

Edwards County, Illinois Multi-Hazard Mitigation Plan

A 2017 Update of the 2009 Countywide MHMP



FEMA



SIU
Southern
Illinois
University
CARBONDALE

Multi-Hazard Mitigation Plan
Edwards County, Illinois

Adoption Date: -- _____ --

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Edwards County Board

Samuel Arnold, County Board Chairman

Duane Lear

Davis Messman

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Section 1. Introduction

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

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

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

Edwards County completed their first Multi-Hazard Mitigation Plan in 2009. Throughout the five-year planning cycle, the Edwards County Emergency Management Agency and Mitigation Planning Team reconvened to monitor, evaluate, and update the plan on an annual basis. The Natural Hazards Research and Mitigation Group at Southern Illinois University Carbondale (SIU), Greater Wabash Regional Planning Commission (GWRPC) and Edwards County have joined efforts in updating the County's first mitigation plan. The update process addressed changes in the probability and impact of specific hazards to the county, as well as changes in land-use, population, and demographics. The plan incorporates detailed GIS and Hazus-MH Level 2 analyses to improve the risk assessment, and finally revised and updated mitigation strategies. This document hereby serves as the 2017 Edwards County Multi-Hazard Mitigation Plan update.

Section 2. Planning Process

2.1 Timeline

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

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

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

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

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

2.2 Jurisdiction Participation Information

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

Participating Jurisdictions

Edwards County	Grayville
Albion	West Salem
Bone Gap	Edwards CUSD #1
Browns	

2.3 Planning Team Information

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

Edwards County Planning Team Members

Jurisdiction	Name	Title
Edwards County	Debbie Judge	ESDA Coordinator
	Mike Valentine	State Attorney
	Tanya Cantrell	EMS Director
	Jeff Hunley	EMT
	John Hampton	EMT
	Kristie Smith	EMT
	Duane Lear	Business Owner/County Board
Albion	Steve McMahel	Mayor
	Mike Judge	Fire Chief
	Matt Henson	Firefighter / Chaplain
	Leon Johnson	Business Owner
Bone Gap	Steven Putt	Village Trustee
	Donald Sutherland	Fire Chief
Browns	Todd Bailey	Village President
Grayville	David Jordan	City Commissioner
	Joe Bisch	Mayor
	Roy Mann	Police Chief
West Salem	Debra Mason	Village Clerk
Edwards County CUSD #1	David Cowger	Superintendent
Edwards County Farm Bureau	Rebecca Perry	Director
University of Illinois Extension	Courtney Yost	Community Educator

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

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

The first MHMP update meeting was held in Albion, Illinois on November 13th, 2014. Representatives from SIU explained the rationale behind the MHMP update process and answered questions from the participants. SIU representatives also provided an overview of GIS/Hazus-MH, described the timeline and the process of mitigation planning.

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

<u>Planning Meetings</u>			
MEETING 1	Nov 13 th , 2014	MEETING 3	<i>Dec 1st, 2015</i>
MEETING 2	April 6 th , 2015	MEETING 4	<i>Oct 12th, 2016</i>

2.4 Public Involvement

The Edwards County EMA solicited public input throughout the planning process and a public meeting was held on April 6th, 2015 to review the County's risk assessment. Appendix A contains the minutes from the public meeting. Appendix B contains press releases and/or articles sent to local newspapers throughout the MHMP development process.

2.5 Neighboring Community Involvement

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

Neighboring Community Participation		
Person Participating	Neighboring Jurisdiction	Title/Organization
Ken Pryor	Crawford County	EMA Coordinator
Jess Angle	Lawrence County	EMA Coordinator
Gerald Brooks	Wabash County	EMA Coordinator
Jeff Jake	Wayne County	EMA Coordinator
Jim Totten	White County	EMA Coordinator

2.6 Review of Technical Documents

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

Federal Emergency Management Agency	NOAA / National Water Service Storm Prediction Center
<i>Developing the Mitigation Plan (April 2003)</i>	<i>Severe Weather Data</i>
<i>Mitigation Ideas (January 2003)</i>	Illinois Emergency Management Agency
<i>Local Mitigation Planning Handbook</i>	<i>2013 Illinois Natural Hazard Mitigation Plan</i>
United State Census Bureau	<i>Hazardous Materials Incident Reports</i>
<i>County Profile Information</i>	Illinois Environmental Protection Agency
<i>2010 Census Data</i>	<i>2014 303d Listed Waters and Watershed Maps</i>
<i>American Community Survey (2009-2013)</i>	Illinois State Water Survey
United States Department of Transportation	<i>Climate Data</i>
<i>PHMSA Hazardous Materials Incident Data</i>	Illinois Department of Natural Resources
United States Geological Survey	<i>Repetitive Loss Data</i>
<i>Earthquake Data</i>	<i>Dam and Levee Data</i>
United States Army Corps of Engineers	Illinois State Geological Survey
<i>National Inventory of Dams</i>	<i>Geologic Data</i>
<i>National Levee Database</i>	Edwards County
NOAA National Climatic Data Center	<i>2013 Assessment Records</i>
<i>Climate Data</i>	<i>2013 Countywide GIS Parcel Database</i>
	<i>2009 Multi-Hazard Mitigation Plan</i>

2.7 Adoption by Local Government

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

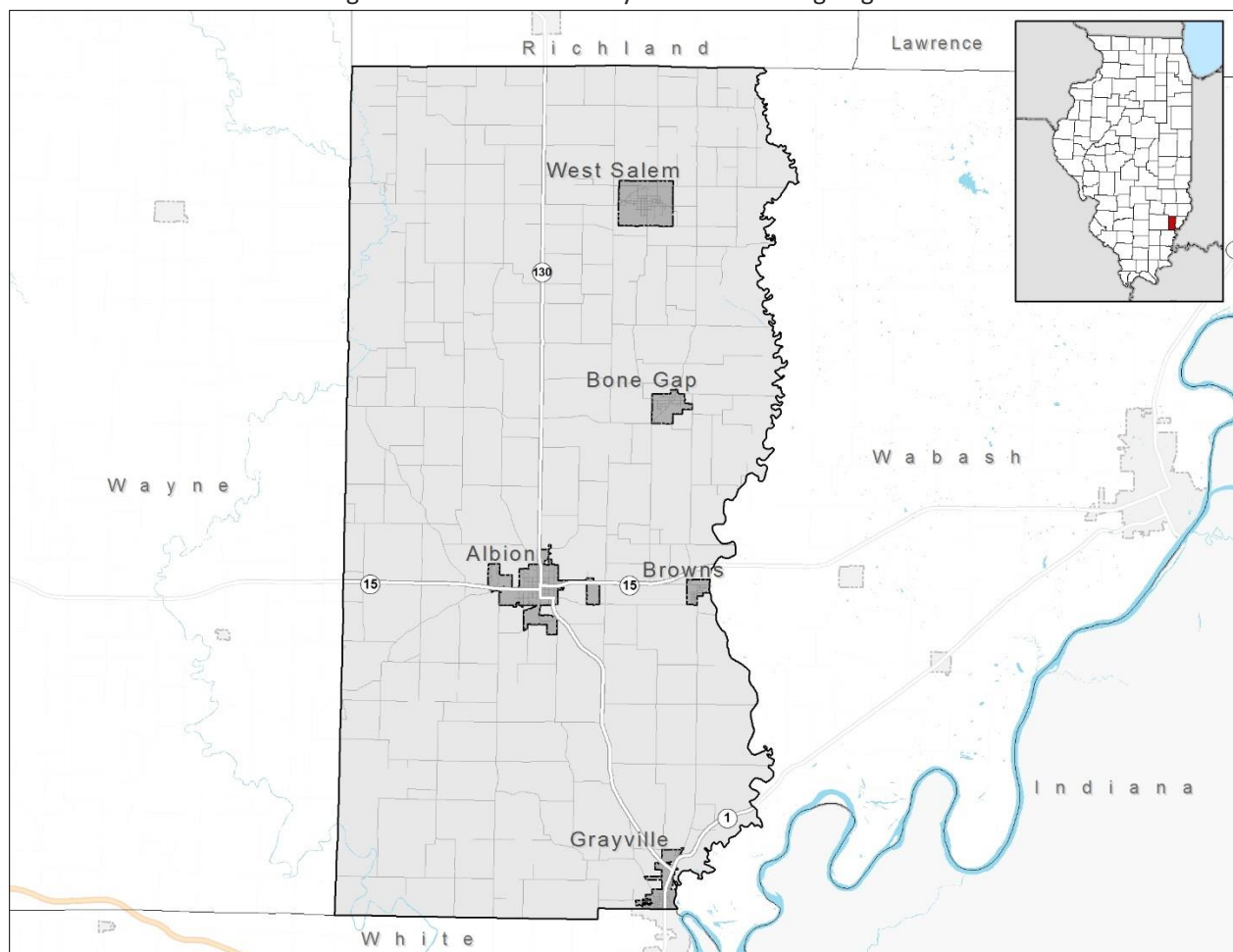
Section 3. County Profile

3.1 County Background

Edwards County, named for Secretary of War and Secretary of Treasury William H. Edwards, was formed from Edwards County in 1814. The County was settled by two Englishmen, George Flower and Morris Birkbeck. At the time of its formation, it encompassed approximately $\frac{1}{4}$ of the state, but it was reduced to its present borders in 1821. In 1819, the town of Albion was laid out by Birkeck and Flower but not incorporated until 1860. Today, Albion is designed as the county seat.

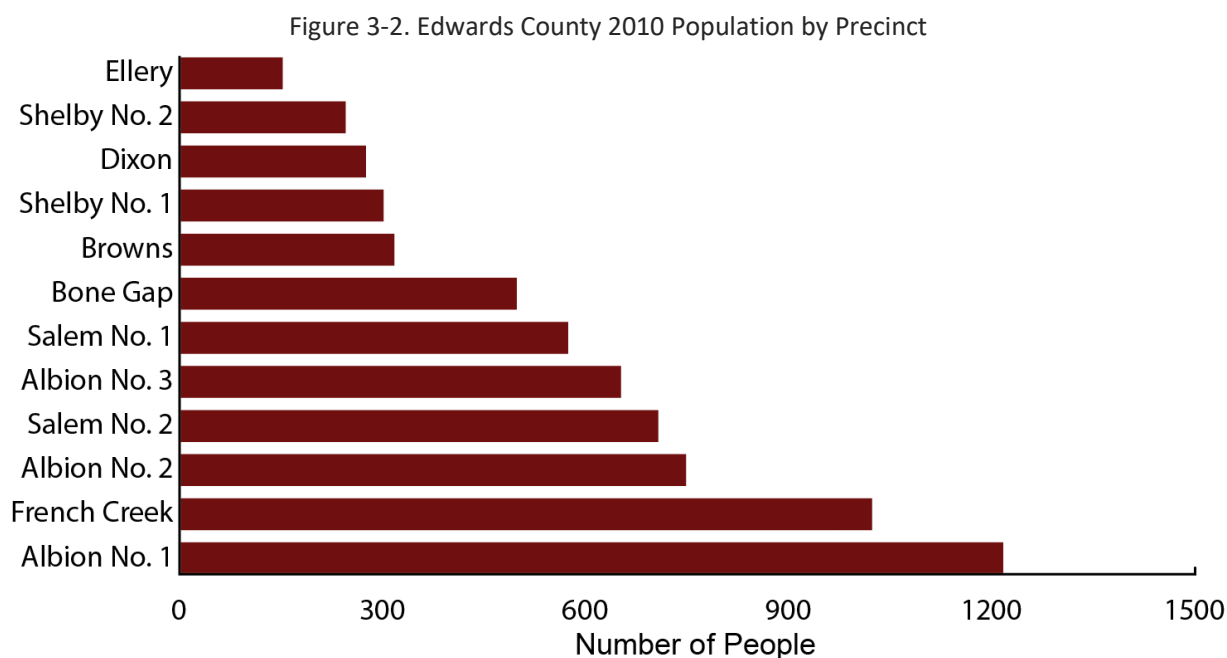
Edwards County is located in the heart of southern Illinois (Figure 3-1). It is bounded on the north by Richland County, on the south by White, on the west by Wayne County, on the east by Wabash County. Its relation to major urban areas is as follows: 181 miles west-southwest of Indianapolis, Indiana; 155 miles south-southeast of Springfield, Illinois; 269 miles south of Chicago, Illinois. The major cities and villiages in Edwards County include Albion, Bone Gap, Browns, West Salem, and Grayville.

Figure 3-1. Edwards County and Surrounding Region



3.2 Demographics

Edwards County's population has experienced a slight decline in total population over the past three decades. According to the U.S. Census Bureau, Edwards County's 2013 population estimate is 6,672, a decrease of -0.7% from 2010. The population is spread throughout twelve townships: Ellery, Albion No. 1, Albion No. 2, Albion No. 3, Bone Gap, Browns, Dixon, French Creek, Salem No. 1, Salem No. 2, Shelby No. 1, and Shelby No. 2. Figure 3-2 displays the breakdown of population by precinct from the 2010 Census.



3.3 Economy and Industry

The diversified Edwards County workforce is spread across agriculture, forestry, construction, manufacturing, retail, healthcare and social assistance, hospitality, education, and transportation. Table 3-1 lists the top employers and the approximate number of employees in Edwards County. The majority of the labor force is in Albion and Grayville and is composed of residents from Edwards County and the five adjacent counties. The 2013 annual per capita income in the county is \$20,898, compared to an Illinois average of \$29,666.

Table 3-1. Edwards County's Major Employers

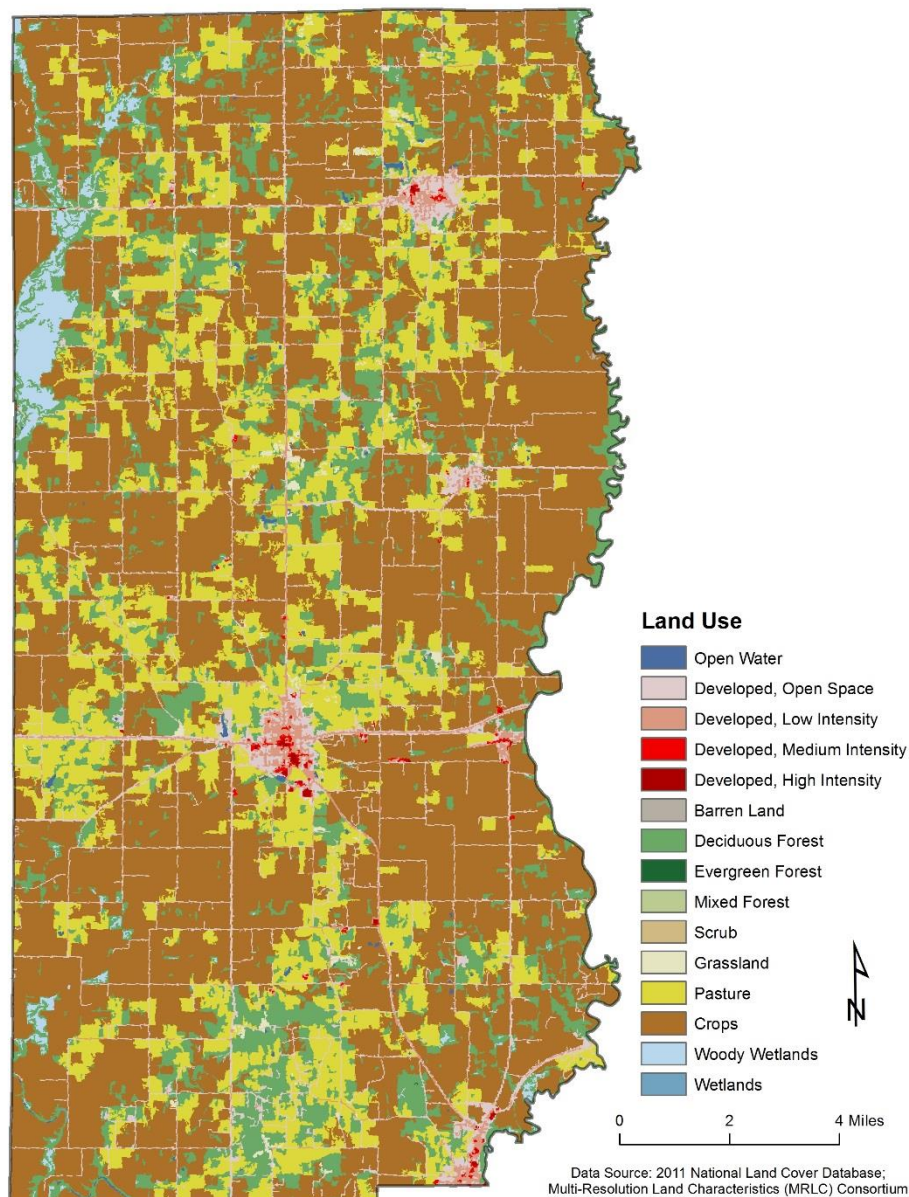
Employer	Industry	Approximate Number of Employees
Champion Laboratories Inc.	Manufacturing	1200
Rest Haven Manor Inc.	Health Care	47
Borowiak IGA	Retail	40
Citizen National Bank	Banking	40
Huff Sealing Corp.	Manufacturing	40
Albion Grade School	Education	38
Pallet Solutions	Wholesale	30

Source: [Connect SI Foundation, Inc.](#)

3.4 Land Use and Development Trends

Today, agriculture is the predominant land cover in the county. Figure 3-3 displays the current land use in Edwards County. This fact did not result because of great agricultural capabilities of the land as a major agricultural producer; neither did it occur because of maximum economic development potential resting in agricultural pursuits. Rather it is a result of the existence of large volumes of land which cannot rationally be occupied by major urban uses within the foreseeable future. As a result many agricultural uses have only limited agricultural potential. Soybeans are the primary crop, followed by corn, winter wheat, and hay. In recent years, residential developments tend to focus along Illinois Routes 15 and 130, particularly within the city limits of Albion. Residential land use has had few significant developments within the county at this time. The largest community within the county is the city of Albion (1,975), according to the U.S. Census 2013 population estimates.

Figure 3-3. Land Use in Edwards County



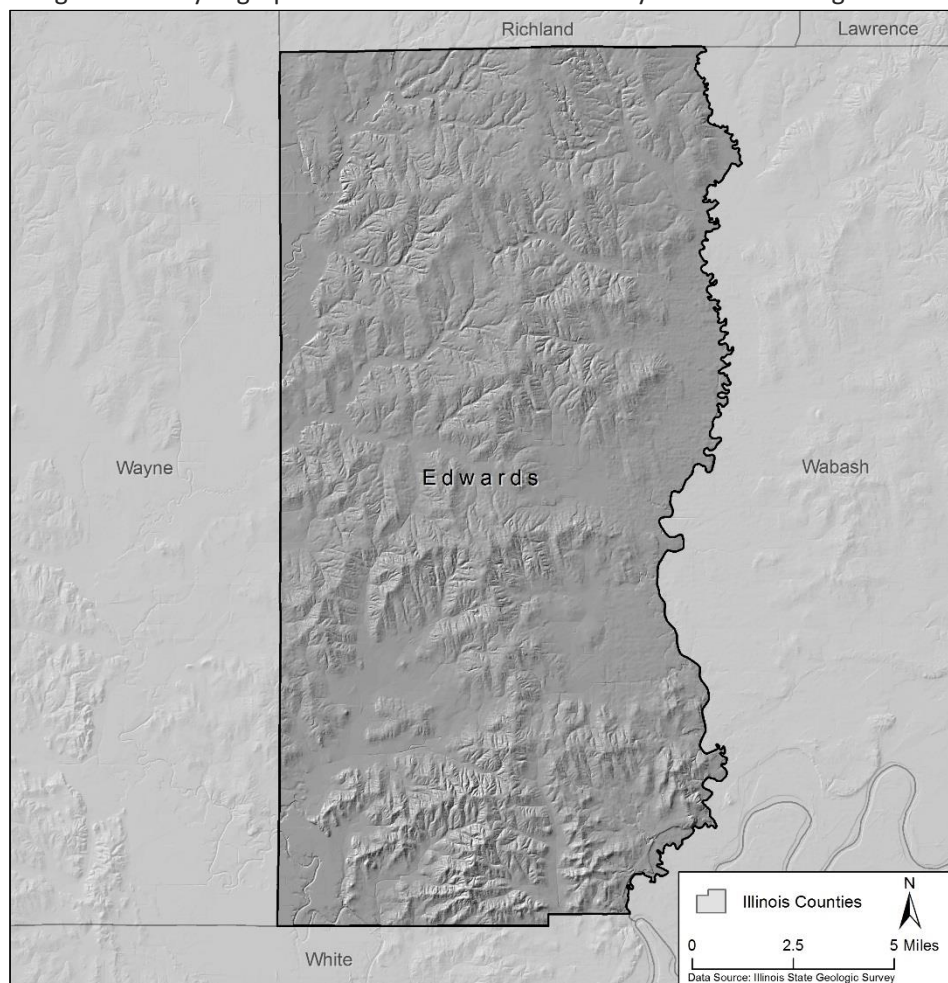
3.5 Climate

Edwards County climate is typical of Southern Illinois and generally characterized by hot dry summers and cool wet winters. The variables of temperatures, precipitation, and snowfall can vary greatly from one year to the next. The average annual temperature for Edwards County is 55 degrees Fahrenheit (°F), which is higher than the Illinois average of 51.37°F. The coldest average temperatures are in January, and the warmest average temperatures are in July. Edwards County's average annual total precipitation is 44.73 inches, which includes an average annual snowfall of 12.47 inches.

3.6 Topography

Edwards County is located in the Mount Vernon Hill Country physiographic sub-division of the Till Plains Section. Figure 3-4 depicts the terrain within Edwards County. The Mount Vernon Hill Country is characterized by low rolling hills and broad alluvial valleys along the major streams. The relief in this region is not pronounced. Upland prairies are flat to moderately hilly, and the valleys are shallow. The land surface is primarily controlled by bedrock, which has been only slightly modified by glacial drift deposits. While the southern boundary of the Mount Vernon Hill Country lies within a few miles of the limits of glaciations, moraine ridges are essentially absent in the area. Elevation in the county varies from slightly more than 550 feet above sea level to approximately 360 feet below sea level.

Figure 3-4. Physiographic Divisions of Edwards County and Surrounding Terrain

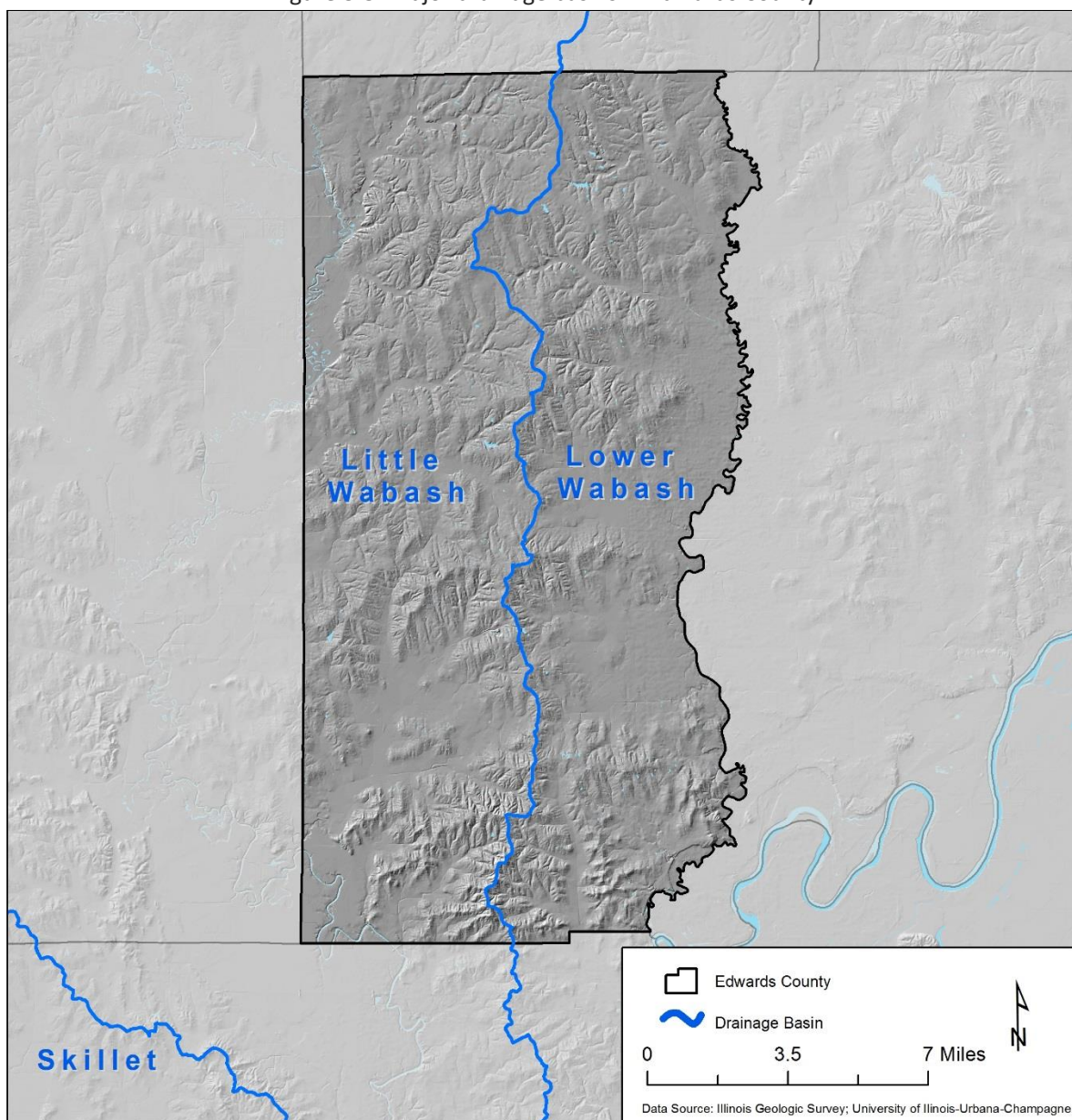


3.7 Major Lakes, Rivers, and Watersheds

Of the 102 Illinois Counties, Edwards County contains the least amount of open water in the state. 1,185 acres are covered by lakes, rivers and streams. Figure 3-5 depicts the major drainage basins in Edwards County. Edwards County lies on the dividing ridge between two eight-digit Hydrologic Unit Code (HUC) Watersheds: Little Wabash and Lower Wabash.

There are a small number of principal streams: Wabash River, Bonpas Creek, and Little Wabash River. There are also several small creeks/streams in the county: West Village Creek, Walser Creek, Village Creek, Sugar Creek, Stinking Creek, Shelby Creek, Parker Creek, Mud Creek, Madden Creek, Little Indian Creek, Johnson Creek, Indian Creek, Harper Creek, French Creek, Crooked Creek, Camp Creek, Butter Creek, Buck Creek, Big Creek, Big Branch, and Bear Creek. There are no significant lakes in Edwards County.

Figure 3-5. Major drainage basins in Edwards County



Section 4. Risk Assessment

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

4.1 Hazard Identification

4.1.1 Existing Plans

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

4.1.2 National Hazard Records

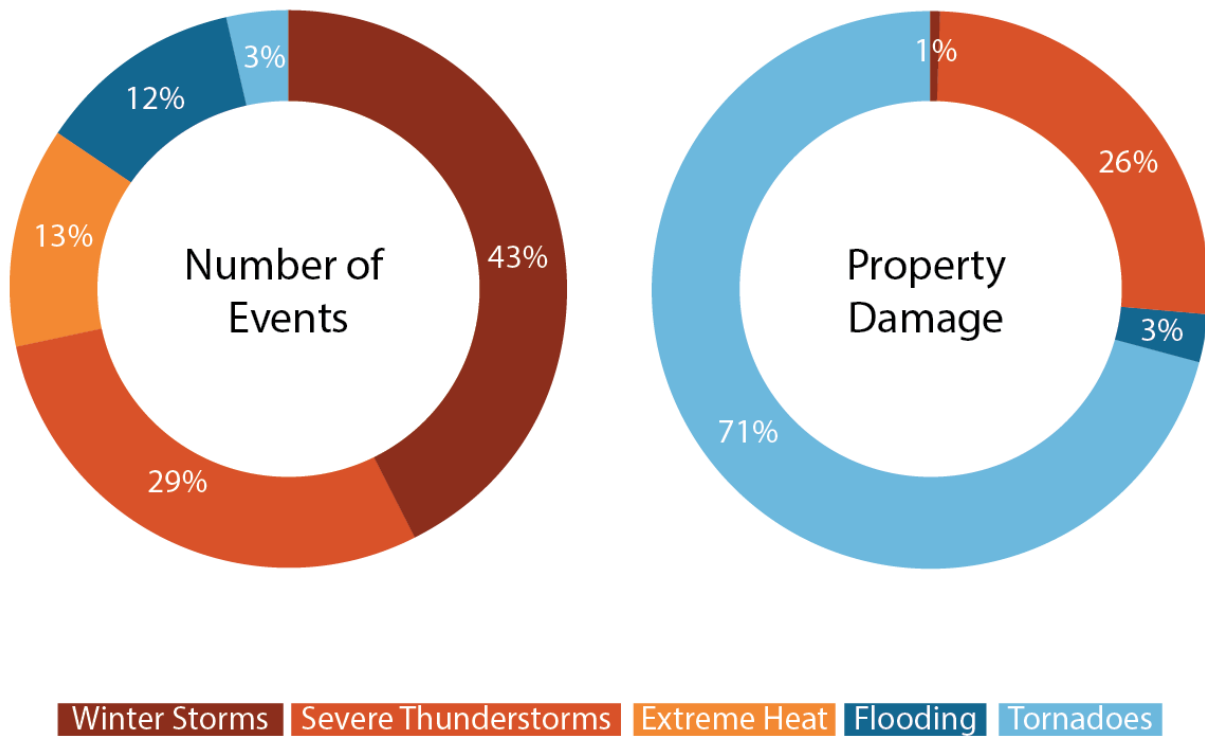
To assist the Planning Team, historical storm event data from the National Climatic Data Center (NCDC) was compiled. NCDC records are estimates of damages reported to the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature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

The NCDC database included 354 reported meteorological events in Edwards County from 1950-2014 (the most updated information as of the date of this plan). The following hazard-profile sections each include a summary table of events related to each hazard type. Table 4-1 summarizes the meteorological hazards reported for Edwards County. Figure 4-1 summarize the relative frequency of NCDC reported meteorological hazards and the percent of total damage associated with each hazard for Edwards County. Full details of individual hazard events are on the [NCDC website](#). In addition to NCDC data, Storm Prediction Center (SPC) data associated with tornadoes, strong winds, and hail was mapped using SPC-recorded latitudes and longitudes. Appendix D includes a map of these events.

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

Hazards	Time Period		Number of Events	Property Damage	Deaths	Injuries
	Start	End				
Flooding	1996	2013	22	\$216,000	0	0
Severe Thunderstorms	1955	2014	112	\$2,678,000	2	3
Tornadoes	1958	2013	9	\$5,680,000	1	1
Winter Storms	1996	2013	157	\$50,000	1	1
Extreme Heat	1997	2013	54	\$0	0	0

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



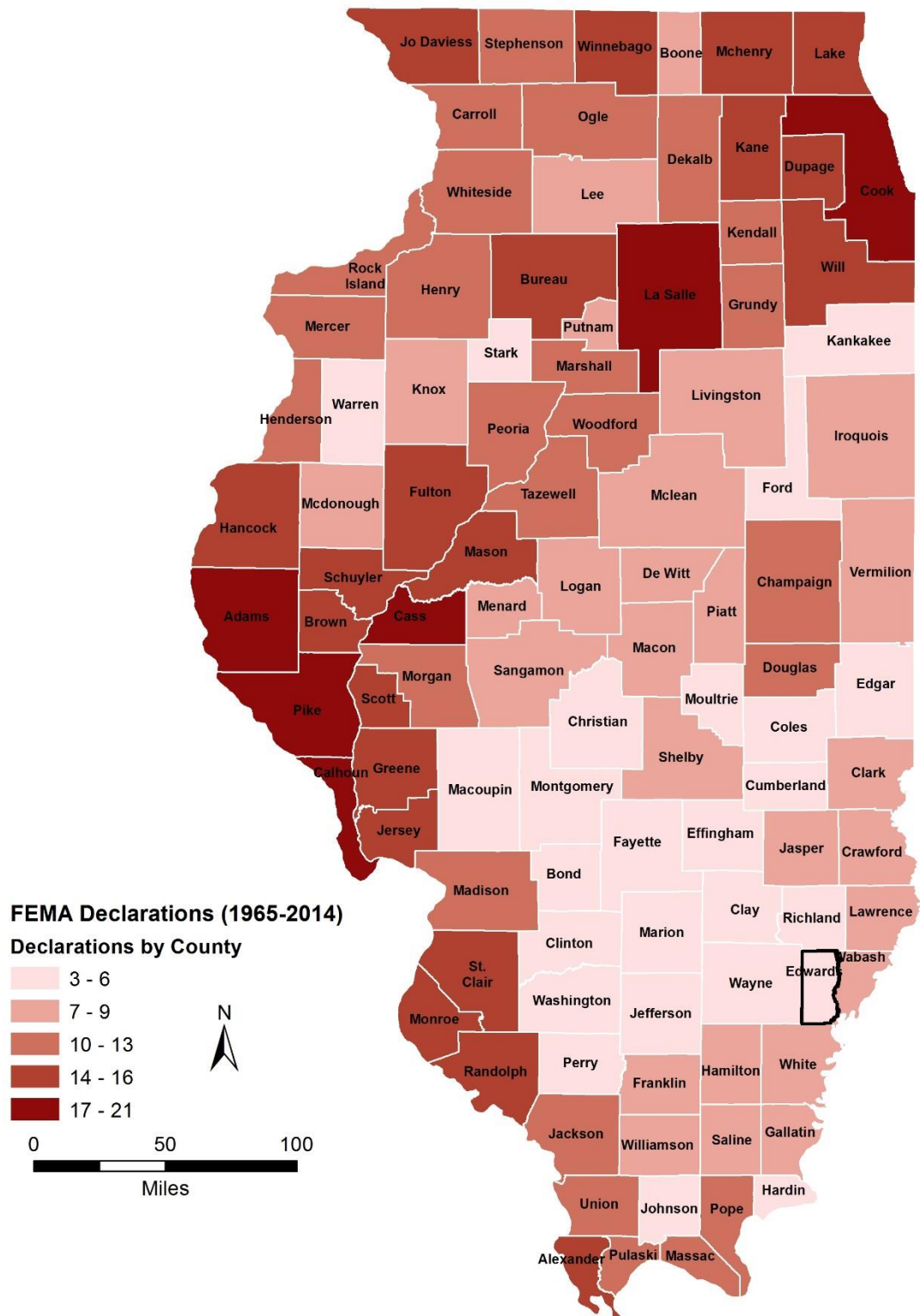
4.1.3 FEMA Disaster Information

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

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

Declaration Number	Date of Declaration	Description
819	1/13/1989	Severe Storms & Tornadoes
871	6/22/1990	Severe Storms, Tornadoes & Flooding
1416	5/21/2002	Severe Storms, Tornadoes & Flooding
3199	2/1/2005	Record/Near Record Snow
3230	9/7/2005	Hurricane Katrina Evacuation

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



4.1.4 Hazard Ranking Methodology

Based on Planning Team input, national datasets, and existing plans, the Edwards County Planning Team re-ranked the list of hazards from the 2009 MHMP. These hazards ranked the highest based on the Risk Priority Index discussed in Section 4.1.5. The previous list was updated by the Planning Team to ensure that jurisdictional rankings accurately reflect each community's assessment of these hazards. No new hazards were identified since the initial plan. It should be noted that Ground Failure and Wildfire have been omitted from the plan and were not natural hazards identified by Edwards County or participating jurisdictions during the risk assessment process.

4.1.5 Risk Priority Index

The Risk Priority Index (RPI) quantifies risk as the product of hazard probability and magnitude so Planning Team members can prioritize mitigation strategies for high-risk-priority hazards. Planning Team members

<u>Edwards County Hazard List</u>
TORNADOES
SEVERE THUNDERSTORM
EARTHQUAKES
WINTER STORMS
HAZARDOUS MATERIALS RELEASE
FLOODING
DROUGHT / EXTREME HEAT
DAM / LEVEE FAILURE

use historical hazards data to determine the probability, combined with knowledge of local conditions to determine the possible severity of a hazard. Tables 4-3 and 4-4 display the criteria the Planning Team used to quantify hazard probability and magnitude.

Table 4-3. Hazard Probability Ranking

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

Table 4-4. Hazard Severity Ranking

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

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

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

Hazard	Probability	Magnitude/Severity	Risk Priority Index	Rank
Tornadoes	3	5	15	1
Severe Thunderstorms	4	4	16	2
Earthquakes	2	8	16	3
Winter Storms	3	4	12	4
Hazardous Materials Release	3	3	9	5
Flooding	2	4	8	6
Drought / Extreme Heat	4	2	8	7
Dam / Levee Failure	2	1	2	8

4.1.6 Jurisdictional Hazard Ranking

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

Table 4-6. Hazard Ranking by Jurisdiction

Jurisdiction	Tornadoes	Severe Storm	Earthquakes	Winter Storms	HAZMAT	Flooding	Heat / Drought	Dam / Levee Failure
Albion	3	4	5	6	7	2	1	8
Bone Gap	1	2	3	4	5	6	7	8
Browns	4	3	5	6	1	2	7	2
Grayville	5	2	4	6	7	1	3	8
West Salem	2	1	3	4	5	7	6	8

Jurisdiction	Tornadoes	Severe Storm	Earthquakes	Winter Storms	HAZMAT	Flooding	Heat / Drought	Dam / Levee Failure
Edwards CUSD #1	4	2	5	3	7	1	6	8

4.2 Vulnerability Assessment

4.2.1 Asset Inventory

Processes and Sources for Identifying Assets

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

Essential Facilities List

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

Table 4-7. Edwards County's Essential Facilities

Facility	Number of Facilities
Care Facilities	2
Emergency Operations Centers	2
Fire Stations	4
Police Stations	3
Schools	3

Facility Replacement Costs

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

Table 4-8. Edwards County's Building Exposure

General Occupancy	Estimated Total Buildings	Total Building Exposure
Residential	3012	\$254,837,048
Agriculture	281	\$11,895,330
Commercial	308	\$2,931,129,480
Industrial	22	\$200,856,225
Total:	3623	\$3,398,718,083

Future Development

Edwards County is expected to see a modest increase in population due to the expansion of existing distribution centers, light industry, and the creation of new opportunities in the service industry such as retail stores, restaurants, and hotels. Most of this expansion is expected to take place within the city limits of Albion within close proximity to transportation corridors such as Illinois Routes 15 and 130.

4.3 Risk Analysis

4.3.1 GIS and Hazus-MH

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

Updates to the default Hazus-MH data include:

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

The following assumptions were made during analysis:

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

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

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

Hazard	Risk Assessment Tool(s)
Flooding	Hazus-MH
Severe Thunderstorm	Historical Records
Tornadoes	GIS-based
Earthquakes	Hazus-MH
Winter Storms	Historical Records
Drought / Extreme Heat	Historical Records
Hazmat Release	GIS-based
Dam / Levee Failure	Historical Records

4.3.2 Tornado Hazard

Hazard Definition

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

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

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

Table 4-10. Enhanced Fujita Tornado Rating

Enhanced Fujita Number	Estimated Wind Speed	Path Width	Path Length	Description of Destruction
0 Gale	40-72 mph	6-17 yards	0.3-0.9 miles	Light damage, some damage to chimneys, branches broken, signboards damaged, shallow-rooted trees blown over.
1 Moderate	73-112 mph	18-55 yards	1.0-3.1 miles	Moderate damage, roof surfaces peeled off, mobile homes pushed off foundations, attached garages damaged.
2 Significant	113-157 mph	56-175 yards	3.2-9.9 miles	Considerable damage, entire roofs torn from frame houses, mobile homes demolished, boxcars pushed over, large trees snapped or uprooted.
3 Severe	158-206 mph	176-566 yards	10-31 miles	Severe damage, walls torn from well-constructed houses, trains overturned, most

Enhanced Fujita Number	Estimated Wind Speed	Path Width	Path Length	Description of Destruction
				trees in forests uprooted, heavy cars thrown about.
4 Devastating	207-260 mph	0.3-0.9 miles	32-99 miles	Complete damage, well-constructed houses leveled, structures with weak foundations blown off for some distance, large missiles generated.
5 Incredible	261-318 mph	1.0-3.1 miles	100-315 miles	Foundations swept clean, automobiles become missiles and thrown for 100 yards or more, steel-reinforced concrete structures badly damaged.

Previous Occurrences of Tornadoes

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

The most damaging tornado event in the NCDC occurred on June 2, 1990, when a large and widespread tornado outbreak occurred across parts of the Midwest and Ohio Valley. The most heavily damaged area was from Southeast Illinois through Southern Indiana and into Southwestern Ohio. There were several strong to violent tornadoes across this corridor including seven that were determined to be F4 in intensity on the Fujita scale. One of the F4 tornadoes began in Hamilton County, struck Albion, then caused severe damage in the Browns area, where one person was killed.

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

Location or County*	Date	Scale	Deaths	Injuries	Property Damage
Edwards County	7/11/1958	F2	0	1	\$25,000
Edwards County	4/13/1972	F1	0	0	\$250,000
Edwards County	1/7/1989	F2	0	0	\$2,500,000
Edwards County	4/3/1989	F1	0	0	\$25,000
Edwards County	6/2/1990	F4	1	0	\$2,500,000
Edwards County	1/22/2012	EF1	0	0	\$30,000
Edwards County	11/17/2013	EF2	0	0	\$350,000
Total:			1	1	\$5,680,000

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

Geographic Location for Tornado Hazard

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

Hazard Extent for Tornado Hazard

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

Risk Identification for Tornado Hazard

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

<u>Risk Priority Index</u>				
Probability	x	Magnitude	=	RPI
3	x	5	=	15

Vulnerability Analysis for Tornado Hazard

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

Critical Facilities

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

Building Inventory

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

Infrastructure

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

GIS-based Tornado Analysis

An EF4 hypothetical tornado scenario through Albion and West Salem was conducted for Edwards County. The following analysis quantifies the anticipated impacts of tornado in the county in terms of numbers and types of buildings and infrastructure damaged.

GIS-overlay modeling was used to determine the potential impacts of an EF4 tornado. The analysis used a hypothetical path based upon an EF4 tornado that tracks 13 miles through Albion and West Salem. Table 4-12 depicts tornado damage curves and path widths utilized for the modeled scenario. The damage curve is based on conceptual wind speeds, path winds, and path lengths from the Enhanced-Fujita Scale guidelines.

Table 4-12. Tornado Path Widths and Damage Curves

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

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

Table 4-13. EF4 Tornado Zones and Damage Curves

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

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

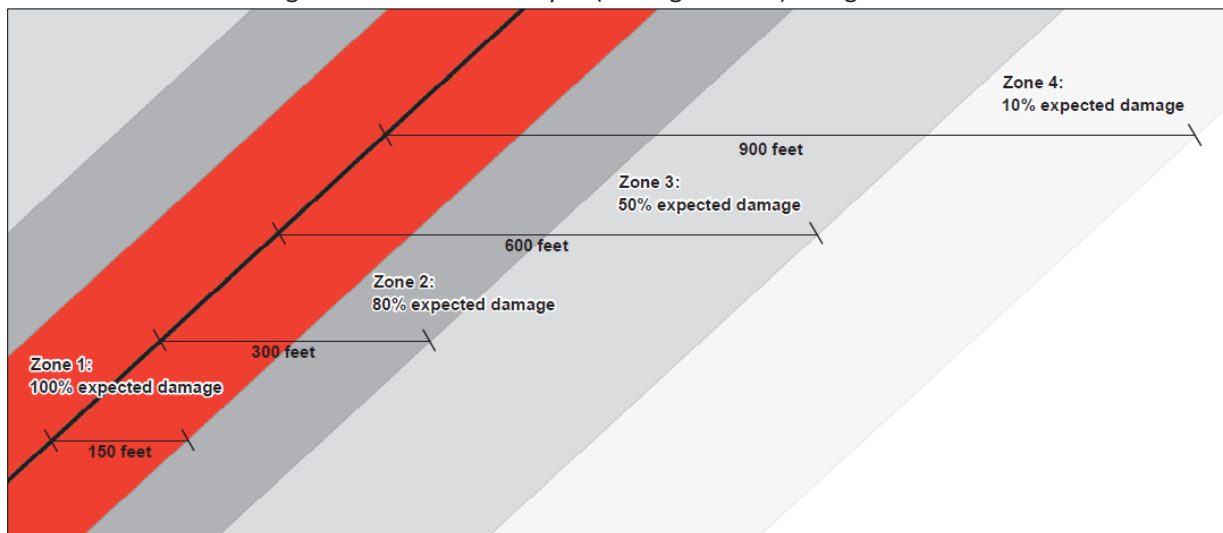
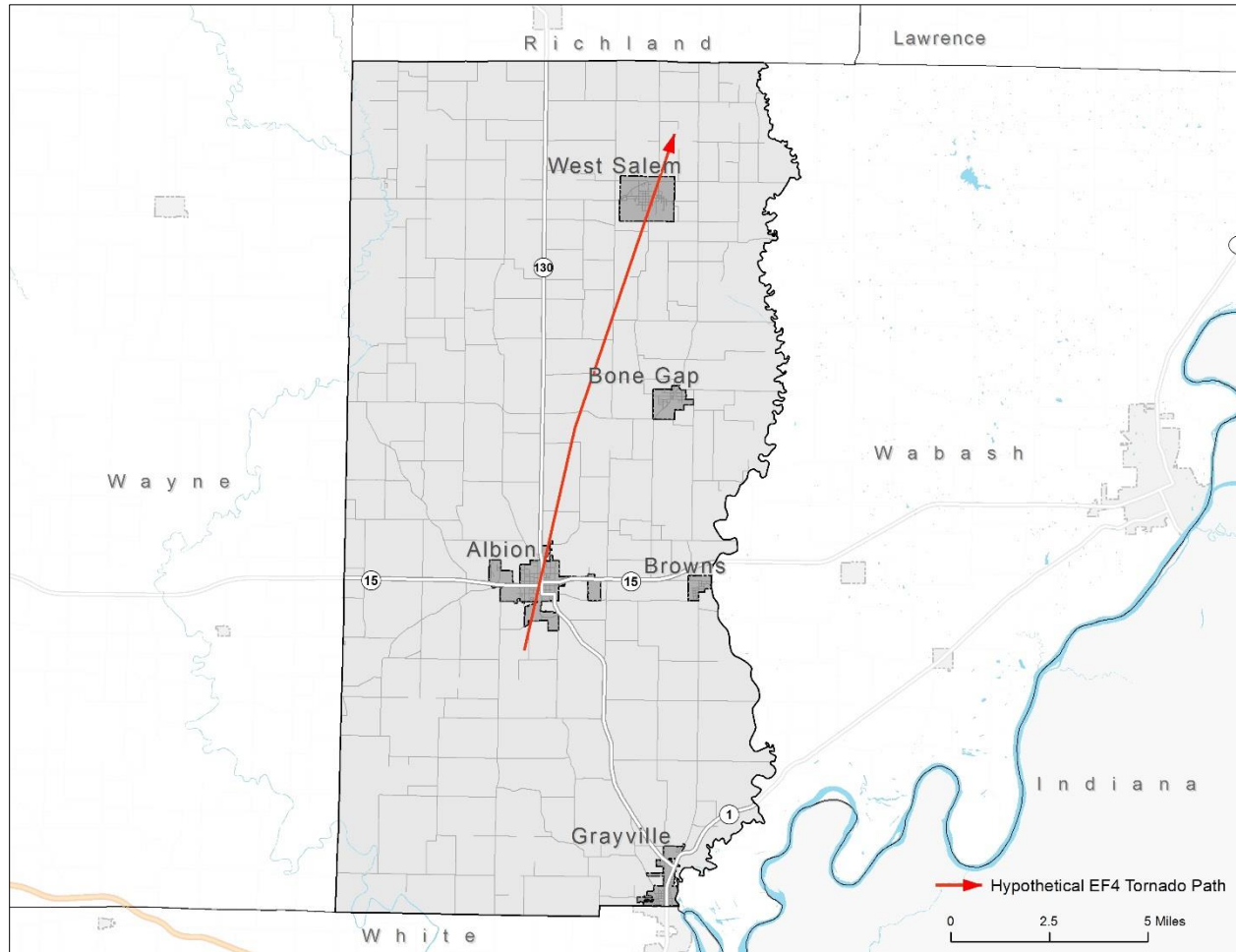


Figure 4-4. Modeled Hypothetical EF4 Tornado Track for Edwards County



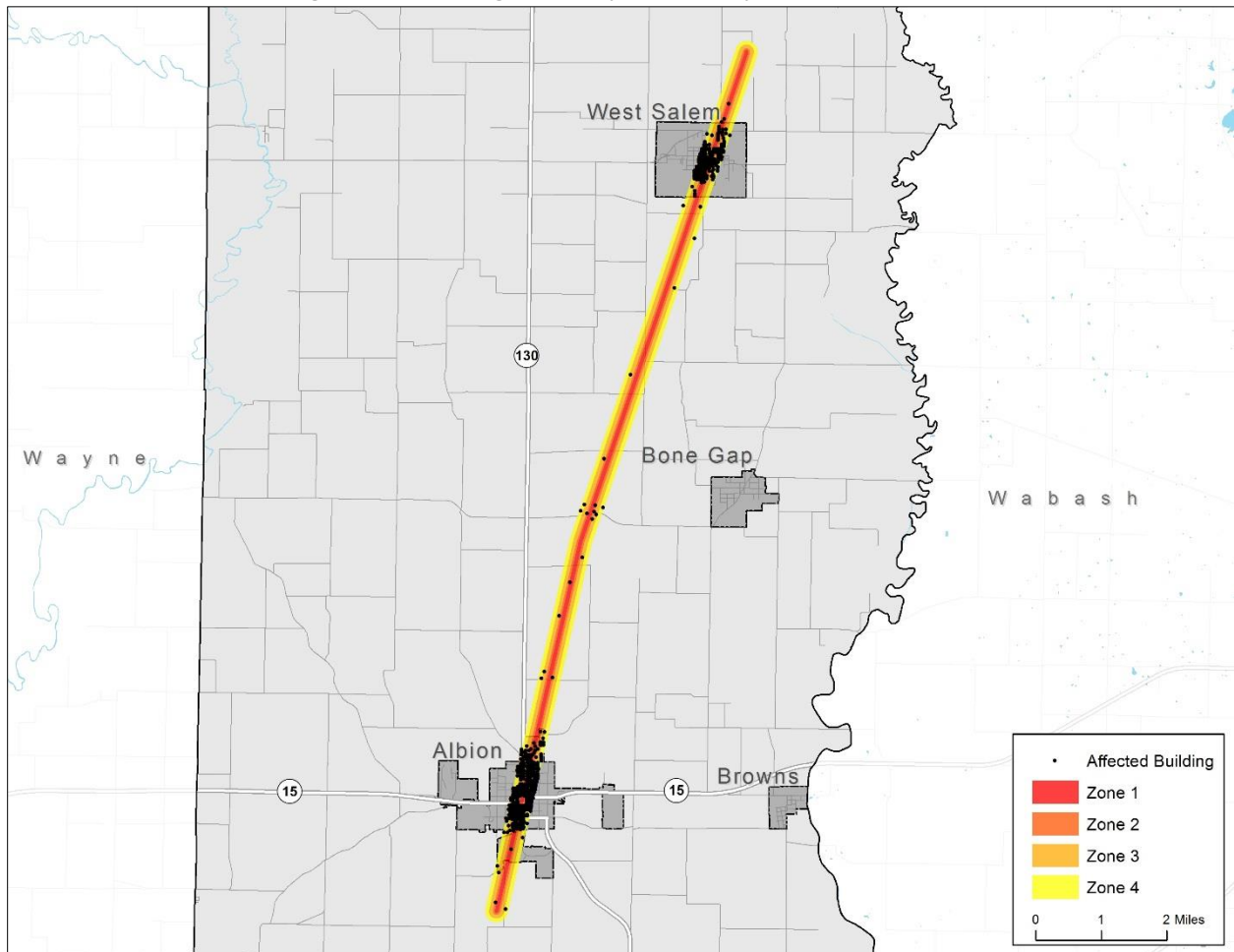
Modeled Impacts of the EF4 Tornado

The GIS analysis estimates that the modeled EF4 tornado would damage 735 buildings. The estimated building losses are over \$500 million. The building losses are an estimate of building replacement costs multiplied by the damage percent. Table 4-14 and Figures 4-5 show the results of the EF4 tornado analysis.

Table 4-14. Estimated Building Loss by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	\$7,148,205	\$6,204,762	\$7,129,800	\$1,461,409
Agriculture	\$222,458,580	\$88,580,616	\$166,764,465	\$16,587,996
Commercial	\$2,916,900	\$0	\$37,294	\$3,252,079
Industrial	\$103,620	\$14,592	\$11,490	\$3,639
Total:	\$232,627,305	\$94,799,970	\$173,943,049	\$21,305,123

Figure 4-5. Building Inventory Affected by the EF4 Tornado



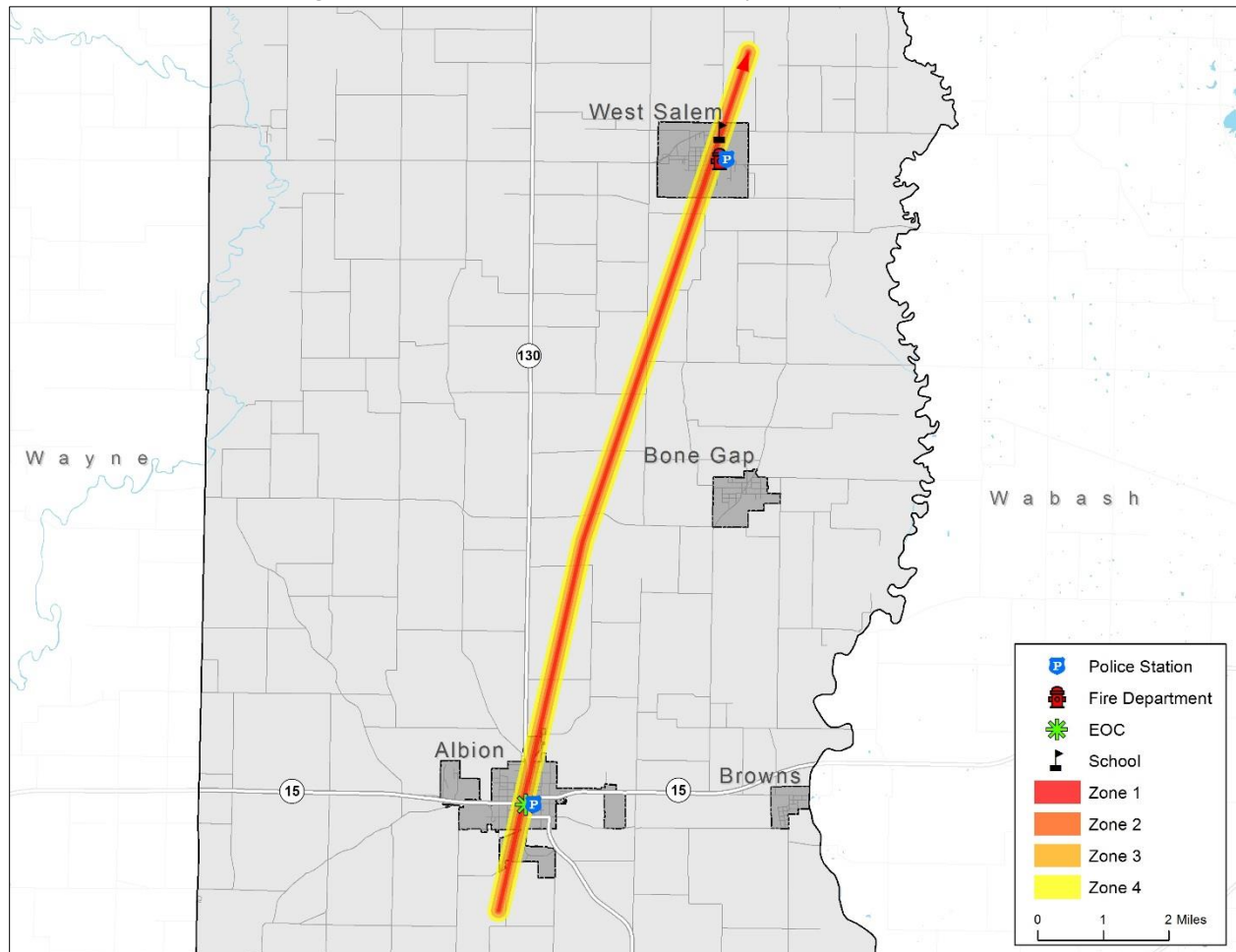
Essential Facilities Damage

There are six essential facilities located within 900 feet of the EF4 tornado path. The affected facilities are identified in Table 4-15, and their geographic locations are shown in Figure 4-6.

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

Essential Facility	Facility Name
EOC	Edwards County EOC
School	West Salem Grade School
Fire Department	West Salem Fire Department
Police Department	Albion Police Department
	West Salem Police Department
	Edwards County Sheriff

Figure 4-6. Essential Facilities Affected by the EF4 Tornado



Vulnerability to Future Assets/Infrastructure for Tornado Hazard

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

Suggestions for Community Development Trends

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

4.3.3 Thunderstorm Hazard

Hazard Definition

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

Hail 0.75 inches or greater in diameter

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

Frequent and dangerous lightning

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

Wind speeds greater than or equal to 58 miles per hour

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

Previous Occurrences of Thunderstorm Hazards

The National Climatic Data Center (NCDC) database reported 32 hailstorms in Edwards County since 1950. Hailstorms occur nearly every year in the late spring and early summer months. The most damaging reported event occurrence was on May 3rd 1996, when baseball size hail dented some vehicles beyond repair. Some windshields were broken. Area homes suffered mainly roofs and siding damage. Just about every unprotected vehicle in Albion suffered at least minimal hail damage. Table 4-16 lists the significant hail storms (such as those that cause death, damage or injury) in Edwards County.

Table 4-16. Selected NCDC-Recorded Hail that Caused Damage, Death, or Injury in Edwards County

Location or County*	Date	Deaths	Injuries	Property Damage
Edwards County	5/3/1996	0	0	\$500,000
Total:		0	0	\$500,000

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

The NCDC database reported four lightning events in Edwards County. The most damaging reported event occurred on July 7th 2011 when clusters of storms consolidated into a large complex that brought heavy rainfall to parts of southern Illinois. A lightning strike took out phone lines, radio consoles, and alarm systems at the county courthouse. The lightning appeared to have surged through the phone lines into the building. Table 4-17 identifies NCDC-recorded lightning that caused damage, death, or injury in Edwards County.

Table 4-17. Selected NCDC-Recorded Lightning that Caused Damage, Death, or Injury in Edwards County

Location or County*	Date	Deaths	Injuries	Property Damage
Edwards County	6/4/1999	0	0	\$30,000
Edwards County	5/23/2011	0	0	\$10,000
Edwards County	7/7/2011	0	0	\$50,000
Total:		0	0	\$90,000

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

The NCDC database reported 76 severe thunder and wind storms in Edwards County. Table 4-18 identifies selected NCDC-recorded wind storms that caused major damage (over \$50,000), death, or injury in Edwards County.

Table 4-18. Selected NCDC-Recorded Thunder and Wind Storms that Caused Major Damage (over \$50,000), Death, or Injury in Edwards County

Location or County*	Date	Deaths	Injuries	Property Damage
Edwards County	5/18/1995	2	0	\$200,000
Edwards County	6/12/1998	0	1	\$50,000
Edwards County	10/24/2001	0	0	\$200,000
Edwards County	4/2/2006	0	0	\$150,000
Edwards County	8/10/2006	0	0	\$50,000
Edwards County	4/19/2011	0	0	\$1,000,000
Total:		2	1	\$1,650,000

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

Geographic Location of Thunderstorm Hazard

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

Hazard Extent for Thunderstorm Hazard

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

Risk Identification for Thunderstorm Hazard

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

<u>Risk Priority Index</u>				
Probability	x	Magnitude	=	RPI
4	x	4	=	16

Vulnerability Analysis for Thunderstorm Hazard

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

Critical Facilities

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

Building Inventory

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

Infrastructure

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

Potential Dollar Losses from Thunderstorm Hazard

According to the NCDC, Edwards County has incurred approximately \$2.7 million in damages relating to thunderstorms, including hail, lightning, and high winds since 1950. NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event. As a result, the potential dollar losses for a future event cannot be reliably constrained; however, based on average property damage in the past decade, SIU estimates that Edwards County incurs property damages of approximately \$40,000 per year related to severe thunderstorms.

Vulnerability to Future Assets/Infrastructure for Thunderstorm Hazard

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

Suggestions for Community Development Trends

Local officials should enhance severe storm preparedness if they sponsor a wide range of programs and initiatives to address the overall safety of county residents. It is suggested that the county should build new structures with more sturdy construction, and harden existing structures to lessen the potential

impacts of severe weather. This is particularly important where the future economic expansion is expected to take place within the city limits of Albion. Additional warning sirens can warn the community of approaching storms to ensure the safety of Edwards County residents and minimize property damage.

4.3.4 Earthquake Hazard

Hazard Definition

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

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

Earthquakes are usually measured by two criteria: intensity and magnitude (M). Earthquake intensity qualitatively measures the strength of shaking produced by an earthquake at a certain location and is determined from effects on people, structures, and the natural environment. Earthquake magnitude quantitatively measures the energy released at the earthquake's subsurface source in the crust, or epicenter. Table 4-19 provides a comparison of magnitude and intensity, and Table 4-20 provides qualitative descriptions of intensity, for a sense of what a given magnitude might feel like.

Table 4-19. Comparison of Earthquake Magnitude and Intensity

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

Table 4-20. Abbreviated Modified Mercalli Intensity Scale

Mercalli Intensity	Description
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motorcars rocked noticeably.

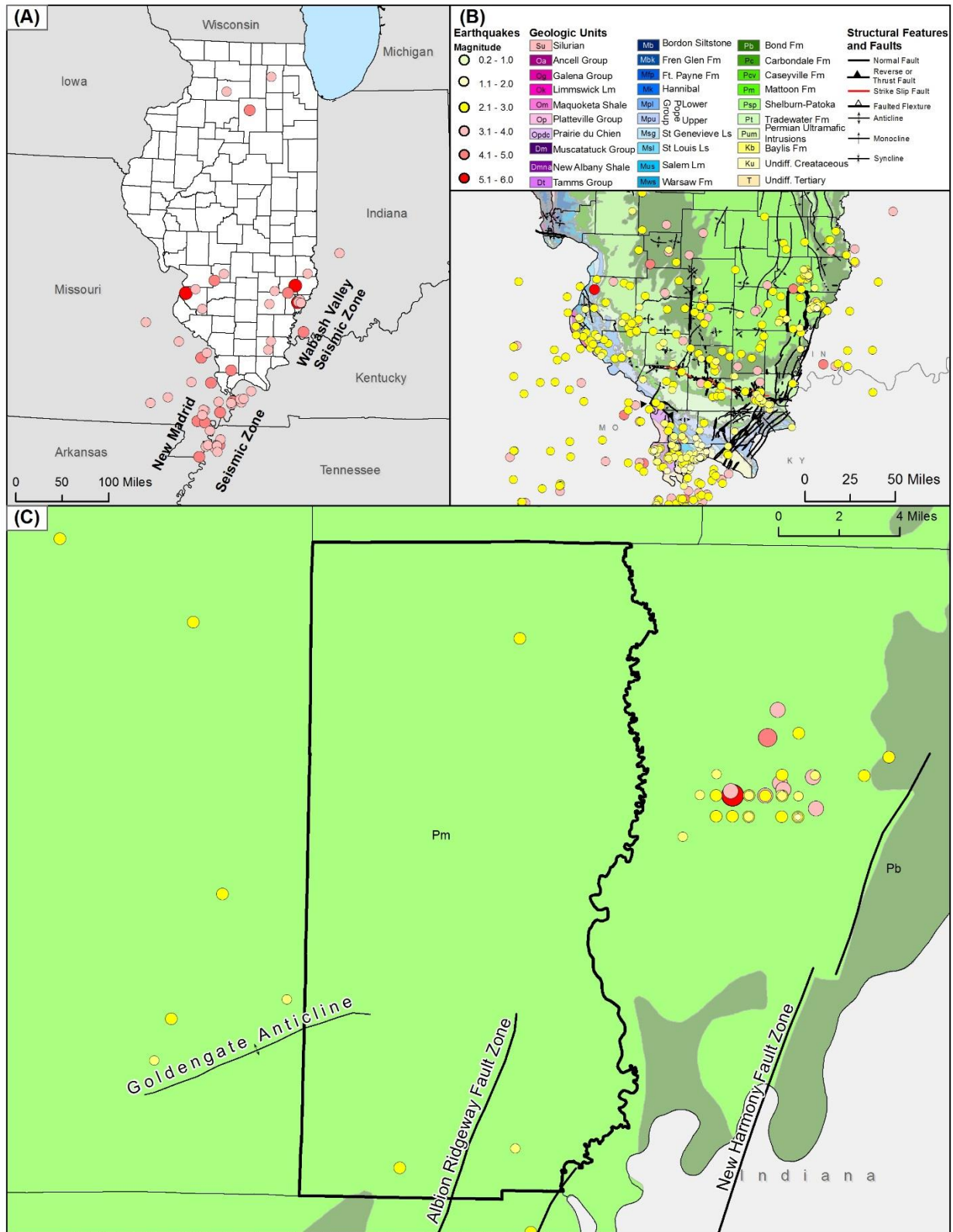
Mercalli Intensity	Description
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, and walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Previous Occurrences for Earthquakes

Historically, the most significant seismic activity in Illinois is associated with New Madrid Seismic Zone. The New Madrid Seismic Zone produced three large earthquakes in the central U.S. with magnitudes estimated between 7.0 and 7.7 on December 16, 1811, January 23, 1812, and February 7, 1812. These earthquakes caused violent ground cracking and volcano-like eruptions of sediment (sand blows) over an area >10,500 km², and uplifted a 50 km by 23 km zone (the Lake County uplift). The shaking was felt over a total area of over 10 million km² (the largest felt area of any historic earthquake). The United States Geological Survey (USGS) and the Center for Earthquake Research and Information (CERI) at the University of Memphis estimate the probability of a repeat of the 1811-1812 type earthquakes (M7.5-8.0) is 7%-10% over the next 50 years (USGS Fact Sheet 2006-3125).

Earthquakes measured in Illinois typically vary in magnitude from very low microseismic events of M=1-3 to larger events up to M=5.4. Figure 4-7 depicts the following: (A) location of notable earthquakes in Illinois region; (B) generalized geologic bedrock map with earthquake epicenters and geologic structures; (C) geologic and earthquake epicenter map of Edwards County. The most recent earthquake in Illinois—as of the date of this report—was a M2.3 event in February 2014, approximately 6 miles NNW of Mound City in Pulaski County. The last earthquake in Illinois to cause minor damage occurred on April 18, 2008 near Mt. Carmel, IL and measured 5.2 in magnitude. Earthquakes resulting in more serious damage have occurred about every 70 to 90 years and are historically concentrated in southern Illinois.

Figure 4-7. Notable Earthquakes in Illinois with Geologic and Earthquake Epicenters in Edwards County



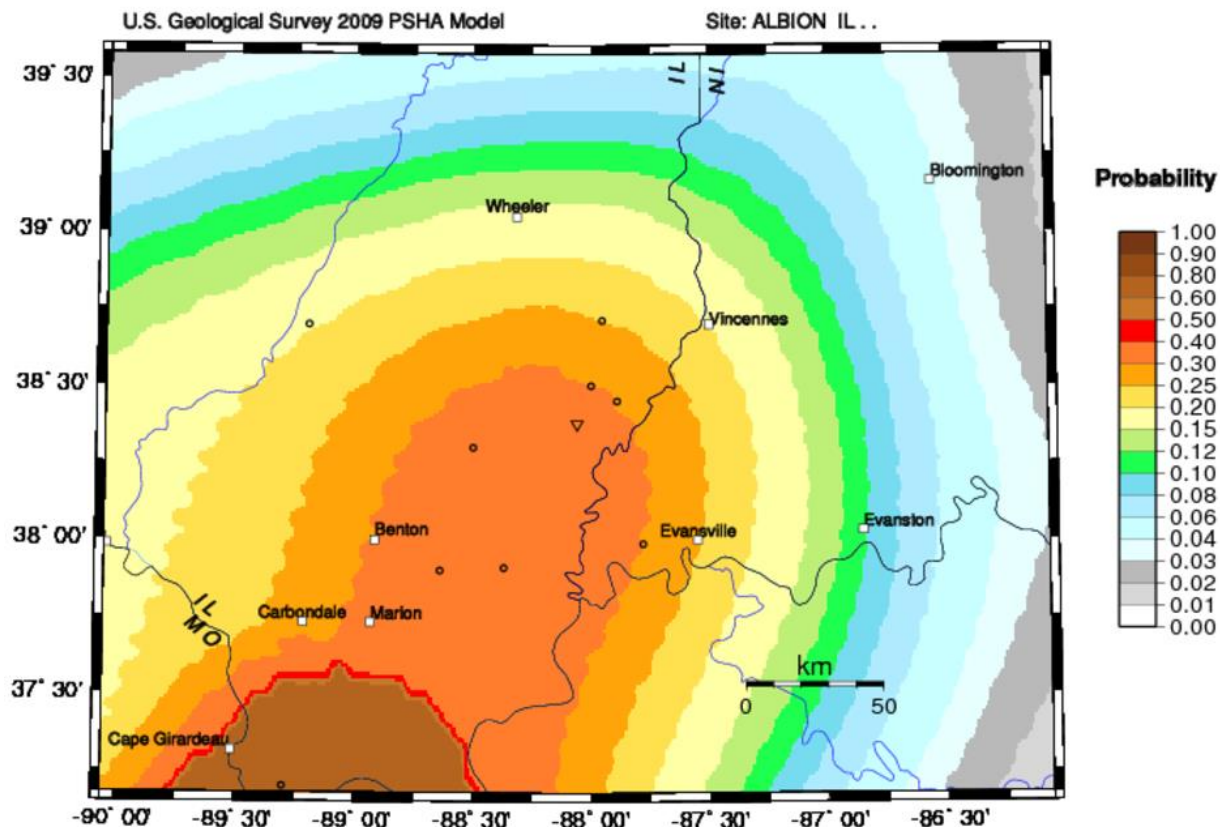
Data Sources: Illinois Geological Survey, U.S. Geological Survey, Center for Earthquake Research and Information at University of Memphis

Geographic Location for Earthquake Hazard

Edwards County is situated in a region susceptible to earthquakes. Since 1974, the epicenters of three small earthquakes (M1.5-M2.0) have been recorded in Edwards County (see Figure 4-7(C)). This local seismic activity is believed to be associated with the Wabash Valley Fault System.

The two most significant zones of seismic activity in Illinois are the New Madrid Seismic Zone and the Wabash Valley Fault System. Return periods for large earthquakes within the New Madrid System are estimated to be ~500–1000 years; moderate quakes between magnitude 5.5 and 6.0 can recur within approximately 150 years or less. The Wabash Valley Fault System extends nearly the entire length of southern Illinois and has the potential to generate an earthquake of sufficient strength to cause damage between St. Louis, MO and Indianapolis, IN. While large earthquakes ($>M7.0$) experienced during the New Madrid Events of 1811 and 1812 are unlikely in Edwards County, moderate earthquakes ($\leq 6.0M$) in or in the vicinity of Edwards County are probable. The USGS estimates the probability of a moderate M5.5 earthquake occurring in Edwards County within the next 500-years at approximately 30% (see Figure 4-8).

Figure 4-8. Probability of M5.5 Earthquake occurring in Edwards County within the next 500 years



Hazard Extent for Earthquake Hazard

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

Risk Identification for Earthquake Hazard

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

<u>Risk Priority Index</u>			
Probability	x	Magnitude	= RPI
2	x	8	= 16

Vulnerability Analysis for Earthquake Hazard

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

Critical Facilities

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

Building Inventory

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

Infrastructure

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

Hazus-MH Earthquake Analyses

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

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

The earthquake hazard modeling scenarios performed:

- Magnitude 5.5 probabilistic earthquake in Edwards County
- Magnitude 7.7 event along the New Madrid Fault Zone
- Magnitude 7.1 event along the Wabash Valley Fault Zone

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

Results for M5.5 Earthquake Scenario

The results of the M5.5 probabilistic earthquake scenario are depicted in Tables 4-21, 4-22, and Figure 4-9. Hazus-MH estimates that approximately 366 buildings will be at least moderately damaged. This is over 12% of the total number of buildings in the Edwards County. It is estimated that eight buildings would be damaged beyond repair.

The total building related losses are approximately \$26 million dollars. It is estimated that 15% of the losses are related to the business interruption of the region. By far, the largest loss is sustained by the residential occupancies which make up over 55% of the total loss.

Table 4-21. M5.5 Earthquake Damage Estimates by Building Occupancy

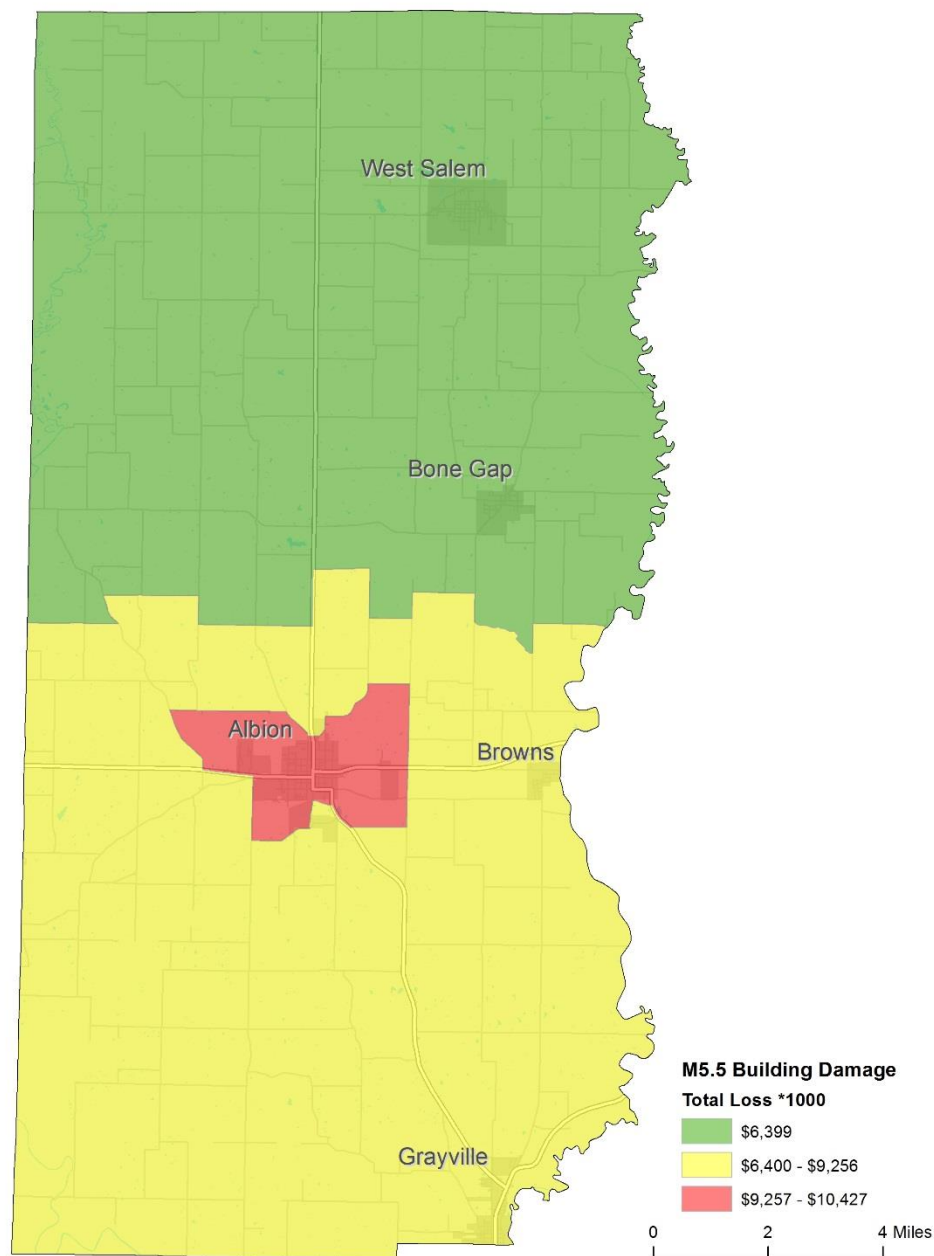
	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	3	0.13	1	0.18	1	0.3	0	0.45	0	0.36
Commercial	17	0.78	6	1.2	5	1.61	1	2.17	0	1.97
Educational	0	0	0	0	0	0	0	0	0	0
Government	1	0.06	0	0.08	0	0.1	0	0.1	0	0.14
Industrial	8	0.36	3	0.54	3	1.02	1	1.65	0	1.14
Other Residential	244	11.05	120	22.64	139	47.45	33	50.09	3	35.99
Religion	6	0.27	2	0.3	1	0.39	0	0.53	0	0.56
Single Family	1,930	87.36	398	75.06	144	49.13	30	45	5	59.85
Total:	2,209		530		293		65		8	

Table 4-22. M5.5 Earthquake Estimates of Building Economic Losses (in Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Other	Total
Income Losses	Wage	\$0.00	\$0.02	\$0.48	\$0.14	\$0.07	\$0.71
	Capital-Related	\$0.00	\$0.01	\$0.37	\$0.08	\$0.02	\$0.48
	Rental	\$0.23	\$0.09	\$0.32	\$0.04	\$0.03	\$0.71

Category	Area	Single Family	Other Residential	Commercial	Industrial	Other	Total
	Relocation	\$0.87	\$0.33	\$0.48	\$0.14	\$0.28	\$2.10
	Subtotal:	\$1.10	\$0.45	\$1.65	\$0.40	\$0.40	\$4.00
Capital Stock Losses	Structural	\$1.78	\$0.46	\$0.78	\$0.65	\$0.71	\$4.38
	Non-Structural	\$6.46	\$1.37	\$1.66	\$1.53	\$1.04	\$12.06
	Content	\$2.44	\$0.30	\$0.90	\$1.07	\$0.65	\$5.36
	Inventory	\$0.00	\$0.00	\$0.03	\$0.24	\$0.03	\$0.30
	Subtotal:	\$10.68	\$2.13	\$3.37	\$3.49	\$2.43	\$22.10
	Total:	\$11.78	\$2.58	\$5.02	\$3.89	\$2.83	\$26.10

Figure 4-9. Edwards County M5.5 Earthquake Building Economic Losses



Results for M7.7 New Madrid Earthquake

The results of the M7.7 New Madrid earthquake scenario are depicted in Tables 4-23, 4-24, and Figure 4-10. Hazus-MH estimates that approximately five buildings will be at least moderately damaged. It is estimated that zero buildings would be damaged beyond repair.

The total building related losses are approximately \$2.51 million dollars. It is estimated that 1% of the losses are related to the business interruption of the region. By far, the largest loss is sustained by the residential occupancies which make up over 50% of the total loss.

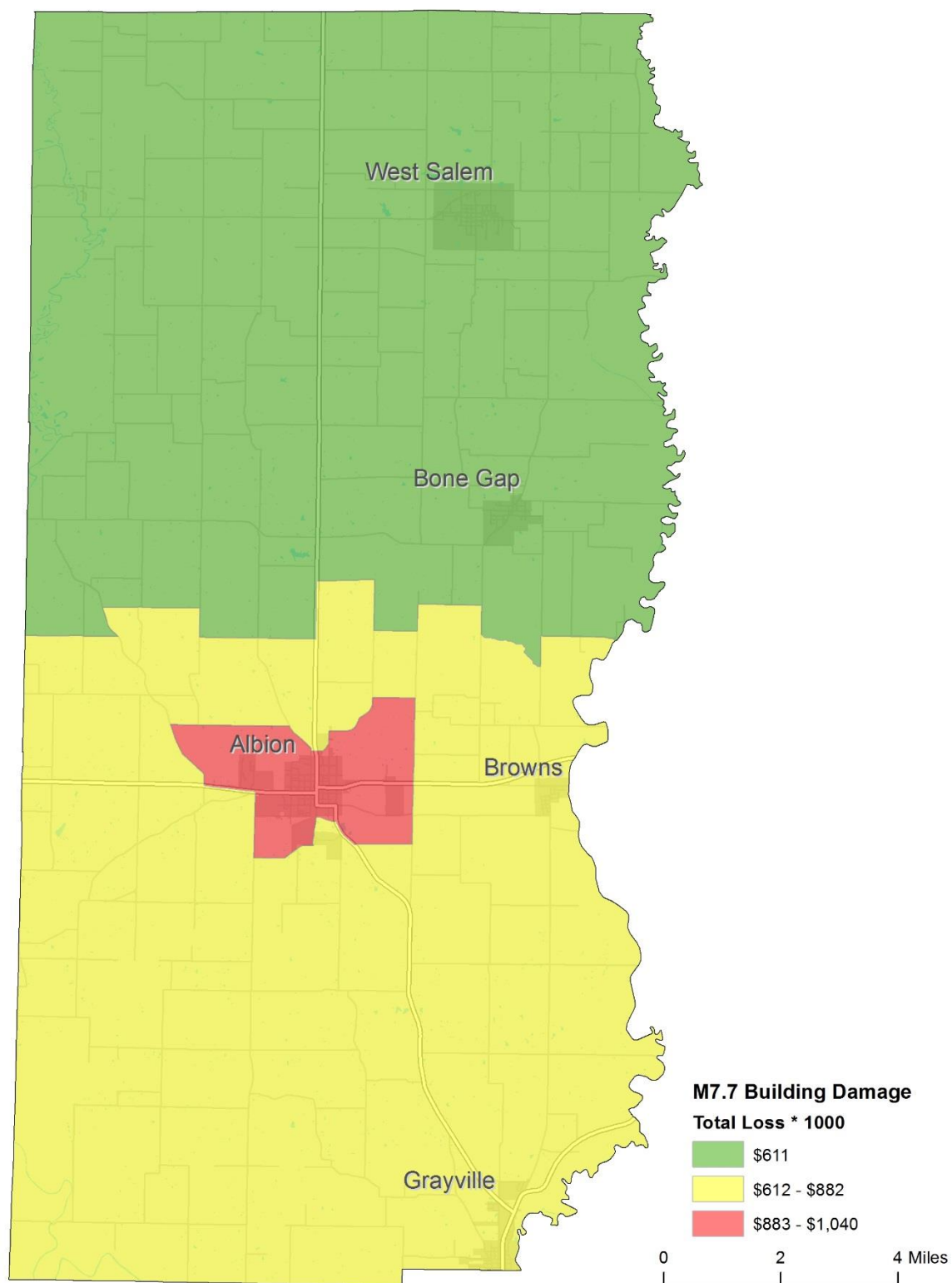
Table 4-23. New Madrid M7.7 Earthquake Damage Estimates by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	5	0.16	0	0.2	0	0.27	0	0.54	0	0
Commercial	29	0.96	1	1.08	0	1.36	0	2.73	0	0
Educational	0	0	0	0	0	0	0	0	0	0
Government	2	0.06	0	0.08	0	0.09	0	0.19	0	0
Industrial	15	0.48	0	0.54	0	0.85	0	1.3	0	0
Other Residential	503	16.51	33	59.7	3	64.07	0	2.19	0	0
Religion	9	0.29	0	0.32	0	0.35	0	0.85	0	0
Single Family	2,483	81.53	21	38.1	2	33.02	0	92.2	0	0
Total:	3,046		55		5		0		0	

Table 4-24. New Madrid M7.7 Earthquake Estimates of Building Economic Losses (in Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Other	Total
Income Losses	Wage	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Capital-Related	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Rental	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Relocation	\$0.01	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01
	Subtotal:	\$0.01	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01
Capital Stock Losses	Structural	\$0.03	\$0.01	\$0.01	\$0.01	\$0.01	\$0.07
	Non-Structural	\$0.60	\$0.13	\$0.21	\$0.28	\$0.14	\$1.36
	Content	\$0.43	\$0.05	\$0.18	\$0.22	\$0.12	\$1.00
	Inventory	\$0.00	\$0.00	\$0.01	\$0.05	\$0.01	\$0.07
	Subtotal:	\$1.06	\$0.19	\$0.41	\$0.56	\$0.28	\$2.50
	Total:	\$1.07	\$0.19	\$0.41	\$0.56	\$0.28	\$2.51

Figure 4-10. New Madrid M7.7 Earthquake Building Economic Losses



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

The results of the Wabash Valley M7.1 earthquake scenario are depicted in Tables 4-25, 4-26, and Figure 4-11. Hazus-MH estimates that approximately 558 buildings will be at least moderately damaged. This is over 19% of the buildings in the county. Twelve buildings would be damaged beyond repair.

The building related losses are approximately \$58 million dollars. It is estimated that 8% of the losses are related to the business interruption of the region. By far, the largest loss is sustained by the residential occupancies which make up over 67% of the total loss.

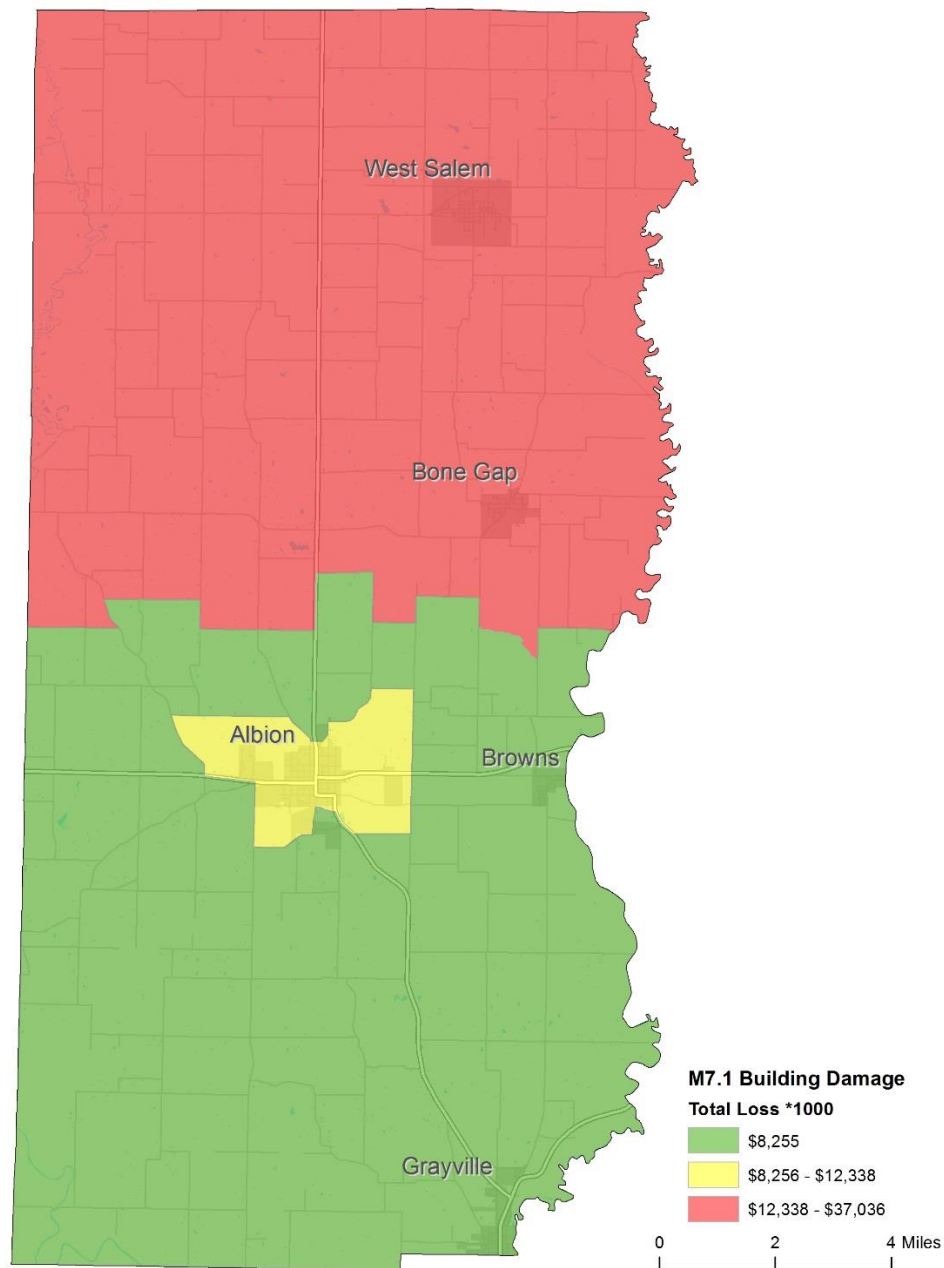
Table 4-25. Wabash Valley 7.1 Magnitude Earthquake Damage Estimates by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	2	0.13	1	0.12	1	0.26	1	0.42	0	0.42
Commercial	19	1.11	6	0.74	4	0.84	1	0.91	0	0.93
Educational	0	0	0	0	0	0	0	0	0	0
Government	1	0.05	0	0.05	1	0.12	0	0.15	0	0.17
Industrial	10	0.61	3	0.34	1	0.33	0	0.2	0	0.19
Other Residential	210	12.34	124	15.24	132	29.36	68	53.8	5	41.35
Religion	5	0.27	2	0.26	2	0.36	1	0.46	0	0.52
Single Family	1,456	85.47	679	83.25	309	68.73	55	44.06	7	56.43
Total:	1,703		815		450		126		12	

Table 4-26. Wabash 7.1 Magnitude Earthquake Estimates of Building Economic Losses (in Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Other	Total
Income Losses	Wage	\$0.00	\$0.02	\$0.32	\$0.04	\$0.14	\$0.52
	Capital-Related	\$0.00	\$0.01	\$0.19	\$0.02	\$0.03	\$0.25
	Rental	\$0.45	\$0.12	\$0.27	\$0.01	\$0.04	\$0.89
	Relocation	\$1.69	\$0.43	\$0.40	\$0.05	\$0.39	\$2.96
	Subtotal:	\$2.14	\$0.58	\$1.18	\$0.12	\$0.60	\$4.62
Capital Stock Losses	Structural	\$3.11	\$0.64	\$0.67	\$0.21	\$1.10	\$5.73
	Non-Structural	\$17.72	\$2.93	\$2.90	\$2.40	\$2.64	\$28.59
	Content	\$10.36	\$1.01	\$2.38	\$2.03	\$2.26	\$18.04
	Inventory	\$0.00	\$0.00	\$0.08	\$0.46	\$0.11	\$0.65
	Subtotal:	\$31.19	\$4.58	\$6.03	\$5.10	\$6.11	\$53.01
	Total:	\$33.33	\$5.16	\$7.21	\$5.22	\$6.71	\$57.63

Figure 4-11. Wabash Valley M7.1 Scenario Building Economic Losses



Vulnerability to Future Assets/Infrastructure for Earthquake Hazard

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

Suggestions for Community Development Trends

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

4.3.5 Winter Storm Hazard

Hazard Definition of Winter Storm Hazard

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

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

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

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

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

Severe cold involves ambient air temperatures that drop to 0°F or below. These extreme temperatures can increase the likelihood of frostbite and hypothermia. High winds during severe cold events can enhance the air temperature's effects. Fast winds during cold weather events can lower the wind chill factor (how cold the air feels on your skin). As a result, the time it takes for frostbite and hypothermia to affect a person's body will decrease.

Previous Occurrences of Winter Storm Hazard

The NCDC database reported 157 winter storm and extreme cold events for Edwards County since 1950. The most recent reported event occurred in January 2009 when a major winter storm dumped 6 to 10 inches of sleet and snow north of a line from East Cape Girardeau through Vienna to the confluence of the Wabash and Ohio Rivers. This resulted in at least two dozen roof collapses and very difficult driving conditions. South of that line at least one inch of ice accumulated with locally around 1.5 inches of ice. This resulted in a federal disaster declaration due to widespread tree damage and power outages. Table 4-27 identifies NCDC-recorded winter storm events that caused damage, death, or injury in Edwards County.

Table 4-27. NCDC-Recorded Winter Storms that Caused Damage, Death, or Injury in Edwards County

Location or County*	Date	Deaths	Injuries	Property Damage
Edwards County	2/14/2010	1	0	\$0
Edwards County	2/1/2008	0	1	\$0
Edwards County	1/26/2009	0	0	\$50,000
Total:		1	1	\$50,000

Geographic Location of Winter Storm Hazard

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

Hazard Extent of Winter Storm Hazard

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

Risk Identification of Winter Storm Hazard

Based on historical information, the probability of future winter storms in Edwards County is highly likely. However, the County ranked this natural hazard as a likely event considering the magnitude of these events resulting in death or injuries are lower for this area. The county should expect winter storms with varying magnitudes to occur in the future. Winter storms ranked as the number four hazard according to the Edwards County Planning Team's risk assessment.

<u>Risk Priority Index</u>				
Probability	x	Magnitude	=	RPI
3	x	4	=	12

Vulnerability Analysis of Winter Storm Hazard

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

Critical Facilities

All critical facilities are vulnerable to winter storms. A critical facility will encounter many of the same impacts as other buildings within the county. These impacts include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow. Table 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

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

Infrastructure

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

Potential Dollar Losses from Winter Storm Hazard

According to the NCDC, Edwards County has incurred approximately \$50,000 in damages relating to winter storms since 1950. NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event. As a result, the potential dollar losses for a future event cannot be reliably constrained; however, based on average property damage in the past decade, SIU estimates that Edwards County incurs property damages of approximately \$1,000 per year related to winter storms, including sleet/ice and heavy snow.

Vulnerability to Future Assets/Infrastructure for Winter Storm Hazard

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

Suggestions for Community Development Trends

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

4.3.6 Hazardous Material Storage and Transportation Hazard

Hazard Definition

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

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

Previous Occurrences of Hazardous Materials Storage and Transportation Hazard

Edwards 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.

The Illinois Emergency Management Agency maintains a comprehensive Hazardous Materials Incident Report Database for the State of Illinois. The database contains information on all Hazardous Materials Reports since 1987 but does not include an assessment of economic and property losses in terms of dollars of damage. The database reported 124 incidents in Edwards County as of February 2015. The most recent

event occurred in September 2014 following an incident in Albion when underground storage tanks released 10,000 gallon of gasoline and 6,000 gallons of diesel. The remediation included removing the underground storage tank. Additional details of individual hazard events are on the IEMA website.

Industries regulated by The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) are required to report incidents which meet or exceed established reporting criteria. The data for reported incidents are available on the PHMSA website via the U.S. Department of Transportation Hazmat Intelligence Portal. The database reported 2 incidents in Edwards County as of February 2015. Table 4-28 identifies PHMSA reported incidents that caused damage, death, or injury in Edwards County. Additional details of individual hazard events are on the PHMSA website.

Table 4-28. Selected PHMSA-Recorded Hazardous Material Incidents that Caused Damage, Death, or Injury

Location	Date	Mode of Transportation	Hazardous Material Class	Death	Injuries	Damages*
Albion	9/4/1984	Highway	Naphtha Petroleum	0	0	0
Browns	8/25/1986	Rail	Ammonia Anhydrous	0	0	0
Totals:				0	0	0

Source: U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration

* Damages includes the cost of the material lost, carrier damage, property damage, response costs, and remediation cleanup costs.

Geographic Location of Hazardous Materials Storage and Transportation Hazard

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

Hazard Extent of Hazardous Materials Storage and Transportation Hazard

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

Risk Identification of Hazardous Materials Storage and Transportation Hazard

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

<u>Risk Priority Index</u>				
Probability	x	Magnitude	=	RPI
3	x	3	=	9

Vulnerability Analysis for Hazardous Materials Storage and Transportation Hazard

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

Critical Facilities

All critical facilities and communities within the county are at risk. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure due to fire or explosion and loss of function of the facility (e.g., a damaged police station can no longer serve the community). Table 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

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

Infrastructure

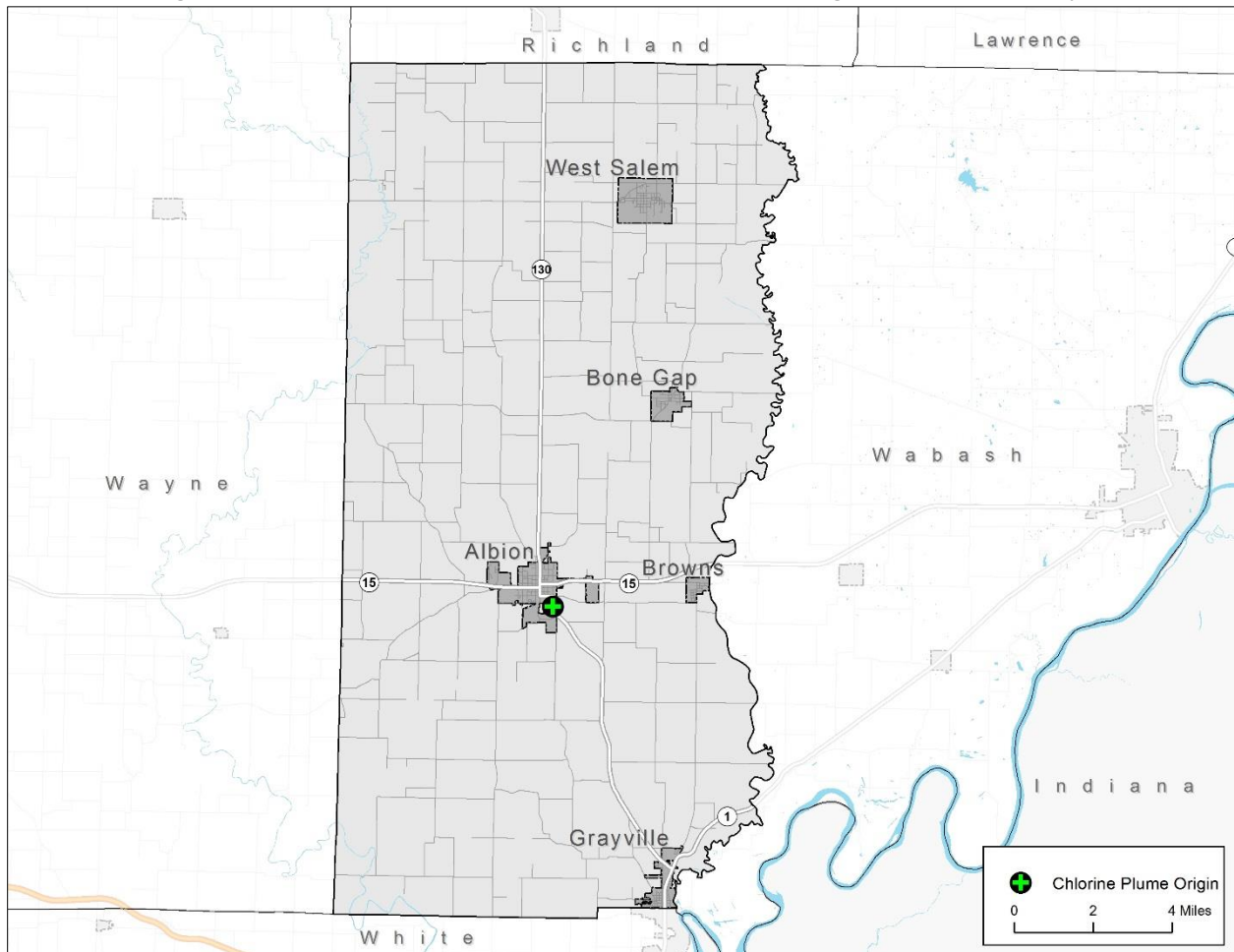
During a hazardous material release, the types of potentially impacted infrastructure include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan, it is important to emphasize that a hazardous materials release could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

ALOHA Hazardous Chemical Release Analysis

The U.S. Environmental Protection Agency's ALOHA (Areal Locations of Hazardous Atmospheres) model was used to assess the impacted area for chlorine release at Illinois State Route 130 near Champion Laboratories, Inc. ALOHA is a computer program designed for response to chemical accidents, as well as emergency planning and training. The Edwards County Planning Team selected this location because Route 130 has frequent truck traffic. Chlorine is a common chemical transported via truck and rail.

For the chlorine scenario, SIU assumed average atmospheric and climatic conditions for the winter season with a breeze from the south-southeast. SIU considered the seasonal conditions upon the request of the Planning Team and obtained average monthly conditions for the Lawrenceville Airport from NOAA's Monthly Weather Summary. Figure 4-12 depicts the plume origin of the modeled hazardous chemical release in Edwards County. The ALOHA atmospheric modeling parameters for the chlorine release, depicted in Figure 4-13, were based upon a south-southeasterly speed of 10 miles per hour. The temperature was 53°F with 75% humidity and a cloud cover of five-tenths skies. SIU used average weather conditions for the month of February reported from NOAA for wind direction, wind speed, and temperature to simulate winter conditions.

Figure 4-12. ALOHA Modeled Hazardous Chemical Plume Origin in Edwards County



The source of the chemical spill is a horizontal, cylindrical-shaped tank. The diameter of the tank was set to 8 feet and the length set to 33 feet (12,408 gallons). At the time of its release, it was estimated that the tank was 75% full. The chlorine in this tank is in its liquid state. This release was based on a leak from a 2.5-inch-diameter hole, 12 inches above the bottom of the tank. According to these ALOHA parameters, this scenario would release approximately 9,090 pounds of material per minute. Figure 4-13 shows the plume modeling parameters in greater detail.

Figure 4-13. ALOHA Modeling Parameters for Chlorine Release

SITE DATA:
 Location: ALBION, ILLINOIS
 Building Air Exchanges Per Hour: 0.97 (unsheltered single storied)
 Time: February 13, 2015 1133 hours CST (user specified)

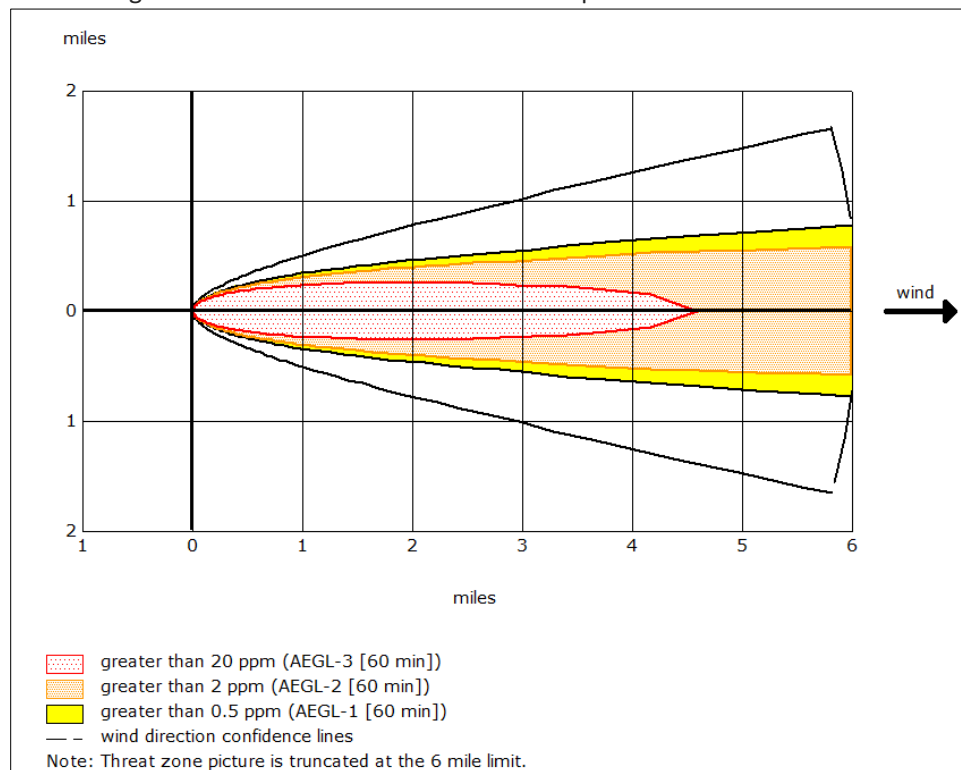
CHEMICAL DATA:
 Chemical Name: CHLORINE Molecular weight: 70.91 g/mol
 AEGL-1 (60 min): 0.5 ppm AEGL-2 (60 min): 2 ppm AEGL-3 (60 min): 20 ppm
 IDLH: 10 ppm
 Ambient Boiling Point: -29.9° F
 Vapor Pressure at Ambient Temperature: greater than 1 atm
 Ambient Saturation Concentration: 1,000,000 ppm or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

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
 Wind: 10 miles/hour from SSE at 10 feet
 Ground Roughness: open country Cloud Cover: 5 tenths
 Air Temperature: 53° F Stability Class: D
 No Inversion Height Relative Humidity: 75%

SOURCE STRENGTH:
 Leak from hole in horizontal cylindrical tank
 Non-flammable chemical is escaping from tank
 Tank Diameter: 8 feet Tank Length: 33 feet
 Tank volume: 12,408 gallons
 Tank contains liquid Internal Temperature: 53° F
 Chemical Mass in Tank: 55.9 tons Tank is 75% full
 Circular opening Diameter: 2.5 inches
 opening is 12 inches from tank bottom
 Release Duration: 18 minutes
 Max Average Sustained Release Rate: 9,090 pounds/min
 (averaged over a minute or more)
 Total Amount Released: 103,601 pounds
 Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

Using the parameters in Figure 4-13, approximately 103,601 pounds of material would be released. The image in Figure 4-14 depicts the plume footprint generated by ALOHA. As the substance moves away from the source, the level of substance concentration decreases. Each color-coded area depicts a level of concentration measured in parts per million.

Figure 4-14. ALOHA Generate Plume Footprint of Chlorine Scenario



The AEGL-3 threat zone travels 4.5 miles and the remaining threat zones extend greater than 6 miles from the point of release. The dashed line depicts the level of confidence within the confines of the entire plume footprint. The ALOHA model is 95% confident that the release will stay within this boundary.

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

AEGL-1: the airborne concentration, expressed as parts per million or milligrams per cubic meter (ppm or mg/m³) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL-2: the airborne concentration (expressed as ppm or mg/m³) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL-3: the airborne concentration (expressed as ppm or mg/m³) of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

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

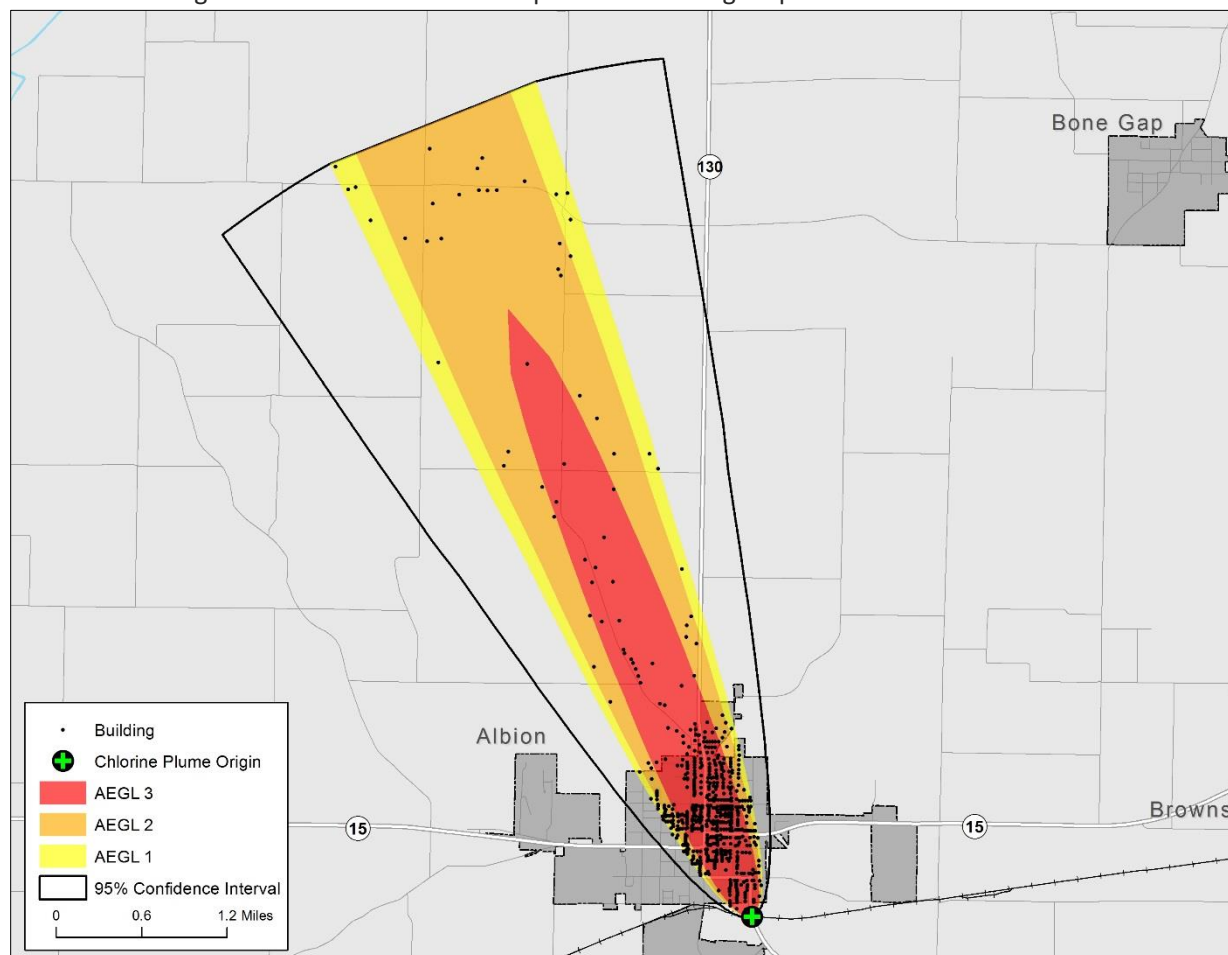
Results for Chlorine Release

An estimate of property exposed to the chlorine spill was calculated by using the building inventory and intersecting these data with each of the AEGL levels (AEGL 3: ≥ 4800 ppm, AEGL 2: ≥ 1200 ppm and AEGL 1: ≥ 250 ppm). The Edwards County assessment and parcel data was utilized for this analysis. There are approximately 648 buildings within the chlorine plume. It should be noted that the results should be interpreted as potential degrees of loss rather than exact number of buildings damaged to the chlorine release. Table 4-29 lists the total amount of building exposure to each AEGL zone. Figure 4-15 depicts the chlorine spill footprint and location of the buildings exposed. The GIS overlay analysis estimates that the full replacement cost of the buildings exposed to the chlorine plume is approximately \$320 million.

Table 4-29. Estimated Building Exposure as a Result of the Chlorine Release

Occupancy	Building Exposure			Number of Buildings		
	AEGL 1	AEGL 2	AEGL 3	AEGL 1	AEGL 2	AEGL3
Residential	\$4,449,218	\$8,826,413	\$19,138,250	48	92	415
Commercial	\$617,400	\$111,927,000	\$167,891,445	9	25	45
Industrial	\$0	\$0	\$7,491,619	0	0	2
Agricultural	\$287,970	\$406,470	\$75,992	2	9	1
Total:	\$5,354,588	\$121,159,883	\$194,597,306	59	126	463

Figure 4-15. ALOHA Plume Footprint and Buildings Exposed to Chlorine Release



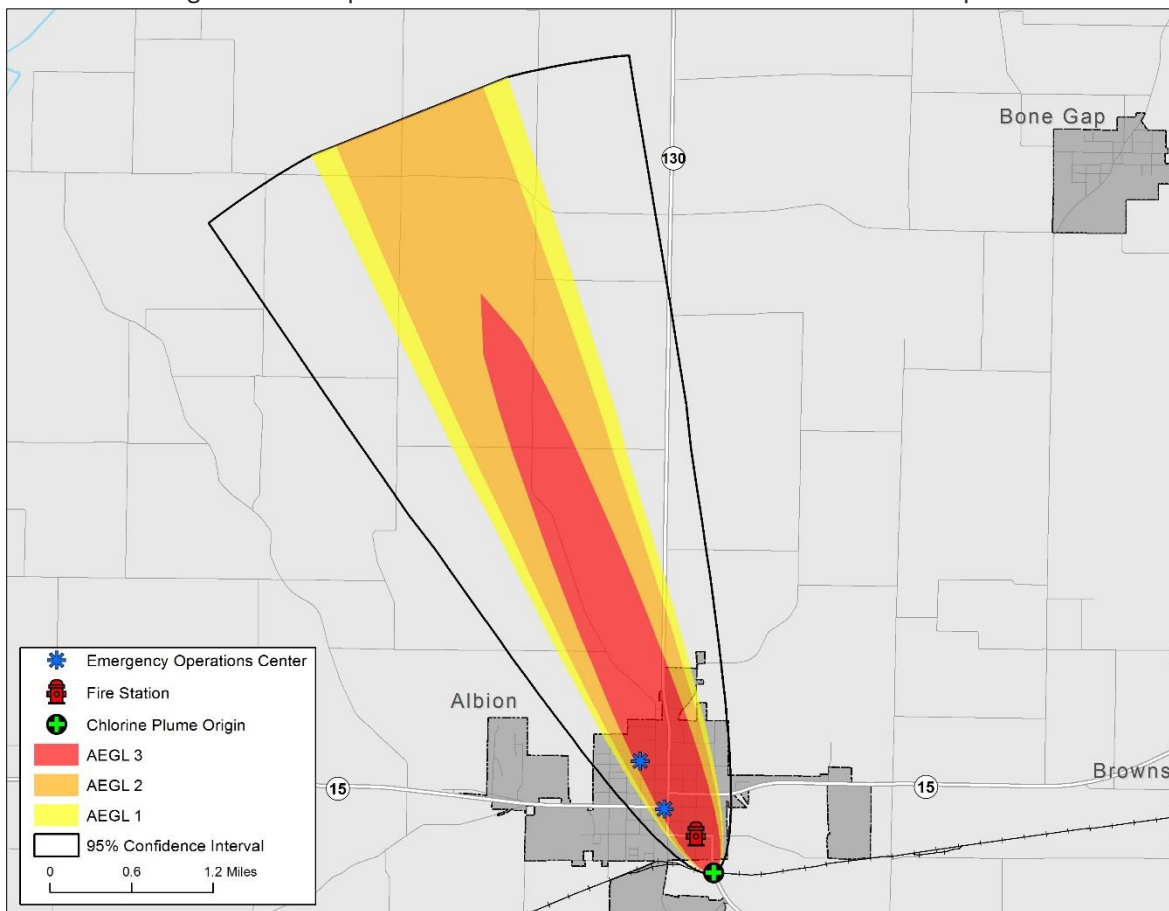
Essential Facilities Damage

There are three essential facilities within the limits of the chlorine scenario. Table 4-30 and Figure 4-16 identifies the affected facilities.

Table 4-30. Essential Facilities within the Chlorine Plume Footprint

Essential Facility	Facility Name
EOCs	Edwards County EOC
	Mobile Command Center
Fire Departments	Albion Fire Department

Figure 4-16. Map of Essential Facilities within the Chlorine Plume Footprint



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

Edwards County is expected to see future economic expansion within the city limits of Albion. These areas are particularly vulnerable to chemical releases because of transportation of hazardous materials along railways, and Illinois Routes 15 and 130.

Suggestion for Community Development Trends

Because the hazardous material hazard event may occur anywhere within the county, future development is susceptible to the hazard. The major transportation routes and the industries located in Edwards County pose a threat of dangerous chemicals and hazardous materials release. Regional particularly vulnerable are within the city limits of Albion within close proximity to transportation corridors such as Illinois Routes 15 and 130.

4.3.7 Flooding Hazard

Hazard Definition for Flooding

Flooding is a significant natural hazard throughout the United States. The type, magnitude, and severity of flooding are functions of the magnitude and distribution of precipitation over a given area, the rate at which precipitation infiltrates the ground, the geometry and hydrology of the catchment, and flow

dynamics and conditions in and along the river channel. Floods are classified as one of two types in this plan: upstream floods or downstream floods. Both types of floods are common in Illinois.

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

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

Previous Occurrences of Flooding

The NCDC database reported 32 flooding events in Edwards County. The most recent recorded event was in December 2013, when a slow-moving cold front passed across the region. The ground was already moist from snowmelt in the wake of the early December winter storm. Storm total rainfall amounts ranged from 4 to 8 inches, with isolated higher amounts around 9 inches in the southern tip of the state, from the city of Cairo to Massac and Gallatin Counties. Ditches and creeks quickly spilled out onto roadways and into nearby fields. There were numerous road closures and water rescues as waters continued to rise. A trained spotter measured 5.9 inches of rain in about 24 hours. Considerable flooding of low-lying areas was reported. Table 4-31 identifies NCDC-recorded flooding events that caused damage, death, or injury in Edwards County.

Table 4-31. NCDC-recorded Flooding Events that caused Death, Damage or Injury in Edwards County

Location or County*	Date	Deaths	Injuries	Property Damage
Albion	4/28/1996	0	0	\$50,000
Edwards County	4/15/1998	0	0	\$10,000
Edwards County	5/12/2002	0	0	\$20,000
Edwards County	5/27/2004	0	0	\$25,000
Edwards County	7/16/2004	0	0	\$2,000
Edwards County	1/5/2005	0	0	\$15,000
Edwards County	3/18/2008	0	0	\$10,000
Edwards County	5/1/2011	0	0	\$30,000
Albion	7/7/2011	0	0	\$50,000
Total:		0	0	\$212,000

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

The Illinois Emergency Management Agency and Illinois Department of Natural Resources were contacted to determine the location of repetitive loss structures in Edwards County. Records indicate that there are no repetitive loss structures within the county. FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the NFIP that has suffered flood loss damage on two or more occasions during a 10-year period that ends on the date of the second loss, in which the cost to repair the flood damage is $\geq 25\%$ of the market value of the structure at the time of each flood loss.

Geographic Location of Flooding

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

The primary sources of river flooding in Edwards County are Big and Village Creeks located in the west portion of the county, and Bonpas Creek located along the eastern boundary of the county. Big and Village Creeks are tributaries to the Little Wabash River, and Bonpas Creek is a tributary to the Wabash River. Little Wabash River can flood the southwestern corner of county. The Wabash River can flood the southeastern corner of the county in the area of Grayville. River flooding generally impacts the village of Browns (Bonpas Creek), the village of Grayville (Wabash River), and unincorporated areas along the eastern and western boundaries of the county. Significant floods on the Wabash River can flood Illinois State Route 1 northeast of Grayville. Illinois State Route 15 can be flooded by Bonpas Creek in the area of Browns.

Flash flooding in Edwards County typically occurs in low-lying areas throughout the county. Within incorporated areas of the county flash flooding and urban flooding are best documented in the town of Albion, village of Browns, and the village of West Salem. In and around Albion, a few side streets, along with Illinois State Route 130 on the north side of town, have been flooded during high intensity rainfall events. Within the village of Browns, flash floods have resulted in damage to several structures in an area of poor drainage along Rail Road Street. Street flooding related to poor drainage has also been documented in West Salem. Within the unincorporated areas of the county, flash floods have resulted in the flooding of several county roads and Illinois State Routes 15 and 130.

Hazard Extent for Flooding

All floodplains are susceptible to flooding in Edwards County. The floodplain of concern is for the 100-year flood event which is defined as areas that have a 1% chance of flooding in any given year. However, flooding is dependent on various local factors including, but not limited to, impervious surfaces, amount of precipitation, river-training structures, etc. The 100-year flood plain covers approximately 15% of Edwards County

Vulnerability Analysis for Flooding

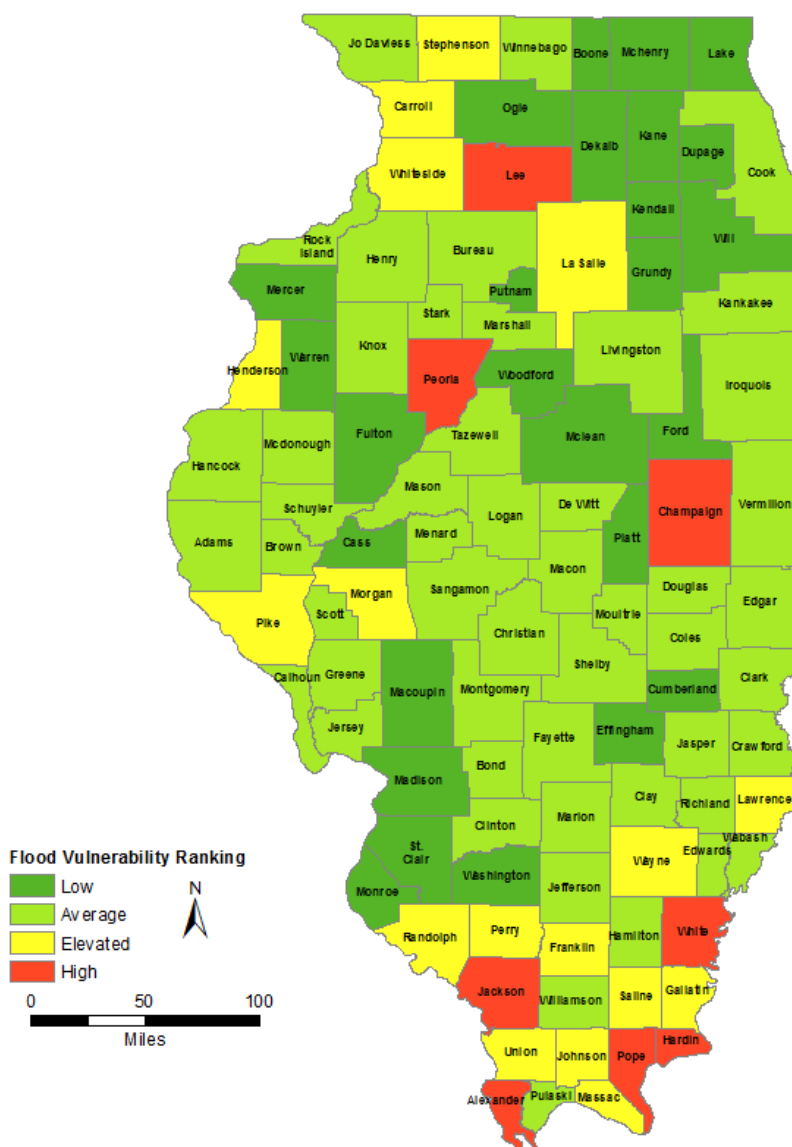
The 2013 Illinois Hazard Mitigation Plan analyzed a variety potential natural hazards including vulnerability to flooding. A Flood Vulnerability Index (FVI) was calculated for all counties and jurisdictions in Illinois. FVI combines Hazus-based estimates of flood exposure and loss with the widely utilized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

vulnerability index. Edwards County has an Average Flood Vulnerability Rating and ranks 47 out of the 102 Counties in Illinois in terms of loss estimation according to Hazus-MH for floods. Table 4-32 lists the jurisdictional Flood Vulnerability Ratings for Edwards County. One jurisdiction in Edwards County surpasses an average Flood Vulnerability Rating: B.

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

Jurisdiction	State Ranking	Flood Vulnerability Rating
Browns	215	Elevated
Grayville	271	Average

Figure 4-17. County Flood Vulnerability Rating for Illinois



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

Risk Identification for Flood Hazard

Based on historical information and the Flood Vulnerability Rating, future occurrence of flooding in Edwards County is likely. However, the County ranked this natural hazard as a possible event considering the magnitude of these events resulting in death or injuries are lower for this area. According to the Risk Priority Index (RPI) and County input, flooding is ranked as the number six hazard.

<u>Risk Priority Index</u>				
Probability	x	Magnitude	=	RPI
2	x	4	=	8

Critical Facilities

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

Building Inventory

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

Infrastructure

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

Hazus-MH Flood Analysis

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

According to this analysis, there are 223 buildings located in the Edwards County 100-year floodplain. The estimated damage to these structures is \$131 million. It should be noted that the results should be interpreted as degrees of loss rather than exact number of buildings exposed to flooding. Figure 4-18 depicts the building inventory within the 100-year floodplain and Table 4-33 shows the loss estimates by occupancy class.

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

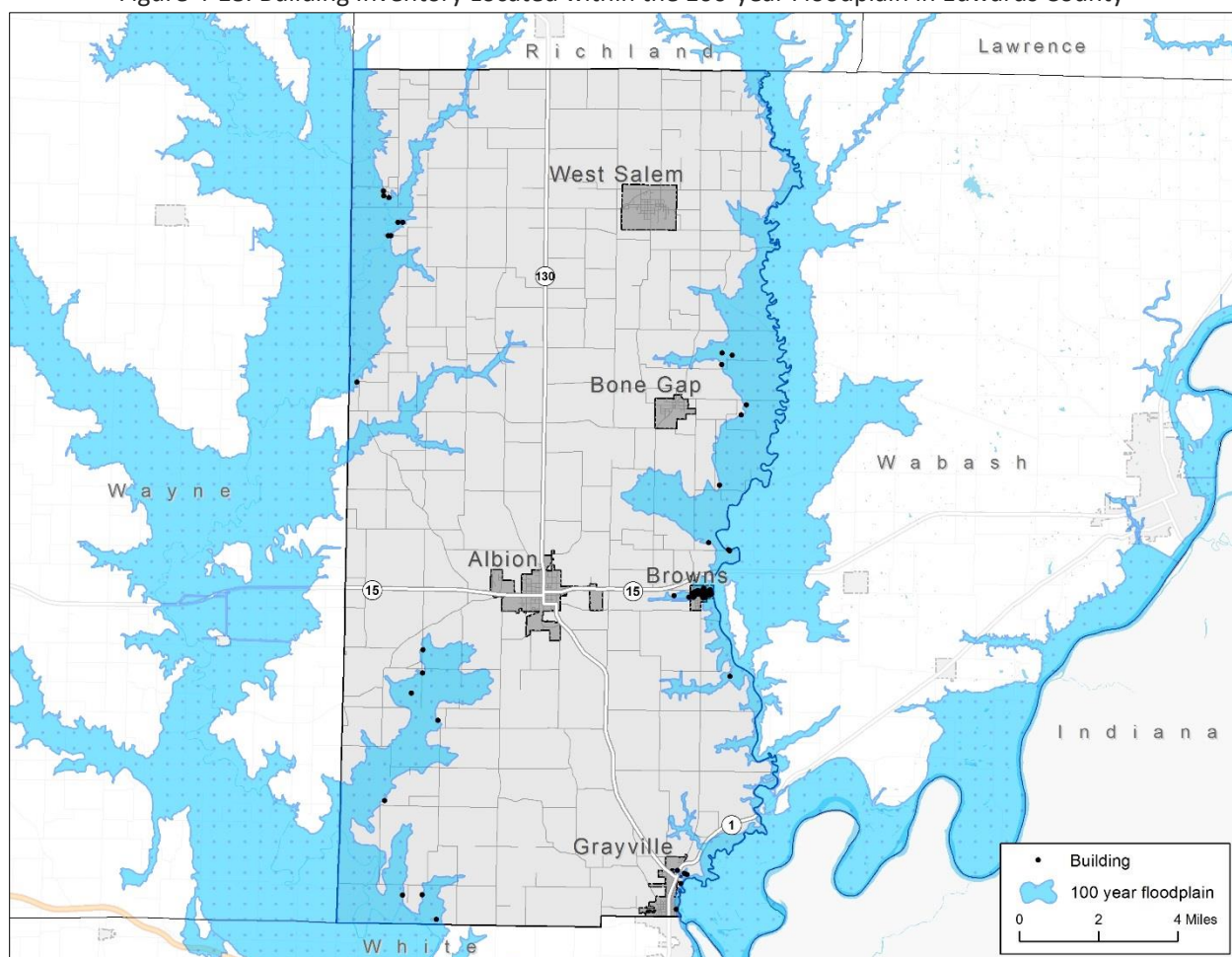


Table 4-33. Estimated Flood Losses within the 100-year Floodplain

Occupancy Class	Number of Structures	Estimated Building Related Losses
Residential	61	\$986,483
Commercial	18	\$137,540,770
Industrial	0	\$0
Agricultural	10	\$86,102
Total:	89	\$138,613,355.90

Essential Facilities Damage

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

Vulnerability Analysis to Future Assets/Infrastructure

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

Suggestions for Community Development Trends

Reducing floodplain development is crucial to reducing flood-related damages. Areas with recent development may be more vulnerable to drainage issues. Storm drains and sewer systems are usually most susceptible to drainage issues. Damage to these can cause back-up of water, sewage, and debris into homes and basements, causing structural and mechanical damage as well as creating public health hazards and unsanitary conditions.

4.3.8 Drought and Extreme Heat Hazard

Hazard Definition for Drought Hazard

Drought is a normal climatic phenomenon that can occur across the state of Illinois and within Edwards County. The meteorological condition that creates a drought is below-normal rainfall. However, excessive heat can lead to increased evaporation, which enhances 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 longer).

The severity of a drought depends on location, duration, and geographical extent. Additionally, drought severity depends on the water supply, usage demands by human activities, vegetation, and agricultural operations. Droughts will affect the quality and quantity of crops, livestock, and other agricultural assets. Droughts 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.

Drought conditions are often accompanied by extreme heat, which is defined as temperatures that exceed the average high for the area by 10°F or more and last for several weeks. Such extreme heat can have severe implications for humans. Below are 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, which estimates 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.

Previous Occurrences for Drought and Extreme Heat

The NCDC database reported 54 drought/heat wave events in Edwards County since 1950. The most damaging recorded event occurred in September 2007 when a prolonged summer drought gradually worsened becoming severe by early September. Many parts of southern Illinois received little or no measurable rainfall in July. The three-month period from June through August of 2002 was the second driest such period on record. The main effect of the drought was on agriculture. Crop loss estimates totaled around 53 million dollars in southern Illinois. It should be noted that Edwards County had recorded events of drought in the Fall of 2010 and in the Summer of 2012 but did not result in any damages, injuries, or lost. Table 4-34 identifies NCDC-recorded drought/heat wave events that caused damage, death, or injury in Edwards County.

Table 4-34. NCDC-recorded Extreme Heat Events that caused Death, Crop Damage or Injury in Edwards County

Location or County*	Date	Deaths	Injuries	Crop Damage
Edwards County	9/1/2002	0	0	\$53,000,000
Edwards County	9/1/2007	0	0	\$3,450,000
Total:		0	0	\$56,450,000

Geographic Location for Drought and Extreme Heat

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

Hazard Extent for Drought and Extreme Heat

The extent of droughts or extreme heat varies both depending on the magnitude and duration of the heat and the range of precipitation.

Risk Identification for Drought and/or Extreme Heat

Based on historical information, the occurrence of future droughts and/or prolonged extreme heat is highly likely. However, the County ranked this natural hazard as a possible event considering the magnitude of these events resulting in deaths or injuries are lower for this area. The County should expect high winds, hail, and lightning of widely varying magnitudes in the future. According to the Edwards County Planning Team's assessment, drought and/or extreme heat are ranked as the number seven

<u>Risk Priority Index</u>				
Probability	x	Magnitude	=	RPI
4	x	2	=	8

hazard.

Vulnerability Analysis for Drought and Extreme Heat

Drought and extreme heat are a potential threat across the entire county; therefore, the county is vulnerable to this hazard and can expect impacts within the affected area. According to FEMA, approximately 175 Americans die each year from extreme heat. Young children, elderly, and hospitalized populations have the greatest risk. The entire population and all buildings are at risk. To accommodate this risk, this plan considers all buildings located within the county as vulnerable. Tables 4-7 and 4-8 display

the existing buildings and critical infrastructure in Edwards County. Even though the exact areas affected are not known, a discussion of the potential impact is detailed below.

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 little or no damage. Potential 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 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

Table 4-8 lists the building exposure in terms of types and number of buildings for the entire county. The buildings within the county can expect similar impacts 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 potentially impacted infrastructures include roadways, utility lines/pipes, railroads, and bridges. The risk to these structures are primarily associated with fire, which could result from hot, dry conditions. Since the county's entire infrastructure is vulnerable, damage to any infrastructure is possible. The impacts to these items include: impassable roadways; broken or failed utility lines (e.g., loss of power or gas to community); or impassable railways. Bridges could become impassable, causing risk to motorists.

Potential Dollar Losses from Drought and Extreme Heat

According to the NCDC, Edwards County has experienced \$56 million in crop damages relating to drought and extreme heat event storms since 1950. NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event. As a result, the potential dollar losses for a future event cannot be reliably constrained.

Vulnerability to Future Assets/Infrastructure from Drought/Extreme Heat Hazard

Future development will remain vulnerable to droughts. 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 densely populated areas put 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.

Suggestion of Community Development Trends

Because droughts and extreme heat are regional in nature, future development is susceptible to drought. 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.

4.3.9 Dam and Levee Failure

Hazard Definition for Dam and Levee Failure

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

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

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

Previous Occurrences of Dam and Levee Failure

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

Geographic Location of Dams and Levees in Edwards County

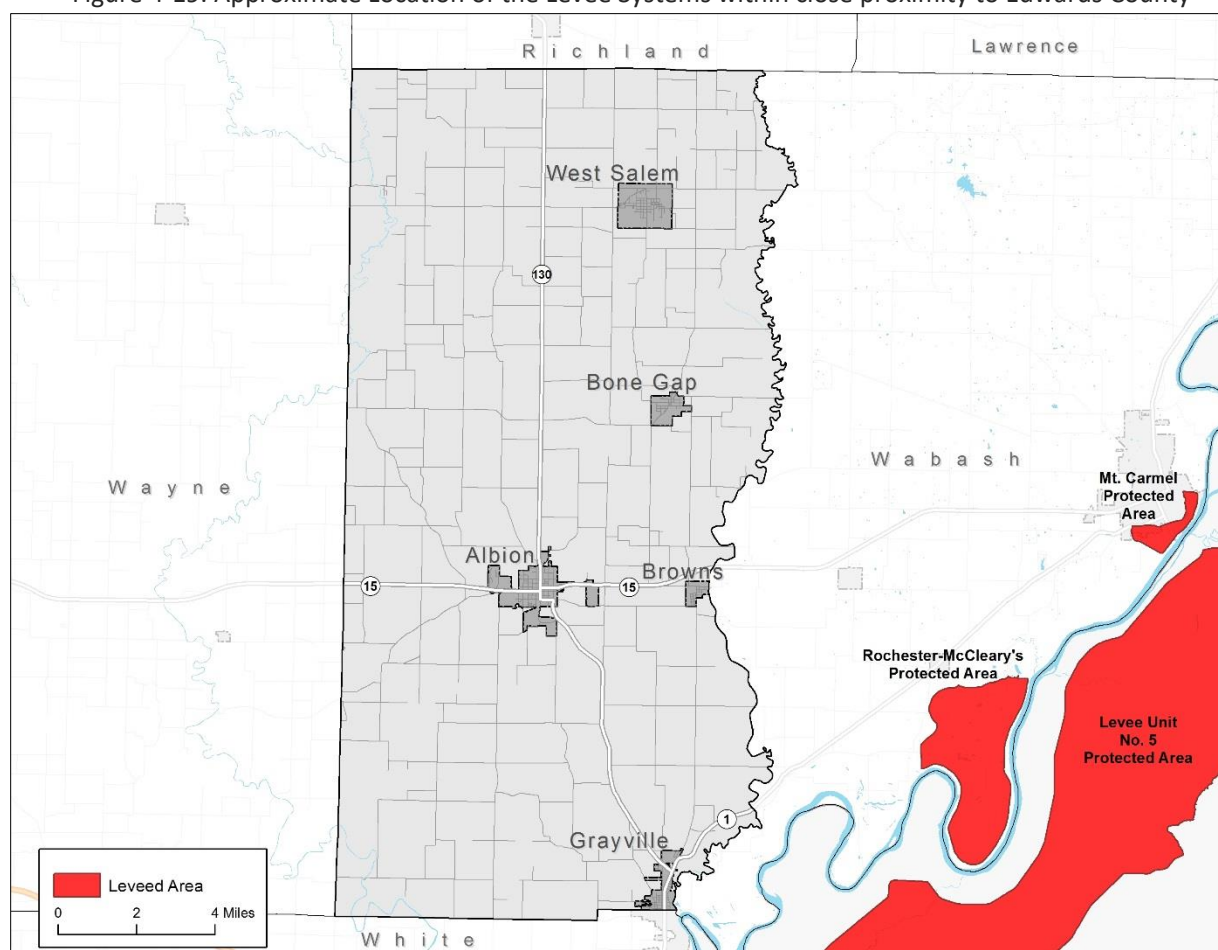
A review of the US Army Corps of Engineers National Levee Database and IDNR records did not reveal any levee systems within Edwards County. However, there are three levee systems within close proximity to Edwards County on the Wabash River. Table 4-35 lists the levees within close proximity to Edwards County and their respective U.S. Army Corps of Engineers (USACE) inspection rating. The approximate location of the levee systems are shown in Figure 4-19.

Table 4-35. Edwards County Levee Inventory

Levee System	Levee Area Acreage	USACE Levee Inspection Rating*
Rochester-McCleary's Bluff Levee System	4823.40	Minimally Acceptable
Levee Unit No. 5 Levee System	50583.45	Minimally Acceptable
Mt. Carmel Levee System	550.45	Minimally Acceptable

*Each levee segment receives an overall segment inspection rating of Acceptable, Minimally Acceptable, or Unacceptable. If a levee system comprises of one or more levee segments (if there are different levee sponsors for different parts of the levee) then the overall levee system rating is the lowest of the segment ratings.

Figure 4-19. Approximate Location of the Levee Systems within close proximity to Edwards County



The U.S. Army Corps of Engineers maintains the National Inventory of Dams (NID) which identified nine dams in Edwards County. According to NID records, zero of the dams in Edwards County are classified as high hazard and zero dams have Emergency Action Plans (EAP). Table 4-26 lists the dams located in Edwards County and their respective classification level.

Table 4-36. Edwards County Dam Inventory

Dam Name	Stream/River	Hazard Rating	EAP
Krajec Lake Dam	Trib. Walser Creek	L	N
Albion Moose Lake Dam	Trib. Village Creek	S	N
West Salem New Reservoir Dam	Trib. Crooked Creek	S	N
Stumpy Hill Farm Dam	Trib. Harper Creek	L	N
Harrison Lake Dam	Trib. Crooked Creek	L	N

Dam Name	Stream/River	Hazard Rating	EAP
Wanboro Lake Dam	Unknown	Unknown	N

Hazard Extent for Dam and Levee Failure

Dams assigned a low hazard potential classification 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. A significant hazard classification means that failure or incorrect operation results in no probable loss of human life; however, dam or levee failure can cause economic loss, environmental damage, and disruption of lifeline facilities. 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. A high hazard potential classification means that failure or incorrect operation has the highest risk to cause loss of human life and to significantly damage buildings and infrastructure.

According to NID records, zero dams in Edwards County are classified as high hazard and zero dams have Emergency Action Plans (EAP). An EAP is not required by the State of Illinois but is recommended in the 2003 Illinois Dam Safety & Inspection Manual.

Risk Identification for Dam and Levee Failure

Based on operation and maintenance requirements and local knowledge of the dams and levees in Edwards County, the probability of failure is possible. However, the warning time and duration of a dam failure event would be very short. Based on input from the Planning Team, future occurrence of the dam failure event in Edwards County is possible. According to the Risk Priority Index (RPI) and County input, dam and levee failure is ranked as the number eights hazard.

<u>Risk Priority Index</u>				
Probability	x	Magnitude	=	RPI
2	x	1	=	2

Vulnerability Analysis for Dam and Levee Failure

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

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

Critical Facilities

All critical facilities within the floodplain are vulnerable to dam and levee failure. An essential facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility, and loss of facility functionality (e.g., a damaged police station cannot serve the community). Table 4-7 lists the types and number of critical facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

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

Infrastructure

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

Hazus-MH Flood Analysis

See section 4.3.2 Flooding Hazard for the results of the Hazus-MH Flood Analysis.

Vulnerability to Future Assets/Infrastructure for Dam and Levee Failure

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

Suggestions for Community Development Trends

Reducing floodplain development is crucial to reducing flood-related damages. Areas with recent development may be more vulnerable to drainage issues. Storm drains and sewer systems are usually most susceptible to drainage issues. Damage to these can cause back-up of water, sewage, and debris into homes and basements, causing structural and mechanical damage as well as creating public health hazards and unsanitary conditions.

Section 5. Mitigation Strategies

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

5.1 Existing Hazard Mitigation Policies, Programs and Resources

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

5.1.1 Successful Mitigation Projects

To be successful, mitigation must be a recurrent process that is continually striving to lessen the impact of natural hazards within the county. Edwards County has made great strides to improve its ability to mitigation against future hazards. The following are projects that have been successfully completed prior to the development of the Edwards County 2017 Multi-Hazard Mitigation Plan.

Mitigation Project Title

Establish 911 – Reverse 911/County

Mitigation Project Title

Purchase weather radios for critical facilities / Grayville only

5.1.2 National Flood Insurance Program

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

NFIP Status

In Edwards County, three out of the six incorporated communities participate in the NFIP. The Village of Browns has been added since the initial 2009 MHMP. Table 5-1 includes a summary of information for Edwards County participation in the NFIP. Edwards County will continue to provide information to its non-participating jurisdictions regarding the benefits of the National Flood Insurance Program.

Two communities, Browns and Grayville, have an effective FIRM and participate in the NFIP. However, Browns as well as the rural county are mapped as (M), No Elevation Determined. This means that there is not a specified Base Flood Elevation (BFE), the point where the 100 year flood would reach, and the

elevation where building is specified. By not having this, the premiums on property are higher and there is a greater risk of flooding without a specified flood elevation.

Table 5-1: Information on Edwards County's Participation in the NFIP

Community	Participate in the NFIP	Initial Flood Hazard Boundary Map Identified	Initial FIRM Identified	Current Effective FIRM Date
Edwards County	Yes	10/27/78	12/07/84	12/07/84 (M)
Browns	Yes	11/15/74	8/24/84	8/24/84 (M)
Grayville	Yes	05/31/74	8/24/84	8/24/84

NFIP status and information are documented in the Community Status Book Report updated on 03/03/2015.

NSFHA – No Special Flood Hazard Area

(M) – No Elevation Determined – All Zone A, C and X

Flood Insurance Policy and Claim Statistics

As of December 2014, eleven households paid flood insurance, insuring \$1,455,700 in property value. The total premiums collected for the policies amounted to \$6,989. Since the establishment of the NFIP in 1978, five flood insurance claims were filed in Edwards County, totaling in \$17,807 in payments. Table 5-2 summarizes the claims since 1978.

Table 5-2: Policy and Claim Statistics for Flood Insurance in Edwards County

Community	Total Losses	Closed Losses	Open Losses	CWOP Losses	Payments
Edwards County	1	0	0	1	0.00

*NFIP policy and claim statistics since 1978 until the most recently updated date of 12/31/2014. Closed Losses refer to losses that are paid; open losses are losses that are not paid in full; CWOP losses are losses that are closed without payment; and total losses refers to all losses submitted regardless of status. Lastly, total payments refer to the total amount paid on losses.

Repetitive Loss Structures

Edwards County has no repetitive loss structures. FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the NFIP that has suffered flood loss damage on two or more occasions during a 10-year period that ends on the date of the second loss, in which the cost to repair the flood damage is $\geq 25\%$ of the market value of the structure at the time of each flood loss. Currently there are over 122,000 Repetitive Loss properties nationwide.

Community Rating System Status

Edwards County and its 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. More than 1,200 communities from all 50 states participate in the CRS. Although joining the CRS is free, completing CRS activities and maintaining a CRS rating will require a degree of commitment from the community, including dedicating staff. Joining the CRS could be one way Edwards County or its incorporated communities improve their existing floodplain management policies and further reduce the flood hazard risk.

5.1.3 Jurisdiction Ordinances

Hazard Mitigation related ordinances, such as zoning, burning, or building codes, have the potential to reduce the risk from known hazards. These types of regulations provide many effective ways to address resiliency to known hazards. Table 5-3 list Edwards County's current ordinances that directly pertain, or can pertain, to hazard mitigation. It is important to evaluate the local building codes and ordinances to determine if they have the ability to reduce potential damages caused by future hazards. The Edwards County Planning Team worked to identify gaps in the current list of ordinances and suggested changes/additions in Section 5.3.

Table 5-3: Edwards County's Jurisdiction Ordinances

Community	Zoning	Storm water Mgmt	Flood	Subdivision Control	Burning	Seismic	Erosion Mgmt	Land Use Plan	Building Codes
Edwards County	N	N	State Model (Current)	N	N	N	N	N	N
Albion	N	N	N	N	Y	N	N	N	2011
Bone Gap	N	N	N	N	N	N	N	N	N
Browns	N	N	State Model (Current)	N	N	N	N	N	N
Grayville	1986	2011	2011	N	2001	N	N	1968	2011
West Salem	N	Y	N	N	Y	N	N	N	Y

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

5.1.4 Fire Insurance Ratings

By classifying communities' ability to suppress fires, the Insurance Service Office (ISO) Public Protection Classification Program helps communities evaluate their public fire-protection services. The program provides a countrywide standard that helps fire departments in planning and budgeting for facilities, equipment, and training. Information is collected on municipal fire-protection efforts in communities throughout the United States. In each of those communities, ISO analyzes the relevant data using a Fire Suppression Rating Schedule. Ratings are assigned from 1 to 10 where Class 1 generally represents superior property fire protection, and Class 10 indicates that the area's fire-suppression program doesn't meet ISO's minimum criteria. There are five Fire Protection Districts servicing Edwards County. Table 5-4 displays each Fire Protection District's insurance rating and total number of employees.

Table 5-4: Edwards County Fire Departments, Insurance Ratings, and Number of Employees/Volunteers

Fire Department	Fire Insurance Rating	Number of Employees
AFD - Albion	4	19
WSFD - West Salem	7	21
LWFPD – Little Wabash	7	16
Bone Gap	8	20
Browns	5	25

5.2 Mitigation Goals

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

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

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

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

Objective: Minimize the amount of infrastructure exposed to hazards.

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

Objective: Improve emergency sheltering in Edwards County.

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

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

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

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

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

Objective: Raise public awareness on hazard mitigation.

Objective: Improve education and training of emergency personnel and public officials.

5.3 Multi-Jurisdictional Mitigation Strategies

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

Table 5-5. FEMA's STAPLEE Evaluation Criteria

S ocial	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 echnical	Mitigation actions are technically most effective if they provide a long-term reduction of losses and have minimal secondary adverse impacts.
A ministrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P olitical	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 egal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E conomic	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 nvironmental	Sustainable mitigation actions that do not have an adverse effect on the environment, comply with federal, state, and local environmental regulations, and are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

Table 5-6 contains a comprehensive range of specific mitigation actions and projects for each jurisdiction, with an emphasis on new and existing buildings and infrastructure. At least two identifiable mitigation action items have been addressed for each hazard listed in the risk assessment. Each of the incorporated communities within and including Edwards County was invited to participate in brainstorming sessions in which goals, objectives, and strategies were discussed and prioritized. Each participant in these sessions was armed with possible mitigation goals and strategies provided by FEMA, as well as information about mitigation projects discussed in neighboring communities and counties.

All potential strategies and goals that arose through this process are included in Table 5-6. The mitigation strategies are arranged by hazards they directly address. In some cases, certain mitigation strategies can address all hazards. If provided by the jurisdiction, each mitigation strategy contains specific details pertaining to the implementation, responsible and/or organizing agency, and potential funding source. Potential funding sources are identified by Federal, State, Local, or Private. A code is assigned to each mitigations strategy for ease of reference when reviewing the prioritization of each mitigations strategies in Section 5-4.

Table 5-6: Edwards County's Multi-Jurisdictional Mitigation Strategies

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
ALL HAZARDS					
AH1	Develop public outreach programs to instruct the public on what to do during potential hazards <i>The County EMA, schools, Red Cross, and other organizations have implemented various forms of this strategy. Local resources have been used to target and inform the resident population. Additional funding will be sought from the Pre-Disaster Mitigation program. All Jurisdictions will be able to participate in this strategy.</i>	All Jurisdictions	Ongoing	L, S	Edwards County EMA, Edwards CUSD #1
AH2	Develop Social Media Techniques for Critical Updates <i>Have social media outlets release updates on weather and possible disasters to get people to safety with warning</i>	All Jurisdictions	Proposed	L, S	Edwards County EMA
AH3	Establish Local Emergency Planning Committee <i>Funding has not been secured as of 2016. If funding is available, it is forecasted to be complete within approximately three years</i>	All Jurisdictions	Proposed	L,S	Edwards County EMA
AH4	Establish an Incident Management Team <i>The County EMA will oversee the implementation of this project. A team will be set up in case of an emergency to better be prepared for immediate response.</i>	All Jurisdictions	Proposed	L, S	Edwards County EMA
AH5	Harden existing community shelters and critical facilities <i>The County EMA and Edwards CUSD #1 will oversee the implementation of this project. Local resources will be used to evaluate the cost benefit of the shelters and define specific locations. Funding has not been secured as of 2015. Implementation is forecasted to be initiated within approximately one year. All Jurisdictions are interested in pursuing this.</i>	Edwards County EMA, Edwards CUSD #1	Ongoing	L, S, F	Edwards County EMA, Edwards CUSD #1
AH6	Identify and procure backup water supply <i>Funding has not been secured as of 2016. Implementation is forecasted to be initiated within three to five years.</i>	Edwards County EMA	Ongoing	L, S	Edwards County EMA
AH7	Construct additional community safe rooms <i>Various jurisdictions interested in protecting citizens via construction and implementation of safe rooms. Local resources and additional grants will be used to procure the generators. If funding is available, is forecasted to be complete within three to five years</i>	Edwards County	Proposed	L, S, F	Edwards County EMA
AH8	Create additional Heating and Cooling Shelters <i>Funding has not been secured as of 2016. Implementation is forecasted to be initiated within 5 years</i>	Edwards County	Ongoing	L, S, F	Edwards County EMA
AH9	Purchase back-up generators for critical facilities <i>The County EMA and Edwards CUSD #1 will oversee the implementation of this project. Local resources and additional grants will be used to procure the generators. If funding is available, is forecasted to be complete within approximately one year.</i>	All Jurisdictions	Proposed	L, S, F	Edwards County EMA, Edwards CUSD #1
AH10	Supply all critical facilities with basic survival supplies <i>The County EMA and Edwards CUSD #1 will oversee the implementation of this project. All critical facilities will be stocked with emergency supplies such as food, water, blankets and other survival gear.</i>	All Jurisdictions	Proposed	L, S	Edwards County EMA, CUSD #1

AH11	Acquire portable lighting for mass casualty preparation <i>Grayville Police will oversee the implementation of this project. Local resources and additional grants will be used to procure the portable lighting. If funding is available, is forecasted to be complete within three to five years</i>	Grayville Police, Bone Gap FD	Proposed	L, S, F	Grayville Police
AH12	Purchase Emergency signage for closures and instruction <i>The County will oversee the implementation of this project. Funding has not been secured, but additional funding will be sought from IDOT and Local resources. Implementation is forecasted to be complete within approximately five years.</i>	All Jurisdictions	Proposed	L, S	Edwards County EMA

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
FLOODING					
F1	Train local floodplain managers through FEMA/IEMA programs <i>Better training in storm water management and floodplains will help to lessen the effects of flooding on the communities. Local resources and additional grants will be used to procure the generators. If funding is available, is forecasted to be complete within three to five years</i>	All Jurisdictions	Proposed	L, S	Edwards County EMA
F2	Implement a plan for voluntary buyouts for structures within Edwards County <i>The County EMA will oversee the implementation of this project. Local resources will be used to evaluate the applicable areas. Funding has not been secured, but additional funding will be sought from the Pre-Disaster Mitigation program. Implementation is forecasted to be initiated within approximately three years.</i>	City of Albion, Grayville, Browns	Ongoing	L, S, F	Edwards County EMA
F3	Maintain a list of flood prone structures <i>Local resources and additional grants will be used to procure the generators. If funding is available, is forecasted to be complete within three to five years</i>	City of Albion	Proposed	L, S	Edwards County EMA
F4	Flood-proof or elevate facilities <i>Flood-proofing needed in flood prone residential and non-residential areas. Including critical facilities such as water treatment plants. Local resources and additional grants will be used to procure the generators. If funding is available, is forecasted to be complete within three to five years</i>	Edwards County , City of Grayville, City of Albion	Proposed	L, S	Edwards County EMA, City of Grayville, City of Albion
F5	Anchor Manufactured Homes and exterior attachments <i>County EMA will oversee this project. Local resources and additional grants will be used to procure the generators. If funding is available, is forecasted to be complete within three to five years</i>	Albion, West Salem, Grayville	Proposed	L, S, F	Edwards County EMA
F6	Implement stream maintenance to improve floodplain management <i>The County EMA and DNR will oversee the implementation of this project. Funding has not been secured as of 2015. Community development grants are a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately three years.</i>	Edwards County, City of West Salem	Proposed	L, S	Edwards County EMA, City of West Salem
F7	Culvert Replacement <i>Public utilities will oversee the implementation of this project. If funding is available, is forecasted to be complete within three to five years</i>	Edwards County	Proposed	L, S, F	Edwards County EMA

F8	Elevate Low-Lying Roads <i>Public utilities will oversee the implementation of this project. If funding is available, is forecasted to be complete within three to five years</i>	Edwards County	Proposed	L, S, F	Edwards County EMA
TORNADO / SEVERE THUNDERSTORMS					
ST1	Install Lightning Detections System <i>The County EMA will oversee the implementation of this project. If funding is available, is forecasted to be complete within three to five years</i>	Edwards County, Grayville Police	Proposed	L, S	Edwards County EMA
ST2	Provide Jurisdiction Wide Siren Coverage <i>County EMA will oversee the implementation of this project. If funding is available, is forecasted to be complete within three to five years</i>	Edwards County, Grayville Police	Proposed	L, S	Edwards County EMA, Grayville Police
ST3	Require safe rooms be constructed within new public buildings <i>County EMA will oversee the implementation of this project. If funding is available, is forecasted to be complete within three to five years</i>	Edwards County, Grayville Police	Proposed	L, S	Edwards County EMA
ST4	Construct New Safe Rooms <i>County EMA will oversee the implementation of this project. If funding is available, is forecasted to be complete within three to five years</i>	Grayville Police	Proposed	L, S	Edwards County EMA

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
ST5	Retrofit Structures for High Winds <i>County EMA will oversee the implementation of this project. If funding is available, is forecasted to be complete within three to five years</i>	City of Albion	Proposed	L, S, F	Edwards County EMA
ST6	Equip Critical Facilities with Lightning Protection Devices <i>Public utilities will oversee the implementation of this project. If funding is available, is forecasted to be complete within three to five years</i>	Edwards County, City of Albion, Grayville	Proposed	L, S	Edwards County EMA
ST7	Enhance Ordinances to exceed minimum standards <i>County EMA will oversee the implementation of this project. If funding is available, is forecasted to be complete within three to five years</i>	Edwards County	Proposed	L, S	Edwards County EMA
WINTER STORMS					
WS1	Purchase Deicing Chemicals	All Jurisdictions	Proposed	L, S	County EMA
WS2	Establish a 4WD/ Off-road vehicle fleet for access to people in need	Edwards County	Proposed	L, S	County EMA
WS3	Place all utility lines underground <i>Prevents lines from freezing and fallen trees from cutting power.</i>	Grayville Police, City of Albion	Proposed	L, S, F	City of Albion
HAZARDOUS MATERIALS RELEASE					

HAZ1	Develop/Update hazmat emergency response plan	City of Albion, Grayville Police	Ongoing	L, S	City of Albion, Grayville Police
HAZ2	Acquire protective gear	City of Albion, Grayville Police	Proposed	L, S	City of Albion, Grayville Police
HAZ3	Update Hazardous Material Facilities to Regulations <i>Update the current facilities to current or better standards</i>	Edwards County	Proposed	L, S, F	Edwards County EMA
DROUGHT / EXTREME HEAT/FIRE					
H1	Audit Water Loss and incentivize water reuse	City of Albion	Proposed	L, S	City of Albion
H2	Retrofit Water Supply Systems <i>Enhance water supply in case of fire and extreme heat.</i>	Edwards County, City of Albion	Proposed	L, S, F	Public Works
H3	Retrofit at risk structures with ignition-resistant materials	Edwards County	Proposed	L, S, F	County EMA
H4	Develop/ Enforce Strict Burn Ordinances	Grayville, Edwards County	Proposed	L, S	Grayville
H5	Purchase Fans for use in extreme heat <i>County EMA will oversee this project.</i>	Edwards County	Proposed	L, S	County EMA
EARTHQUAKE					
EQ1	Retrofit/harden critical structures, Replace and improve pump stations <i>The County EMA and public utilities will oversee the implementation of this project. Funding has not been secured as of 2016, but the pre-disaster mitigation program is a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately five years.</i>	Bone Gap FD, City of Albion	Proposed	L, S, F	Edwards County EMA
EQ2	Develop Engineered Pipelines to withstand earthquake effects <i>The County EMA and public utilities will oversee the implementation of this project. Implementation, if funding is available, is forecasted to be complete within approximately five years.</i>	Edwards County	Proposed	L, S, F	Edwards County EMA
Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
EQ3	Map and assess vulnerability to seismic hazards <i>Create an assessment of at risks areas</i>	City of Albion	Proposed	L, S	Edwards County EMA
EQ4	Adopt 2009 International Building Code <i>Adjust ordinance to use updated code</i>	Edwards County	Proposed	L, S	Edwards County EMA

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

5.4 Prioritization of Multi-Jurisdictional Mitigation Strategies

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

Table 5-7 displays the priority ranking for each mitigation strategy. Each code refers to a specific mitigations strategy listed in Table 5-6. For each participating jurisdiction a rating (high, medium, or low) was assessed for each mitigation item. The ranking is the result of the STAPLEE evaluation and the timeframe the community is interested in completing the strategy: H - High 1-3 years; M - Medium 3-5 years; and L - Low 5+years.

Table 5-7. Prioritization of the Edwards County's Mitigation Strategies

Code	Priority Ranking						
	Edwards County	Albion	Bone Gap FD	Browns	Grayville	West Salem	Edwards CUSD #1
AH1	M	M	-	-	-	-	-
AH2	H	H	-	H	-	H	-
AH3	H	-	-	H	-	H	-
AH4	M	M	-	-	-	-	-
AH5	H	-	-	H	-	H	H
AH6	M	M	-	-	-	-	-
AH7	H	-	H	-	-	-	-
AH8	H	-	-	H	-	H	-
AH9	M	-	M	-	-	-	H
AH10	M	-	M	M	H	M	M
AH11	H	-	-	H	H	-	-
AH12	H	-	-	H	H	-	-
F1	M	-	-	-	-	-	-
F2	H	H	-	H	H	-	-
F3	H	H	-	-	-	-	-
F4	M	-	-	-	-	-	-
F5	M	-	-	-	-	-	-
F6	H	H	-	-	-	H	-
F7	H	H	-	-	-	-	-
F8	H	-	-	-	-	-	-
H1	H	H	-	-	-	-	-
H2	H	H	-	-	-	-	-

H3	M	-	-	-	-	-	-
H4	H	-	-	-	H	-	-
H5	H	-	-	-	-	-	-
ST1	H	-	-	-	H	-	-
ST2	H	-	H	-	H	-	-
ST3	L	-	-	-	L	-	-
ST4	L	-	-	-	L	-	-

Section 5. Mitigation Strategies

Code	Priority Ranking						
	Edwards County	Albion	Bone Gap FD	Browns	Grayville	West Salem	Edwards CUSD #1
ST5	M	M	M	-	-	-	-
ST6	M	M	-	-	L	-	-
ST7	M	-	-	-	-	-	-
EQ1	H	H	H	-	-	-	-
EQ2	M	-	-	-	-	-	-
EQ3	L	L	-	-	-	-	-
EQ4	H	-	-	-	-	-	-
HAZ1	M	-	-	-	M	-	-
HAZ2	M	-	-	-	M	-	-
HAZ3	M	-	-	-	-	-	-
WS1	L	L	-	-	L	-	-
WS2	L	L	-	-	L	-	-
WS3	L	-	-	-	-	-	-

Section 6. Plan Implementation and Maintenance

6.1 Implementation through Existing Programs

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

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

6.2 Monitoring, Evaluation, and Updating the MHMP

Throughout the five-year planning cycle, the Edwards County Emergency Management Agency will reconvene the Planning Team to monitor, evaluate, and update the plan on an annual basis. Additionally, a meeting will be held in 2022 to address the five-year update of this plan. Members of the planning committee are readily available to engage in email correspondence between annual meetings. If the need for a special meeting, due to new developments or the occurrence of a declared disaster in the county, the team will meet to update mitigation strategies. Depending on grant opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

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

Updates or modifications to the MHMP during the five-year planning process will require a public notice and a meeting prior to submitting revisions to the individual jurisdictions for approval. The plan will be updated via written changes, submissions as the committee deems appropriate and necessary, and as approved by the Edwards 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, the updated data will be used for future risk assessments and vulnerability analyses.

Definitions

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

Hazard Mitigation Grant Program (HMPG)	Authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration.
Hazus-MH	A geographic information system (GIS)-based disaster risk assessment tool.
Multi-Hazard Mitigation Planning	Identify policies and actions that can be implemented over the long term to reduce risk and future losses from various hazardous events.
National Flood Insurance Program	Administered by the Federal Emergency Management Agency, which works closely with nearly 90 private insurance companies to offer flood insurance to property owners and renters. In order to qualify for flood insurance, a community must join the NFIP and agree to enforce sound floodplain management standards.
Planning Team	A group composed of government, private sector, and individuals with a variety of skills and areas of expertise, usually appointed by a city or town manager, or chief elected official. The group finds solutions to community mitigation needs and seeks community acceptance of those solutions.
Risk Priority Index	Quantifies risk as the product of hazard probability and magnitude so Planning Team members can prioritize mitigation strategies for high-risk-priority hazards.
Risk Assessment	Quantifies the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people.
Strategy	A collection of actions to achieve goals and objectives.
Vulnerability	Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions.

Acronyms

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

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

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

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

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

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

G GIS – Geographic Information System

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

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

M MHMP – Multi-Hazard Mitigation Plan

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

P PA – Public Assistance
PHMSA – Pipeline and Hazardous Materials Safety Administration
PPM – Parts Per Million

R RPI – Risk Priority Index

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

U USGS – United States Geological Survey

Appendices

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Appendix A. MHMP Meeting Minutes

Formal Mitigation Planning Meetings

Meeting 1 – November 13th, 2014

Meeting 2 – April 6th, 2014

Meeting 3 – December 1st, 2015

Meeting 4 – October 12th, 2016

Meeting 1 – November 13th, 2014

Edwards County Multi-Hazard Mitigation Meeting 1

Chairman: Debbie Judge (EMA Coordinator)

Plan Directors: Southern Illinois University and Greater Wabash Regional Planning
Commission

Meeting Date: November 13, 2014

Meeting Time: 10:00 pm

Place: Farm Bureau- Albion, IL

Attendance: See attached sign in sheet

The planning team was welcomed by Prof. Nicholas Pinter, project director from SIU. Prof. Pinter gave an overview of the planning process and discussion of schedule and milestones. He explained that the objective of this project is to update Edwards County's 2009 Multi-Hazard Mitigation Plan (MHMP) to meet the requirements of the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA). The grant requires a 25% match from the county but will be met by sweat equity by an accumulation of time spent at the meetings, on research assignments, surveys, along with the time spent reviewing and producing the planning document.

The first task of the meeting was to assemble a list of disaster-related threats facing the community. A power point presentation was presented by Amanda Dampitz, project manager at SIU. Amanda discussed the historical disasters that have occurred in Edwards County. Amanda also covered the significant natural hazard events that occurred during 2009 through 2013 (the life span the 2009 MHMP). This information was used to guide the Hazard Ranking Exercise that the County and each participating jurisdiction must complete.

The next task of the meeting was to assemble a list of disaster-related threats facing Edwards County. Using the hazards ranked in the 2009 MHMP, the Planning Team evaluated each hazard based on the probability/likelihood each hazard would occur and the impact/severity it would have on Edwards County.

Each jurisdiction within the county is responsible for filling out a separate Risk Assessment and submit it to SIU.

The next meeting will be the public meeting where SIU will present the results of the risk assessment, describe the GIS and Hazus models. This which will give the public a chance to voice their opinions regarding the plan. After the public meeting the team will meet and review the Risk Assessment.

Meeting was adjourned.

Edwards County Pre-Disaster Mitigation Planning Committee
Meeting #1 November 13, 2014

	A	B	C	D	E
	Member Name	Representing	Address	Email Address	Employer/Job Description
1	Steven Pott	Boone County	549 S. State St.	jpotth@wastash.net	Village Trustee
2	Matt Henson	Albion FDI	384 N. 3rd St, Albion	matth@livingtheadventure.net	FD Chaplain, MS Secretary, FB: refisher,
3	Steve McNamee	City of Albion	27 W. Elm St. Albion	City of Albion	Mayor
4	Wendy Johnson	Albion	505 I St	Wj@mpf.com	Sebastian Trapp
5	Dwaine Lear	Edwards Co	P.O. Box 101 Albion	Wj@mpf.com	Learn Electrical
6	David Sutherland	Boone Gap Fire Dept	P.O. Box 125 Boone Gap	don@wastash.net	Fire Chief, Farmer
7	Courtney Yost	Illinois Extension	600 Cherry Ln. Lawrenceville	yost@illinois.edu	Community Economic Development Educator
8	David Jordan	Grayville	413 Highland, Grayville	bison@newell.net	City Commissioner
9	Mike Valentine	Edwards Co	50 E Main St. Albion, IL	ELSTATE@AT&T.NET	STATES ATT
10	David Conyer	Edwards Co. Schools	361 W. Main St. Albion, IL	clearwater@ccusd.org	Edwards Co. CUSD #1 Superintendent
11	Dee F. Hunley	Edwards Co EMS	2075 Morris St. Park Ridge, IL	joe.pur1@yaho.com	Edwards Co EMS
12	John Hampton	Edwards Co. EMS	931 Jefferson St. - Bridgeport, IL	john.hampton@yaho.com	Edwards Co. EMS
13	Tanya Cantrell	Edwards Co EMS	307 S Albion St West Salem	ccens1@yaho.com	Edwards Co EMS
14	Mike Judge	Albion Police Dept	50 E Main Albion	pd726@att.net	Chief of Police
15	Kristie Smith	Edwards Co. EMS	316 N Stringtown Rd Quincy	krystie.kristie@yahoo.com	Edwards Co. EMS
16	Debra Judy	Edwards Co	50 E Main St Albion	dj221may@att.net	Edwards Co EMA
17	Debra E. Mason	West Salem	624 S WEST ST. W.S. IL	debmason501@comcast.net	Village of West Salem
18	Rebecca Perry	Edwards Co. Forms	15 S. 5th St. Albion	edwardsco@fairfieldwitness.net	Farm Bureau

Meeting 2 – April 6th, 2015

Meeting 2

Edwards County Multi-Hazard Mitigation Plan Meeting 2

Chairman: Debbie Judge (EMA Coordinator)

Plan Directors: Southern Illinois University and Greater Wabash Regional Planning Commission

Meeting Date: April 6, 2015

Meeting Time: 10:00 a.m.

Place: Farm Bureau- Albion, IL

Attendance: see sign in sheet

Public Meeting and County Risk Assessment

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

A draft of the Edwards County Mitigation Plan was also given to each planning team members for review. It was explained by Prof. Pinter that each planning team member should review the plan an consider the risk assessment before attending the next meeting. The next meeting will involve developing mitigation strategies to address each ranked hazard.

Edwards County Pre-Disaster Mitigation Planning Committee

Public Meeting 4/6/2015

Public Meeting 4/9/2015					
	A	B	C	D	E
	Member Name	Representing	Address	Email Address	Employer/Job Description
1					
2	Sarah Mang	BLURPC	10 W. Main Albion	sarahmang@qurpc.com	Exec. Director
3	David Coxier	ECUSD	361 W. Main St. Albion	dcozier@ecusd.org	Superintendent
4	Diane Coys	Media	19 W. Main Albion	dcozier@qurpc.com	Chief
5	Dan Reed	EC Fire Dept	Box 125 Base Gap IL	dreed@wabasq.net	Chief
6	Mike Judge	Albion Blue	53 E Main Albion	mjudge@albhon.com	Chief of Police
7	Debra Judge	Edwards Co EMT	10 E Main Albion	djudge@albhon.com	Chief
8	STEVE NYMKEW	City of Albion	27 W Elm	cityofalbion@gmail.com	Mayor
9	Nicholas Pinter	SUC	1259 Lincoln Drive Carbondale	npinter@geo.siu.edu	Professor
10	Amenda Dampier	SUC	"	adampier@gmail.com	Researcher
11	Courtney Post	W.I.I. Extension	600 Cherry Ln. Littleton	postc@illinois.edu	CEO
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Meeting 3 – December 1st, 2015

Edwards County Multi-Hazard Mitigation Plan Meeting 3

Chairman: Debbie Judge (EMA Coordinator)

Plan Directors: Southern Illinois University and Greater Wabash Regional Planning
Commission

Meeting Date: December 1, 2015

Meeting Time: 10:00 a.m.

Place: Farm Bureau- Albion, IL

Attendance: see sign in sheet

This meeting consisted of a brainstorming session in which the planning team met with SIU and GWRPC to provide local knowledge that identified and prioritized mitigation strategies and projects that can address the threats identified in the risk assessments. Each participant was given a handout for their jurisdiction to fill out mitigation strategies specific to each hazard.

GWRPC will work with the County to get all forms completed and turned in for every jurisdiction.

Edwards County Pre-Disaster Mitigation Planning Committee

Meeting #3 12/1/2015

A	B	C	D	E
Member Name	Representing	Address	Email Address	Employer/Job Description
1				
2	DONALD SUTHERLAND	BC Fire Dist 280 W Main St Bonita CA	donalds@washington.net	Chief
3	STEVE MUMFEL	City of Albion 27 W Elm	albioncityof@comcast.net	Mayor
4	JOE BISCH	City of Grayville 119 W Main	grayvillecityof@comcast.net	Mayor
5	ROY MANN	City of Grayville Police 101 S Main	grayvillepd8833@gmail.com	Chief of Police
6	DAVID E. MASON	Willingboro Police 106 E South St	willingboro@comcast.net	Willingboro
7	DEBBIE JUDGE	Edwards Co EMA 50 E Main St	dizze@edwardsco.net	Chief of Police
8	MAK	Albion Police 50 E Main	pd782@albm.com	Chief of Police
9	BOB JONES	Edwards Co Sheriff Dept 50 E Main St	70006177@edwardsco.net	Deputy
10	DAVID JONES	Mayor 19 W Main	gator@edwardsco.net	Mayor
11	MARY BETH SMITH	County Clerk 50 E Main	edwards@edwardsco.net	Clerk & Recorder
12	MATT HENSON	384 N 7th St	matt@henson.com	
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Edwards County Pre-Disaster Mitigation Planning Committee

Meeting #3 12/1/2015				
A	B	C	D	E
Member Name	Representing	Address	Email Address	Employer/Job Description
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2	David Genger	Edwards Co. Leas	361 W. Main St. Alton	danger@edccusd.org
3				Edwards Co. Superintendent
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Meeting 4 – October 12th, 2016

Meeting 4

Edwards County Multi-Hazard Mitigation Plan Meeting 4

Chairman: Debbie Judge (EMA Coordinator)

Plan Directors: Southern Illinois University and Greater Wabash Regional Planning
Commission

Meeting Date: October 12, 2016

Meeting Time: Come and Go- informal

Place: GWRPC 10 W. Main St. Albion, IL

Attendance: see sign in sheet

Sarah Mann with GWRPC met with individuals on a one on one basis to hand deliver the plan and explain the process of editing errors. Each person who attended was given a printed copy of the draft plan that was provided by SIU. Each person was asked to spend time reviewing the plan and bring back an edited version with any errors within 2 weeks.

Edwards County Pre-Disaster Mitigation Planning Committee

Meeting #4 10/12/2016

	A		B		C		D		E	
	Member Name	Representing	Address	Email Address	Employer/Job Description					
1	Deborah Judge	Edwards Co EMS	50 E Main St Albion IL	djudge@edwardscoems.com	Edwards Co Sheriff's Dept/EMS					
2	Dennis Lupin	City of Albion	27 W Elm St Albion IL	djudge@edwardscoems.com	City of Albion, Treasurer					
3	Steve McMahon	City of Albion	27 W Elm St Albion IL	cityofalbion@gmail.com	Mayor, City of Albion					
4	Mike Judge	Albion Police Dept	50 E Main St Albion IL	pd792@edwardscoems.com	Chief of Police					
5	Penny Turner	Albion Fire Dept	50 E Main St Albion IL	albionfiredept@gmail.com	Chief					
6	John Griscar	Edwards Co 911	50 E Main St Albion IL	edco911@edwardscoems.com	911 Coord					
7	Danby Bell	Edwards Co Sheriff's Dept	50 E Main St Albion IL	241@edwardscoems.com	Sheriff					
8	Nike Valentine	ELSA	" "	ELSA@edwardscoems.com	S/A					
9	James A. New	Albion Fire	" "	ems@edwardscoems.com	Secretary					
10	James A. New	Edwards Co EMS	27 W Elm St Albion IL	ems@edwardscoems.com	Admin					
11	Kristie Smith	Edwards Co EMS	27 W Elm St Albion IL		Event					
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Edwards County Pre-Disaster Mitigation Planning Committee
Meeting #4 10/12/2016

	A	B	C	D	E
	Member Name	Representing	Address	Email Address	Employer/Job Description
1					
2	Harvey Fenton	West Salem Fire Dept	106 E. Smith St. West Salem, MO 64786	paperj1616@gmail.com	Fire Chief
3	TOM HARTIN	ED CO BOARD	374 CO RD 400N		CHAPMAN
4	Todd Bailey	Mayor At Large	607 Henkle St	superca@wabash.net	
5	Bruce LUTFP			Shw50929@gmail.com	
6	Deby Blair	ED CO SHERIFF	309 S. ALBION ST.	241@fountain.com	SHERIFF
7	TRAVIS Thacker	LWFPD	706 N. 1st St	thompson_2006@hotmail.com	File Chief
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Appendix B. Local Press Release and Newspaper Articles

PUBLICATION -- ONE INSERTION

Certificate of
Publication

I, the undersigned, publisher of the Navigator Journal-Register, do hereby certify that said Navigator Journal-Register is a public newspaper, printed and published weekly in the City of Albion, County of Edwards and State of Illinois; that said newspaper has a general circulation in said county and has been published regularly for at least six months prior to date of the first insertion of the annexed notice; and that the notice of which the annexed is a true copy was published in said newspaper in its regular issue dated March 25, 2015.

Given under my hand at Albion, this 31st day of March, A.D. 2015.

The Navigator Journal-Register
Patrick Seil, Publisher

By Kim Herten

Printer's Fee \$25.31

Received payment April 16, 2015
Kim Herten

The Edwards County Multi-Hazard Mitigation Plan (MHMP) Steering Committee will host a public information meeting on Monday, April 6th at 10:00 a.m. at the Edwards County Farm Bureau basement located at 15 S. 5th St., Albion, IL. Through a grant funded by FEMA, the county has formed an alliance with SIU and Greater Wabash Regional Planning Commission to identify potential natural hazards and produce an updated to the 2009 MHMP. The public is invited to attend this meeting to learn about the MHMP process and provide input regarding natural hazards that occur in Edwards County. For more information, refer to GWRPC website www.gwrpc.com.

MARCH 25, 2015 | www.navigatorjournal.com



The Navigator

LEGAL NOTICES

6B

NOTICE TO THOMAS E. HERING BONE GAP, IL 15-OP-6 Ross A. Hering vs Thomas E. Hering by the Judge in Edwards County, on March 5th, 2015. The order has the same terms as the original order served on Thomas Hering previously. The Plenary order is in effect until March 5th, 2017.

The Edwards County Housing Authority is accepting sealed bids for mowing and trimming of the Housing Authority's senior properties in Albion and West Salem for the 2015 mowing season. Complete specifications may be picked up at the Edwards County Housing Authority Office located at 125 West Cherry Street, Albion, IL. Bids are to be submitted by 3:30 p.m. on Friday, April 17, 2015 to the office of the Edwards County Housing Authority, Edwards

County Housing authority reserves the right to reject any or all bids and to waive technicalities.

The White County Housing Authority is inviting architectural/engineering firms to submit information on services they can provide for bathroom renovation work to be performed under the Capital Fund Program 106POC68-501-13, IL-06POC68-501-14, and 106POC68-501-15. For extent of work and services required contact the White County Housing Authority, P.O. Box 277, Crossville, IL 62827. Phone No. 618-946-3868. All interested firms should respond with a letter of interest; demonstration of understanding of modernization; evidence of firm's ability to perform the work; evidence that the architect/engineer is registered or licensed to perform the required services in the

State of Illinois; profiles of the firm's principals, staff and facilities; and a certified statement that the architect/engineer is not barred, suspended or otherwise prohibited from professional practice by any Federal, State or local Agency. Request for detailed information and letters of interest are to be submitted by April 8, 2015, 3:00 p.m. to the White County Housing Authority, P.O. Box 277, Crossville, IL 62827.

The White County Housing Authority will receive bids for lawn care in Norris City, Crossville and Grayville. Bids must be quoted for each location per mowing. Lawn care services required shall include mowing and trimming around buildings, trees, shrubs, landscaped areas, sidewalks and driveways to property lines extending to city street, including ditches and banks, clean-

ing grass clippings off the sidewalks and porches. Spraying weed killer is prohibited. Mowing is restricted to Wednesday through Friday, beginning now earlier than 8:00 a.m. and ending no later than Executive Director. Certificate of Insurance is required. Insurance coverage must include General Liability, Automotive Liability and Workers Compensation and Employers' Liability. The White County Housing Authority reserves the right to reject any or all bids. Deliver or Mail bid to White County Housing Authority, 500 4th St., P.O. Box 277, Crossville, IL. Bids will be received until 3:00 p.m., April 8, 2015.

The White County Housing Authority will be accepting bids for Monthly Pest Control Services for 115 scattered site dwelling units and 3 maintenance and management buildings.

Interested bidders should quote a monthly rate and include a description of the method of treatment. Illinois Dept. of Public Health License and Certificate of Insurance are required. Insurance coverage must include general liability, automotive liability, workers and compensation and employers liability. Deliver or mail bid to White County Housing Authority, 500 4th St., P.O. Box 277, Crossville, IL 62827. Bid will be accepted until 3:00 p.m. April 8, 2015.

The Edwards County Sheriff's Department will be taking sealed bids on a Black 1986 Chevrolet Corvette, this vehicle is in good condition, the car has 179,473 miles showing on the odometer and can be seen by coming to the Edwards County Sheriff's Office, Monday through Friday, 8:00 a.m. to 4:00 p.m. We

will begin taking bids on Monday, March 23, 2015, bids will be opened on Friday, April 17, 2015 at 3:00 p.m. Bids can either be brought in to the Sheriff's Office or mailed to the Edwards County Sheriff's Office, 50 East Main Street, Suite One, Albion, Illinois 62806. Put Corvette Bid on the envelope. The Edwards County Sheriff's Department reserves the right to reject any and all bids.

Bone Gap Fire Board will be meeting and having election of officers on March 28 at 5:00 p.m. at the Bone Gap Firehouse.

The Edwards County Multi-Hazard Mitigation Plan (MHMP) Steering Committee will host a public information meeting on Monday, April 6th at 10:00 a.m. at the Edwards County Farm Bureau basement located at 15 S. 5th St., Albion, IL. Through a grant funded

by FEMA, the county has formed an alliance with SIU and Greater Wabash Regional Planning Commission to identify potential natural hazards and produce an updated to the 2009 MHMP. The public is invited to attend this meeting to learn about the MHMP process and provide input regarding natural hazards that occur in Edwards County. For more information, refer to GWRPC website www.gwrpc.com.

REQUEST FOR PROPOSAL/ QUALIFICATIONS FOR A GUARANTEED SAVINGS CONTRACT

Notice is hereby given that The City of Grayville, Illinois will extend the deadline on Request for Proposals for a Guaranteed Energy Savings Contract, originally due by 11:00 a.m., March 16th 2015, at The City of Grayville City Hall, located at 122 S. Court St.

Grayville, Illinois 62844 until 11:00 a.m., May 25th 2015. Please submit 7 (07) hard copies and one electronic copy of responses. Selection of a well-qualified provider will occur by the City Council on or after May 25th, 2015 during a regular scheduled board meeting held in the City Council Meeting Room located in City Hall. To receive a copy of the Request for Proposals, please contact: Jo Ellen Sell, City Clerk, The City of Grayville, 122 S. Court St., Grayville, IL 62844, 618-375-3671 (fax) 618-375-7869. The City of Grayville reserves the right to accept the Request for Proposal that, in its opinion, best serves the interests of the City.

Access Illinois Public Notices at www.publicnoticesillinois.com

Appendix C. Adopting Resolutions

See Attached Adopting Resolutions

Appendix D. Historical Hazards

See Attached Large Format Map and Newspaper Clippings

Appendix E. List of Essential Facilities

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

Emergency Operations Center Facilities

Facility Name	Address	City	Comments
Edwards County EOC	50 East Main Street	Albion	
Mobile Command Center	90 West Pine Street	Albion	

Fire Station Facilities

Facility Name	Address	City	Comments
Albion Rural Fire Department	27 West Elm	Albion	
Bone Gap Rural Fire Department	Main Street	Bone Gap	
Browns Volunteer Fire Department	315 Front Street	Browns	
West Salem Rural Fire Department	106 E South Street	West Salem	

Police Station Facilities

Facility Name	Address	City	Comments
West Salem Police Department	106 E South Street	West Salem	
Edwards County Sheriff	50 E Main Street	Albion	
Albion Police Department	50 E Main Street	Albion	

School Facilities

Facility Name	Address	City	Comments
Albion Grade School	361 West Main Street	Albion	
Edwards County High School	361 West Main Street	Albion	
West Salem Schools	105 East School Street	West Salem	

Medical Care Facilities

Facility Name	Address	City	Comments
Rest Haven	120 West Main	Albion	49 Beds
West Salem Manor	757 West Church Street	West Salem	36 Beds

Appendix F. Critical Facilities Map

See Attached Large Format Map of Critical Facilities.