Lawrence County, Illinois Multi-Hazard Mitigation Plan

2017 Countywide MHMP

FEMA

IEMA
ILLINOIS EMERGENCY MANAGEMENT AGENCY

SIU
Southern Illinois University
CARBONDALE

Multi-Hazard Mitigation Plan

Lawrence County, Illinois

Adoption Date: -- _____ --

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Acknowledgements

The Lawrence County Multi-Hazard Mitigation Plan would not have been possible without the incredible feedback, input, and expertise provided by the County leadership, citizens, staff, federal and state agencies, and volunteers. We would like to give special thank you to the citizens not mentioned below who freely gave their time and input in hopes of building a stronger, more progressive County. Lawrence County gratefully acknowledges the following people for the time, energy and resources given to create the Lawrence County Multi-Hazard Mitigation Plan.

Lawrence County Board

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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.

The Lawrence County Emergency Management Agency, Southern Illinois University, and Greater Wabash Regional Planning Commission have joined efforts in developing the county's first mitigation plan. This plan incorporates state-of-the art hazard analyses, addresses changes in probability and impact of specific hazards, incorporates changes in land-use, population and demographic within the county. Detailed GIS and Hazus-MH Level 2 analyses were performed for the Risk Assessment and sound mitigation strategies were established for each jurisdiction. This document hereby serves as the Lawrence County 2017 Multi-Hazard Mitigation Plan.

Section 2. Planning Process

2.1 Timeline

The MHMP process is broken into a series of six meetings. These meetings are organized by SIU and hosted by the Lawrence County Emergency Management Agency (EMA). At these meetings, various tasks are completed by SIU and the Lawrence County Multi-Hazard Mitigation Planning Team:

Meeting 1: The purpose of Meeting 1 is to introduce the MHMP process, discuss scheduling and milestones, and organize resources. This meeting included a discussion of roles, responsibilities, decision-making processes, administrative procedures, and communication strategies. SIU gathered local resources that contributed to the detailed county risk assessment such as critical facilities in the county, as well as assessor's data and pertinent GIS data.

Meeting 2: SIU 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. The Planning Team also provided SIU with disaster scenarios for the county's risk assessment.

Meeting 3: 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 4: This meeting consisted of a "brainstorming session." The Planning Team provided 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.

Meeting 5: The Planning Team reviewed the draft plan, 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.

Meeting 6: This is not a formal meeting of the Planning Team, but rather the adoption of the approved plan. Once FEMA approves the plan, the plan is returned to the county for formal adoption by the appropriate commissions and town boards.

2.2 Jurisdiction Participation Information

Approximately nine 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

Lawrence County

Bridgeport

Lawrenceville

Sumner

Lawrence County CUSD #20

Red Hill CUSD #10

Lawrence County Memorial Hospital

Rides Mass Transit District

University of Illinois Extension

2.3 Planning Team Information

Jess Angle, Lawrence 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.

Lawrence County Planning Team Members

Jurisdiction	Name	Title
Lawrence County	Jess Angle	EMA Coordinator
	Danielle Brown	Manager, Farm Bureau
	Russell Adams	Sheriff
	Cheri Spahn	Administrative Assistant
	Phyllis Wells	Administrative Assistant
	Carla Simmons	Health Department, Nurse
	Julie Parrott	PHEP
	Linda Kissel	Chief County Assessment Officer
	Eric Paulin	Director
	Will Gibson	County Clerk
	Arnold Herman	Director, Social Work
	Jeanie Fox	Social Worker
	Janice Zuilling	Social Worker
Lawrenceville	Don Wagner	Mayor
	James White	Police Chief
	Michael Mefford	Fire Chief

Jurisdiction	Name	Title
	Chris Winkles	Tax Assessor
	Roy McKinstry	Community Advocate
	Judy McKinstry	Community Advocate
	Roxana Wagner-Schultz	Community Advocate
Bridgeport	Jene Hays	Retiree
	Brad Purcell	Mayor
Sumner	Gary Hutchinson	Mayor
Lawrence County CUSD #20	Doug Daugherty	Superintendent
Red Hill CUSD #10	Jakie Walker	Superintendent
Lawrence County Memorial Hospital	Doug Florkowski	CEO
	Larry Spour	CFO
	Rita Garvey	RN
	Kathy Ketterman	Safety Director
Rides Mass Transit District	Jeffrey Drake	Public Relations
	Bill Lamb	Supervisor
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 meeting was held in Lawrenceville, Illinois on November 13, 2014. Representatives from SIU explained the rationale behind the MHMP 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 Lawrence County Planning Team assembled for four formal meetings and held one informal meeting for reviewing the plan. Each meeting was approximately two hours in length. 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.

Planning Meetings

MEETING 1	Nov 13th, 2014
MEETING 2	March 24th, 2015
MEETING 3	Oct 21st, 2015
MEETING 4	Oct 20th, 2016

2.4 Public Involvement

The Lawrence County EMA solicited public input throughout the planning process. A public meeting was held on March 24, 2015 to review the county's risk assessment. The public was encouraged to recommend mitigation strategies. 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 neighboring counties to obtain their involvement in the planning process.

Neighboring Community Participation

Person Participating	Neighboring Jurisdiction	Title/Organization
Ken Pryor	Crawford County	EMA Coordinator
Debbie Judge	Edwards 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 Lawrence 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 following technical data, reports, and studies were utilized:

Federal Emergency Management Agency
- *Developing the Mitigation Plan (April 2003)*
- *Mitigation Ideas (January 2003)*
- *Local Mitigation Planning Handbook*

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

United States Department of Transportation
- *PHMSA Hazardous Materials Incident Data*

United States Geological Survey
- *Earthquake Data*

United States Army Corps of Engineers
- *National Inventory of Dams*
- *National Levee Database*

NOAA National Climatic Data Center
- *Climate Data*

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

Illinois Emergency Management Agency
- *2013 Illinois Natural Hazard Mitigation Plan*
- *Hazardous Materials Incident Reports*

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

Illinois State Water Survey
- *Climate Data*

Illinois Department of Natural Resources
- *Repetitive Loss Data*
- *Dam and Levee Data*

Illinois State Geological Survey
- *Geologic Data*

Lawrence County
- *2013 Assessment Records*
- *2013 Countywide GIS Parcel Database*

2.7 Adoption by Local Government

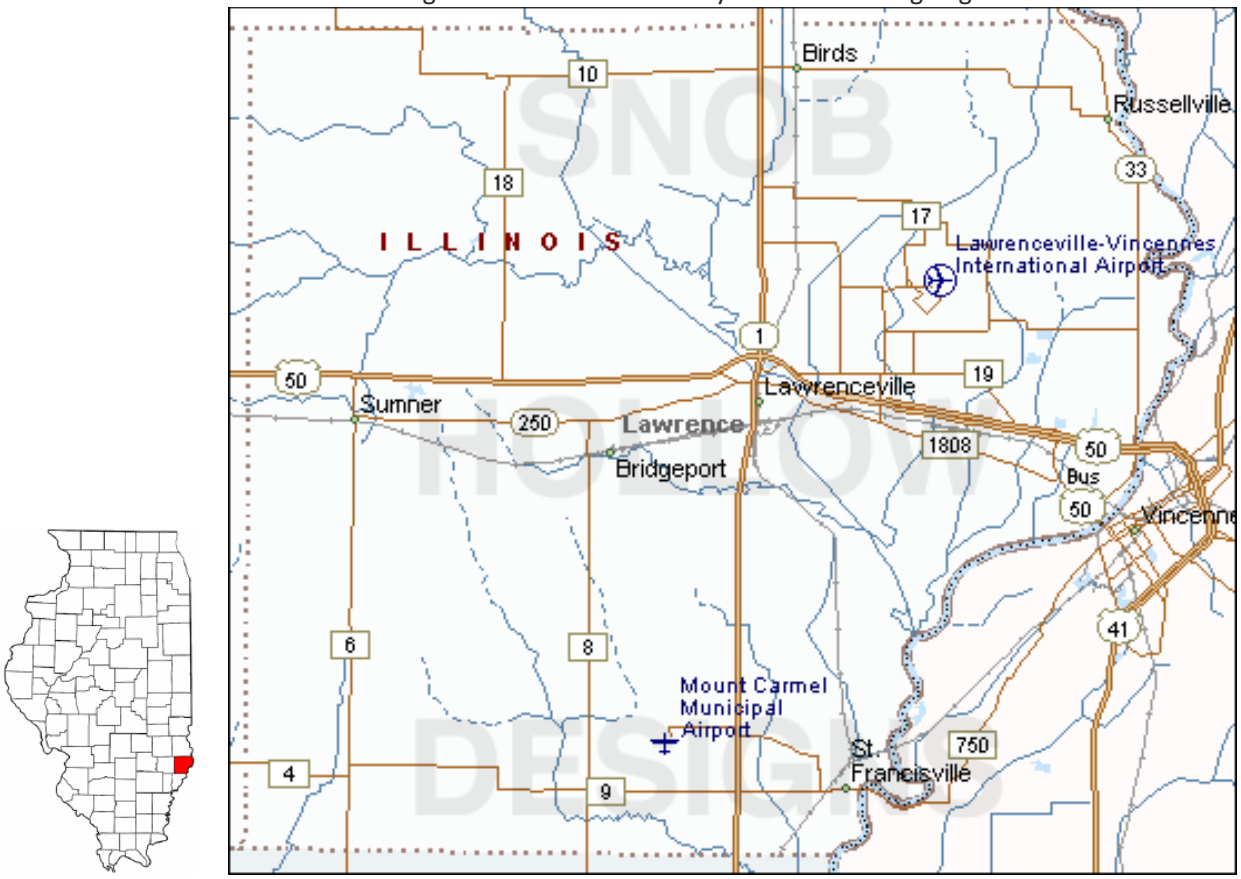
Upon IEMA and FEMA approval, the Planning Team presented and recommended the plan to the County Board for formal adoption. The plan was formally adopted by the Lawrence County Board on <adoption date>. The Planning Team worked with the County and its jurisdictions to ensure all parties formally adopted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

Section 3. County Profile

3.1 County Background

Lawrence County was formed in 1821 out of Crawford and Edwards counties. Named after Captain James Lawrence, who was killed in battle during the War of 1812, it is the easternmost county in the state of Illinois. The Wabash River forms the eastern boundary, Crawford County forms the northern boundary, Richland County forms the western boundary and Wabash County forms the southern boundary. Its county seat is Lawrenceville which is the highest populated area in Lawrence County. The distance to major metro areas include: Evansville, IN is approximately one hours drive south and Terre Haute, IN is approximately one hours drive north. Other major metro areas within a two to four hour driving distance include: Chicago, Indianapolis, Cincinnati, Lexington, Louisville, Nashville, St. Louis, and Kansas City. Located only 35 miles west of the median center of the U.S. population, Lawrence County is the center location for access to goods and services. Figure 3-1 displays a map of Lawrence County.

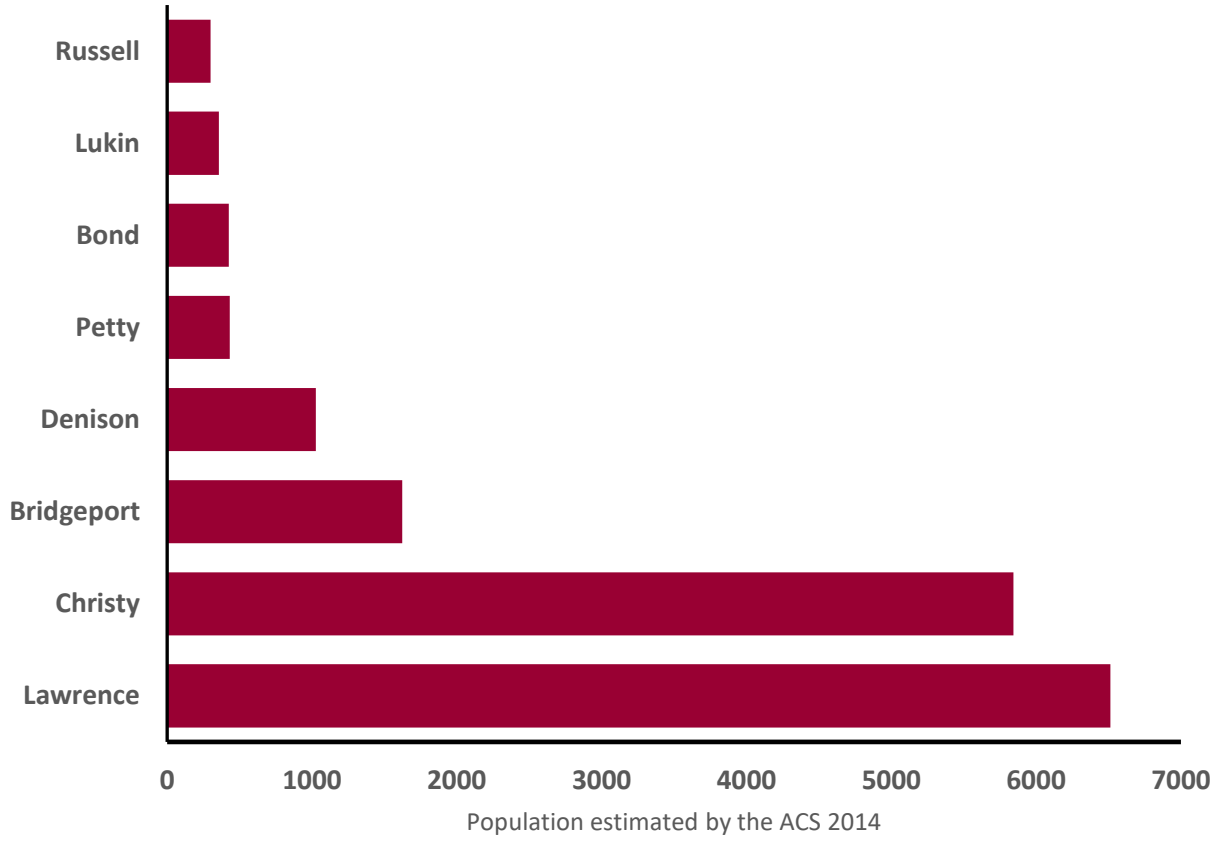
Figure 3-1. Lawrence County and Surrounding Region



3.2 Demographics

According to the 2010 U.S. Census, Lawrence County's population was 16,833, an increase of 8.9% from 2000 to 2010. As of July 1st, 2013, Lawrence County's population estimate is 16,558. The population is spread through nine townships: Allison, Bond, Bridgeport, Christy, Denison, Lawrence, Lukin, Petty and Russell. The largest incorporated jurisdiction in Lawrence County is the City of Lawrenceville, which has a population of approximately 4,348. Figure 3-2 displays the breakdown of population by township from the 2010 Census.

Figure 3-2. Lawrence County 2014 Population by Township



3.3 Economy and Industry

The Illinois Department of Employment Security reported for 2014 that nearly 3,400 workers were employed in the private sector. The breakdown is included in Table 3-1. Service-Providing industry represents the largest number of employees. American FactFinder reported for 2014 an annual per capita income of $14,208 in Lawrence County.

Lawrence County's major employers and number of employees is listed in Table 3-2. The largest employer is Automotive Technology Systems, LLC, which was established in 2008 and has 941 employees. According to the City of Lawrenceville, IL Comprehensive Plan and Pre-Disaster Mitigation Plan 2014, Lawrenceville

has experienced significant job losses over the past decade but retains a higher concentration of manufacturing jobs than the nation as a whole.

Table 3-1. Lawrence County's Major Employers

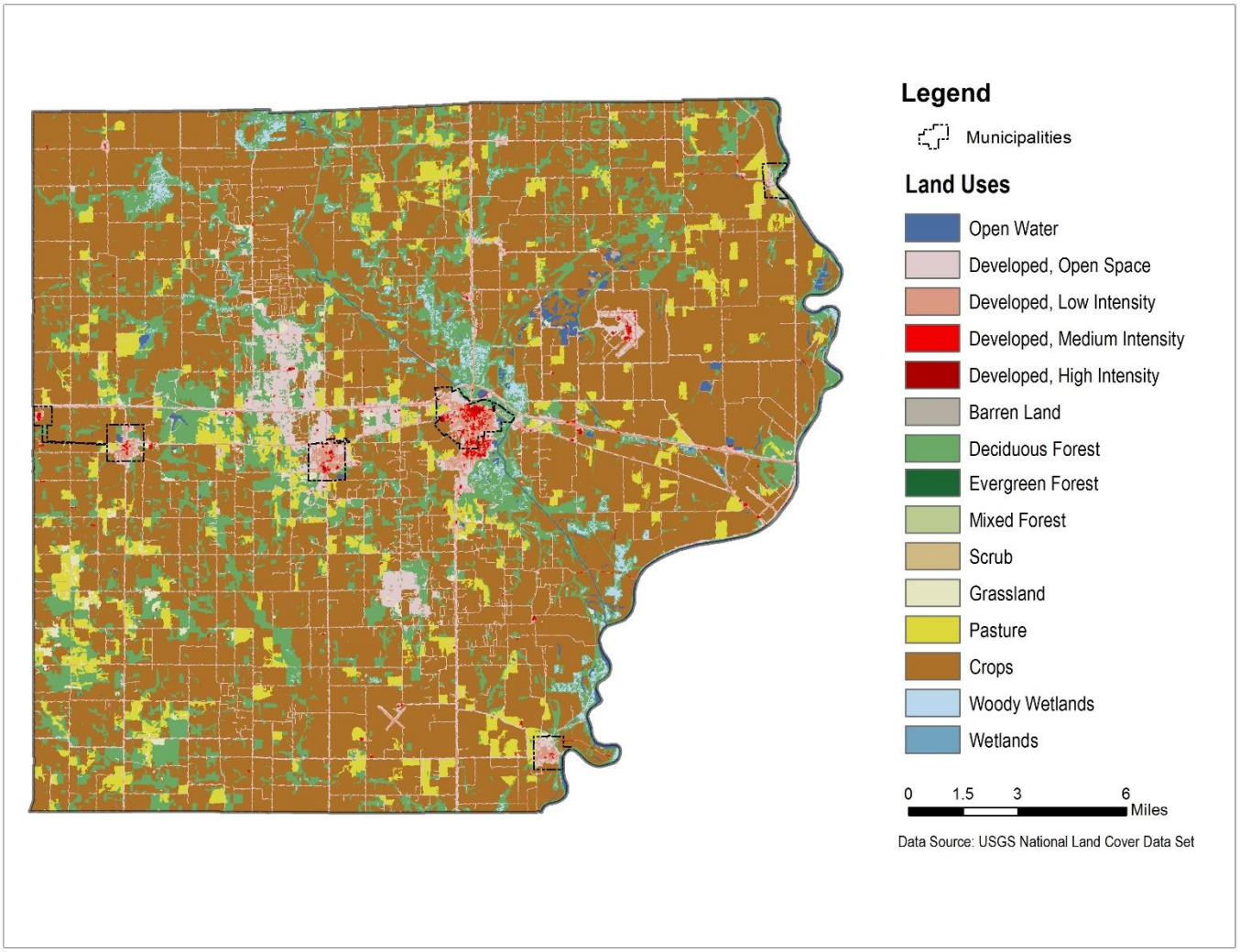
Employer	Industry	Approximate Number of Employees
Toyota Boshoku	Manufacturers & Service Providers	900
Lawrence Correctional Center	Corrections	500
Community School Systems	Government Educational	460
United Methodist Village Golden	Facilities Healthcare Facilities	351
Rule Insurance Lawrence County	Manufacturers & Service Providers	290
Memorial Hospital	Healthcare Facilities	213
Rucker's Wholesale	Candy	172
Wal-Mart	Manufacturers & Service Providers	135
AgriGold Hybrids Kauffman	Retail/Commercial Businesses	160
Engineering, Inc. Lawrence	Manufacturers & Service Providers	148
Community Health Care	Manufacturers & Service Providers	125
Center	Healthcare Facilities	118
Lawrence County	Oil Companies Healthcare	115
Health Department	Facilities	106
Pioneer Oil Lawrence	Energy	86
County	Oil Companies	55
Joule Industrial Contractors	Government	65
McKim's IGA	Manufacturers & Service Providers	53
Tracy Electric	Retail/Commercial Businesses	50

Source: City of Lawrenceville, Comprehensive Plan & Disaster Mitigation Plan, 2014

3.4 Land Use and Development Trends

Most of the Greater Wabash Region territory is primarily dedicated to agricultural purposes due to fertile soils. Corn is the major crop followed by soybeans, wheat, and winter wheat. While the amount of agricultural use remains high, some farmland is gradually being converted to other uses such as industrial and residential land uses. Lawrence County is home to one state park, Red Hills State Park, which includes 967 acres for picnicking, camping, hiking, boating and fishing. Figure 3-3 depicts Lawrence County's land use map.

Figure 3-3. Land Use in Lawrence County



3.4 Climate

The Greater Wabash Region has four distinct seasons and a moderate climate, with average monthly temperatures ranging from 32°F to 90°F. The summers are usually typified by hot, humid weather with highs reaching the upper 90's, and moderate cold winters with night-time lows averaging in the teens. The average precipitation totals approximately 43 inches of rain and 14 inches of snow.

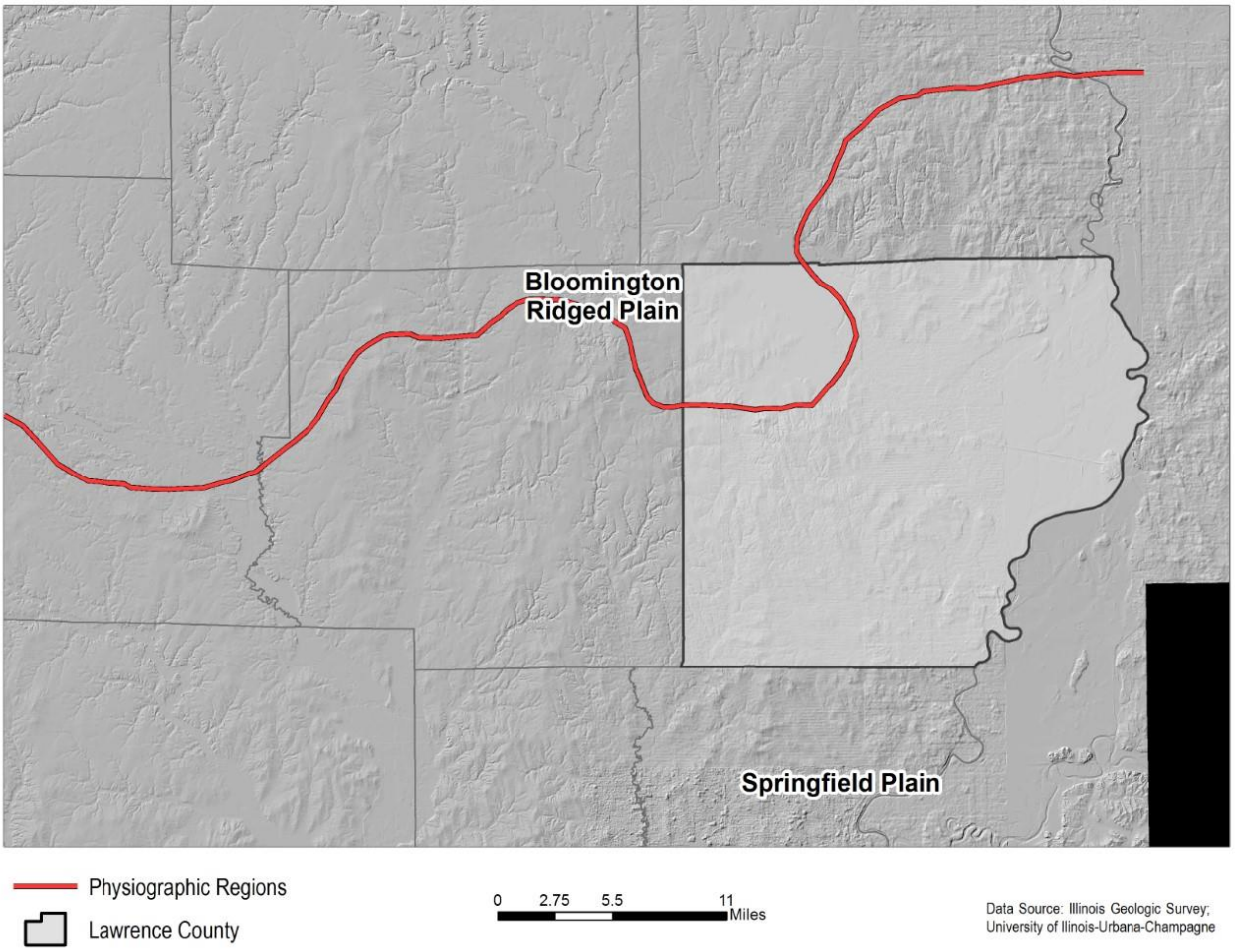
The region's relatively mild climate poses no significant hindrance to economic development efforts. This factor could allow for a much more diverse agricultural sector of the local economy. The growing season lasts about 190 to 200 total days.

3.5 Topography

Lawrence County is located in the Springfield Plain and Mount Vernon Hill Country physiographic sub-division of the Till Plains Section. Figure 3-4 depicts the physiographic divisions within Lawrence County. The Springfield Plain includes the level portion of the Ridged Plan physiographic division. It is distinguished mainly by its flatness and by shallow entrenchment of drainage. The Mount Vernon Hill Country is characterized by low rolling hills and broad alluvial valleys along the major streams. The relief in this region is not pronounced. Upland prairies are flat to moderately hilly, and the valleys are shallow. The land surface is primarily controlled by bedrock, which has been only slightly modified by glacial drift deposits. While the southern boundary of the Mount Vernon Hill Country lies within a few miles of the limits of glaciations, moraine ridges are essentially absent in the area.

The relief in Lawrence County is characterized as low on the nearly level to gently sloping uplands. The greatest change in relief is in areas along major drainage ways with some areas having as much as a 75-foot drop in elevation from the adjacent uplands. Elevation in the county varies from slightly more than 640 feet above sea level to approximately 410 feet above sea level at the point in the southeast corner where the Wabash River leaves the county. According to the Illinois State Geological Survey, Red Hills Chapel is the highest place in Lawrence County.

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



3.6 Major Lakes, Rivers, and Watersheds

Lawrence County is boarded by two rivers; the Embarras River (pronounced "Ambraw") on the central-western side of the county and the Wabash River on the eastern side. The Embarras River is a 195 mile long tributary of the Wabash River in southeastern Illinois. Generally the Embarras flows southward through Douglas, Coles, Cumberland and Jasper Counties. It turns southeast in Jasper County, running the remainder of its course through Richland, Crawford, and Lawrence Counties. Sections of the river's lower course have been straightened and channelized. The Embarras River meets the Wabash River about 5 miles north of St. Francisville, IL.

The Wabash River is the longest free-flowing river east of the Mississippi. At 503-miles long, from its origin near the western Ohio border, the Wabash River flows across northern and central Indiana to southern Illinois, forming the Illinois-Indiana state line before draining into the Ohio River. The Wabash River's watershed drains a sizable portion of eastern Illinois and two-thirds of Indiana. Figure 3-5 depicts the Wabash River System.

Red Hill State Park in Lawrence County is home to a 40 acre lake, which has a maximum depth of 30 feet and 2.5 miles of shoreline. Ideal for fishing and boating, the lake was created by a dam constructed across Muddy Creek, a tributary of the Embarras River in 1953.

Figure 3-5. Major drainage basins in Lawrence County

*Currently the Embarras River is classified as an approximate zone we do not know where the floodway is, or its depth. (City of Lawrenceville Comprehensive Plan and Pre-Disaster Mitigation Plan 2014).

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 hazard by assessing the vulnerability of buildings, infrastructure, and people. This assessment identifies the characteristics and potential consequences of a hazard, how much the hazard 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 identification of potential hazards. Several other documents were used to profile historical hazards and guide the Planning Team during the hazard ranking exercise. Section 2.6 contains a complete list of the technical documents utilized to develop this plan.

4.1.2 National Hazard Records

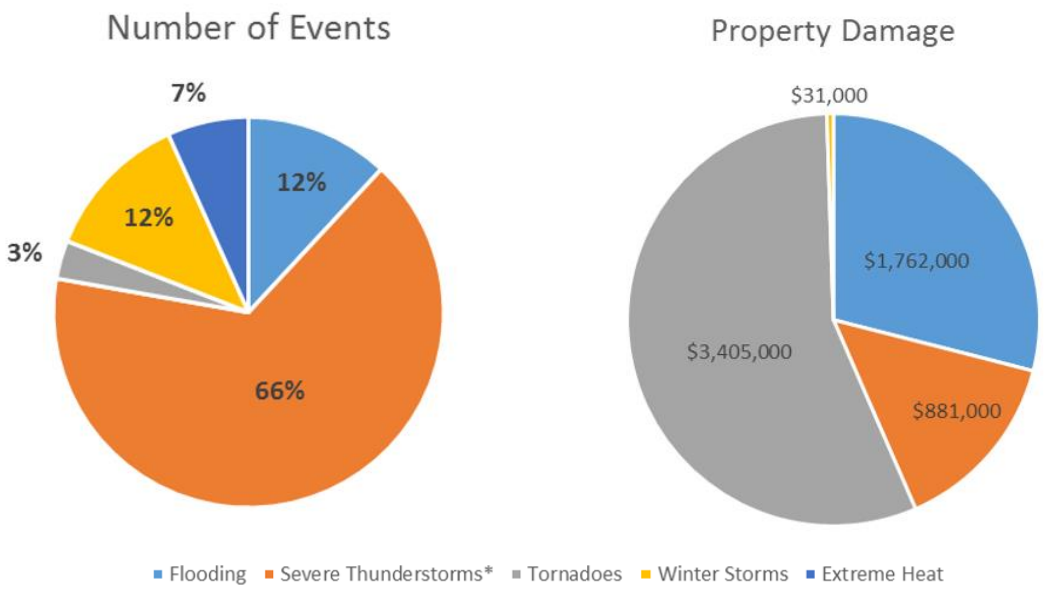
To assist the Planning Team, historical storm event data from the National Climatic Data Center (NCDC) was complied. NCDC records are estimates of damages reported to the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature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

The NCDC database included 252 reported meteorological events in Lawrence 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 Lawrence County. Figure 4-1 summarize the relative frequency of NCDC reported meteorological hazards and the percent of total damage associated with each hazard for Lawrence 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 Lawrence County

Hazards	Time Period		Number of Events	Property Damage	Deaths	Injuries
	Start	End				
Flooding	1996	2013	30	$1,762,000	0	0
Severe Thunderstorms	1956	2015	166	$881,000	0	2
Tornadoes	1956	2009	8	$3,405,000	0	15
Winter Storms	1996	2014	31	$31,000	0	0
Extreme Heat	1997	2012	17	$0	0	0

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



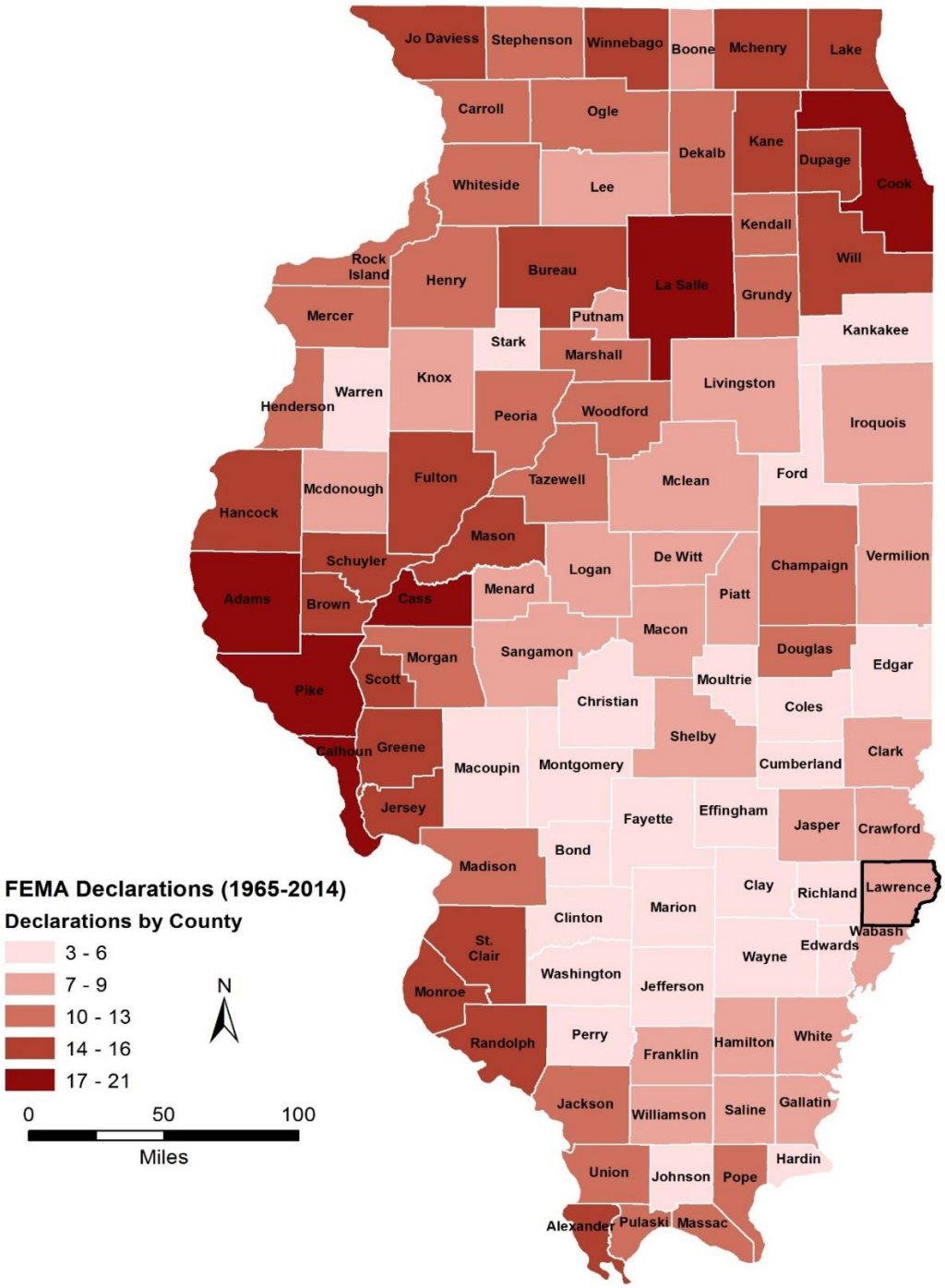
4.1.3 FEMA Disaster Information

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 additional PA funding, including Individual Assistance (IA) and the Hazard Mitigation Grant Program (HMGP). Lawrence County has received federal aid for five declared disasters and two emergency since 1965. Table 4-2 lists specific information for each disaster declaration in Lawrence County. Figure 4-2 depicts the number of disasters and emergencies that have been declared for the State of Illinois and Lawrence County since 1965.

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

Declaration Number	Date of Declaration	Description
1112	5/6/1996	Severe Storms & Flooding
1416	5/21/2002	Severe Storms, Tornadoes & Flooding
3199	2/1/2005	Record/Near Record Snow
3230	9/7/2005	Hurricane Katrina Evacuation
1771	6/24/2008	Severe Storms & Flooding
1991	6/7/2011	Severe Storms & Flooding
4116	5/10/2013	Severe Storms, Straight-Line Winds & Flooding

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



4.1.4 Hazard Ranking Methodology

Based on Planning Team input, national datasets, and existing plans, the Lawrence County Planning Team developed and ranked a list of hazards. These hazards ranked the highest based on the Risk Priority Index discussed in Section 4.1.5. It should be noted that Ground Failure and Wildfire have been omitted from the plan and were not natural hazards identified by Lawrence County or participating jurisdictions during the risk assessment process.

Lawrence County Hazard List

SEVERE THUNDERSTORM
TORNADOES

EARTHQUAKES

HAZARDOUS MATERIALS RELEASE

FLOODING

DAM / LEVEE FAILURE

DROUGHT / EXTREME HEAT

WINTER STORMS

4.1.5 Risk Priority Index

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

Table 4-3. Hazard Probability Ranking

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

Table 4-4. Hazard Severity Ranking

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

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

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

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

Jurisdiction	Severe Storms	Tornadoes	Earthquakes	HAZMAT	Flooding	Dam / Levee Failure	Heat / Drought	Winter Storms
Lawrence County CUSD #20	4	1	2	8	2	7	6	3
Red Hill CUSD #10	5	1	2	7	4	8	6	3
Lawrence County Memorial Hospital	1	2	3	4	5	6	8	7
Rides Mass Transit District	1	2	3	4	5	6	8	7
University of IL Extension	1	2	3	4	5	6	8	7

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 a list of critical facilities from state resources. 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. Lawrence 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 Lawrence County. Essential facilities are a subset of critical facilities. Appendix E include a comprehensive list of the essential facilities in Lawrence County and Appendix F displays a large format map of the locations of the critical facilities within the county.

Table 4-7. Lawrence County's Essential Facilities

Facility	Number of Facilities
EOC	1
Fire Stations	4
Police Stations	4
Medical Care	1
Schools	6

Facility Replacement Costs

Table 4-8 identifies facility replacement costs and total building exposure. Lawrence 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. Lawrence County's Building Exposure

General Occupancy	Estimated Total Buildings	Total Building Exposure
Residential	6,600	$349,600,626
Agriculture	459	$11,337,858
Commercial	654	$4,411,235,595
Industrial	118	$542,567,595
Total:	**7,831**	**$5,314,741,674**

Future Development

Lawrence 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 of Lawrenceville within close proximity to transportation corridors such as US Route 50 and Illinois Route 1 (see section 3.4 Land Use and Development Trends).

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

Depending upon the analysis options and the quality of data the user inputs, Hazus-MH generates a combination of site-specific and aggregated loss estimates. Hazus-MH is not intended as a substitute for detailed engineering studies; it is intended to serve as a planning aid for communities interested in

assessing their risk to flood-, earthquake-, and hurricane-related hazards. This plan does not fully document the processes and procedures completed in its development, but this documentation is available upon request. Table 4-9 indicates the analysis type (i.e. GIS, Hazus-MH, or historical records) used for each hazard assessment.

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

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

4.3.2 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 166 hailstorms, lightning events, and thunderstorm and wind storms in Lawrence County since 1950. Table 4-10 identifies selected NCDC-recorded storms that caused major damage, death, or injury in Lawrence County. Additional details of individual hazard events are on the NCDC website.

Table 4-10. Selected NCDC-Recorded Severe Thunderstorms that Caused Major, Death, or Injury in Lawrence County

Location or County*	Date	Deaths	Injuries	Property Damage
Lawrence	03/1984	0	2	0
	Total:	**0**	**2**	**0**

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

Geographic Location 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 Lawrence County Planning Team's assessment, severe thunderstorms are ranked as the number one hazard.

Risk Priority Index

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 Lawrence 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 essential facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

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

Infrastructure

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

Potential Dollar Losses from Thunderstorm Hazard

According to the NDCD, Lawrence County has incurred approximately $881,000 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 decades, SIU estimates that Lawrence County incurs property damages of approximately $13,800 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 near the City of Lawrenceville. Additional warning sirens can warn the community of approaching storms to ensure the safety of Lawrence County residents and minimizing property damage.

4.3.3 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 4-11 outlines the Enhanced Fujita intensity scale.

Table 4-11. Enhanced Fujita Tornado Rating

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

Previous Occurrences of Tornadoes

There have been several occurrences of tornadoes in Lawrence County during recent decades. The National Climatic Data Center (NCDC) database reported 8 tornadoes/funnel clouds in Lawrence County since 1950. Table 4-12 identifies NCDC-recorded tornadoes that caused damage, death, or injury in Lawrence County. Additional details of individual hazard events are on the NCDC website.

The most damaging tornado event occurred in February 1956, when a tornado developed near Olney (Richland County), moving 20 miles before lifting in northern Lawrence County East of Pinkstaff. The worst damage was at Pinkstaff. The tornado did about $2.5 million in damage, mainly in Pinkstaff and injured 2 people.

Table 4-12. NCDC-Recorded Tornadoes That Caused Damage, Death, or Injury in Lawrence County

Location or County*	Date	Scale	Deaths	Injuries	Property Damage
Lawrence County	04/1956	F2	0	0	$25,000
Lawrence County	02/1956	F2	0	2	$2,500,000
Lawrence County	05/1958	F1	0	1	$25,000
Lawrence County	04/1963	F2	0	10	$250,000
Lawrence County	05/1971	F2	0	0	$25,000
Lawrence County	04/1974	F3	0	0	$25,000
Lawrence County	06/1990	F2	0	1	$250,000
Lawrence County	03/2009	EF1	0	1	$305,000
		Total:	**0**	**5**	**$3,405,000**

*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 Lawrence County is likely. The County should expect tornadoes with varying magnitudes to occur in the future. Tornadoes ranked as the number two hazard according to the Lawrence County Planning Team's risk assessment.

Risk Priority Index

Probability	x	Magnitude	=	RPI
3	x	4	=	12

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 Lawrence 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 essential facilities for the entire county and Appendix F displays a large format map of the locations of all critical facilities within the county.

Building Inventory

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

Infrastructure

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

GIS-based Tornado Analysis

One tornado scenario was conducted for Lawrence County through the Cities of Bridgeport, Sumner and Lawrenceville. The following analysis quantifies the anticipated impacts of tornadoes in the county in terms of numbers and types of buildings and infrastructure damaged.

GIS-overlay modeling was used to determine the potential impacts of an EF4 tornado. The analysis used a hypothetical path based upon the F4 tornado event that runs through the cities above. Table 4-13 depicts tornado damage curves and path widths utilized for the modeled scenarios. The damage curve is based on conceptual wind speeds, path winds, and path lengths from the Enhanced-Fujita Scale guidelines.

Table 4-13. 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 tornado path were created in GIS with buffers added (damage zones) around the tornado paths. Table 4-14 and Figure 4-3 illustrate the zone analysis. Figure 4-4 depicts the selected hypothetical tornado paths.

Table 4-14. EF4 Tornado Zones and Damage Curves

Zone	Buffer (feet)	EF4 Damage Curve
1	0-150	100%
2	150-300	80%
3	300-600	50%
4	600-900	10%

Figure 4-3. EF4 Tornado Analysis (Damage Curves) Using GIS Buffers

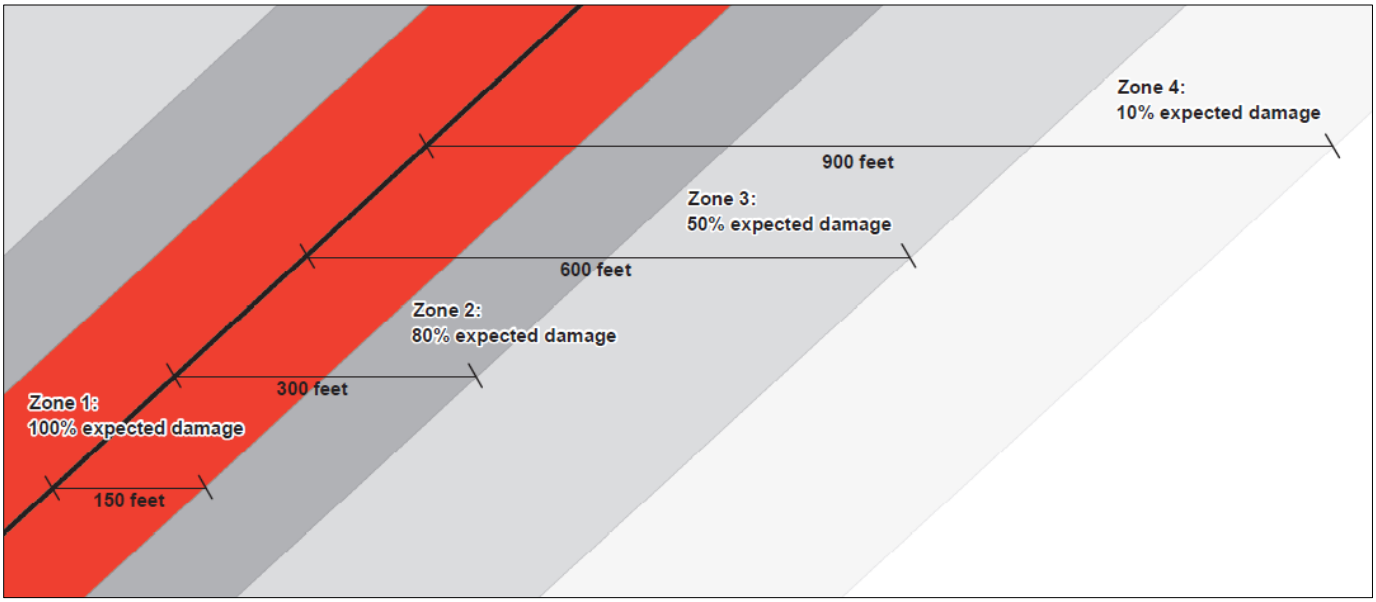
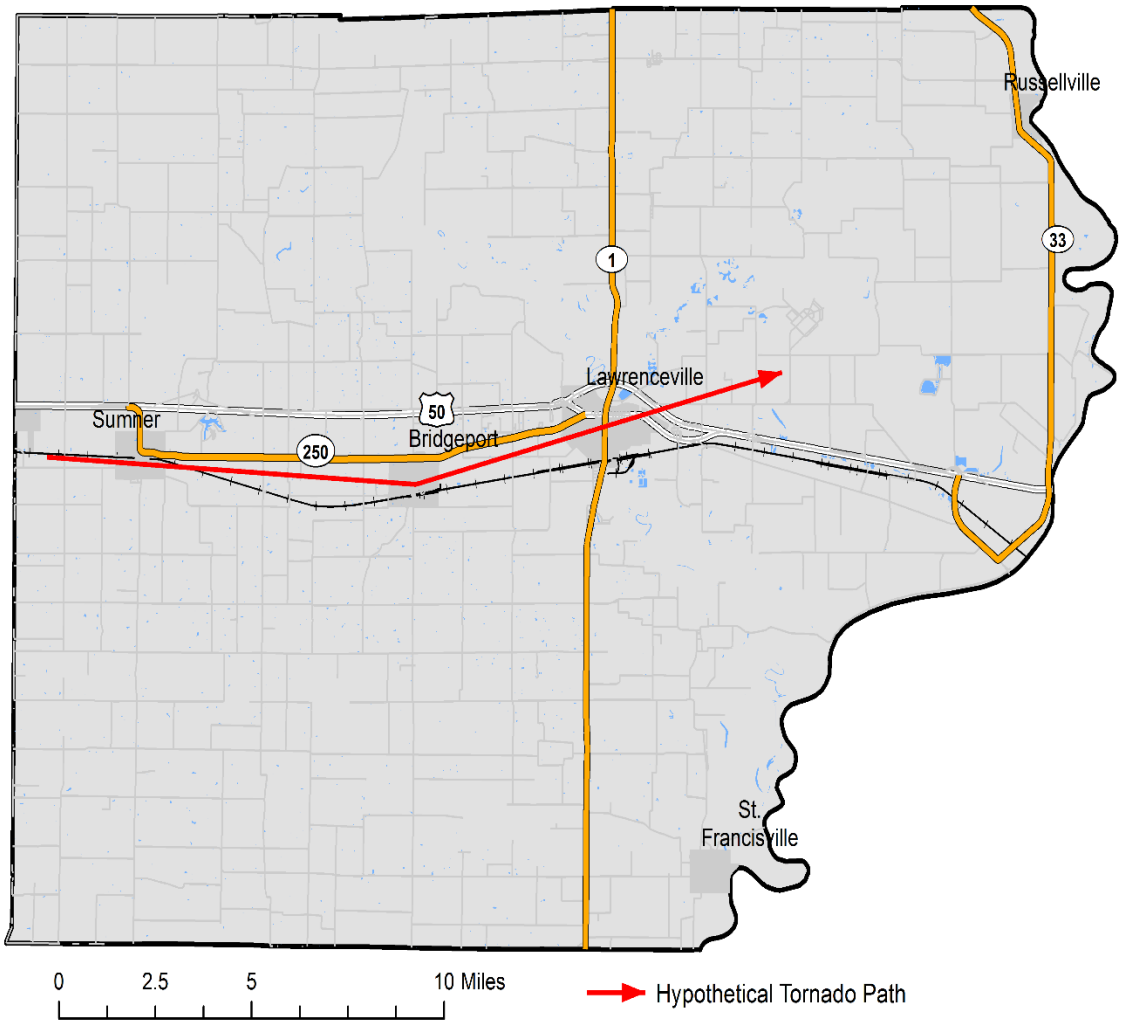


Figure 4-4. Modeled Tornado Track for Lawrence County



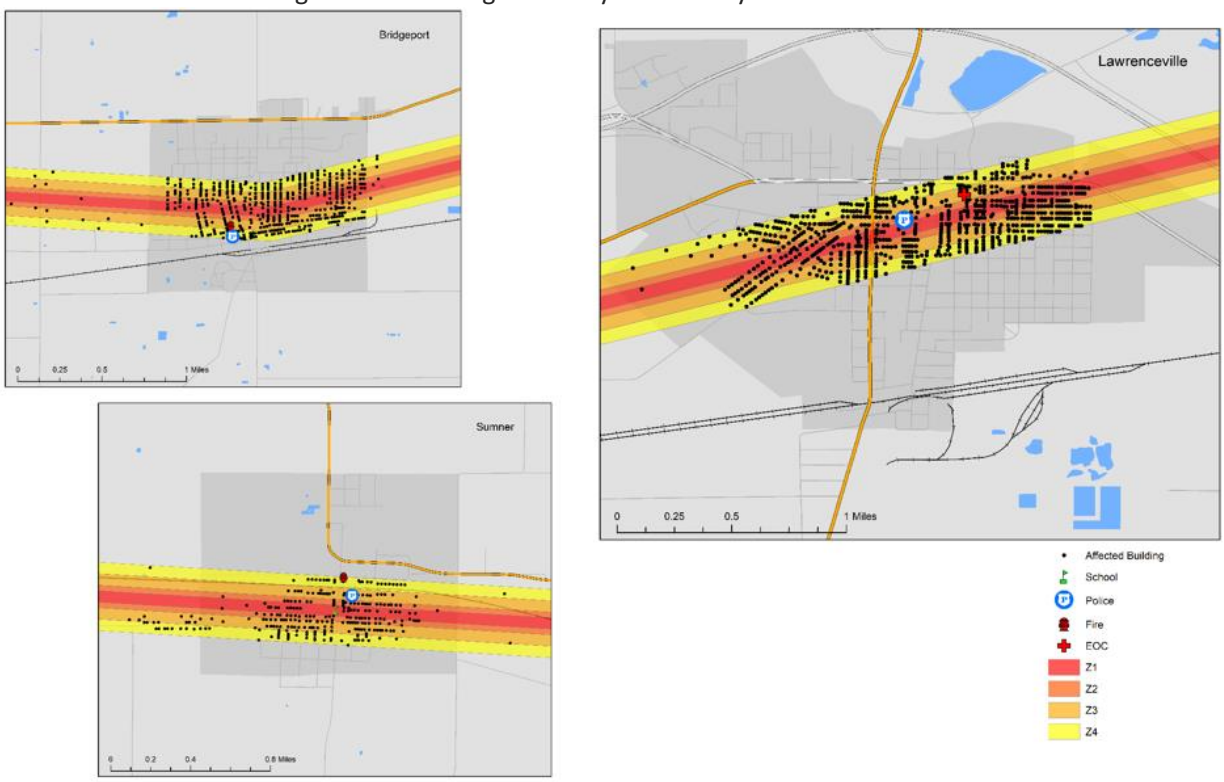
Modeled Impacts of the EF4 Tornado

The GIS analysis estimates that the modeled EF4 tornado would damage 1604 buildings. The estimated building losses are approximately $747 million. The building losses are an estimate of building replacement costs multiplied by the damage percent. Table 4-15 and Figures 4-5 show the results of the EF4 tornado analysis.

Table 4-15. Estimated Building Loss by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$14,425,259	$12,019,666	$17,495,829	$2,842,036
Agriculture	$0	$14,558	$210,600	$63,208
Commercial	$109,973,808	$137,973,067	$389,987,841	$62,001,981
Industrial	$0	$264,180	$0	$0
Total:	**$124,399,067**	**$150,271,471**	**$407,694,270**	**$64,907,225**

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



Essential Facilities Damage

There are 7 essential facility located within 900 feet of the F4 tornado path. The affected facilities are identified in Table 4-16, and their geographic locations are shown in Figure 4-5.

Table 4-16. Essential Facilities Affected by the EF4 Tornado

Essential Facility	Facility Name
School	Sumner Attendance Center
EOC Facility	Lawrence County Civil Defense
Fire Department	Christy Fire Protection District
	Bridgeport Fire Protection District
Police Department	Sumner Police Department
	Lawrence County Sheriff
	Bridgeport Police Department

Vulnerability to Future Assets/Infrastructure for Tornado Hazard

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

Suggestions for Community Development Trends

Preparing for severe storms will be enhanced if local officials sponsor a wide range of programs and initiative to address severe storm preparedness. It is suggested that the county should build new structures with more sturdy construction, and harden existing structures to lessen the potential impacts of severe weather. This is particularly import where the future economic expansion is expected to take place within the City of Lawrenceville. Additional warning sirens can warn the community of approaching storms to ensure the safety of Lawrence County residents and minimizing 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 4-17 provides a comparison of magnitude and intensity, and Table 4-18 provides qualitative descriptions of intensity, for a sense of what a given magnitude might feel like.

Table 4-17. 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 4-18. Abbreviated Modified Mercalli Intensity Scale

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

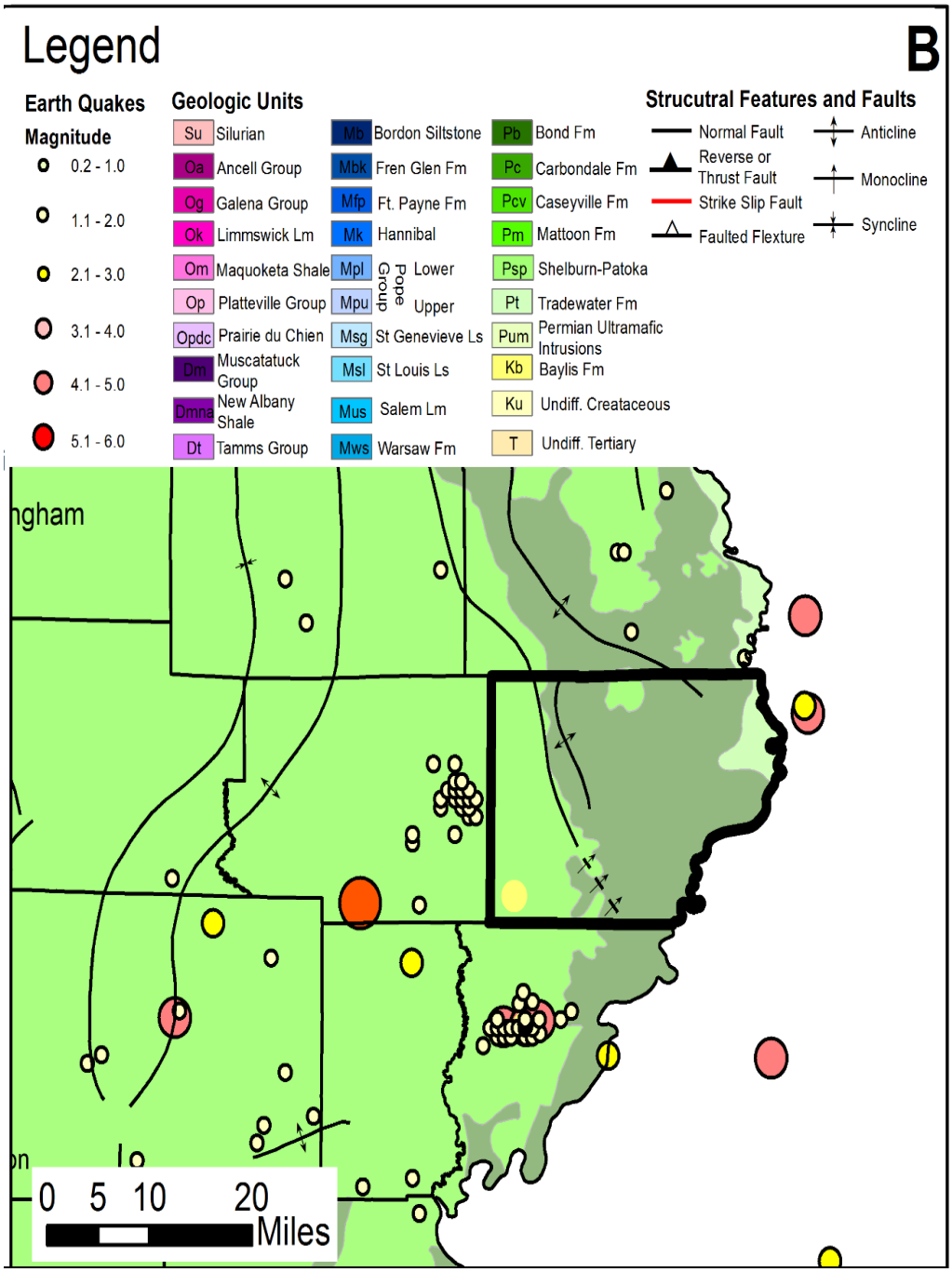
Previous Occurrences for Earthquakes

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

Earthquakes measured in Illinois vary in magnitude from very low microseismic events of M=1-3 to larger events up to M=5.4. Figure 4-6 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 Lawrence County. The most recent earthquake in Illinois—as of the date of this report—was a M3.0 event in July 2017, approximately 10 miles SW of Vandalia, Illinois in Fayette 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 4-6(C). Notable Earthquakes in Illinois with Geologic and Earthquake Epicenters in Lawrence County



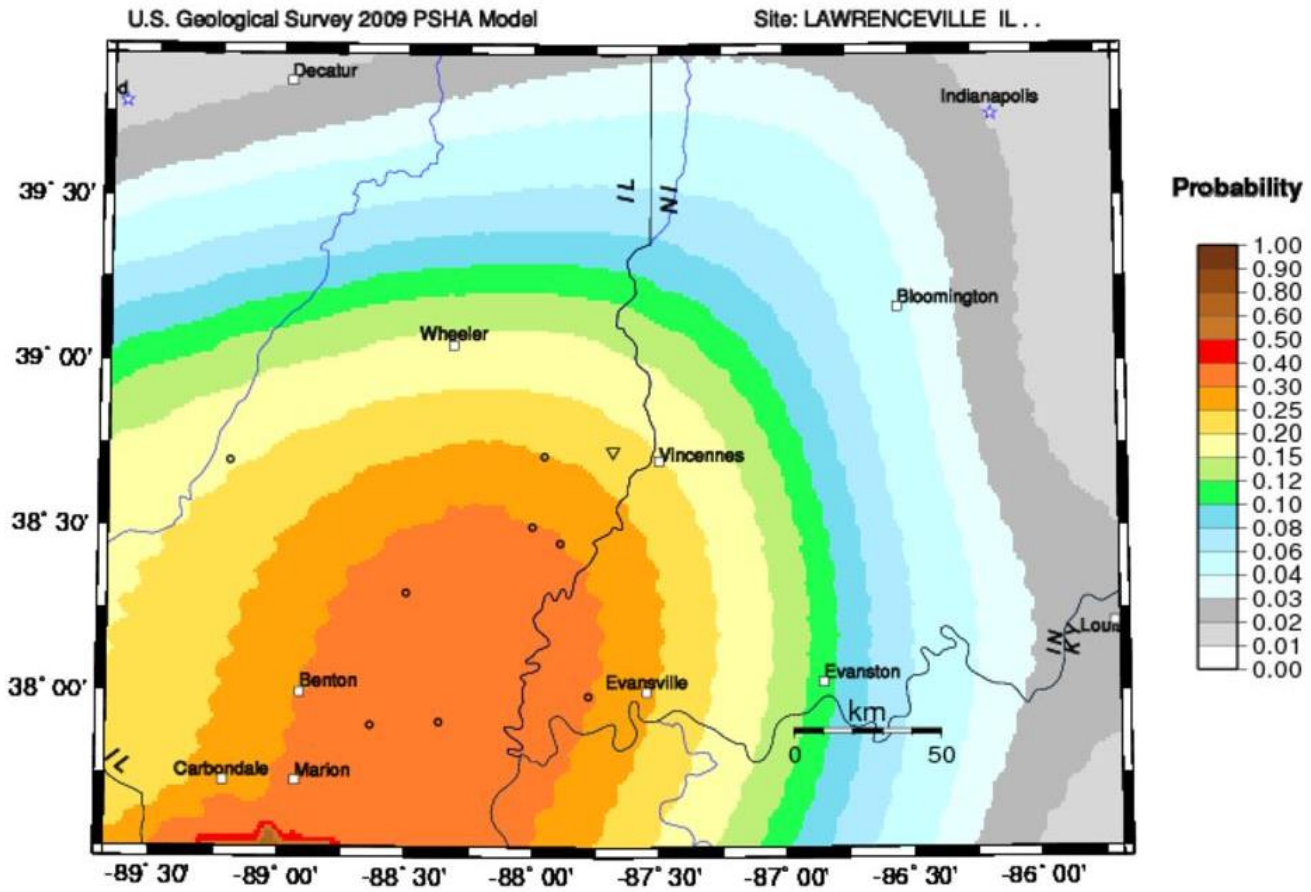
Geographic Location for Earthquake Hazard

Lawrence County is situated in a region susceptible to earthquakes. Since 1974, no epicenters of any sized earthquake has been recorded in Lawrence County (see Figure 4-6(C)) while neighboring counties have had six medium sized earthquakes and subsequent aftershock sequences. Some the of this local seismic

activity has been focused along and near the large historic stress zones such as the La Salle Anticline Belt (the southern end of which reaches into Lawrence County), the Wabash Valley Fault System (the northern extremes of which come very close to the county), and regional fault systems such as the Cottage Grove Fault System, St. Genevieve Fault Zone, Pomona Fault, and Dowel Fault. The seismogenic potential of these structures is unknown, and the geologic mechanism related to the minor intraplate earthquakes is poorly understood.

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 Lawrence County, moderate earthquakes (≤ 6.0M) in or in the vicinity of Lawrence County are probable. The USGS estimates the probability of a moderate M5.5 earthquake occurring in Lawrence County within the next 500-years at approximately 20-30% (see Figure 4-7).

Figure 4-7. Probability of M5.5 Earthquake occurring in Lawrence County within the next 500 years



Hazard Extent for Earthquake Hazard

Earthquake effects are possible anywhere in Lawrence 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 Lawrence County are possible, but large (>M7.0) earthquakes that cause catastrophic damage are unlikely. According to the Lawrence County Planning Team's assessment, earthquakes are ranked as the number three hazard.

Risk Priority Index

Probability	x	Magnitude	=	RPI
2	x	6	=	12

Vulnerability Analysis for Earthquake Hazard

Earthquakes could impact the entire county equally; therefore, the entire county's population and all buildings are vulnerable to an earthquake. To accommodate this risk, this plan considers all buildings located within the county as vulnerable. Tables 4-7 and 4-8 display the existing buildings and critical infrastructure in Lawrence 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 essential 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 Lawrence 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 epicenter in Lawrence 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 4-19, 4-20, and Figure 4-8. Hazus-MH estimates that approximately 276 buildings will be at least moderately damaged. This is over 4.00% of the total number of buildings in the Lawrence County. It is estimated that 5 building would be damaged beyond repair.

The total building related losses are approximately $19.14 million dollars. It is estimated that 16% 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 65% of the total loss.

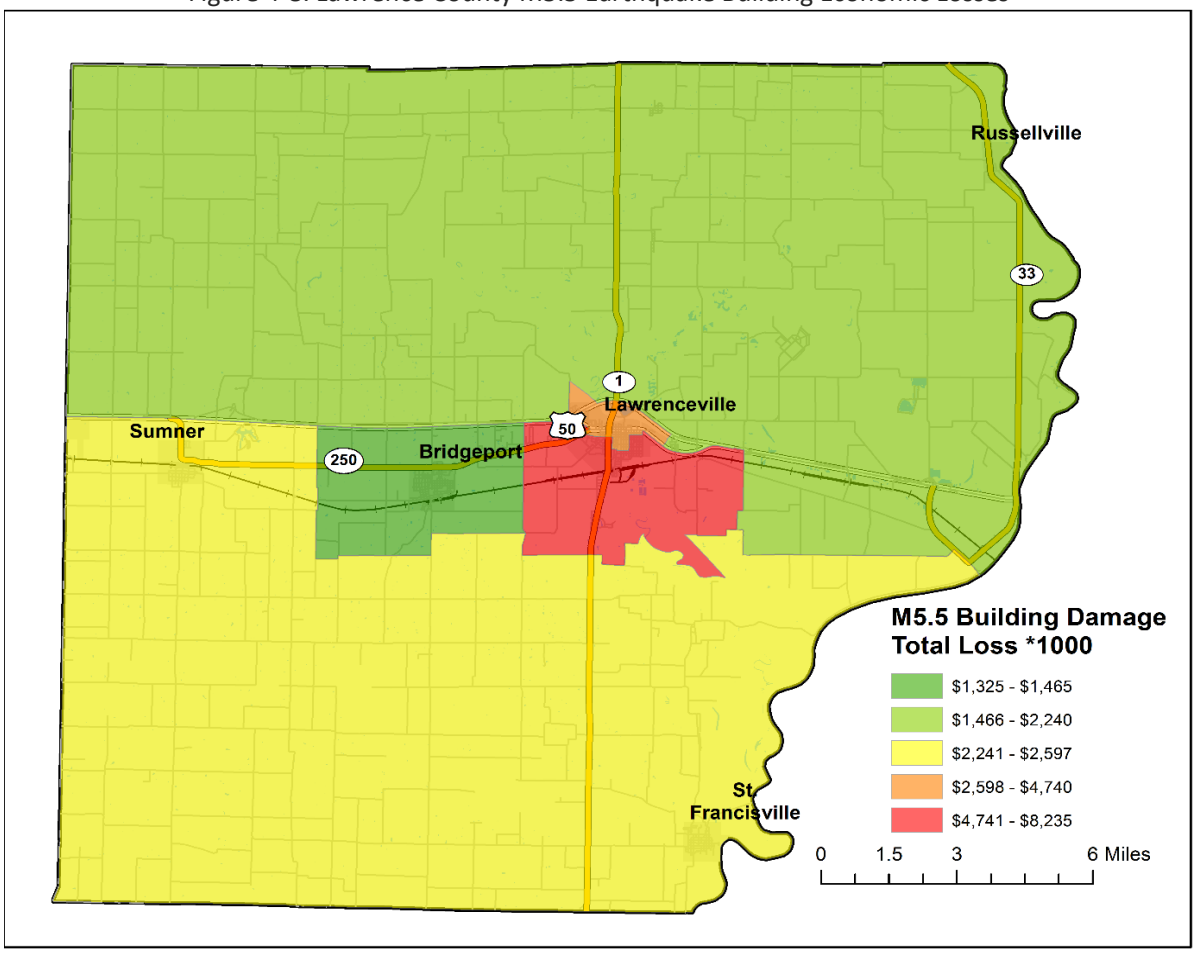
Table 4-19. M5.5 Earthquake Damage Estimates by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	15	0.25	2	0.32	1	0.49	0	0.68	0	0.47
Commercial	192	3.20	25	4.39	13	5.54	3	7.07	0	5.37
Educational	13	0.22	2	0.29	1	0.39	0	0.45	0	0.51
Government	20	0.34	2	0.32	1	0.37	0	0.36	0	0.35
Industrial	66	1.10	7	1.28	4	1.68	1	2.06	0	1.31
Other Residential	94	15.69	147	25.87	89	38.71	10	23.61	1	15.39
Religion	45	0.75	5	0.96	3	1.26	1	1.68	0	1.56
Single Family	4,702	78.45	379	66.56	118	51.55	27	64.08	4	75.04
Total:	**5,147**		**569**		**230**		**42**		**5**	

Table 4-20. 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	0.17	0.32	0.02	0.07	0.58
	Capital-Related	0.00	0.07	0.31	0.01	0.01	0.40
	Rental	0.19	0.17	0.25	0.01	0.02	0.64
	Relocation	0.71	0.21	0.35	0.05	0.20	1.51
	Subtotal	**0.90**	**0.62**	**1.23**	**0.09**	**0.30**	**3.13**
Capital Stock Losses	Structural	1.60	0.48	0.55	0.18	0.33	3.14
	Non-Structural	4.95	1.79	1.32	0.50	0.68	9.24
	Content	1.62	0.46	0.73	0.35	0.38	3.55
	Inventory	0.00	0.00	0.02	0.05	0.01	0.08
	Subtotal:	**8.17**	**2.73**	**2.62**	**1.08**	**1.40**	**16.01**
	Total:	**9.07**	**3.35**	**3.85**	**1.17**	**1.70**	**19.14**

Figure 4-8. Lawrence 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 4-21, 4-22, and Figure 4-9. Hazus-MH estimates that approximately 5 buildings will be at least moderately damaged. It is estimated that 0 buildings would be damaged beyond repair.

The total building related losses are approximately $1.86 million dollars. It is estimated that 2% 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 62% of the total loss.

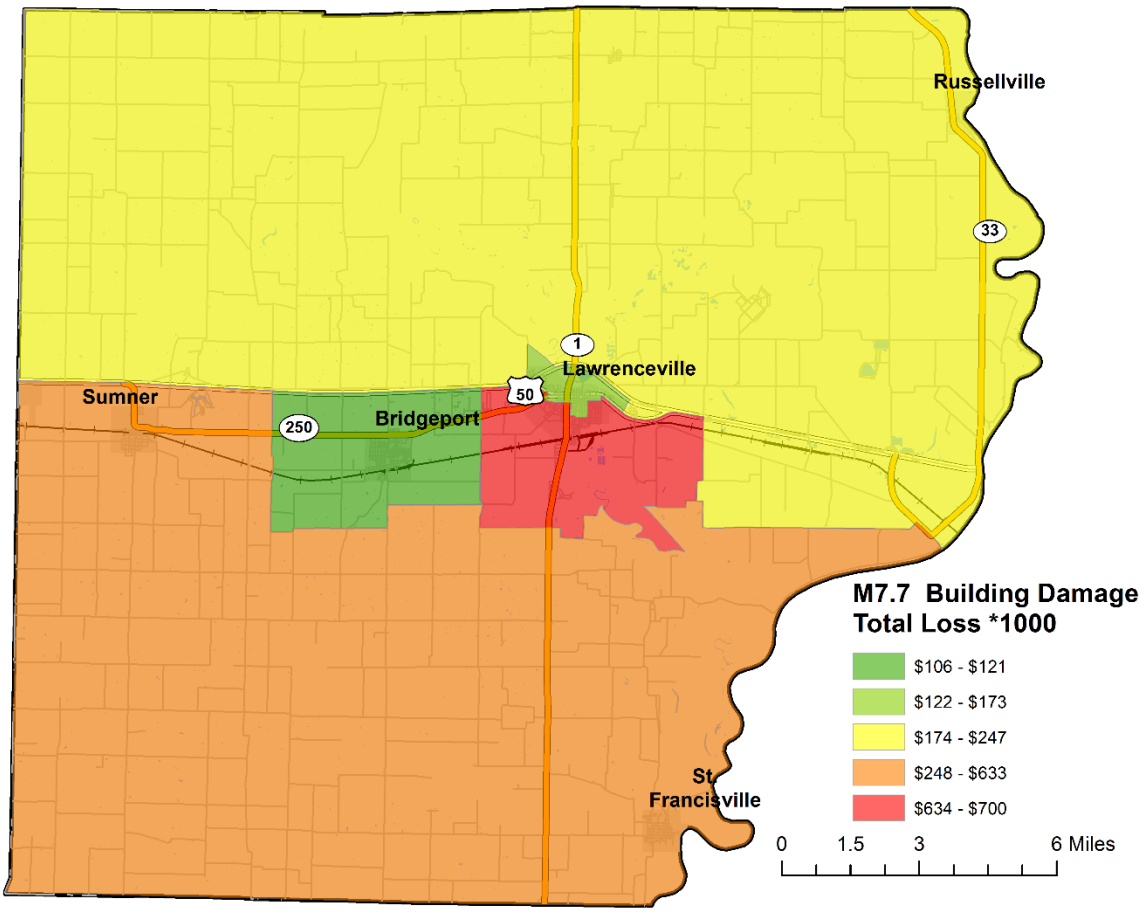
Table 4-21. New Madrid M7.7 Earthquake Damage Estimates by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	18	0.21	0	0.26	0	0.40	0	0.55	0	0.00
Commercial	218	2.57	2	2.91	0	4.15	0	5.78	0	0.00
Educational	13	0.15	0	0.19	0	0.21	0	0.40	0	0.00
Government	20	0.23	0	0.26	0	0.31	0	0.55	0	0.00
Industrial	74	0.87	1	1.03	0	1.66	0	2.04	0	0.00
Other Residential	2,833	33.84	44	54.29	3	1.66	0	2.04	0	0.00
Religion	45	0.53	1	0.63	0	0.76	0	1.31	0	0.00
Single Family	5,276	62.10	33	40.42	2	31.43	0	65.43	0	0.00
Total:	**8,497**		**81**		**5**		**0**		**0**	

Table 4-22. 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	0.01
	Capital-Related	0.00	0.00	0.00	0.00	0.00	0.01
	Rental	0.00	0.00	0.00	0.00	0.00	0.01
	Relocation	0.01	0.00	0.00	0.00	0.00	0.02
	Subtotal:	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.05**
Capital Stock Losses	Structural	0.02	0.01	0.01	0.00	0.01	0.05
	Non-Structural	0.43	0.27	0.15	0.111	0.10	1.05
	Content	0.29	0.12	0.11	0.08	0.09	0.69
	Inventory	0.00	0.00	0.00	0.02	0.00	0.02
	Subtotal:	0.74	0.40	0.27	0.21	0.20	1.81
	Total:	**0.75**	**0.40**	**0.27**	**0.21**	**0.20**	**1.86**

Figure 4-9. New Madrid M7.7 Earthquake Building Economic Losses



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

The results of the Lawrence Valley M7.1 earthquake scenario are depicted in Tables 4-23, 4-24, and Figure 4-10. Hazus-MH estimates that approximately 2,265 buildings will be at least moderately damaged. This is over 26.00% of the buildings in the county. It is estimated that 80 buildings would be damaged beyond repair.

The building related losses are approximately $168.07 million dollars. It is estimated that 14% of the losses are related to the business interruption of the region. The largest loss is sustained by the residential occupancies which make up over 57% of the total loss.

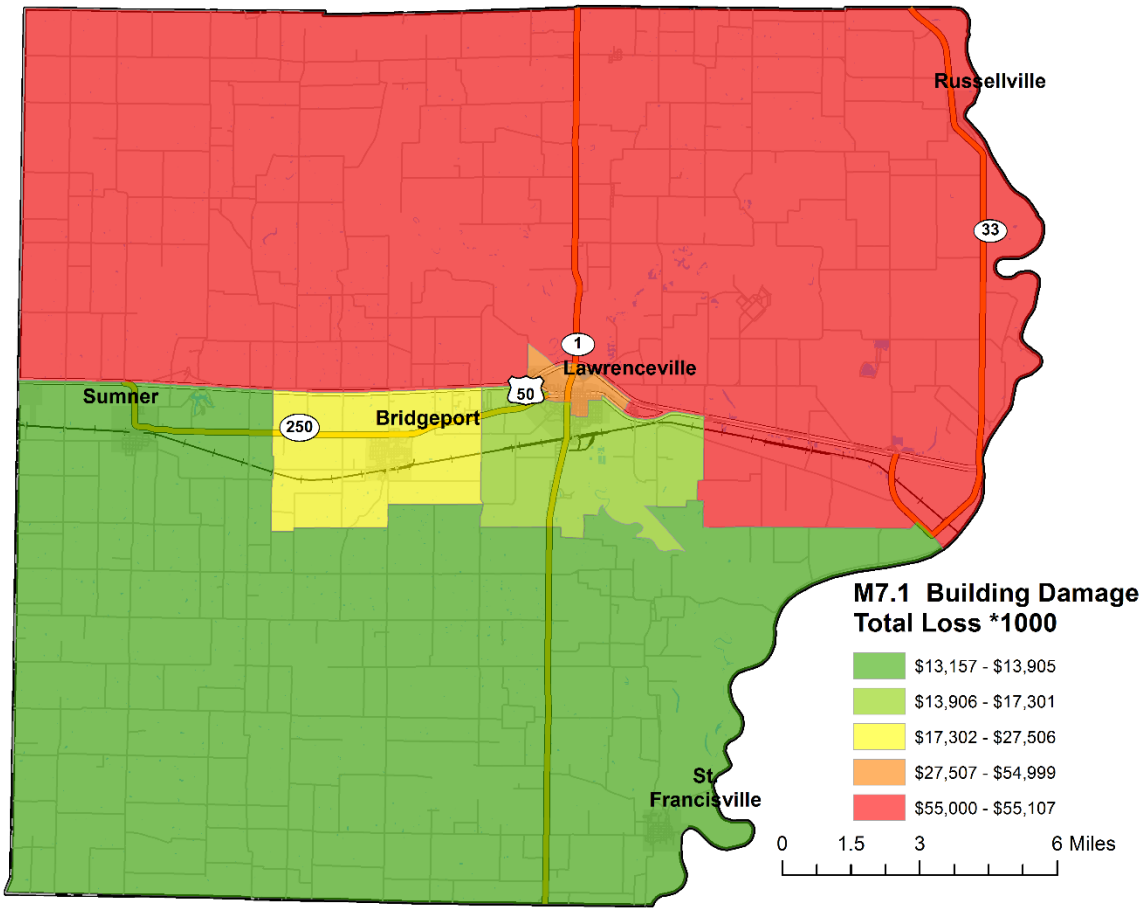
Table 4-23. Wabash Valley 7.1 Magnitude Earthquake Damage Estimates by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	9	0.25	3	0.13	4	0.23	2	0.28	0	0.19
Commercial	67	1.80	52	2.02	66	4.00	31	5.84	4	5.25
Educational	5	0.14	3	0.11	3	0.21	1	0.24	0	0.22
Government	6	0.17	4	0.17	6	0.38	3	0.47	0	0.44
Industrial	25	0.67	15	0.60	23	1.39	11	1.99	1	1.46
Other Residential	1,150	30.76	836	32.38	648	39.30	218	40.72	28	35.00
Religion	17	0.46	11	0.44	12	0.70	5	0.98	1	0.91
Single Family	2,457	65.76	1,656	64.15	887	53.79	265	49.48	46	56.54
Total:	**3,736**		**2,580**		**1,649**		**536**		**80**	

Table 4-24. Wabash Valley 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	0.44	2.69	0.31	0.48	3.91
	Capital-Related	0.00	0.18	2.97	0.21	0.11	3.47
	Rental	1.56	0.90	1.98	0.13	0.17	4.73
	Relocation	5.78	1.17	2.89	0.60	1.65	12.09
	Subtotal:	**7.34**	**2.69**	**10.53**	**1.25**	**2.41**	**24.20**
Capital Stock Losses	Structural	7.35	1.73	3.33	1.54	1.80	15.75
	Non-Structural	37.83	13.01	13.46	7.69	6.87	78.86
	Content	20.73	5.27	9.37	6.63	5.48	47.49
	Inventory	0.00	0.00	0.23	1.39	0.15	1.77
	Subtotal:	**65.91**	**20.01**	**26.39**	**17.25**	**14.30**	**143.87**
	Total:	**73.25**	**22.70**	**36.92**	**18.50**	**16.71**	**168.07**

Figure 4-10. 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 Hazardous Material Storage and Transportation Hazard

Hazard Definition

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

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

Previous Occurrences of Hazardous Materials Storage and Transportation Hazard

Lawrence 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.

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 Lawrence County is likely. According to the Risk Priority Index (RPI) and County input, hazardous materials storage and transportation hazard is ranked as the number four hazard.

Risk Priority Index

Probability	x	Magnitude	=	RPI
3	x	2	=	6

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 Lawrence 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 essential 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.

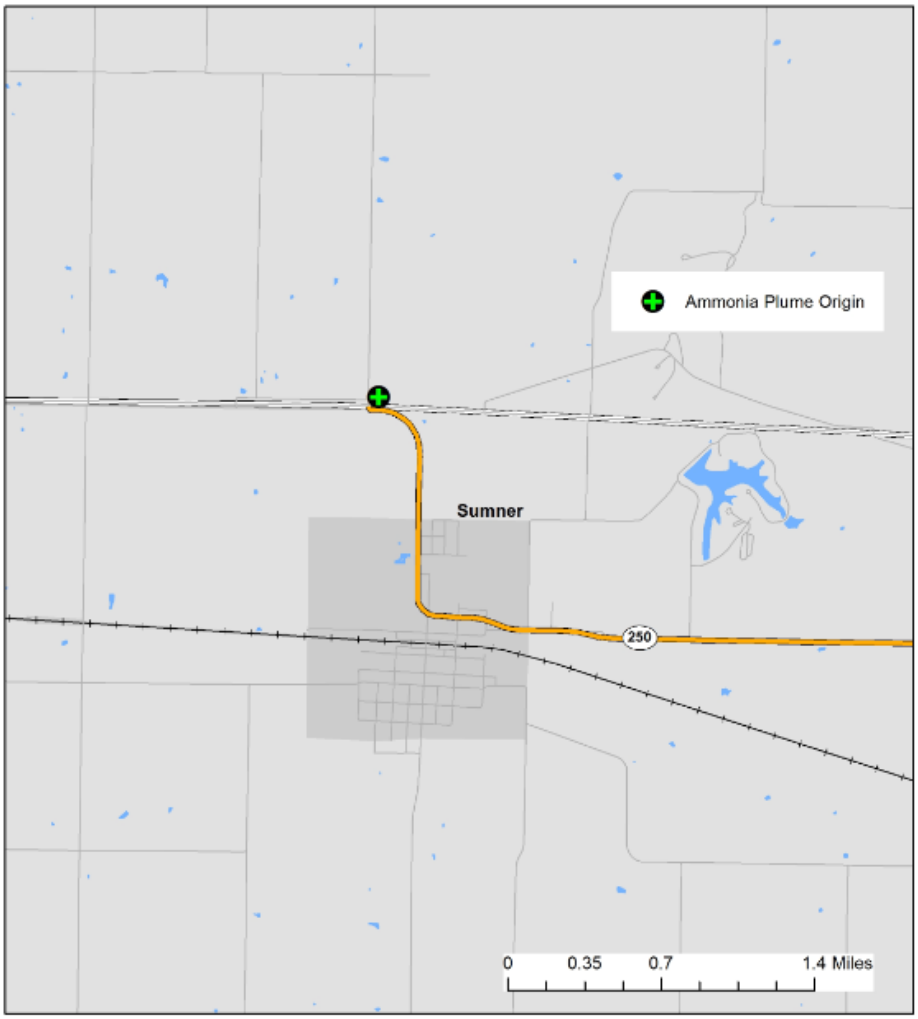
ALOHA Hazardous Chemical Release Analysis

The U.S. Environmental Protection Agency's ALOHA (Areal Locations of Hazardous Atmospheres) model was used to assess an ammonia release at the intersection of IL 250 and US 50 in Sumner. ALOHA is a computer program designed for response to chemical accidents, as well as emergency planning and training. The Lawrence County planning team chose this scenario because of the transport of ammonia along these main routes in proximity to the city.

Ammonia is a clear colorless gas with a strong odor. Ammonia is shipped as a liquid under its own vapor pressure. The density of liquid ammonia is 6 lb/gal. Contact with the unconfined liquid can cause frostbite. Gas is generally regarded as nonflammable but does burn within certain vapor concentration limits and with strong ignition. Fire hazard increases in the presence of oil or other combustible materials. Although gas is lighter than air, vapors from a leak initially hug the ground. Prolonged exposure of containers to fire or heat may cause violent rupturing and rocketing. Long-term inhalation of low concentrations of the vapors or short-term inhalation of high concentrations have adverse health effects. Used as a fertilizer, as a refrigerant, and in the manufacture of other chemicals (NOAA Reactivity, 2007).

For the Sumner Ammonia Release scenario SIU assumed average atmospheric and climatic conditions for the fall season with a breeze from the northeast. Figures 4-11 depicts the plume origins of the modeled hazardous chemical releases in Lawrence County.

Figure 4-11. ALOHA Modeled Hazardous Chemical Plume Origin in Lawrence County



ALOHA displays the estimated threat zones as Acute Exposure Guideline Levels (AEGL). The AEGLs 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/m^3) 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/m^3) 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/m^3) 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.

Analysis Parameters of the Sumner Ammonia Scenario

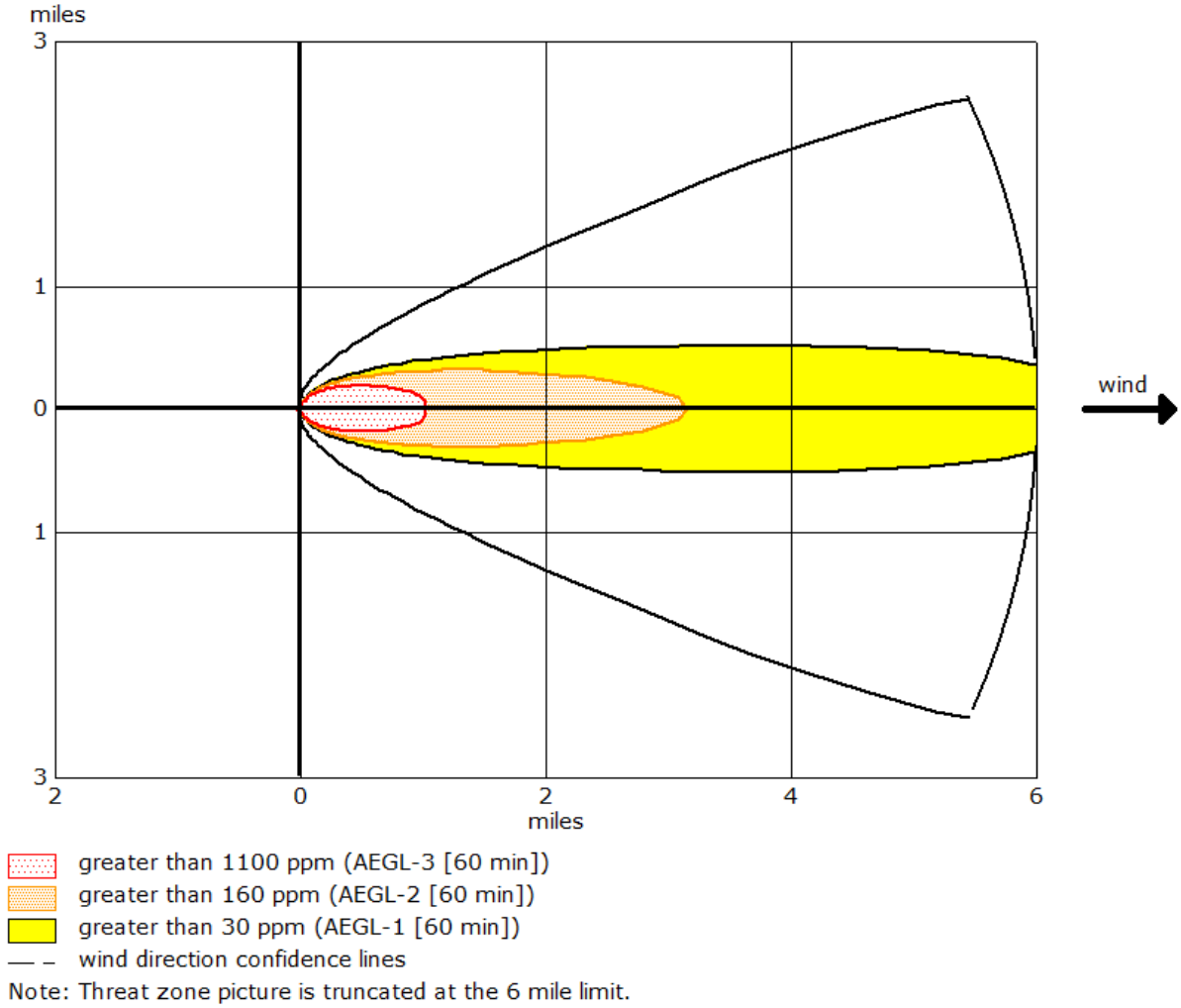
The ALOHA atmospheric modeling parameters for the ammonia release, depicted in Figure 4-12, were based upon a northern speed of 6 miles per hour. The temperature was 58°F with 75% humidity and a cloud cover of five-tenths skies. SIU used average weather conditions reported by NOAA for wind direction, wind speed, and temperature to simulate fall conditions. 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 ammonia in this tank is in its liquid state. This release was based on a leak from a 2.5-inch-diameter hole, 12 inches above the bottom of the tank. Figure 4-12 shows the plume modeling parameters in greater detail.

Figure 4-12. ALOHA Modeling Parameters for Ammonia Release

```
County Aloha Starting Parameters
Using the Lawrenceville-Vincennes International Airport as the location for the Monthly Weather Summary from NOAA
http://www.nws.noaa.gov/climate/

Chemical Release
        Location: Sumner, IL
        Elevation: 146.719
        Month: March
        Average Wind Speed:6
        Wind Direction: North
        Average Temperature: 58

 SITE DATA:
   Location: SUMNER, ILLINOIS
   Building Air Exchanges Per Hour: 0.61 (unsheltered single storied)
   Time: March 25, 2015  1640 hours CDT (using computer's clock)

 CHEMICAL DATA:
   Chemical Name: AMMONIA                Molecular Weight: 17.03 g/mol
   AEGL-1 (60 min): 30 ppm   AEGL-2 (60 min): 160 ppm   AEGL-3 (60 min): 1100 ppm
   IDLH: 300 ppm      LEL: 150000 ppm     UEL: 280000 ppm
   Ambient Boiling Point: -28.8° 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: 6 miles/hour from 345° true at 10 feet
   Ground Roughness: open country         Cloud Cover: 5 tenths
   Air Temperature: 58° F                Stability Class: C
   No Inversion Height                   Relative Humidity: 75%

 SOURCE STRENGTH:
   Leak from hole in horizontal cylindrical tank
   Flammable chemical escaping from tank (not burning)
   Tank Diameter: 8 feet                 Tank Length: 33 feet
   Tank Volume: 12,408 gallons
   Tank contains liquid                  Internal Temperature: 58° F
   Chemical Mass in Tank: 24.0 tons      Tank is 75% full
   Circular Opening Diameter: 2.5 inches
   Opening is 12 inches from tank bottom
   Release Duration: 11 minutes
   Max Average Sustained Release Rate: 7,020 pounds/min
      (averaged over a minute or more)
   Total Amount Released: 44,480 pounds
   Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).
```

Using the parameters in Figure 4-12, approximately 44,480 pounds of material would be released. The image in Figure 4-13 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 4-13. ALOHA Generate Plume Footprint of the Sumner Ammonia Release



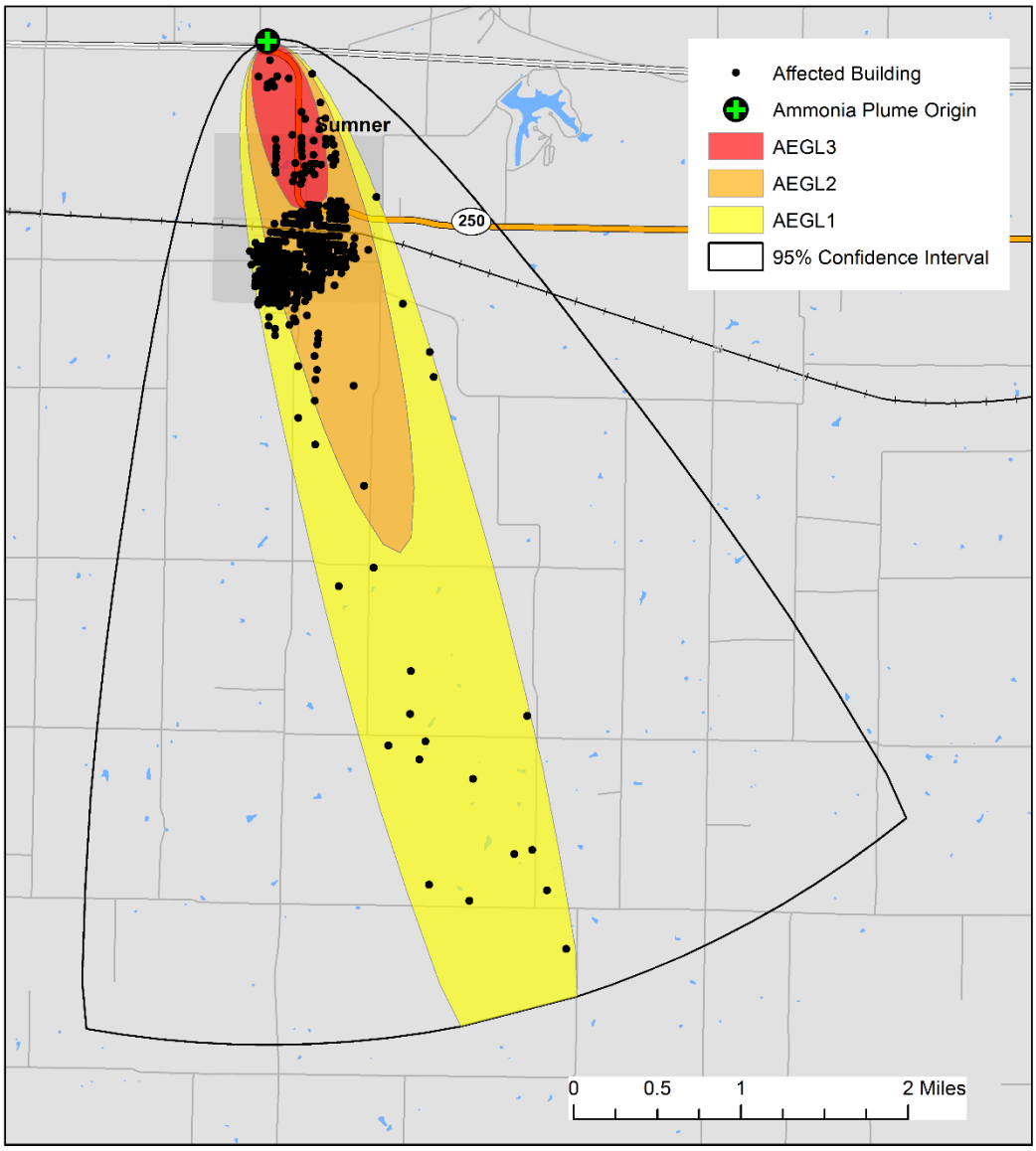
Results for Sumner Ammonia Scenario

An estimate of property exposed to the ammonia spill was calculated by using the building inventory and intersecting these data with each of the AEGL levels. The Lawrence County assessment and parcel data was utilized for this analysis. There are 517 buildings within the ammonia 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 ammonia release. Table 4-25 lists the total amount of building exposure to each AEGL zone. Figure 4-14 depicts the ammonia spill footprint and location of the buildings exposed.

Table 4-25. Estimated Building Exposure as a Result of an Ammonia Release

Occupancy	Building Exposure			Number of Buildings		
	AEGL 1	AEGL 2	AEGL 3	AEGL 1	AEGL 2	AEGL 3
Residential	$12,776,481	$16,007,688	$3,586,127	108	305	34
Commercial	$0	$820,097,058	$111,550,398	0	50	9
Industrial	$0	$0	$0	0	0	0
Agricultural	$333,870	$6,000	$67,398	8	2	1
Total:	**$13,110,351**	**$836,110,746**	**$115,203,923**	**116**	**357**	**44**

Figure 4-14. ALOHA Plume Footprint and Buildings Exposed to the Ammonia Release

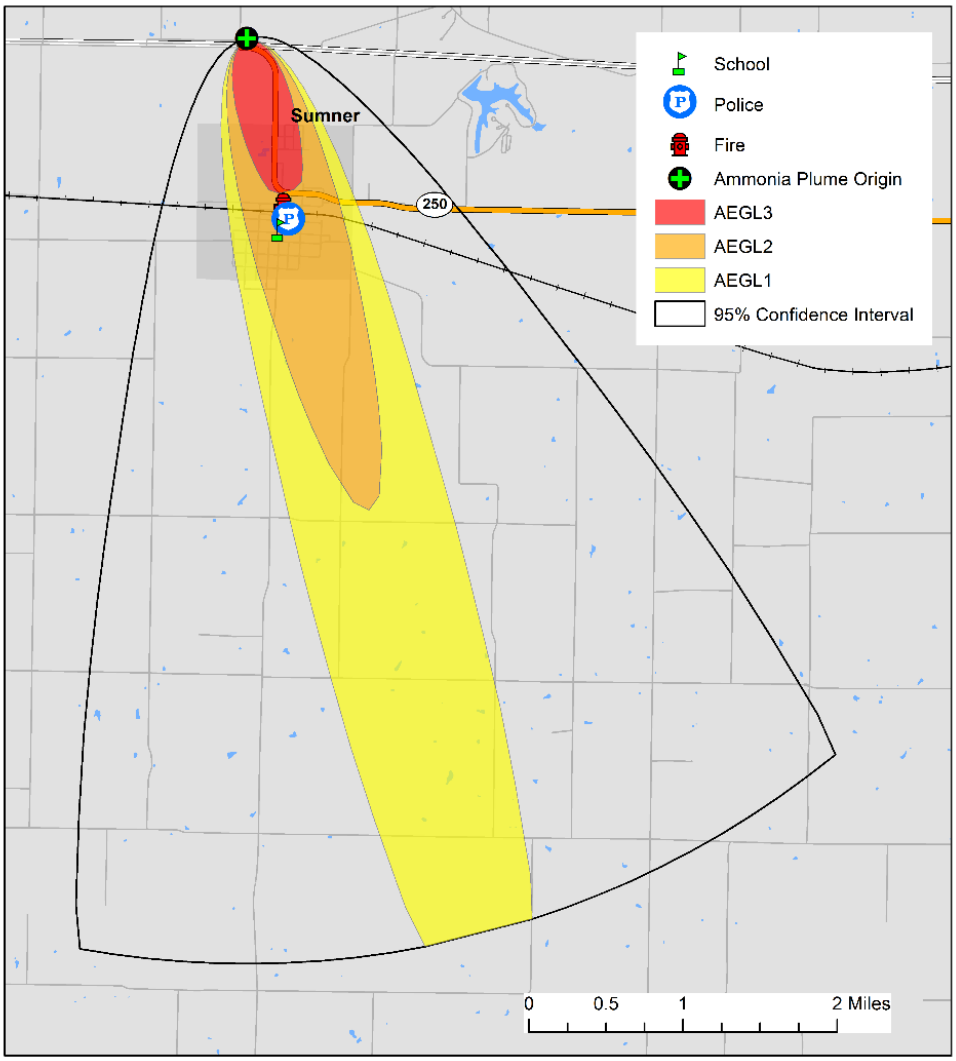


There are 4 essential facilities within the limits of the Sumner ammonia scenario. Table 4-26 and Figure 4-15 identifies the affected facilities.

Table 4-26. Essential Facilities within the Sumner Ammonia Plume Footprint

Essential Facility	Facility Name
Schools	Sumner Attendance Center
Fire Department	Christy Fire Protection District
Police Department	Sumner Police Department

Figure 4-15. Map of Essential Facilities within the Sumner Ammonia Plume Footprint



Suggestion for Community Development Trends

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

4.3.6 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 30 flooding events in Lawrence County. The most significant flood events occurred in June 2008. Very heavy rainfall throughout east-central and southeast Illinois over two days causing the Embarras River to overtop levees and flood 75 square-miles. Table 4-27 identifies NCDC-recorded flooding events that caused damage, death, or injury in Lawrence County.

Table 4-27. NCDC-recorded Flooding Events that caused Death, Damage or Injury in Lawrence County

Location or County*	Date	Deaths	Injuries	Property Damage
Birds	1996	0	0	$250,000
Bridgeport	1999	0	0	$12,000
St. Francisville	2008	0	0	$1,500,000
	Total:	**0**	**0**	**$1,762,000**

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

There are 2 residential structures in Lawrence County that have experienced repetitive losses due to flooding. FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the NFIP that has suffered flood loss damage on two or more occasions during a 10-year

period that ends on the date of the second loss, in which the cost to repair the flood damage is ≥ 25% of the market value of the structure at the time of each flood loss.

The Illinois Emergency Management Agency and Illinois Department of Natural Resources was contacted to determine the location of repetitive loss structures in Lawrence County. Records indicate that there are 2 repetitive loss structures within the county. The total amount paid for building replacement and building contents for damage to these repetitive loss structures is $73,030. Table 4-28 describes the repetitive loss structures for each jurisdiction.

Table 4-28. Repetitive Loss Structures for each Jurisdiction in Lawrence County

Jurisdiction	Number of Properties	Number of Losses	Total Paid
Lawrenceville	2	5	$73,030
Total:	**2**	**5**	**$73,030**

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 Lawrence County is the Embarras and Wabash Rivers and their tributaries. On June 10, 2008, Lawrence County was one of six counties (Clark, Coles, Crawford, Lawrence, Jasper, and Lawrence) in southeastern Illinois that was declared a state disaster area due to flooding. Heavy rains in May and June caused levees along the Embarras and Wabash rivers to fail. The Embarras River flood of record at Ste. Marie, Illinois occurred on June 8, 2008 with a flood stage of 28.01 feet. The most severe flooding occurred in eastern Lawrence County.

Hazard Extent for Flooding

All floodplains are susceptible to flooding in Lawrence 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 Lawrence County

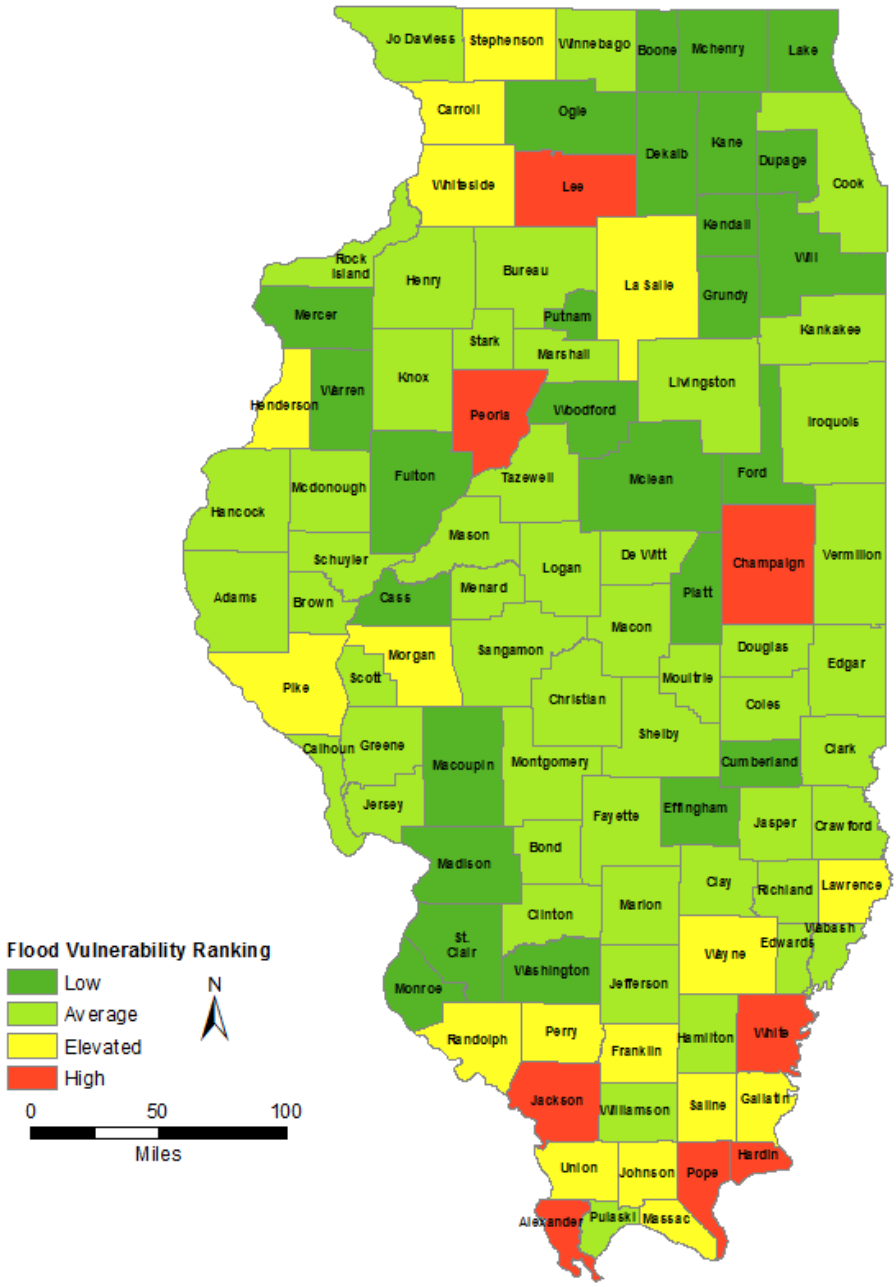
Vulnerability Analysis for Flooding

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 4-16 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. Lawrence County has an Average Flood Vulnerability Rating and ranks 12 out of the 102 counties in Illinois in terms of loss estimation according to Hazus-MH for floods. Table 4-29 lists the jurisdictional Flood Vulnerability Ratings for Lawrence County.

Table 4-29. Jurisdictional Flood Vulnerability Ranking for Lawrence County

Jurisdiction	State Ranking	Flood Vulnerability Rating
Russellville	13	High
Sumner	126	Elevated
Lawrenceville	225	Elevated
St. Francisville	236	Elevated
Bridgeport	269	Average

Figure 4-16. County Flood Vulnerability Rating for Illinois



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

Risk Identification for Flood Hazard

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

Risk Priority Index

Probability	x	Magnitude	=	RPI
4	x	4	=	16

Critical Facilities

All critical facilities within the floodplain are vulnerable to floods. An essential facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility, and loss of facility functionality (e.g., a damaged police station cannot serve the community). Appendix E include a list of the essential facilities in Lawrence 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 homes 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 Lawrence County by utilizing a detailed building inventory database created from assessor and parcel data.

According to this analysis, there are 952 buildings located in the Lawrence County 100-year floodplain. The estimated damage to these structures is approximately $628 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 4-17 depicts the building inventory within the 100-year floodplain and Table 4-30 shows the loss estimates by occupancy class.

Figure 4-17. Building Inventory Located within the 100-year Floodplain in Lawrence County

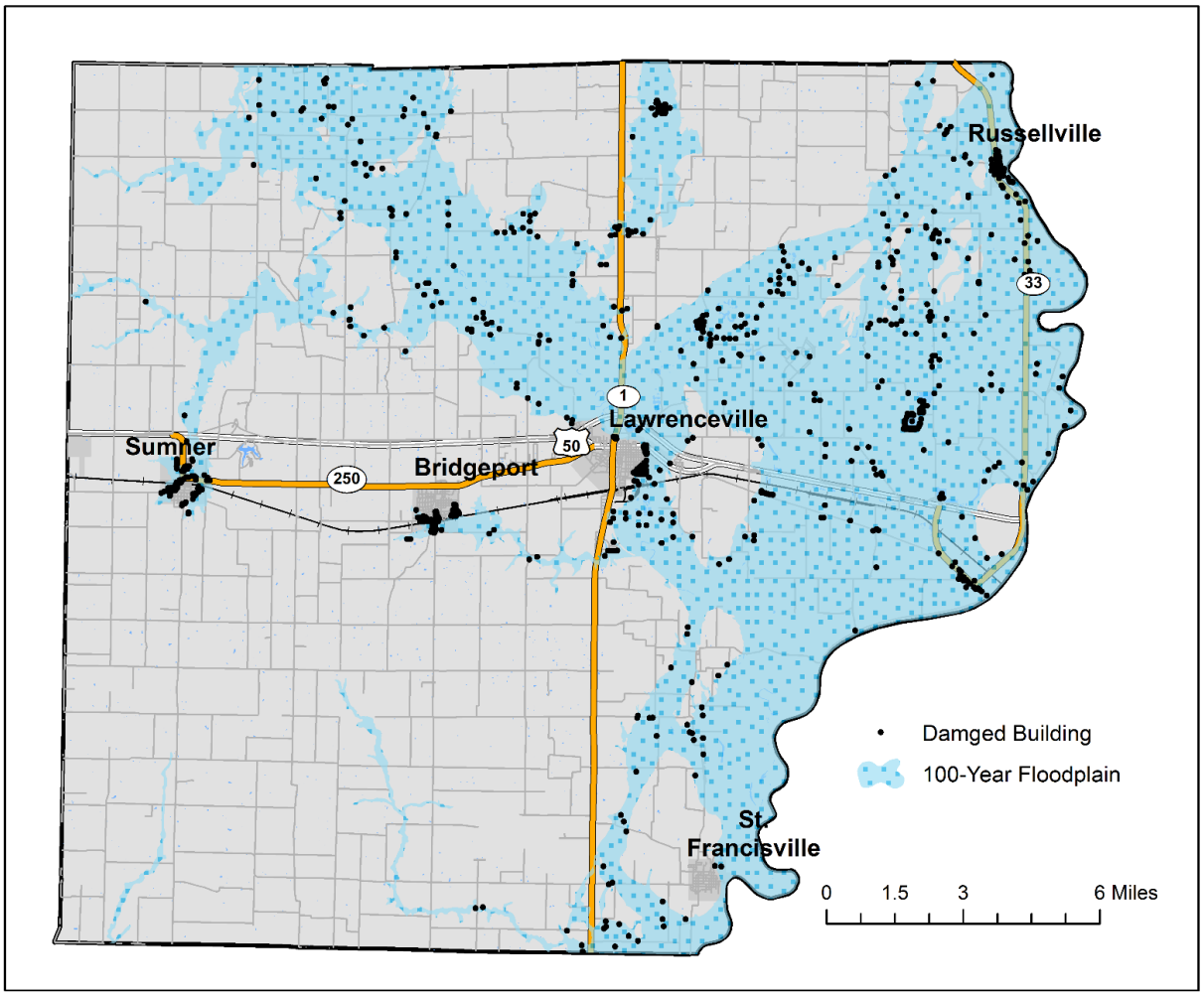


Table 4-30. Estimated Flood Losses within the 100-year Floodplain

Occupancy Class	Number of Structures	Estimated Building Related Losses
Residential	774	$14,794,927
Commercial	81	$531,576,386
Industrial	22	$80,729,316
Agricultural	75	$974,398
Total:	**952**	**$628,075,027**

Essential Facilities Damage

The analysis identified that there are no 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 Lawrence County. All essential facilities in the county are at risk. Appendix E include a list of the essential facilities in Lawrence 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.

4.3.7 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 Lawrence County historical records, in June 2008 there were levee breaks that inundated parts of the county with flood waters forcing the evacuation of 200 homes.

Geographic Location of Dams and Levees in Lawrence County

A review of the US Army Corps of Engineers National Levee Database records shows that there are two Levee systems along the Wabash River in Lawrence County. It is 22.63 miles long and is rated *Minimally Acceptable.* It is part of the Russell-Allison-Ambraw Levee Drainage District. The second is 5.99 miles long and part of the England Pond Levee System and is also rated *Minimally Acceptable.*

The U.S. Army Corps of Engineers maintains the National Inventory of Dams (NID) which identified two dams in Lawrence County. According to NID records, one dam has an Emergency Action Plan (EAP). Table 4-31 lists the dams located in Lawrence County and their respective classification level.

Table 4-31. Lawrence County Dam Inventory

Dam Name	Stream/River	Hazard Rating	EAP
Lawrenceville Sewage Basin Dam (IL50102)	Embarras River	Low	Yes
Red Hills Lake Dam (IL00177)	Muddy Creek	Significant	No

Hazard Extent for Dam and Levee Failure

Dams are 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.

Risk Identification for Dam and Levee Failure

Based on operation and maintenance requirements and local knowledge of the dams and levees in Lawrence 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 hazardous materials accident in Lawrence County is likely. According to the Risk Priority Index (RPI) and County input, flooding is ranked as the number six hazard.

Risk Priority Index

Probability	x	Magnitude	=	RPI
3	x	4	=	12

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 Lawrence County; therefore, the population and buildings located within the floodplain are vulnerable to dam and levee failure. To accommodate this risk, this plan considers those buildings in communities located within 100-year flood plain as vulnerable. According to the US Army Corps of Engineers National Levee Database, maps identifying potential impact areas suggests that failure of the Red Hills Lake Dam would result in some communities being more vulnerable than others. For example, the community of Sumner would be more vulnerable to potential impacts from the Red Hills Lake Dam than Bridgeport and Lawrenceville (east of the dam). Also, if the Lawrenceville Sewage Basin Dam were to fail, the impacts would be greater for those communities downstream of the dam.

To help clarify the potential impacts from dam and levee failure, the gap in the lack of inundation maps must be closed and perhaps identified as a mitigation action for this hazard by communities.

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 essential 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 4.3.6 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; there for all buildings and infrastructure are vulnerable. Table 4-8 includes the building exposure for Lawrence County. All essential facilities in the county are at risk. Appendix E include a list of the essential facilities in Lawrence 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 and Extreme Heat Hazard

Drought is a normal climatic phenomenon that can occur across the state of Illinois and within Lawrence 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 for the last for several weeks. Such extreme heat can have severe implications for humans. Below are common terms associate 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 17 drought/heat wave events in Lawrence County since 1950. None of these events had reported injuries or caused damage to property or crops.

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 likely. The county should expect future droughts and/or prolonged extreme heat magnitudes in the future. According to the Lawrence County Planning Team's assessment, drought and/or extreme heat are ranked as the number seven hazard.

Risk Priority Index

Probability	x	Magnitude	=	RPI
3	x	2	=	6

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 Lawrence County. Even though the exact areas affected are not known, a discussion of the potential impact are 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 essential 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 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 risk to these structures is primarily associated with fire, which could result from hot, dry conditions.

Potential Dollar Losses from Drought and Extreme Heat

According to the NCDC, Lawrence County has not experienced any property damages relating to drought and extreme heat event storms since 1950. However, Lawrence County had experienced $25.5M in crop damages due to drought in September 2012. Extreme (D3) to Exceptional (D4) drought conditions that had been ongoing across central and southeast Illinois since June eased significantly during the month of September. Remnants of Hurricane Isaac brought widespread rain totals of 2 to 4 inches from September 1st through 3rd. This was followed by additional rainfall throughout the month that resulted in much of the area being downgraded to the Moderate Drought category (D1) or better. 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 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 31 winter storm and extreme cold events for Lawrence County since 1950. The most recent reported event occurred in February of 2011. A powerful storm system tracking from the Southern Plains into the Great Lakes brought a wide variety of wintry precipitation to central and southeast Illinois on February 1st into the 2nd. The extreme winter precipitation created nearly impossible travel conditions at times and resulted in numerous accidents and injuries across central and southeast Illinois. Numerous county highways and several interstates were closed...including I-55, I-72, I-74 and I-155...from the afternoon of February 1st through much of the day February 2nd. All schools in each of the 35 impacted counties were closed for at least three days. Power outages were widespread, impacting nearly one million people. Some locations in southeast Illinois, along and south of I-70 were without power for nearly a week after the storm. Damages done to power lines, power poles, trees and other property due to ice was around $10M, while snow removal costs for communities in central and southeast Illinois was more than $4.4M. Table 4-32 identifies NCDC-recorded winter storm events that caused damage, death, or injury in Lawrence County.

Table 4-32. NCDC-Recorded Winter Storms that Caused Damage, Death, or Injury in Lawrence County

Location or County	Date	Deaths	Injuries	Property Damage
Lawrence County	1999	0	0	$1,000
Lawrence County	2011	0	0	$30,000
	Total:	**0**	**1**	**$31,000**

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 Lawrence County is likely. The county should expect winter storms with varying magnitudes to occur in the future. Winter storms ranked as the number eight hazard according to the Lawrence County Planning Team's risk assessment.

Risk Priority Index

Probability	x	Magnitude	=	RPI
3	x	2	=	6

Vulnerability Analysis of Winter Storm Hazard

Winter storm impacts are equally likely across the entire county; therefore, the entire county is vulnerable to a winter storm and can expect impacts within the affected area. To accommodate this risk, this plan considers all buildings located within the county as vulnerable. Tables 4-7 and 4-8 display the existing buildings and critical infrastructure in Lawrence 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 essential 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, Lawrence County has had some monetary losses but there have only been two events to cause damage 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 for Lawrence County.

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.

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 Lawrence County Planning Team worked to identify existing hazard mitigation policies, develop mitigation goals, and a create a comprehensive range of mitigation strategies specific to each jurisdiction. This work provides a blueprint for reducing the potential loses identified in the risk assessment (section 4).

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 Lawrence 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. Lawrence County has made great strides to improve its ability to mitigation against future hazards. The following is a project that has been successfully completed prior to the development of the Lawrence County 2017 Multi-Hazard Mitigation Plan.

UPGRADED 911 SYSTEM

Lawrence County upgraded their 911 system.

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 NIFP status, flood insurance policy and claim statistics, repetitive loss structures, and Community Rating System status.

NFIP Status

In Lawrence County, two incorporated communities participate in the NFIP. Table 5-1 includes a summary of information for Lawrence County participation in the NFIP. Bridgeport and Lawrence County were mapped with a flood risk but were sanctioned in 1982 and 2010 respectively. Sanctioned communities do not qualify for flood-related Federal disaster assistance for acquisition, construction, or reconstruction purposes in Special Flood Hazard Areas. This may have serious consequences for the community's real estate market and economic viability, as each federally regulated lender must notify the purchaser or lessee that Federal disaster assistance is not available for that property in the event of a flood. Lawrence County will continue to provide information to its non-participating jurisdictions regarding the benefits of the National Flood Insurance Program.

Two communities, Lawrenceville and Sumner, have an effective FIRM and participate in the NFIP.

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

Community	Participate in the NFIP	Initial Flood Hazard Boundary Map Identified	Initial FIRM Identified	Current Effective FIRM Date
City of Lawrenceville	Yes	03/08/1974	07/16/1984	07/18/2011
City of Sumner	Yes	03/01/1974	07/16/1984	07/18/2011
City of Bridgeport	No	07/10/1981	07/18/2011	07/18/2011
Lawrence County	No	11/24/1978	02/01/1985	07/18/2011

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 September 2016, 28 households paid flood insurance, insuring $2,520,600 in property value. The total premiums collected for the policies amounted to $13,603. Since the establishment of the NFIP in 1978, 16 flood insurance claims were filed in Lawrence County, totaling in $132,886.96 in payments. Table 5-2 summarizes the claims since 1978.

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

Community	Total Losses	Closed Losses	Open Losses	CWOP Losses	Payments
Lawrence County	3	2	0	1	$17,133.14
City of Lawrenceville	11	9	0	2	$114,024.63
City of Sumner	2	1	0	1	$1,729.19
Total	**16**	**12**	**0**	**4**	**$132,886.96**

*NFIP policy and claim statistics since 1978 until the most recently updated date of 9/30/2016. 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

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

The Illinois Emergency Management Agency and Illinois Department of Natural Resources was contacted to determine the location of repetitive loss structures in Lawrence County. Records indicate that there are 2 repetitive loss structures within the county. The total amount paid for building replacement and building contents for damage to these repetitive loss structures is $73,030. Table 5-3 describes the repetitive loss structures for each jurisdiction.

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

Jurisdiction	Number of Properties	Number of Losses	Total Paid
Lawrenceville	2	5	$73,030
Total:	**2**	**5**	**$73,030**

Community Rating System Status

Lawrence 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 maintain a CRS rating will require a degree of commitment from the community, including dedicating staff. Joining the CRS could be one way Lawrence 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 5-4 list Lawrence 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 Lawrence County Planning Team worked to identify gaps in the current list of ordinances and suggested changes/additions in Section 5.3.

Table 5-4: Lawrence County's Jurisdiction Ordinances

Community	Zoning	Storm water Mgmt	Flood	Subdivision Control	Burning	Seismic	Erosion Mgmt	Land Use Plan	Building Codes
Lawrence County	N	N	N	N	Y	N	N	N	Y
Sumner	N	N	N	N	Y	N	N	N	N
Bridgeport	N	N	N	N	Y	N	N	N	N
Lawrenceville	Y	Y	Y	Y	Y	N	Y	Y	Y

*Only those jurisdictions that have ordinances are included in the table.

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. At this time, there is no indication that Lawrence County or participating jurisdictions will be adopting, reviewing or strengthening current building codes and ordinances.

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. Rating are assigned from 1 to 10 where Class 1 generally represents superior property fire protection, and Class 10 indicates that the area's fire-suppression program doesn't meet ISO's minimum criteria. Table 5-5 displays each Fire Departments' insurance rating and total number of employees.

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

Fire Department	Fire Insurance Rating	Number of Employees
Lawrenceville	6	25
Sumner	6	24
Bridgeport	5	20

5.2 Mitigation Goals

In Section 4 of this plan, the risk assessment identified Lawrence County as prone to several hazards. The Planning Team members understand that although they cannot eliminate hazards altogether, Lawrence 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 Lawrence County.

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

Objective: Support compliance with the NFIP for each jurisdiction in Lawrence 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 Lawrence County residents on the hazards

Objective: Raise public awareness on hazard mitigation.

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

5.3 Multi-Jurisdictional Mitigation Strategies

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

Table 5-6. FEMA's STAPLEE Evaluation Criteria

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

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

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

Table 5-7: Lawrence County's Multi-Jurisdictional Mitigation Strategies

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
	ALL HAZARDS				
AH1	**Develop vulnerable population list** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Ongoing	L, S, F, P	County EMA
AH2	**Promote disaster resilience through workshops, education materials, and planning guides** *County EMA will oversee this strategy. Rides Mass Transit District will look into displaying emergency disaster materials on public transit fleet within county. The University of Illinois Extension provides workshops and trainers on the PDMP process. Lawrence County Industrial Development Council provides meeting space and administrative assistance to local organizations involved in a PDMP process. Services are coordinated through the University of Illinois Extension. Red Hill CUSD #10 will reach families through educational materials on natural hazards, disaster preparedness and mitigation planning. If funding is available, implementation is forecasted within the next year.*	County EMA, All Jurisdictions	Proposed	L, S, F	County EMA
AH3	**Compile and publicize location of safe rooms and/or shelters** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA, All Jurisdictions	Proposed	L, S, F, P	County EMA
AH4	**Enhance emergency communication system infrastructure** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Proposed	L, S, F, P	County EMA
AH5	**Continue liaison/groups that meet regularly to discuss hazard mitigation** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next years.*	County EMA	Ongoing	L, S, F	County EMA
AH6	**Continue local emergency planning committee** *County EMA will oversee this strategy. Lawrence County Memorial Hospital sends a representative to attend LEPC meetings.*	County EMA, LCMH	Ongoing	L, S, F	County EMA
AH7	**Improve communication between utility companies** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Proposed	L, S, F	County EMA
AH8	**Establish an Incident Management Team** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Ongoing	F	County EMA
AH9	**Improve EMA training, staff, resources, and equipment** *Improve education of emergency personnel and public officials throughout the County. The County EMA will oversee the implementation of this project. Currently, All department leaders and emergency room R.N.s at Lawrence County Memorial Hospital must complete NIMS training (15700, 15100.HCb, 15200.HCa and 15800.b). Implementation of improvement throughout the county is forecasted within the next year.* LCMH;	County EMA, LCMH	Ongoing	S, F, P	County EMA
AH10	**Distribute NOAA Weather Radios** *NOAA Radios have been distributed in the Lawrence County Memorial Hospital building and rural health clinic*. The *County EMA will oversee the implementation of this strategy in other parts of the county. If funding is available, implementation is forecasted within the next year.*	County EMA, LCMH	Ongoing	S, F, P	County EMA
AH11	**Equip critical facilities with back-up generators** *Jurisdictions throughout the county will research and purchase back-up generators at their facilities. County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Ongoing	S, F	County EMA
AH12	**Acquire portable lighting for mass casualty preparation** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Ongoing	F	County EMA
AH13	**Purchase emergency signage for closures and direction** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Ongoing	L, S, F	County EMA

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
AH14	**Acquire a Hazard Even Training Trailer** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next three years.*	County EMA	Proposed	S, F	County EMA
AH15	**Provide backup utilities and communications** *Lawrence County Memorial Hospital has permanent backup generators in place. Portable generators and redundant communication (Starcom radios, HAM radios, etc.) are available. A policy for electrical, gas, water failure is in place. LCMH will maintain this state of readiness by keeping each of these current.*	LCMH	Ongoing	S, F, P	LCMH
AH16	**An annual HVA** *Lawrence County Memorial Hospital performs an annual Hazard Vulnerability Assessment through the safety committee to include natural, technological, human and hazardous material hazards.*	LCMH	Ongoing	S, F, P	LCMH
AH17	**Coordinate mass transit as largest rural transportation provider in Illinois** *Rides Mass Transit District routes accessibility locally and regionally; mass transit already exists within Lawrence and existing Counties and is funded through local, State, and federal funds. RMTD will develop an alternative route for various hazard situations.*	RMTD	Proposed	L, S, F	RMTD
TORNADO / SEVERE THUNDERSTROMS					
ST1	**Require the construction of safe rooms within new public buildings** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next three years.*	County EMA	Proposed	S, F	County EMA
ST2	**Retrofit Structures to withstand high winds** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Proposed	L, S, F, P	County EMA
ST3	**Enhance ordinances to exceed minimum construction standards / techniques in regards to high winds** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA, Lawrenceville	Proposed	S, F	County EMA
ST4	**Provide jurisdiction-wide siren warning coverage** *Lawrenceville will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	Lawrenceville	Ongoing	L, F	Lawrenceville
EARTHQUAKES					
EQ1	**Map and assess community vulnerability to seismic hazards** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA, Lawrenceville	Ongoing	S, F	County EMA
EQ2	**Provide information to residents on structural and non-structural retrofitting** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next five years.*	County EMA	Proposed	S, F	County EMA
EQ3	**Develop Earthquake Emergency Action Plan** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA, Lawrenceville	Ongoing	L, F	County EMA
EQ4	**Perform detailed engineering studies of bridges and buildings** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Proposed	L, S, F, P	County EMA
EQ5	**Evacuation and shelter in place capability** *Evacuation policy with shelter in place provision is in place at Lawrence County Memorial Hospital. LCMH will maintain the readiness of the shelter*	LCMH	Ongoing	S, F, P	LCMH
EQ6	**Ensure safety of building** *Lawrence County Memorial Hospital has a structural engineer available to assess integrity of facility as needed.*	LCMH	Ongoing	S, F, P	LCMH
HAZARDOUS MATERIAL RELEASE					
HAZ1	**Develop/update hazmat emergency response plan** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA, Lawrenceville	Proposed	L, S	County EMA

Code	Mitigation Strategy	Jurisdictions Involved	Status	Funding Source*	Responsible Organization or Agency
HAZ2	**Acquire Protective Gear** *County EMA will oversee this strategy and seek to outfit police departments, fire departments and others with necessary gear. If funding is available, implementation is forecasted within the next years. Lawrence County Memorial Hospital has appropriate PPE available 24/7 for hazardous material cleanup as well as two portable decontamination units and one fixed decontamination.*	County EMA, LCMH, Lawrenceville	Proposed/ Ongoing	L, S, F, P	County EMA
HAZ3	**Decontamination training** *Lawrence County Memorial Hospital conducts decontamination training annually.*	LCMH	Ongoing	S, F, P	LCMH
FLOODING					
F1	**Culvert replacement** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA		F	County EMA
F2	**Develop dam/levee failure emergency action plans** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Ongoing	F	County EMA
F3	**Elevate low-lying roads** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Ongoing	F	County EMA
WINTER STORMS					
WS1	**Purchase deicing chemicals** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year. Lawrence County Memorial Hospital has purchased deicing chemicals and keeps them on site. Chemicals will be replenished as needed.*	County EMA, LCMH, Lawrenceville	Ongoing	L, S, F, P	County EMA
WS2	**Establish a network of 4WD/Off-road vehicles to access stranded people** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	County EMA	Ongoing	L, S, F	County EMA
WS3	**Snow removal** *LCMH has snow removal equipment and will use an outside company if snow accumulation is greater than their ability to remove it.*	LCMH	Ongoing	S, F, P	LCMH
WS4	**Install signs that direct traffic toward shelters and safe travel routes** *County EMA will oversee this strategy. If funding is available, implementation is forecasted within the next year.*	Lawrenceville	Proposed	L	Lawrenceville

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

5.4 Prioritization of Multi-Jurisdictional Mitigation Strategies

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

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

Table 5-8. Prioritization of the Lawrence County Mitigation Strategies

Code	Priority Ranking								
	Lawrence County	Bridgeport	Lawrenceville	Sumner	Lawrence County CUSD #20	Red Hill CUSD #10	Lawrence County Memorial Hospital	Rides Mass Transit District	University of Illinois Extension
AH1	H	-	-	-	-	-	-	-	-
AH2	M	H	H	H	H	H	H	H	M
AH3	H	H	H	H	H	H	H	H	H
AH4	H	-	-	-	-	-	-	-	-
AH5	M	-	-	-	-	-	-	-	-
AH6	H	-	-	-	-	-	H	-	-
AH7	H	-	-	-	-	-	-	-	-
AH8	H	-	-	-	-	-	-	-	-
AH9	H	-	-	-	-	-	H	-	-
AH10	H	-	-	-	-	-	H	-	-
AH11	H	-	-	-	-	-	-	-	-
AH12	H	-	-	-	-	-	-	-	-
AH13	H	-	-	-	-	-	-	-	-
AH14	M	-	-	-	-	-	-	-	-
AH15	-	-	-	-	-	-	H	-	-
AH16	-	-	-	-	-	-	H	-	-
AH17	-	-	-	-	-	-	-	H	-
ST1	M	-	-	-	-	-	-	-	-
ST2	M	-	-	-	-	-	-	-	-
ST3	H	-	H	-	-	-	-	-	-
ST4	-	-	H	-	-	-	-	-	-
EQ1	H	-	M	-	-	-	-	-	-
EQ2	L	-	-	-	-	-	-	-	-
EQ3	H	-	H	-	-	-	-	-	-
EQ4	H	-	-	-	-	-	-	-	-
EQ5	-	-	-	-	-	-	H	-	-
EQ6	-	-	-	-	-	-	H	-	-
HAZ1	H	-	H	-	-	-	-	-	-
HAZ2	M	-	H	-	-	-	H	-	-
HAZ3	-	-	-	-	-	-	H	-	-
F1	H	-	-	-	-	-	-	-	-
F2	H	-	-	-	-	-	-	-	-
F3	H	-	-	-	-	-	-	-	-
WS1	H	-	M	-	-	-	H	-	-
WS2	H	-	-	-	-	-	-	-	-
WS3	-	-	-	-	-	-	H	-	-
WS4	-	-	H	-	-	-	-	-	-

Section 6. Plan Implementation and Maintenance

6.1 Implementation through Existing Programs

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

Continued public involvement is also critical to the successful implementation of the MHMP. Comments from the public on the MHMP will be received by the Lawrence County Emergency Management Agency and forwarded to the Planning Team for discussion. Education efforts for hazard mitigation will be an ongoing effort of Lawrence 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 Lawrence County Emergency Management Agency.

6.2 Monitoring, Evaluation, and Updating the MHMP

Throughout the five-year planning cycle, the Lawrence 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 Lawrence County Board.

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

Definitions

100-year Floodplain	Areas subject to inundation by the 1-percent-annual-chance flood event.
Critical Facility	A structure, because of its function, size, service area, or uniqueness, that has the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if it is destroyed or damaged or if its functionality is impaired. This includes, but are not limited to, water and wastewater treatment facilities, municipal buildings, educations facilities, and non-emergency healthcare facilities.
Community Rating System (CRS)	A voluntary program for National Flood Insurance Program (NFIP) participating communities. The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management.
Comprehensive Plan	A document, also known as a "general plan," covering the entire geographic area of a community and expressing community goals and objectives. The plan lays out the vision, policies, and strategies for the future of the community, including all the physical elements that will determine the community's future developments.
Disaster Mitigation Act of 2000 (DMA 2000)	The largest legislation to improve the planning process. It was signed into law on October 30, 2000. This new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur.
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. Meeting Minutes

Formal Mitigation Planning Meetings

Meeting 1 – November 13th, 2014

Meeting 2 – March 24th, 2015

Meeting 3 – October 21st, 2015

Meeting 4 – October 20th, 2016

Meeting 1 – November 13th, 2014

Lawrence County Multi-Hazard Mitigation Meeting 1

Chairman: Jess Angle (EMA Coordinator)

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

Meeting Date: November 13th, 2014

Meeting Time: 1:00 p.m.

Place: Lawrenceville City Hall – Lawrenceville, IL

Attendance: see attached list

Introduction to the Multi-Hazard Mitigation Planning Process

The planning team was welcomed by Prof. Nicholas Pinter, project director from SIU. Prof. Pinter gave an overview of Southern Illinois University's involvement in Regional Mitigation Planning. He introduced the plan partners: Jess Angle Lawrence County EMA Coordinator and Greater Wabash Regional Planning Commission. Next he turned the meeting over to Amanda Damptz, project manager at SIU.

Amanda explained that the objective of this project is to develop Lawrence County's Multi-Hazard Mitigation Plan (MHMP) to meet the requirements of the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA). This project is in response to the Disaster Mitigation Act of 2000, which requires communities to develop and maintain a mitigation plan in order to be eligible for Hazard Mitigation Assistance. Because the county does not participate in the National Flood Insurance Program (NFIP), Amanda stressed that any potential funds can only be used for projects outside of Special Flood Hazard Areas. In addition, the county cannot apply for Flood Mitigation Assistance because it requires NFIP participation.

Next, Amanda explained that 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**.

Finally, Amanda presented a PowerPoint that divided the project into five to six meetings:

> Meeting 1: will consist of an overview of the planning process and discussion of schedule and milestones. This meeting will also include a discussion of roles, responsibilities, decision-making processes, administrative procedures, and communication strategies. SIU will collect and organize GIS and assessor's resources to use for the improved risk assessment and will confirm locations of essential and critical facilities.
>
> Meeting 2: will consist of profiling pertinent hazards to county and ranking them based on probability and risk for potential damage.
>
> Meeting 3: will be the public meeting. At the public meeting, the university will present the results of the risk assessment and describe the GIS and Hazus models. The meeting will conclude with open Q&A and an introduction to mitigation strategies.

Meeting 4: will be a mitigation brainstorming session. The group will review the risk assessment from Meeting 2 to assist in prioritizing developed mitigation strategies. At the end of the meeting, the group will develop goals and objectives, as well as determining a 'pre-plan' on how to implement the strategies. Following this meeting, the university will compile a draft version of the mitigation plan.

Meeting 5: is an opportunity for the planning team to review and revise the draft plan. They will make any necessary changes and fill in any gaps, and then submit the revisions to the university. The university partnership does not typically attend this meeting, but is available upon request.

Meeting 6: is not technically a formal meeting. Meeting 6 consists of adopting the final plan upon FEMA's approval. The approval process can take several months, but once the plan is approved, the county will have to the end of their grant period to adopt the plan. The date the county adopts the plan is the date that is set for the five-year update.

Lastly, Prof. Pinter and Amanda Damptz fielded any questions from the planning team about the process of mitigation planning.

Meeting was adjourned.

Lawrence County PDMP First Meeting
November 13, 2014 at 1 pm
Lawrenceville City Hall, Lawrenceville, IL

	Name	Representing	Phone Number	Address	Email Address	Job Description	Milage
1	Rita Dawson	Lcmh	943-7266	2200 State L'ville	Dlawrence@hosp.org	RN	
2	Ron McKinstry		943-5076	RR#1 Box 60	—	—	
3	Judy "			L'ville - Lawrence Addition	—	—	
4	Arnold Herman	Lawrence/Crawford	618-943-4401	2222 Lexington, Lawrenceville, IL	aherman@lcaec.org	Sheltered Workshop	1
5	Jeanie Fox	LCAEC	943-4401	2222 Lexington L'ville	jfox@lcaec.org	Sheltered Workshop	
6	Janice Zwilling	LCAEC	943-4401	2222 Lexington Lawrenceville, IL	jzwilling@lcaec.org	Sheltered Workshop	
7	Russell Adams	LAW CO. SHERIFF	618 943 5766	1306 Lexington Lawrenceville	LCSD62439@yahoo.com	LAW enforcement	
8	Gary Hutchison	Sumner Mayor	618-936-2532	129 E South Ave Sumner, IL	cityofsumner@bspeedy.com	Mayor	10
9	Bill Gray	Law Co Bd Chairman	812-881-0124	514 Washington Bridgeport	bgray48@frontier	Chairman	5
10	James White	Police Chief of L'ville	618-928-7899	RR1 Box 9 Lawrenceville, Ill	lawrencevillepd@yahoo	Chief	1
11							
12							
13							
14							
15							
	Name	Representing	Phone Number	Address	Email Address		Job Description
17							
18							
19							

Lawrence
County PDMP First Meeting
November 13, 2014 at 1 pm
Lawrenceville City Hall, Lawrenceville, IL

	Name	Representing	Phone Number	Address	Email Address	Job Description	Milage
1	Brad Purcell	Bridgeport	812 881-9289	807 East State	brapurcell@hotmail.com	Mayor	6
2	Courtney Yost	Yost Zebrowski		600 Cherry Ln	yost@illinois.net	CED Director	
3	Danielle Brown	Lawrence Co. Farm Bureau	618-943-2610	600 Cherry Ln PO Box 498	Lcfbmgr@frontier.com	Manager	
4	Michael Mefford	Lawrence Allison Fire	618-943-2828	1106 Walnut	mff@email.com	Chief	6
5	Doug Daugherty	CUSD #20	618-990-5262	1802 Cedar L-ville, IL	ddaugherty@cusd20.net	Superintendent	2
6	Carla Simmons	LCHD	812-881-7950	RR#1 Box 43J L-ville	CSimmons@lchealth.com	CD Nurse	4
7	Jess Angle	Law. EMA	618-562-5800	PO 312 B'port IL	LCEMA@frontier.com	EMA Director	4
8	Julie Parrott	LCHD	618 564-5401	P.O. Box 516 L-ville, IL 62439	jparrott@lchealth.com	PHEP	4
9	Cheri Spahn	Law Co Courthouse	618 943-3369	1100 State St L-ville IL 62439	lawrencecountyboard@yahoo	Admin Assistant	
10	Phyllis Wells	LCHD	618 943 9995	RR#3 Box 516 Lawrenceville IL	PWells@lchealth.com	Admin	4
11	DAVID A. WHITE	COUNTY BOARD	618-943-3128	RR1 Box 481 LAWRENCEVILLE, IL	~~[illegible]~~	VICE CHAIRMAN	4
12	Gene Hays		618-928-2215	RR#3 Box 207 Lawrenceville Ill		RETIRED	5
13	LINDA KISSEL	LAWRENCE CO ASSESSMENT OFFICE	618-943-2719	1106 JEFFERSON LAWRENCEVILLE IL	caa051@yahoo.com	Chief Co. ASSESSMENT OFFICER	1
14	Eric Paulin	LCHD	618 943-3302	P.O. Box 516 L'ville, IL 62439	EPaulin@lchealth.com	Env. Hlth Director	4
15	Will Gibson	Lawrence County (County Clerk)	(618)943-2643	1711 Christy Lville, IL 62439	lawcoclerk@hotmail.com	County Clerk	1
16	Chris Winkler	City of Lawrenville	812-899-0687	1108 Office St. Lville IL 62439	Chris.lawco51@yahoo.com	Tax Assessor	1
17	Roxanne Waggoner-Schultz	City of Lawrenville	812-890-2408	1104 Ash 62439	ROXANNESCHULTZ@BELLSOUTH.NET	Community advocate	1
18							
19							

LAWRENCE
County PDMP First Meeting
November 13, 2014 at 1 pm
Lawrenceville City Hall, Lawrenceville, IL

20	Don Wagner	943-2116	1530 Panter Ave	Lawrenceville	Mayor	1		
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22								
23								
24								
25								

Meeting 2 – March 24th, 2015

Lawrence County Multi-Hazard Mitigation Plan Meeting 2

Chairman: Jess Angle (EMA Coordinator)

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

Meeting Date: March 24, 2015

Meeting Time: 10:00 a.m.

Place: Lawrenceville City Hall – Lawrenceville, IL

Attendance: see sign in sheet

SIU presented the historical hazards. 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 SIU and discussion took place on the historical disasters that have occurred in Lawrence County.

SIU also covered the significant natural hazard events that have historically occurred in Lawrence County. 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 Lawrence County. The Planning Team evaluated each hazard based on the probability/likelihood each hazard would occur and the impact/severity it would have on Lawrence County.

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

Meeting was adjourned.

Lawrence County PDMP Meeting
March 24, 2015 at 10 qm
City Hall, Lawrenceville, IL

	Name	Representing	Phone Number	Address	Email Address	Job Description	Milage
1	Eric A. Paulin	Lawrence Co Hlth. Dept.	618 943-3302	P.O. Box 510	EPaulin@LCHealth.com	Env. Director	6
2	Julie D. Parrott	Lawrence Co. Health	6189433302	P.O. Box 516	jparrott@lchealth.com	Adm. Asst.	6
3	DAVID A WHITE	LAWRENCE Co BOARD	618-943-3128	R2 Box 481 - LAWRENCEVILLE	NA	BOARD MEMBER	5
4	ERNIS POLAND	Law Co 911	6189457119	Po Box 11 BRIDGEPORT	egmail.com lawrencecounty911	Director	5
5	Michael Meffo-d	LA Fire Dept.	812-899 0029	R#4 Box 130 L'ville	meff@email.com	Chief	6
6	Roxana Schultz	L'ville Representative	812-890 2408	1106 Ashort Lawrenceville IL	ROXANASCHULTZ@BELLSOUTH.NET	City Rep.	2
7	Jess Angle	Law. Co. EMA	618 945-9500	P.O. 312 Bridgeport, IL 62417	LCEMA@frontier.com	Coordinator	5
8	Travis Trainer	Sumner Police	618-936-2221	129 E South Ave Sumner, IL 62466	TRAVISTRAINER@BSPRGT.com	Police Chief	8
9	James White	Lawrenceville Police Dept	618-926 7899	RR1 Box 9 Lawrenceville, Il	lawrencevillepd@yahoo	Police Chief	2
10	BRAD PURCELL	BRIDGEPORT CITY	812-881-9289	234 WASHINGTON ST		MAYOR	3
11	W.R. Brian	Lawrence Board	618-936-2829	1851 W. N. Ln.		Board Member	8
12	Judith Phipps	Law. Co Board	618240-3915	12191 Bunker Hill Ln St. Francisville, Il	jphipps49@yahoo.com	Board Member	20
13	Cheri Spahn	Law Co Board	618-943-3369	625 Judy Ave Bridgeport IL 62417	lawrencecountyboard@yahoo.com	Admin. Assistant	8
14	Will Gibson	Lawrence County Clerk	(618)943-2346	1711 Christy Ave. L'ville, IL 62439	lawcoclerk@hotmail.com	County Clerk	1
15	Bill Gray	Law Co Board	812-881-0124	514 Washington Bridgeport IL 62417	bgray_48@frontier.com	Board Member	8
	Name	Representing	Phone Number	Address	Email Address	Job Description	

Lawrence County PDMP Meeting
March 24, 2015 at 10 qm
City Hall, Lawrenceville, IL

	Name	Representing	Phone Number	Address	Email Address	Job Description	Milage
1	Don Wagner	Lawrenceville	943-2116	700 E State	dohaumahotmail.com	Mayor	0
2	Gary Hutchinson	Sumner	936-2415	129 E South Ave	cityofsumner@speedy.com	Mayor	20
3	Doug Daugherty	CUSD #20	943-2326	1802 Cedar Street	ddaugherty@cusd20.net	Superintendent	2
4	Courtney Yost						3
5	Janice Zwilling	LCAEC	943-4401	2222 Lexington Lawrenceville	jzwilling@lcaec.org	Administrative Asst	2
6	Jeanie Fox	LCAEC	943-4401	2222 Lexington Lawrenceville	jfox@lcaec.org	Facility Mgr	2
7	Victoria Goad	LC Farm Bureau	943-2610	600 Cherry In Lawrenceville	LCFBmgr@frontier.com	manager	2
8	Kara Kuykendall	GWRPC	445 3612	Albion	karakuykendall@mn.com	Grants	90
9							
10							
11							
12							
13							
14							
15							
	Name	Representing	Phone Number	Address	Email Address	Job Description	

Meeting 3 – October 21st, 2015

Lawrence County Multi-Hazard Mitigation Plan Meeting 3

Chairman: Jess Angle (EMA Coordinator)

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

Meeting Date: October 21, 2015

Meeting Time: 10:00 a.m.

Place: Lawrenceville City Hall – Lawrenceville, IL

Attendance: see sign in sheet

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 public release in the newspaper. 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. A PowerPoint presentation was made by SIU on the historic accounts of natural disasters that have affected the county.

Next meeting: identify and prioritize mitigation strategies

Lawrence County PDMP Meeting
October 21, 2015 at 10:00 a.m.
Lawrenceville City Hall, Lawrenceville, IL

	Name	Representing	Phone Number	Address	Email Address	Job Description	Milage
1	Jess Angle	Law. Co. EMA	618-562-5800	P.O 312 B'port	LCEMA@frontier.com		6
2	Dean Kelly	HEALTH DEPT.	618-943-3703		DEANKELLY2@HOTMAIL.COM	BOARD MEMBER	4
3	W. R. Brian	County Board	618-936-2829	1851 W.W. Sumner, IL			0
4	Brad Purcell	Mayor Bridgeport	812-881-9289	804 E. State B'port	BRADPURCELL@frontier.com	MAYOR	6
5	Bill Gray	County Board	812-881-0124	B'port	bgray_48@frontier	Retired	8
6	Dennis Poland	Lawrence 911	945.7119	P.O. Box 11 Bridgeport		Director	5
7	Michael Mefford	Lawrence Allison Fire Dept.	812-599-0029	1106 Walnut Lawrenceville	meffeomail.com	Fire Chief	6
8	Eric Paulin	Lawrence Co. Hlth Dept.	(618) 943-3302	P.O. Box 516 L'ville	EPaulin@LCHealth.com	ENV. Director	5
9	Chris Winkles	City of Lawrence	812-838-06 7	1103 Olive L'ville	Chris.lawco51@Yahoo.com	Mayor	2
10	Victor L. Fritch	City of Lawrenceville	6189432825	709 State St. Lawrenceville	hotirfrotiv@Hotmail.com	Self Employed	0
11	Gary Hutchinson	City of Sumner	618-936-2415	129 E. South Ave.	GWHutch@Frontier.com	Mayor	10
12	Don Wagner	City of L'ville	618-943-2116	700 E. State St.	dohawn@hotmail.com	Mayor	0
13	Laci Shaffer	L.C. Health Dept.	943-3302	PO Box 516 L'ville	lshaffer@lchealth.com	Director of P.H. PHEP Coordinator	5
14	Corinne Thornton	L.C. Health Dept	943-3302	PO Box 516 L'ville	cthornton@lchealth.com	Public Health Associate	5
15	Kathy Ketterman	Lawrence County memorial Hospital	943-1000	2200 W. State Street L'ville	kketterman@lcmhosp.org	Safety	2
	Name	Representing	Phone Number	Address	Email Address	Job Description	

Lawrence County PDMP Meeting
October 21, 2015 at 10:00 a.m.
Lawrenceville City Hall, Lawrenceville, IL

17	James R White	Lawrenceville Police Dept	618-928-7899	700 East State St. Lawrenceville, ILL	lawrencevillepd@yahoo	Chief of Police	
18	Rodney Nolan	City of L'ville	943-2116	700 E STATE ST LAWRENCEVILLE, ILL	rnolan38@hotmail.com	city clerk	O
19	[illegible]	citizen L'ville	943-2825	709 State	Retired Meter maid	citizen	
20	[illegible]	WAKO	618-943-3384	Rte 250 East	wakoc@yahoo.com	News director	
21	Will C. Gibson	Lawrence County Clerk	(618)943-2346	1100 State L'ville, IL	lawcoclerk@hotmail.com	Elected official	
22	Tim Kropp	SIU			timkropp@siu.edu	Grad Student	
23	K. Levi Milliron	SIU			millironk25@siu.edu		
24							
25							

Meeting 4 – October 20th, 2016

Lawrence County Multi-Hazard Mitigation Plan Meeting 4

Chairman: Jess Angle (EMA Coordinator)

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

Meeting Date: October 20, 2016

Meeting Time: 2:00 p.m.

Place: Lawrenceville City Hall, Lawrenceville, 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. Once they have been submitted, the plan will be disseminated to all planning team members for review.

Lawrence County PDMP Meeting
October 20, 2016 at 2 pm

City Hall, Lawrenceville, Il

	Name	Representing	Phone Number	Address	Email Address	Job Description	Milage
1	Deborah Lemeron	Lawrence Co. Memorial Hospital	618-943-1000	2200 State St Lawrenceville IL	dlemeron@lcmhosp.org	Emergency Preparedness	
2	Danelle Adams	Lawrence County E911	618 945-7119	101 Rucker St. Bridgeport, Il 62417	lawrencecounty911@outlook.com	911 Director	
3	Tammy Tate	Law Co. Bd.	618-210-5524	936 Rosemont Bridgeport, IL 62417	tammytate2011@gmail.com	Admin Assistant	
4	Will Gibson	Law. Co. Clerk	(618)943-2346	1711 Christy Ave. Lville, IL 62439	lawcoclerk@hotmail.com	Co. Clerk	
5	Sean Kenley	United Methodist Village	618 943 3494	2101 Jones St Lawrenceville	umvplant@umvillage	Dir of Plant Operations	
6	Doug Florkowski	Lawrence Co Memorial Hospital	618-943-7200	2200 State St. Lawrenceville IL 62439	dflorkowski@lcmhosp.org	COO	
7	Larry Spour	Lawrence County Memorial Hospital	618-943-7203	2200 State St. Lawrenceville, IL 62439	lspour@lcmhosp.org	CFO	
8	Laci Shaffer	Lawrence County Health Department	618-943-3302 x 222	11362 Country Club Rd. Lawrenceville, IL	lshaffer@lchealth.com	CD Nurse	
9	Eric Paulin	LCHD	618-943-3302 x229	11362 Country Club Rd Lville, IL.	EPaulin@LCHealth.com	Env. Hlth	
10	Sarah Fehrenbacher	LCHD	618-943-3302 x298	11362 Country Club Rd Lawrenceville, IL	sfehrenbacher@lchealth.com	Administrator	
11	Julie Cutright	LCHD	618-943-3302 x299	11362 Country Club Rd. Lawrenceville, IL	jcutright@lchealth.com	emerg. prep.	
12	DAVID A. WHITE	LAW Co. Bd	618-943 3128	11852 Cunningham Blvd LAWRENCEVILLE, IL	—	BOARD MEMBER	
13	LORI Haynes	AperionCare Bridgeport	618-928-3793	2003 Cedar St Lawrenceville, IL 62439	lhaynes@aperioncare.com	Licensed Administrator	
14	Jakie Walker	Red Hill CUSD #10	618-945-2061	1250 Judy Ave Bridgeport, IL 62417	jwalker@cusd10.org	Supt of Schools	
15	Bryan Schallenberg	AgReliant Genetics, LLC	618/943/4922	5528 Akin Rd. St. Francisville, IL 62460	bryan.schallenberg@agreliant.com	Location Manager	
	Name	Representing	Phone Number	Address	Email Address	Job Description	

Lawrence County PDMP Meeting
October 20, 2016 at 2 pm

City Hall, Lawrenceville, IL

	Name	Representing	Phone Number	Address	Email Address	Job Description	Milage
1	V Cates	City	943.2116	700 E. State St	lawrencevile62439@yahoo.com		
2	R Nolan	City	943-2116	700 E State St.	~~[illegible]~~ rnolan38@hotmail.com		
3	D Tewell	City	943-4821	700 E State St	debit626@yahoo.com	Billing Clk	
4	S. Tipsword	City	812.890-0047	700 E State St	smc02152@[illegible]	Billing Clk	
5	D. Wagner	City	618-943-2116	1530 Porter Ave	dohawn@hotmail.com	Mayor	0
6	S. Groner	County Indus Develop Comm.	618-943-5219		stevenrg@illinois.edu	Admin.	
7	Thomas Robinson	Robinson Insurance & Financial Services.	618.943.4417	1120 Bond St Lawrenceville, IL	tomdcfan1@gmail.com	owner	
8	Beth Robinson	"	"	"	"	"	
9	Rachel Hipsher	Chamber of Commerce	618-943-3516	813 12 Lawrenceville, IL	rgard@lawrencecochamber.com	Director	0
10							
11							
12							
13							
14							
15							
	Name	Representing	Phone Number	Address	Email Address	Job Description	

Lawrence County PDMP Meeting
October 20, 2016 at 2 pm

City Hall, Lawrenceville, IL

17 Sarah Swain	Lawrence Co Assessment	(618) 943-2719	1106 Jefferson Lawrenceville 62439	ccao51@yahoo.com	Deputy Assessment	
18 Barbie Morey	Law. Co Treasure	(618) 9213-2016	1106 Jefferson Lawrenceville	bsmorey21@gmail.com	Treasure	
19 Linda Kissel	Law Co. Assessment	(618) 943-2719	1106 Jefferson Lawrenceville 62439	ccao51@yahoo.com	Supervisor of Assessments	
20 Bill Gray	Law Co Bd Chairman	812 881-0124	1100 STATE St Lawrenceville, IL	bgray[illegible]@frontier.com	Bd Chairman	
21 Kara Kuykendall	GWRPC	445 3612	Albion	[illegible]		
22 Levi						
23 Tamara						
24						
25						

Appendix B. Press Release and Newspaper Articles

Record

Friday, October 9, 2015

ar purchase, adopts levy

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ad its coun- unani- mem-

Lawrenceville's levy total for the fiscal year beginning May 1, 2015 and ending April 30, 2016 is $450,000.

In that amount the total levy breaks down as follows:

$70,000 levy for the general fund
$50,000 levy for the garbage
$114,000 levy for the police pension
$30,000 levy for the streets
$4,000 levy for street lighting
$10,000 levy for auditing
$43,000 levy for social security
$44,000 levy for IMRF (retirement)
$85,000 levy for liability insurance

IN OTHER BUSINESS:

—Approval of the bills of the city, sewer, and water departments.

—The city is operating under budget at 32.7 percent compared to 42 percent, which would be on target.

—The next Lawrenceville City Council meeting is scheduled for Nov. 12 at 7 p.m. at City Hall.

om United Fund

organizations during the 2015-16 fiscal year. During a late Thursday afternoon meet- ial assistance: Bridgeport ERBA Head Start, Care Call, Friends of the Library, Lawrence , Lawrence County Camp Girls, Lawrence County Humane Society, Sign of the Kingdom Senior Citizens, Lawrenceville Teen Center and URChoice. Representatives from the

County hazard mitigation committee meeting Oct. 21

LAWRENCEVILLE — The Lawrence County Hazard Mitigation Steering Committee will host a public meeting at 10 a.m. on Oct. 21, at Lawrenceville City Hall.

The Federal Emergency Management Agency (FEMA) requires each unit of government in the United States to have a FEMA-approved multi-hazard mitigation plan. In the pursuance of compliance, Wayne County and Southern Illinois University - Carbondale have worked to identify potential natural hazards and to produce a mitigation plan to address the hazards.

The partnership has resulted in a draft multi-hazard mitigation plan (MHMP). The draft plan seeks to identify potential natural hazards for Lawrence County and establish mitigation measures that are intended to reduce or eliminate the negative impact that a particular hazard may have on the county.

The MHMP steering committee is interested in receiving public input on the draft plan. Anyone who has questions or would like to provide input should attend the meeting on Oct. 21 or contact Kara Kuykendall, Grant Writer, Greater Wabash Regional Planning Commission, at 618-445-

Appendix C. Adopting Resolutions

See Attached Adopting Resolutions

Appendix D. Historical Hazards

See Attached Newspaper Clippings and Large Format Map

Appendix E. List of Essential Facilities

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

Emergency Operations Centers

Name	Address	City
Lawrence County EOC	101 Industry Road	Bridgeport

Fire Stations

Name	Address	City
Bridgeport Fire Protection District	Washington Street 7 3rd Street	Bridgeport
Lawrence Allison Fire Protection District	1112 Walnut Street	Lawrenceville
Denison Fire Protection District	6th & Main	St. Francisville
Christy Fire Protection District	109 E. North Avenue	Sumner

Police Stations

Name	Address	City
Bridgeport Police Department	235 Washington Street	Bridgeport
Lawrence County Sheriff	1306 Lexington Avenue	Lawrenceville
Lawrenceville Police Department	700 State Street	Lawrenceville
St. Francisville Police Department	207 North 6th Street	St. Francisville
Sumner Police Department	129 E. South Avenue	Sumner

Medical Care Facilities

Name	Address	City	Comments
Lawrence County Memorial Hospital	2111 State Street	Lawrenceville	
Aperion Nursing Home	900 Corporation Street	Bridgeport	
United Methodist Village Nursing Home (main campus)	1616 Cedar Street	Lawrenceville	
United Methodist Village Nursing Home (north campus)	2101 James Street	Lawrenceville	

Schools

Name	Address	City	Comments
Lawrenceville High School	503 8th Street	Lawrenceville	
Parkview Junior High	1802 Cedar Street	Lawrenceville	
Parkside Elementary School	1900 Cedar Street	Lawrenceville	
Red Hill High School	908 Church Street	Bridgeport	
Sumner Attendance School	110 West Locust Street	Sumner	
Bridgeport Elementary School	1300 North Main Street	Bridgeport	

Appendix F. Critical Facilities Map

See Attached Large Format Map of Critical Facilities.