning process also incorporated the existing natural hazard mitigation elements from 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
City of Casey	2009	Zoning Ordinance	Describes zoning restrictions and guidelines	Section 5
FEMA	2007	NFIP	Describes the NFIP program, which communities participate; provides flood maps	Sections 4 and 5
City of Marshall		Zoning Ordinance	Describes zoning restrictions and guidelines	Section 5
Assessor	2009	GIS Database	Parcel data for Clark County	Section 4
Clark County Highway Dept		County Highway Maps	County highway maps	Section 3

Section 2 - Jurisdiction Participation Information

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

Table 2-1: Participating Jurisdictions

Jurisdiction Name
Clark County
City of Casey
City of Marshall
City of Martinsville
Village of Westfield

2.1 Adoption by Local Governing Body

The draft plan was made available on May 4, 2010 to the planning team for review. Comments were then accepted. The Clark County hazard mitigation planning team presented and recommended the plan to the County Board, who adopted it 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. 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
Clark County	Todd Kuhn	MHMP planning team member
Clark County	Steve Turpin	MHMP planning team member
Clark County	Jerry Lorton	MHMP planning team member
City of Marshall	Cory Sheehy	MHMP planning team member
City of Marshall	Rob Crumrin	MHMP planning team member
Marshall School District	Rick Manuell	MHMP planning team member
Village of Westfield	Dick Wheeler	MHMP planning team member
City of Casey	Shelby Biggs	MHMP planning team member
City of Martinsville	Herman Davidson	MHMP planning team member
Clark County	Dallas Richardson	MHMP planning team member

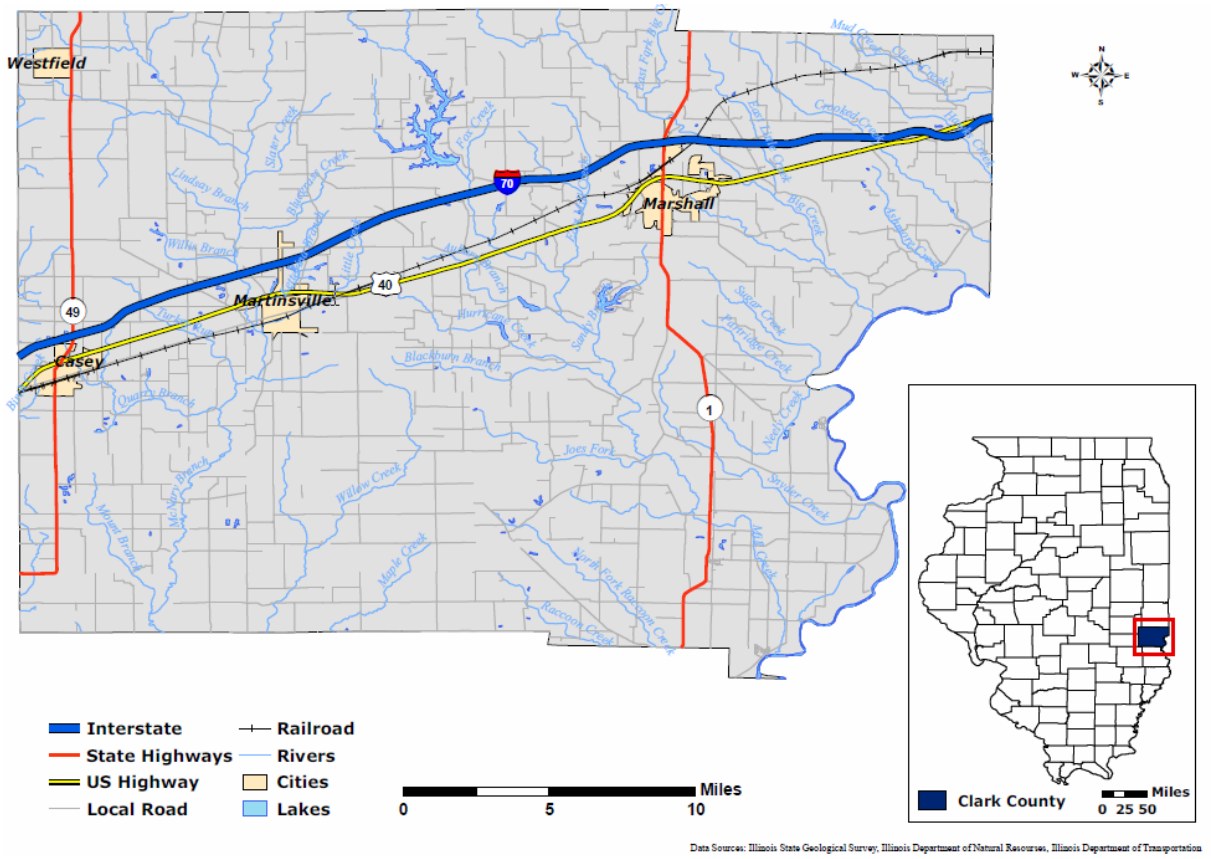
All members of the MHMP planning committee were actively involved in attending the MHMP meetings, providing available Geographic Information Systems (GIS) data and historical hazard information, reviewing and providing comments on the draft plans, coordinating and participating in the public input process,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

Section 3 - Jurisdiction Information

Named for Revolutionary soldier George Rogers Clark, Clark County was formed from Crawford County in 1819. At the time of its formation, Clark County spanned over approximately one-third of Illinois. It acquired its present boundaries in 1831 as new counties were formed from it. The City of Marshall is the county seat.

Clark County is located in the southeastern Illinois. The county has total land area of 501.50 square miles. It is bordered by Edgar County in the north, Crawford County in the south, Coles and Cumberland counties in the west, Jasper County in the southwest, and Vigo County, Indiana in the east. Figure 3-1 depicts Clark County's location.

Figure 3-1: Clark County, Illinois



Sources:http://www.cyberdriveillinois.com/departments/archives/irad/clark.html; http://www.fedstats.gov/qf/states/17000.html; http://factfinder.census.gov; http://www.genealogytrails.com

3.1 Topography

Clark County is situated in the Central Lowland Province of the Till Plains Section and lies mostly within the Springfield Plain physiographic division. Part of county's eastern border is defined by the Wabash River; the northeast corner of the county lies within the Bloomington Ridged Plain physiographic division. The Springfield Plain includes the level portion of the Illinois drift sheet in central and southern Illinois. It is characterized mainly by its flatness and by

its relatively shallow entrenchment of drainage. The Bloomington Ridged Plain includes most of the Wisconsin moraines, which are characterized by low, broad concentric ridges with intervening wide stretches of relatively flat or gently undulating ground moraine.

3.2 Climate

Clark County climate is typical of Southern Illinois. The variables of temperature, precipitation, and snowfall can vary greatly from one year to the next. Winter temperatures can fall below freezing starting as early as October and extending as late as April. Based on National Climatic Data Center (NCDC), normals from 1971 to 2000, in winter, on average the lowest winter temperature is 24.2° F and the average high is 45.3° F. In summer, the average low is 63.1° F and average high is 86.8° F. Average annual precipitation is 45.85 inches throughout the year.

3.3 Demographics

Clark County has a population of 16,834. According to American FactFinder (2008), Clark County experienced a population decline of 1.03%. The population is spread throughout 15 townships: Anderson, Auburn, Casey, Darwin, Dolson, Douglas, Johnson, Marshall, Martinsville, Melrose, Orange, Parker, Wabash, Westfield, and York. The largest community in Clark County is Marshall, which has a population of approximately 4,734. The breakdown of population by incorporated and unincorporated areas is included in Table 3-1. Incorporated communities are marked with an asterisk (*).

Table 3-1: Population by Community

Community	2009 Population	% of County
Anderson	397	2.3%
Auburn	289	1.7%
Casey*	4,176	24.5%
Darwin	378	2.22%
Dolson	352	2.06%
Douglas	161	0.94%
Johnson	376	2.21%
Marshall*	4,734	27.8%
Martinsville*	1,688	9.9%
Melrose	395	2.32%
Orange	251	0.14%
Parker	242	1.42%
Wabash	2,102	5.87%
Westfield*	816	4.79%
York	651	3.82%

Source: American FactFinder, 2008

3.4 Economy

American FactFinder reported for 2000 that 79.1% of the workforce in Clark County was employed in the private sector. The breakdown is included in Table 3-2. Manufacturing represents the largest sector, employing approximately 26.3% of the workforce. The 2000 annual per capita income in Clark County is $17,655.

Table 3-2: Industrial Employment by Sector

Industrial Sector	% Dist. In County (2000)
Agriculture, forestry, fishing, hunting, and mining	4.5%
Construction	7.9%
Manufacturing	26.3%
Wholesale trade	1.7%
Retail trade	11.6%
Transportation, warehousing and utilities	5.3%
Information	1.5%
Finance, insurance, real estate, and rental/leasing	3.8%
Professional, technical services	4.2%
Health care, social assistance	20.2%
Arts, entertainment, recreation	5.1%
Public administration	3.4%

Source: American FactFinder, 2000

3.5 Industry

Clark County's major employers and number of employees are listed in Table 3-3. The largest employer is TRW Automotive, which was established in 1958 and has approximately 700 employees. The Marshall School District is the second largest, with 198 employees.

Table 3-3: Major Employers

Company Name	City/Town	Year Established	# of Employees	Type of Business
Manufacturing				
TRW Automotive	Marshall	1958	700	Automobile Electronics
Yargus Manufacturing, Inc	Marshall	1992	85	Conveyer
C.I. Wescom	Casey	1978	40	Electronics
Stoutin Ice	Casey	1977	25	Ice Company
Rowe Foundry	Martinsville	1898	50	Iron Casting
Pap-R-Products	Martinsville	1947	85	Paper
Transportation				
East Central Illinois Mass Transit District	Clark and Edgar Counties	2008	13	Transportation
Health Care				
Burnside Community Health Center	Marshall	1963	115	Nursing Care/Rehab
Casey Health Care	Casey	1970	35	Nursing Home

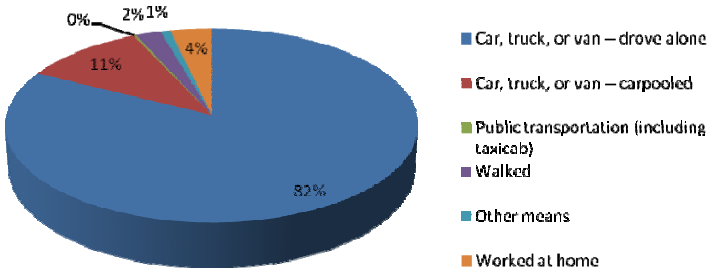
Company Name	City/Town	Year Established	# of Employees	Type of Business
Heartland Nursing Center	Casey	1970	60	Nursing Home
Other				
City of Martinsville	Martinsville	1833	7	Municipal government
Martin's IGA	Casey	1960	40	Grocery store
Casey/Westfield School District	Casey	Early 1900s	185	School
Marshall School District	Marshall		198	School
Martinsville School District	Martinsville	1872	58	School
Schilling Brothers Inc	Casey	1960	15	Farm Implement
Farm Pride, Inc	Casey	1980	15	Farm Implement
J&K Mitchell	Casey	1990	20	Auto Sales & Service
Bolin Enterprises	Casey	1990	150	Pipeline Maintenance
Scotty's Lawncare	Casey	1990	15	Mowing and Landscaping
Richard's Farm Restaurant	Casey	1976	50	Restaurant
Total Grain Market	Casey	2006	40	Grain Company

Source: Clark County Planning Team

Commuter Patterns

According to American FactFinder information from 2000, approximately 7,802 of Clark County's population are in the work force. The average travel time from home to work is 22.4 minutes. Figure 3-2 depicts the commuting patterns for Clark County's labor force.

Figure 3-2: Commuter Patterns for Clark County



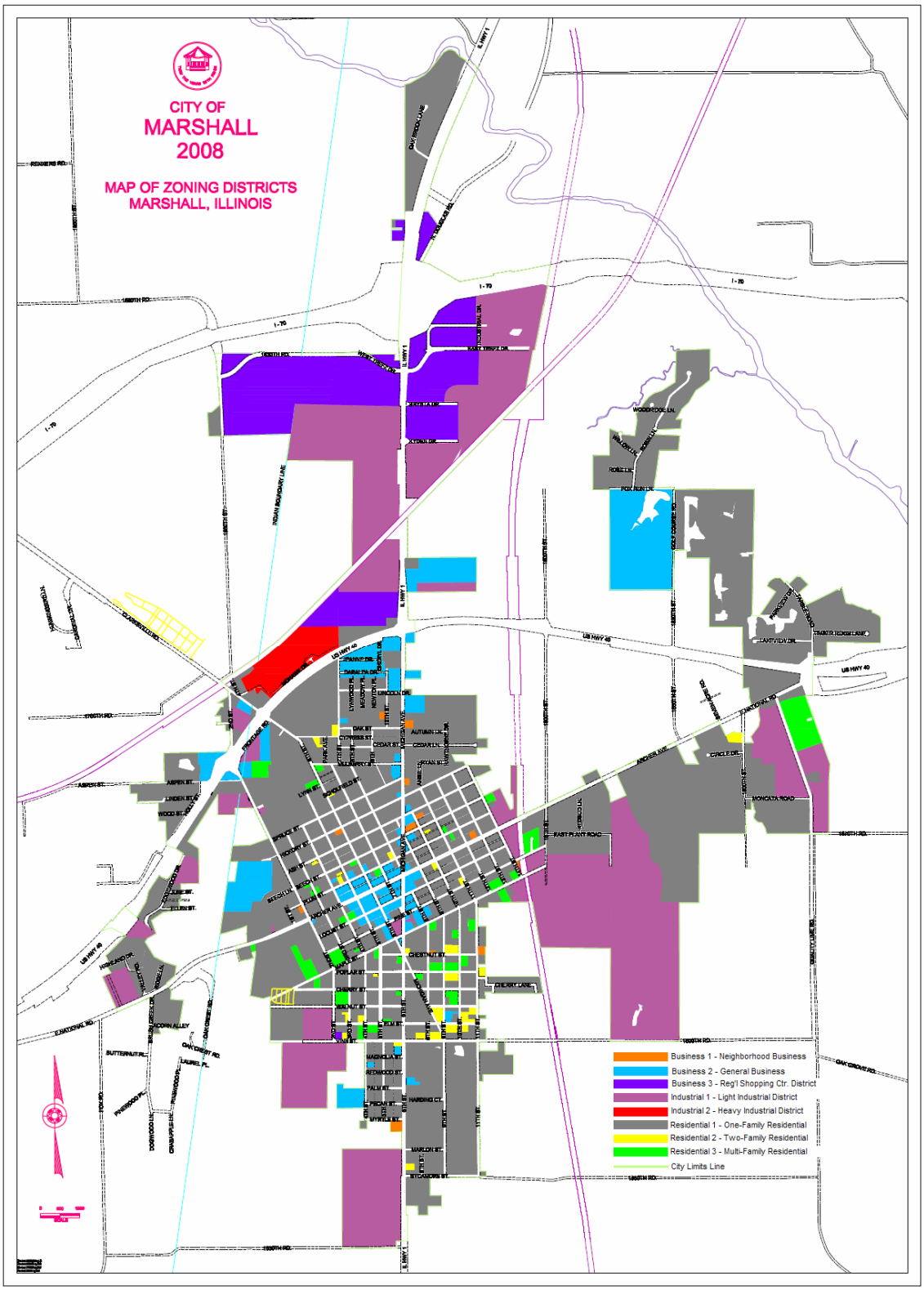
3.6 Land Use and Development Trends

Agriculture is the predominant land use in Clark County. Other significant land uses include manufacturing, residential, and tourism. Clark County is home to several spacious parks for fishing, camping, hiking, and water sports. The parks include Mill Creek Park, which is continuously developing new facilities to further recreation, Lincoln Trail State Park, Casey KOA, and Wilderness Lake Campground.

The City of Marshall has earmarked the Interstate Plaza (intersection of State Route 1 and I-70) and Quality Lime Road for future economic development. Figure 3-3 depicts Marshall's zoning map. As the county's population continues to grow, the urbanized areas will extend further into

the county, placing more pressure on existing transportation and utility infrastructure while increasing the rate of farmland conversion as well.

Figure 3-3: City of Marshall Zoning Map



3.7 Major Lakes, Rivers, and Watersheds

Clark County has a number of bodies of water including Ingle Pond, Robert Lashbrook Pond, Craig Lake, Lincoln Trail State Park Lake, Newmans Lake, Martin Tarble Lake, and Snake Trail Campground Lake. It is also bounded by the Wabash River to the east. According to the USGS, Clark County consists of two drainage basins: Middle Wabash-Busseron (HUC 05120111) and the Embarras (HUC 05120112). Figure 3-3 depicts Illinois hydrologic units.

Figure 3-3: Illinois Watersheds

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. A risk assessment involves quantifying the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people. This assessment identifies the characteristics and potential consequences of a disaster, how much 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 plans identified in Table 1-3 did not contain a risk analysis. These local planning documents were reviewed to identify historical hazards and help identify risk. To facilitate the planning process, State flood data was used for the flood analysis.

4.1.2 National Hazard Records

4.1.2.1 National Climatic Data Center (NCDC) Records

To assist the planning team, historical storm event data was compiled from the National Climatic Data Center (NCDC). NCDC records are estimates of damage reported to the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to given weather events.

The NCDC data included 149 reported events in Clark County between January 1, 1959 and the October 31, 2009 (the most updated information as of the date of this plan). A summary table of events related to each hazard type is included in the hazard profile sections that follow. A full table listing all events, including additional details, is 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

4.1.2.2 FEMA Disaster Information

In the past decade, FEMA has declared a number of emergencies and disasters for the state of Illinois. Emergency declarations allow states access to FEMA funds for Public Assistance (PA); disaster declarations allow for even more PA funding including Individual Assistance (IA) and the Hazard Mitigation Grant Program (HMGP). Clark County has received federal aid for both PA and IA funding for two declared disasters since 1999. Figure 4-1 depicts the disasters and emergencies that have been declared for Clark County within the past decade. Table 4-2 lists more specific information for each declaration.

Figure 4-1: FEMA-Declared Emergencies and Disasters in Clark County (1999-present)

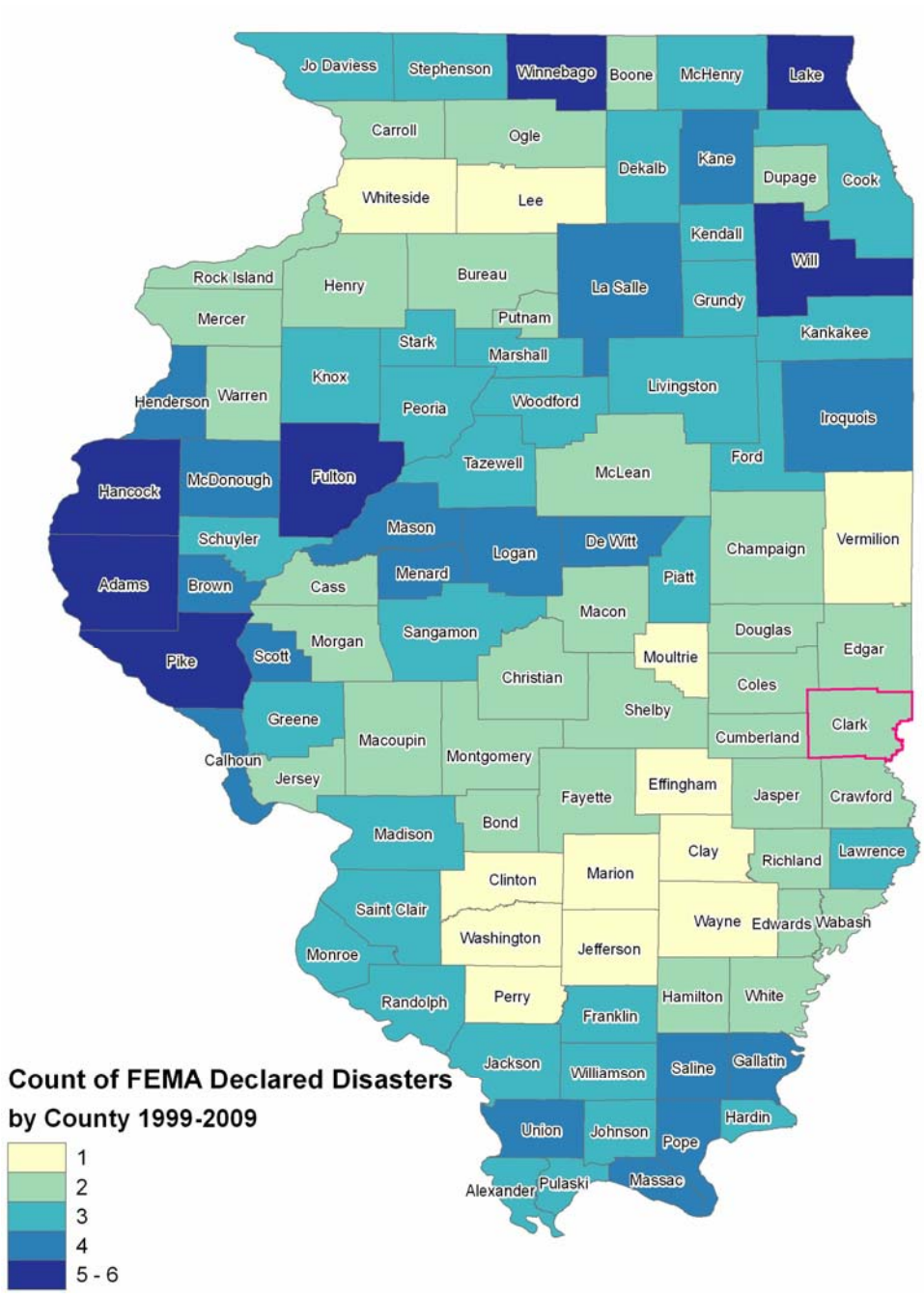


Table 4-2: FEMA-Declared Emergencies in Clark County (1999-present)

Date of Incident	Date of Declaration	Disaster Description	Type of Assistance
04/21/2002	05/21/2002	Severe storms, tornadoes, and flooding	Individual
06/01/2008	06/24/2008	Severe storms and flooding	Individual and Public

4.1.3 Hazard Ranking Methodology

During Meeting #2, held on January 6, 2010, the planning team reviewed historical hazards information and participated in a risk analysis using a projector and Excel spreadsheet. The spreadsheet listed the compiled NCDC data for each community.

The spreadsheet calculated the probability rating (Low, Medium, High) of each hazard based on the number of events that have occurred in the county within the past 50 years. Throughout the planning process, the MHMP team had the opportunity to update the NCDC data with more accurate local information. For example, the NCDC records often list the locations of hazards such as floods under the county, not accounting for how the individual communities were affected. In such situations, the probability rating assigned to the county was applied to all jurisdictions within the county.

Team consensus was also important in determining the probability of hazards not recorded by NCDC, for example dam and levee failure and hazardous materials spills. The probabilities for these hazardous events were determined by the planning team's estimation, derived from local experience and records, of the number of historical events that have occurred within the past 50 years. The probability ratings are based on the following guidelines:

- Low = 0-5 events
- Medium = 6-15 events
- High = 16+ events

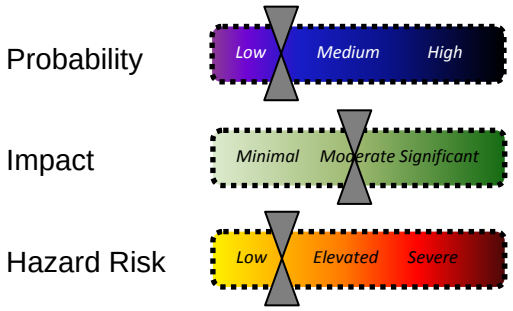
After improving the NCDC data with additional local data, the team determined each hazard's potential impact on the communities. The impact rating (Minimal, Moderate, Significant) was based on the following guidelines.

- Minimal = Few injuries
Critical facilities shut down for 24 hours
Less than 15% of property damaged
- Moderate = Multiple injuries
Critical facilities shut down for 1-2 weeks
At least 30% of property damaged
- Significant = Multiple deaths
Critical facilities shut down for more than 1 month
More than 50% of property damaged

Finally, the overall hazard risk was determined by multiplying probability and impact. It is important to consider both probability and impact when determining risk. For example, if an asteroid were to collide with Earth, the impact would be extreme; but the probability of an

asteroid strike (has not happened in billions of years) is so negligibly small that the overall risk is extremely low. There has never been a situation in human history in which a person was killed by a meteor. In contrast, other potentially damaging events like thunderstorms and floods are relatively less severe, but have occurred regularly in many places.

Each hazard addressed within the plan will use sliding scales to represent the probability, impact, and overall risk ratings. The scales will be depicted as follows:



The planning team identified tornadoes and floods as the most significant hazards affecting Clark County. The hazard rankings are listed in Table 4-3.

Table 4-3: Clark County Hazards

HAZARD CATEGORIES	HAZARD PROBABILITY	HAZARD IMPACT	HAZARD RISK
	Low, Medium, High	Minimal, Moderate, Significant	Low, Elevated, Severe
CLARK COUNTY			
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Significant	Elevated
Severe Thunderstorm	High	Moderate	Severe
Winter Weather (snow & ice)	High	Moderate	Severe
Drought/Extreme Heat	Medium	Minimal	Low
Hazardous Materials Release	High	Moderate	Severe
Structural Failure & Fires	Low	Minimal	Low
MARSHALL			
Tornado	High	Significant	Severe
Flood	Medium	Moderate	Elevated
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Significant	Elevated
Severe Thunderstorm	High	Moderate	Severe
Winter Weather (snow & ice)	High	Moderate	Severe
Drought/Extreme Heat	Medium	Minimal	Low
Hazardous Materials Release	High	Moderate	Severe
Structural Failure & Fires	Low	Minimal	Low
CASEY			
Tornado	High	Significant	Severe
Flood	Low	Moderate	Low
Dam/Levee Failure	Low	Minimal	Low

HAZARD CATEGORIES	HAZARD PROBABILITY	HAZARD IMPACT	HAZARD RISK
Earthquake	Low	Significant	Elevated
Severe Thunderstorm	High	Moderate	Severe
Winter Weather (snow & ice)	High	Moderate	Severe
Drought/Extreme Heat	Medium	Minimal	Low
Hazardous Materials Release	High	Moderate	Severe
Structural Failure & Fires	Low	Minimal	Low
MARTINSVILLE			
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Significant	Elevated
Severe Thunderstorm	High	Moderate	Severe
Winter Weather (snow & ice)	High	Moderate	Severe
Drought/Extreme Heat	Medium	Minimal	Low
Hazardous Materials Release	High	Moderate	Severe
Structural Failure & Fires	Low	Minimal	Low
WESTFIELD			
Tornado	Medium	Significant	Elevated
Flood	Medium	Moderate	Elevated
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Significant	Elevated
Severe Thunderstorm	High	Moderate	Severe
Winter Weather (snow & ice)	High	Moderate	Severe
Drought/Extreme Heat	Medium	Minimal	Low
Hazardous Materials Release	High	Moderate	Severe
Structural Failure & Fires	Low	Minimal	Low
WEST UNION			
Tornado	High	Significant	Severe
Flood	Medium	Moderate	Elevated
Dam/Levee Failure	Medium	Moderate	Elevated
Earthquake	Low	Significant	Elevated
Severe Thunderstorm	High	Moderate	Severe
Winter Weather (snow & ice)	High	Moderate	Severe
Drought/Extreme Heat	Medium	Minimal	Low
Hazardous Materials Release	High	Moderate	Severe
Structural Failure & Fires	Low	Minimal	Low

4.1.4 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 2 approach to analyzing hazards as defined for HAZUS-MH. The approach includes substitution of selected default data with local data. This process improved 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 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 will fall into a structural class, and structures in each class will respond in a similar fashion to a specific depth of flooding or ground shaking. 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 through GIS, HAZUS-MH, and historical information to predict which communities would be at risk.

Using HAZUS-MH

1. 100-year overbank flooding
2. Earthquake scenarios

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 Polis-SIU; verified the datasets using local knowledge, and allowed Polis-SIU to use their local GIS data for additional verification. 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 reflect a Level 2 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 the 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.

Clark County provided The Polis Center with parcel boundaries and county Assessor records. Records without improvements were deleted. The parcel boundaries were converted to parcel points located in the centroids of each parcel boundary. Each parcel point was linked to an Assessor record based upon matching parcel numbers. The generated building inventory points represent the approximate locations (within a parcel) of building exposure. The parcel points were aggregated by census block. Parcel-matching results for Clark County are in Table 4-4.

- The aggregate building inventory tables used in this analysis have not been updated. Default HAZUS-MH model data was used for the earthquake.
- For the flood analysis, user-defined facilities were updated from the building inventory information provided by Clark County.

Table 4-4: Parcel-Matching for Clark County

Data Source	Count
Assessor Records	13,698
County-Provided Parcels	13,698
Assessor Records with Improvements	8,664
Matched Parcel Points	8,632

The following assumptions were made during the analysis:

- The building exposure for flooding, tornado, and HAZMAT is determined from the Assessor records. It is assumed that the population and the buildings are located at the centroid of the parcel.
- The building exposure for earthquake used HAZUS-MH default data.
- The algorithm used to match county-provided parcel point locations with the Assessor records is not perfect. The results in this analysis reflect matched parcel records only. The parcel-matching results for Clark County are included in Table 4-4.
- Population counts are based upon 2.5 persons per household. Only residential occupancy classes are used to determine the impact on the local population. If the event were to occur at night, it would be assumed that people are at home (not school, work, or church).
- The analysis is restricted to the county boundaries. Events that occur near the county boundaries do not contain damage assessments from adjacent counties.

4.2.1.2 Essential Facilities List

Table 4-5 identifies the essential facilities that were added or updated for the analysis. Essential facilities are a subset of critical facilities. A map and list of all critical facilities is included as Appendix F.

Table 4-5: Essential Facilities List

Facility	Number of Facilities
Care Facilities	5
Emergency Operations Centers	6
Fire Stations	7
Police Stations	6
Schools	15

4.2.1.3 Facility Replacement Costs

Facility replacement costs and total building exposure are identified in Table 4-6. The replacement costs have not been updated by local data. Table 4-6 also includes the estimated number of buildings within each occupancy class.

Table 4-6: Building Exposure

General Occupancy	Estimated Total Buildings	Total Building Exposure (X 1000)
Agricultural	184	$29,056
Commercial	374	$136,459
Education	9	$13,008
Government	16	$8,612
Industrial	137	$146,435
Religious/Non-Profit	47	$33,898
Residential	8,857	$870,319
Total	**9,624**	**$1,237,787**

4.3 Future Development

As the county's population continues to grow, the residential and urban areas will extend further into the county, placing more pressure on existing transportation and utility infrastructure while increasing the rate of farmland conversion; Clark County will address specific mitigation strategies in Section 5 to alleviate such issues.

Because Clark County is vulnerable to a variety of natural and technological threats, the county government—in partnership with state government—must make a commitment to prepare for the management of these types of events. Clark County is committed to ensuring that county elected and appointed officials become informed leaders regarding community hazards so that they are better prepared to set and direct policies for emergency management and county response.

4.4 Hazard Profiles

4.4.1 Tornado Hazard

Hazard Definition for Tornado Hazard

Tornadoes pose a great risk to Illinois and its citizens. Tornadoes can occur at any time during the day or night. They can also happen during any month of the year. The unpredictability of tornadoes makes them one of the state's 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 miles per hour, but higher and lower values can occur. A wind velocity of 200 miles per hour 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 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 miles per hour to F5 tornadoes with effective wind speeds of over 260 miles per hour. The Fujita intensity scale is described in Table 4-7.

Table 4-7: 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.

Source: NOAA Storm Prediction Center

Previous Occurrences for Tornado Hazard

Photo by Curt Coffey

There have been several occurrences of tornadoes within Clark County during the past few decades. The NCDC database reported nine tornadoes/funnel clouds in Clark County since 1959. The most recent recorded event occurred on May 25, 2007 during a chain of thunderstorms. The tornado touched down between Casey and Martinsville.

Clark County NCDC recorded tornadoes are identified in Table 4-8. Additional details for NCDC events are included in Appendix D.

Table 4-8: Clark County Tornadoes*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Clark County	06/16/70	Tornado	F0	0	0	3K	0
Clark County	03/20/76	Tornado	F1	0	0	25K	0
Clark County	07/10/82	Tornado	F0	0	0	0K	0
Clark County	06/24/85	Tornado	F0	0	0	3K	0
Clark County	06/13/87	Tornado	F0	0	0	0K	0
Clark County	06/02/90	Tornado	F1	0	0	25K	0
Martinsville	05/14/94	Tornado	F0	0	0	0	0
Westfield	06/01/99	Tornado	F0	0	0	350K	0
Casey	05/25/07	Tornado	F0	0	0	0K	0K

** 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.

A horse and buggy stand amid the remains of the Livingston Hotel and the Til Alcorn home. They were damaged during the tornado in Livingston on May 26, 1917.

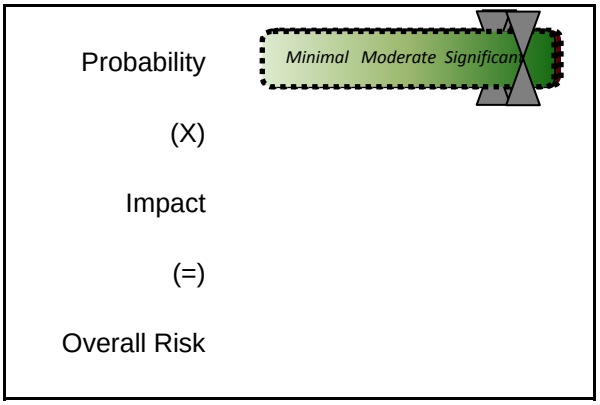
Source: History of Marshall, Illinois and Eastern Clark County, 1978. Photo submitted by William Sullivan ad Harvey Kesler.

Hazard Extent for Tornado Hazard

The historical tornadoes generally moved from southwest to northeast across the county. The extent of the hazard varies both in terms of the extent of the path and the wind speed.

Risk Identification for Tornado Hazard

Based on historical information, the probability of a tornado is high. Tornadoes with varying magnitudes are expected to occur. In Meeting #2, the planning team determined that the potential impact of a tornado is significant; therefore, the overall risk of a tornado hazard for Clark County is severe.



Vulnerability Analysis for Tornado Hazard

Tornadoes can occur within any area in the county; therefore, the entire county population and all buildings are vulnerable to tornadoes. To accommodate this risk, this plan will consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Clark County are discussed in Table 4-6.

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, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Table 4-5 lists the types and numbers of all of the essential facilities in the area. A map and list of all critical facilities is included as Appendix F.

Building Inventory

The building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, and loss of building function (e.g. damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

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 gauge the anticipated impacts of tornadoes in the county, in terms of numbers and types of buildings and infrastructure.

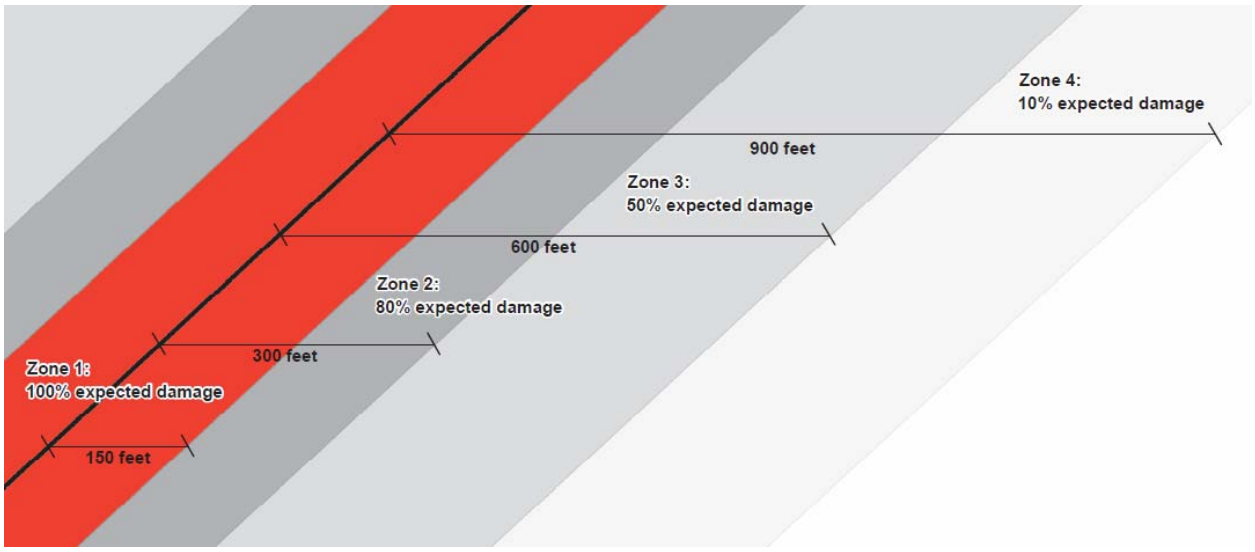
GIS overlay modeling was used to determine the potential impacts of an F4 tornado. The analysis used a hypothetical path based upon the F4 tornado event that ran for 23 miles through Casey, Martinsville, and Marshall. The selected widths were modeled after a recreation of the Fujita-Scale guidelines 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 4-9 depicts tornado damage curves as well as path widths.

Table 4-9: Tornado Path Widths and Damage Curves

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

Within any given tornado path there are degrees of damage. The most intense damage occurs within the center of the damage path with decreasing amounts of damage away from the center. After the hypothetical path is digitized on a map the process is modeled in GIS by adding buffers (damage zones) around the tornado path. Figure 4-2 and Table 4-10 describe the zone analysis. The selected hypothetical tornado path is depicted in Figure 4-3, and the damage curve buffers are shown in Figure 4-4.

Figure 4-2: F4 Tornado Analysis Using GIS Buffers



An F4 tornado has four damage zones, depicted in Table 4-10. Total devastation is estimated within 150 feet of the tornado path. The outer buffer is 900 feet from the tornado path, within which buildings will experience 10% damage.

Table 4-10: F4 Tornado Zones and Damage Curves

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

Figure 4-3: Hypothetical F4 Tornado Path in Clark County

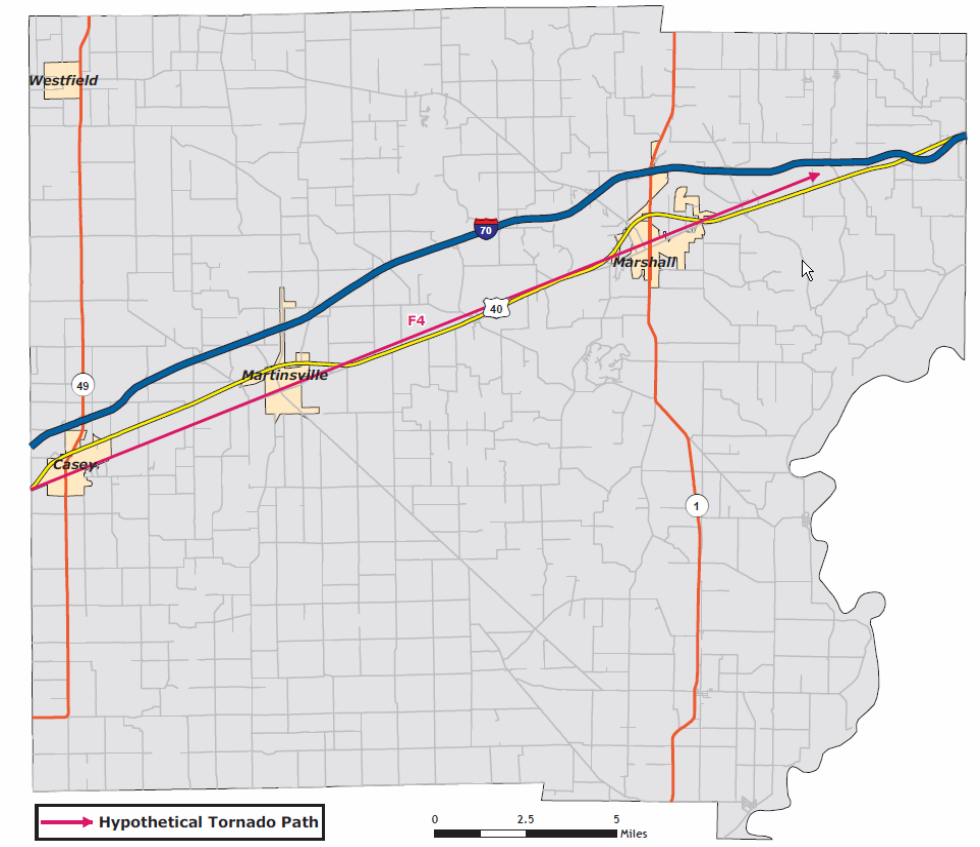
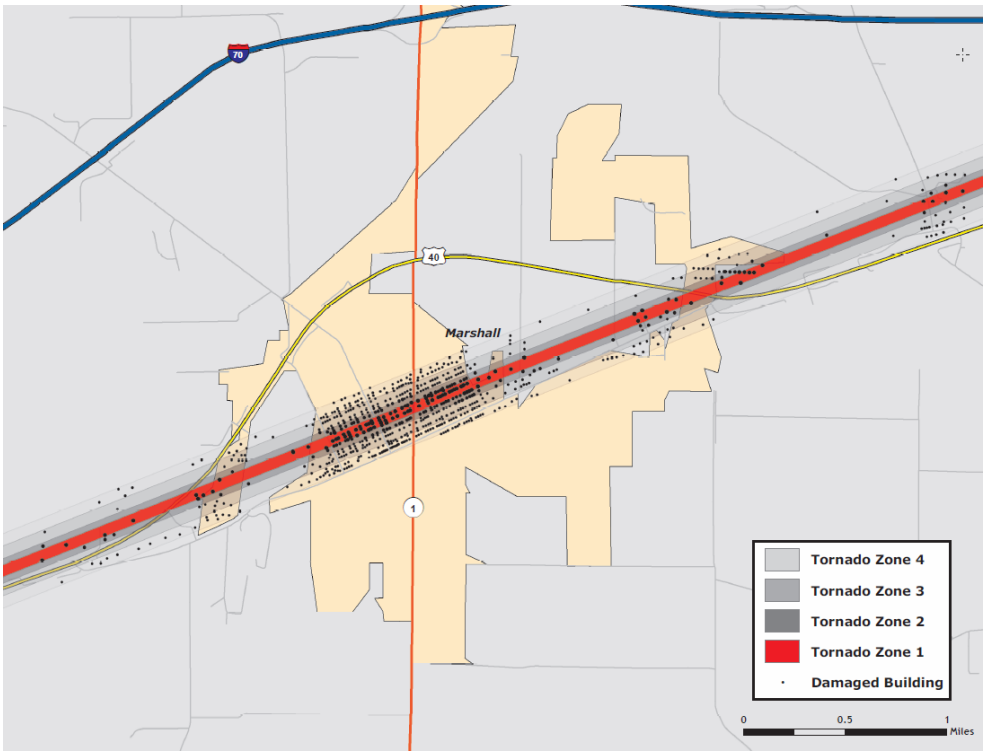


Figure 4-4: Modeled F4 Tornado Damage Buffers in Clark County



The results of the analysis are depicted in Tables 4-11 and 4-12. The GIS analysis estimates that 1,651 buildings will be damaged. The estimated building losses were $51 million. The building losses are an estimate of building replacement costs multiplied by the percentages of damage. The overlay was performed against parcels provided by Clark County that were joined with Assessor records showing property improvement.

The Assessor records often do not distinguish parcels by occupancy class if the parcels are not taxable. For purposes of analysis, the total number of buildings and the building replacement costs for government, religious/non-profit, and education should be lumped together.

Table 4-11: Estimated Numbers of Buildings Damaged by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	187	221	437	417
Commercial	59	59	71	80
Industrial	2	1	1	3
Agriculture	5	4	4	19
Religious	15	10	36	20
Government	0	0	0	0
Education	0	0	0	0
Total	**268**	**295**	**549**	**539**

Table 4-12: Estimated Building Losses by Occupancy Type (X 1000)

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$13,058	$12,084	$11,880	$2,458
Commercial	$2,885	$2,560	$4,504	$937
Industrial	$37	$0	$8	$79
Agriculture	$254	$154	$46	$84
Religious	$0	$0	$0	$0
Government	$0	$0	$0	$0
Education	$0	$0	$0	$0
Total	**$16,234**	**$14,798**	**$16,438**	**$3,558**

Critical Facilities Damage

There are 40 critical facilities located within 900 feet of the hypothetical tornado path. The affected facilities are identified in Table 4-13, and their geographic locations are shown in Figures 4-5 through 4-7.

Table 4-13: Estimated Essential Facilities Affected

Name
Care Facilities
Casey Health Care Center
Villas of Holly Brook
Burnsides Community Health Center
Emergency Centers
Casey EMA
Martinsville ESDA
Clark County EOC
Clark County EMA
Fire Stations
Martinsville Fire Protection District
Marshall Fire Department
Casey Fire Department 1
Casey Fire Department 2
Police Stations
Casey Police Department
Clark County Sheriff
Martinsville Police Department
Clark County E-911
School Facilities
Casey-Westfield Junior High School
Martinsville Junior High School
Martinsville High School
Martinsville Pre-S/Project Help
Martinsville Unit Office
Casey-Westfield Unit Office
Communication Facilities

Name
WKZI 800
WMMC CH 290
Holly Lane Siren
Hazmat Facilities
Casey Fertilizer Co, Inc.
Effingham Equity-Marshall
Ferrellgas Company 1
Ferrellgas Company 2
Illini FS
Littlejohn Grain Inc. 1
Littlejohn Grain Inc 2
Rowe Foundry
Charles Industries Ltd.
Verizon Casey Co.
Natural Gas Facilities
Marathon Pipe Line-Hydrostatic
Marshall West Meter Station
Marshall Town Border Station
Oil Facilities
Marathon Pipe Line LLC
Potable Water Facilities
Marshall WTP
Waste Water Facilities
Casey STP

Figure 4-5: Essential Facilities within Tornado Path in Marshall

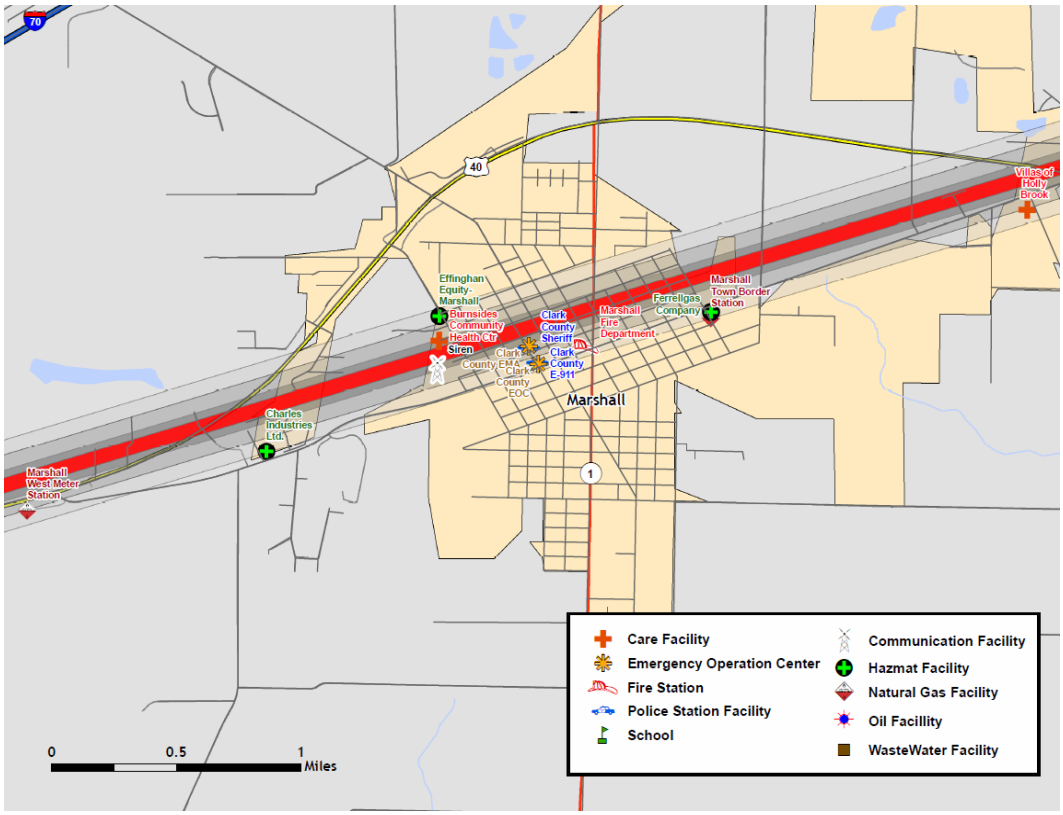


Figure 4-6: Essential Facilities within Tornado Path in Martinsville

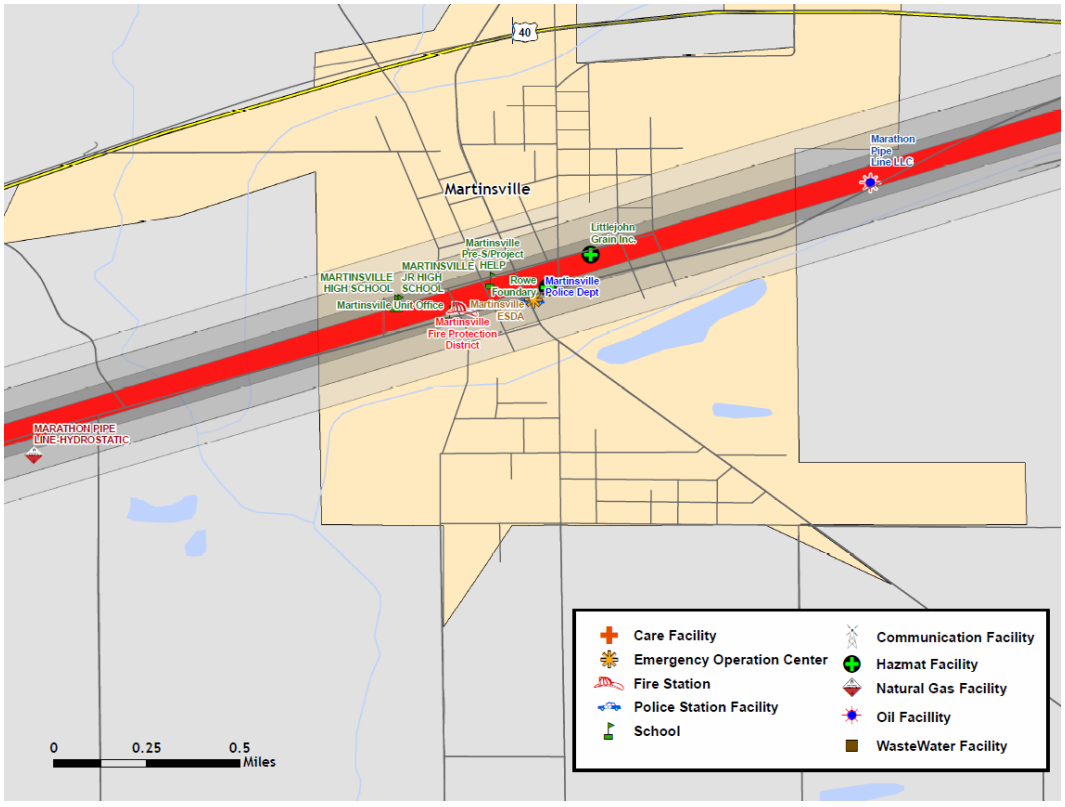
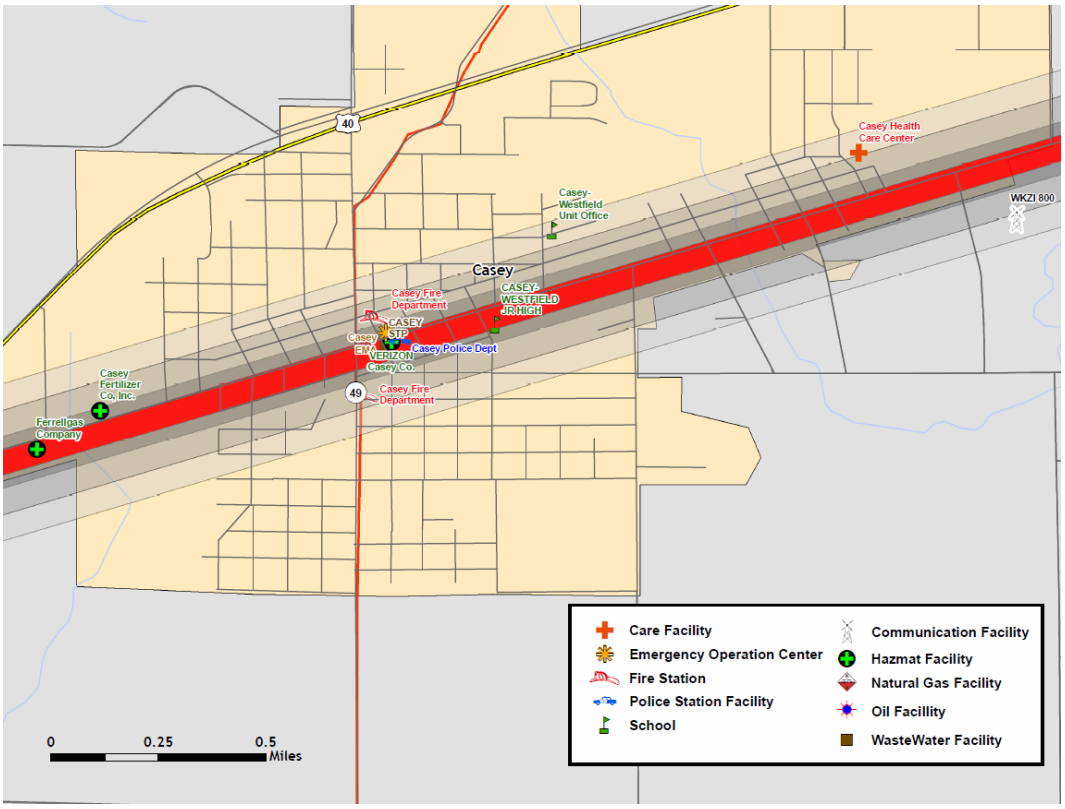


Figure 4-7: Essential Facilities within Tornado Path in Casey



Vulnerability to Future Assets/Infrastructure for Tornado Hazard

The entire population and buildings have been identified as at risk because tornadoes can occur anywhere within the state, 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 Clark County is included in Table 4-6.

All critical facilities in the county and communities within the county are at risk. A map and list of all critical facilities is included as Appendix F.

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 warnings of approaching storms are also vital to preventing the loss of property and ensuring the safety of Clark 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 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 18 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 in which 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.

Flooding west of Bluff Road in Clark County, IL – January 2009
(Source: NWS)

Hazard Definition for Dam and Levee Failure

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

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

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

Previous Occurrences for Flooding

Summer 2008 flooding near Martinsville, IL (Source: NWS)

The NCDC database reported 21 flood events in Clark County since 1959. One of the most recent significant events occurred during the summer of 2008. Several episodes of heavy rain in early June caused extensive flooding in eastern Illinois, which persisted for two weeks. Rainfall totals ranged from 5 to 11 inches between June 2 and June 6, with the majority of the rain falling on June 6. Hundreds of homes and businesses were flooded, and six counties were declared disaster areas with total damages estimated around $3 million. An elderly man was killed on June 5 in neighboring Coles County as he attempted to cross a flooded bridge in his vehicle.

Clark County NCDC recorded floods are identified in Table 4-14. Additional details for NCDC events are included in Appendix D.

Table 4-14: Clark County Previous Occurrences of Flooding*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
West Union	08/04/98	Flash Flood	N/A	0	0	0	0
Countywide	07/11/00	Flash Flood	N/A	0	0	0	0
Countywide	10/04/00	Flash Flood	N/A	0	0	0	0
Casey	02/09/01	Flash Flood	N/A	0	0	0	0
Martinsville	06/05/01	Flash Flood	N/A	0	0	0	0
Countywide	07/08/01	Flash Flood	N/A	0	0	0	0
Countywide	05/07/02	Flash Flood	N/A	0	0	0	0
Statewide	05/07/02	Flood	N/A	0	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Marshall	05/08/02	Flash Flood	N/A	0	0	0	0
Countywide	05/12/02	Flash Flood	N/A	0	0	0	0
Statewide	05/12/02	Flood	N/A	0	1	0	0
West Union	05/27/02	Flash Flood	N/A	0	0	0	0
Marshall	05/10/03	Flash Flood	N/A	0	0	0	0
Countywide	05/30/04	Flash Flood	N/A	0	0	0	0
Statewide	01/15/05	Flood	N/A	0	0	0	0
Casey Muni Arpt	06/06/08	Flash Flood	N/A	0	0	0K	0K
Westfield	06/06/08	Flood	N/A	0	0	500K	0K
Oilfield	02/11/09	Flood	N/A	0	0	0K	0K
Westfield	05/14/09	Flash Flood	N/A	0	0	0K	0K
Dennison	05/25/09	Flash Flood	N/A	0	0	0K	0K
Oilfield	08/19/09	Flash Flood	N/A	0	0	0K	0K

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

Previous Occurrences for Dam and Levee Failure

According to the Clark County planning team, there are no records or local knowledge of any dam or certified levee failure in the county.

Repetitive Loss Properties

FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the NFIP, which has suffered flood loss damage on two occasions during a 10-year period that ends on the date of the second loss, in which the cost to repair the flood damage is 25% of the market value of the structure at the time of each flood loss.

The Illinois Emergency Management Agency (IEMA) was contacted to determine the location of repetitive loss structures. Table 4-15 lists 2009 data for damages to these repetitive loss structures; however, it is recognized that a number of residential properties are under-reported due to property owners' inabilities to pay for flood insurance.

Table 4-15: Clark County Repetitive Loss Structures

Jurisdiction	Occupancy Type	Number of Structures	Number of Losses
Clark County	Single-Family	2	5

Geographic Location for Flooding

Most river flooding occurs in early spring and is the result of excessive rainfall and/or the combination of rainfall and snowmelt. Severe thunderstorms may cause flooding during the summer or fall, but tend to be localized. The primary source of river flooding in Clark County is the Wabash River.

July 25, 1998; Casey, IL
Source: *The Reporter*

Flash floods, brief heavy flows in small streams or normally dry creek beds, also occur within the county. Flash flooding is typically characterized by high-velocity water, often carrying large amounts of debris. Urban flooding involves the overflow of storm drain systems and is typically the result of inadequate drainage following heavy rainfall or rapid snowmelt.

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.

The National Oceanic and Atmospheric Administration (NOAA) Advanced Hydrologic Prediction Service provides information from gauge locations at points along various rivers across the United States. For Clark County, no data is provided.

Geographic Location for Dam and Levee Failure

HAZUS-MH identified 15 dams in Clark County. The maps in Appendix F illustrate the locations of Clark County dams. Table 4-16 summarizes the dam information.

Table 4-16: National Inventory of Dams

Dam Name	River	Hazard	EAP
Snake Trail Campground Lake Dam	Embarass River Tributary	L	N
Craig Lake Dam	Raccoon Creek Tributary	L	Y
Bass Lake Dam	East Fork Mill Creek Tributary	L	N
Martin Tarbel Lake Dam	Mill Creek Tributary	L	N
Lincoln Trail State Park Lake Dam	Sandy Branch Creek	H	Y
Round Grove Sportsman Lake Dam	North Fork Embarass River Tributary	L	N
Sherwood Forest Lake Dam	Willis Branch Tributary	L	N
Mill Creek Structure 9 Dam	Joe's Fork	L	N
Mill Creek Structure 1 Dam	Mill Creek	S	N
Mill Creek Structure 8 Dam	Blackburn Branch	L	Y
No Name 2043	Ashmore Creek Tributary-Offstream	L	N
Mill Creek Watershed-Str 6	Auburn Branch	S	N
Mill Creek Watershed-Str 2	Mill Creek West Tributary	S	N
Newman's Lake Dam	Kettering Branch Northeast Tributary	L	N
Lashbrook Pond Dam	Mill Creek Northeast Tributary	L	N

A review of the United States Army Corps of Engineers and local records revealed no certified levees within Clark County; however, aerial photography revealed a number of agricultural levees.

** The dams and levees listed in this multi-hazard mitigation plan are recorded from default HAZUS-MH data. Their physical presences were not confirmed; therefore, new or unrecorded structures may exist. A more complete list of locations is included in Appendix F.*

Hazard Extent for Flooding

The HAZUS-MH flood model is designed to generate a flood depth grid and flood boundary polygon by deriving hydrologic and hydraulic information based on user-provided elevation data or by incorporating selected output from other flood models. HAZUS-MH also has the ability to clip a Digital Elevation Model (DEM) with a user-provided flood boundary, thus creating a flood depth grid. For Clark County, HAZUS-MH was used to extract flood depth by clipping the DEM with the IDNR FIRMs Base Flood Elevation (BFE) boundary. The BFE is defined as the area that has a 1% chance of flooding in any given year.

Flood hazard scenarios were modeled using GIS analysis and HAZUS-MH. The flood hazard modeling was based on historical occurrences and current threats. Existing flood maps were used to identify the areas of study. These digital files, although not official FIRMs, provided the boundary which was the basis for this analysis. Planning team input and a review of historical information provided additional information on specific flood events.

Hazard Extent for Dam and Levee Failure

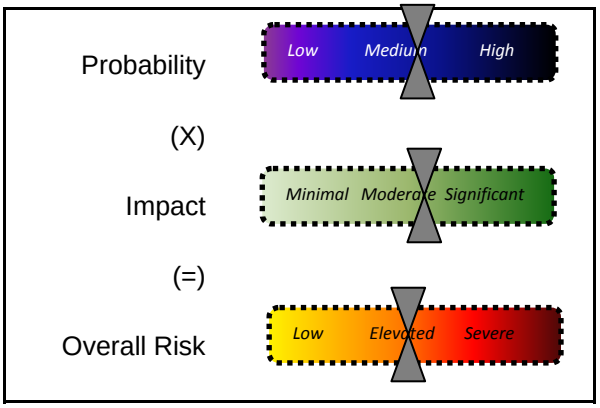
When dams are assigned the low (L) hazard potential classification, it means that failure or incorrect operation of the dam will result in no human life losses and no economic or environmental losses. Losses are principally limited to the owner's property. Dams assigned the significant (S) hazard classification are those dams in which failure or incorrect operation results in no probable loss of human life; however it can cause economic loss, environment damage, and disruption of lifeline facilities. Dams classified as significant hazard potential dams are often located in predominantly rural or agricultural areas, but could be located in populated areas with a significant amount of infrastructure. Dams assigned the high (H) hazard potential classification are those dams in which failure or incorrect operation has the highest risk to cause loss of human life and significant damage to buildings and infrastructure.

According to default HAZUS-MH data, one dam is classified as high hazard and three dams have Emergency Action Plans (EAP). An EAP is not required by the State of Illinois but is strongly recommended by the Illinois Department of Natural Resources.

Accurate mapping of the risks of flooding behind levees depends on knowing the condition and level of protection the levees actually provide. FEMA and the U.S. Army Corps of Engineers are working together to make sure that flood hazard maps clearly reflect the flood protection capabilities of levees, and that the maps accurately represent the flood risks posed to areas situated behind them. Levee owners—usually states, communities, or in some cases private individuals or organizations—are responsible for ensuring that the levees they own are maintained according to their design. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove the levee meets design, operation, and maintenance standards for protection against the one-percent-annual chance flood.

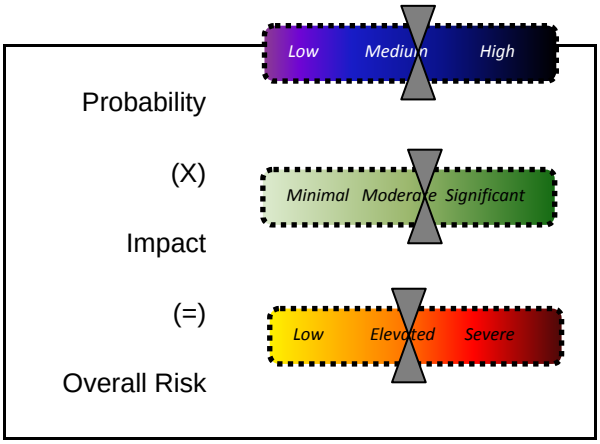
Risk Identification for Flood Hazard

Based on historical information, the probability of a flood is medium. In Meeting #2, the planning team determined that the potential impact of a flood is moderate; therefore, the overall risk of a flood hazard for Clark County is elevated.



Risk Identification for Dam/Levee Failure

Based on historical information, the probability of dam/levee failure is low. In Meeting #2, the planning team determined that the potential impact of dam/levee failure is minimal; therefore, the overall risk of dam/levee failure for Clark County is low.



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

HAZUS-MH generated the flood depth grid for a 100-year return period by clipping the IGS 1/3 ArcSecond (approximately 10 meters) Digital Elevation Model (DEM) to the Clark County flood boundary. Next, HAZUS-MH utilized a user-defined analysis of Clark County with site-specific parcel data provided by the county.

HAZUS-MH estimates the 100-year flood would damage 117 buildings at a replacement cost of $1.9 million. The total estimated numbers of damaged buildings are given in Table 4-17. Figure 4-8 depicts the Clark County parcel points that fall within the 100-year floodplain. Figures 4-9 and 4-10 highlight damaged buildings within the floodplain areas in Martinsville and Marshall.

Table 4-17: Clark County HAZUS-MH Building Damage

General Occupancy	Number of Buildings Damaged	Total Building Damage (x1000)
Residential	46	$458
Commercial	2	$42
Industrial	0	$0
Agricultural	62	$1,396
Religious	7	$0
Government	0	$0
Education	0	$0
Total	**117**	**$1,896**

Figure 4-8: Clark County Buildings in Floodplain (100-Year Flood)

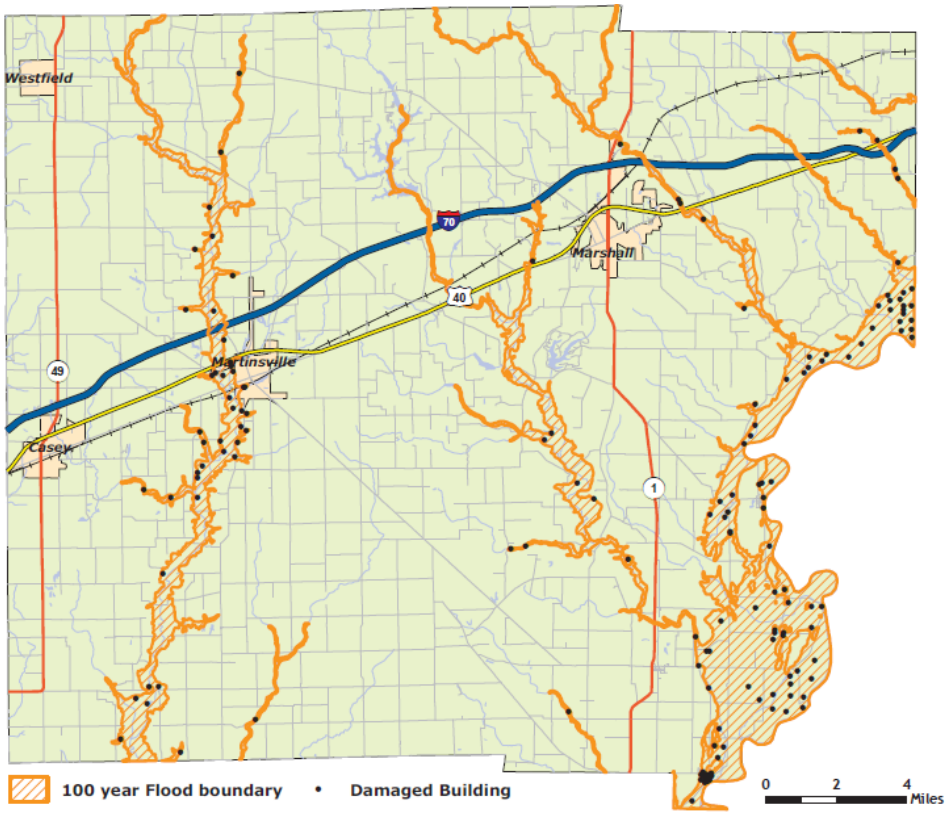


Figure 4-9: Clark County Urban Areas (Martinsville) Flood-Prone Areas (100-Year Flood)

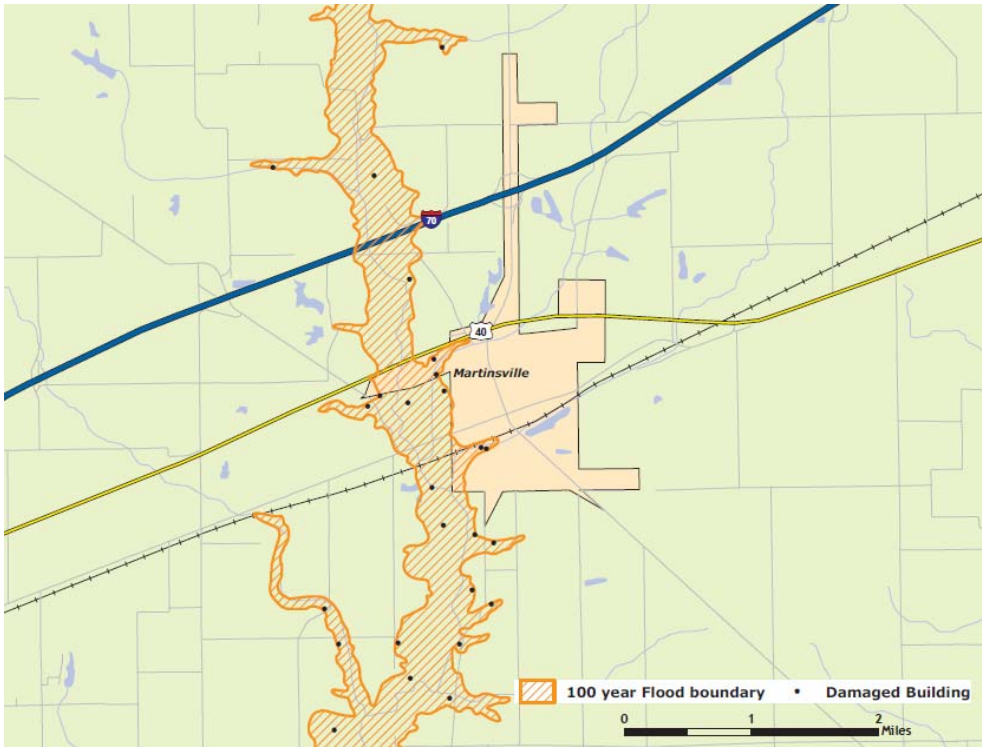
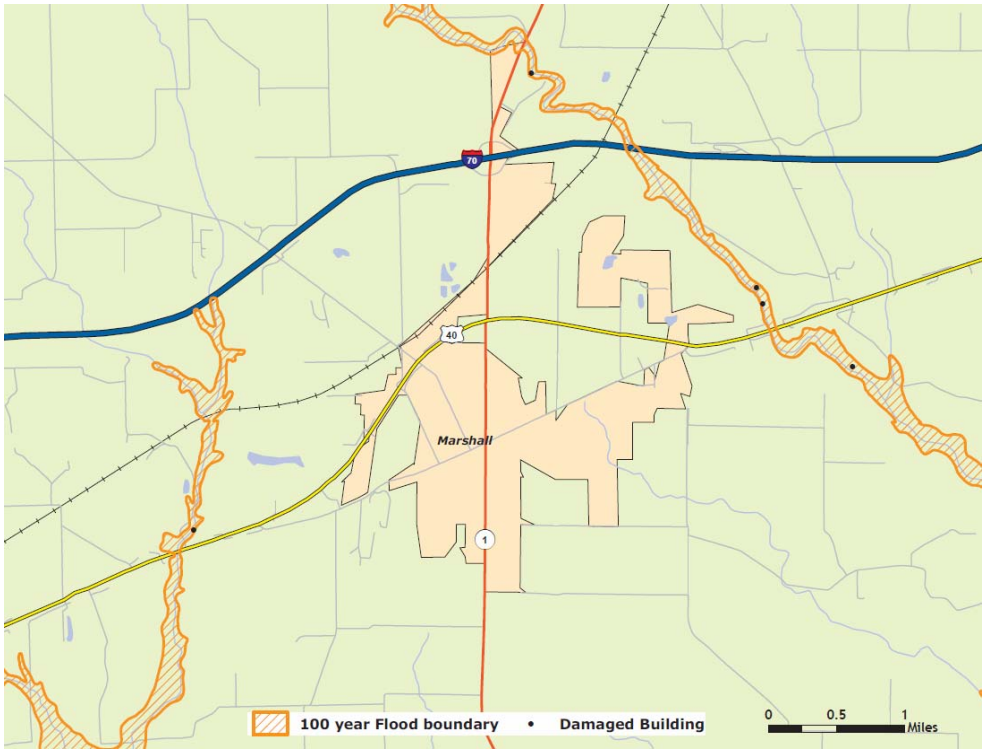


Figure 4-10: Clark County Urban Areas (Marshall) Flood-Prone Areas (100-Year Flood)

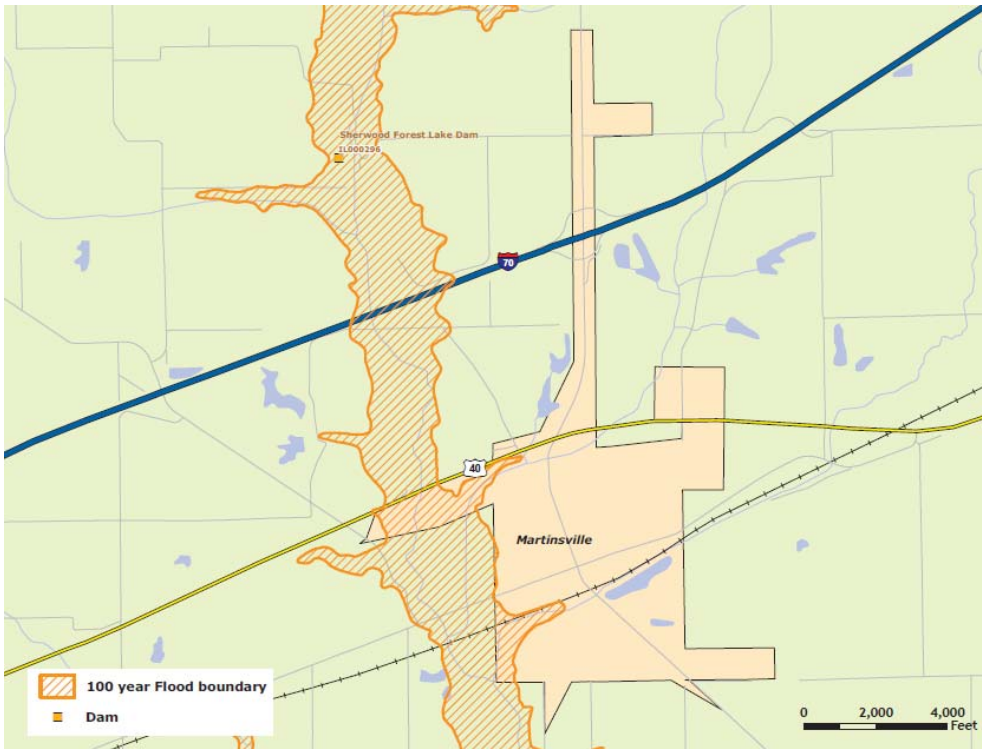


Critical Facilities

A critical 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 map and list of all critical facilities is included as Appendix F.

The analysis identified Sherwood Forest Lake Dam as the only critical facility subject to flooding. Figure 4-11 shows the location of the vulnerable dam.

Figure 4-11: Boundary of 100-Year Flood Overlaid with Critical 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 also fail or become impassable, causing traffic risks.

Vulnerability Analysis for Flash Flooding

Flash flooding could affect any location within this jurisdiction; therefore, the entire county's population and buildings are vulnerable to a flash flood. These structures can expect the same impacts as discussed in a riverine flood. A map and list of all critical facilities is included as Appendix F.

Vulnerability Analysis for Dam and Levee Failure

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

Vulnerability to Future Assets/Infrastructure for Flooding

Flash flooding may affect nearly every location within the county; therefore all buildings and infrastructure are vulnerable to flash flooding. Currently, the Clark County Board reviews new development for compliance with the local ordinance. At this time no construction is planned within the area of the 100-year floodplain. Therefore, there is no new construction which will be vulnerable to a 100-year flood.

Vulnerability to Future Assets/Infrastructure for Dam and Levee Failure

The Clark County Board reviews new development for compliance with the local ordinance.

Analysis of Community Development Trends

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

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, the forces of plate tectonics have shaped Earth as the huge plates that form the earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing 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 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 shows 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 huge destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill 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.

The possibility of the occurrence of a catastrophic earthquake in the central and eastern United States is real as evidenced by history and described throughout this section. The impacts of significant earthquakes affect large areas, terminating public services and systems needed to aid the suffering and displaced. These impaired systems are interrelated in the hardest struck zones. Power lines, water and sanitary lines, and public communication may be lost; and highways, railways, rivers, and ports may not allow transportation to the affected region. Furthermore, essential facilities, such as fire and police departments and hospitals, may be disrupted if not previously improved to resist earthquakes.

As with hurricanes, mass relocation may be necessary, but the residents who are suffering from the earthquake can neither leave the heavily impacted areas nor receive aid or even communication in the aftermath of a significant event.

Magnitude, which is determined from measurements on seismographs, measures the energy released at the source of the earthquake. Intensity measures the strength of shaking produced by the earthquake at a certain location and is determined from effects on people, human structures, and the natural environment. Tables 4-18 and 4-19 list 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

Previous Occurrences for Earthquake Hazard

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.

Seismic activity on the New Madrid Seismic Zone of southeastern Missouri is very significant both historically and at present. 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.

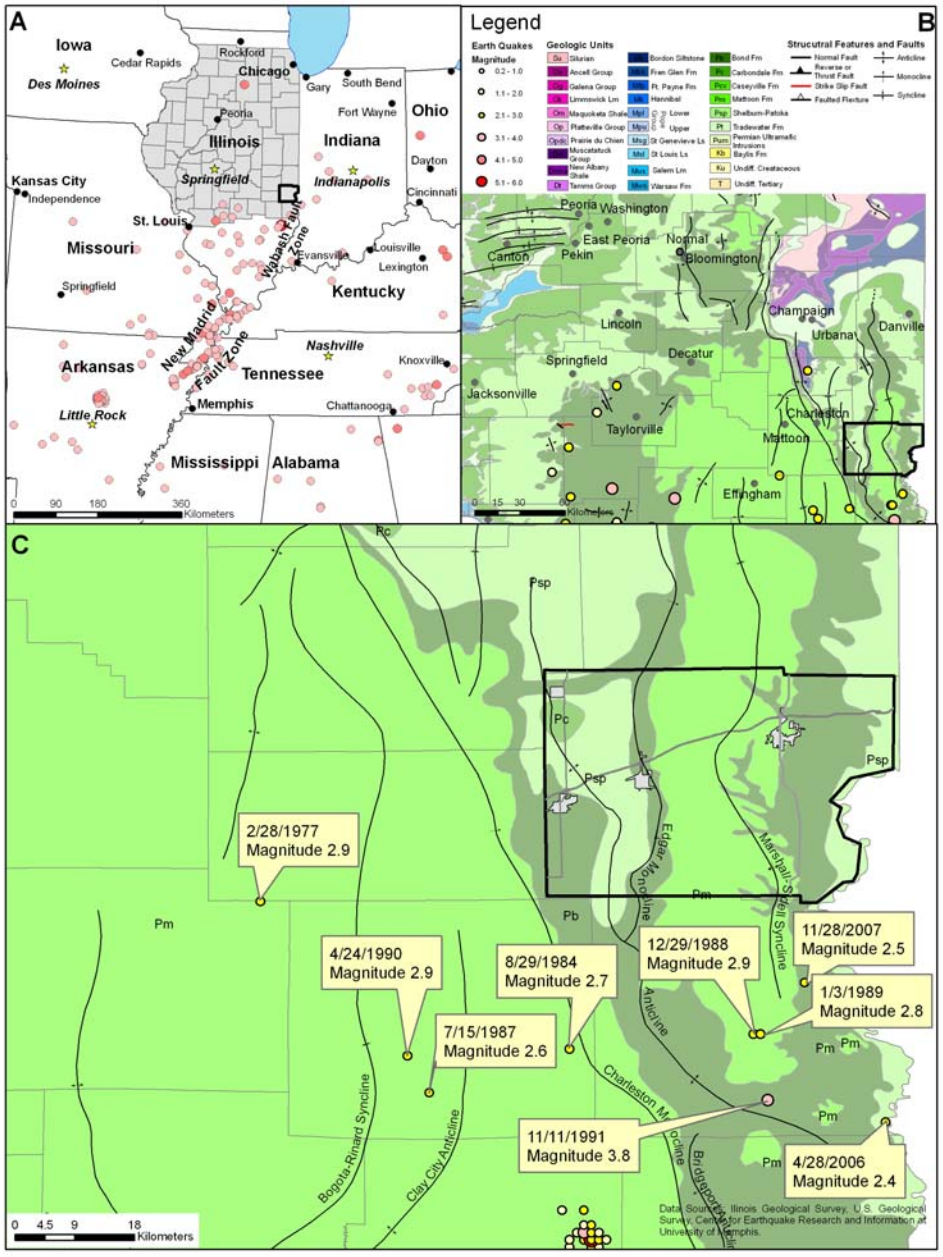
Above text adapted from http://earthquake.usgs.gov/regional/states/illinois/history.php and from Seismicity of the United States, 1568-1989 (Revised), C.W. Stover and J.L. Coffman, U.S. Geological Survey Professional Paper 1527, United States Government Printing Office, Washington: 1993.

Geographic Location for Earthquake Hazard

Clark 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. There have been no earthquake epicenters recorded in Clark County since 1974.

Figure 4-12 depicts the following: a) Location of notable earthquakes in the Illinois region with inset of Clark County; b) Generalized geologic bedrock map with earthquake epicenters, geologic structures, and inset of Clark County; c) Geologic and earthquake epicenter map of Clark County.

Figure 4-12 a, b, c: Clark County Earthquakes

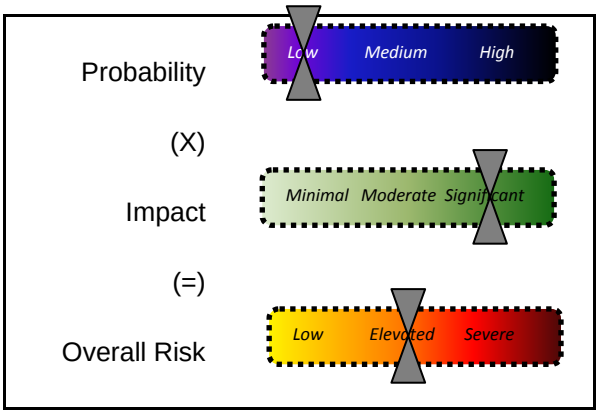


Hazard Extent for Earthquake Hazard

The extent of the earthquake is countywide. One of the most critical sources of information that is required for accurate assessment of earthquake risk is soils data. A National Earthquake Hazards Reduction Program (NEHRP) compliant soils map was used for the analysis which was provided by ISGS. The map identifies the soils most susceptible to failure.

Risk Identification for Earthquake Hazard

Based on historical information, the probability of an earthquake is low; however, USGS research and studies attest that future earthquakes in Clark County are possible. In Meeting #2, the planning team determined that the potential impact of an earthquake is significant; therefore, the overall risk of an earthquake hazard for Clark County is elevated.



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. a damaged police station will no longer be able to serve the community). A map and list of all critical facilities is included as Appendix F.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. 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 residents to seek shelter).

Infrastructure

During an earthquake, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan, it is important to emphasize that any number of these items could become damaged in the event of an earthquake. The impacts to these items include broken, failed, or impassable roadways, broken or failed utility lines (e.g. loss of power or gas to community), and

railway failure from broken or impassable railways. Bridges could also fail or become impassable causing traffic risks. Typical scenarios are described to gauge the anticipated impacts of earthquakes in the county in terms of numbers and types of buildings and infrastructure.

The Polis-SIU team reviewed existing geological information and recommendations for earthquake scenarios. Four earthquake scenarios—two based on deterministic scenarios and two based on probabilistic scenarios—were developed to provide a reasonable basis for earthquake planning in Clark 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.

The first deterministic scenario was a 7.1 magnitude epicenter along the Wabash Valley fault zone. Shake maps provided by USGS were used in HAZUS-MH to estimate losses for Clark County based on this event.

The second deterministic scenario was a moment magnitude of 5.5 with the epicenter located in Clark County. This scenario was selected based upon the opinion of the Illinois State Geological Survey (ISGS) stating it could occur in the selected location and that it would therefore represent a realistic scenario for planning purposes.

Additionally, the analysis included two different types of probabilistic scenarios. These types of scenarios are based on ground shaking parameters derived from U.S. Geological Survey probabilistic seismic hazard curves. The first probabilistic scenario was a 500-year return period scenario. This scenario evaluates the average impacts of a multitude of possible earthquake epicenters with a magnitude that would be typical of that expected for a 500-year return period. The second probabilistic scenario allowed calculation of annualized loss. The annualized loss analysis in HAZUS-MH provides a means for averaging potential losses from future scenarios while considering their probabilities of occurrence. The HAZUS-MH earthquake model evaluates eight different return period scenarios for the 100-, 250-, 500-, 750-, 1000-, 1500-, 2000-, and 2500-year return period earthquake events. HAZUS-MH then calculates the probabilities of these events as well as the interim events, calculates their associated losses, and sums these losses to calculate an annualized loss. These analysis options were chosen because they are useful for prioritization of seismic reduction measures and for simulating mitigation strategies.

The following earthquake hazard modeling scenarios were performed:

- 7.1 magnitude earthquake on the Wabash Valley Fault System
- 5.5 magnitude earthquake local epicenter
- 500-year return period event
- Annualized earthquake loss

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. Fortunately, a National Earthquake Hazards Reduction Program (NEHRP) soil classification map exists for Illinois. NEHRP soil classifications portray the degree of shear-wave amplification that can occur during ground shaking. ISGS supplied the soils map that was

used for the analysis. FEMA provided a map for liquefaction potential that was used by HAZUS-MH.

An earthquake depth of 10.0 kilometers was selected based on input from ISGS. HAZUS-MH also requires the user to define an attenuation function unless ground motion maps are supplied. The decision was made to use the Central Eastern United States (CEUS) attenuation function. The probabilistic return period analysis and the annualized loss analysis do not require user input.

The building losses are broken 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 7.1 Magnitude Earthquake Wabash Valley Scenario

The results of the 7.1 Wabash Valley earthquake are depicted in Table 4-20, Table 4-21, and Figure 4-13. HAZUS estimates that approximately 166 buildings will be at least moderately damaged. This is more than 2% of the total number of buildings in the region. It is estimated that no building will be damaged beyond repair.

The total building related losses totaled $23.3 million; 6% 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 55% of the total loss.

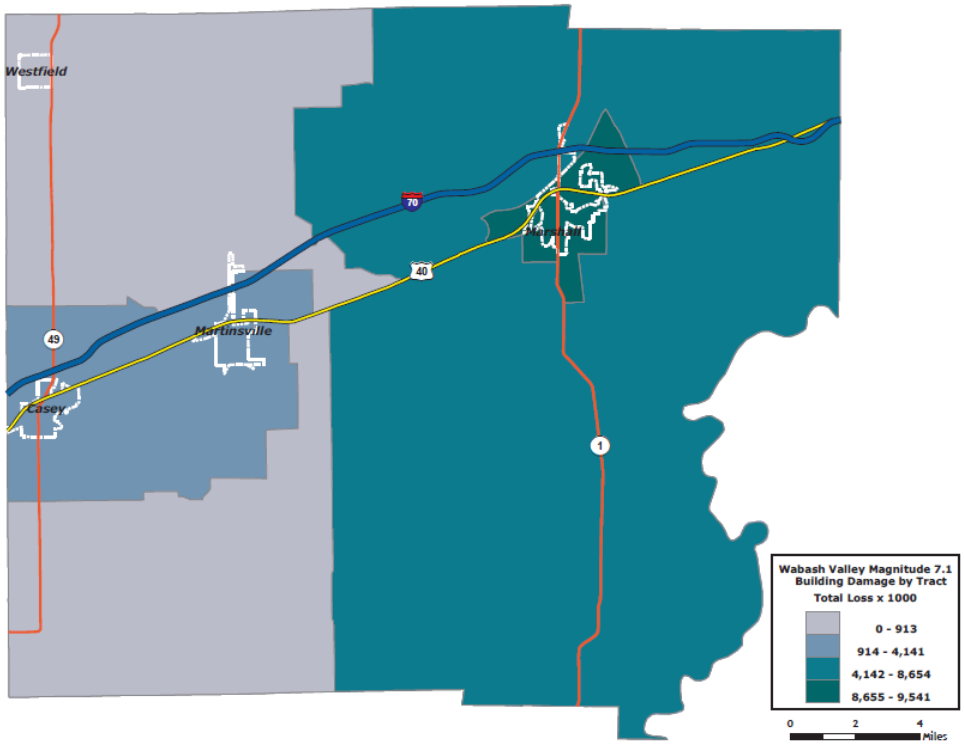
Table 4-20: Wabash Valley Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	156	1.80	21	2.68	7	4.23	0	6.56	0	3.07
Commercial	327	3.76	36	4.71	10	6.37	0	9.79	0	5.66
Education	8	0.09	1	0.11	0	0.13	0	0.18	0	0.22
Government	14	0.16	1	0.18	0	0.21	0	0.26	0	0.28
Industrial	121	1.40	12	1.53	4	2.28	0	3.50	0	1.52
Other Residential	2,220	25.54	284	37.10	77	47.66	1	24.96	0	17.57
Religion	40	0.46	5	0.67	1	0.88	0	1.32	0	1.20
Single Family	5,805	66.78	406	53.03	62	38.25	2	53.43	0	70.48
Total	8,693		766		161		5		0	

Table 4-21: 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	0.04	0.15	0.03	0.03	0.24
	Capital-Related	0.00	0.02	0.16	0.02	0.01	0.19
	Rental	0.07	0.06	0.10	0.03	0.01	0.27
	Relocation	0.24	0.09	0.12	0.07	0.07	0.59
	Subtotal	**0.31**	**0.20**	**0.53**	**0.14**	**0.12**	**1.29**
Capital Stock Losses							
	Structural	0.46	0.14	0.14	0.16	0.14	1.04
	Non_Structural	5.64	1.49	1.57	2.22	0.99	11.92
	Content	3.91	0.64	1.30	1.82	0.89	8.57
	Inventory	0.00	0.00	0.04	0.33	0.06	0.43
	Subtotal	**10.02**	**2.27**	**3.06**	**4.52**	**2.09**	**21.96**
	Total	**10.32**	**2.47**	**3.58**	**4.66**	**2.21**	**23.25**

Figure 4-13: Wabash Valley Scenario-Building Economic Losses in Thousands of Dollars



Wabash Valley Scenario—Essential Facility Losses

Before the earthquake, the region had 555 care beds available for use. On the day of the earthquake, the model estimates that only 190 care beds (34%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 85% of the beds will be back in service. By day 30, 96% will be operational.

Results for 5.5 Magnitude Earthquake in Clark County

The results of the initial analysis, the 5.5 magnitude earthquake with an epicenter in the City of Marshall, are depicted in Tables 4-22 and 4-23 and Figure 4-14. HAZUS estimates that approximately 1,672 buildings will be at least moderately damaged. This is more than 17% of the total number of buildings in the region. It is estimated that 75 buildings will be damaged beyond repair.

The total building related losses totaled $114.5 million; 16% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which comprised more than 60% of the total loss.

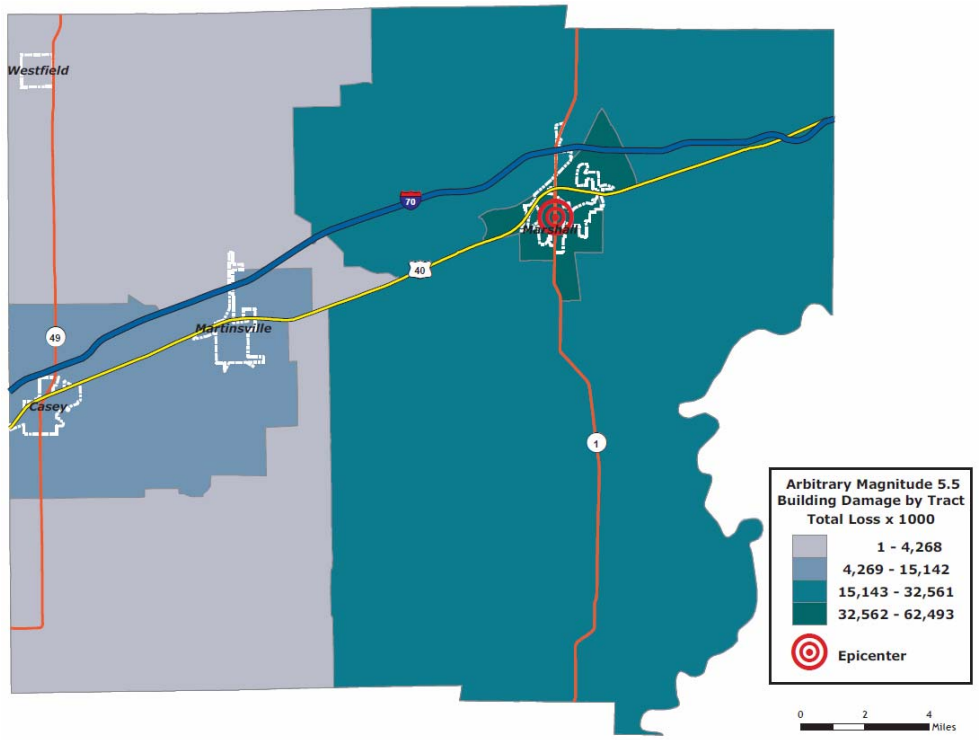
Table 4-22: Clark County 5.5M Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	102	1.75	34	1.60	33	2.62	13	3.78	2	3.01
Commercial	214	3.69	72	3.36	61	4.84	23	6.56	5	6.40
Education	5	0.09	2	0.08	2	0.12	1	0.17	0	0.23
Government	9	0.16	3	0.13	3	0.21	1	0.25	0	0.31
Industrial	82	1.41	24	1.12	22	1.72	8	2.40	1	1.99
Other Residential	1,441	24.84	572	26.59	429	34.27	119	34.62	21	27.66
Religion	25	0.43	10	0.46	8	0.64	3	0.93	1	1.10
Single Family	3,923	67.63	1,434	66.68	697	55.58	176	51.29	45	59.29
Total	5,800		2,151		1,253		344		75	

Table 4-23: Clark 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	1.44	1.66	0.34	0.26	3.69
	Capital-Related	0.00	0.60	1.63	0.21	0.07	2.50
	Rental	1.25	0.96	0.97	0.25	0.12	3.54
	Relocation	4.61	0.82	1.44	0.64	1.01	8.53
	Subtotal	**5.86**	**3.81**	**5.70**	**1.43**	**1.46**	**18.27**
Capital Stock Loses							
	Structural	6.50	1.42	1.76	1.78	1.67	13.14
	Non_Structural	28.20	7.57	6.07	7.86	3.84	53.54
	Content	12.40	2.54	4.06	6.52	2.76	28.28
	Inventory	0.00	0.00	0.13	0.96	0.15	1.24
	Subtotal	**47.11**	**11.53**	**12.02**	**17.11**	**8.42**	**96.20**
	Total	**52.97**	**15.34**	**17.72**	**18.54**	**9.88**	**114.46**

Figure 4-14: Clark County 5.5M Scenario-Building Economic Losses in Thousands of Dollars



Clark County 5.5M Scenario—Essential Facility Losses

Before the earthquake, the region had 555 care beds available for use. On the day of the earthquake, the model estimates that only 53 care beds (10%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 62% of the beds will be back in service. By day 30, 83% will be operational.

Results 500-Year Probabilistic Scenario

The results of the 500-year probabilistic analysis are depicted in Tables 4-24 and 4-25. HAZUS-MH estimates that approximately 487 buildings will be at least moderately damaged. This is more than 5% of the total number of buildings in the region. It is estimated that seven buildings will be damaged beyond repair. The total building-related losses totaled $18.2 million; 24% 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 53% of the total loss.

Table 4-24: 500-Year Probabilistic Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	140	1.73	24	2.42	15	3.72	4	5.37	0	3.59
Commercial	292	3.59	50	4.93	26	6.37	6	8.74	0	6.69
Education	7	0.09	1	0.12	1	0.16	0	0.19	0	0.25
Government	13	0.16	2	0.20	1	0.27	0	0.28	0	0.36
Industrial	105	1.30	18	1.79	11	2.65	2	3.72	0	2.10
Other Residential	2,059	25.32	325	32.33	176	42.51	20	30.49	2	23.44
Religion	38	0.46	6	0.55	3	0.73	1	1.03	0	1.02
Single Family	5,477	67.36	580	57.66	181	43.60	33	50.19	5	62.55
Total	8,131		1,006		414		66		7	

Table 4-25: 500-Year Probabilistic Scenario-Building Economic Losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.14	0.52	0.13	0.07	0.86
	Capital-Related	0.00	0.06	0.48	0.08	0.02	0.64
	Rental	0.26	0.17	0.31	0.07	0.03	0.83
	Relocation	0.97	0.24	0.46	0.20	0.27	2.13
	Subtotal	1.24	0.60	1.77	0.47	0.39	4.46
Capital Stock Losses							
	Structural	1.36	0.35	0.51	0.52	0.48	3.22
	Non_Structural	3.84	0.99	1.02	1.09	0.58	7.53
	Content	1.07	0.20	0.50	0.74	0.31	2.82
	Inventory	0.00	0.00	0.02	0.15	0.02	0.19
	Subtotal	6.28	1.54	2.05	2.50	1.39	13.76
	Total	7.52	2.14	3.81	2.97	1.78	18.23

500-Year Probabilistic Scenario—Essential Facility Losses

Before the earthquake, the region had 555 care beds available for use. On the day of the earthquake, the model estimates that only 102 care beds (18%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 84% of the beds will be back in service. By day 30, 97% will be operational.

Results Annualized Risk Scenario

HAZUS-MH estimates that approximately 362 buildings will be at least moderately damaged. This is approximately 4% of the total number of buildings in the region. It is estimated that two buildings will be damaged beyond repair.

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 that is susceptible to liquefaction.

In Meeting #4, the MHMP team discussed specific mitigation strategies for potential earthquake hazards. The discussion included strategies to harden and protect future, as well as existing, structures against the possible termination of public services and systems including power lines, water and sanitary lines, and public communication.

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, or frequent lightning. Severe thunderstorms most frequently occur in Illinois during the spring and summer months, 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 or 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 miles per hour

Hail

Hail is 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 damage in other areas near the storm. Hailstones range from pea-sized to baseball-sized, but hailstones larger than softballs have been reported on rare occasions.

Lightning

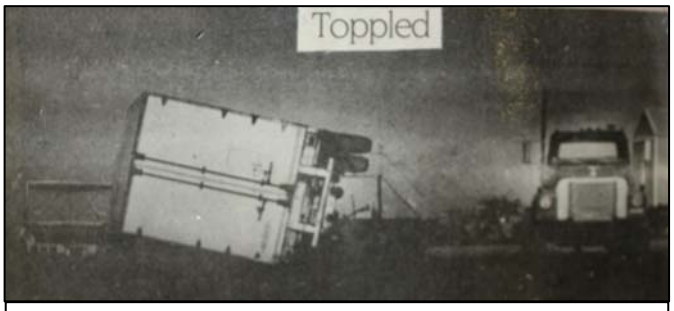
Lightning is a discharge of electricity from a thunderstorm. Lightning is often perceived as a minor hazard, but in reality lightning causes damage to many structures and kills or severely injures numerous people in the United States each year.

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 20 hail storms in Clark County since 1959. Hail storms occur nearly every year in the late spring and early summer months. The most recent reported occurrence was in June 2008 when storms blew down a number of trees and power lines.



April 1989: 68 mph winds in Casey toppled a parked semi-trailer. Source: *Casey Daily Reporter*; photo by Greg Gravenier

Clark County hail storms are identified in Table 4-26. Additional details for NCDC events are included in Appendix D.

Table 4-26: Clark County Hail Storms*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Clark County	06/15/82	Hail	1.00 in.	0	0	0	0
Clark County	05/01/83	Hail	1.00 in.	0	0	0	0
Clark County	04/27/84	Hail	1.75 in.	0	0	0	0
Clark County	04/22/88	Hail	1.75 in.	0	0	0	0
Clark County	05/25/89	Hail	1.75 in.	0	0	0	0
Dennison	07/02/96	Hail	1.75 in.	0	0	0	0
Clark County	07/29/96	Hail	1.75 in.	0	0	0	0
Westfield	06/21/97	Hail	1.75 in.	0	0	0	0
Martinsville	05/09/00	Hail	1.00 in.	0	0	0	0
Marshall	05/17/01	Hail	0.75 in.	0	0	0	0
Marshall	05/08/02	Hail	1.00 in.	0	0	0	0
Casey	06/04/02	Hail	0.75 in.	0	0	0	0
Marshall	08/02/02	Hail	0.75 in.	0	0	0	0
Casey	05/14/03	Hail	1.00 in.	0	0	0	0
Clarksville	05/30/04	Hail	1.75 in.	0	0	0	0
Marshall	08/18/04	Hail	0.75 in.	0	0	0	0
Martinsville	05/17/06	Hail	1.00 in.	0	0	0	0
Moriah	04/11/07	Hail	0.75 in.	0	0	0K	0K
Darwin	06/09/08	Hail	1.75 in.	0	0	0K	0K
Casey	06/27/08	Hail	0.88 in.	0	0	0K	0K

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

The NCDC database reported no occurrences of significant lightning strikes in Clark County since 1959.

The NCDC database identified 69 wind storms reported since 1959, the most recent of which was reported in August 2009 when storms produced wind gusts between 60 and 70 miles per hour.

As shown in Table 4-27, wind storms have historically occurred year-round with the greatest frequency and damage between May and July. The following table includes available top wind speeds for Clark County.

Table 4-27: Clark County Wind Storms*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Clark County	04/01/74	Tstm Wind	0 kts.	0	0	0	0
Clark County	06/20/79	Tstm Wind	0 kts.	0	0	0	0
Clark County	08/20/79	Tstm Wind	0 kts.	0	0	0	0
Clark County	04/08/80	Tstm Wind	0 kts.	0	0	0	0
Clark County	08/31/80	Tstm Wind	0 kts.	0	0	0	0
Clark County	05/20/82	Tstm Wind	56 kts.	0	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Clark County	06/15/82	Tstm Wind	0 kts.	0	0	0	0
Clark County	07/10/82	Tstm Wind	0 kts.	0	0	0	0
Clark County	05/01/83	Tstm Wind	0 kts.	0	0	0	0
Clark County	03/15/84	Tstm Wind	0 kts.	0	0	0	0
Clark County	06/13/87	Tstm Wind	0 kts.	0	0	0	0
Clark County	07/06/87	Tstm Wind	0 kts.	0	0	0	0
Clark County	04/26/89	Tstm Wind	0 kts.	0	0	0	0
Clark County	05/12/90	Tstm Wind	0 kts.	0	0	0	0
Clark County	07/09/92	Tstm Wind	0 kts.	0	0	0	0
Clark County	07/16/92	Tstm Wind	61 kts.	0	0	0	0
Marshall	06/21/95	Tstm Winds	0 kts.	0	0	0	0
Statewide	03/25/96	High Wind	0 kts.	1	0	0	0
Statewide	04/28/96	High Wind	53 kts.	0	0	0	0
Walnut Prairie	05/08/96	Tstm Wind	0 kts.	0	0	0	0
Martinsville	06/17/96	Tstm Wind	0 kts.	0	0	0	0
Casey	10/17/96	Tstm Wind	0 kts.	0	0	0	0
Statewide	04/06/97	High Wind	56 kts.	0	0	0	0
Statewide	04/30/97	High Wind	61 kts.	0	1	38K	0
Westfield	04/30/97	Tstm Wind	0 kts.	0	0	8K	0
Marshall	06/21/97	Tstm Wind	0 kts.	0	0	0	0
Countywide	06/12/98	Tstm Wind	0 kts.	0	0	0	0
Martinsville	06/18/98	Tstm Wind	0 kts.	0	0	0	0
Melrose	06/28/98	Tstm Wind	0 kts.	0	0	0	0
Countywide	06/29/98	Tstm Wind	0 kts.	0	0	0	0
Casey	07/22/98	Tstm Wind	0 kts.	0	0	0	0
Clarksville	07/22/98	Tstm Wind	0 kts.	0	0	0	0
Marshall	11/10/98	Tstm Wind	0 kts.	0	0	0	0
Statewide	11/10/98	High Wind	57 kts.	0	1	60K	0
Darwin	04/08/99	Tstm Wind	0 kts.	0	0	0	0
Martinsville	06/01/99	Tstm Wind	0 kts.	0	0	0	0
Countywide	06/04/99	Tstm Wind	0 kts.	0	0	0	0
Countywide	05/09/00	Tstm Wind	0 kts.	0	0	0	0
Marshall	06/20/00	Tstm Wind	0 kts.	0	0	0	0
West Union	07/28/00	Tstm Wind	0 kts.	0	0	0	0
Casey	09/07/01	Tstm Wind	50 kts.	0	0	0	0
Marshall	10/24/01	Tstm Wind	50 kts.	0	0	0	0
Marshall	05/09/02	Tstm Wind	50 kts.	0	0	0	0
Casey	06/04/02	Tstm Wind	55 kts.	0	0	0	0
Marshall	07/09/02	Tstm Wind	50 kts.	0	0	0	0
Martinsville	07/22/02	Tstm Wind	50 kts.	0	0	0	0
Martinsville	05/06/03	Tstm Wind	55 kts.	0	0	0	0
Marshall	05/10/03	Tstm Wind	60 kts.	0	0	0	0
Martinsville	08/02/03	Tstm Wind	60 kts.	0	0	0	0
West Union	08/31/03	Tstm Wind	52 kts.	0	0	0	0
Clarksville	05/30/04	Tstm Wind	55 kts.	0	0	0	0
Marshall	07/03/04	Tstm Wind	55 kts.	0	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Casey	07/22/04	Tstm Wind	55 kts.	0	0	0	0
Marshall	05/13/05	Tstm Wind	50 kts.	0	0	0	0
Marshall	07/21/05	Tstm Wind	50 kts.	0	0	0	0
Marshall	07/26/05	Tstm Wind	50 kts.	0	0	0	0
Martinsville	11/15/05	Tstm Wind	50 kts.	0	0	0	0
Casey	04/02/06	Tstm Wind	73 kts.	0	0	0	0
Martinsville	10/18/07	Tstm Wind	52 kts.	0	0	5K	0K
Martinsville	02/05/08	Tstm Wind	61 kts.	0	0	20K	0K
Casey	06/04/08	Tstm Wind	61 kts.	0	0	20K	0K
Westfield	06/06/08	Tstm Wind	56 kts.	0	0	15K	0K
West Union	06/27/08	Tstm Wind	56 kts.	0	0	1K	0K
Marshall	07/08/08	Tstm Wind	52 kts.	0	0	2K	0K
Ernst	02/11/09	Tstm Wind	52 kts.	0	0	0K	0K
Marshall	02/11/09	Tstm Wind	52 kts.	0	0	0K	0K
Casey	05/13/09	Tstm Wind	52 kts.	0	0	12K	0K
Marshall	08/04/09	Tstm Wind	52 kts.	0	0	15K	0K
Martinsville	08/04/09	Tstm Wind	52 kts.	0	0	5K	0K

** 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

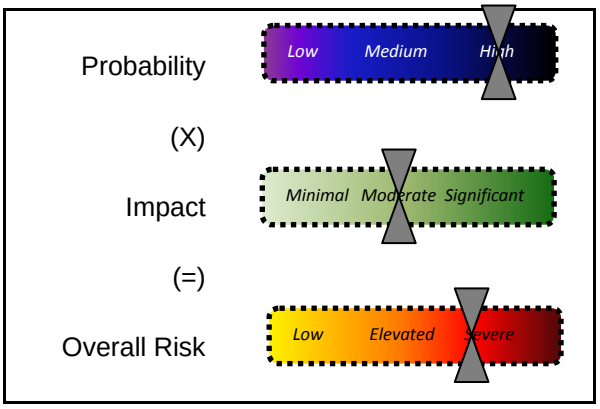
The entire county has the same risk for occurrence of thunderstorms. They can occur at any location within the county.

Hazard Extent for Thunderstorm Hazard

The extent of the historical thunderstorms varies in terms of the extent of the storm, the wind speed, and the size of hail stones. Thunderstorms can occur at any location within the county.

Risk Identification for Thunderstorm Hazard

Based on historical information, the probability of a thunderstorm is high. In Meeting #2, the planning team determined that the potential impact of a thunderstorm is moderate; therefore, the overall risk of a thunderstorm hazard for Clark County is severe.



Vulnerability Analysis for Thunderstorm Hazard

Severe thunderstorms are an equally distributed threat across the entire jurisdiction; therefore, the entire county's population and all buildings are vulnerable to a severe thunderstorm and can expect the same impacts within the affected area. This plan will therefore consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Clark County are discussed in Table 4-6.

Critical Facilities

All critical facilities are vulnerable to severe thunderstorms. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality (e.g. a damaged police station will no longer be able to serve the community). Table 4-5 lists the types and numbers of all of the essential facilities in the area. A map and list of all critical facilities is included as Appendix F.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is provided in Table 4-6. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality (e.g. a damaged home will no longer be habitable causing residents 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.

Potential Dollar Losses for Thunderstorm Hazard

A HAZUS-MH analysis was not completed for thunderstorms because the widespread extent of such a hazard makes it difficult to accurately model outcomes.

To determine dollar losses for a thunderstorm hazard, the available NCDC hazard information was condensed to include only thunderstorm hazards that occurred within the past ten years. Clark County's MHMP team then reviewed the property damages reported to NCDC and made any applicable updates.

It was determined that since 1999, Clark County has incurred $95,000 in damages relating to thunderstorms, including hail, lightning, and high winds. The resulting information is listed in Table 4-28.

Table 4-28: Clark County Property Damage (1999–Present)

Location or County	Date	Type	Property Damage
Darwin	04/08/99	Tstm Wind	$ -
Martinsville	06/01/99	Tstm Wind	$ -
Countywide	06/04/99	Tstm Wind	$ -
		1999 Subtotal	$ -
Martinsville	05/09/00	Hail	$ -
Countywide	05/09/00	Tstm Wind	$ -
Marshall	06/20/00	Tstm Wind	$ -
West Union	07/28/00	Tstm Wind	$ -
		2000 Subtotal	$ -
Marshall	05/17/01	Hail	$ -
Casey	09/07/01	Tstm Wind	$ -
Marshall	10/24/01	Tstm Wind	$ -
		2001 Subtotal	$ -
Marshall	05/08/02	Hail	$ -
Marshall	05/09/02	Tstm Wind	$ -
Casey	06/04/02	Hail	$ -
Casey	06/04/02	Tstm Wind	$ -
Marshall	07/09/02	Tstm Wind	$ -
Martinsville	07/22/02	Tstm Wind	$ -
Marshall	08/02/02	Hail	$ -
		2002 Subtotal	$ -
Martinsville	05/06/03	Tstm Wind	$ -
Marshall	05/10/03	Tstm Wind	$ -
Casey	05/14/03	Hail	$ -
Martinsville	08/02/03	Tstm Wind	$ -
West Union	08/31/03	Tstm Wind	$ -
		2003 Subtotal	$ -
Clarksville	05/30/04	Hail	$ -
Clarksville	05/30/04	Tstm Wind	$ -
Marshall	07/03/04	Tstm Wind	$ -
Casey	07/22/04	Tstm Wind	$ -
Marshall	08/18/04	Hail	$ -
		2004 Subtotal	$ -
Marshall	05/13/05	Tstm Wind	$ -
Marshall	07/21/05	Tstm Wind	$ -
Marshall	07/26/05	Tstm Wind	$ -
Martinsville	11/15/05	Tstm Wind	$ -
		2005 Subtotal	$ -
Casey	04/02/06	Tstm Wind	$ -
Martinsville	05/17/06	Hail	$ -
		2006 Subtotal	$ -

Location or County	Date	Type	Property Damage
Moriah	04/11/07	Hail	$ -
Martinsville	10/18/07	Tstm Wind	$ 5,000
		2007 Subtotal	$ 5,000
Martinsville	02/05/08	Tstm Wind	$ 20,000
Casey	06/04/08	Tstm Wind	$ 20,000
Westfield	06/06/08	Tstm Wind	$ 15,000
Darwin	06/09/08	Hail	$ -
Casey	06/27/08	Hail	$ -
West Union	06/27/08	Tstm Wind	$ 1,000
Marshall	07/08/08	Tstm Wind	$ 2,000
		2008 Subtotal	$ 58,000
Ernst	02/11/09	Tstm Wind	$ -
Marshall	02/11/09	Tstm Wind	$ -
Casey	05/13/09	Tstm Wind	$ 12,000
Marshall	08/04/09	Tstm Wind	$ 15,000
Martinsville	08/04/09	Tstm Wind	$ 5,000
		2009 Subtotal	$ 32,000
		Total Property Damage	**$ 95,000**

The historical data is erratic and not wholly documented or confirmed. As a result, potential dollar losses for a future event cannot be precisely calculated; however, based on averages in the last decade, it can be determined that Clark County incurs an annual risk of approximately $9,500 per year.

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 Clark County residents.

4.4.5 Drought and Extreme Heat Hazard

Hazard Definition for Drought Hazard

Drought is a climatic phenomenon that occurs in Clark County. The meteorological condition that creates a drought is below normal rainfall. However, excessive heat can lead to increased evaporation, which will enhance drought conditions. Droughts can occur in any month. Drought differs from normal arid conditions found in low rainfall areas. Drought is the consequence of a reduction in the amount of precipitation over an undetermined length of time (usually a growing season or more).

The severity of a drought depends on location, duration, and geographical extent. Additionally, drought severity depends on the water supply, usage demands made by human activities, vegetation, and agricultural operations. Drought brings several different problems that must be addressed. The quality and quantity of crops, livestock, and other agricultural assets will be affected during a drought. Drought can adversely impact forested areas leading to an increased potential for extremely destructive forest and woodland fires that could threaten residential, commercial, and recreational structures.

Hazard Definition for Extreme Heat Hazard

Drought conditions are often accompanied by extreme heat, which is defined as temperatures that hover 10°F or more above the average high for the area and last for several weeks. Extreme heat can occur in humid conditions when high atmospheric pressure traps the damp air near the ground or in dry conditions, which often provoke dust storms.

Common Terms Associated with Extreme Heat

Heat Wave: Prolonged period of excessive heat, often combined with excessive humidity

Heat Index: A number in degrees Fahrenheit that tells how hot it feels when relative humidity is added to air temperature. Exposure to full sunshine can increase the heat index by 15°F.

Heat Cramps: Muscular pains and spasms due to heavy exertion. Although heat cramps are the least severe, they are often the first signal that the body is having trouble with heat.

Heat Exhaustion: Typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs, resulting in a form of mild shock. If left untreated, the victim's condition will worsen. Body temperature will continue to rise and the victim may suffer heat stroke.

Heat and Sun Stroke: A life-threatening condition. The victim's temperature control system, which produces sweat to cool the body, stops working. The body's temperature can rise so high that brain damage and death may result if the body is not cooled quickly.

Source: FEMA

Previous Occurrences for Drought and Extreme Heat Hazard

The NCDC database reported seven drought/heat wave events in Clark County since 1959. The most recent reported event occurred in July 2006 across central and southeast Illinois. Afternoon high temperatures ranged from 94°F to 100°F most afternoons, with afternoon heat indices ranging from 105°F to 110°F. Overnight lows only fell into the mid-70s.

NCDC records of droughts/heat waves are identified in Table 4-29. Additional details for NCDC events are included in Appendix D.

Table 4-29: Clark County Drought/Heat Wave Events*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Statewide	07/26/97	Excessive Heat	N/A	2	0	0	0
Statewide	06/26/98	Excessive Heat	N/A	1	0	0	0
Statewide	07/20/99	Excessive Heat	N/A	4	0	0	0
Statewide	07/28/99	Excessive Heat	N/A	1	0	0	0
Statewide	07/22/05	Excessive Heat	N/A	1	0	0	0
Statewide	07/30/06	Heat	N/A	1	0	0	0
Statewide	08/01/06	Heat	N/A	0	0	0	0

** 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 Drought and Extreme Heat Hazard

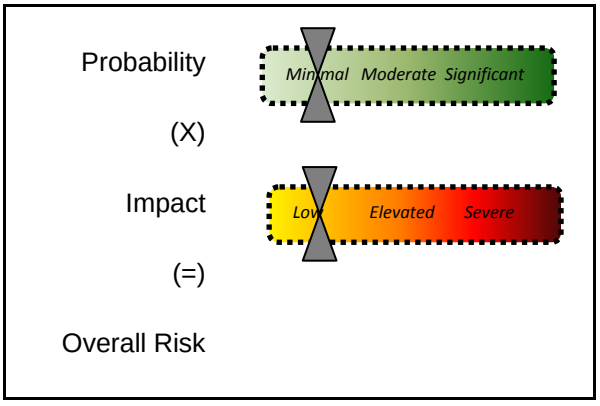
Droughts are regional in nature. All areas of the United States are vulnerable to the risk of drought and extreme heat.

Hazard Extent for Drought and Extreme Heat Hazard

Droughts and extreme heat can be widespread or localized events. The extent of the droughts varies both in terms of the extent of the heat and the range of precipitation.

Risk Identification for Drought/Extreme Heat Hazard

Based on historical information, the probability of a drought is medium. In Meeting #2, the planning team determined that the potential impact of a drought or an extended period of extreme heat is minimal; therefore, the overall risk of a drought/extreme heat hazard for Clark County is low.



Vulnerability Analysis for Drought and Extreme Heat Hazard

Drought and extreme heat impacts are an equally distributed threat across the entire jurisdiction; therefore, the county is vulnerable to this hazard and can expect the same impacts within the affected area. According to FEMA, approximately 175 Americans die each year from extreme heat. Young children, elderly, and infirmed populations have the greatest risk.

The entire population and all buildings have been identified as at risk. The building exposure for Clark County, as determined from the building inventory is included in Table 4-6.

Critical Facilities

All critical facilities are vulnerable to drought. A critical facility will encounter many of the same impacts as any other building within the jurisdiction, which should involve only minor damage. These impacts include water shortages, fires as a result of drought conditions, and residents in need of medical care from the heat and dry weather. Table 4-5 lists the types and numbers of all of the essential facilities in the area. A map and list of all critical facilities is included as Appendix F.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. The buildings within the county can all expect the same impacts similar to those discussed for critical facilities. These impacts include water shortages, fires as a result of drought conditions, and residents in need of medical care from the heat and dry weather.

Infrastructure

During a drought the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. The risk to these structures is primarily associated with a fire that could result from the hot, dry conditions. 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 heat wave. 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 Drought/Extreme Heat Hazard

Future development will remain vulnerable to these events. Typically, some urban and rural areas are more susceptible than others. For example, urban areas are subject to water shortages during periods of drought. Excessive demands of the populated area place a limit on water resources. In rural areas, crops and livestock may suffer from extended periods of heat and drought. Dry conditions can lead to the ignition of wildfires that could threaten residential, commercial, and recreational areas.

Analysis of Community Development Trends

Because droughts and extreme heat are regional in nature, future development will be impacted across the county. Although urban and rural areas are equally vulnerable to this hazard, those living in urban areas may have a greater risk from the effects of a prolonged heat wave. The atmospheric conditions that create extreme heat tend to trap pollutants in urban areas, adding contaminated air to the excessively hot temperatures and creating increased health problems. Furthermore, asphalt and concrete store heat longer, gradually releasing it at night and producing high nighttime temperatures. This phenomenon is known as the "urban heat island effect."

Local officials should address drought and extreme heat hazards by educating the public on steps to take before and during the event—for example, temporary window reflectors to direct heat back outside, staying indoors as much as possible, and avoiding strenuous work during the warmest part of the day.

Source: FEMA

4.4.6 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: 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.

Snowstorms

Significant snowstorms are characterized by the rapid accumulation of snow, often accompanied by high winds, cold temperatures, and low visibility. A blizzard is categorized as a snowstorm with winds of 35 miles per hour or greater and/or visibility of less than one-quarter mile for three or more hours. The strong winds during a blizzard blow about falling and already existing snow, creating poor visibility and impassable roadways. Blizzards have the potential to result in property damage.

January 1978: South of Casey on Route 49
Source: *Casey Daily Reporter*

Illinois has repeatedly been struck by blizzards. Blizzard conditions cannot only cause power outages and loss of communication, but also make transportation difficult. The blowing of snow can reduce visibility to less than one-quarter mile, and the resulting disorientation makes even travel by foot dangerous if not deadly.

Severe Cold

Severe cold is characterized by the ambient air temperature dropping to around 0°F or below. These extreme temperatures can increase the likelihood of frostbite and hypothermia. High

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

Previous Occurrences for Winter Storm Hazard

The NCDC database identified 22 winter storm and extreme cold events for Clark County since 1959. The most recent reported event occurred in January 2009. A powerful winter storm swept through central and southeast Illinois, bringing heavy snow accumulation of approximately 8-12 inches.

The NCDC winter storms are listed in Table 4-30. Additional details for NCDC events are included in Appendix D.

Table 4-30: Winter Storm Events*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Central Illinois	12/08/95	Winter Storm	N/A	1	0	0	0
Central Illinois	12/18/95	Winter Storm	N/A	1	0	0	0
Statewide	01/02/96	Winter Storm	N/A	0	4	0	0
Statewide	01/04/96	Winter Storm	N/A	0	0	0	0
Statewide	01/18/96	Winter Storm	N/A	0	2	0	0
Statewide	02/02/96	Extreme Cold	N/A	2	0	0	0
Statewide	03/19/96	Winter Storm	N/A	1	0	0	0
Statewide	01/08/97	Heavy Snow	N/A	0	6	0	0
Statewide	01/15/97	Winter Storm	N/A	1	7	0	0
Statewide	01/26/97	Winter Storm	N/A	0	9	0	0
Statewide	11/13/97	Winter Storm	N/A	0	1	0	0
Statewide	01/01/99	Heavy Snow	N/A	1	1	0	0
Statewide	01/05/99	Extreme Cold	N/A	0	0	0	0
Statewide	03/11/00	Heavy Snow	N/A	1	9	0	0
Statewide	12/13/00	Winter Storm	N/A	1	1	0	0
Statewide	03/25/02	Winter Storm	N/A	0	0	0	0
Statewide	12/24/02	Heavy Snow	N/A	0	0	0	0
Statewide	01/25/04	Ice Storm	N/A	0	0	0	0
Statewide	12/22/04	Winter Storm	N/A	0	0	0	0
Statewide	03/21/06	Winter Storm	N/A	0	0	0	0
Statewide	04/05/07	Frost/freeze	N/A	0	0	0K	0K
Statewide	01/26/09	Heavy Snow	N/A	0	0	0K	0K

** 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

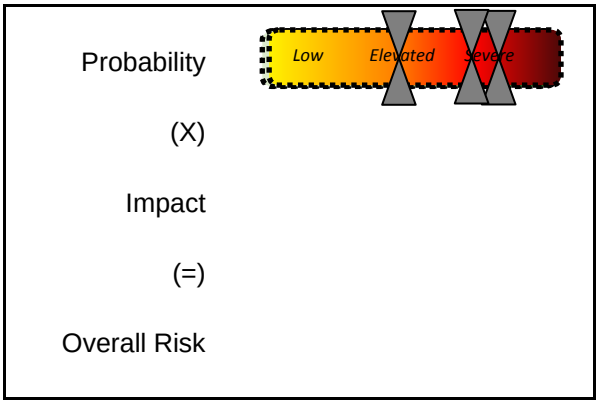
Severe winter storms are regional in nature. Most of the NCDC data is calculated regionally or in some cases statewide.

Hazard Extent for Winter Storm Hazard

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

Risk Identification for Winter Storm Hazard

Based on historical information, the probability of a winter storm is high. In Meeting #2, the planning team determined that the potential impact of a winter storm is moderate; therefore, the overall risk of a winter storm hazard for Clark County is severe.



Vulnerability Analysis for Winter Storm Hazard

Winter storm impacts are equally distributed across the entire jurisdiction; therefore, the entire county is vulnerable to a winter storm and can expect the same impacts within the affected area. The building exposure for Clark County, as determined from the building inventory, is included in Table 4-6.

Critical Facilities

All critical facilities are vulnerable to winter storms. Critical facilities will encounter many of the same impacts as other buildings within the jurisdiction. These impacts include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow. Table 4-5 lists the types and numbers of the essential facilities in the area. A map and list of all critical facilities is included as Appendix F.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. The impacts to the general buildings within the county are similar to the damages expected to the critical facilities. These include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow.

Infrastructure

During a winter storm, the types of 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.

Potential Dollar Losses for Winter Storm Hazard

A HAZUS-MH analysis was not completed for winter storms because the widespread extent of such a hazard makes it difficult to accurately model outcomes.

To determine dollar losses for a winter storm hazard, the available NCDC hazard information was condensed to include only winter storm hazards that occurred within the past ten years. Clark County's MHMP team then reviewed the property damages reported to NCDC and made any applicable updates.

It was determined that since 1999, Clark County has not incurred significant property damages from winter storms, including sleet/ice and heavy snow.

Vulnerability to Future Assets/Infrastructure for Winter Storm Hazard

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

Analysis of Community Development Trends

Because the winter storm events are regional in nature future development will be equally impacted across the county.

4.4.7 Hazardous Materials Storage and Transport Hazard

Hazard Definition for Hazardous Materials Storage and Transport Hazard

Illinois has numerous active transportation lines that run through many of its counties. Active railways transport harmful and volatile substances between our borders every day. The transportation of chemicals and substances along interstate routes is commonplace in Illinois. The rural areas of Illinois have considerable agricultural commerce creating a demand for fertilizers, herbicides, and pesticides to be transported along rural roads. These factors increase the chance of hazardous material releases and spills throughout the state of Illinois.

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

Previous Occurrences for Hazardous Materials Storage and Transport Hazard

Clark County has not experienced a significantly large-scale hazardous material incident at a fixed site or during transport resulting in multiple deaths or serious injuries, although there have been many minor releases that have put local firefighters, hazardous materials teams, emergency management, and local law enforcement into action to try to stabilize these incidents and prevent or lessen harm to Clark County residents.

July 4, 1953: Fire at Velsicol Chemical Corporation plant north of Marshall
Source: History of Marshall Illinois and Eastern Clark County, 1978

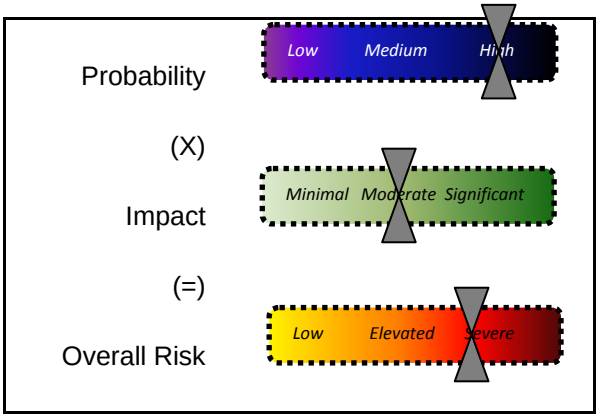
Geographic Location for Hazardous Materials Storage and Transport Hazard

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

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.

Risk Identification for Hazardous Materials Release



Based on historical information, the probability of a hazmat hazard is high. In Meeting #2, the planning team determined that the potential impact of a hazmat release is moderate; therefore, the overall risk of a hazmat hazard for Clark County is severe.

Vulnerability Analysis for Hazardous Materials Storage and Transport Hazard

Hazardous material impacts are an equally distributed threat across the entire jurisdiction; therefore, the entire county is vulnerable to a hazardous material release and can expect the same impacts within the affected area. The main concern during a release or spill is the population affected. The building exposure for Clark County, as determined from building inventory, is included in Table 4-6. 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 will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure due to fire or explosion and loss of function of the facility (e.g. a damaged police station will no longer be able to serve the community). Table 4-5 lists the types and numbers of all essential facilities in the area. A map and list of all critical facilities is included as Appendix F.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. 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 residents to seek shelter).

Infrastructure

During a hazardous material release the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan it is important to emphasize that 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.

In terms of numbers and types of buildings and infrastructure, typical scenarios are described to gauge the anticipated impacts of hazardous material release events in the county.

The U.S. EPA's ALOHA (Areal Locations of Hazardous Atmospheres) model was utilized to assess the area of impact for an anhydrous ammonia release at the intersection of Conrail railroad and Clarksville Road in Marshall.

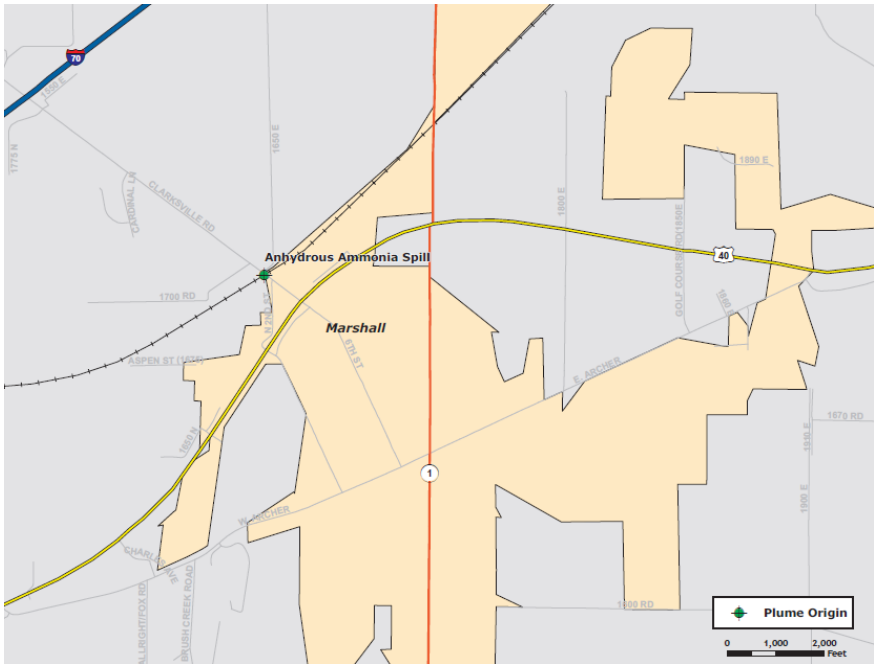
Anhydrous ammonia is a clear colorless gas with a strong odor. Contact with the unconfined liquid can cause frostbite. Though the gas is generally regarded as nonflammable, it can burn within certain vapor concentration limits with strong ignition. The fire hazard increases in the presence of oil or other combustible materials. Vapors from an anhydrous ammonia leak initially hug the ground, and prolonged exposure of containers to fire or heat may cause violent rupturing and rocketing. Long-term inhalation of low concentrations of the vapors or short-term inhalation of high concentrations has adverse health effects. Anhydrous ammonia is generally used as a fertilizer, a refrigerant, and in the manufacture of other chemicals.

Source: CAMEO

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

For this scenario, moderate atmospheric and climatic conditions with a slight breeze from the west were assumed. The target area was chosen due to its proximity to the residential, commercial, and essential facility locations. The geographic area covered in this analysis is depicted in Figure 4-15.

Figure 4-15: Location of Chemical Release



Analysis

The ALOHA atmospheric modeling parameters, depicted in Figure 4-16, were based upon a westerly wind speed of five miles per hour. The temperature was 65°F with 75% humidity and a cloud cover of five-tenths skies.

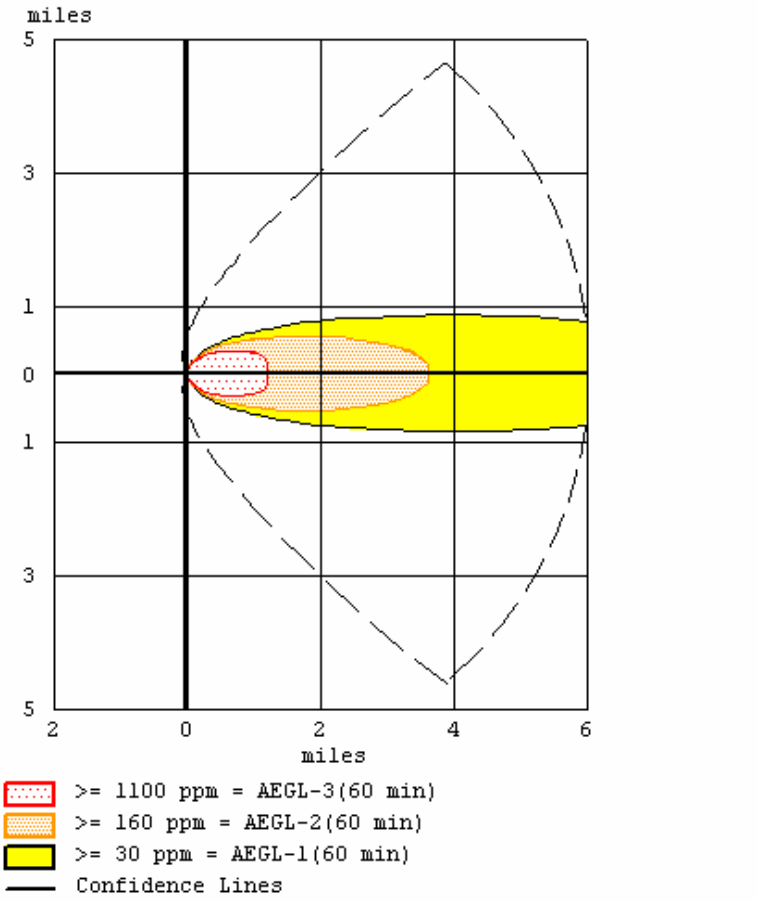
The source of the chemical spill is a horizontal, cylindrical-shaped tank. The diameter of the tank was set to 10.4 feet and the length set to 53 feet (33,500 gallons). At the time of its release, it was estimated that the tank was 85% full. The anhydrous ammonia in this tank is in its liquid state.

This release was based on a leak from a 2.5-inch-diameter hole, 12 inches above the bottom of the tank. According to the ALOHA parameters, approximately 7,530 pounds of material would be released per minute. The image in Figure 4-17 depicts the plume footprint generated by ALOHA.

Figure 4-16: ALOHA Plume Modeling Parameters

```
SITE DATA:
  Location: MARSHALL, ILLINOIS
  Building Air Exchanges Per Hour: 0.32 (sheltered single storied)
  Time: January 28, 2010  1539 hours CST (user specified)

CHEMICAL DATA:
  Chemical Name: AMMONIA                  Molecular Weight: 17.03 g/mol
  AEGL-1(60 min): 30 ppm   AEGL-2(60 min): 160 ppm   AEGL-3(60 min): 1100 ppm
  IDLH: 300 ppm      LEL: 160000 ppm      UEL: 250000 ppm
  Ambient Boiling Point: -28.9° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 5 miles/hour from W at 10 meters
  Ground Roughness: open country          Cloud Cover: 5 tenths
  Air Temperature: 65° F                  Stability Class: C
  No Inversion Height                     Relative Humidity: 75%

SOURCE STRENGTH:
  Leak from hole in horizontal cylindrical tank
  Flammable chemical escaping from tank (not burning)
  Tank Diameter: 10.4 feet                Tank Length: 53 feet
  Tank Volume: 33500 gallons
  Tank contains liquid                    Internal Temperature: 65° F
  Chemical Mass in Tank: 72.8 tons        Tank is 85% full
  Circular Opening Diameter: 2.5 inches
  Opening is 12 inches from tank bottom
  Release Duration: 37 minutes
  Max Average Sustained Release Rate: 7,530 pounds/min
     (averaged over a minute or more)
  Total Amount Released: 139,776 pounds
  Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
  Model Run: Heavy Gas
  Red   : 1.2 miles --- (1100 ppm = AEGL-3(60 min))
  Orange: 3.6 miles --- (160 ppm = AEGL-2(60 min))
  Yellow: greater than 6 miles --- (30 ppm = AEGL-1(60 min))
```

Figure 4-17: Plume Footprint Generated by ALOHA



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. 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). The image in Figure 4-18 depicts the plume footprint generated by ALOHA in ArcGIS.

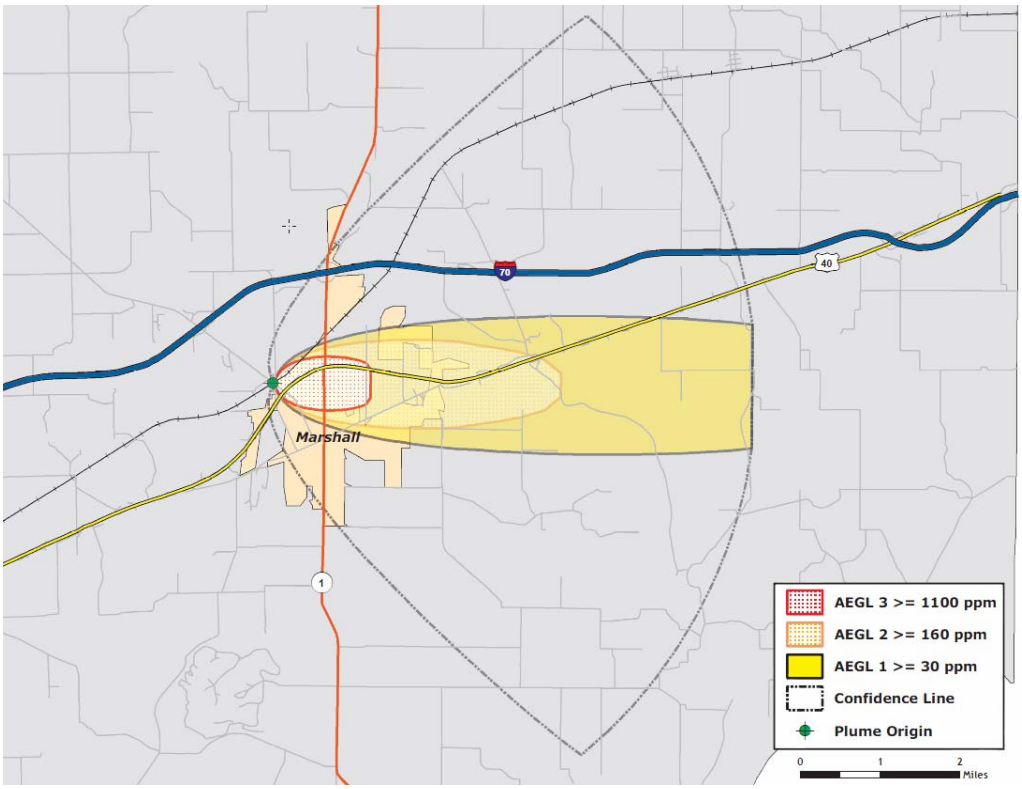
- **AEGL 3:** Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death. The red buffer (>=1100 ppm) extends no more than six miles from the point of release after one hour.

- **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. The orange buffer (>=160 ppm) extends no more than six miles from the point of release after one hour.

- **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 non-sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure. The yellow buffer (>=30 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 level will be contained. The ALOHA model is 95% confident that the release will stay within this boundary.

Figure 4-18: ALOHA Plume Footprint Overlaid in ArcGIS

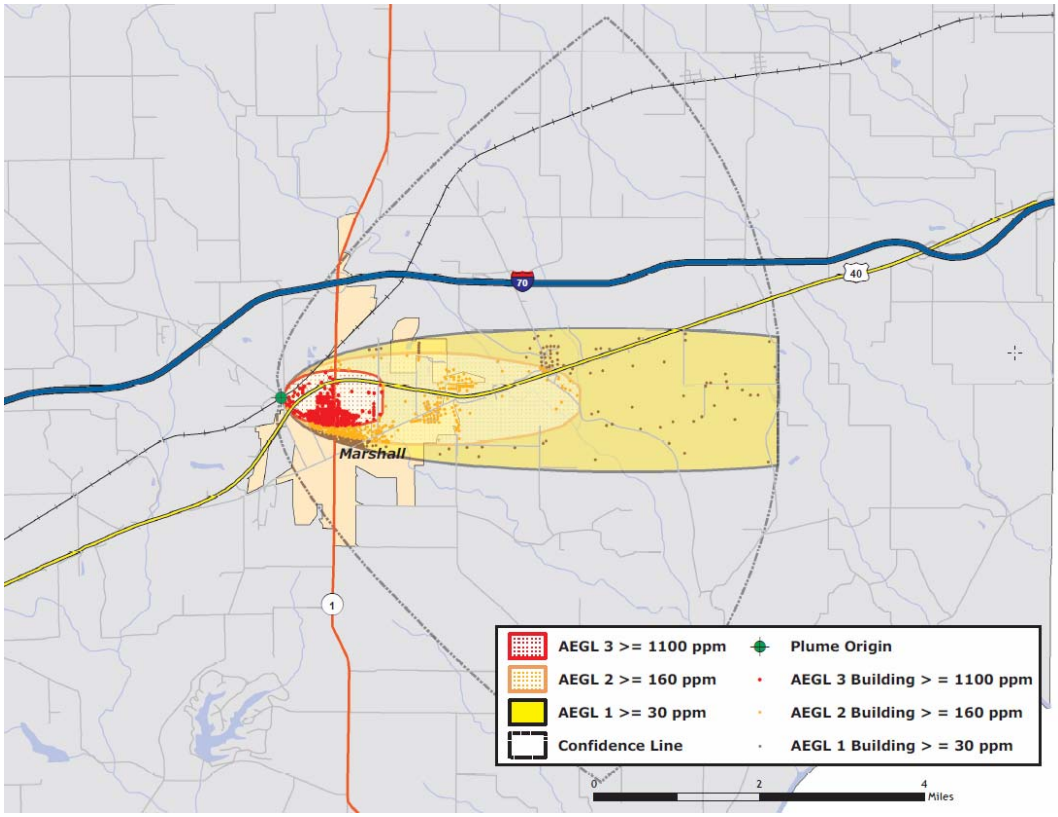


Results

By summing the building inventory within all AEGL levels (AEGL 3: >=1,100 ppm, AEGL 2: >=160 ppm and Level 1: >=3 ppm.), the GIS overlay analysis predicts that as many as 748 buildings could be exposed at a replacement cost of $58.3 million. If this event were to occur, approximately 1,553 people would be affected. The results are depicted in Figure 4-19.

The Assessor records often do not distinguish parcels by occupancy class when the parcels are not taxable; therefore, the total number of buildings and the building replacement costs for government, religious/non-profit, and education may be underestimated.

Figure 4-19: Clark County Building Inventory Classified By Plume Footprint



Building Inventory Damage

The results of the analysis against the building inventory points are depicted in Tables 4-31 through 4-34. Table 4-31 summarizes the results of the chemical spill by combining all AEGL level. Tables 4-32 through 4-34 summarize the results of the chemical spill for each level separately.

Table 4-31: Estimated Exposure for all Level (all ppm)

Occupancy	Population	Building Counts	Building Exposure (thousands)
Residential	1,553	621	$49,123
Commercial	0	70	$7,542
Industrial	0	10	$159
Agriculture	0	35	$1,447
Religious	0	12	$0
Government	0	0	$0
Education	0	0	$0
Total	**1,553**	**748**	**$58,271**

Table 4-32: Estimated Exposure for Level 3 (>=1100 ppm)

Occupancy	Population	Building Counts	Building Exposure (thousands)
Residential	598	239	$17,279
Commercial	0	27	$3,677
Industrial	0	7	$159
Agriculture	0	3	$19
Religious	0	2	$0
Government	0	0	$0
Education	0	0	$0
Total	**598**	**278**	**$21,134**

Table 4-33: Estimated Exposure for Level 2 (>=160 ppm)

Occupancy	Population	Building Counts	Building Exposure (thousands)
Residential	615	246	$21,468
Commercial	0	38	$3,304
Industrial	0	1	$0
Agriculture	0	8	$420
Religious	0	3	$0
Government	0	0	$0
Education	0	0	$0
Total	**615**	**296**	**$25,192**

Table 4-34: Estimated Exposure for Level 1 (>=30 ppm)

Occupancy	Population	Building Counts	Building Exposure (thousands)
Residential	340	136	$10,376
Commercial	0	5	$7,542
Industrial	0	2	$159
Agriculture	0	24	$1,447
Religious	0	7	$0
Government	0	0	$0
Education	0	0	$0
Total	**340**	**174**	**$19,524**

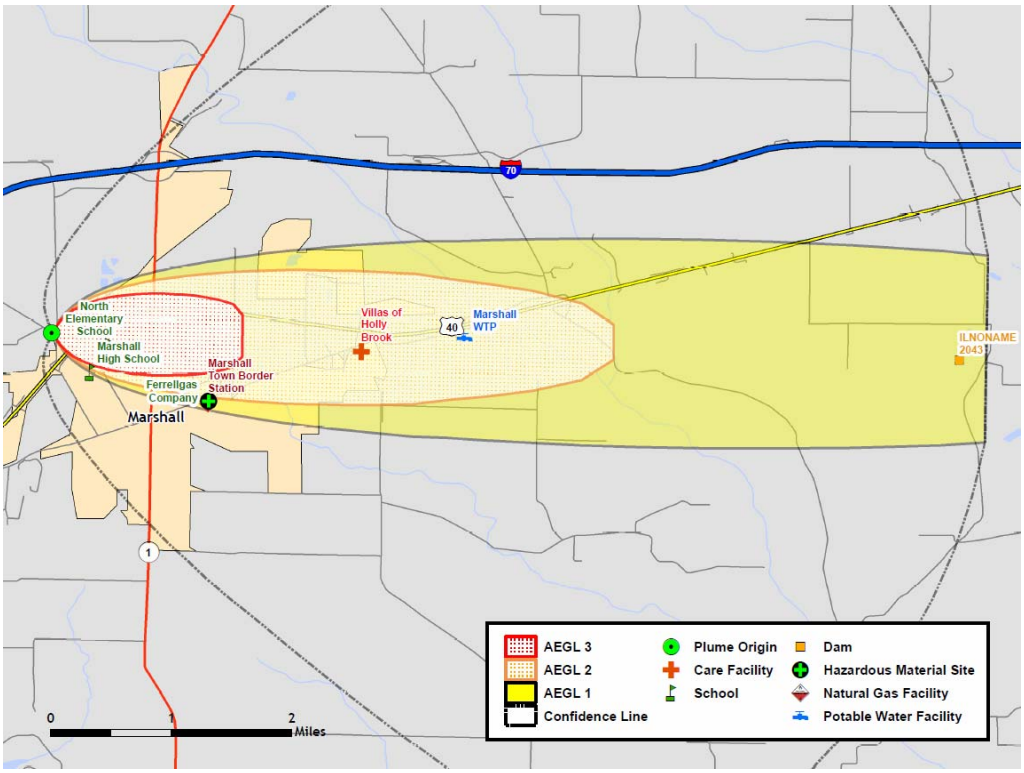
Critical Facilities Damage

There are seven critical facilities within the limits of the chemical spill plume. The affected facilities are identified in Table 4-35. Their geographic locations are depicted in Figure 4-20.

Table 4-35: Essential Facilities within Plume Footprint

Name
Villas of Holly Brook
Marshall High School
North Elementary School
Ferrellgas Company
Ilnoname 2043 (Dam)
Marshall Town Border Station
Marshall Water Treatment Plan

Figure 4-20: Essential Facilities within Plume Footprint



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

Any new development within the county will be vulnerable to these events, especially development along major roadways.

Analysis of Community Development Trends

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

4.4.8 Fire Hazard

Hazard Definition for Fire Hazard

This plan will address three major categories of fires for Clark County: 1) tire/scrap fires; 2) structural fires; and 3) wildfires.

Tire Fires

The state of Illinois generates thousands of scrap tires annually. Many of those scrap tires end up in approved storage sites that are carefully regulated and controlled by federal and state officials. However, scrap tires are sometimes intentionally dumped in unapproved locations throughout the state. The number of unapproved locations cannot be readily determined. These illegal sites are owned by private residents who have been continually dumping waste and refuse, including scrap tires, at those locations for many years.

Tire disposal sites can be fire hazards, in large part, because of the enormous number of scrap tires typically present at one site. This large amount of fuel renders standard firefighting practices nearly useless. Flowing and burning oil released by the scrap tires can spread the fire to adjacent areas. Tire fires differ from conventional fires in the following ways:

- Relatively small tire fires can require significant fire resources to control and extinguish.
- Those resources often cost much more than Clark County government can absorb compared to standard fire responses.
- There may be significant environmental consequences of a major tire fire. Extreme heat can convert a standard vehicle tire into approximately two gallons of oily residue that may leak into the soil or migrate to streams and waterways.

Structural Fires

Lightning strikes, poor building construction, and building condition are the main causes for most structural fires in Indiana. Clark County has a few structural fires each year countywide.

Wildfires

When hot and dry conditions develop, forests may become vulnerable to devastating wildfires. In the past few decades an increased commercial and residential development near forested areas has dramatically changed the nature and scope of the wildfire hazard. In addition, the increase in structures resulting from new development strains the effectiveness of the fire service personnel in the county.

Previous Occurrences for Fire Hazard

Clark 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.

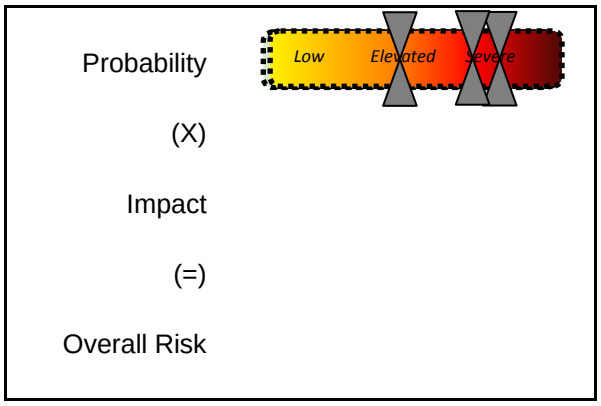
Geographic Location for Fire Hazard

Fire hazards occur countywide and therefore affect the entire county. The forested areas in the county have a higher chance of widespread fire hazard.

Hazard Extent for Fire Hazard

The extent of the fire hazard varies both in terms of the severity of the fire and the type of material being ignited. All communities in Clark County are affected by fire equally.

Risk Identification for Fire Hazard



Based on historical information, the probability of a fire is low. In Meeting #2, the planning team determined that the potential impact of a fire is minimal; therefore, the overall risk of a fire hazard for Clark County is low.

Vulnerability Analysis for Fire Hazard

This hazard impacts the entire jurisdiction equally; therefore, the entire population and all buildings within the county are vulnerable to fires and can expect the same impacts within the affected area.

Table 4-5 lists the types and numbers of all essential facilities in the area. A map and list of all critical facilities is included as Appendix F.

The building exposure for Clark County, as determined from the building inventory, is included in Table 4-6. Because of the difficulty predicting which communities are at risk, the entire population and all buildings have been identified at risk.

Critical Facilities

All critical facilities are vulnerable to fire hazards. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural damage from fire and water damage from efforts extinguishing fire. Table 4-5 lists the types and numbers of essential facilities in the area. A map and list of all critical facilities is included as Appendix F.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is provided in Table 4-6. Impacts to the general buildings within the county are similar to the damages expected to the critical facilities. These impacts include structural damage from fire and water damage from efforts to extinguish the fire.

Infrastructure

During a fire 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 fire. Potential impacts include structural damage resulting in impassable roadways and power outages.

Vulnerability to Future Assets/Infrastructure for Fire Hazard

Any future development will be vulnerable to these events.

Analysis of Community Development Trends

Fire hazard events may occur anywhere within the county, because of this future development will be impacted.

Section 5 - Mitigation Strategy

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

Clark County, Marshall, and Martinsville are members of the NFIP. Casey does not have an identified flood hazard boundary, and therefore chooses not to participate in the program. Although Westfield is adjacent to identified flood hazard areas, the town is not located within an identified flood hazard area and has chosen not to participate in the program. Clark County will continue to educate these jurisdictions on the benefits of the program. 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	Floodplain Ordinance
Clark County	11/04/88	01/16/81	N/A	N/A	08/02/07
Casey	N/A	N/A	N/A	N/A	N/A
Marshall	06/14/74	11/04/88	N/A	N/A	06/02/07
Martinsville	11/23/74	11/04/88	N/A	N/A	08/02/07
Westfield	N/A	08/02/07	N/A	N/A	08/02/07

HAZUS-MH identified approximately 46 households located within the Clark County Special Flood Hazard Area; 13 households paid flood insurance, insuring $1,494,300 in property value. The total premiums collected amounted to $4,351, which on average was $150 annually. From 1978 through 2007, five claims were filed totaling $98,735. The average claim was $19,747.

The county and incorporated areas do not participate in the NFIP'S 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 actions meeting the three goals of the CRS: 1) reduce flood losses; 2) facilitate accurate insurance rating; and 3) promote the awareness of flood insurance.

5.1.2 Stormwater Management Stream Maintenance Ordinance

The City of Marshall has a stormwater management ordinance, adopted in 1976, which regulates the use of stormwater sewers.

5.1.3 Zoning Management Ordinance

Unincorporated Clark County does not have zoning regulations, but the City of Marshall regulates all aspects of zoning including types of land use, building regulations, and procedures for construction approval. Table 5-2 lists the adoption dates of plans and ordinances within the county.

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Table 5-2: Description of Zoning Plans/Ordinances

Community	Comp Plan	Zoning Ord	Subd Control Ord	Erosion Control	Storm Water Mgmt	Burning Ord	Seismic Ord	Bldg. Stndrds
Clark County	N/A	N/A	N/A	N/A	N/A	N/A	N/A	State
Casey	N/A	N/A	N/A	N/A	N/A	2007	N/A	State
Marshall	N/A	1956	1981	N/A	1976	1997	N/A	State
Martinsville	N/A	N/A	N/A	N/A	N/A	1988	N/A	State
Westfield	N/A	N/A	N/A	N/A	N/A	N/A	N/A	State

5.1.4 Erosion Management Program/ Policy

Clark County does not have an erosion management program.

5.1.5 Fire Insurance Rating Programs/ Policy

Table 5-3 lists Clark County's fire departments and respective information.

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

Fire Department	Fire Insurance Rating	Number of Firefighters
Marshall Fire Protection District	7	26
Martinsville Fire Protection District	7	30
Casey Fire Department	7	21
Westfield Fire Department	6	21

5.1.6 Land Use Plan

Clark County does not have a land use plan; the City of Marshall addresses land use within its zoning ordinance.

5.1.7 Building Codes

Clark County uses the Illinois State Building Code as their guide for building standards.

5.2 Mitigation goals

In Section 4 of this plan, the risk assessment identified Clark County as prone to eight hazards. The MHMP planning team members understand that although hazards cannot be eliminated altogether, Clark County can work toward building disaster-resistant communities. Following are a list of goals, objectives, and actions. The goals represent long-term, broad visions of the overall vision the county would like to achieve for mitigation. The objectives are strategies and steps that will assist the communities in attaining the listed goals.

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

(a) Objective: Retrofit critical facilities and structures 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 secondary effects of 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 community.

(e) Objective: Improve emergency sheltering in the community.

Goal 2: Create new or revise existing plans/maps for the community

(a) Objective: Support compliance with the NFIP.

(b) Objective: Review and update existing, or create new, 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 community residents on the hazards affecting their county

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

(b) Objective: Improve education and training 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 a list of the six mitigation measure categories from the *FEMA State and Local Mitigation Planning How to Guides*. The measures are listed as follows:

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

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

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

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

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

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

After Meeting #3, held February 24, 2010, 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 March 24, 2010. 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?

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 first. 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, permitting, and site control issues. Public awareness and input of these mitigation actions can increase knowledge to capitalize on funding opportunities and monitoring the progress of an action.

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 5-5. The factors were the STAPLE+E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria listed in Table 5-4.

Table 5-4: 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 implementations of any mitigation actions. Table 5-5 presents mitigation projects developed by the planning committee, as well as actions that are ongoing or already completed. Since this is the first mitigation plan developed for Clark County, there are no deleted or deferred mitigation items.

Table 5-5: Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Install new wells	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	Marshall	Complete	Marshall recently installed two new wells at the 500-year flood level.
Connect water services for redundancy	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	Martinsville, Marshall	Complete	This project is complete.
Trim trees to minimize the amount/duration of power outages	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Clark County, Casey, Marshall, Martinsville, Westfield	Ongoing	DPW conducts ongoing tree trimming; however, it would benefit the communities to obtain additional funding to increase the frequency of tree trimming. Funding will be sought from state and local sources.
Establish a mutual aid response agreement	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat	Clark County	Ongoing	MABAS provides hazmat response for the county.
Equip all schools and nursing homes with weather radios	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, Tornado, Thunderstorm, Winter Storm	Clark County, Casey, Marshall, Martinsville, Westfield	In Progress	This project is underway.
Conduct a study to determine shelter capacity in the county	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Clark County, Casey, Marshall, Martinsville, Westfield	In Progress	Red Cross is currently completing this study.
Institute a buy-out plan for approximately 30 properties in Old York	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP for each jurisdiction.	Flood	Clark County	High	The County EMA oversees the implementation of the project. Funding has not been secured as of 2010 but will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.
Publicize Nixle notification system	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Drought, Hazmat, Fire	Clark County	High	The County EMA will work with E911 office to complete this project. Local resources will be used to test the system and state and federal sources will be used to advertise to the public. If resources are available, implementation will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Institute a mass notification system, e.g. Reverse 911, to cover all communities within the county	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Drought, Hazmat, Fire	Clark County	High	The County EMA oversees the implementation of the project. Funding will be sought from state and federal agencies. Implementation, if funding is available, is forecasted to begin within one year.
Procure back-up generators or transfer switches for critical facilities: Marshall - 2, Casey - 3, Martinsville - 1, Westfield - 1+, County - 1+	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, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Clark County, Casey, Marshall, Martinsville, Westfield	High	Each municipality will oversee the implementation of this project in the respective cities/towns. Funding has not been secured as of 2010. If funding is available, this project is forecasted to begin within one year.
Establish public outreach programs to educate residents on the hazards affecting Clark County	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Drought, Fire	Clark County, Casey, Marshall, Martinsville, Westfield	High	The County will participate in raising awareness of the NFIP program. With the help of schools and healthcare facilities, the County EMA will improve the program to offer more information and reach wider audiences. State and federal resources will be used for funding. If funding and resources are available, implementation will begin within one year.
Raise drinking water wells to flood-proof	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	Marshall, Martinsville, Casey	High	Each municipality will oversee the implementation of this project in the respective cities/towns. IDNR is a proposed source of funding. Implementation will begin within one year if funding is available.
Develop an evacuation plan for hazardous materials spills	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	Clark County	Low	The County EMA and LEPC will oversee the implementation of this project. Local resources will be used to develop the plans. Implementation will begin within five years.
Increase hazmat training to include field exercises and drills	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Hazmat	Clark County	Low	The County EMA will use local resources to evaluate training needs. Federal, State, and local resources will be sought to fund this project. Implementation, if funding is available, will begin within five years.
Bury new power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	Clark County	Low	The municipalities and utility companies will oversee the implementation of this project. Local and corporate resources will be used to prioritize power lines and bury them. The project is forecasted to be complete within approximately five years once funding is obtained.
Improve drainage relating to stormwater system in order to protect new and existing structures	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Casey	Medium	The municipalities will rely on state and federal resources to evaluate the current conditions of the waterways and drainage and develop a plan. Funding has not been secured as of 2010, but state and federal funding will be sought. Implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
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	Clark County, Casey, Marshall, Martinsville, Westfield	Medium	The municipalities will oversee implementation of this project. Funding has not been secured as of 2010, but the PDM program and community grants are an option. If funding is available, implementation will begin within three years.
Conduct a commodity flow study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Clark County, Casey, Marshall, Martinsville, Westfield	Medium	Community planners and local government leaders will coordinate this study. Funding will be requested from community grants or IDHS. Implementation will begin within three years.
Establish safe rooms in critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Thunderstorm	Clark County, Casey, Marshall, Martinsville, Westfield	Medium	The EMA director will work with local shelters, schools, healthcare facilities, and first responders to identify locations to establish safe rooms. The county may opt to conduct an engineering study to determine best locations. The PDM program or local resources are funding options. If funding is available, implementation will begin within three years.
Purchase new snow removal equipment, brining equipment, and additional salt storage	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.	Winter Storm	Clark County, Casey, Marshall, Martinsville, Westfield	Medium	The County Highway and City Street Superintendents will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within three years.
Install additional warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Martinsville, Westfield	Medium	The County EMA oversees the implementation of the project. Local resources will be used to maintain the warning systems. Additional funding will be sought from community grants and state and federal sources to expand the warning system coverage area. Implementation, if funding is available, is forecasted to begin within three years.
Elevate roads that frequently flood	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Martinsville, Clark County	Medium	The Martinsville Street Superintendent will oversee this project, working with highway departments. State and federal agencies are potential funding sources. If funding is available, implementation will begin within five years.
Update the database of special needs populations	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Drought, Hazmat, Fire	Clark County	Low	The health department will oversee implementation of this project. Local resources will be used to update the database. Implementation will begin within five years.
Integrate floodplain management ordinances with this multi-hazard mitigation plan and future land use plans as part of the 5-year update	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Drought, Hazmat, Fire	Clark County	Low	The County Floodplain Manager will oversee the implementation of this strategy. Local resources will make the necessary updates and integrate the plans. Implementation will begin within five years.

The Clark County Emergency Management will provide assistance through available resources to the municipalities as they complete their mitigation actions. The County Board 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.

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 five incorporated communities within and including Clark County was invited to participate in brainstorming sessions in which goals, objectives, and strategies were discussed and prioritized. Each participant in these sessions was armed with possible mitigation goals and strategies provided by FEMA, as well as information about mitigation projects discussed in neighboring communities and counties. All potential strategies and goals that arose through this process are included in 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 Clark County Emergency Management Agency will reconvene the MHMP planning committee to monitor, evaluate, and update the plan on an annual basis. Additionally, a meeting will be held during the summer of 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, due to new developments or a declared disaster occurs in the county, the team will meet to update mitigation strategies. Depending on grant opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

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 Board.

The GIS data used to prepare the plan was obtained from existing county GIS data as well as data collected as part of the planning process. This updated HAZUS-MH GIS data has been returned to the county for use and maintenance in the county's system. As newer data becomes available, 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 since many of the mitigation projects identified as part of this planning process are ongoing. Clark County and its incorporated jurisdictions will update the land use ordinances listed in Table 5-2 as necessary and as part of regularly scheduled updates. The mitigation plan will be used to help guide building code changes and land use planning. Each community will be responsible for updating its own plans and ordinances.

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 the EMA director and forwarded to the MHMP planning committee for discussion. Education efforts for hazard mitigation will be ongoing through the EMA. The public will be notified of periodic planning meetings through notices in the local newspaper. Once adopted, a copy of this plan will be maintained in each jurisdiction and in the County EMA Office.

Appendix A: Multi-Hazard Mitigation Plan Meeting Minutes

Minutes of the Clark County, IL MHMP Meeting
December 8, 2009

The first regular meeting of Multi Hazard Mitigation Planning Team was held on Tuesday, December 8, 2009 at the Clark County Highway Department, 15487 N. Hwy 1 in Marshall, IL.

The meeting started at approximately 1:30 pm.

The following representatives were present:

Dave Coats	POLIS
Adam Campbell	POLIS
Phil Reeds	City of Martinsville
Dick Wheeler	Village of Westfield
Steve Turpin	Clark County Assessor
Brad Burson	Marathon Pipeline
Shelby Biggs	City of Casey
Pete Manual	School System (Marshall, IL)
Jonathan Remo	SIU Carbondale
Rob Crumrin	City of Marshall
Dallas Richardson	Clark County Highway
Todd Kuhn	Clark County
Cory Sheehy	City of Marshall
Jerry Lorton	Clark County EMA/SO

After introductions, Dave Coats of Polis made a presentation which summarized the purpose of the Plan. Dave Coats described what would occur at each of the five meetings and the approximate timeline for each of the meetings.

It was agreed upon by all representatives that a Community Meeting would be held during the 3rd meeting where a request would be made for the general public to participate.

It was determined that representatives were present from all incorporated areas of the County in addition to representatives of the unincorporated areas in Clark County, IL.

A username and password were provided to all representatives to view the meeting date on:

PDMplanning.com

Upon completion of the general presentation Adam Campbell of Polis displayed a map of Clark County where infrastructure is located in Clark County.

Requests were made by Polis and assigned for additional or validating information to community representatives.

It was agreed to meet at the County Highway Department at approximately the same time for meeting two. It was also agreed that notification of the meeting would be made by email.

The meeting concluded at approximately 2:55 pm.

Minutes of the Clark County, IL MHMP Meeting
January 6, 2010

The second regular meeting of Multi Hazard Mitigation Planning Team was held on Wednesday, January 6, 2010 at the Clark County Highway Department, 15487 N. Hwy 1 in Marshall, IL.

The meeting started at approximately 2:00 pm.

The following representatives were present:

Melissa Gona	POLIS
Adam Campbell	POLIS
Phillip Reeds	City of Martinsville
Herman Davidson	City of Martinsville
Steve Turpin	Clark County Assessor
Brad Burson	Marathon Pipeline
Shelby Biggs	City of Casey
Rick Manuell	School System (Marshall, IL)
Rob Crumrin	City of Marshall
Rhonda Cooper	Clark County Highway
Todd Kuhn	Clark County
Cory Sheehy	City of Marshall
Jerry Lorton	Clark County EMA/SO

Data prepared by the Planning Group representatives was provided to POLIS.

After introductions Adam Campbell of POLIS recapped the purpose of the PLAN.

The Planning Group at that time provided input to Representatives of POLIS in terms of classifying risks and the impact of those risks as they related to each community as well as the county.

The second phase of the meeting involved the Planning Group making observations of and logging additional information on a large detailed map of Clark County that was previously prepared by POLIS. The map displayed historical tornado and severe thunderstorm report data.

It was agreed to meet at the County Extension Building at 15493 State Highway 1, Marshall, IL at 2:00 pm on Wednesday, February 24, 2010 for meeting three (3). It was agreed that Clark County would invite the public to participate in the meeting.

The meeting concluded at approximately 2:45 pm.

Minutes of the Clark County, IL MHMP Meeting
February 24, 2010

The third regular meeting of the Multi Hazard Mitigation Planning Team was held on Wednesday, February 24, 2010 at the U of I- Clark County Extension Building, 15493 N. Hwy 1 in Marshall, IL.

The meeting started at approximately 2:00 pm.

The following representatives were present:

Herman Davidson	City of Martinsville
Steve Turpin	Clark County Assessor
David Coats	IUPUI
Jonathon Remo	SIU Carbondale
Brad Burson	Marathon Pipeline
Rick Manuell	School System (Marshall, IL)
Dallas Richardson	Clark County Highway
Dick Wheeler	Village of Westfield
Todd Kuhn	Clark County
Shelby Biggs	City of Casey
Jerry Lorton	Clark County EMA/SO
Rob Crumrin	City of Marshall

A meeting notice, inviting the public, was published in the Casey Reporter and the Marshall Independent Choice newspapers prior to the meeting date.

A draft of the Plan was provided to each Planning Team Member.

Jonathan Remo of SIU Carbondale made a presentation to the group based on information provided by the Team during a previous meeting, historical data obtained by POLIS/SIU and software modeling . The modeling scenarios were disasters based on floods, earthquake as well as hazardous material release in various areas in Clark County.

David Coats briefed the Planning Team on the agenda for Meetings four (4) and five (5). Each Team Member was requested to review the plan and forward any additions or corrections to Jerry Lorton in written form, prior to the fourth meeting. Meeting four will require the Team to provide mitigation strategies for hazards that have been identified in each of their communities in Clark County.

The fifth meeting will require the Planning Team to meet and review the written revisions provided by SIU/POLIS.

It was agreed to meet at the Clark County Highway Building at 15487 State Highway 1, Marshall, IL at 2:00 pm on Wednesday, March 24, 2010 for meeting Four (4).

The meeting concluded at approximately 2:40 pm.

Minutes of the Clark County, IL MHMP Meeting
March 24, 2010

The fourth regular meeting of the Multi Hazard Mitigation Planning Team was held on Wednesday, March 24, 2010 at the Clark County Highway Department, 15487 N. Hwy 1 in Marshall, IL.

The meeting started at approximately 2:00 pm.

The following representatives were present:

Herman Davidson	City of Martinsville
Steve Turpin	Clark County Assessor
John Buechler	POLIS
Butch Ruffner	City of Casey
Rick Manuell	School System (Marshall, IL)
Tim Wick	POLIS
Dallas Richardson	Clark County Highway
Todd Kuhn	Clark County
Jerry Lorton	Clark County EMA/SO
Rob Crumrin	City of Marshall

John Buechler and Tim Wick of the Polis Center provided information to the planning team to assist in the selection of Hazard Mitigation projects in each of the communities as well as in the non incorporated areas of Clark County, IL. Discussions were held and input was provided for hazard mitigation strategies that included but were not limited to, flooding, tornado/thunderstorms, winter storms, earth quakes and hazmat.

John Buechler also discussed the agenda for Meetings #5. The fifth meeting will require the Planning Team to meet and review the written revisions provided by SIU/POLIS.

POLIS agreed to provide Clark County EMA with revised printed and electronic copies of the plan. The plan document will be distributed to planning members. A date for the 5th meeting will be set after the plan is distributed to all members for review and possible revision.

Minutes of the Clark County, IL MHMP Meeting
May 4, 2010

The fifth meeting of the Multi Hazard Mitigation Planning Team was held on Tuesday, May 4, 2010 at the Clark County Highway Department, 15487 N. Hwy 1 in Marshall, IL.

The meeting started at approximately 2:00 pm.

The following representatives were present:

Herman Davidson	City of Martinsville
Rob Crumrin	City of Marshall
Dallas Richardson	Clark County Highway
Jerry Lorton	Clark County EMA/SO
Shelby Biggs	City of Casey

Jerry Lorton summarized the areas of the plan that he observed that required revision. Rob Crumrin summarized the revisions that he had emailed to Laura Danielson of POLIS.

Jerry Lorton will provide POLIS with the written revisions and will make notification to the Planning Team.

Jerry Lorton stated the plan called for the Planning Team to meet annually and the plan would require an update in five years.

The revisions and corrections to the plan are contained in an eleven page document that is attached to the minutes.

Jerry Lorton stated POLIS would make the revisions on the PDM site. The planning team will need to proof the document after POLIS makes the corrections.

The meeting concluded at approximately 2:30 pm.

Appendix B: Local Newspaper Articles and Photographs

Tornado causes damage and injuries near Martinsville

On the first Tuesday of every month Martinsville residents hear the sound of the emergency siren as it is tested by local Emergency Services Disaster Agency (ESDA). However, this area heard that sound and it was no test.

On July 10, a tornado touched down in Clark County. Four people were reportedly injured and several structures received damage.

The worst hit were the mobile homes of Charles Poindexter and his daughter, Vickie Keller, who lived by Snake Trail Campground, 1 mile west of Martinsville.

The Poindexter mobile home was totally destroyed leaving only part of the frame. Wilma Poindexter, 53, and Charles Poindexter, Jr., 20 were injured and taken to Terre Haute's Union Hospital. Mr. Poindexter was treated for bruised ribs and released. Mrs. Poindexter remains in Union Hospital where she is being treated for a fractured back.

Also injured were Patty and Theodore Hopkins, both of Colorado.

The Keller mobile home was flipped on its top. The office roof was blown off and six campers and mobile homes were either damaged or destroyed.

Those aiding in evacuating the hurt were the Clark Co. ESDA, Martinsville Fire Dept., ambulance teams from Marshall, West Union and Casey.

The Martinsville Hen House also received damage. The restaurant roof received damage. According to one source the front and back doors of the restaurant blew open saving it from the pressure of the tornado.

Also, destroyed was the Shell sign. Glass from this sign flew through the canopy over the gas pumps where employees were serving cars. There were no injuries.

Police Chief Herman Davidson told the Planet that several people called in not knowing what to do. Following are the steps you should take if the area is threatened by a tornado:

BEFORE

When the skies look threatening, listen to the radio. The National Weather Service tracks all weather systems with sophisticated radar and is usually able to give adequate warning of violent weather conditions.

When a watch is issued, listen to broadcast advisories and be ready to take cover. It is wise to collect a battery-powered light and radio and have family members within earshot under watch conditions. Also, take your car keys; should a tornado hit your area, your car may still be operable—but keys would be lost in the rubble.

Take an inventory of all your household furnishings and personal belongings. In case of tornado or other disaster, this inventory will be invaluable to you in settling your insurance claim. Make sure you keep your inventory in a safe place, like a bank safe deposit box.

DURING

A tornado sounds like the roar of hundreds of airplanes. You'll probably get warning before that ominous sound approaches. We suggest you listen to the radio when the sky looks forbidding.

A tornado watch means tornadoes may be expected to develop.

A tornado warning means a tornado has actually been sighted.

For further protection, move to your basement. Get under a heavy table or work bench if possible. If you have no basement, take cover in small, windowless interior rooms on the lowest level, such as closets or bathrooms.

If you're in an office building or school, protect yourself in an interior hallway or a l
auditoriums or g

structures with wide, free-span roofs.

In mobile homes or vehicles, leave them and go to a substantial structure. If there is no shelter nearby, lie flat in the nearest ditch, ravine or culvert with your hands shielding your head.

AFTER

Closely inspect your property, including automobiles, for damage. Report any gas leaks or electrical damage immediately.

If your home is damaged, get in touch with your insurance agent or company.

In the meantime, secure your remaining property to protect it from further damage or theft. Take an inventory of the damage so you can file your insurance claim as soon as possible.

Notify your relatives of your safety. Local authorities may waste time trying to locate you if you don't send word. Limit your calls to one minute each. Do not tie up the telephone lines with unnecessary calls.

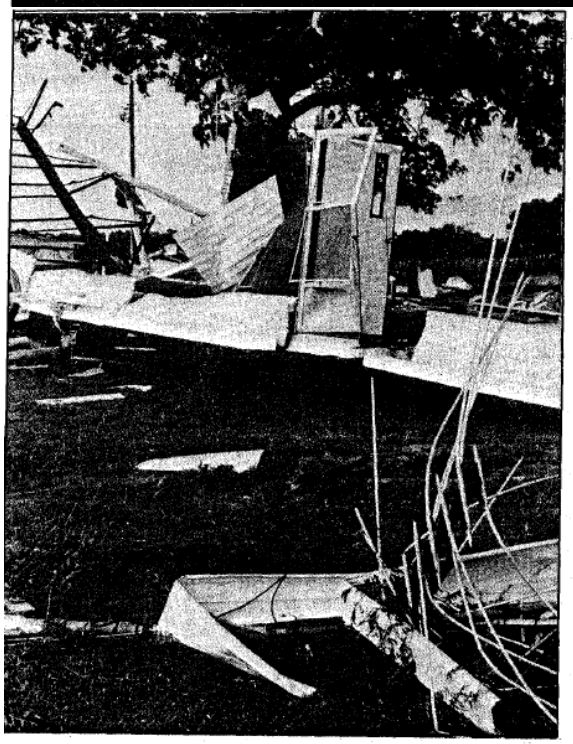
Cooperate in the general clean-up of debris. You are responsible for

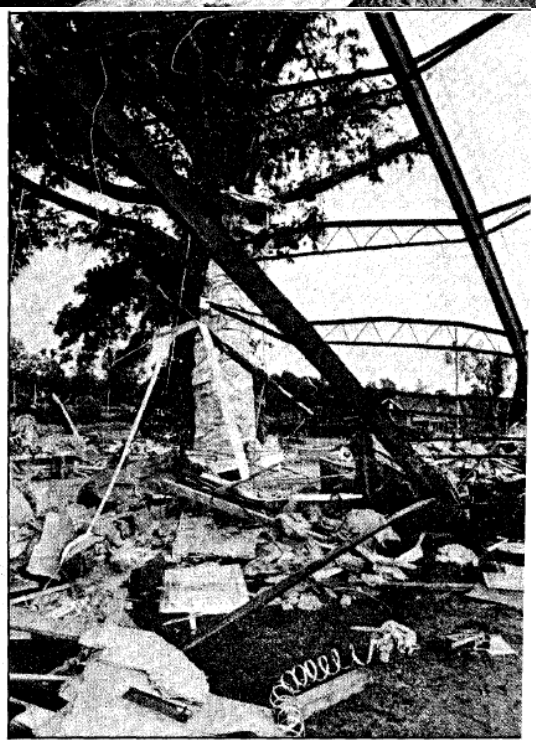
MULTI-HAZARD Mitigation Plan
Public Meeting Announcement

The Clark County Hazard Mitigation Planning Group will host a public information and strategy planning session at 2:00 pm on February 24, 2010 at the U of I-Clark County Extension Building, 15493 N. State Hwy 1, Marshall, IL.

Over the last several months, a planning group, consisting of community members throughout the county has worked with Southern Illinois University- Carbondale, IL and the Polis Center at Indiana University-Purdue University Indianapolis (IUPUI) to develop a Multi-Hazard Mitigation Plan for Clark County. Upon completion, the group will submit the plan to FEMA for approval.

The planning group is interested in receiving public input on the plan. Anyone who has questions or would like to provide input is encouraged to attend the meeting. For additional information contact Jerry Lorton at 217-826-6393.





OMES SHREDDED — A tornado cut through the steel mobile home just west of Martinsville Saturday and pushed it out into an adjacent road and field. These photos show what is left of the structure. Bulldozers were needed to clear a path in the street that runs in front of the homes. The winds swept 53-year-old Wilma Poindexter through the air and flung her in a nearby fi was listed in satisfactory condition at Terre Haute Union hospital Sund story on page one, please.)

(Star Photos: Randy F

HARD WAY TO TURN OVER — There wasn't much left of Theron and Vicki Keller's mobile home near Martinsville after a tornado picked it up and rolled it over Saturday evening. Neighbors gathered at the site Sunday to help sort through the remains. Just a few feet away, Mrs. Keller's mother's home also was destroyed.

(Star Photo: Randy

'My Hat Didn't Blow Off,' But Homes D

By GINA SEGOVIA
Star Staff Writer

MARTINSVILLE, Ill. — At 6 p.m. Saturday Vicki Keller's husband Theron pulled his 18-wheeler into the drive in front of their mobile home.

Her five-year-old son's "Daddy's home," was cut short when the wind-tongue of a tornado curled under their mobile home and turned it over.

Keller and her family were in the middle of Saturday's weather nightmare that destroyed at least six campers, two mobile homes and an equipment storage house in Clark County. Only one woman remains hospitalized as a result of the storm.

Mrs. Keller's arm was sucked into to a closet "I couldn't get it out . . . I could hear my baby crying. But I couldn't get to him." Her one-year-old boy was sleeping on the couch. She later found the baby under a couch, table, and lamp — uninjured.

While she was searching for her children, her mother's mobile home was being sliced up like a melon. Rug shreds were hanging from the top branches of a tree. The floor of the home had been catapulted into a tree.

"She was cooking spaghetti," her daughter said. She ended up over there in that field across the road, under a stove and a couch and my father. He tried to get to her. It took three people to pull the stuff from her."

Neighbors gathered Sunday to help the Kellers move salvaged belongings from the upside down trailer. Trees stood within a few feet of the tradgedy — untouched. "I was standing right next to the truck and my hat didn't even blow off," Bill Huddlestun recalled.

Keller's mother, Wilma Poindexter, 53, was in satisfactory condition at Union Hospital Sunday with back injuries. Her husband, who had refused treatment the night before, was taken to the hospital Sunday afternoon. He was released.

Minutes after the twister's devastation had been completed on a crest that overlooks the Snake Trail campsite, it slithered across the lake and whipped a Colorado family's trailer up and over. It had been parked only five minutes.

Patty and Theodore Hopkins already had picked up what was left of their belongings and gone home Sunday afternoon. "That girl had quite a sense of humor," an Illinois disaster worker said. "She came back today wearing a t-shirt that said 'when I die I'm going to heaven 'cause I've already been to Terre Haute.' "

Most of the campsites at the park were empty Sunday. George M. Stoutin, owner of the ground, commanded a battalion of chai Sunday. The saws chewed away at the covering a supply store roof.

In the middle of the storm a 12-year-old from his camper clutching his dog. His fam in town shopping. "The dog flew across the the disaster volunteer said. "The boy clung tree there. He was one scared little boy."

The dog swam back across the lake uninjured owner.

Victor Arnold knows the exact time the arrived. At 5:57 p.m. Saturday his clock s The Casey farmer was watching the ne started raining like 60 and I decided to s door." When he looked out his front door h machinery storage shop, bulldozed. Crinkle flew through his yard like pieces of toilet

On Sunday the metal hung from a giant spl It dotted the soy fields on old U.S. 40 lik pieces of foil. A trickle of cars ignored bar and Arnold waved at the craned necks.

He expressed a common refrain amo tornado witnesses, "I was lucky. It blew ou windows and tore out my power lines. B fine," he said.

Police Dept.
MARTINSVILLE, ILL. 62442
217-382-4023

SUPPLEMENTARY REPORT

TRAIN DERAILMENT (Classification) NO. S 81014

me of Complainant | Address | Phone No.

Conrail Train East Bound Derailment
ense

DETAILS OF OFFENSE, PROGRESS OF INVESTIGATION, ETC.:
(Investigating Officer must sign)

ge No. 1 Date November 13 1980

At 5:48 A.M. the Martinsville Police department recieved a phone call from Tom Phillips reference Conrail train blocking both crossings. Tom said he thought it was derailed. Advised him to call Officer Durant Jr. for he was still working. In the mean time I got up and dressed and proceeded to the derailment. Officer Durant Jr. advised me that there was no Hazardous Material on derailed cars. I then proceeded to get barricades from below the library to barricade both crossings, which I did.

At 6:06 A.M. we recieved a call from Conrail in reference to both railroad crossing will be blocked for 2 to 3 hours. I also called City E.S.D.A. coordinator Max Cruse and told him about the derailment.

At 6:20 A.M. I had Robin call Supt. of Martinsville Schools Hornbeck and tell him both crossing will be closed and he will have to reroute the buses.

At 8:41 I recieved a call from the Clark County E.S.D.A. Secretary in reference to the derailment. I told Robin Davidson that it happened at 5:30 A.M., 2 cars left the track. 1 car had 2 semi trailer on it, the other only had 1 trailer on it, all the trailers were empty. There were no injuries cause of the derailment from broken couple on one of the piggy back cars which fell down and hit a switch.

ille, Illinois-Wednesday Morning, July 25, 1984 VOL-101 NO

Chemical leak in train car causes evacuation of several area resident

by Brian Miller
Staff Writer

On Thursday night, July 19, at pproximately 7:30, a Conrail eight train stopped near the State ighway Garage on route 40 about o miles east of Martinsville. One the tank cars was leaking hylene Oxide, a volatile liquid, at turns into a highly toxic gas hen exposed to the air.

Route 40 was blocked off for about) minutes, and about 40 people in a ie mile radius were evacuated.

The leak was sealed at 1:15 a.m. pparently, no damage was done, id the actual leakage was only ight.

A passing train noticed the leak. ne volatile chemical is stored at a ery low temperature. The passing ain probably noted the frost on the p of the faulty car. Also, quite a bit the paint on the car had been ten off by the corrosive chemical.

The Martinsville Fire Department as called to the scene to wash down id dilute the chemical spill. The tate Police sent their hazardous aterials expert to take control of ie situation.

Evidently, a small plug was issing from a sample valve on the p of the car. The cause was most kely human error. The plug was ither simply left out or not ghtened down well enough. The otion of the train could have orked the already loose plug out of s proper place.

Remarkably, a plug for the valve as purchased from Larry Mann at he local hardware store. "It was a /4" galvanized plug that only cost 1 cents," commented Mann.

The real threat that night was th other possibility of events. "When a leak such as Thursday night's occurs, the first thought is that it came from a pop off valve," according to Odell Roddy, Martinsville ESDA coordinator. If 75 pounds/sq. in. of pressure builds up inside the tank, the pop off valve will release the added pressure by releasing excess gas until the internal pressure returns to normal.

"Such an event would be caused by a contamination of the chemical. The compound would heat up, build pressure, and then probably explode," stated Roddy. "It would affect all of Clark County," he added.

Every precaution was taken with the tank car to guarantee that the above scenario did not occur. The chemical company responsible for the Ethylene Oxide flew two men into the area from Houston, Texas to sample the gas for contaminants.

Others at the scene included Martinsville Police, Clark County Police, State Police, ETA, and County ESDA.

However, one man who was not called to the scene was Odell Roddy. "Our ESDA unit trains and trains for just this type of emergency. I've been training since 1962. Martinsville has a crack unit, but they simply decided to let us sleep," stated a frustrated Roddy. "The disaster was there for five hours before I was even notified, and then I was told to evacuate."

Roddy plans to contact the chairman of the County Board and discuss the problem. Roddy commented," We have a really good ESDA group. We should absolutely be called right at the first."

This train car was leaking Ethylene Oxide, a volatile compound, two miles east of Martinsville on Thursday night.

Planet Photo

Martinsville Chief of Police Herman Davidson was one of the first people at the scene. Davidson believed that it was the Clark County ESDA coordinator. John Trefz, job to call Roddy, not his own. "I saw that the situation was under control so I came back into town," stated Davidson.

Dan Crumrin, Clark County Sheriff, said, "I assumed that it would be his (Trefz) job to contact Roddy. However, the incident occured outside of the Martinsville city limits, and I'm not sure if he suppposed to be called. Also, hazardous materials officer there from the State Police. I that was satisfactory. He's expert."

When asked whose job it contact Roddy, Crumrin answ "Well, that's part of the prob I'm not really sure. I assumed t was his (Trefz) job, but I'm sure."

John Trefz was not availabl comment.

Appendix C: Adopting Resolutions

Resolution #_____

ADOPTING THE CLARK COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, Clark County recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHERAS, Clark County participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Clark County Board hereby adopts the Clark County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that the Clark County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Emergency Management Agency and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____ Day of _____, 2010.

_____
County Board Member

_____
County Board Member

_____
County Board Member

_____
Attested by: County Clerk

Resolution #_____

ADOPTING THE CLARK COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, the City of Casey recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHERAS, the City of Casey participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the City of Casey hereby adopts the Clark County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Clark County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Emergency Management Agency and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____ Day of _____, 2010.

_____
City Mayor

_____
City Council Member

_____
City Council Member

_____
City Council Member

_____
City Council Member

_____
Attested by: City Clerk

Resolution #_____

ADOPTING THE CLARK COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, the City of Marshall recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHERAS, the City of Marshall participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the City of Marshall hereby adopts the Clark County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Clark County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Emergency Management Agency and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____ Day of _____, 2010.

_____
City Mayor

_____
City Council Member

_____
City Council Member

_____
City Council Member

_____
City Council Member

_____
Attested by: City Clerk

Resolution #_____

ADOPTING THE CLARK COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, the City of Martinsville recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHERAS, the City of Martinsville participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the City of Martinsville hereby adopts the Clark County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Clark County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Emergency Management Agency and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____ Day of _____, 2010.

_____
City Mayor

_____
City Council Member

_____
City Council Member

_____
City Council Member

_____
City Council Member

_____
Attested by: City Clerk

Resolution #_____

ADOPTING THE CLARK COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, the Village of Westfield recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHERAS, the Village of Westfield participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Village of Westfield hereby adopts the Clark County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Clark County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Illinois Emergency Management Agency and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____ Day of _____, 2010.

_____
Village President

_____
Village Council Member

_____
Village Council Member

_____
Village Council Member

_____
Village Council Member

_____
Attested by: Village Clerk

Appendix D: NCDC Historical Hazards

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Clark County	06/16/70	2203	Tornado	F	0	0	3K	0	None reported
Clark County	04/01/74	1550	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	03/20/76	1530	Tornado	F1	0	0	25K	0	None reported
Clark County	06/20/79	1700	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	08/20/79	1710	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	04/08/80	954	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	08/31/80	1335	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	05/20/82	1724	Tstm Wind	56 kts.	0	0	0	0	None reported
Clark County	06/15/82	1600	Hail	1.00 in.	0	0	0	0	None reported
Clark County	06/15/82	1600	Hail	1.00 in.	0	0	0	0	None reported
Clark County	06/15/82	1600	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	06/15/82	1600	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	07/10/82	1700	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	07/10/82	1705	Tornado	F0	0	0	0K	0	None reported
Clark County	07/10/82	1715	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	05/01/83	1423	Hail	1.00 in.	0	0	0	0	None reported
Clark County	05/01/83	1445	Hail	1.00 in.	0	0	0	0	None reported
Clark County	05/01/83	1541	Hail	1.00 in.	0	0	0	0	None reported
Clark County	05/01/83	2205	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	05/01/83	2305	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	03/15/84	2015	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	04/27/84	2030	Hail	1.75 in.	0	0	0	0	None reported
Clark County	06/24/85	1540	Tornado	F0	0	0	3K	0	None reported
Clark County	06/13/87	1415	Tornado	F0	0	0	0K	0	None reported
Clark County	06/13/87	1435	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	07/06/87	1855	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	04/22/88	1939	Hail	1.75 in.	0	0	0	0	None reported
Clark County	04/26/89	2230	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	05/25/89	1451	Hail	1.75 in.	0	0	0	0	None reported
Clark County	05/12/90	2015	Tstm Wind	0 kts.	0	0	0	0	None reported
Clark County	06/02/90	1605	Tornado	F1	0	0	25K	0	None reported
Clark County	07/09/92	1403	Tstm Wind	0 kts.	0	0	0	0	None reported

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Clark County	07/16/92	1520	Tstm Wind	61 kts.	0	0	0	0	None reported
Martinsville	05/14/94	1915	Tornado	F0	0	0	0	0	A tornado briefly touched down in a field six miles south of Martinsville. No damage was reported.
Marshall	06/21/95	1615	Tstm Winds	0 kts.	0	0	0	0	Numerous large tree limbs were blown down throughout the eastern half of Clark County.
Central Illinois	12/08/95	700	Winter Storm	N/A	1	0	0	0	A winter storm brought one to five inches of snow to Central Illinois during the day and evening of the 8th. A sharp cold front moved through during the evening of the 8th dropping temperatures as much as 25 degrees in three hours. Strong winds developed behind the front at 20 to 30 mph overnight and during the day on the 9th, causing considerable blowing and drifting of the snow, especially in open areas. The brisk winds and temperatures near zero created wind chills as low as 45 degrees below zero. One woman was killed in a traffic accident after sliding on an ice-covered road into on-coming traffic.
Central Illinois	12/18/95	1900	Winter Storm	N/A	1	0	0	0	A winter storm brought heavy rains the evening of the 18th, which changed to freezing rain overnight before changing to all snow by 0700 on the 19th. Snowfall ranged from one inch in Mason County to six inches in Edgar County. Numerous accidents were reported, though only one fatality occurred when a five-month-old boy was killed when his mother lost control of the vehicle and spun into the path of an on-coming tractor-semitrailer. Numerous power lines were knocked down throughout Central Illinois, due to the freezing rain and strong winds of 20 to 30 mph. The strong winds also caused considerable blowing and drifting of snow closing some roads in Central Illinois until the winds subsided in the evening on the 19th.
Statewide	01/02/96	2:00 AM	Winter Storm	N/A	0	4	0	0	The second major winter storm of the season moved through Central Illinois January 2nd and 3rd. The storm dumped up to 8 inches of snow across the area. Also, gusty northwest winds from 30 to 40 mph accompanied the storm, creating near whiteout conditions, making travel hazardous, and closing numerous roads. There were numerous minor accidents, though only two accidents resulted in 4 serious injuries.
Statewide	01/04/96	3:00 AM	Winter Storm	N/A	0	0	0	0	Following on the heels of the January 2nd/3rd storm, another winter storm moved through Central Illinois on January 4th. Snowfall ranged from 2 to 7 inches. Numerous minor accidents were reported across the area, though no major injuries were reported.
Statewide	01/18/96	10:00 AM	Winter Storm	N/A	0	2	0	0	A major winter storm moved through Central Illinois January 18th and 19th. Severe thunderstorms moved through the area during the late morning and early afternoon hours. Afterward, temperatures began to drop quickly. Most locations recorded a 60 degree drop over a 12 hour period. The rain changed to ice than snow causing numerous power outages and minor accidents. Two people were injured when the driver of the RV lost control of the vehicle when a strong gust of wind moved through the Farmer City area in DeWitt county. Gusty winds of 25 to 35 mph created winds chills near 40 below zero across most of Central Illinois.
Statewide	02/02/96	12:00 AM	Extreme Cold	N/A	2	0	0	0	Bitterly cold weather took hold of Central Illinois on the 2nd, 3rd, and 4th of this month. New record low temperatures were made with a low of minus 19 in both Peoria and Springfield on February 3rd. Also, new record low high temperatures were made when the temperatures at Peoria and Springfield never went above zero on the 2nd and 3rd. Many people experienced problems with cars and frozen pipes. However, two deaths were reported due to the extreme cold. A 78 year old man in Springfield froze to death within a few feet of his own front door. He reportedly could not find his house keys and fell. His wife could not help him and they were not found for several hours. She was treated for exposure and released. In Peoria, a 79-year-old woman froze to death on her front porch. Apparently she mistakenly thought she was locked out of her home.
Statewide	03/19/96	12:00 AM	Winter	N/A	1	0	0	0	A winter storm moved into southeastern Illinois early on March 19th. The storm dumped up to 11

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
			Storm						inches of snow across the area. There was considerable blow and drifting of snow which temporarily closed some roads in the area. One man was killed, near Casey in Clark County, when he lost control of his semi-truck and slammed into a concrete overpass and burst into flames. Several schools, a nursing home, and several businesses in the area were evacuated because the truck was carrying some type of chlorine compound, which emitted dense smoke and a bleach-like smell through the area. The buildings were evacuated as a precaution. Otherwise, there were numerous minor accidents which did not result in any serious injuries.
Statewide	03/25/96	4:00 AM	High Wind	0 kts.	1	0	0	0	Strong gradient winds caused minor damage across Central Illinois and caused a bizarre accident which killed one person. Winds gusting to between 40 and 55 mph caused a bedliner and a concrete block to be blown from the bed of the pickup truck. The concrete block was thrown through the windshield of a car travelling in the opposite direction. The block hit the driver's chest killing him. The winds blew down numerous power lines, tore off the roof of a building in Rushville, and metal sheathing and insulation from the roof of a mobile home was blown off in Bloomington.
Statewide	04/28/96	9:15 AM	High Wind	53 kts.	0	0	0	0	Strong gradient winds between 40 and 50 mph, with gusts to 61 mph, caused damage over a large area of Central Illinois. Numerous trees, tree limbs, and power lines were blown down. Also, a part of the roof and guttering on the Charleston High School, in Coles County, was blown off. Several barns and machine sheds sustained minor damage and one grain bin was blown over onto a car. No injuries were reported. A window in a business in Pana, Christian County, was blown out and the roof of the building sustained some damage. One tree fell onto a car in Forsyth, Macon County, though fortunately no one was in it at the time. Numerous houses throughout Central Illinois sustained some minor roof and siding damage as well. No damage estimate was available.
Walnut Prairie	05/08/96	1:10 PM	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds blew down numerous power poles and power lines in Walnut Prairie.
Martinsville	06/17/96	6:22 PM	Tstm Wind	0 kts.	0	0	0	0	A one foot in diameter tree was blown over 1 mile east of Martinsville.
Dennison	07/02/96	1:35 PM	Hail	1.75 in.	0	0	0	0	Hail up to golf ball size fell in Dennison causing some corn and soybean damage. Also, the hail damaged the siding and windows on one home and the roof of a tool shed. No injuries were reported and no damage estimate was available.
Clark County	07/29/96	1:00 AM	Hail	1.75 in.	0	0	0	0	None reported
Casey	10/17/96	6:15 PM	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds blew down a large tree in Casey, as well as, numerous tree limbs. No injuries or damage were reported.
Statewide	01/08/97	9:00 PM	Heavy Snow	N/A	0	6	0	0	A winter storm developed over the southern Plains and tracked to the northeast across southern Illinois. The storm dumped between 3 and 11 inches of snow over central Illinois. The heaviest snow fell in a corridor just north of I-70. Charleston in Coles County reported the most snow with 11 inches. Numerous accidents were reported throughout central Illinois. However, only 6 minor injuries were reported.
Statewide	01/15/97	3:00 AM	Winter Storm	N/A	1	7	0	0	A winter storm developed over the central Rockies and moved east into the Midwest. The storm brought between 4 and 6 inches of snow to a large part of central Illinois north of I-70. South of I-70 a mixture of freezing rain, sleet, and snow occurred with snow totals of 1 to 3 inches. After the snow stopped, the winds picked up to between 20 and 30 mph with higher gusts, causing near whiteout conditions. Also, temperatures fell below zero across the entire area, so with the strong winds and cold temperatures, wind chill readings dipped well below minus 40 degrees in many locations. Numerous accidents were reported though only 6 minor injuries and one person with serious injuries were reported. A 78 year old man died of exposure after apparently trying to walk a short distance to his brother's house and his body was not discovered for over 24 hours.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Statewide	01/26/97	5:00 AM	Winter Storm	N/A	0	9	0	0	A winter storm developed over the southern Plains and moved east, to the south of Illinois. One area of snow moved through central Illinois on the 26th with snow amounts ranging from 1 to 4 inches. Then the snow let up around 4 pm on the 26th. A mixed bag of precipitation began to fall over the southern areas of central Illinois around 4 am on the 27th and spread north into the rest of central Illinois. By the time the precipitation ended in the evening of the 27th, another 1 to 5 inches of snow had fallen. Numerous accidents were reported, especially in the morning hours on the 27th. Nine minor injuries were reported.
Statewide	04/06/97	9:15 AM	High Wind	56 kts.	0	0	0	0	The combination of a strong area of low pressure over Lake Superior and a strong area of high pressure over Texas created very high gradient winds over Central Illinois. Sustained winds averaged between 25 and 40 mph with higher gusts to 65 mph in some areas. These gradient winds blew down numerous trees, tree limbs, and power lines throughout Central Illinois. In Lincoln (Logan County), one tree fell onto a house damaging a porch and deck. No injuries were reported in this incident. Meanwhile, in Galesburg (Knox County) another tree fell onto a house causing extensive roof damage and broke a window in the home, though no injuries were reported. Two miles northeast of Castleton (Stark County), the winds destroyed a two story barn and in Woodford County near El Paso a semi was blown over on US 24, but no injuries were reported. No damage estimates were available for this event.
Statewide	04/30/97	2:00 PM	High Wind	61 kts.	0	1	38K	0	Strong gradient winds in excess of 50 mph with gusts to around 70 mph followed behind a line of severe thunderstorms as they marched across Central Illinois. The gradient winds lagged behind the thunderstorms by about 20 to 30 minutes and continued during the night finally letting up the next day, May 1st. Thousands of people across Central Illinois lost power for a time as hundreds of power lines were blown down. Several semis were blown over, with one trucker sustaining minor injuries when his semi was overturned near Jacksonville. Also, numerous trees and tree limbs were blown down and widespread structural damage was reported. The gradient winds blew down a 150 foot communications tower in Princeville (Peoria County). No injuries were reported. Homes in Manito (Mason County), Leroy (McLean County), Georgetown (Vermilion County), Effingham (Effingham County), and Olney (Richland County) sustained some damage due to trees falling on them. The gradient winds blew part of the roof off of a grade school gymnasium one mile west of De Land (Piatt County). Damage was estimated around $32,000 and no injuries were reported. Also, the winds blew the roof off of an apartment building in Towanda (McLean County), though no injuries were reported. Numerous sheds, grain bins, and machine sheds were either blown over, damaged, or destroyed by the gradient winds. No deaths or serious injuries were reported.
Westfield	04/30/97	3:45 PM	Tstm Wind	0 kts.	0	0	8K	0	Thunderstorm winds blew down numerous trees and power lines in Westfield. Two trees fell onto homes causing minor damage. Also, the winds damaged the roof of a mobile home. No injuries were reported but damage was estimated around $7,800. As a strong area of low pressure moved into the Midwest, severe thunderstorms developed along and ahead of a cold front which moved through Central Illinois during the afternoon and early evening hours. There were numerous reports of trees, tree limbs, and power lines knocked down. Also, 6 tornadoes were reported across the area. Only a few minor injuries were reported and no deaths occurred with these tornadoes.
Westfield	06/21/97	5:05 PM	Hail	1.75 in.	0	0	0	0	None reported
Marshall	06/21/97	5:20 PM	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds blew down a large tree onto a home in Marshall. No injuries were reported and no damage estimate was available.
Statewide	07/26/97	9:00 AM	Excessive Heat	N/A	2	0	0	0	A brief heat wave hit Central Illinois persisting for a little less than 48 hours from July 26the to July 27th. Temperatures ranged from 95 to 100 degrees both days with heat index values ranging from 105 to 115 degrees. One man died while working in farm fields near Danville (Vermilion County)

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
									and an elderly woman died in her home in Bloomington (McLean County). There were numerous reports of heat related injuries in most area hospitals. Also, there were numerous reports of roads buckling due to the high temperatures.
Statewide	11/13/97	3:30 PM	Winter Storm	N/A	0	1	0	0	A mixture of snow, sleet and freezing rain moved into portions of southeast Illinois late in the afternoon on November 13. Some glazing was reported in Lawrence County at the onset of the event. The activity changed over to all snow soon after the event began. A band of 3 to 5 inch snowfall occurred across this entire area. The event tapered off by early morning on November 14.
Countywide	06/12/98	5:26 PM	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds blew down numerous trees, tree limbs, and power lines throughout the county.
Martinsville	06/18/98	9:25 PM	Tstm Wind	0 kts.	0	0	0	0	A large tree was blown down across North Creek Road about one mile south of Martinsville.
Statewide	06/26/98	3:00 AM	Excessive Heat	N/A	1	0	0	0	A hot and humid airmass built in across Central Illinois late in June. High temperatures on June 26th and 27th climbed into the middle and upper 90s. This combined with the high humidity values produced heat indices of 105 to 110 degrees at times. Several heat related illnesses were reported in area hospitals due to the heat. One death was reported in Peoria and was confirmed to be heat related as a woman died in her home on June 27th. Also, several highways in the area had sections of roadway buckle due to the excessive heat.
Melrose	06/28/98	9:30 PM	Tstm Wind	0 kts.	0	0	0	0	Numerous large trees were blown down, which caused damage to several homes and vehicles in Melrose. Also, several mobile homes were destroyed. No injuries were reported and no damage estimate was available.
Countywide	06/29/98	5:23 PM	Tstm Wind	0 kts.	0	0	0	0	A large bow echo system developed over eastern Iowa and moved rapidly to the southeast into Illinois. It moved into Central Illinois's County Warning Area (CWA) around 4 pm in Knox County and exited the CWA (Lawrence County) around 830 pm. Damage was reported in all 35 counties with this system. Wind speeds were measured or estimated to be between 60 to 80 mph, blowing down or uprooting thousands of trees, tree limbs, power poles, and power lines. Hundreds of trees fell onto structures causing damage ranging from just torn guttering to major roof and structural damage. Also, hundreds of vehicles sustained damage from fallen trees and numerous outbuildings, sheds, and silos were either damaged or destroyed. Considerable crop damage was sustained in most areas. Speeds were measured or estimated in these areas at 100 to 110 mph. These areas of damage were apparently "microbursts" produced by a series of mesocyclones that formed on the forward edges of the bow echo. These microbursts, or swaths of more intense wind damage were generally about 1/2 a mile in width. In these areas significant structural damage occurred, such as peeling off roofs, blowing over freight railroad cars, bending steel power poles, and other structural damage. A third phenomena that occurred with this event were spin-up tornadoes along the leading edge of the bow echo structure. These tornadoes caused significant damage in narrow swaths along the bow echo's path and were often masked by the microburst damage occurring adjacent to them. Based on valid spotter observations and mesocyclone signatures on Doppler radar, the existence of these tornadoes was validated. Approximately twelve people sustained injuries and damage was estimated around $16 million.
Clarksville	07/22/98	3:17 PM	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds blew down several trees and power lines 2.5 miles northeast of Clarksville. Also, an old school house was moved three feet off its foundation. No injuries were reported.
Casey	07/22/98	4:48 PM	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds blew down several trees and power lines in the Casey and Martinsville areas.
West Union	08/04/98	8:00 PM	Flash Flood	N/A	0	0	0	0	A series of thunderstorms moved across western portions of Clark County dumping up to 6 inches of rain in the West Union area in less than three hours. Numerous roads were flooded. However, no structural damage or injuries were reported.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Statewide	11/10/98	4:30 AM	High Wind	57 kts.	0	1	60K	0	A strong storm system moved across the Midwest which ushered in a line of severe thunderstorms. About an hour after the storms passed strong gradient winds developed and continued until the late afternoon hours. Winds gusted to over 50 mph at times with sustained winds well over 35 mph. Thousands of power lines and tree limbs were blown down throughout Central Illinois and hundreds of trees were blown over. High winds ripped sheet metal from a storage tank containing ammonia near Creve Coeur (Tazewell County). Some pieces of sheet metal sheared open two relief valves, releasing gas fumes into the air. Homes in the area were evacuated. No one was injured and the leak was soon fixed. The high winds prevented the gas fumes from stagnating over the area. The winds destroyed a shed just south of Galesburg (Knox County) causing $60,000 in damage. Also, a semi was blown over. The driver received minor injuries but refused treatment. In St. David (Fulton County) the winds ripped off the roof of a home. Also, a large tree limb fell causing minor damage to a back porch and a car.
Marshall	11/10/98	7:56 AM	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds blew some roofing off of a building in Marshall and several power lines were blown down. Also, several trees were uprooted. No damage estimate was available.
Statewide	01/01/99	12:00 PM	Heavy Snow	N/A	1	1	0	0	A major winter storm paralyzed much of the region during the first few days of 1999. Snow began falling across portions of Central Illinois before noon on New Year's Day and continued to fall, moderate to heavy at times for most of the following 24-hour period. Locations near and south of Charleston/Mattoon saw periods of mixed precipitation, including freezing rain, while farther north snow was predominate. After the snowfall and precipitation diminished, winds increased from the northwest and temperatures dropped, causing dangerous wind chills and treacherous driving conditions with extensive blowing and drifting snow through the third day of the year. Total snow accumulations topped 6 inches mainly along and north of Interstate 70. Lesser amounts fell to the south, where more freezing precipitation was reported. The heaviest snow band in Central Illinois was found west and north of a line from Quincy to Virginia (Cass County) to Peoria to Bloomington to Champaign where reports of 14 or more inches of snow were common. The weight of the heavy snow and ice caused many roofs and porches to collapse, resulting in one death and an injury. An overhang attached to a garage at a Dalton City (Moultrie County) residence collapsed, killing a 47-year old woman and injuring her husband. In Pekin (Tazewell County), a storage building roof collapsed. A garage roof collapsed onto a station wagon in Winchester (Scott County). In Sullivan (Moultrie County), another roof collapsed. In Chesterville (Moultrie County), the roof caved in on the Bourbon Township Shed. Structural damage was sustained at the Farm and Fleet just west of Bloomington on Route 9 (McLean County). Part of the roof collapsed on the TCI building in Decatur (Macon County). The roof caved in and fell onto a service truck and two cars at Walker's Tire and Muffler Shop in Farmer City (Dewitt County). A private airplane was totaled when the roof of one of the main hangers at Kermit Patchett Airport in Marshall (Clark County) collapsed. Several homes in town also reported collapsed porches.
Statewide	01/05/99	5:00 AM	Extreme Cold	N/A	0	0	0	0	A clear sky, light winds and thick snow cover set the stage for record cold morning temperatures across the region. A new state record low was set at Congerville, where the mercury plunged to 36 degrees below zero. Other bitterly cold record readings came from: Champaign and Lincoln both with 25 degrees below zero, Springfield with 21 below and Peoria with 19 degrees below zero.
Darwin	04/08/99	11:00 PM	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds destroyed a machine shed and a barn 4 miles west of Darwin. Two cars in the machine shed were damaged. In Darwin, numerous trees were blown down. No injuries were reported.
Westfield	06/01/99	8:45 PM	Tornado	F0	0	0	350K	0	A tornado touched down 4 miles southeast of Westfield. It destroyed 3 machine sheds, a barn, and several trees. The nearby house did not sustain any damage. As it travelled to the northeast,

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
									another farm was hit. Two sheds, a brooder house, and half a barn were destroyed. The house sustained major damage with a large hole in the roof and almost every window was shattered. Debris was found up to two miles away. The house was shifted on its foundation which caused the concrete porch to split in half. A 2x4 flew through the house and was embedded into a wall. The tornado then lifted and dissipated 3 miles west of Clarksville. No injuries were reported and damage was estimated around $350,000.
Martinsville	06/01/99	8:50 PM	Tstm Wind	0 kts.	0	0	0	0	As severe storms moved through Clark County, numerous trees were blown down. One of the trees fell onto a house in rural Martinsville causing moderate damage. In Marshall, eight homes sustained minor damage and several power lines were blown down. Also, 3 miles southeast of Marshall, a machine shed was destroyed and a residence sustained minor damage. No injuries were reported.
Countywide	06/04/99	6:05 PM	Tstm Wind	0 kts.	0	0	0	0	Several trees and power lines were blown down countywide.
Statewide	07/20/99	10:00 AM	Excessive Heat	N/A	4	0	0	0	The excessive heat wave began on the 20th of July and continued for most of the area through the 26th. Temperatures were in the lower to middle 90s with heat index values in the 105 to 110 degree range each day. Northern sections of the area did cool down some by the 25th as a front moved through the area...so the heat advisory was cancelled in those areas. During this time period four heat related deaths were reported in Central Illinois. In Atlanta (Logan County), two young boys (2 1/2 and 1 1/2 years old) wandered away on the afternoon of the 20th and were found about an hour later in their parents' car. Both were reported dead shortly thereafter. In West Peoria (Peoria County), an elderly woman was found in her apartment on the 24th. All of the windows were closed and the air conditioner was broken. In Springfield (Sangamon County), a 62 year old woman was found in her home on the 25th. Again all of the windows were closed and there were no fans or air conditioning. M3VE, M2VE, F82PH, F62PH
Statewide	07/28/99	10:00 AM	Excessive Heat	N/A	1	0	0	0	The heat returned to Central Illinois after a two day break. Temperatures rose into the lower to middle 90s again with heat index values in the 105 to 110 degree range. One heat related death occurred during this time. A 50 year old woman in Danville (Vermilion County) died on the 30th. She was found in her apartment. By the 30th a cold front began to move through the area, so the heat advisory was cancelled for northern sections of the area, but the excessive heat persisted in the rest of Central Illinois through the 31st. F50PH
Statewide	03/11/00	4:00 AM	Heavy Snow	N/A	1	9	0	0	Heavy snowfall of 6 to 10 inches, accompanied by blowing and drifting, occurred in parts of central and southeast Illinois from the morning into the early evening of March 11, 2000. Several weather related traffic accidents resulted in nine serious injuries and one fatality. A 16 year old male was killed in a one car accident near the town of Oakland in Coles County. Four people were injured in a traffic accident near Neoga in Cumberland county, three people were injured in an accident near Assumption in Christian county, and two people were injured in an accident near Windsor in Shelby county. A second, but smaller band of heavy snow, occurred from eastern Morgan county into northern Sangamon county, where 6 to 8 inches was reported. M16VE
Countywide	05/09/00	2:35 PM	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds blew down numerous power lines, especially across the southern half of Clark County.
Martinsville	05/09/00	2:45 PM	Hail	1.00 in.	0	0	0	0	None Reported
Marshall	06/20/00	11:30 PM	Tstm Wind	0 kts.	0	0	0	0	A couple of trees were blown down.
Countywide	07/11/00	1:30 AM	Flash Flood	N/A	0	0	0	0	An area of thunderstorms moved through the county during the early morning hours of the 11th. Recently saturated ground allowed for the rainfall, totaling over 2 inches in some areas, to cause

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
									flash flooding in Clark County. IL Routes 40 and 1 were reported underwater in spots, as well as other county roads, with Marshall and Martinsville being the hardest hit. A vehicle was reported stuck in high water in the area, but no specific location was provided. No injuries were reported and no damage estimates were available.
West Union	07/28/00	4:20 AM	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds blew down several large trees in West Union.
Countywide	10/04/00	9:55 PM	Flash Flood	N/A	0	0	0	0	A stationary boundary just south of the area provided a focus for widespread thunderstorms producing heavy rainfall. Radar estimates and surface reports indicated anywhere from 2 to over 6 inches of rain falling during the evening and overnight hours across the area. Numerous roads were reported to have either ponding of water on them, or were completely covered in water for a period of time. The following reports were from Cumberland county, the hardest hit area in this event. North of Greenup, in Union township, a road around a bridge was washed out, causing over $90,000 in damage. One car had to be pulled out of high water along County Highway 6. The vehicle was three-quarters submerged, but there were no injuries. In Sumpter Township, the flood water scoured a hole along a culvert and under a roadway, which caved in when a truck passed over it. There were no injuries with this as well and no evacuations were needed.
Statewide	12/13/00	5:00 PM	Winter Storm	N/A	1	1	0	0	Between 6 and 8 inches of snow accumulated along and east of a Bloomington to Decatur to Taylorville line with a light ice coating on top of the heavy snow. The snow started between 8 and 10 am, with 6 inches accumulating by 5 pm, and ending by 10 pm. Freezing rain and sleet mixed in with the snow after 3 PM. This was the second winter storm to strike Central IL during the 2000-2001 winter season with the first one occurring just 2 days prior.
Casey	02/09/01	1:45 PM	Flash Flood	N/A	0	0	0	0	State Route 49, south of Casey, was reported to be flooded in spots
Marshall	05/17/01	7:00 AM	Hail	0.75 in.	0	0	0	0	None Reported
Martinsville	06/05/01	3:50 PM	Flash Flood	N/A	0	0	0	0	Water was reported over US Route 40, near Martinsville
Countywide	07/08/01	10:57 PM	Flash Flood	N/A	0	0	0	0	Radar estimated over 5 inches of rainfall across the county overnight, with the heaviest rain falling between Marshall and Casey. A cooperative observer in Marshall reported 4 inches of rain during the period, with the Casey observer reporting 3.2 inches. Numerous county roads were reported to be flooded as well as streets in both Casey and Marshall. A portion of Cork Road at 1950th (4 miles northeast of Marshall) was reported to have been washed out. The Little Creek in Martinsville was reported to be out of its banks and water covering many of the bridges going over the creek. No injuries were reported and no damage figures were available.
Casey	09/07/01	12:30 PM	Tstm Wind	50 kts.	0	0	0	0	Thunderstorm winds blew down several large trees in Casey. One car was trapped by the fallen trees. None of the car's occupants were injured.
Marshall	10/24/01	2:30 PM	Tstm Wind	50 kts.	0	0	0	0	Several trees and power lines were blown down.
Statewide	03/25/02	9:00 PM	Winter Storm	N/A	0	0	0	0	Freezing rain late in the evening of the 25th into the early morning hours of the 26th produced one-quarter to one-half inch of ice in the counties between I-72 and I-70. The freezing rain changed to sleet, then snow before daybreak. Snowfall amounts ranging from 4 to 7 inches, with significant blowing and drifting, occurred along a line from Pana through Monticello to Danville. The combination of ice and snow resulted in downed power lines and tree limbs, along with dozens of traffic accidents the morning of the 26th.
Countywide	05/07/02	5:00 AM	Flash Flood	N/A	0	0	0	0	Over 2.5 inches of rain fell in a short amount of time. It caused numerous roads to become flooded countywide, including Illinois Route 1 between Marshall and West Union. In Marshall, so much rain fell that a gas station canopy collapsed due to the weight of the water. No injuries were reported.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Statewide	05/07/02	9:00 AM	Flood	N/A	0	0	0	0	Even though the rains had ended, the flooding continued on numerous county roads into the afternoon hours.
Marshall	05/08/02	5:30 PM	Flash Flood	N/A	0	0	0	0	Over 2 inches of rain fell on already saturated ground in a short amount of time. Numerous roads in and around Marshall were flooded, including Illinois Route 1. Part of 11th Street at Vine in Marshall was washed away.
Marshall	05/08/02	5:30 PM	Hail	1.00 in.	0	0	0	0	None Reported
Marshall	05/09/02	2:40 AM	Tstm Wind	50 kts.	0	0	0	0	Several power lines were blown down in town.
Statewide	05/12/02	9:00 AM	Flood	N/A	0	1	0	0	Although the rain had ended, runoff from the storms continued to aggravate the flooding situation across Central Illinois. The runoff continued to cause flooding problems on numerous county roads and basements. In Clark County, Illinois Route 1 was flooded south of Martinsville, as well as Old Route 40 between Martinsville and Casey.
Countywide	05/12/02	10:15 AM	Flash Flood	N/A	0	0	0	0	Over 4 inches of rain fell causing flash flooding. Illinois Route 49 north of Casey was flooded.
West Union	05/27/02	6:20 PM	Flash Flood	N/A	0	0	0	0	Illinois Route 1 was flooded at several locations near West Union due to heavy rains.
Casey	06/04/02	7:30 PM	Tstm Wind	55 kts.	0	0	0	0	Several trees and tree limbs were blown down. One fallen limb in Martinsville pulled power lines down. Three miles north of Casey, part of the roof of a hog containment building was blown off.
Casey	06/04/02	7:35 PM	Hail	0.75 in.	0	0	0	0	None Reported
Marshall	07/09/02	5:03 PM	Tstm Wind	50 kts.	0	0	0	0	Two trees blown down. One west of Marshall and another northeast of Marshall.
Martinsville	07/22/02	8:30 PM	Tstm Wind	50 kts.	0	0	0	0	A tree was blown over onto an unoccupied car, damaging it.
Marshall	08/02/02	5:05 PM	Hail	0.75 in.	0	0	0	0	None Reported
Statewide	12/24/02	12:00 PM	Heavy Snow	N/A	0	0	0	0	Heavy snow accumulations between 6 and 8 inches fell across a large part of Central and Southeast IL between noon on 12/24/02 and 4 AM on 12/25/02. The Christmas Eve snow caused numerous vehicle related accidents, especially during the afternoon and early evening of 12/24/02 when 35 to 40 accidents occurred in Champaign county. There were no deaths in Central and Southeast IL, but there were two minor vehicle related injuries in Springfield where snowfall amounts averaged 5 inches. There was only minor blowing and drifting snow with this winter storm. With the exception of Lawrence County, this was the first heavy snow of the season across Central and Southeast IL.
Martinsville	05/06/03	10:00 PM	Tstm Wind	55 kts.	0	0	0	0	Several power poles were blown down.
Marshall	05/10/03	9:30 AM	Flash Flood	N/A	0	0	0	0	Very heavy rain fell on already saturated ground...especially south of Marshall. Illinois Route 1 was briefly flooded south of Marshall as well as some secondary roads in the area.
Marshall	05/10/03	10:07 AM	Tstm Wind	60 kts.	0	0	0	0	Numerous trees were blown down
Casey	05/14/03	9:30 PM	Hail	1.00 in.	0	0	0	0	None Reported
Martinsville	08/02/03	7:00 PM	Tstm Wind	60 kts.	0	0	0	0	Thunderstorm winds blew down several trees and power lines. A couple of the trees fell onto homes causing damage. Also, one home had several windows blown out. No injuries were reported.
West Union	08/31/03	4:22 PM	Tstm Wind	52 kts.	0	0	0	0	Several trees were blown down.
Statewide	01/25/04	12:00 PM	Ice Storm	N/A	0	0	0	0	A strong winter storm moved out of Southern Plains and into the Ohio River Valley. This system brought significant icing to the southeastern portions of Central Illinois on January 25th. Also,

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
									significant sleet accumulation was reported in numerous locations along and south of Interstate 70. There were numerous reports of power outages, downed tree limbs and traffic accidents in all of these counties. There were no reports of serious injuries or fatalities.
Clarksville	05/30/04	5:13 PM	Tstm Wind	55 kts.	0	0	0	0	Numerous trees and tree branches were blown down at the Mill Creek Park campground. One unoccupied truck was destroyed when a tree fell on it. Several campers had windows broken on them. No injuries were reported.
Clarksville	05/30/04	5:40 PM	Hail	1.75 in.	0	0	0	0	None Reported
Countywide	05/30/04	6:15 PM	Flash Flood	N/A	0	0	0	0	Several roads were flooded after very heavy rains fell, including IL Route 1 south of Marshall.
Marshall	07/03/04	1:00 PM	Tstm Wind	55 kts.	0	0	0	0	Ten trees were blown down in Marshall.
Casey	07/22/04	2:10 PM	Tstm Wind	55 kts.	0	0	0	0	Numerous tree limbs were blown down. Also, in Casey the roof was blown off of a restaurant.
Marshall	08/18/04	5:35 PM	Hail	0.75 in.	0	0	0	0	None Reported
Statewide	12/22/04	7:00 AM	Winter Storm	N/A	0	0	0	0	A major winter storm developed over the southern plains early on December 22nd and lifted into the eastern Great Lakes region by the morning of December 23rd. This storm brought heavy snow to much of southeast Illinois, with 8 to 12 inch snowfall totals common across Clark, Jasper, Crawford, Clay, Richland and Lawrence counties. The heaviest snowfall came in two bursts, the first during the early morning hours of the 22nd and the second during late evening hours on the 22nd and early morning hours of the 23rd. In addition to the heavy snowfall, winds gusting to 25 mph late on the 22nd and early on the 23rd caused considerable blowing and drifting snow. Snow drifts in excess of 3 feet were reported in spots. No fatalities or major injuries were reported, though there were numerous automobile accidents due to snow covered and slippery roads.
Statewide	01/15/05	2:00 PM	Flood	N/A	0	0	0	0	The Wabash River climbed to record or near record levels in many locations along the Illinois/Indiana border. On the afternoon of the 15th, a levee breach was observed just north of Darwin, in eastern Clark County. Water from the Wabash River surrounded the towns of York and Darwin, and the only way to get to these towns was by boat. A major levee failure on the Indiana side of the Wabash River caused the flooding on the Illinois side of the river to be less severe than it may have been. Damage estimates across the region totaled $335,000.
Marshall	05/13/05	6:30 PM	Tstm Wind	50 kts.	0	0	0	0	A few trees blown down.
Marshall	07/21/05	9:00 PM	Tstm Wind	50 kts.	0	0	0	0	Numerous large tree limbs blown down.
Statewide	07/22/05	12:00 PM	Excessive Heat	N/A	1	0	0	0	A period of excessive heat and humidity developed across all of central and southeast Illinois from July 22nd through the 25th. Daytime high temperatures ranged from the middle 90s to around 100 degrees daily, with overnight low temperatures only falling into the middle and upper 70s. The high humidity values pushed afternoon and early evening heat indices into the 105 to 115 degree range. The heat wave resulted in one direct fatality. An elderly woman was found dead in Springfield in her mobile home with malfunctioning air conditioning. F77MH
Marshall	07/26/05	8:30 PM	Tstm Wind	50 kts.	0	0	0	0	Several large tree limbs blown down.
Martinsville	11/15/05	3:50 PM	Tstm Wind	50 kts.	0	0	0	0	A swath of wind damage extended along the Interstate 70 corridor from Martinsville to Marshall to the Indiana state line. Numerous trees, tree limbs and power lines were blown down. Siding was torn off a house in Marshall.
Statewide	03/21/06	5:50 AM	Winter Storm	N/A	0	0	0	0	A major winter storm impacted central Illinois on the 21st. A swath of heavy snow fell across much of the region with 6 to 10 inch snowfall totals common. No major injuries or fatalities were reported

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
Casey	04/02/06	6:08 PM	Tstm Wind	73 kts.	0	0	0	0	Many out buildings were damage and a machine shed was destroyed. Widespread tree, power pole and power line damage was reported. No injuries were reported.
Martinsville	05/17/06	7:55 PM	Hail	1.00 in.	0	0	0	0	None Reported
Statewide	07/30/06	11:00 AM	Heat	N/A	1	0	0	0	An extended period of heat and humidity occurred across central and southeast Illinois from July 30th to August 2nd. Afternoon high temperatures ranged from 94 to 100 degrees most afternoons, with afternoon heat indices ranging from 105 to 110. Overnight lows only fell into the mid 70s.
Statewide	08/01/06	12:00 AM	Heat	N/A	0	0	0	0	An extended period of heat and humidity occurred across central and southeast Illinois from July 30th to August 2nd. Afternoon high temperatures ranged from 94 to 100 degrees most afternoons, with afternoon heat indices ranging from 105 to 110. Overnight lows only fell into the mid 70s.
Statewide	04/05/07	12:00 AM	Frost/freeze	N/A	0	0	0K	0K	An extended period of cold weather occurred across central and southeast Illinois during the first two weeks of April. Several hard freezes occurred at night during this time. The cold snap occurred after a period of unseasonably mild weather in late March which resulted in plants and flowers leafing out and blooming earlier than normal. The hard freeze caused considerable damage to the plants that started their growth early due to the warm conditions in late March. The most significant agricultural damage occurred to winter wheat, mainly in locations along and south of I-72. Damage estimates will be unknown until late summer.
Moriah	04/11/07	14:30 PM	Hail	0.75 in.	0	0	0K	0K	Thunderstorms developed ahead of a strong area of low pressure that moved through central Illinois on April 11th. These storms produced a few reports of severe hail.
Casey	05/25/07	13:53 PM	Tornado	F0	0	0	0K	0K	Thunderstorms fired along a nearly stationary frontal boundary during peak afternoon heating. One of these storms produced a tornado.
Martinsville	10/18/07	3:55 AM	Tstm Wind	52 kts.	0	0	5K	0K	A thunderstorm complex moved across portions of central Illinois, during the overnight hours, to the north of a warm front. These storms produced numerous reports of tree and power line damage.
Statewide	02/04/08	2:00 AM	Dense Fog	N/A	0	0	0K	0K	A period of rain and mild temperatures over melting snow cause an extended period of dense fog across much of central and southeast Illinois. Numerous school closures and vehicular accidents occurred as a result of the dense fog. One accident resulted in a fatality in Vermilion county.
Martinsville	02/05/08	19:00 PM	Tstm Wind	61 kts.	0	0	20K	0K	Thunderstorms developed in the vicinity of a warm front over east central and southeast Illinois during the afternoon hours of February 5th. Many of the thunderstorms on either side of the front produced heavy rains and flooding. The storms to the south of the warm front also produced damaging winds and hail, especially along and south of the I-70 corridor. The flooding produced numerous road closures across the region, while the winds produced primarily tree, power line and power pole damage. However, several structures received minor, mainly roofing damage and one mobile home was destroyed.
Casey	06/04/08	13:45 PM	Tstm Wind	61 kts.	0	0	20K	0K	Scattered thunderstorms developed during the afternoon hours of the 4th. A few of these storms produced damaging winds and large hail.
Westfield	06/06/08	16:01 PM	Tstm Wind	56 kts.	0	0	15K	0K	An area of strong to severe thunderstorms with very heavy rain moved across east central Illinois during the afternoon and evening hours of the 6th. Widespread flooding occurred in the wake of the storms.
Casey Muni Arpt	06/06/08	19:00 PM	Flash Flood	N/A	0	0	0K	0K	An area of strong to severe thunderstorms with very heavy rain moved across east central Illinois during the afternoon and evening hours of the 6th. Widespread flooding occurred in the wake of the storms.
Westfield	06/06/08	22:45 PM	Flood	N/A	0	0	500K	0K	Several episodes of heavy rain from June 2nd through the 4th, and again on the 6th, produced

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
									copious amounts of rain and extensive flooding in eastern Illinois which persisted for two weeks. Rainfall totals ranged from 5 to 11 inches between June 2nd and June 6th, with the majority of the rain falling on June 6th. Hundreds of homes and businesses were flooded, and six counties were declared disaster areas with total damages estimated around $3 Million.
Darwin	06/09/08	12:47 PM	Hail	1.75 in.	0	0	0K	0K	Two rounds of scattered thunderstorms moved through southeast Illinois on the 9th. The first round occurred during the early afternoon hours, while the second round occurred during the evening hours. Several of the thunderstorms produced severe hail, ranging up to golf ball size.
Casey	06/27/08	16:17 PM	Hail	0.88 in.	0	0	0K	0K	A line of strong to severe thunderstorms moved across east central and southeast Illinois during the afternoon and early evening hours of the 27th. The storms blew down numerous trees and power lines. Several structures, mainly outbuildings, also sustained wind damage.
West Union	06/27/08	17:15 PM	Tstm Wind	56 kts.	0	0	1K	0K	A line of strong to severe thunderstorms moved across east central and southeast Illinois during the afternoon and early evening hours of the 27th. The storms blew down numerous trees and power lines. Several structures, mainly outbuildings, also sustained wind damage.
Marshall	07/08/08	17:50 PM	Tstm Wind	52 kts.	0	0	2K	0K	A strong cold front pushed into central Illinois on 7/8/08, triggering strong to severe thunderstorms. The storms produced wind gusts as high as 70 mph and widespread wind damage, particularly across east-central Illinois along and east of I-57.
Statewide	01/26/09	20:00 PM	Heavy Snow	N/A	0	0	0K	0K	A powerful winter storm brought periods of snow to portions of central and southeast Illinois from late on January 26th through the morning of January 28th. The first wave of precipitation deposited between 2 and 4 inches of snow along and south of the I-70 corridor by the morning of January 27th. The second wave brought additional heavy accumulations of snow, mainly along and south of I-72 during the evening of January 27th into the morning of the 28th.
Oilfield	02/11/09	12:00 PM	Flood	N/A	0	0	0K	0K	An area of low pressure tracked through the region on February 11th, bringing widespread rain and thunderstorms. As a result of the rainfall, localized flooding of low-lying rural roads and poor drainage areas occurred. The Little Wabash River rose out of its banks, flooding a few nearby roads. In addition, a few strong thunderstorms developed and produced gusty winds and small hail.
Marshall	02/11/09	14:10 PM	Tstm Wind	52 kts.	0	0	0K	0K	An area of low pressure tracked through the region on February 11th, bringing widespread rain and thunderstorms. As a result of the rainfall, localized flooding of low-lying rural roads and poor drainage areas occurred. The Little Wabash River rose out of its banks, flooding a few nearby roads. In addition, a few strong thunderstorms developed and produced gusty winds and small hail.
Ernst	02/11/09	14:15 PM	Tstm Wind	52 kts.	0	0	0K	0K	An area of low pressure tracked through the region on February 11th, bringing widespread rain and thunderstorms. As a result of the rainfall, localized flooding of low-lying rural roads and poor drainage areas occurred. The Little Wabash River rose out of its banks, flooding a few nearby roads. In addition, a few strong thunderstorms developed and produced gusty winds and small hail.
Casey	05/13/09	16:00 PM	Tstm Wind	52 kts.	0	0	12K	0K	An impressive upper-level wave tracking across the Northern Plains helped push a strong cold front toward the Mississippi River by the evening of May 13th. An increasingly unstable and sheared airmass across central Illinois allowed severe thunderstorms to develop in advance of the front. Widespread wind damage occurred with the storms, with 4 tornadoes touching down around the area as well. The thunderstorms also produced torrential rainfall, with widespread 2 to 4 inch amounts reported. This produced flash flooding in much of central and southeast Illinois from the evening of the 13th until the morning of the 14th.
Westfield	05/14/09	1:30 AM	Flash Flood	N/A	0	0	0K	0K	An impressive upper-level wave tracking across the Northern Plains helped push a strong cold front toward the Mississippi River by the evening of May 13th. An increasingly unstable and sheared airmass across central Illinois allowed severe thunderstorms to develop in advance of the front.

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	Description
									Widespread wind damage occurred with the storms, with 4 tornadoes touching down around the area as well. The thunderstorms also produced torrential rainfall, with widespread 2 to 4 inch amounts reported. This produced flash flooding in much of central and southeast Illinois from the evening of the 13th until the morning of the 14th.
Dennison	05/25/09	12:00 PM	Flash Flood	N/A	0	0	0K	0K	Low pressure moving along a stationary frontal boundary draped along the Ohio River brought locally heavy rainfall to southeast Illinois on May 25th. Rain amounts of 3.00 to 5.00 inches fell in many locations south of I-70, with flash flooding reported mainly east of a line from Marshall, IL to Olney, IL.
Martinsville	08/04/09	9:15 AM	Tstm Wind	52 kts.	0	0	0K	0K	A large bow echo developed in advance of a front across southern Iowa and northern Missouri during the early morning hours of August 4th. The storms then raced eastward across central and southeast Illinois, producing wind gusts of between 60 and 70 mph. Numerous trees and power lines were blown down in a wide swath from the Mississippi River eastward to the Indiana border.
Martinsville	08/04/09	9:16 AM	Tstm Wind	52 kts.	0	0	5K	0K	A large bow echo developed in advance of a front across southern Iowa and northern Missouri during the early morning hours of August 4th. The storms then raced eastward across central and southeast Illinois, producing wind gusts of between 60 and 70 mph. Numerous trees and power lines were blown down in a wide swath from the Mississippi River eastward to the Indiana border.
Marshall	08/04/09	9:20 AM	Tstm Wind	52 kts.	0	0	15K	0K	A large bow echo developed in advance of a front across southern Iowa and northern Missouri during the early morning hours of August 4th. The storms then raced eastward across central and southeast Illinois, producing wind gusts of between 60 and 70 mph. Numerous trees and power lines were blown down in a wide swath from the Mississippi River eastward to the Indiana border.
Oilfield	08/19/09	19:00 PM	Flash Flood	N/A	0	0	0K	0K	A vigorous upper-level disturbance in conjunction with a warm front lifting northward through central Illinois triggered strong to severe thunderstorms during the afternoon and evening of August 19th. Embedded supercells within a long line of storms produced enhanced wind damage and tornadoes. Total damages to crops and property from the 7 tornadoes were estimated to be more than $25M.

Appendix E: Historical Hazard Maps

The following map shows historical natural hazard events that occurred in Clark County. Figures A, B, C, and D on the following pages depict magnified views of the demarcated regions on the county map.

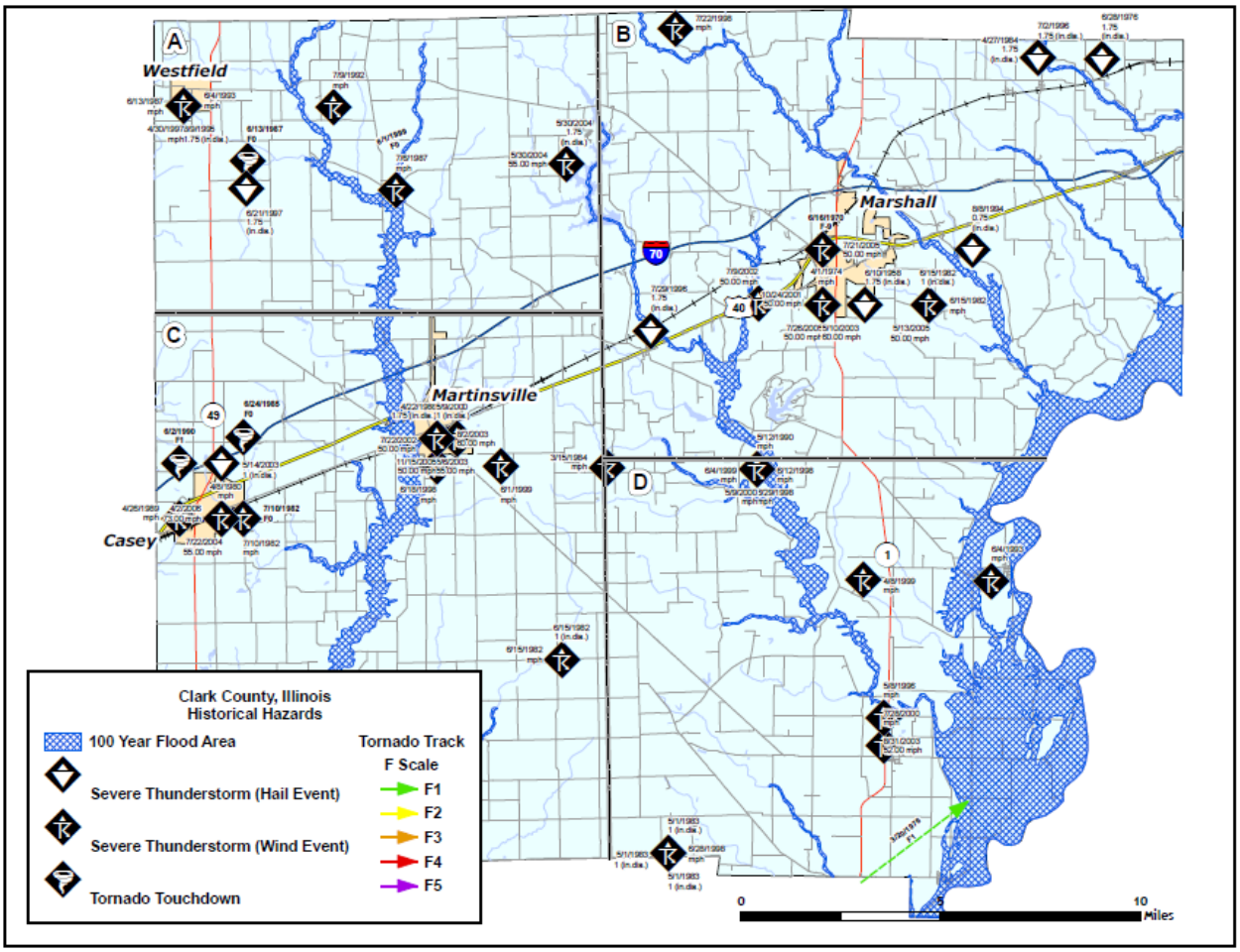


Figure A: Northwest Portion of Clark County

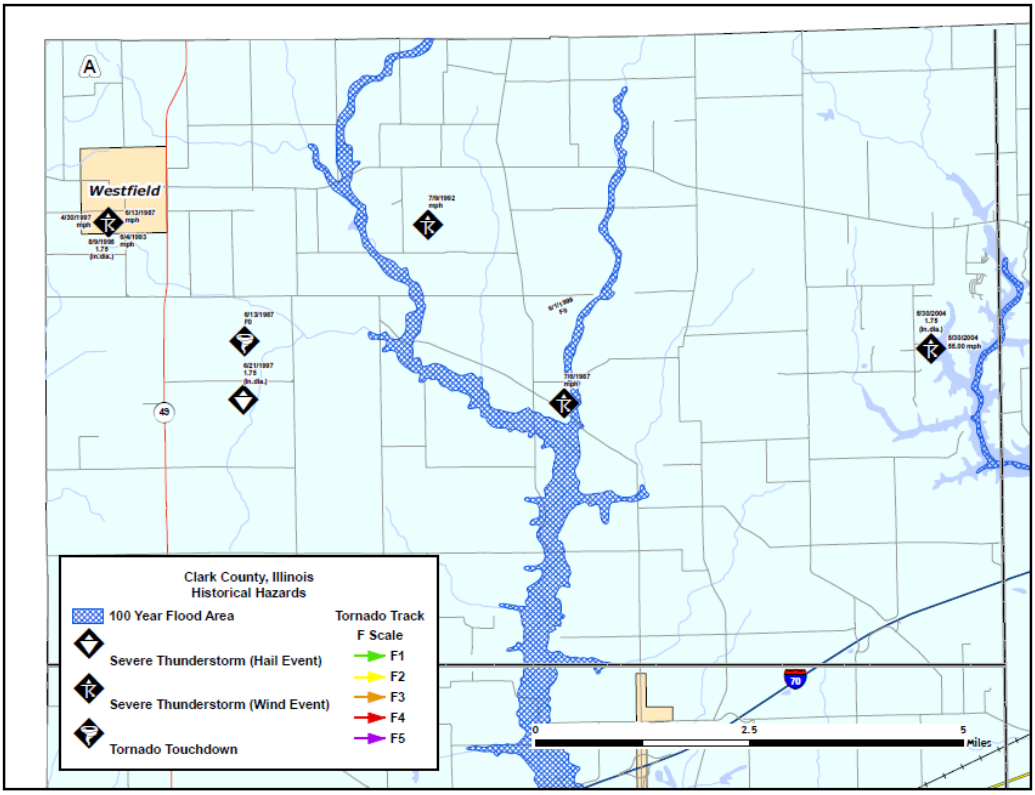


Figure B: Northeast Portion of Clark County

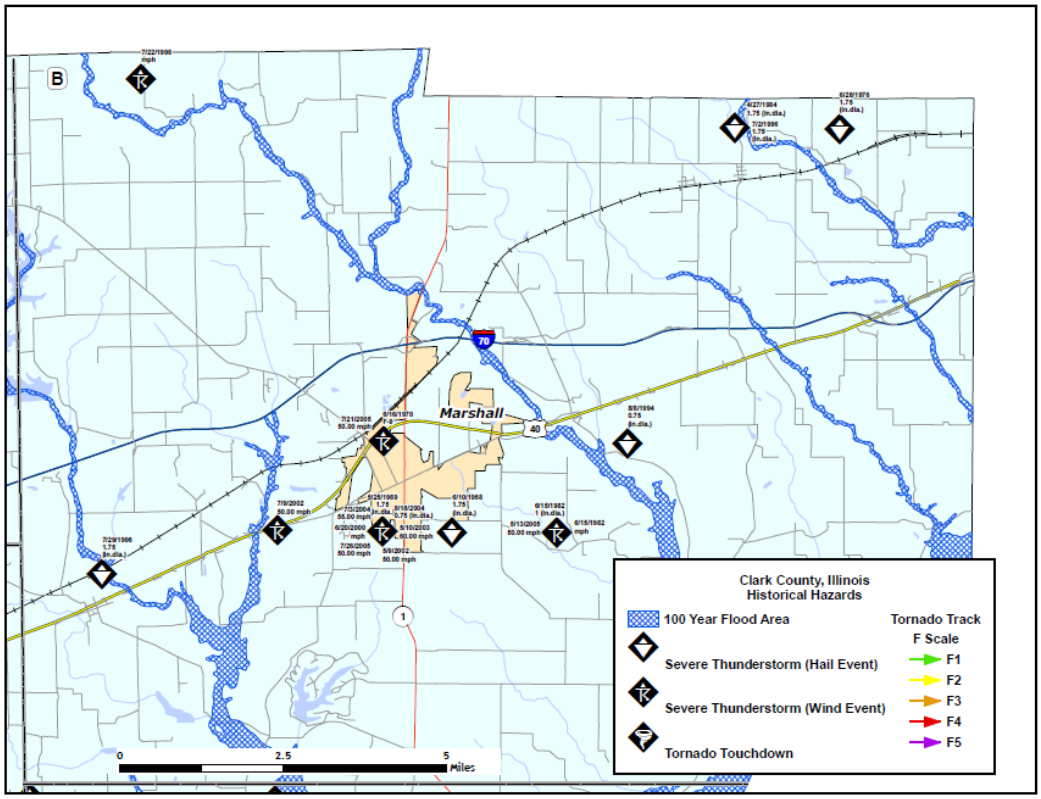


Figure C: Southwest Portion of Clark County

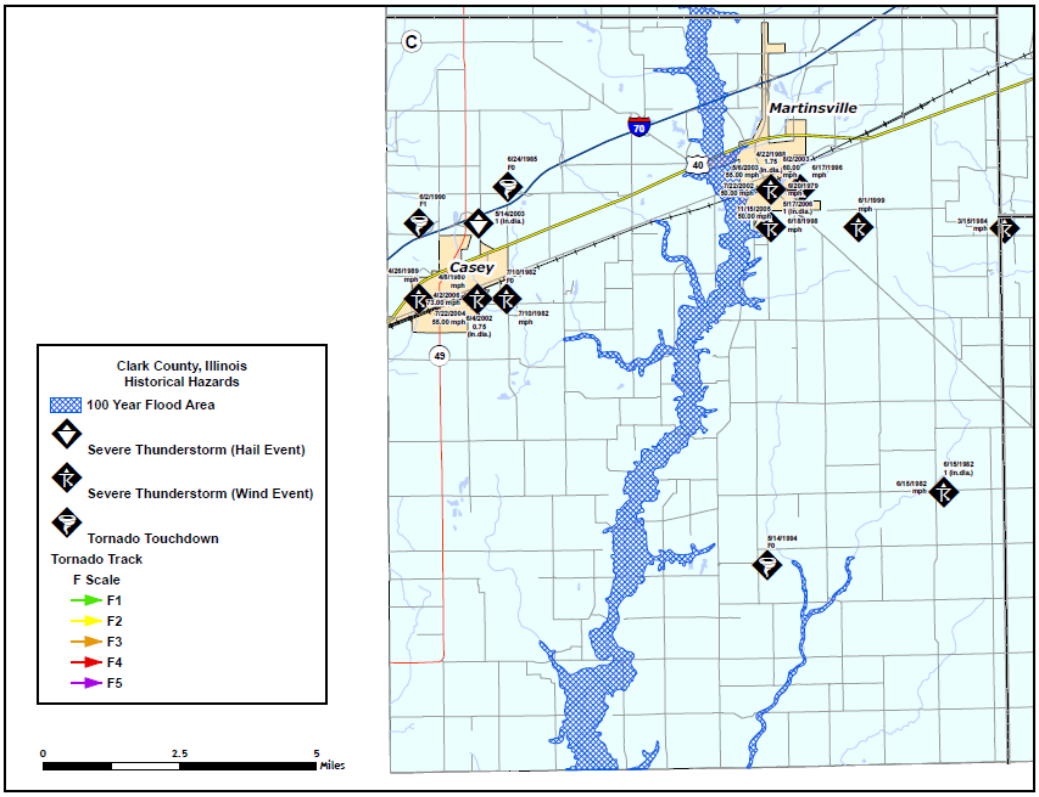
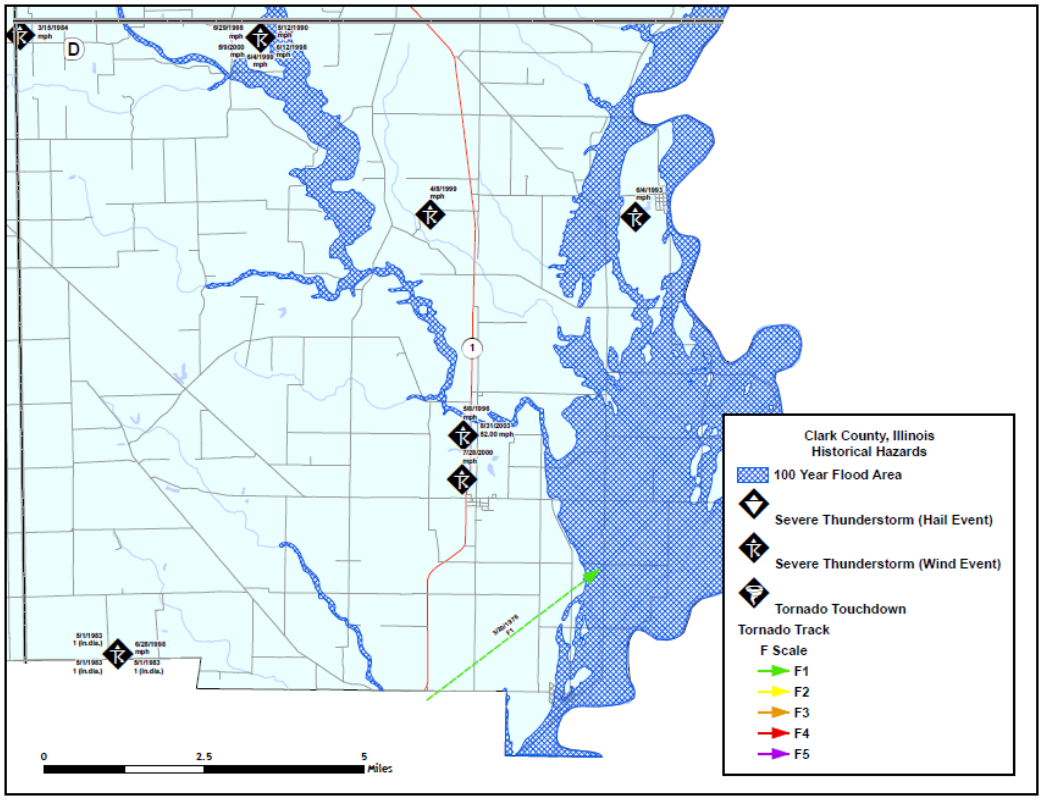
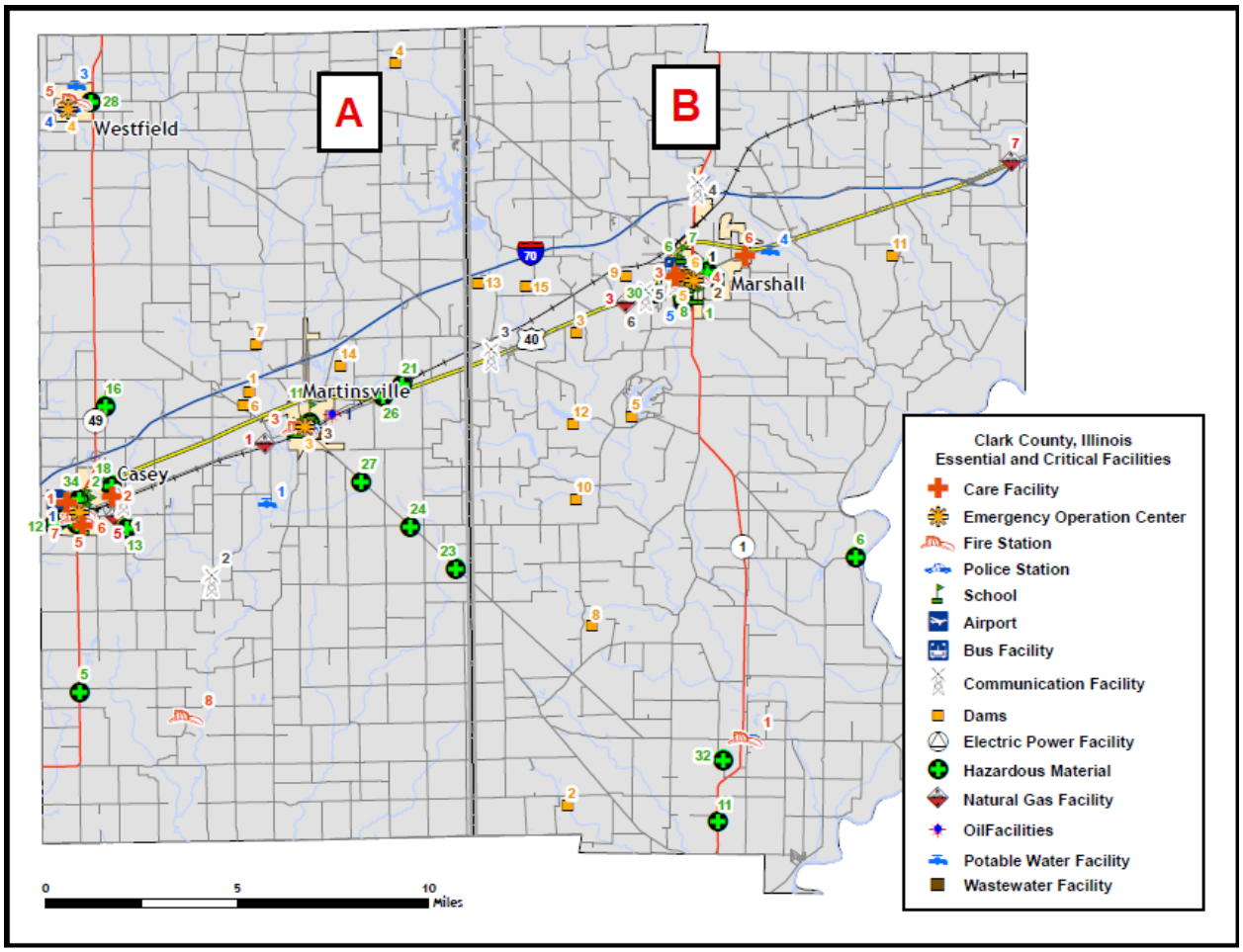


Figure D: Southeast Portion of Clark County

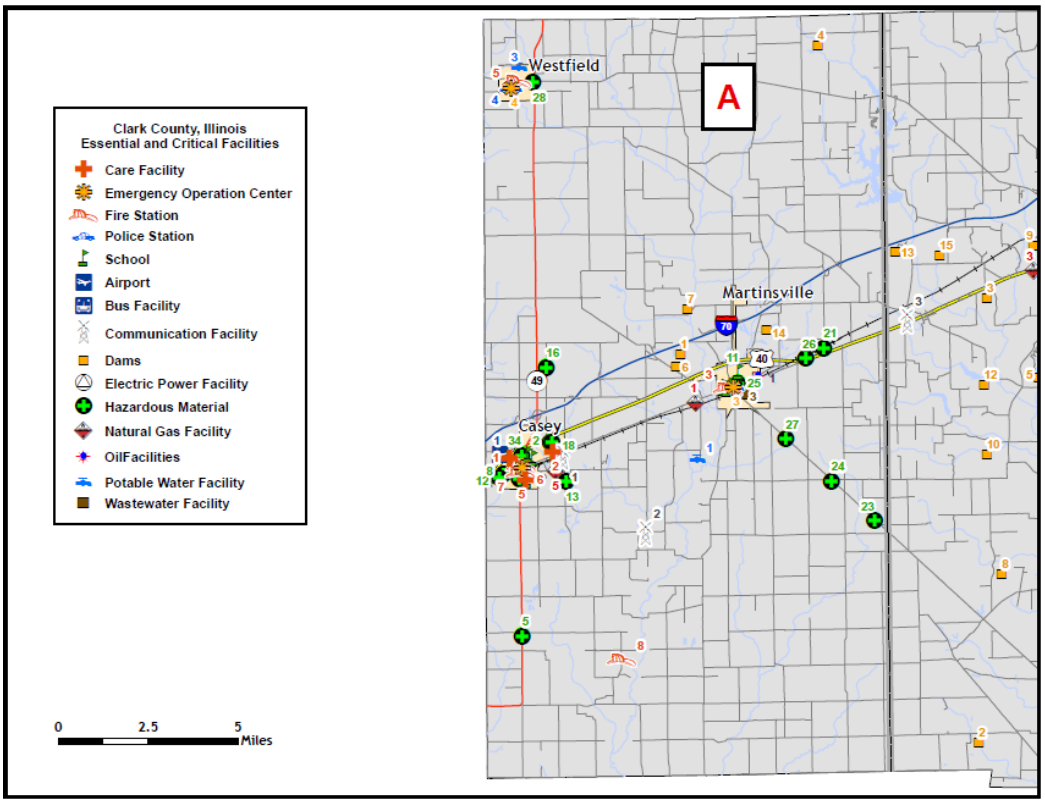


Appendix F: Critical Facilities Maps

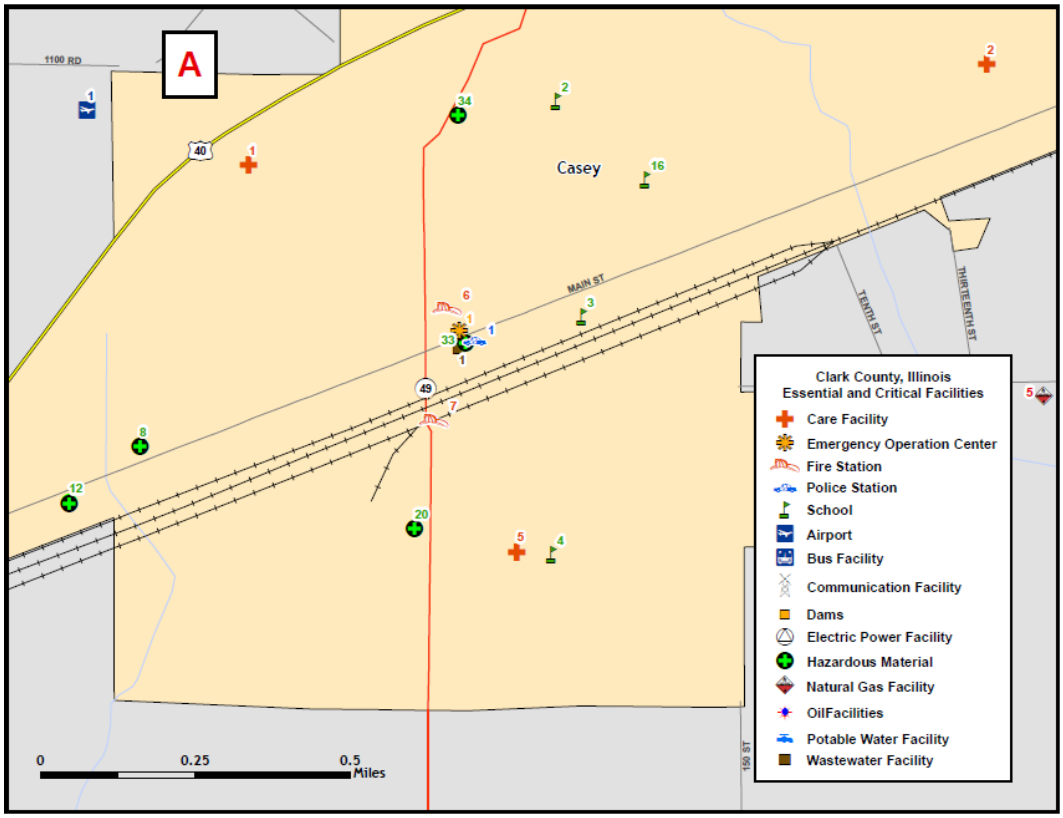
The following map shows the locations of Clark County's critical facilities. The figures on the following pages depict magnified views of the demarcated regions on the county map. There is also a table for Region A and a table for Region B that include facility identification numbers and names and types of critical facilities. The facility identification number can be matched to the numbers listed above the facilities within the maps. The numbers were automatically assigned through HAZUS-MH and may repeat; the legend clarifies types of facilities.



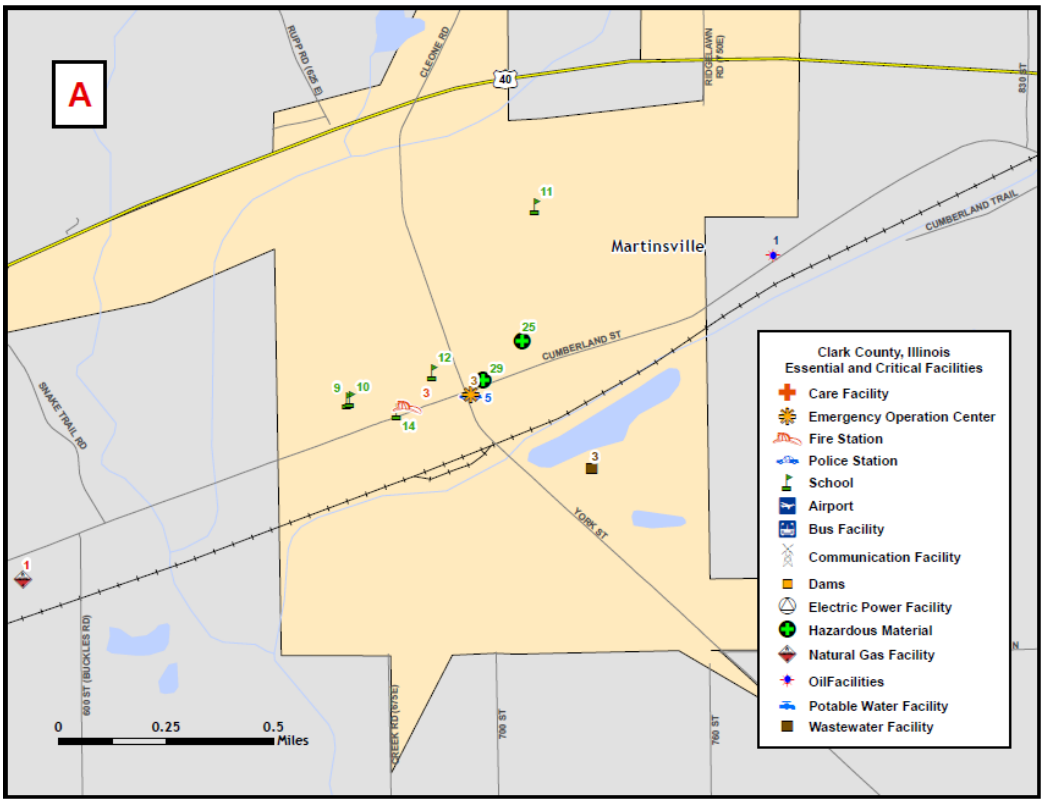
Region A: Western Clark County



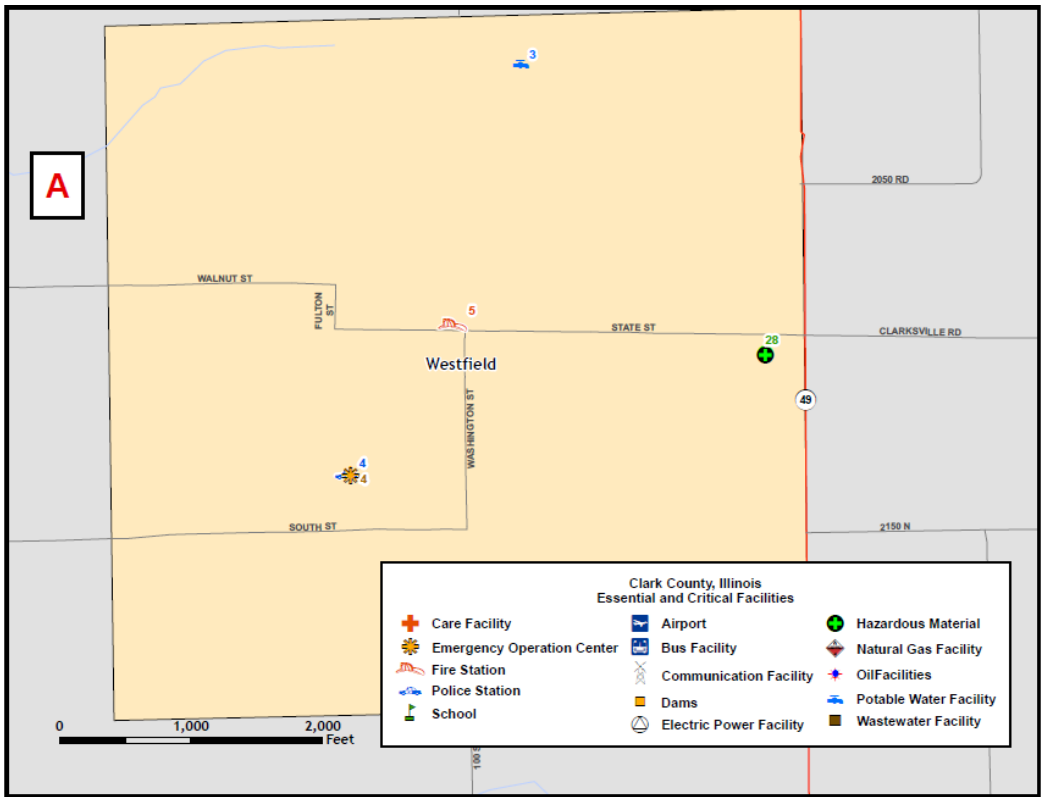
Region A: Casey



Region A: Martinsville



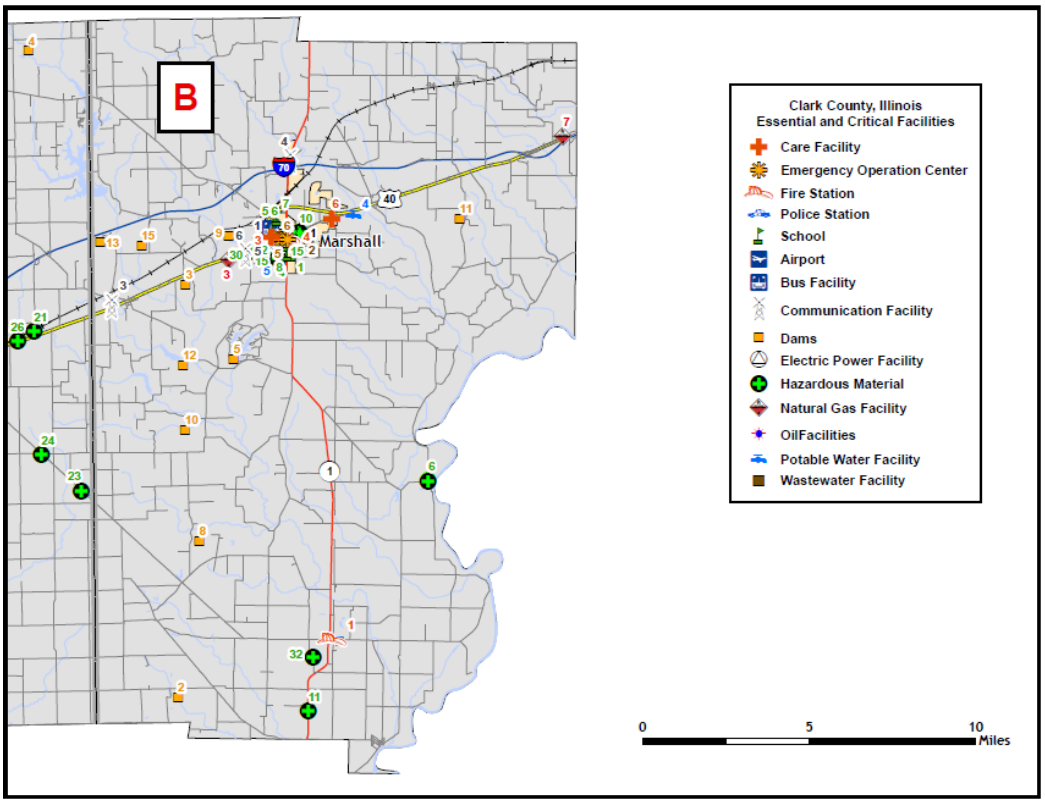
Region A: Westfield



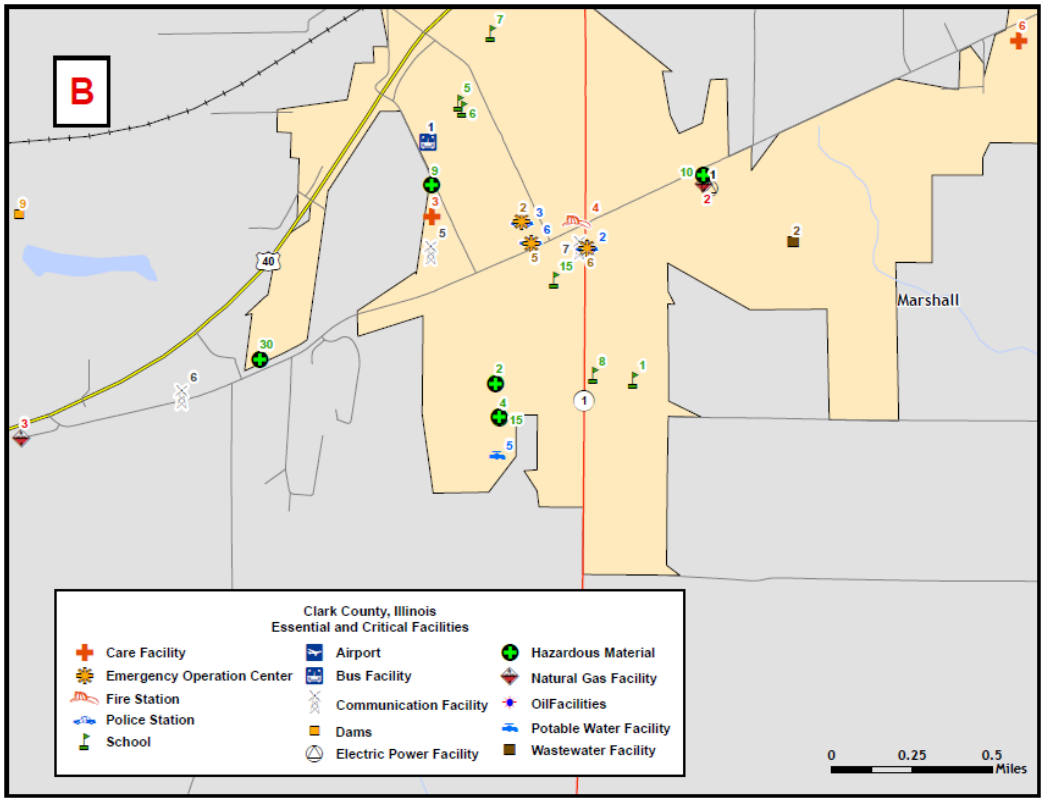
Region A Facilities Table

ID#	Name	Facility Type	ID#	Name	Facility Type
1	Casey Municipal Airport	Airport	1	Snake Trail Campground Lake Dam	Dam
1	Heartland Manor Nursing Center	Care	6	Round Grove Sportsman Lake Dam	Dam
2	Casey Health Care Center	Care	7	Sherwood Forest Lake Dam	Dam
5	Simple Blessings	Care	14	Newmans Lake Dam	Dam
1	WKZI 800	Communication	3	Martinsville ESDA	EOC
2	WCBH CH 282	Communication	3	Martinsville Fire Protection District	Fire Department
1	Casey EMA	EOC	21	Illini FS	Hazmat Site
6	Casey Fire Department	Fire Department	23	Littlejohn Grain Chemical Storage	Hazmat Site
7	Casey Fire Department	Fire Department	24	Miller Fertilizer, Inc.	Hazmat Site
8	Martinsville Station #2	Fire Department	25	Littlejohn Grain Inc.	Hazmat Site
5	B & B Propane Inc.	Hazmat Site	26	Littlejohn Grain Inc.	Hazmat Site
7	Casey	Hazmat Site	27	Marathon Pipe Line	Hazmat Site
8	Casey Fertilizer Co, Inc.	Hazmat Site	29	Rowe Foundry	Hazmat Site
12	Ferrellgas Company	Hazmat Site	1	Marathon Pipe Line-Hydrostatic	Natural Gas
13	Graver Inc.	Hazmat Site	1	Marathon Pipe Line LLC	Oil
16	H+H Fertilizer Corp	Hazmat Site	5	Martinsville Police Dept	Police
18	Hearland Ag, Inc.	Hazmat Site	9	Martinsville Jr. High School	School
20	Huisinga Grain, Inc.	Hazmat Site	10	Martinsville High School	School
33	VERIZON Casey Co.	Hazmat Site	11	Martinsville Elementary School	School
34	Speedway# 7076	Hazmat Site	12	Martinsville Pre-S/Project HELP	School
5	Casey West Meter Station	Natural Gas	14	Martinsville Unit Office	School
1	Casey Police Dept	Police	3	Martinsville STP	WWTP
1	Casey WTP	Potable Water	4	Martin Tarbel Lake Dam	Dam
2	Casey-Westfield High School	School	4	Westfield ESDA	EOC
3	Casey-Westfield Jr. High School	School	5	Westfield Fire Department	Fire Department
4	Monroe Elementary School	School	28	Littlejohn Grain Inc.	Hazmat Site
16	Casey- Westfield Unit Office	School	4	Westfield Police Dept	Police
1	Casey STP	WWTP	3	Westfield WTP	Potable Water

Region B: Eastern Clark County



Region B: Marshall



Region B Facilities Table

ID#	Name	Facility Type	ID#	Name	Facility Type
2	Craig Lake Dam	Dam	2	Clark County EMA	EOC
3	Bass Lake Dam	Dam	5	Clark County EOC	EOC
8	Mill Creek Structure 9 Dam	Dam	6	Marshall ESDA	EOC
10	Mill Creek Structure 8 Dam	Dam	4	Marshall Fire Department	Fire Department
11	ILNONAME 2043	Dam	2	TRW - Automotive Electronics	Hazmat Site
12	Mill Creek Watershed-STR 6	Dam	4	FEDERAL - MOGUL CORP.	Hazmat Site
13	Mill Creek Watershed-STR 2	Dam	9	Effingham Equity- Marshall	Hazmat Site
15	Lashbrook Pond Dam	Dam	10	Ferrellgas Company	Hazmat Site
1	West Union Community Fire Protection District	Fire Department	15	GKN Sinter Metals	Hazmat Site
6	Bunker Hill Supply Company	Hazmat Site	30	Charles Industries Ltd.	Hazmat Site
11	Ferrellgas Company	Hazmat Site	2	Marshall Town Border Station	Natural Gas
32	MCI WUNNIL	Hazmat Site	3	Marshall West Meter Station	Natural Gas
2	Union York Water Nation	Potable Water	7	Marshall State Line Station	Natural Gas
1	Marshall Community Schools	Bus	2	Marshall Police Dept	Police
3	Burnsides Community Health Ctr	Care	3	Clark County Sheriff	Police
6	Villas of Holly Brook	Care	6	Clark County E-911	Police
3	WMMC CH 290	Communication	4	Marshall WTP	Potable Water
4	Siren	Communication	1	H E L P Marshall	School
5	Siren	Communication	5	Marshall High School	School
6	Siren	Communication	6	Marshall Jr. High School	School
7	Siren	Communication	7	North Elementary School	School
5	Lincoln Trail State Park Lake Dam	Dam	8	South Elementary School	School
9	Mill Creek Structure 1 Dam	Dam	15	Marshall Unit Office	School
1	Marshall Municipal Utilities	Electric	2	Marshall STP	WWTP
5	Marshall Vine St Water Tower	Potable Water	6	Marshall S Michigan Ave Water Tower	Potable Water