

Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan

March 2017

Hancock County

Basco

Bentley

Bowen

Carthage

Dallas City

Ferris

Hamilton

LaHarpe

Nauvoo

Plymouth

Pontoosuc

Warsaw

West Point



Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan

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March 2017

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PURPOSE STATEMENT

HANCOCK COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN TASK FORCE

The Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan identifies local hazard mitigation goals and objectives, and specific hazard mitigation actions to implement over the long term that will result in reduction in risk and potential for future losses associated with the occurrence of natural hazards. The original plan was developed and approved in 2010. This plan represents a review and update of that plan.

The Task Force reviewed the existing plan; progress on mitigation projects since the 2010 plan; any changes to risk (i.e. risks that may have been mitigated); the impact of natural hazards on citizens, infrastructure, private property, and critical facilities through a combined effort of communities, institutions, and citizenry to update and support a mitigation action plan that will be adopted and implemented by each participating community.

Natural Hazards Being Considered

Drought
Earthquake
Extreme Temperature
Flood
Flash Flooding
Severe Storm/Tornado
Severe Winter Storm

Jurisdictions Participating in NFIP

Hancock County
City of Dallas City
Village of Elvaston
City of Hamilton
City of La Harpe
City of Nauvoo
Village of Pontoosuc
City of Warsaw

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INTRODUCTION

WHY A MITIGATION PLAN?

Communities look to protect the health, safety, and welfare of their citizens. Related to natural hazard events this has traditionally meant responding to the needs of the community after an event occurs. Mitigation looks to reduce the need for response by permanently removing people and structures from harms way when a known area of impact can be identified (such as a floodplain) or significantly reducing the impact from a known risk (such as a tornado). This Plan provides an assessment of the risks to Hancock County from natural hazard events and a comprehensive range of mitigation projects to lessen the impact of these hazards on our communities. With the availability of mitigation grant funding from the Federal Government, communities have the opportunity to implement mitigation projects that would not otherwise be financially possible. The preparation of this plan follows the guidelines to make participating communities eligible to apply for mitigation grant funding.

COMMUNITY PARTICIPATION IN PLAN DEVELOPMENT

The criteria that would constitute satisfactory jurisdictional participation in the planning process were established at the first meeting of the Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan Task Force. Figure 1 shows the required participation elements established. All other communities met these requirements.

Figure 1: Participation Guidelines for Jurisdictions

Participation Guidelines for Jurisdictions

• Attend a minimum of 1 meeting
• Submit a list of relevant community documents
• Confirm hazards that affect the community
• Confirm the list of critical facilities submitted by HAZUS
• Develop goals and projects for the community
• Develop and prioritize mitigation actions for the community
• Host opportunities for public involvement
• Review and comment on draft plan

Press Releases regarding the public meetings were sent to all local media, both in the county and neighboring counties. Extension Staff also spoke to local radio listeners regarding the planning process and Public meetings. Neighboring Counties were also informed and invited to the meetings. Two public meetings and four focus groups were held to ensure public comment on the process and plan. Focus group invitees list is included in the appendix, as well as the public meeting press release/

HANCOCK COUNTY DEMOGRAPHIC OVERVIEW

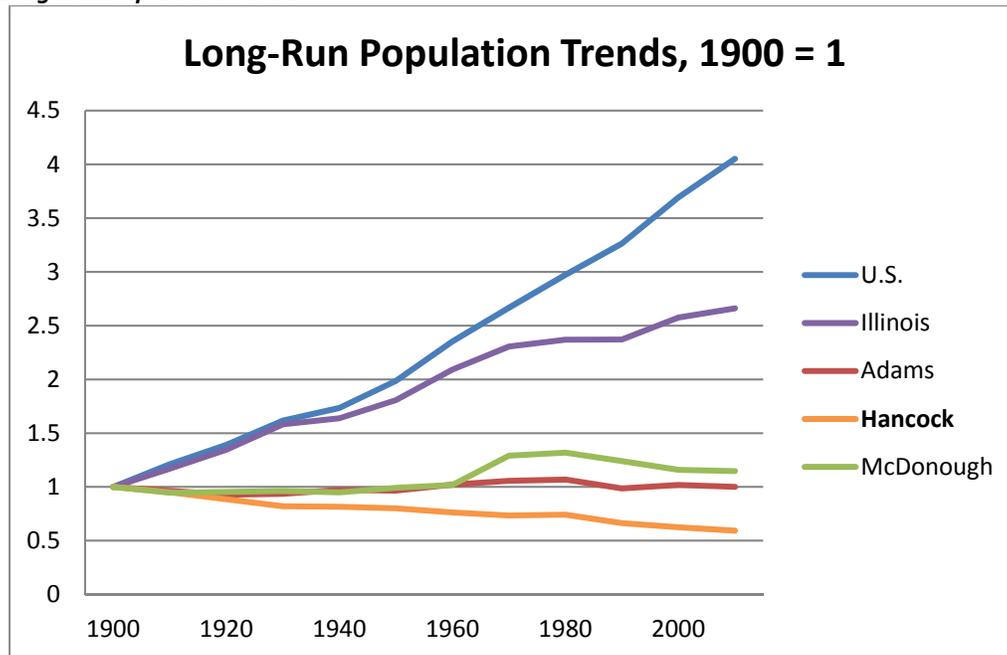
The following data is presented to provide an overview of Hancock County. All data are benchmarked against two near neighbors, Adams and McDonough counties, and when appropriate the State of Illinois and the nation.

POPULATION TRENDS

Long-Run Population Trend

The population in Hancock County has decreased every decade since 1900, with the exception of 1970 to 1980 which saw a slight increase. In 1900 the county had a population of 32,215 and by 2010 the county population had shrunk to 19,104, a decrease of 41 percent. In comparison, Hancock's two near neighbors, Adams and McDonough counties, saw slight increases in population over this time period (see figure).

Figure 2: Long-Run Population Trend

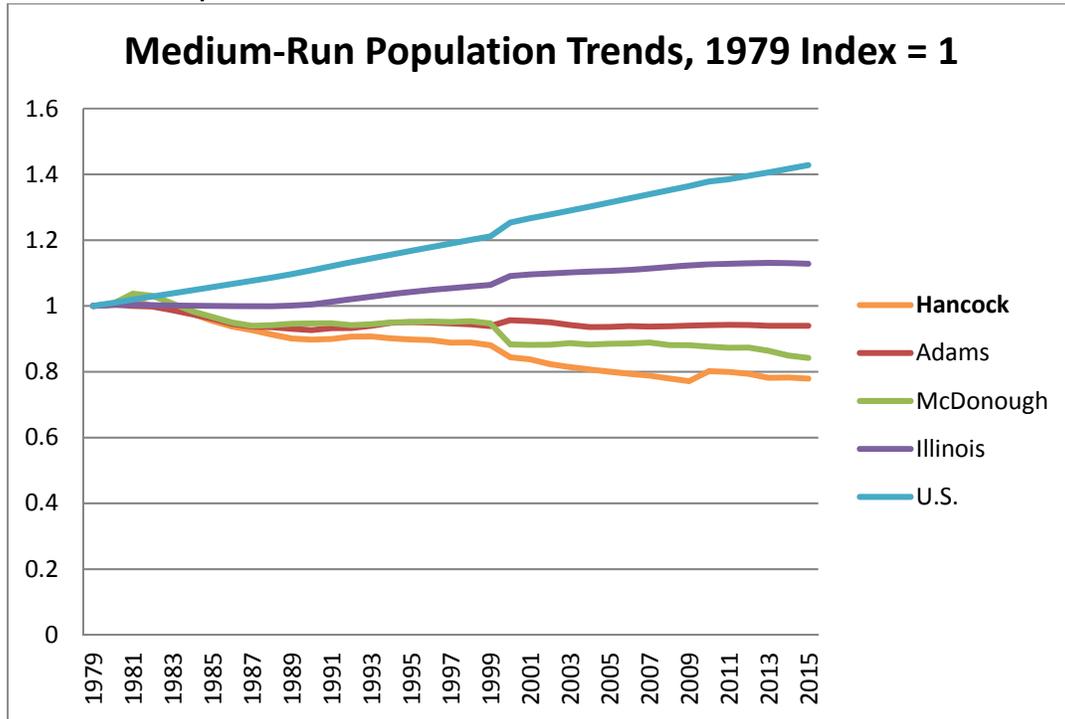


Source: U.S. Census Bureau, Decennial Census 1900-2010

Medium-Run Population Trend

The population in Hancock County declined from 23,800 in 1979 to 18,543 in 2015, a loss of about 22 percent. The population trend over this time period was generally slow steady decline. Similarly, Hancock's nearest neighbors McDonough and Adams counties both also saw shrinking populations over the same time period, though the percentage of population lost was less in these two counties than in Hancock (see figure below). Conversely, both the state of Illinois and the nation grew in population of this time period.

Figure 3: Medium-Run Population Trend



Source: U.S. Census Bureau, Population Estimates Series

Age of the Population

Hancock County has an older population than its two near neighbors, the state, and the nation. It is estimated that 21.4 percent of Hancock’s population is under the age of 18. This is the lowest percentage among all benchmark areas with the exception of McDonough County. Conversely, Hancock County has the highest percentage of persons over 65 years of age amongst all benchmark areas (see table).

Figure 4: Population Under 18 and Over 65

2014 Estimated Percentage of Population Under 18 and Over 65					
	U.S.	Illinois	Adams Co.	Hancock Co.	McDonough Co.
Under 18	23.1%	24.4%	22.8%	21.1%	16.2%
Over 65	14.5%	14.2%	18.0%	21.2%	14.5%

Source: U.S. Census Bureau, American Community Survey, 2010-2014

Racial Make-up of the Population

Hancock County’s population is predominantly white, and non-Hispanic. Whites comprise an estimated 97.8 percent of the population. Non-Hispanics of any race make up 98.8 percent of the total population. Hancock County is similar, but slightly less racially and ethnically diverse, than its two neighbors Adams and McDonough counties (see tables).

Figure 5: Population – Racial Make-up

2014 Estimated Racial Make-up					
	U.S.	Illinois	Adams Co.	Hancock Co.	McDonough Co.
White	73.8%	72.5%	93.1%	97.8%	90.3%
Black	12.6%	14.4%	3.7%	0.4%	5.2%
Other	13.6%	13.1%	3.2%	1.8%	4.5%

2014 Estimated Hispanic Population					
	U.S.	Illinois	Adams Co.	Hancock Co.	McDonough Co.
Hispanic or Latino	16.9%	16.3%	1.3%	1.2%	2.7%
Not Hispanic or Latino	83.1%	83.7%	98.7%	98.8%	97.3%

Source: U.S. Census Bureau, American Community Survey, 2010-2014

INCOME

Median Household and Per Capita Income

In 2014 the estimated median household income in Hancock County was \$45,741. This was higher estimated median household income than both Adams County at \$45,472, and McDonough County at \$37,959. In terms of per capita income, Hancock is again estimated higher than its two neighbors. The 2014 per capita income estimate for Hancock County was \$24,418. The figures for Adams and McDonough counties were \$24,247 and \$20,592 respectively. All three counties trailed U.S. averages in both measures. The estimated median household income for the U.S. in 2014 was \$53,582, while the per capita income was estimated at \$28,555.

Poverty Rate

In 2014, an estimated 12.1 percent of Hancock County’s population lived below the poverty line. The poverty rate among children under 18 was 18.8 percent. Hancock County compared favorably against all benchmark areas in both poverty measures (see table).

Figure 6: Poverty Status

2014 Estimated Poverty Status					
	U.S.	Illinois	Adams Co.	Hancock Co.	McDonough Co.
Population in Poverty	15.6%	14.4%	14.4%	12.1%	24.2%
Children in Poverty	21.9%	20.4%	19.8%	18.8%	21.9%

Source: U.S. Census Bureau, American Community Survey, 2010-2014

HOUSING AND HOUSEHOLDS

Household Types

Married couple families are the largest household-type group in Hancock County. While this is also the largest group in all of the benchmark areas, a greater proportion of Hancock County households are married couples (see table).

Figure 7: Household Types

2014 Estimated Households by Type and Presence of Own Children					
	U.S.	Illinois	Adams Co.	Hancock Co.	McDonough Co.
Total Households	116,211,092	4,778,633	26,866	7,983	12,553
Average Household Size	2.63	2.63	2.44	2.32	2.2
Married-Couple Families	56,270,862	2,304,148	13,752	4,384	5,429
Pct. of Total Households	48.4%	48.2%	51.2%	54.9%	43.2%
Male Householder, No Wife	5,543,754	218,990	906	423	279
Pct. of Total Households	4.8%	4.6%	3.4%	5.3%	2.2%
Female Householder, No Husband	15,143,448	607,987	2,774	645	1,315
Pct. of Total Households	13.0%	12.7%	10.3%	8.1%	10.5%
Non-Family Households	39,253,028	1,647,508	9,434	2,531	5,530
Pct. of Total Households	33.8%	34.5%	35.1%	31.7%	44.1%
Households with Own Children	33,917,911	1,408,891	7,116	1,893	2,976
Pct. of Total Households	29.2%	29.5%	26.5%	23.7%	23.7%

Source: U.S. Census Bureau, American Community Survey, 2010-2014

Owner Occupancy Rates

Hancock County has a high rate of owner occupancy. In 2008, an estimated 80.6 percent of occupied housing units were owner occupied. This owner occupancy rate was higher than all benchmark areas (see table).

Figure 8: Occupancy Rates

2014 Owner vs Renter Occupancy Rates					
	U.S.	Illinois	Adams Co.	Hancock Co.	McDonough Co.
Owner Occupied	64.4%	66.9%	71.1%	78.8%	61.8%
Renter Occupied	35.6%	33.1%	28.9%	21.2%	38.2%

Source: U.S. Census Bureau, American Community Survey, 2010-2014

Housing Type

Detached single-family homes are the predominant housing type in Hancock County. In 2014, an estimated 82.4 percent of housing units in Hancock County were detached single family homes.

Hancock County had a higher proportion of detached single family homes than all benchmark areas (see table).

Figure 9: Housing Units

2014 Estimated Housing Units by Units in Structure					
	U.S.	Illinois	Adams Co.	Hancock Co.	McDonough Co.
1-unit, detached	61.7%	58.6%	75.0%	82.4%	63.1%
1-unit, attached	5.8%	5.8%	3.1%	0.6%	4.4%
2 units	3.7%	5.7%	4.8%	2.9%	3.1%
3 or 4 units	4.4%	6.8%	5.0%	4.8%	6.5%
5 to 9 units	4.8%	6.2%	2.4%	1.4%	4.8%
10 to 19 units	4.5%	4.0%	1.5%	0.9%	4.2%
20 or more units	8.6%	10.2%	3.0%	0.3%	7.9%
Mobile home	6.4%	2.6%	5.1%	6.7%	6.0%
Boat, RV, van, etc.	0.1%	0.0%	0.1%	0.0%	0.0%

Source: U.S. Census Bureau, American Community Survey, 2010-2014

Age of Structures

The median year that a structure was built in Hancock County was 1960. The dominant year that structures in Hancock County were built was 1959 or earlier. Hancock County’s building stock is older than all benchmark areas (see table).

Figure 10: Age of Structures - County

2014 Median Year and Dominant Year Structures Built					
	U.S.	Illinois	Adams Co.	Hancock Co.	McDonough Co.
Median Year Built	1976	1967	1962	1960	1965
Dominant Year Built	1959 or Earlier	1959 or Earlier	1959 or Earlier	1959 or Earlier	1959 or Earlier

SELECTED DATA FOR PARTICIPATING JURISDICTIONS

The following data covers selected demographics for jurisdictions in Hancock County, which are participating in this mitigation plan.

Land Area and Population

Most of the villages and cities in Hancock County lost population between 2000 and 2014 according to Census estimates (see table).

Figure 11: Land Area and Population - Municipalities

Land Area and Population			
	Land Area (Sq Miles)	2000 Population	2014 Population
Augusta	0.713	657	609
Basco	0.227	107	85
Bowen	0.431	535	489
Carthage	1.605	2,725	2,600
Dallas City	2.375	1,055	1,153
Elvaston	0.797	152	104
Ferris	1.957	168	166
Hamilton	3.748	3,029	3,059
La Harpe	1.355	1,385	1,387
Nauvoo	3.382	1,063	1,195
Plymouth	0.589	562	495
Pontoosuc	1.409	171	88
Warsaw	6.617	1,793	1,441
West Point	0.168	195	222

Source: U.S. Census Bureau, Decennial Census & American Community Survey, 2010-2014

Age of the Population

In general villages and cities in Hancock County have older populations than the state of Illinois and the U.S. Most places have a lower proportion of the population under the age of 18, and a higher proportion of the population over the age of 65 than the state and nation (see table).

Figure 12: Population Under 18 and Over 65 – Municipalities

2014 Estimated Percentage of Population Under 18 and Over 65

	Pct Under 18	Pct Over 65
<i>U.S.</i>	23.1%	14.5%
<i>Illinois</i>	24.4%	14.2%
Augusta	13.00%	24.60%
Basco	12.90%	28.20%
Bowen	27.20%	11.50%
Carthage	21.00%	22.80%
Dallas City	29.20%	21.00%
Elvaston	19.30%	27.90%
Ferris	19.10%	14.50%
Hamilton	21.10%	19.80%
La Harpe	24.30%	22.00%
Nauvoo	19.90%	29.90%
Plymouth	14.10%	15.20%
Pontoosuc	19.30%	18.20%
Warsaw	17.60%	17.80%
West Point	29.30%	9.90%

Source: U.S. Census Bureau, Decennial Census & American Community Survey, 2010-2014

Age of Structures

Most of the villages and cities in Hancock County have older building stock. All of the municipalities except for have structures which are generally older than state and national averages (see table).

Figure 13: Age of Structures - Municipalities

2014 Estimates of Median Year and Dominant Year Structures Built

	Median Year Built	Dominant Year Built
<i>U.S.</i>	1976	1959 or Earlier
<i>Illinois</i>	1967	1959 or Earlier
Augusta	1951	1959 or Earlier
Basco	1939	1959 or Earlier
Bowen	1950	1959 or Earlier
Carthage	1962	1959 or Earlier
Dallas City	1951	1959 or Earlier
Elvaston	1939	1959 or Earlier
Ferris	1939	1959 or Earlier
Hamilton	1970	1959 or Earlier
La Harpe	1961	1959 or Earlier
Nauvoo	1965	1959 or Earlier
Plymouth	1939	1959 or Earlier
Pontoosuc	1949	1959 or Earlier
Warsaw	1945	1959 or Earlier
West Point	1939	1959 or Earlier

Source: U.S. Census Bureau, Decennial Census & American Community Survey, 2010-2014

HANCOCK COUNTY LAND USE AND DEVELOPMENT TRENDS

Hancock County, Illinois, located in West Central Illinois, is a primarily rural county encompassing 795 square miles, with 19.9 square miles of water area, primarily miles of Mississippi River Bank. Sparsely populated, with a mere 21.7 persons per square mile, the primary land use for the county is agricultural land. The fifteen incorporated jurisdictions within the county encompass 25.6 square miles, which represents over 3% of the total land mass of the County.

Agriculture remains a dominant force. According to the 2012 Census of Agriculture, there are 1,090 farms in the county, a slight increase since 2007, which showed 1063 farms in the county. The average size of farms is 354 acres (down from 370 in 2007), and the average market value of agricultural products (crops and livestock) sold per farm is \$290,977, a 64% increase from 2007 when the average was \$177,364. Harvested agricultural land in Hancock County represents nearly 296,937 acres annually, or 463 square miles of the county land mass. The remaining land uses in the county include wetlands, rural residential property, lakes, ponds, streams, and recreational land.

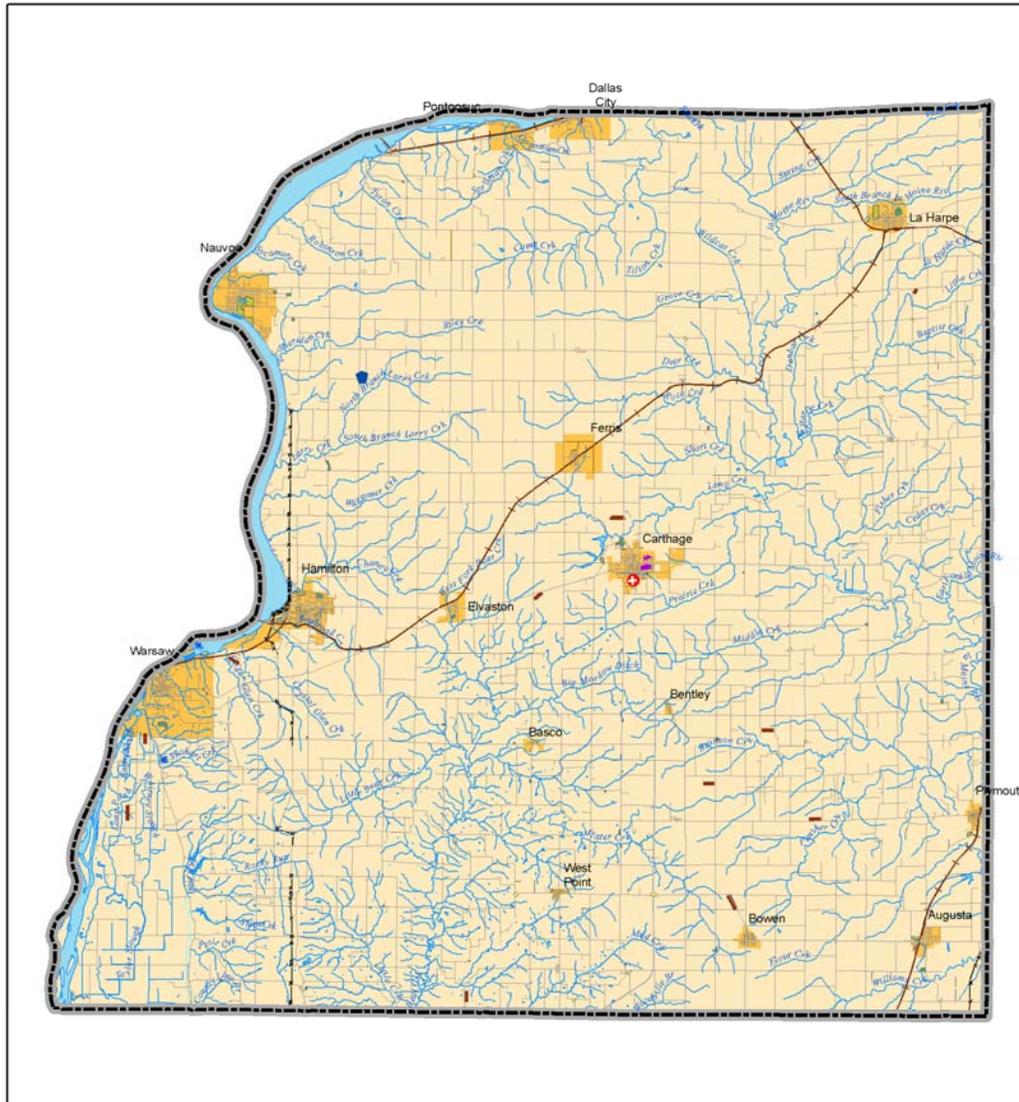
The development trends of Hancock County, like many similar rural counties, have been stagnant for the past several decades. As reported in previous sections, the population continues to both age and diminish in number. There are no major industries or employers, as you will see in a table following this section. With no significant manufacturing shipments, the county, through the Hancock County Economic Development Corporation, has focused energy on housing development and tourism. Due in large part to the sluggish regional economy, little to no development has occurred in the county over the past two decades.

The City of Nauvoo has benefitted from substantial investment by the Church of Latter Day Saints which reconstructed a temple based on plans from the original which was destroyed by fire in the 1800's. Nauvoo is a destination for LDS members because of the historical connection to their religion, as is Carthage which is where the original LDS Prophet, Joseph Smith, was murdered by a mob in the county jail. The LDS Church has restored many historical properties and constructed a modern Visitors Center. There is also an annual Pageant in July which attracts thousands of visitors. As you might imagine, the LDS Church contributes significantly to local tourism efforts and to assist the City of Nauvoo adapt infrastructure and manage tourists and traffic, especially during the summer season. Nauvoo is also the home of a State Park which adds to the mix. According to the Nauvoo Tourism Office, approximately 150,000 tourists visit the community each year, contributing a large portion of the \$26 million of tourism dollars generated by Hancock County in 2014, according to the Illinois Office of Tourism.

In addition to its tourism appeal, Carthage is trying to capitalizing on an extension of Highway 336, a four-lane road is part of highway construction connecting Chicago, Indianapolis, St. Louis and Kansas City. The city of Carthage annexed land bordering that highway bypass, with the first construction being a new facility for Memorial Hospital. Hamilton is also attempting to capitalize on its natural assets of eagles and geodes, both of which have dedicated followers which come back year after year to view the one and find the other. With the current enhancement of Highway 336 and the various tourism opportunities, there is potential for future development in Hancock County. Focuses on housing and recreational development are planned for the region with some growing interest in entrepreneurship and "economic gardening" rather than the labor-intensive, and rarely successful, strategy of attracting a large industrial employer.

Figure 14: County Map

Hancock County



1:312,184



- Legend**
- County Boundary Line
 - Places-Municipalities
 - School
 - Airport or Airfield
 - Golf Course
 - Government Center
 - Hospital/Hospice/Urgent Care Facility
 - Primary Road
 - Ramp
 - Secondary Road
 - Local Neighborhood Road, Rural Road, City Street
 - Alley/Private Drive/Service Drive
 - Vehicular Trail (ATV)
 - Railroad Feature (Main, Spur, or Yard)
 - Ferry Crossing
 - Powerline
 - Perennial Shoreline
 - Intermittent Shoreline
 - Stream/River
 - Canal, Ditch or Aqueduct
 - Lakes/Rivers
 - Park
 - Airport—Statistical Representation
 - Amusement Center
 - Campground
 - Cemetery
 - Golf Course
 - Industrial Building or Industrial Park
 - Shopping Center or Major Retail Center



All data from 2008 US Census TIGER/Line except
 2007 land cover raster data from USGS,
 2005 DOQ/2 imagery data from USGS,
 2003 DEM elevation data from USGS
 Datum and Projection:
 WGS84, UTM Zone 16N
 Map produced by:
 University of Illinois U-C Extension CADS
 January 2009

MAJOR EMPLOYERS IN HANCOCK COUNTY

FIGURE 15: MAJOR EMPLOYERS IN HANCOCK COUNTY

Employer	# Employees	Website
Memorial Hospital Hancock Village	208 (130 FT; 78 PT)	http://www.mhtlc.com/
Professional Swine Management	<i>Farms: 112 (98 FT; 14 PT)</i> <i>HQ: 28 (27 FT; 1 PT)</i>	http://www.psmswine.com/
W.L. Miller Gray Quarries	120	http://www.wlmillerco.com/
Southeastern School District	97 (91 FT; 6 PT)	http://www.southeastern337.com/
Hamilton School District	95 (48 FT; 47 PT)	http://www.hhs328.com/
Dadant & Sons	90	http://www.dadant.com/
Warsaw School District	77 (65 FT; 12 PT)	http://www.hancock.k12.il.us/whs/
La Harpe Elementary School District	76	http://www.laharpeeagles.org/
Dallas City Elementary School District	64 (53 FT; 11 PT)	http://www.dcbulldogs.com/
Nauvoo Restoration, Inc.	60 (15 FT; 10 PT; 35 Volunteer)	
Illini West High School District	55	http://www.illiniwest.org/
Montebello Healthcare Center	55	
Nauvoo-Colusa School District	52 (48 FT; 4 PT)	http://www.nauvoo-colusa.com/
First State Bank (3 locations)	50	http://www.firststateil.com/
Methode	50	http://www.methode.com/
Marine Bank (3 locations)	44 (41 FT; 3 PT)	http://www.marinebk.com/
Carthage Elementary School District	44	http://www.carthageschools.k12.il.us/
Carthage Veterinary Service	43 (42 FT; 1 PT)	http://www.hogvet.com/
County Market	40-50 (25 FT; 15-25 PT, depending on season)	http://www.freshtraditions.com/
Mental Health Centers of Western Illinois	30	http://www.mhcwi.org/
LaHarpe- Davier Healthcare Center	30	http://www.laharpedavier.4t.com/
Precision Foundry Tooling Cores for You	29	http://www.pftooling.com/ http://www.coresforyou.com/

CHAPTER 1 – PLANNING PROCESS

HOW THE PLAN WAS PREPARED

The University of Illinois Extension facilitated preparation of the Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan. Utilizing the 2010 Plan, the Hancock County Multijurisdictional Hazard Mitigation Steering Committee reviewed and revised all components of the plan, paying special attention to major changes to project ideas and risks.

The following meetings were part of the planning process. Sign In sheets, agenda's and minutes from the meetings are included in the appendix of the document.

July 7, 2016 – Planning and Mayor's Meeting

In July of 2016, the Hancock County Emergency Manager, together with University of Illinois Extension Staff, developed a meeting and activity outline for the completion of the plan. Later that evening, the timetable was provided to the mayors and village board presidents from the county.

September 22, 2016 – Steering Committee Meeting #1

During the first meeting, the following items were discussed:

- Scope of Work
- Planning Timeline to review , revise and update document
- Jurisdictional Participation Requirements
- Match Documentation
- Plan Goals
- Historical Weather Updates
- Community Profile Changes

September 29, 2016 – Initial Public Meeting

As part of the public engagement plan, a public meeting was held at 6pm to allow citizen and interested parties to review the current plan, make comments and suggestions for the updated plan, and provide any additional input or projects to be included in the plan update. Multiple media outlets were utilized to advertise the plan, including electronic and print media. A copy of the press release is included in the plan attachments.

October 27, 2016- Steering Committee Meeting #2

For the second Steering Committee Meeting, representatives from the Illinois State Water Survey joined the group to discuss HAZUS updates, changes to critical facilities, and any other relevant information for the HAZUS Updates. Additional topics of the meeting included:

- Distribute , Review and update 2010 Project Grids and project priorities
- Discuss Jurisdictional responsibilities regarding project ideas for the plan
- Changes to Risk Assessments for each Community
- Identifying completed projects to be removed from project grids

November 10, 2016 – Steering Committee Meeting # 3

The jurisdictional project grids were reviewed and collected at this meeting. The project Grid was reorganized by project type rather than jurisdiction for the plan update. The group agreed that this change made it easier to review since many of the projects encompass several jurisdictions, or were designated as countywide projects.

November 10, 2016 and December 8, 2016 - Focus Groups

Four focus groups were held for the major industrial clusters within Hancock County. These groups were First Responders/Emergency Management; Agriculture; Health Care/Social Service; and Education. The focus groups were asked to discuss each natural hazard that could affect the industry; how it might impact the industry; and what might be done to mitigate the risks from this hazard. Minutes from these groups are included in the appendix of the plan.

December 8, 2016 – Steering Committee Meeting – Make Up

This final meeting prior to the draft plan was held for all jurisdictions to review the progress of the plan, provide additional comments prior to the draft plan, and allow any questions to be answered as to the planning process.

January 26, 2017– Steering Committee Meeting #4

The January 12 meeting was postponed due to weather, so the meeting was rescheduled to meet right before the public meeting on January 26. This was the final steering committee meeting, with jurisdiction representatives reviewing the draft document for any changes, corrections or additions prior to the public meeting. The committee was reminded that upon FEMA approval, each participating jurisdiction will be asked to pass a resolution adopting the plan.

January 26, 2017 – Final Public Meeting

On January 26, 2017, a public meeting was held to give the community an opportunity to review the plan prior to the submission to the Illinois Emergency Management Agency (IEMA). The public also learned the process of the planning and future submission to FEMA.

THE PLANNING TEAM

Hancock County received a planning grant through the Hazard Mitigation Grant Program to update this plan. Hancock County contracted through the University of Illinois Extension to facilitate the planning process and to coordinate the plan preparation and participation. Carrie McKillip led development at the Staff level, assisted by Shelby Crow. Zachary Kennedy, Extension Specialist, provided assistance on plan data. The Illinois State Water Survey Staff, Brad McVay and Lisa Graff, developed the updated HAZUS information included in the plan.

All communities in Hancock County were invited to participate in the Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan update process. Following is a list of the participating communities: Augusta, Basco, Bentley, Bowen, Carthage, Dallas City, Ferris, Hamilton, La Harpe, Nauvoo, Plymouth, Pontoosuc, Warsaw, and West Point. Elvaston did not participate in the updated plan. Hancock County as a jurisdiction is represented by Jack Curfman, Emergency Manager.

Based upon the short timeline for Hazard Mitigation Planning in Hancock County, participation requirement for jurisdictional participation was kept at a minimum requirement. Each participating jurisdiction was required to attend at least one steering committee meeting.

The list of jurisdictional representatives is outlined below:

HANCOCK COUNTY:	Jack Curfman
BASCO:	James Damron
BENTLEY:	Marty Husband
BOWEN:	Lindsay Schlotterbeck
CARTHAGE:	Gary Waddell
	Jim Nightingale
DALLAS CITY:	Kevin Six
FERRIS:	Terry Pope
HAMILTON:	Jean Massey
LA HARPE:	Max Owsley
NAUVOO:	Gary Shanks
	Charles Gilbert
PLYMOUTH:	Chris Sanson
PONTOOSUC:	Bob Durand
WARSAW:	Mike Heisler
WEST POINT:	Larry Wood
	Ron Clampit

Each participating jurisdiction, whether village, city, or county is responsible for, and has the authority to adopt the plan once completed, and controls its own policies, zoning, and flood plain participation. The jurisdictions with floodplains (See page 5) are all in compliance with NFIP regulations, and have the intention of continuing participation.

PUBLIC PARTICIPATION

The importance of public participation in the planning process was recognized by the Steering Committee. Efforts to educate the public regarding creation of the plan and to provide opportunities for the public to have input on the plan were an integral part of the planning process. These efforts are discussed below.

Representing a rural county without large media outlets, the Hancock County Hazard Mitigation utilized multiple methods to engage citizens of the county in the planning process. Press releases, public meetings, and issue-based focus groups were all used to gather opinion and suggestions. Throughout the process, steering committee members were also encouraged to explain and discuss the planning process with their friends and neighbors and encourage their input.

Throughout the planning timeframe, multiple press releases have been sent out to area newspapers and radio stations explaining the process, promoting the public meetings, and encouraging survey participation.

Two public meetings were held which allowed interested parties to view the risk assessments, propose potential projects, and to discuss any ideas or concerns that they may have. The overall objective was to encourage public comment as to what could be done to permanently reduce the risk to life and property from natural disasters. Both meetings were held in Carthage at the University of Illinois Extension Office. While multiple press releases and articles were placed for each, turnout was light. While attendance was small, discussion was lively, and significant input was gathered in this manner. In addition to such discussion, those attending were asked to complete a brief form to better capture their thoughts and ideas about mitigation strategies.

To ensure that diverse groups were also included in the process, four focus groups were held during the planning process to gather input from the following sectors:

- Ag and Natural Resources
- Health and Human Services
- Public Safety/Emergency Response
- Education

Names of those individuals and groups invited to participate are provided in the Appendix. Also in the Appendix is an agenda for these small groups and a copy of the form used to gather information additional to the recorded discussion.

REVIEW AND INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS, AND TECHNICAL INFORMATION

All known existing plans within Hancock County were gathered by University of Illinois Extension. At the first Task Force meeting the community representatives were given a documents Form to be completed in consultation with the leaders in their community, providing them with a list of plans and other documents that should be considered during preparation of the plan. Natural hazards mitigation can be incorporated into existing plans and ordinances during updates. If a community does not have particular regulations that would promote hazard mitigation, such as building codes, these could be considered for adoption. Other documents could provide helpful information for assessing risks or determining appropriate mitigation projects. A combined listing of community documents is below.

Figure 16: Existing Community Documents

	Augusta	Basco	Bowen	Carthage	Dallas City	Elvaston	Ferris	Hamilton	La Harpe	Nauvoo	Plymouth	Pontoosuc	Warsaw	West Point
Comprehensive Plan				X						X			X	
Subdivision Ordinance				X					X	X			X	
Zoning Ordinance				X				X		X			X	
Building Codes				X				X		X			X	
Land Use Plan				X						X			X	
Existing Land Use Map				X						X			X	
Flood Ordinance				X	X			X		X			X	
Flood Insurance Rate Map*				X	X	X		X	X	X		X	X	
Repetitive Flood Loss List				X									X	
Elevation Certificates for Bldgs													?	
Capital Improvement Plan				X									X	
Historic Preservation Ordinance				X					X				X	
Storm Water Management Plan					X				X				X	
Hazard Mitigation Plan									X	X		X	X	
Emergency Management Plan	X			X	X			X	X	X			X	
Drainage Ordinance									X				X	
Critical Facilities Map				X									X	X
Hazard Vulnerability Analysis													X	
Infrastructure Map				X					X	X		X	X	X
Topographic Map				X						X		X	X	
Community Website				X	X			X	X	X				

	Augusta	Basco	Bowen	Carthage	Dallas City	Elvaston	Ferris	Hamilton	La Harpe	Nauvoo	Plymouth	Pontoosuc	Warsaw	West Point
COMMUNITY ACTION														
Siren/Call System	X		X	X	X			X	X	X			X	
Weather Radio	X								X	X				
Storm Spotters	X			X	X			X	X	X			X	X
Local Weather Station	X			X										
Watershed Repairs								X						
Road Treatment	X	X	X	X	X	X	X	X	X	X		X	X	X

* The Flood Insurance Rate Maps for Hancock County, produced by the Illinois State Water Survey, were effective 10/16/2009 and the above Figure reflects that status.

STATE AND LOCAL CAPABILITY ASSESSMENT

This section provides details on the State and local capabilities when dealing with hazard mitigation. The State and local capabilities are referenced in order to show what plans, documents and regulations are already in place and are ready to be used in the event of a natural disaster occurring.

STATE CAPABILITY ASSESSMENT:

The Illinois Natural Hazard Mitigation Plan (INHMP) compiled by the state and updated October 2013 looks at the State's ability to respond in the event of a natural disaster. A selection from the "Purpose" section of the document is provided below:

"The contents of this Illinois Natural Hazard Mitigation Plan (INHMP) are intended to provide the framework for hazard mitigation not only during the recovery and reconstruction process, but on a year-round basis to identify current and proposed mitigation projects which will reduce the potential for future losses and decrease the costs to the taxpayers."

LOCAL CAPABILITY ASSESSMENT:

The local capability assessment has an overview of existing communities and their respective plans, documents and regulations that are currently in place or planned to mitigate some of the devastating effects of natural disasters. As with many rural communities, many of the parties responsible for implementing the mitigation plans have multiple roles in addition to mitigation. Local capabilities also may be directly impacted by lack of availability of state and federal assistance in implementing mitigation projects.

MITIGATION MEASURES IN PLACE OR PLANNED:

The following are mitigation measures that communities either have in place or are planned for the county-wide hazard mitigation plan.

Weather Warning Systems

All but a few of the communities (Basco, Bentley, Elvaston, Ferris, Pontoosuc and West Point) have a siren in town or at the fire station that signals residents when a strong storm, tornado or other hazard is present. Several of the communities without functioning sirens will be looking for funding assistance to purchase sirens and/or emergency call systems for weather warnings. Dallas City chose to implement a phone system to notify community members of weather emergencies.

Emergency Warning Radios

Several Weather Radios Campaigns have transpired since the original Mitigation Plan for Hancock County was developed. These campaigns are planned to continue to place as many weather radios within the county as possible.

Severe Weather Spotters

Most communities have volunteer firemen from a department or district. Often these are the people who will be assigned to look out for inclement weather and report back to the police. Many of the smaller communities in Hancock County with populations under 200 do not have an official "storm-spotter."

Stormready Communities

There are zero Stormready Communities in Hancock County.

Weather Ready Nation Ambassador

The Hancock County Emergency manager has undergone training to become a Weather Ready Nation Ambassador. This initiative, sponsored by NOAA, encourages partnerships to improve the nations readiness and resilience against extreme weather.

Building Code Standards

There are only three communities with assigned building codes: Carthage, Nauvoo and Warsaw.

Local Media/Technology Outreach

There are radio stations in Carthage OR Quincy, IL and Burlington or Keokuk, IA. The only community with their own radio station in Hancock County for weather alerts and local news is in Carthage, IL. Cell Phone transmission towers do provide alerts to weather app subscribers who have weather alerts enabled on smart phones.

Road Treatment in Advance of Expected Ice Conditions

All but one community plans on using cinder, salt or sand to prevent slippage during icy conditions in the communities. This work is most often done by the communities themselves but may also be done by the county if the road is a county road or if the community cannot budget for such preventative measures.

Figure 17: Overview of Safety Measures

	Augusta	Basco	Bentley	Bowen	Carthage	Dallas City	Elvaston	Ferris	Hamilton	La Harpe	Nauvoo	Plymouth	Pontoosuc	Warsaw	West Point
Community Action															
Siren	X			X	X	X			X	X	X	X		X	
Weather Radio										X	X				
Storm Spotters	X				X	X			X	X	X	X		X	X
Local Weather Station	X				X										
Watershed Repairs									X						
Road Treatment	X	X		X	X	X	X	X	X	X	X	X	X	X	X

Preventative measures that already exist or are being implemented may be found in the table above marked with an X. There are still many documents that have not yet been compiled for the villages in regards to hazard mitigation.

References: 2013 Illinois Natural Hazards Mitigation Plan

http://iema.illinois.gov/iema/Mitigation/Documents/Plan_IllMitigationPlan.pdf

CHAPTER 2 – RISK ASSESSMENT

HAZARD VULNERABILITIES AFFECTING HANCOCK COUNTY

The Hancock County Hazard Mitigation Steering Committee met on October 27, 2016, to determine the risk by natural hazard for each jurisdiction in Hancock County with additional input from the previous public meeting (on Sept 29) and the first Committee meeting (on Sept 22) where components of the original plan were reviewed. Steering Committee members reviewed the 2013 Illinois State Hazard Mitigation Plan, both for methodology and risk assessment for Hancock County. Additionally, historical data for weather related events in Hancock County were reviewed by jurisdiction.

The steering committee initially opted to follow the approach used by the Illinois Natural Hazard Mitigation Planning Committee (Severe-High-Elevated-Guarded-Low) for the county wide ratings but opted to simplify by merging into three categories (High-Moderate-Low) when assessing risk for each natural hazard by jurisdiction. Scale of each risk by jurisdiction was done by consensus of the committee after reviewing historical data, potential magnitude of loss to both property and life, and local knowledge of the topography of the jurisdiction. During the discussion, the representative from the jurisdiction reflected specific knowledge to which the group deferred, especially in the categories of drought and flood. Specifically mentioned by several jurisdictions was the water supply in a drought situation, and well as the rural areas that are dependent upon their own wells. The ratings determined by the committee are listed below.

Figure 18: Overall Summary of Hancock County’s Vulnerability to Natural Hazards

Jurisdiction	Severe Storms (Lightning, Hail)	Flooding	Winter Storms	Drought	Extreme Temps	Earthquake	Tornado
Hancock County*	SEVERE	ELEVATED	HIGH	HIGH	ELEVATED	GUARDED	HIGH
Augusta	MODERATE	---	HIGH	LOW	MODERATE	LOW	MODERATE
Basco	HIGH	---	HIGH	LOW	MODERATE	LOW	HIGH
Bowen	HIGH	---	HIGH	MODERATE	MODERATE	LOW	HIGH
Carthage	HIGH	---	HIGH	HIGH	MODERATE	LOW	MODERATE
Dallas City	HIGH	HIGH	HIGH	LOW	MODERATE	LOW	HIGH
Elvaston	HIGH	---	HIGH	LOW	MODERATE	LOW	HIGH
Ferris	HIGH	---	HIGH	LOW	MODERATE	LOW	HIGH
Hamilton	HIGH	MODERATE	HIGH	LOW	MODERATE	LOW	HIGH
La Harpe	HIGH	---	HIGH	MODERATE	MODERATE	LOW	HIGH
Nauvoo	HIGH	LOW	HIGH	LOW	MODERATE	LOW	HIGH
Plymouth	HIGH	---	HIGH	LOW	LOW	LOW	HIGH
Pontoosuc	MODERATE	HIGH	LOW	LOW	LOW	LOW	LOW
Warsaw	HIGH	HIGH	HIGH	MODERATE	MODERATE	LOW	HIGH
West Point	HIGH	---	HIGH	MODERATE	MODERATE	LOW	HIGH

**Illinois Hazard Rating By County Based on Criteria and Methodology. Established at the Illinois Natural Hazard Mitigation Planning Committee Meeting on March 10, 2004.*

Community ratings provided by Steering Committee and/or community members on Sept 22, Sept 29, and October 27, 2016.

Repetitive Loss Data

In accordance with FEMA Requirements, repetitive loss history within Hancock County was reviewed. The information, proved by the Illinois Emergency Management Agency, included all of the repetitive loss data as of April 30, 2009.

Of the fourteen repetitive loss properties identified in Hancock County, three are located in unincorporated areas and all but one are single family dwellings. Seven of these properties are located within the jurisdiction of Dallas City. One was a non-residential property, and the six are listed as single family. Note that Dallas City is split between Hancock and Henderson Counties so it is possible that one or more of the identified repetitive loss properties is located in Henderson. Dallas City chose to participate in the Hancock Mitigation Planning process rather than Henderson's.

The remaining four properties are located in the jurisdiction of Pontoosuc, all listed as single family. All these properties will remain vulnerable until they are mitigated to protect against the natural hazards that caused the losses. In both Dallas City and Pontoosuc, this is predominantly flooding, and elevation or buyout would be the most effective mitigation effort.

2013 Illinois Natural Hazard Mitigation Plan Ratings for Hancock County

The historical occurrence of natural hazards is one of four main criteria that were used in the Illinois Natural Hazard Mitigation Plan to create hazard ratings for each county in the state. Based upon Historical frequency and probability, vulnerability, severity of impact, and a population criterion, the plan includes a rating for each type of natural hazard for each county. Ratings (from low to high) of low, guarded, elevated, high and severe were assigned based upon the aforementioned criteria. Hancock County was given the following ratings:

Figure 19: Hancock County Hazard Ratings

Hazard Ratings for Hancock County Assigned in the 2013 Illinois Natural Hazard Mitigation Plan						
Severe Storms	Floods	Winter Storms	Drought	Extreme Heat	Earthquake	Tornado
Severe	Elevated	High	High	Elevated	Guarded	High

Source: 2013 Illinois Natural Hazard Mitigation Plan

Also in the 2013 Illinois Natural Hazard Mitigation Plan was a recommended assessment of vulnerability levels defined by the percentage of people affected.

Figure 20: Vulnerability Levels

Vulnerability (percentage of people)

Factors:

- 1) The relationship of where people live in or near the hazard area.
- 2) The percentage of people that will be adversely affected should the hazard occur.

Low (6)	Less than 10% of the total population of the jurisdiction
Medium (12)	10% to 25% of the total population of the jurisdiction
High (18)	More than 25% of the total population of the jurisdiction

FEDERAL DISASTER DECLARATION HISTORY SINCE 1981

Most of the federally declared disasters that Hancock County has been a part of since 1981 have been flood events.

FEMA DR#735 – Hancock County was one of several counties that were a part of this 1985 disaster, which was the result of flooding, severe storms, and ice jams. This disaster also affected counties along the Kankakee, Wabash, and Illinois rivers.

FEMA DR #871 – Hancock County was one of thirty Illinois counties that were a part of this 1990 declaration. Heavy rain in May and June caused widespread flooding across the state.

FEMA DR #997 – This 1993 known as the Great Flood of 1993 prompted a disaster declaration encompassing thirty-nine Illinois counties.

FEMA DR#1112 – Flooding in 1996 resulted in a federal disaster declaration for several central and southern Illinois counties, including Hancock County.

FEMA DR #1368 – In April of 2001 heavy flooding devastated ten Illinois counties. In May a federal disaster was declared for the ten counties affected, including Hancock County. In all over \$1.2 million in federal and state disaster assistance was extended to residents of the ten counties. Disaster housing grants accounted for \$506,000 while the Small Business Administration (SBA) made \$711,000 in low-interest in disaster loans. 45 families in Hancock County were approved for disaster housing grants which totaled \$33,392.

FEMA DR#1416 – This May 2002 disaster declaration was the result of several tornadoes, severe storms and flooding. Nearly two thirds of the state's counties were a part of this declaration which encompassed all of central and southern Illinois, including Hancock County. Disaster assistance for this event topped \$10.3 million.

FEMA DR#1469 – Flooding was again the cause of this May 2003 declaration. This disaster included sixteen counties in west central and southern Illinois. A total of \$4,535,866 in grants and low-interest disaster loans were approved for those affected by the disaster.

FEMA DR#1771 – The flooding of June 2008 caused massive damage across the state. In total eighteen Illinois counties, including Hancock, were part of this disaster declaration. Individual assistance extended in this disaster is in excess of \$15 million.

FEMA DR#1960 – The major winter storm that ran from January 31 until February 3, 2011 affected 65 Illinois Counties and committed \$96,905,253 in federal assistance. This major winter storm crippled the transportation across the state, and caused major overtime costs for any jurisdiction providing snow removal.

FEMA DR#4116 - Hancock County received a Public Assistance Declaration for damage to public infrastructure damaged from severe storms and flooding that occurred between April 16 and May 5, 2013. Disaster assistance from FEMA topped \$396 million for the counties affect by the event.

2008 JUNE FLOOD

(The following is an excerpt from the 2009 Long Term Recovery Council Final Report Aftermath of the Floods of June 2008 & Recommendations for Long –term Economic Recovery, Prepared by the Office of Sustainability University of Illinois.)

Heavy rains in 2008 produced widespread flooding across the Midwest. According to statewide average precipitation totals, the period of March–June 2008 was the wettest in Iowa’s recorded history and ranked as the 4th and 8th wettest in Indiana and Wisconsin, respectively. Total precipitation in June alone exceeded 14 inches in areas of southern Wisconsin, southwestern Iowa, and southeastern Indiana. These heavy rains contributed to record flooding in Illinois and along its border rivers. As a result of the June 2008 flooding, 25 Illinois counties were declared federal disaster areas per FEMA-1771-DR.

The 2008 flood peaks were either the highest or second highest on record at 12 of the 24 stations on the Mississippi River. Historic records were set at Keithsburg, Gladstone, and Burlington, Iowa exceeding the records set in 1993.

Although the flood heights experienced in 2008 for select locations along the Mississippi River were nearly as high or higher than those reached in 1993, the period of time above flood stage was much shorter. For example, the flood crest reached at Burlington in 2008 was over 0.5 feet higher than the 1993 flood crest of 25.10 feet, the previous record peak. The spring flooding that occurred (April-May) in both 1993 and 2008 were of similar duration at this location. However, the Burlington gage was above flood stage for only one month in June-September of 2008 as compared to over three months during the same time period in 1993 (Figure 4-1). In Quincy, the 2008 flood crest was 1.3 feet lower than the 1993 flood crest of 32.13 feet, the record peak at that location. The length of time above flood stage in 2008 was also shorter than in 1993.

Overall, the 1993 flood on the Mississippi River was more severe in terms of its magnitude, duration, spatial extent, and its impact on the region.

Levees

More than 100 levees are located along the Mississippi River from Dubuque, Iowa to Cairo, Illinois. Most of these levees were built to protect agricultural land; notable exceptions include those in the St. Louis metro and Quad Cities areas, which were built to protect urban areas.

During the 2008 June floods, a number of levees overtopped or breached. It is important to note that overtopping is not considered a failure. Levees are designed and built for a certain level of protection. When flood conditions exceed that level, the levee has provided the intended level of protection and may then be overtopped per its design. Typically levees that protect primarily agricultural areas are designed for more frequent floods than those protecting urban or more highly populated areas.

In total, 26 levees overtopped or breached along the Mississippi River between Rock Island, Illinois and St. Louis, Missouri in 2008. Six of the 26 overtopped or breached levee systems are located in Illinois. Breached or overtopped levees along the Mississippi River impacted river levels at nearby locations, as well as downstream. On June 17 across the river from Burlington, Iowa, two levees near the Illinois community of Gulfport were overtopped. This caused a sudden drop in river levels near Henderson County and further downstream. The Des Moines River flows into the Mississippi River less than 3 miles downstream from the Keokuk gage. There were multiple levee overtoppings and breaches on both sides of the Mississippi River downstream of this location. The Hunt-Lima levee system which extends into Henderson County was overtopped.

SEVERE STORMS / HAIL

(Source: Federal Emergency Management Agency)

All thunderstorms are dangerous. Every thunderstorm produces lightning. In the United States an average of 300 people are injured and 80 people are killed each year by lightning. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms.

Facts about thunderstorms:

- Thunderstorms may occur singly, in clusters, or in lines.
- Some of the most severe occur when a single thunderstorm affects one location for an extended time.
- Thunderstorms typically produce heavy rain for a brief period, anywhere from 30 minutes to an hour.
- Warm, humid conditions are highly favorable for thunderstorm development.
- About 10% of thunderstorms are classified as severe – one that produces hail at least ¾ of an inch in diameter, has winds of 58 miles per hour or higher, or produces a tornado.

Facts about lightning:

- Lightning’s unpredictability increases the risk to individuals and property.
- Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall.
- “Heat lightning” is actually lightning from a thunderstorm too far away for thunder to be heard.
- Most lightning deaths and injuries occur when people are caught outdoors in the summer months during the afternoon and evening.

Facts about hail:

- As a thunderstorm grows, updrafts will push water droplets into a region of the atmosphere which is below the freezing temperature. These water droplets collide with other droplets just before freezing, which is why some hailstones can grow to several inches in diameter. The stronger the updraft associated with a thunderstorm, the larger the hail associated with the storm will be.

The National Oceanic and Atmospheric Administration’s (NOAA) National Climatic Data Center keeps a database of all severe weather events. With regard to severe storms the database keeps records of thunderstorm and high wind events, hail events, and tornados. According to the NCDC the Storm Events database keeps record of all thunderstorm and wind events, as well as hail events from 1955 forward. However, the lack of damage inducing thunderstorm and high wind events before 1997 and the lack of any events before 1970 call into question the completeness of this data. The tornado events are reportedly tracked back to 1950.

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The following table displays all of the damage or injury inducing thunderstorm and high wind events in Hancock County that are listed in the NCDC Storm Events Database.

Figure 21: Thunderstorm and High Wind Events Causing Damage or Injury in Hancock County 1955-Present

Location or County	Date	Time	Recorded Windspeed	Deaths	Injuries	Property Damage	Crop Damage
Bowen	8/18/1993	6:10 PM	0 kts.	0	0	1K	0
Hamilton	8/28/1993	3:25 AM	0 kts.	0	0	1K	0
HANCOCK (1)	1/10/1997	4:00 AM	N/A	0	1	0	0
HANCOCK (1)	4/6/1997	8:00 AM	54 kts.	0	0	1.6M	0
HANCOCK (1)	9/29/1997	11:00 AM	52 kts.	0	1	15K	0
Elvaston	4/7/1998	3:45 PM	0 kts.	0	0	1K	0
Countywide	7/26/1999	7:00 PM	0 kts.	0	0	12K	0
La Harpe	4/20/2000	3:20 AM	0 kts.	0	0	15K	0
Hamilton	5/8/2000	8:06 PM	0 kts.	0	0	1K	0
Countywide	6/13/2000	10:25 PM	0 kts.	0	0	5K	0
Carthage	7/31/2000	5:45 PM	0 kts.	0	0	6K	0
Nauvoo	6/1/2001	5:15 PM	0 kts.	0	0	40K	0
Warsaw & Hamilton	7/5/2003	9:15 PM	52 kts.	0	0	100K	10K
Dallas City	7/8/2003	12:57 PM	52 kts.	0	0	50K	5K
Augusta	7/9/2003	8:43 PM	52 kts.	0	0	40K	5K
Nauvoo, Hamilton, Carthage, Bentley	7/18/2003	6:00 AM	70 kts.	0	0	3.7M	90K
Nauvoo	8/26/2003	4:35 PM	52 kts.	0	0	0	5K
Bowen	8/28/2003	4:00 PM	55 kts.	0	0	10K	2K
Nauvoo	5/23/2004	2:18 AM	52 kts.	0	0	5K	0
Hamilton	5/24/2004	8:13 PM	65 kts.	0	0	10K	20K
Nauvoo	5/30/2004	1:35 PM	70 kts.	0	0	10K	0
Carthage	8/27/2004	12:55 AM	59 kts.	0	0	5K	10K
Carthage	8/28/2004	12:55 AM	59 kts.	0	0	3K	3K
Nauvoo	6/8/2005	12:00 PM	52 kts.	0	0	3K	0
Nauvoo	9/8/2005	3:10 PM	56 kts.	0	0	10K	0
Sutter	3/30/2006	8:30 PM	52 kts.	0	0	1K	0
Niota	6/3/2008	8:13 AM	52 kts.	0	0	5K	0K
Sutter & Carthage	7/27/2008	3:40 PM	61 kts.	0	0	10K	0K
Durham	6/21/2010	5:01 PM	52 kts.	0	0	1K	0
Warsaw	8/20/2010	4:20 PM	56 kts.	0	0	10K	0
Hamilton	8/20/2010	4:40 PM	56 kts.	0	0	10K	0
Bowen	6/10/2011	5:50 PM	52 kts.	0	0	5K	0
Hamilton	6/27/2011	12:30 AM	61 kts.	0	0	250K	0
Warsaw	6/27/2011	12:38 AM	56 kts.	0	0	5K	0
Carthage	6/27/2011	12:45 AM	65 kts.	0	0	250K	0
Bentley	6/27/2011	12:45 AM	61 kts.	0	0	250K	0
Plymouth	6/27/2011	12:46 AM	61 kts.	0	0	5K	0
Bowen	6/16/2012	5:48 PM	70 kts.	0	0	75K	0

Source: National Climatic Data Center Notes: (1) denotes that this storm event affected an area larger than, but including Hancock County.

Not all of the damage displayed in the records with (L) occurred in Hancock County.

The following table displays the number of hail events in Hancock County that are listed in the NCDC Storm Events Database.

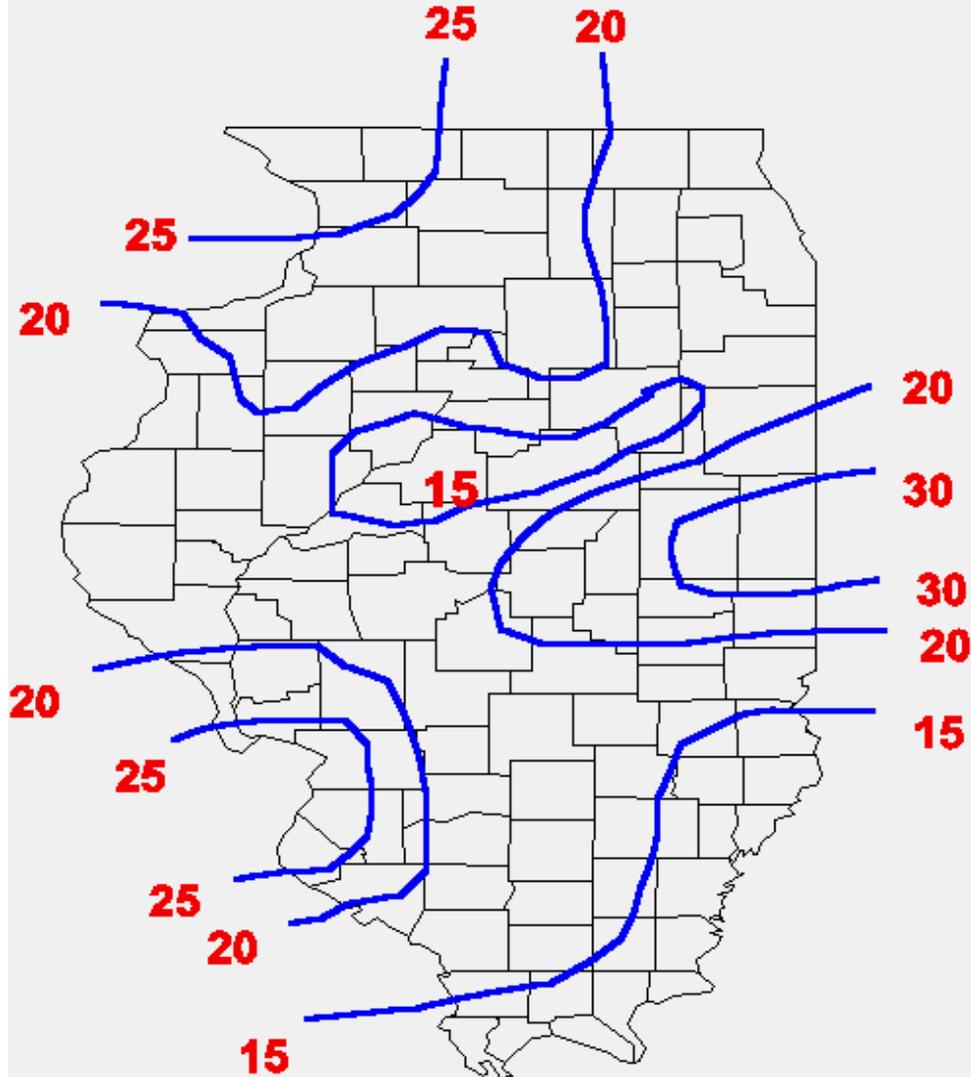
Figure 22: Number of Hail Events by Jurisdiction 1955-Present

Number of Hail Events by Jurisdiction 1955-Present	
Jurisdiction	Number of Hail Events
Unspecified – Hancock County	27
Augusta	9
Basco	1
Bentley	10
Bowen	7
Burnside	1
Carthage	15
Dallas City	10
Elvaston	2
Ferris	1
Fountain Green	6
Hamilton	10
La Harpe	5
Nauvoo	5
Niota	2
Plymouth	6
Pontoosuc	NA
Sutter	1
Warsaw	6
West Point	1

Source: National Climatic Data Center

Figure 23: Pattern of Hail Days

Figure 1. The pattern of hail days during the 1981-1994 period.



To get the hail days per year, divide these numbers by 14. They will not match the 1900-1994 average because the more recent years were quieter.

TORNADO

(Source: Federal Emergency Management Agency)

Tornadoes are nature's most violent storms. Spawned from powerful thunderstorms, tornadoes can cause fatalities and devastate a neighborhood in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. Every state is at some risk from this hazard.

Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible. Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. Tornadoes generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado.

Facts about tornadoes:

- They may strike quickly, with little or no warning.
- They may appear nearly transparent until dust and debris are picked up or a cloud forms in the funnel.
- The average tornado moves southwest to northeast, but tornadoes have been known to move in any direction.
- The average forward speed of a tornado is 30 MPH, but may vary from stationary to 70 MPH.
- Waterspouts are tornadoes that form over water.
- Tornadoes are most frequently reported east of the Rocky Mountains during spring and summer months.
- Peak tornado season in the southern states is March through May; in the northern states, it is late spring through early summer.
- Tornadoes are most likely to occur between 3 p.m. and 9 p.m., but can occur at any time.

The National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center keeps a database of all severe weather events. With regard to severe storms the database keeps records of thunderstorm and high wind events, hail events, and tornadoes. According to the NCDC the Storm Events database keeps record of all thunderstorm and wind events, as well as hail events from 1955 forward. However, the lack of damage inducing thunderstorm and high wind events before 1997 and the lack of any recorded events before 1970 call into question the completeness of this data. The tornado events are reportedly tracked back to 1950.

The following table displays all of the damage or injury inducing tornado events in Hancock County that are listed in the NCDL Storm Events Database.

Figure 24: Tornadoes Causing Injuries or Property Damage 1955-Present

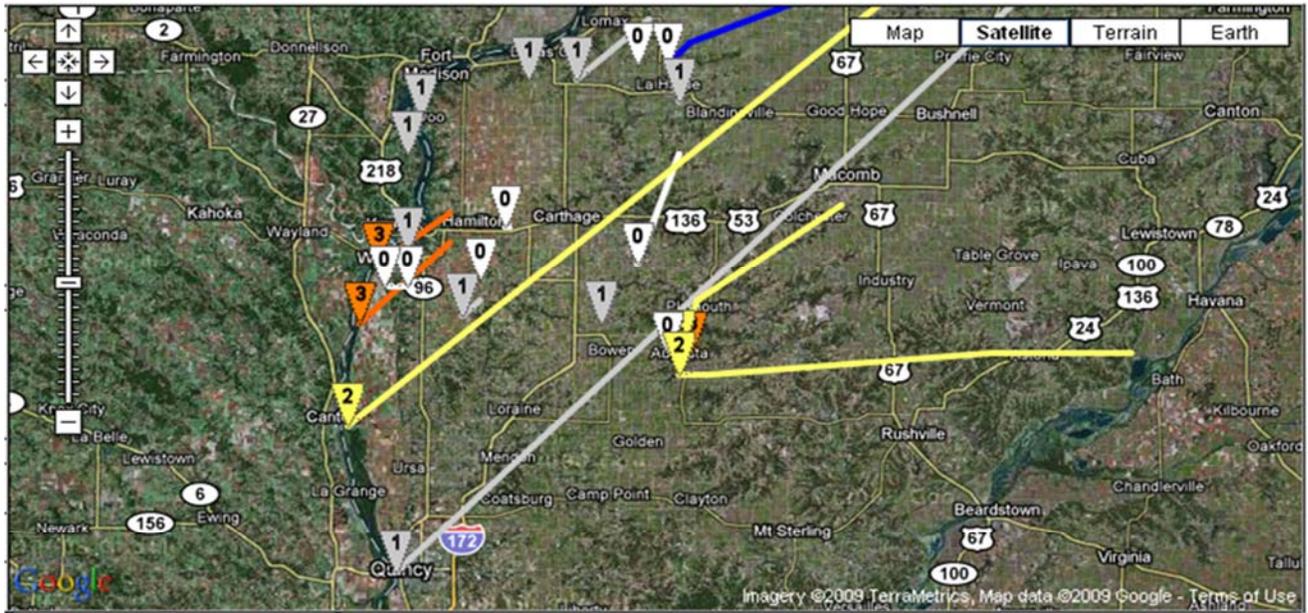
Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 HANCOCK	04/23/1955	1930	Tornado	EF1	0	0	3K	0
4 HANCOCK	05/09/1957	1910	Tornado	EF1	0	0	3K	0
9 HANCOCK	05/08/1973	2000	Tornado	EF1	0	0	0K	0
10 HANCOCK	06/02/1973	1600	Tornado	EF1	0	0	0K	0
11 HANCOCK	06/16/1973	1940	Tornado	EF1	0	0	0K	0
13 HANCOCK	09/30/1973	1700	Tornado	EF3	0	0	0K	0
15 HANCOCK	04/13/1974	1840	Tornado	EF3	0	0	2.5M	0
16 HANCOCK	04/13/1974	1900	Tornado	EF2	0	10	2.5M	0
31 HANCOCK	06/21/1981	1914	Tornado	EF1	0	0	2.5M	0
32 HANCOCK	06/21/1981	1947	Tornado	EF1	0	0	3K	0
42 HANCOCK	04/29/1984	2050	Tornado	EF0	0	0	0K	0
52 HANCOCK	06/30/1986	0140	Tornado	EF1	0	1	25K	0
55 HANCOCK	03/08/1990	1515	Tornado	EF2	0	0	250K	0
56 HANCOCK	06/13/1990	1815	Tornado	EF0	0	0	0K	0
57 HANCOCK	06/16/1990	1600	Tornado	EF1	0	0	25K	0
113 St Mary	04/30/1997	01:03 PM	Tornado	EF0	0	0	0	0
115 Warsaw	04/30/1997	12:50 PM	Tornado	EF0	0	0	400K	0
116 Warsaw	04/30/1997	12:52 PM	Tornado	EF0	0	0	400K	0
117 Warsaw	04/30/1997	12:54 PM	Tornado	EF1	0	0	400K	0
140 Warsaw	04/08/1999	05:35 PM	Tornado	EF3	0	0	15.0M	0
141 La Harpe	04/08/1999	06:35 PM	Tornado	EF0	0	0	0	0
235 Tioga	05/10/2003	05:49 PM	Tornado	EF2	0	0	400K	0
315 Warsaw	06/02/2007	19:45 PM	Tornado	EF0	0	0	5K	0K
340 Sutter	04/10/2008	17:30 PM	Tornado	EF1	0	0	100K	0K
341 Basco	04/10/2008	17:33 PM	Tornado	EF0	0	0	20K	0K
342 Elvaston	04/10/2008	17:35 PM	Tornado	EF0	0	0	30K	0K

Source: National Climatic Data Center – Storm Events Database

Note: 1 - "HANCOCK" in all capital letters refers to an unspecified location within Hancock County

Figure 25: Tornadoes Causing Injuries or Property Damage 1950-Present

Information about tornado activity in Illinois is posted at the Illinois State Climatologist Web site <http://www.isws.illinois.edu/atmos/statecli/>. Information posted includes tornado climatology; tornado maps, statistics, research and links to other sites. Below are excerpts from the Illinois State Climatologist web site.



Legend		
= F?	= F0	= F1
= F2	= F3	= F4
	Fujita Scale	
= F5		

Hancock County Tornadoes 1950 - 2008
 Source: TornadoHistoryProject.com

Fujita Tornado Scale

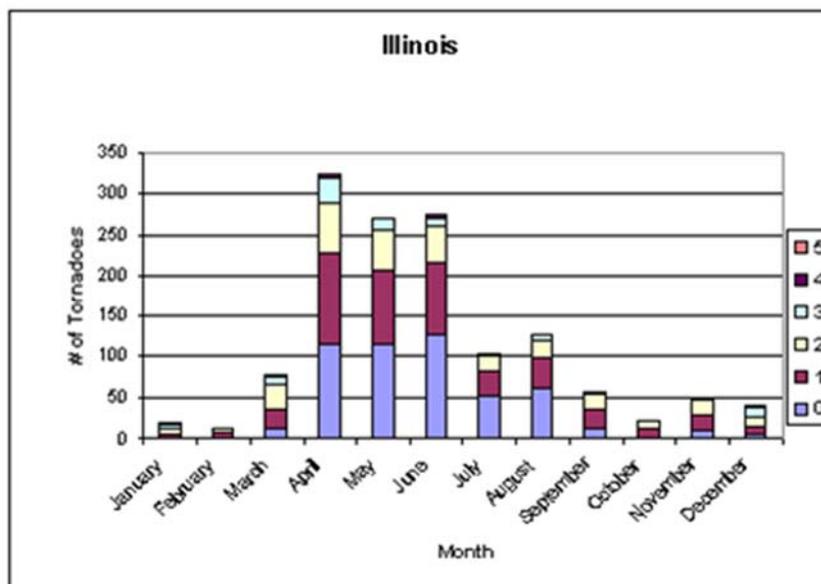
Tornadoes were typically classified using the Fujita or F-scale, the higher the number the worse the damage. In recent years, the F-scale was changed to the EF-scale or "Enhanced Fujita"-scale. This was based on refinements to the original scale and is described in more detail by the NWS [here](#) and [here](#). Below is the original scale.

Figure 26: Fujita Tornado Scale

EF-0	40-72 mph	Light damage: some damage to chimneys; tree branches broken; sign boards damaged.
EF-1	73-112 mph	Moderate damage: peels off some roofing; mobile homes pushed off foundation; moving cars blown off road.
EF-2	113-157 mph	Considerable damage: roofs torn off houses; mobile home demolished; large trees snapped or uprooted; cars lifted off ground.
EF-3	158-205 mph	Severe damage: roofs and walls blown down; trains overturned; most trees uprooted; cars lifted and tossed.
EF-4	207-260 mph	Devastating damage: well-constructed buildings leveled; cars tossed some distance;
EF-5	261-318 mph	Incredible damage: massive destruction; car-size objects thrown as far as 100 meters; most buildings leveled and swept away; incredible phenomena will occur.

Historically, most tornadoes in Illinois have occurred in April through June.

Figure 27: Tornado F-Scale versus Month by F scale in Illinois



WINTER STORMS

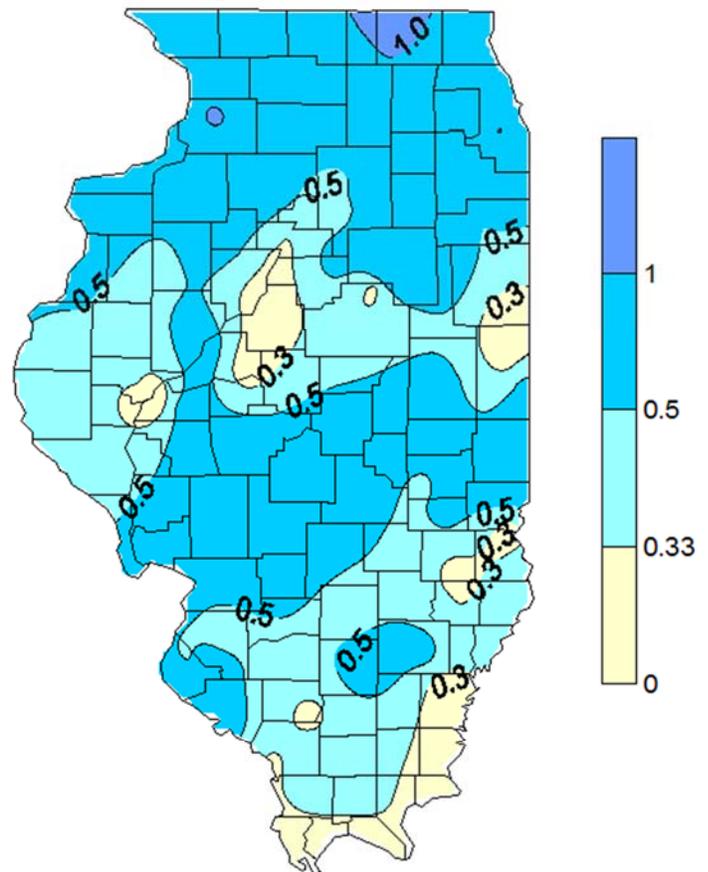
Winter storms in Hancock County consist of snow and ice and at times result in blizzard conditions. Winter storms can produce flooding, storm surge, closed highways, blocked roads, downed power lines and hypothermia. Snowfalls are generally measured in inches but at times have reached over one foot. Blowing snow reduces visibility and is the cause of many vehicle accidents. A heavy snowstorm is one that produces at least 6" of snow within 48 hours.

A blizzard is a winter storm with sustained winds or frequent gusts of 35 mph or greater and considerable falling or blowing snow reducing visibility to less than ¼ mile for three hours or longer. Drifting is a major concern with roadways being blocked and buildings and driveways becoming inaccessible.

Freezing rain and sleet create slippery roadways and sidewalks causing dangerous conditions and can weigh down tree limbs and power lines causing damage and power outages. Freezing rain is rain that freezes when it hits the ground, trees, power lines and buildings, creating a coating of ice. Sleet is rain that turns to ice pellets before reaching the ground and creates slippery conditions.

Winter storms in Illinois can be severe and cause extensive damage. Information about winter storms in Illinois can be found at the Illinois State Climatologist web site <http://www.isws.illinois.edu/atmos/statecli/Winter/winter.htm>. Figure is a graphic from the web site showing the historical snowfall data.

Figure 28: Average Snowfall



Average number of days with 6 or more inches of snowfall per winter (1971-2000)

"0.33 days per winter" means one storm every 3 years, on average
"0.5 days per winter" means one storm every other year, on average

From 1995 through 2015 there were 110 snow or ice events in Hancock County or 5.5 per year. The following table displays the number of winter storms that have occurred in Hancock County since 1995.

Figure 29: Snow and Ice Events in Hancock County 1995 - Present

Date	Time	Type	Deaths	Injuries	Property Damage	Crop Damage
1/18/1995	6:00 PM	Heavy Snow	0	0	0	0
11/10/1995	4:00 AM	Snow/sleet/freezing Rain	0	0	0	0
11/27/1995	4:00 AM	Snow/sleet/freezing Rain	0	0	0	0
1/18/1996	4:30 AM	Winter Storm	0	0	0	0
11/14/1996	6:00 AM	Winter Storm	0	0	0	0
12/27/1996	6:00 PM	Winter Storm	0	0	0	0
1/9/1997	4:00 AM	Winter Storm	0	0	0	0
1/15/1997	4:00 AM	Winter Storm	0	0	0	0
1/24/1997	4:00 AM	Winter Storm	0	0	0	0
2/3/1997	8:00 PM	Winter Storm	0	0	0	0
4/10/1997	6:00 AM	Heavy Snow	0	0	0	0
12/9/1997	5:00 PM	Heavy Snow	0	0	0	0
12/24/1997	11:00 AM	Heavy Snow	0	0	0	0
1/8/1998	10:00 AM	Winter Storm	0	0	0	0
3/8/1998	12:00 PM	Heavy Snow	0	0	0	0
12/30/1998	5:00 PM	Winter Storm	0	0	0	0
1/1/1999	5:17 AM	Winter Storm	0	0	0	0
3/5/1999	3:00 PM	Winter Storm	0	0	0	0
3/8/1999	4:00 PM	Winter Storm	0	0	0	0
12/15/1999	4:00 AM	Winter Storm	0	0	0	0
12/16/1999	7:00 PM	Winter Storm	0	0	0	0
12/19/1999	3:00 PM	Winter Storm	0	0	0	0
12/23/1999	2:00 PM	Winter Storm	0	0	0	0
1/3/2000	3:00 PM	Winter Storm	0	0	0	0
1/17/2000	8:00 AM	Winter Storm	0	0	0	0
1/29/2000	3:00 PM	Winter Storm	0	0	0	0
2/17/2000	7:00 PM	Winter Storm	0	0	0	0
12/1/2000	2:00 AM	Snow	0	0	0	0
12/10/2000	10:00 PM	Winter Storm	0	0	0	0
12/13/2000	8:00 AM	Snow	0	0	0	0
12/15/2000	1:00 PM	Ice Storm	0	0	0	0
12/18/2000	4:00 AM	Snow/blowing Snow	0	0	0	0
12/20/2000	7:00 AM	Snow	0	0	0	0
12/28/2000	10:00 AM	Snow	0	0	0	0
1/26/2001	2:00 AM	Snow/blowing Snow	0	0	0	0
1/28/2001	10:00 AM	Ice Storm	0	0	0	0
2/8/2001	11:00 PM	Winter Storm	0	0	0	0

Figure 29: Snow and Ice Events in Hancock County 1995 - Present

Date	Time	Type	Deaths	Injuries	Property Damage	Crop Damage
4/14/2001	5:00 PM	Snowmelt Flooding	0	0	0	0
1/30/2002	5:00 AM	Winter Storm	0	0	0	0
3/1/2002	5:00 PM	Winter Storm	0	0	0	0
1/2/2003	1:00 AM	Winter Storm	0	0	0	0
1/15/2003	11:00 PM	Winter Storm	0	0	0	0
2/14/2003	4:00 PM	Winter Storm	0	0	0	0
11/24/2004	1:45 PM	Heavy Snow	0	0	15K	0
1/5/2005	3:00 AM	Ice Storm	0	0	80K	0
12/8/2005	3:00 AM	Winter Weather/mix	0	0	0	0
1/20/2006	6:00 PM	Ice Storm	0	0	15K	0
2/15/2006	9:00 PM	Winter Weather	0	0	10K	0
3/21/2006	2:00 AM	Winter Weather	0	0	10K	0
11/30/2006	6:30 PM	Winter Storm	0	0	0	0
12/1/2006	12:00 AM	Winter Storm	0	0	0	0
1/12/2007	7:15 AM	Ice Storm	0	0	0	0
1/20/2007	7:00 PM	Winter Weather	0	0	0	0
2/6/2007	5:25 AM	Winter Weather	0	0	0	0
2/12/2007	10:15 PM	Winter Storm	0	0	0	0
2/16/2007	3:45 PM	Winter Weather	0	0	0	0
2/24/2007	7:45 AM	Ice Storm	0	0	0	0
12/1/2007	7:00 AM	Ice Storm	0	0	0	0
12/6/2007	2:20 PM	Winter Weather	0	0	0	0
12/10/2007	10:00 PM	Ice Storm	0	0	0	0
12/15/2007	3:00 AM	Winter Weather	0	0	0	0
12/22/2007	9:30 PM	Winter Weather	0	0	0	0
12/28/2007	5:00 AM	Winter Weather	0	0	0	0
12/31/2007	11:00 AM	Winter Weather	0	0	0	0
1/29/2008	1:00 PM	Winter Weather	0	0	0	0
1/31/2008	12:45 PM	Winter Weather	0	0	0	0
2/1/2008	12:00 AM	Winter Storm	0	0	0	0
2/1/2008	12:00 AM	Winter Weather	0	0	0	0
2/3/2008	2:30 PM	Winter Weather	0	0	0	0
2/6/2008	5:00 AM	Winter Weather	0	0	0	0
2/25/2008	6:00 PM	Winter Weather	0	0	0	0
2/28/2008	4:00 PM	Winter Weather	0	0	0	0
11/30/2008	1:30 AM	Winter Weather	0	0	0	0
12/16/2008	9:00 AM	Winter Weather	0	0	0	0
12/18/2008	6:30 PM	Ice Storm	0	0	0	0
2/20/2009	11:00 PM	Winter Weather	0	0	0	0

Figure 29: Snow and Ice Events in Hancock County 1995 - Present

Date	Time	Type	Deaths	Injuries	Property Damage	Crop Damage
12/7/2009	10:30 PM	Winter Storm	0	0	0	0
12/25/2009	2:00 PM	Winter Weather	0	0	0	0
1/6/2010	7:00 PM	Winter Storm	0	0	0	0
1/25/2010	6:00 AM	Winter Weather	0	0	0	0
2/08/2010	2:00 AM	Winter Weather	0	0	0	0
2/21/2010	11:15 AM	Winter Storm	0	0	0	0
3/20/2010	4:00 AM	Winter Weather	0	0	0	0
12/12/2010	3:00 PM	Winter Weather	0	0	0	0
12/24/2010	9:30 AM	Winter Weather	0	0	0	0
1/10/2011	11:00 PM	Winter Weather	0	0	0	0
1/17/2011	4:00 AM	Winter Weather	0	0	0	0
2/1/2011	8:00 AM	Blizzard	0	0	0	0
2/24/2011	8:00 PM	Winter Weather	0	0	0	0
2/27/2011	6:00 PM	Winter Weather	0	0	0	0
1/12/2012	2:00 AM	Winter Weather	0	0	0	0
4/11/2012	3:00 AM	Frost/Freeze	0	0	0	0
4/11/2012	2:00 AM	Frost/Freeze	0	0	0	0
12/20/2012	12:00 PM	Blizzard	0	0	0	0
2/21/2013	1:00 PM	Winter Storm	0	0	0	0
2/26/2013	5:30 AM	Winter Storm	0	0	0	0
3/24/2013	2:30 PM	Winter Storm	0	0	0	0
12/13/2013	12:00 PM	Winter Weather	0	0	0	0
1/4/2014	6:00 PM	Winter Weather	0	0	0	0
2/1/2014	12:00 AM	Winter Storm	0	0	0	0
2/4/2014	1:00 PM	Winter Storm	0	0	0	0
2/17/2014	5:00 AM	Winter Weather	0	0	0	0
11/15/2014	9:30 PM	Winter Weather	0	0	0	0
1/5/2015	1:00 PM	Winter Weather	0	0	0	0
2/1/2015	12:00 AM	Winter Weather	0	0	0	0
2/4/2015	9:00 AM	Winter Weather	0	0	0	0
2/25/2015	4:00 PM	Winter Storm	0	0	0	0
12/28/2015	12:00 AM	Ice Storm	0	0	0	0

Source: 3/24/2013 National Climatic Data Center

DROUGHT

(Source: Illinois State Climatologist Office)

Drought is a complex physical and social phenomenon of widespread significance, and despite all the problems droughts have caused, drought has been difficult to define. There is no universally accepted definition because: 1) drought, unlike flood, is not a distinct event, and 2) drought is often the result of many complex factors acting on and interacting within the environment. Complicating the problem of drought is the fact that drought often has neither a distinct start nor end. It is usually recognizable only after a period of time and, because a drought may be interrupted by short spells of one or more wet months, its termination is difficult to recognize.

Drought is also a temporary feature of the climate of Illinois, and we know it occurs only when less than adequate precipitation exists for an extended period of time. Because of the complex nature of droughts, there are many definitions, often reflecting a specific area of concern of an individual, a city, or a region.

The most commonly used drought definitions are:

1. **Meteorological or Climatological Drought** – a period of well-below-average precipitation that spans from a few months to a few years.
2. **Agricultural Drought** – a period when soil moisture is inadequate to meet the demands for crops to initiate and sustain plant growth.
3. **Hydrological Drought** – a period of below-average stream flow and/or depleted reservoir storage.

How are droughts measured? The Illinois State Climatologist Office website shows a method for estimating drought conditions on a state-wide basis.

Figure 30: Severity of Precipitation Drought Expressed as Percent of the Statewide Average Precipitation

Drought Duration	Moderate Drought	Severe Drought
3 months	45 to 60%	less than 45%
6 months	56 to 70%	less than 56%
12 months	70 to 80%	less than 70%
24 months	78 to 90%	less than 78%

According to the National Drought Mitigation Center there have been 82 reported impacts from droughts affecting Hancock County from 1970 to the present. These impacts fall into several categories. There were 37 agricultural impacts, 14 water/energy impacts, 5 environmental impacts, 4 social impacts, 1 fire impact and 20 other impacts. It should be noted that a single drought event can have multiple impacts which fall into different impact categories. Hancock County was affected in many including crop damage, drinking water issues, and barge traffic congestion.

Hancock County was one of several counties affected by the drought of 2005-06. This drought started in June of 2005 and continued through March of 2006. The drought affected Bureau, Carroll, Hancock, Henderson, Henry, Jo Daviess, McDonough, Hancock, Putnam, Rock Island, Stephenson, Warren, and Whiteside counties. In total the drought did \$228.5 million in crop damage. The NCDC provides descriptions of this drought:

“The drought that began back in June 2005 continued through December 2005 and into January 2006. Since the growing season was now over, the main impacts on the drought were hydrologic. A report on the hydrologic conditions is supplied by the service hydrologist. Stream flows began the month with most locations reporting near normal (25th to 74th percentile) conditions. A few locations reported above normal (76th to 90th percentile) conditions and a few locations reported below normal (10th to 24th percentile) conditions. From the 2nd through the 6th most locations reported below normal conditions, with a few locations reporting much below normal (less than 10th percentile) conditions and a few locations reporting near normal conditions. After the 6th most locations returned to the same conditions they experienced when the month began. Aside from some minor day to day fluctuations, these conditions persisted through the end of the month. December's precipitation was below normal. Total precipitation for the month was 1.26 inches, or 0.61 inches below normal and 67% of normal. The six-month precipitation total was 11.71 inches, or 7.05 inches below normal and 62% of normal. December was the eleventh consecutive month with below normal precipitation. During this eleven-month period total precipitation has been 21.85 inches, or 13.08 inches below normal and 63% of normal. According to the U.S. Drought Monitor maps (<http://drought.unl.edu/dm/>), the drought conditions for the HSA did not change much during the month. By the end of the month, the eastern two-thirds of the HSA were in the Extreme Drought (D3) category. The western one-third of the HSA was in the Severe Drought (D2) or Moderate Drought (D1) category. According to the NOAA/NWS Climate Prediction Center, parts of the HSA have been extremely dry over the past year. In the northwest Illinois climate division the yearly precipitation total for 2005 was in the lowest 1% of all annual precipitation totals for 1895 through 2005. In the east central Iowa climate division the total for 2005 was in the lowest 4% of all annual precipitation totals for the same time period. Conditions have also been dry, albeit not as severe, over the past three years. In the northwest Illinois climate division the three-year precipitation total for 2003 through 2005 was in the lowest 4% of all three-year precipitation totals for 1897 through 2005. In the east central Iowa climate division the total for 2003 through 2005 was in the lowest 10% of all three year precipitation totals for the same time period. “The drought that began back in June 2005 continued through March 2006 but shrunk considerably in size and scope by the start of April 2006. This shrinkage was due to a persistent wet pattern that had set up during March 2006 and continued into April 2006. Since the growing season had yet to begin, the drought was essentially hydrologic in nature. A report of the hydrologic conditions is supplied by the service hydrologist. River Conditions Monthly stream flows for March averaged near normal (25th to 75th percentile) to below normal (10th to 24th percentile). All basins averaged below normal except for the lower Cedar-Iowa River basins and the entire Rock River basin, which averaged near normal. Stream flows began the month with most locations reporting stream flows that were below normal (10th to 24th percentile) or much below normal (less than 10th percentile). A few locations reported near normal (25th to 75th percentile) conditions and one location reported a record low flow for the day. Stream flows gradually decreased until moderate rainfall fell on the 5th. On the 6th, stream flows began increasing in response to this rainfall. Stream flows then remained nearly steady or increased slightly through the 13th when most locations reported near normal conditions. Some locations reported below normal (10th to 24th percentile) flows while other locations reported above normal (76th to 90th percentile) flows. Stream flows then gradually decreased into the late parts of the month but then rose on the last day of the month. On the 30th most locations reported below normal conditions while some locations reported near or much below normal flows. Moderate rainfall on the 30th resulted in flow increases on the 31st. On that day, half of the locations reported below or much below normal flows and half of the locations reported near or above below normal flows. Source: U.S. Geological Survey, WaterWatch Web site (<http://water.usgs.gov/waterwatch/>). Drought According to the U.S. Drought Monitor maps, minimal changes in the drought situation occurred during the month. Severe drought conditions (D2) continued to cover much of the HSA with moderate drought conditions (D1) across northwestern portions of the HSA.”

EXTREME TEMPERATURES

(Source: Illinois Climatologist Office-Illinois State Water Survey)

Extreme heat is a combination of high temperatures and high humidity. Conditions of extreme heat are dangerous and can cause injury and death. The Heat Index is apparent temperature or a measure of how it feels when temperature and humidity are combined. It is the result of biometeorological studies and takes into account body size, core and body surface temperatures, clothing, the skin's resistance to heat and moisture transfer away from the body. The Heat Index assumes an average-sized adult with clothing in the shade with a 5-mph wind. Being in the full sun or in an area with little air movement can increase the apparent temperature.

What makes extreme heat dangerous? The body cools itself by sweating because the evaporation of moisture has a cooling effect. High humidity reduces this evaporation and hinders the body's effort to cool itself. The dew point temperature is a useful measure of the moisture content of the atmosphere. During summer in Illinois, dew point temperatures in the 50s are generally comfortable. Most people begin to feel the humidity when dew point temperatures are in the 60s. Dew point temperatures in the 70s are rare and cause significant discomfort.

Effects of extreme heat:

- **Heat cramps:** muscular pains and spasms due to heavy exertion. They usually involve the abdominal muscles or legs. It is thought that the loss of water from heavy sweating causes the cramps.
- **Heat exhaustion:** occurs when people exercise heavily or work in a warm, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to vital organs. This results in mild shock.
- **Heatstroke/Sunstroke:** LIFE THREATENING. The victim's temperature control system stops working as the body quits producing sweat. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly.

The following Figure includes all the extreme temperature entries for Hancock County in the NCDC database. It should be noted that these temperature extremes affected an area larger than just Hancock County.

Figure 31: Temperature Extremes in Hancock County 1996-Present

Date	Time	Type	Deaths	Injuries
1/30/1996	8:00 PM	Extreme Cold	0	0
2/1/1996	12:00 AM	Extreme Cold	0	0
1/10/1997	4:00 AM	Extreme Windchill	0	1
1/17/1997	4:00 AM	Extreme Windchill	0	0
7/25/1997	4:00 AM	Excessive Heat	0	0
7/19/1999	4:00 AM	Excessive Heat	1	0
8/31/2000	4:21 AM	Excessive Heat	0	0
12/16/2000	2:00 PM	Extreme Windchill	0	0
12/21/2000	4:00 AM	Extreme Windchill	0	0
12/23/2000	10:00 PM	Extreme Windchill	0	0
2/2/2007	4:00 AM	Extreme Cold/wind Chill	0	0
1/14/2009	23:00 PM	Extreme Cold/wind Chill	0	0
7/4/2012	12:00 PM	Excessive Heat	0	0
1/5/2014	12:00 AM	Extreme Cold/Wind Chill	0	0

Source: National Climatic Data Center

Note: (1) - The person who passed away was not a Hancock County resident, they lived in Kewanee.

EARTHQUAKES

(Source: 2013 Illinois Natural Hazard Mitigation Plan)

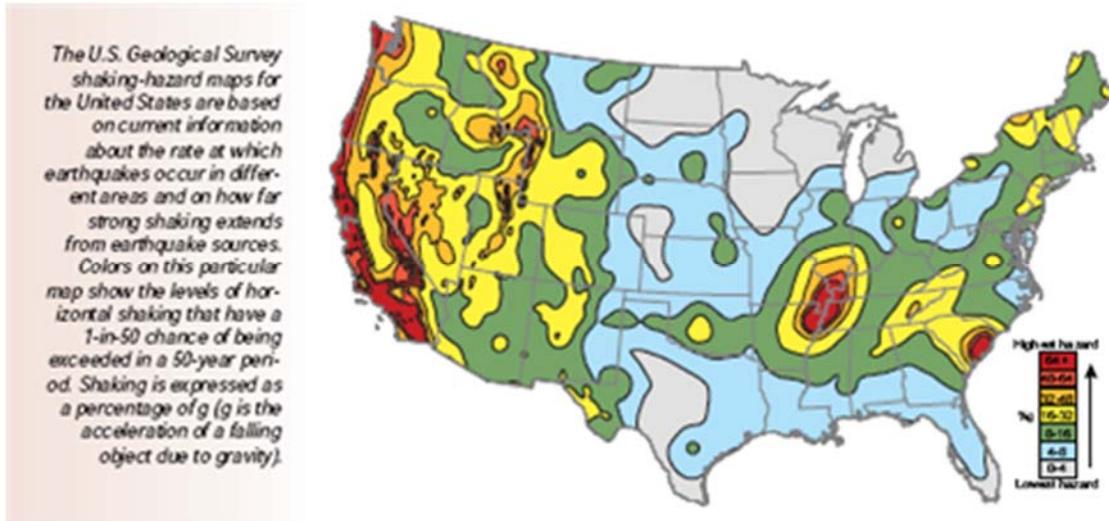
Although there have been over 560 earthquakes in Illinois during the last two centuries, only very few of them have caused any damage (Modified Mercalli Intensity of VI or higher) or injuries. Larger earthquakes in the New Madrid region have caused more damage in Illinois than earthquakes originating in Illinois. The risk of probable damage from future earthquakes can be estimated based on the historical record of past earthquakes. Petersen et al., 2008 and colleagues at the USGS have created maps for building codes of the largest probable ground shaking that have a low probability of being exceeded over a 50 year period. They have plotted intensity information as numerical values of ground shaking, or accelerations. These values can be converted to Modified Mercalli Intensities using the conversion values. These USGS maps only show the estimate of shaking on the top of bedrock. Shaking will be modified by the overlying soils.

For most of Illinois, the risk is dominated by the possibility of large earthquakes recurring in the New Madrid Seismic Zone, south of Illinois. In this scenario, the maximum accelerations in the southern-most counties of Illinois exceed 60 percent of gravity, or Modified Mercalli Intensity IX. Although the risk decreases to the north, there is a 2 % probability during the next 50 years that an acceleration greater than 10 percent of gravity (Modified Mercalli Intensity VI) could be exceeded in any of the southern half of Illinois. Because of the record of minor to moderate earthquakes in northern Illinois, west of Chicago, the risk of damaging earthquake motions increases in the western suburbs of Chicago. But if magnitude 4 to 5 earthquakes occur near or under Chicago as early events have been located, damage could occur to weak, old structures through other parts of the city.

There is no record of significant earthquake damage in Hancock County. The HAZUS section of this report looks at specific risks to Hancock County by seismic activity. As part of the risk assessment

process, the steering committee did recognize the need to be a potential shelter site for earthquake victims from southern Illinois should either the New Madrid or Wabash Fault experience a significant event.

Figure 32: Shaking Hazard Map



(Source: U.S. Geological Survey)

Figure 33: Earthquakes in Illinois Over The Past 200 Years

Earthquakes in Illinois 1795-2015
Illinois State Geological Survey

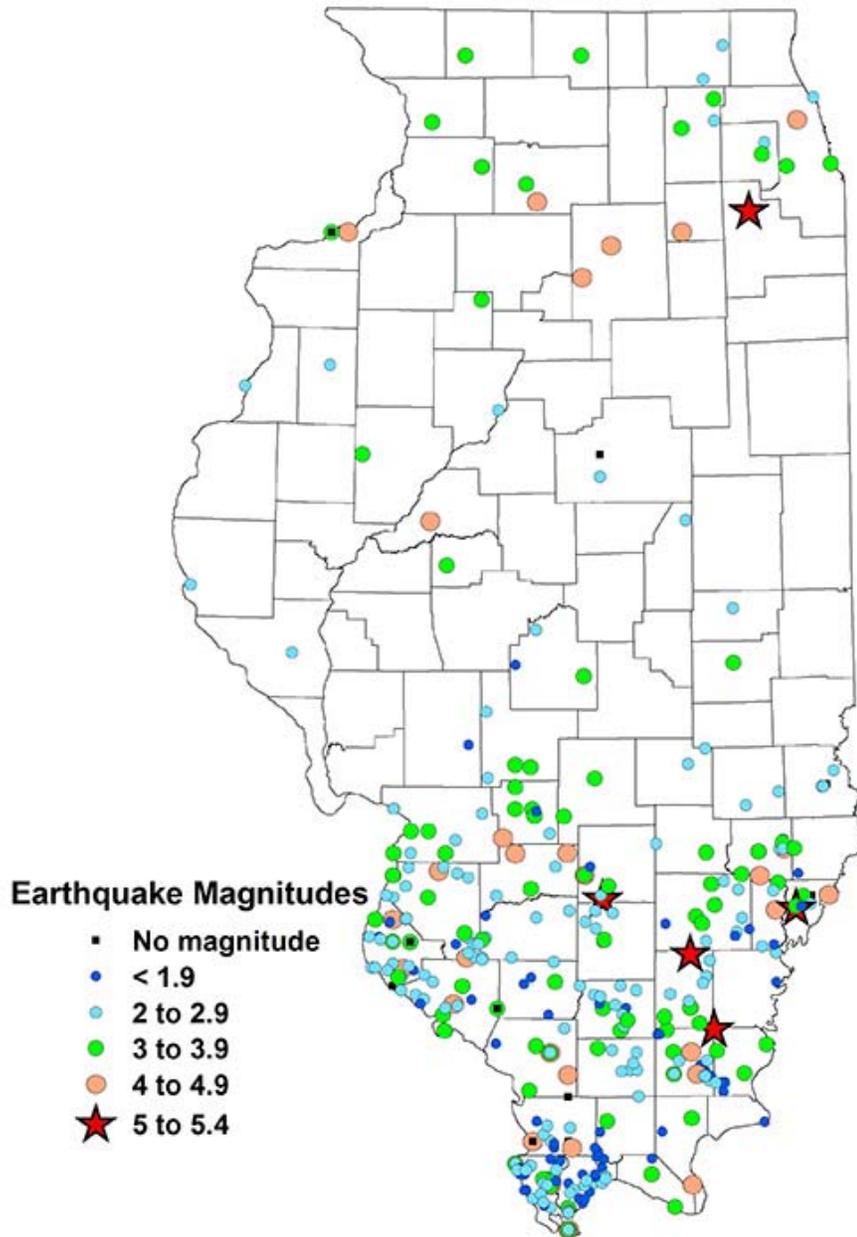
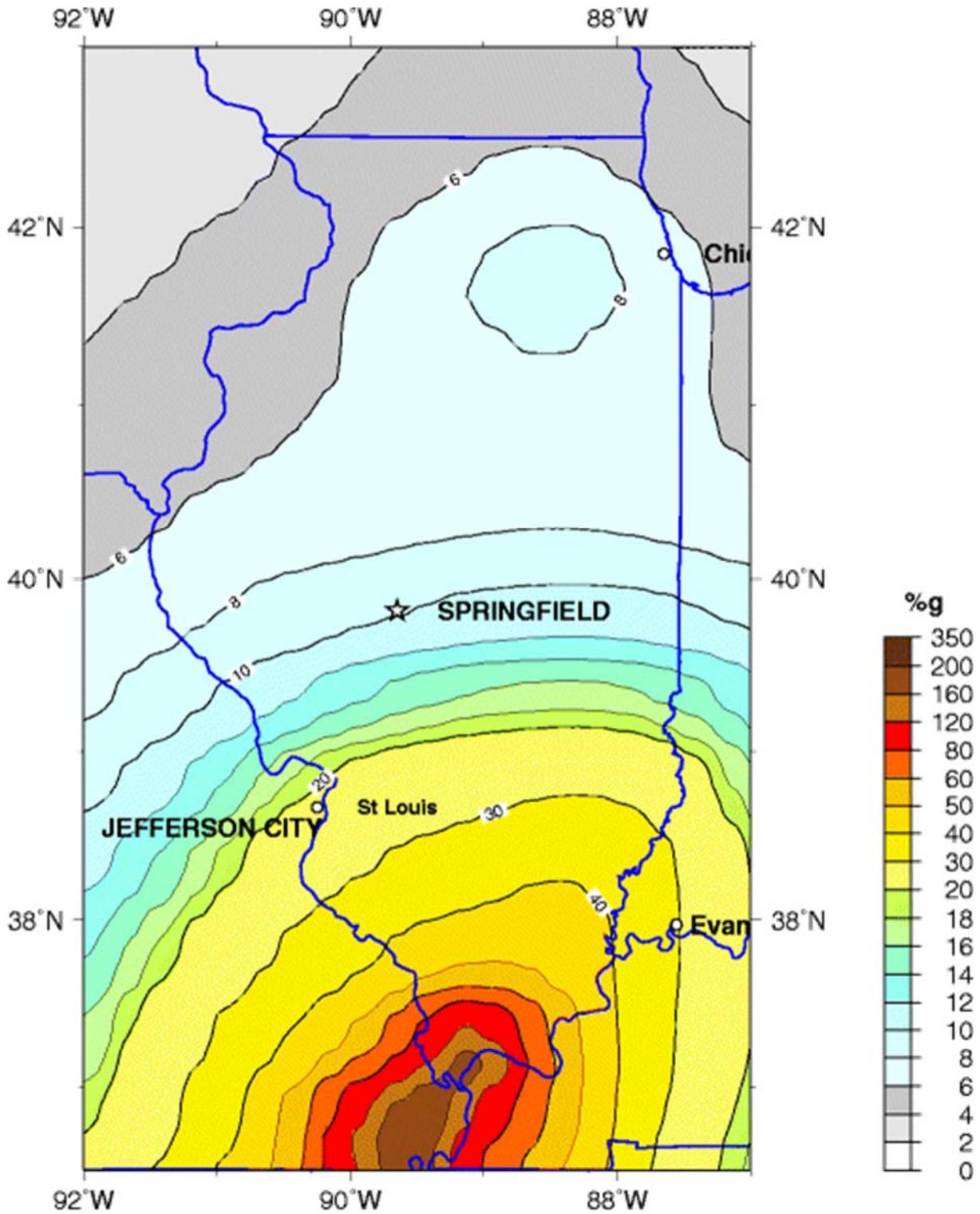


Figure 34: Illinois Seismic Map



Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years
site: NEHRP B-C boundary
National Seismic Hazard Mapping Project (2008)

FLOOD

(Source: Illinois Natural Hazard Mitigation Plan.)

Except for fire, the most common hazard in the United States is flooding with thousands occurring each year from oceans, rivers, lakes, small stream, gullies, creeks, culverts, dry streambeds or low-lying ground. The standard definition of a flood is “A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land.” A simpler definition is too much water in the wrong place. Since water circulates from clouds to the soil to streams to rivers to the oceans and returns to the clouds, a scientific definition of a flood is an imbalance in the “hydrological system” with more water flowing through the system than the system can draw off.

Floods are not all alike:

- **Riverine Floods:** Develop slowly, sometimes over a period of days or weeks.
- **Flash Floods:** Develop quickly, sometimes in just a few minutes. Usually flash floods are the result of intense storms dropping large amounts of rain within a brief period.
- **Overland Floods:** Occurs outside a defined river or stream (e.g., ponding in a low lying area).
- **Aquifer Flood:** Water is expelled from a subterranean geologic formation to the surface causing flooding in the immediate area.
- **Subterranean Flood:** Water floods into tunnels that are normally dry.

Snow melt filling rivers too quickly, heavy rainfall associated with slow-moving, low-pressure or frontal storm systems or storm surge create excess water. This water accumulates and overflows onto adjacent lands not normally covered by water. These floods can occur any time of the year, any time of the day or night and in any part of the country. Flooding can be local, impacting a neighborhood or community, or very large, affecting entire river basins and multiple states. The severity of floods is determined by the amount of rainfall or other water source, duration, topography, ground cover, frozen soil, wet or saturated soil that can't hold any more water, full reservoirs, high rivers or stream levels, ice-covered rivers or urbanizations (lots of buildings, parking lots and roads). The majority of scientists believe that global warming causes extremes in weather that have increased flooding. Human activity influences the frequency and severity of floods.

Figure 35: Flooding Events in Hancock County since 1995

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
Carthage	5/16/1995	7:47 PM	Flash Flooding	N/A	0	0	0	0
County Wide	2/20/1997	4:00 PM	Flood	N/A	0	0	0	0
Multi - County	4/8/1997	6:00 AM	Flood	N/A	0	0	0	0
County Wide	5/23/1998	11:37 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Hamilton	4/8/1999	7:00 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Multi - County	6/2/2000	8:30 AM	Flood	N/A	0	0	0	0
Carthage	6/26/2000	12:45 AM	Urban/sml Stream Fld	N/A	0	0	0	0
County Wide	7/4/2000	1:39 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Niota	7/4/2000	12:38 PM	Urban/sml Stream Fld	N/A	0	0	0	0

Warsaw	7/11/2000	3:40 AM	Flash Flood	N/A	0	0	0	0
Carthage	7/31/2000	5:45 PM	Urban/sml Stream Fld	N/A	0	0	0	0
County Wide	2/24/2001	9:00 AM	Urban/sml Stream Fld	N/A	0	0	0	0
Multi - County	4/14/2001	5:00 PM	Snowmelt Flooding	N/A	0	0	0	0
Multi - County	5/1/2001	1:00 AM	Flood	N/A	0	0	0	0
Carthage	8/22/2001	7:24 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Augusta	8/22/2001	10:15 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Carthage	10/21/2001	7:00 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Carthage	10/21/2001	9:40 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Carthage	5/12/2002	2:15 AM	Flash Flood	N/A	0	0	0	0
County Wide	5/12/2002	12:10 AM	Flash Flood	N/A	0	0	0	0
County Wide	6/11/2002	2:35 PM	Flash Flood	N/A	0	0	0	0
Carthage	6/13/2002	5:05 AM	Flash Flood	N/A	0	0	0	0
Navoo	6/13/2002	5:05 AM	Flash Flood	N/A	0	0	0	0
La Harpe	6/13/2002	5:50 AM	Flash Flood	N/A	0	0	0	0
Multi - County	5/20/2003	1:03 AM	Flood	N/A	0	0	6.0M	0
Hamilton	7/8/2003	7:20 PM	Flash Flood	N/A	0	0	100K	20K
Multi - County	5/24/2004	10:50 AM	Flood	N/A	0	0	0	0
Multi - County	6/1/2004	12:00 AM	Flood	N/A	0	0	0	0
Multi - County	8/27/2004	4:48 PM	Flood	N/A	0	0	0	6K
Multi - County	9/16/2004	4:30 AM	Flood	N/A	0	0	0	10K
Multi - County	10/23/2004	10:00 PM	Flood	N/A	0	0	0	0
Multi - County	11/1/2004	10:19 AM	Flood	N/A	0	0	0	0
Multi - County	12/7/2004	8:11 AM	Flood	N/A	0	0	0	0
Multi - County	1/4/2005	12:00 AM	Flood	N/A	0	0	0	0
Multi - County	1/12/2005	10:56 PM	Flood	N/A	0	0	0	0
Multi - County	2/14/2005	12:30 AM	Flood	N/A	0	0	0	0
La Harpe	6/22/2007	4:50 AM	Flash Flood	N/A	0	0	0K	0K
La Harpe	6/22/2007	6:32 AM	Flash Flood	N/A	0	0	0K	0K
La Harpe	6/22/2007	21:45 PM	Flash Flood	N/A	0	0	0K	0K
La Harpe	6/22/2007	12:05 PM	Flood	N/A	0	0	0K	0K
Dallas City	6/23/2007	5:30 AM	Flood	N/A	0	0	0K	0K
Warsaw	4/1/2008	12:00 AM	Flood	N/A	0	0	0K	0K
Hamilton	4/25/2008	6:19 AM	Flash Flood	N/A	0	0	0K	0K
Tioga	5/1/2008	18:00 PM	Flood	N/A	0	0	0K	0K
Niota	6/1/2008	12:00 AM	Flood	N/A	0	0	0K	0K
Sutter	12/27/2008	4:35 AM	Flash Flood	N/A	0	0	0K	0K
Dallas City	4/30/2009	5:33 AM	Flood	N/A	0	0	0K	0K
Durham	5/1/2009	8:30 AM	Flood	N/A	0	0	100K	0K

Dallas City	5/15/2009	4:57 AM	Flash Flood	N/A	0	0	0K	0K
Durham	5/15/2009	20:00 PM	Flood	N/A	0	0	250K	0K
Durham	5/15/2009	10:00 PM	Flood	N/A	0	0	250000	0
Dallas City	5/15/2009	4:57 AM	Flash Flood	N/A	0	0	0	0
Warsaw	6/1/2009	18:45 PM	Flash Flood	N/A	0	0	0K	0K
Warsaw	6/1/2009	6:45 AM	Flash Flood	N/A	0	0	0	0
Niota	8/27/2009	20:15 PM	Flash Flood	N/A	0	0	0K	0K
Niota	8/27/2009	10:15 PM	Flash Flood	N/A	0	0	0	0
Dallas City	5/13/2010	5:15 AM	Flash Flood	N/A	0	0	0	0
Burnside	5/13/2010	9:00 PM	Flood	N/A	0	0	250000	0
Nauvoo	6/12/2010	12:45 AM	Flash Flood	N/A	0	0	10000	0
Burnside	6/14/2010	11:00 AM	Flood	N/A	0	0	250000	0
Augusta	6/22/2010	1:00 AM	Flash Flood	N/A	0	0	100000	0
Nauvoo	6/22/2010	2:00 AM	Flood	N/A	0	0	250000	0
Burnside	6/22/2010	11:00 AM	Flood	N/A	0	0	250000	0
Bentley	7/7/2010	7:00 PM	Flash Flood	N/A	0	0	0	0
La Harpe	7/19/2010	9:51 PM	Flash Flood	N/A	0	0	0	0
Burnside	7/20/2010	5:30 AM	Flood	N/A	0	0	150000	0
Dallas City	7/25/2010	9:30 PM	Flood	N/A	0	0	125000	0
Hamilton	8/13/2010	3:45 PM	Flash Flood	N/A	0	0	0	0
Hamilton	6/5/2011	3:00 AM	Flash Flood	N/A	0	0	25000	0
Burnside	6/15/2011	11:46 PM	Flood	N/A	0	0	125000	0
Elvaston	6/15/2011	12:00 AM	Flash Flood	N/A	0	0	100000	0
Carthage	6/15/2011	1:00 AM	Flash Flood	N/A	0	0	0	0
La Harpe	4/17/2013	2:30 PM	Flood	N/A	0	0	250000	0
Burnside	4/18/2013	5:20 AM	Flood	N/A	0	0	0	0
Dallas City	4/18/2013	2:00 PM	Flood	N/A	0	0	0	0
Burnside	5/5/2013	11:30 AM	Flood	N/A	0	0	0	0
Nauvoo	5/29/2013	8:00 PM	Flood	N/A	0	0	0	0
Hamilton	6/1/2013	12:00 AM	Flood	N/A	0	0	0	0
Hamilton	7/2/2014	11:00 PM	Flood	N/A	0	0	0	0
Bowen	6/26/2015	9:25 AM	Flash Flood	N/A	0	0	0	0
Nauvoo	7/11/2015	5:00 PM	Flash Flood	N/A	0	0	0	0
West Point	7/11/2015	7:25 PM	Flash Flood	N/A	0	0	0	0

HAZUS OVERVIEW

Hazus is a geographic information system-based natural hazard analysis tool developed and freely distributed by the Federal Emergency Management Agency (FEMA). It is a loss and risk assessment software package built on GIS technology. The information generated can be used for planning mitigation efforts in order to reduce risk and for planning emergency response. Hazus output will provide a baseline for evaluating success in reducing natural hazard risk exposure when conducting future assessments.

The Hazus assessment is highly data dependent. The accuracy of the analyses depends on a number of important datasets including essential facilities, building structure information, and general building stock inventories. Hancock County's Hazus analyses included creation of a building inventory using Hancock County assessor's data and an update of the Essential Facilities database. Risks and losses due to flood and earthquake hazards were modeled using Hazus methodology. Losses due to a hypothetical tornado scenario were modeled using a separate methodology using the asset information prepared for Hazus.

PROCESSES AND SOURCES FOR IDENTIFYING ASSETS

Essential Facilities

Essential facility data are an example of site-specific information used in Hazus for analysis. Essential facility data include schools, medical care facilities, emergency operation centers, police stations, and fire stations. This information was first updated for the 2010 Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan.

At meeting two for the plan update, the planning team was asked to further update this information. These updates and corrections to the Hazus data tables were completed prior to performing the risk assessment. The Hazus 3.1 database was modified using community feedback from meetings and the National Geospatial-Intelligence Agency dataset. Locations of these facilities were confirmed using community feedback and Internet mapping services such as Google Maps. A complete list and a map of all the essential facilities are included in Appendix F. The updated Hazus inventory contributed to a Level 2 analysis, which improved the accuracy of the risk assessment.

Figure 36 identifies the essential facilities that were used for the analysis. A complete list of the essential facilities is included as Appendix F.1. A map of all the essential facilities is included as Appendix F.2

Figure 36: Essential Facilities List

Facility	Number of Facilities
Medical Care Facilities	8
Emergency Centers	1
Fire Stations	13
Police Stations	9
Schools	22

Structure Based Asset Inventory - User Defined Facilities (UDF)

In order to create a risk assessment that contains estimated values and losses for each building structure, a User Defined Facilities (UDF) analysis needs to be completed in Hazus. A UDF analysis and inventory was completed for the flood and tornado risk assessments. This includes structures located within the 0.2% annual chance (500 year) floodplain and structures within the City of Carthage.

A User Defined Facilities table was created using parcel and assessor’s data provided by Hancock County. Using GIS, parcel data was joined with the assessor’s data and converted into a polygon feature class based on the parcels which contained property information. Centroid points were then created from these polygons and placed on top of the selected structures using aerial photography of Hancock County. The features were classified into several different occupancy classes that are compatible with Hazus. Figure 37 gives a brief explanation of these classes.

Figure 37: Hazus Building Occupancy Classes

Hazus Category	Occupancy Class
Residential	
RES1	Single Family Dwelling
RES2	Mobile Home
RES3A	Multi Family Dwelling -Duplex
RES3B	Multi Family Dwelling – 3-4 Units
RES3C	Multi Family Dwelling – 5-9 Units
RES3D	Multi Family Dwelling – 10-19 Units
RES3E	Multi Family Dwelling – 20-49 Units
RES3F	Multi Family Dwelling – 50+ Units
RES4	Temporary Lodging
RES5	Institutional Dormitory
RES6	Nursing Home
Commercial	
COM1	Retail Trade
COM2	Wholesale Trade
COM3	Personal and Repair Services
COM4	Business/Professional/Technical Services
COM5	Depository Institutions
COM6	Hospital
COM7	Medical Office/Clinic
COM8	Entertainment & Recreation
COM9	Theaters
COM10	Parking

Hazus Category	Occupancy Class
Industrial	
IND1	Heavy
IND2	Light
IND3	Food/Drugs/Chemicals
IND4	Metals/Minerals Processing
IND5	High Technology
IND6	Construction

Agriculture	
AGR1	Agriculture

Religion/Non-Profit	
REL1	Church/Membership Organizations

Government	
GOV1	General Services
GOV2	Emergency Response

Education	
EDU1	Schools/Libraries
EDU2	Colleges/Universities

Estimates for fair market value and content cost were calculated from the assessed value of the structure based on its occupancy class. Since religious, governmental, and other tax exempt structures have no tax assessed values, replacement cost values were determined using R.S. Means (2006) estimates located in the Hazus Flood Technical Manual. If available, replacement cost values listed in the Hazus Essential Facilities Database were used for schools and other governmental buildings.

Flood Risk Assessment

The flood risk assessment conducted for Hancock County combines the GIS-based technology of Hazus with updated asset inventory, essential facilities, and flood hazards to provide a solid, consistent framework to quantify the county's risk.

The impact of five separate flood events was modeled including the 10%, 4%, 2%, 1%, and 0.2% annual chance floods, also known as the 10, 25, 50, 100, and 500 year floods, respectively. Average annualized flood losses, defined as the estimated long-term value of losses averaged on an annual basis, were then calculated based on the results of these flood scenarios.

The Mississippi River along the western border of Hancock County presents the county's greatest flood hazard. Mississippi River flood elevations were determined by the January 2004 Upper Mississippi River System Flow Frequency Study (UMRSFFS) (USACE, 2004). For each of the five flood scenarios, flood elevation grids were created using flood elevations at cross sections from the 2004 U.S. Army Corps of Engineers (USACE) Upper Mississippi River Flow Frequency Study. Flood depth grids were then calculated by subtracting ground elevations from the flood elevation grids. Topographic information was supplied by the USACE specifically for their Mississippi River study.

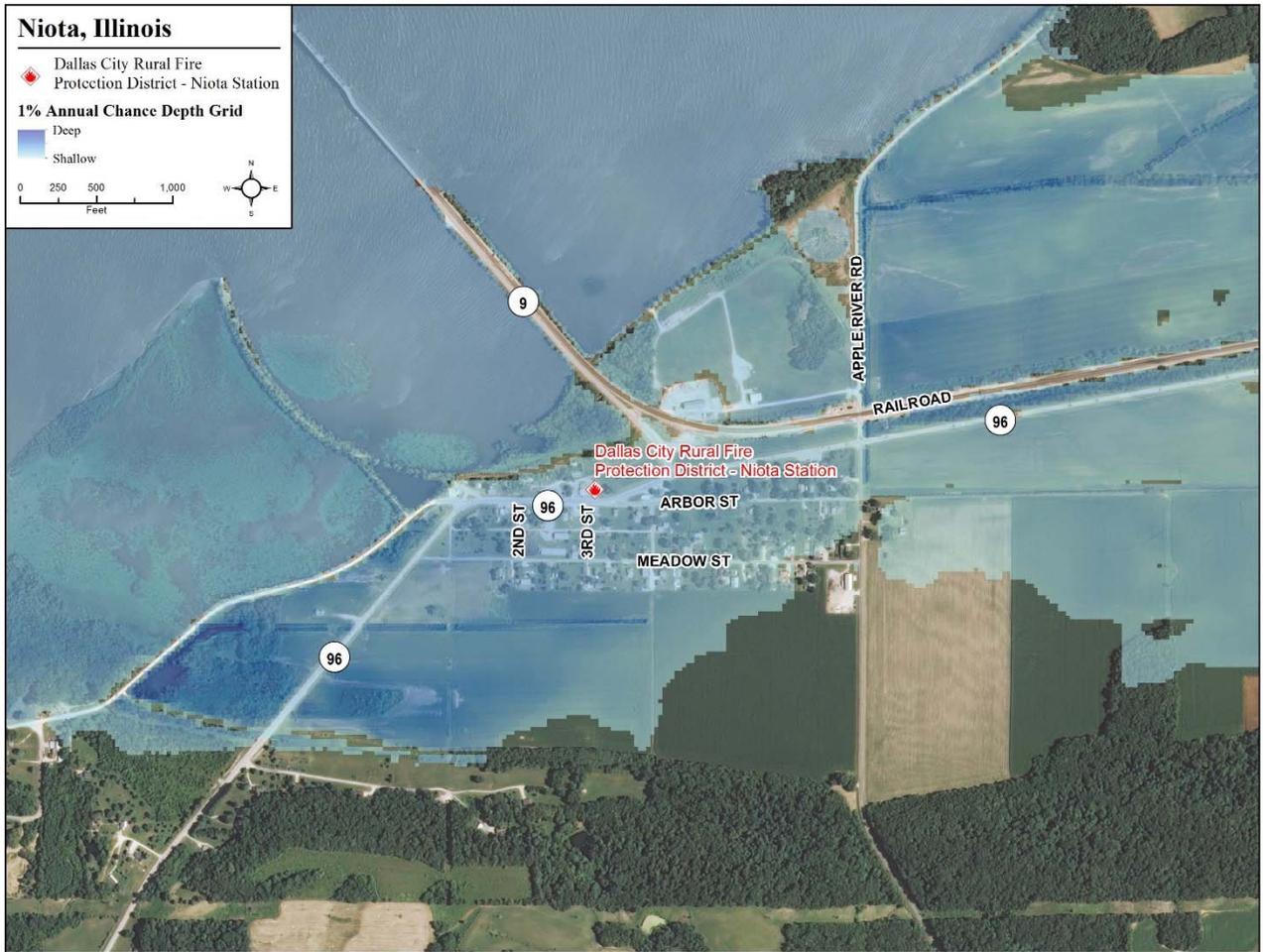
For areas outside of the Mississippi River flood plain, Hazus generated the flood depth grid for all five recurrence-based flood scenarios, derived from the United States Geological Survey (USGS) 1/3 ArcSecond seamless Digital Elevation Model (DEM) with a 10 meter cell size.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software, which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific flood.

Essential Facilities Damage

The Dallas City Rural Fire Protection District station, located within the unincorporated community of Niota, was identified to be at risk for moderate flooding damages. A map of the essential facilities potentially at risk to flooding is shown in Figure 38.

Figure 38: 1% Annual Chance Flood Boundary and Essential Facilities at Risk



Essential facilities located within the flood boundary are at risk for damages similar to those of other buildings located within the flood risk area. These damages include structural failure, water damage, and loss of facility functionality. Not only is the structure vulnerable to damage, the contents and staff are also at great risk. A complete list and a map of all the essential facilities are included in Appendix F.

Building Exposure

There are 261 structures that were determined to be at a high risk of flooding in Hancock County. For the purpose of this risk assessment, “high risk” structures are those that are located within the 0.2% annual chance (500 year) floodplain. Estimates of the fair market value of the structures are detailed in Figure 39.

Figure 39: Structure exposure per flood event

Community Name	10% Annual Chance Flood (10yr)		4% Annual Chance Flood (25yr)		2% Annual Chance Flood (50yr)		1% Annual Chance Flood (100yr)		0.2% Annual Chance Flood (500yr)	
	Count	Total Exposure (FMV)	Count	Total Exposure (FMV)	Count	Total Exposure (FMV)	Count	Total Exposure (FMV)	Count	Total Exposure (FMV)
Augusta	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Basco	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Bentley	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Blandinsville (RR)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Bowen	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Carthage	9	\$455,493	10	\$468,966	11	\$546,093	14	\$756,042	17	\$870,717
Dallas City	4	\$142,872	6	\$224,631	12	\$875,424	18	\$1,110,936	23	\$1,334,265
Elvaston	1	\$20,052	1	\$20,052	1	\$20,052	1	\$20,052	1	\$20,052
Ferris	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Hamilton	1	\$414,909	1	\$414,909	2	\$417,960	4	\$2,062,050	5	\$2,175,765
La Harpe	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Nauvoo	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Plymouth	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Pontoosuc	14	\$255,435	19	\$349,113	28	\$541,502	57	\$1,622,417	82	\$2,709,379
Warsaw	3	\$163,317	3	\$163,317	3	\$163,317	4	\$201,048	8	\$322,895
West Point	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Hancock County Unincorporated Areas	90	\$3,410,637	101	\$3,763,296	110	\$4,249,899	118	\$4,912,054	125	\$5,826,135
Total	122	\$4,862,715	141	\$5,404,284	167	\$6,814,247	216	\$10,684,599	261	\$13,259,208

Economic Flood Losses

A Hazus flood loss analysis was performed using the user defined facilities inventory to investigate the impact of five separate flood events, the 10%, 4%, 2%, 1%, and 0.2% annual chance floods. Average annualized loss, which is the estimated long-term value of losses averaged on an annual basis, was then calculated based on the loss estimates generated by Hazus for these five flood scenarios. The results are listed by community and by occupancy class in Figures 40 and 41.

Figure 40: Estimated Losses by Community

Community Name	10% Annual Chance Flood (10yr)		4% Annual Chance Flood (25yr)		2% Annual Chance Flood (50yr)		1% Annual Chance Flood (100yr)		0.2% Annual Chance Flood (500yr)		Average Annualized Loss	
	Count	Total Losses	Count	Total Losses	Count	Total Losses	Count	Total Losses	Count	Total Losses	Count	Total Losses
Augusta	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Basco	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Bentley	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Blandinsville	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Bowen	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Carthage	9	\$95,600	10	\$125,400	11	\$153,300	14	\$189,100	17	\$273,900	17	\$13,750
Dallas City	4	\$21,600	6	\$31,500	12	\$77,200	18	\$299,600	23	\$855,300	23	\$11,170
Elvaston	1	\$900	1	\$1,600	1	\$2,200	1	\$2,900	1	\$6,600	1	\$200
Ferris	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Hamilton	1	\$180,000	1	\$243,600	2	\$315,300	4	\$889,200	5	\$2,258,000	5	\$41,450
La Harpe	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Nauvoo	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Plymouth	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Pontoosuc	14	\$96,700	19	\$141,000	28	\$203,500	57	\$412,100	82	\$934,300	82	\$22,050
Warsaw	3	\$69,700	3	\$112,100	3	\$137,300	4	\$161,400	8	\$256,800	8	\$11,740
West Point	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Hancock County Unincorporated Areas	90	\$2,197,100	101	\$2,713,400	110	\$3,255,100	118	\$3,722,100	125	\$4,567,500	125	\$285,200
Total	122	\$2,661,600	141	\$3,368,600	167	\$4,143,900	216	\$5,676,400	261	\$9,152,400	261	\$385,560

Figure 41: Estimated Losses by Occupancy

Occupancy	10% Annual Chance Flood (10yr)		4% Annual Chance Flood (25yr)		2% Annual Chance Flood (50yr)		1% Annual Chance Flood (100yr)		0.2% Annual Chance Flood (500yr)		Average Annualized Loss	
	Count	Total Losses	Count	Total Losses	Count	Total Losses	Count	Total Losses	Count	Total Losses	Count	Total Losses
Residential	71	\$998,200	85	\$1,357,500	105	\$1,821,900	145	\$2,336,400	186	\$3,449,500	186	\$155,720
Commercial	15	\$327,700	18	\$392,000	22	\$456,100	27	\$548,300	30	\$822,200	30	\$42,490
Industrial	0	\$0	0	\$0	0	\$0	1	\$510,700	1	\$1,778,400	1	\$15,270
Agricultural	32	\$1,154,100	34	\$1,314,700	36	\$1,453,000	37	\$1,736,800	38	\$2,273,700	38	\$138,340
Governmental	4	\$181,600	4	\$304,400	4	\$412,900	5	\$544,200	5	\$751,900	5	\$33,270
Educational	0	\$0	0	\$0	0	\$0	1	\$0	1	\$76,700	1	\$470
Total	122	\$2,661,600	141	\$3,368,600	167	\$4,143,900	216	\$5,676,400	261	8,615,500	261	\$385,560

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. The number of displaced people that will require accommodations in temporary public shelters is also estimated.

For the 1% annual chance flood event, approximately 144 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 53 people (out of a total population of 19,104) will seek temporary shelter in public shelters.

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) finishes (dry wall, insulation, etc.), 2) structural (wood, brick, etc.) and 3) foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

For the 1% annual chance flood Hazus estimates that a total of 1,689 tons of debris will be generated. Of the total amount, finishes compose 50% of the total, and structures compose 27% of the total. If the debris tonnage is converted into a number of truckloads, it will require about 68 truckloads (at 25 tons/truck) to remove the debris generated by the flood.

HAZUS-MH EARTHQUAKE ANALYSIS

Earthquake occurrence is not common within the state of Illinois. “However, a recent study of earthquakes around the world within stable interior parts of continents shows that earthquakes with

magnitudes up to 6.8 can occur anywhere in these settings. A magnitude 6.8 earthquake would produce intensities of VII to IX (refer to Figure 42).” (IEMA, p. III-136)

Probabilities of Future Earthquakes

The likelihood of an earthquake of magnitude 6.3 or greater occurring somewhere in the Central U.S. within the next 15 years is 40% to 63% and 86% to 97% within the next 50 years. An earthquake of this size would damage older structures, especially those of masonry construction. Serious damage could also occur to many schools in the region (ISGS, 1995).

Earthquake Occurrence in the Vicinity

According to the United States Geological Survey/National Earthquake Information Center (USGS/NEIC) ComCat Earthquake catalog, which includes databases of earthquakes from 1900–present, there have been 3 recorded earthquakes in a 160 kilometer radius of the approximate center of Hancock County.

All three recorded earthquakes have been under magnitude 3. The strongest earthquake within this 160 km radius was a magnitude 2.9 event that occurred on February 8, 2004.

Figure 42: Earthquake Magnitude vs. Modified Mercalli Intensity Scale

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

http://earthquake.usgs.gov/learn/topics/mag_vs_int.php

Figure 43: Abbreviated Modified Mercalli Intensity Scale

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

5. Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
6. Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
7. 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.
8. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
9. 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.
10. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
11. Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
12. Damage total. Lines of sight and level are distorted. Objects thrown into the air.

http://earthquake.usgs.gov/learn/topics/mag_vs_int.php

Description of Earthquake Scenario

The Hazus assessment is highly data dependent; the accuracy of the analyses depends on a number of important datasets, including essential facilities and general building stock inventories. Use of the national datasets is considered a Level 1 Hazus analysis. For planning purposes, this scenario involves a Hazus Level 1 analysis of a theoretical moment magnitude 5 earthquake with an epicenter located in Hancock County at latitude 40° 9' 19.952" N, and longitude 91° 9' 1.445" W. This locates the epicenter within Section 13, Township 5 North, Range 7 West, immediately to the northwest of the City of Carthage. Depth of origin used in the analysis was 10 kilometers below the surface.

Building Damage

The Hazus General Building Stock data was used for this analysis. The assessor's data was not used because it was not in the scope of the project to create a UDF inventory for every structure in Hancock County. Hazus estimates that about 1,433 buildings will be at least moderately damaged. This is over 14% of the total number of buildings in the region. An estimated 70 buildings will be damaged beyond repair. Figure 44 summarizes the expected damage by general occupancy for the buildings in the region. Figure 45 summarizes the expected damage by general building type.

Figure 44: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	174	2.64	62	3.28	63	6.01	26	8.41	5	6.67
Commercial	273	4.16	106	5.56	99	9.46	42	13.25	11	14.91
Education	18	0.27	7	0.38	7	0.70	3	0.94	1	1.25
Government	22	0.33	9	0.48	10	0.93	4	1.11	1	1.42
Industrial	67	1.02	23	1.22	21	2.04	9	2.77	2	2.68
Other Residential	419	6.38	184	9.69	198	18.91	72	23.03	14	19.16
Religion	55	0.83	17	0.89	13	1.25	5	1.67	1	1.84
Single Family	5,542	84.38	1,493	78.51	635	60.69	154	48.81	37	52.06
Total	6,570		1,901		1,046		315		72	

Figure 45: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	4,857	73.93	1,215	63.91	367	35.09	39	12.47	5	6.94
Steel	159	2.43	55	2.90	76	7.27	38	12.19	8	11.89
Concrete	103	1.57	34	1.78	33	3.16	13	4.00	2	2.65
Precast	56	0.85	15	0.81	21	2.05	12	3.81	2	2.26
Reinforced Masonry	20	0.31	4	0.23	6	0.58	3	1.04	0	0.52
Unreinforced Masonry	1,125	17.13	446	23.47	371	35.43	145	45.95	44	62.73
Manufactured Housing	250	3.81	132	6.95	172	16.40	65	20.55	11	16.18
Total	6,570		1,901		1,046		315		72	

Transportation and Utility Lifeline Damage

Figures 46 and 47 provide information on the damage to the utility lifeline systems. Table 46 provides damage to the utility system facilities. Figure 47 provides estimates on the number of leaks and breaks by the pipelines of the utility systems.

Figure 46: Expected Utility System Facility Damage

System	Total #	# of Locations			
		With at Least	With Complete	with Functionality > 50 %	
		Moderate Damage	Damage	After Day 1	After Day 7
Potable Water	4	0	0	4	4
Waste Water	8	1	0	6	8
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	6	2	0	5	6

Figure 47: Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	930	50	13
Waste Water	558	36	9
Natural Gas	372	10	3
Oil*	0	0	0

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.05 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 52.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 1,880 truckloads (at 25 tons/truck) to remove the debris generated by the earthquake.

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 69 households to be displaced due to the earthquake. Of these, 40 people (out of a total population of 19,104) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the earthquake is \$205.23 million, which includes building and lifeline-related losses based on the region's available inventory. The following sections provide more detailed information about these losses.

Building-Related Losses

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

Total building-related losses were \$154.98 million; 17% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 52% of the total loss. Figure 48 provides a summary of the losses associated with building damages.

Figure 48: Building-Related Economic Loss Estimates

(Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	\$0	0.41	3.75	0.09	0.63	4.88
	Capital-Related	0	0.17	3.19	0.05	0.26	3.68
	Rental	1.75	0.85	1.73	0.04	0.28	4.64
	Relocation	6.10	0.85	2.78	0.23	3.15	13.10
	Subtotal	7.84	2.28	11.45	0.41	4.32	26.30
Capital Stock Losses							
	Structural	9.18	1.67	4.56	0.64	9.30	25.34
	Non Structural	35.74	7.61	12.42	2.07	11.62	69.47
	Content	14.38	2.21	6.97	1.42	7.90	32.87
	Inventory	0	0	0.19	0.21	0.60	1.00
	Subtotal	59.30	11.49	24.14	4.33	29.43	128.68
	Total	67.14	13.77	35.58	4.74	33.74	154.98

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Figures 49 & 50 provide a detailed breakdown in the expected lifeline losses.

Figure 49: Transportation System Economic Losses

(Millions of Dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	752.9	\$0.00	0
	Bridges	115.04	\$1.52	1.32
	Tunnels	0	\$0.00	0
	Subtotal	867.94	\$ 1.52	
Railways	Segments	93.39	\$0.00	0
	Bridges	0.15	\$0.00	0
	Tunnels	0	\$0.00	0
	Facilities	0	\$0.00	0
	Subtotal	93.54	\$ -	
Light Rail	Segments	0	\$0.00	0
	Bridges	0	\$0.00	0
	Tunnels	0	\$0.00	0
	Facilities	0	\$0.00	0
	Subtotal	0	\$ -	
Bus	Facilities	0	\$ -	0
	Subtotal	0	\$ -	
Ferry	Facilities	0	\$ -	0
	Subtotal	0	\$ -	0
Port	Facilities	7.99	\$ 0.58	0
	Subtotal	7.99	\$ 0.58	0
Airport	Facilities	0	\$ -	0
	Runways	0	\$ -	0
	Subtotal	0	\$ -	
TOTAL		969.47	\$ 2.10	

Figure 50: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	\$0.00	0.00
	Facilities	147.90	\$6.55	4.43
	Distribution Lines	18.60	\$0.23	1.22
	Subtotal	166.50	\$6.78	
Waste Water	Pipelines	0.00	\$0.00	0.00
	Facilities	591.40	\$41.08	6.95
	Distribution Lines	11.20	\$0.16	1.45
	Subtotal	602.60	\$41.24	
Natural Gas	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Distribution Lines	7.40	\$0.05	0.62
	Subtotal	7.40	\$0.05	
Oil Systems*	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	\$0.00	
Electrical Power	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	\$0.00	
Communication	Facilities	0.70	\$0.09	13.20
	Subtotal	0.70	\$0.09	
TOTAL		777.20	\$48.16	

GIS TORNADO ANALYSIS

GIS-overlay modeling was used to estimate the potential impacts of a F3 tornado moving through Hancock County. A hypothetical tornado track was created that begins southwest of the City of Carthage and travels 2.9 miles on a northeasterly path through Carthage and ending to the northeast of the City.

Description of Analysis

As stated above, the scenario for this analysis is a Fujita Scale F3 tornado moving through the City of Carthage. See Figure 52 for a map of this scenario. Hazus software was not used for this analysis, however, similar GIS-based methodology was used to estimate potential damages based on current structure values located in the path of the simulated tornado track.

Estimates of dollar losses for structures located in the tornado's path were determined through this analysis. Estimates for injuries/loss of life, shelter needs, and damage to infrastructure are not included. In order to estimate the potential damages, GIS was used to create four different buffer zones around the tornado track. Each zone represents a different Fujita scale wind intensity from F3 to F0 based on their proximity to the center of the track. A damage percentage is assigned to each zone, with the most intense damage occurring within the center of the tornado path and decreasing amounts of damage away from the center. These percentages are listed in Figure 51. This methodology of creating buffers was based on the publication titled "A Study of the GIS Tools Available During Tornado Events and Their Effectiveness for Meteorologists, First Responders and Emergency Managers" presented at the American Meteorological Society Cloud Physics Conference in 2006 (Hubbard, MacLaughlin, 2006).

Once these zones were created they were overlaid on top of points derived from the Hancock County Assessor's database. Each point represents an existing structure and is attributed with an estimate of the fair market value of the structure as calculated from its assessed value. The number of structures that fell in each tornado damage zone is listed in Figure 53. Depending on which damage zone each of these points were located in, the fair market value of the structure was multiplied by the percentage listed in Figure 51 to give an estimate of the dollar losses that may result in such an event. These loss estimates are listed in Figure 55.

Figure 51: Tornado Damage Zones

Zone	Range (Feet)	Damage Percentage
1 (F3)	0-330	80%
2 (F2)	331-660	50%
3 (F1)	661-1320	10%
4 (F0)	1321-2640	0%

Figure 53: Number of Structures in Each Tornado Damage Zone

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	69	68	135	237
Commercial	1	7	34	58
Industrial	0	0	1	0
Agriculture	0	0	1	1
Governmental	0	4	2	5
Religion	0	2	2	6
Education	2	0	0	1
Total	72	81	175	308

A total of 328 structures were damaged in this scenario. Nine of these structures were essential facilities, which are listed in Figure 54.

Figure 54: Essential Facilities Located in Tornado Path

Essential Facilities	City
Carthage Police Department	Carthage
Carthage Clipper Fire Department	Carthage
Memorial Support Services	Carthage
Modern Family Medical Care	Carthage
Hancock County Health Department	Carthage
Carthage Middle School	Carthage
Hancock County Learning Center	Carthage
Illini West H.S. Superintendent's Office	Carthage
Emergency Service and Disaster Agency	Carthage

Damage to or loss of these essential facilities can result in a great negative impact on the community during a disaster. The loss of a healthcare center can reduce the capacity to treat those injured during an event. The loss of schools can have impacts such as reduced options for temporary shelter, as schools are often used in this capacity and can also increase the amount of time it takes to restore a level of normalcy to the community.

Economic Losses

The total loss estimate for this event is \$13,693,600. As detailed in Figure 55 below, residential losses are the largest contributor to loss estimates. This is unsurprising as 83% of the structures reporting losses are residential. Zone 2 shows the highest loss totals due to several high value structures located in this zone, such as the Carthage Clipper Fire Department building.

Figure 55: Total Loss Estimates by Occupancy

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	\$3,870,800	\$2,504,400	\$971,700	\$0
Commercial	\$74,000	\$648,400	\$558,800	\$0
Industrial	\$0	\$0	\$500	\$0
Agriculture	\$0	\$0	\$1,500	\$0
Governmental	\$0	\$1,708,500	\$143,700	\$0
Religion	\$0	\$1,301,100	\$293,600	\$0
Education	\$1,616,600	\$0	\$0	\$0
Total	\$5,561,400	\$6,162,400	\$1,969,800	\$0
Total Losses	\$13,693,600			

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HAZUS FLOOD HAZARD ANALYSIS

The Federal Emergency Management Agency (FEMA) has developed and supports the use of HAZUS-MH methodology (<http://www.fema.gov/plan/prevent/hazus>) which uses Geographic Information Systems (GIS) tools and fiscal data to assess risk in terms of potential losses for a given flood event or other natural disaster scenario. This analysis helps to identify potential impacts of natural hazards for planning and mitigation. Flood Insurance Rate Maps (FIRMs) show the expected extent of flooding inundation. However, the risk exposure is a combination of the extent and depth of flooding combined with social and economic impacts. The HAZUS analyses conducted for Hancock County combines the computational power of HAZUS-MH with updated information for essential facilities and flood hazards to provide a solid, consistent framework to quantify the county's risk. The information generated can be used for planning mitigation efforts in order to reduce risk and for planning emergency response. Furthermore, the objective HAZUS-MH output will provide a baseline for evaluating success in reducing natural hazard risk exposure when conducting future assessments.

The HAZUS-MH assessment is highly data dependent; the accuracy of the analyses depends on a number of important datasets including essential facilities and general building stock inventories. Use of the national datasets is considered a Level 1 HAZUS-MH analysis. The Hancock County HAZUS work included an update of the Essential Facilities database and use of updated flood data for the Mississippi River. The HAZUS analysis was performed to investigate impact of the 1% annual chance flood (a.k.a. the 100-year flood).

The Mississippi River along the western border of Hancock County presents the county's greatest flood hazard. Mississippi River flood elevations were determined by the January 2004 Upper Mississippi River System Flow Frequency Study (UMRSFFS) (USACE, 2004). The UMRSFFS was developed by five Corps of Engineer Districts (St. Paul, Rock Island, Omaha, Kansas City, St. Louis) and coordinated through representatives from seven federal agencies and seven states. In the HAZUS analyses for flooding from the Mississippi River, a flood depth grid was manually generated and then input to HAZUS-MH for analysis. The flood depth grid was created using 1% annual chance flood elevations at cross sections from the 2004 U.S. Army Corps of Engineers (USACE) Upper Mississippi River Flow Frequency Study (UMRSFFS). The elevations at cross sections were made into a grid, and ground elevations were subtracted from this grid, creating a flood depth grid. The ground elevations were derived from topographic information supplied by the USACE specifically for their Mississippi River study.

For areas outside of the Mississippi River flood plain, HAZUS-MH generated the flood depth grid for a 1% annual chance flood for streams draining 5 square miles or more, based on the United States Geological Survey (USGS) 1/3 ArcSecond National Elevation Dataset (NED), or 10 meter Digital Elevation Model (DEM).

Essential facility data are an example of site-specific information used in HAZUS-MH for analysis. Essential facility data include schools, medical care facilities, emergency operation centers, police stations, and fire stations. The HAZUS-MH MR3 database was updated using community feedback from meetings, updated database information from HAZUS-MH MR4, and the National Geospatial-Intelligence Agency dataset. The HAZUS-MH MR4 (Maintenance Release 4, August 2009) database was modified using community feedback from meetings, and the National Geospatial-Intelligence Agency dataset. Locations of these facilities were confirmed using community feedback and Internet mapping services such as Google Maps.

The default HAZUS-MH MR4 General Building Stock (GBS) database used in the analysis includes residential, commercial, industrial, agricultural, religious, government, and educational buildings. Default databases in HAZUS include square footage by occupancy, building count by occupancy, and

general occupancy mapping. These data for residential structures are derived from the Census 2000. Data for non-residential structures are derived from Dun & Bradstreet (D&B). Information in the default HAZUS-MH database was adjusted for regional differences using information from three reports from the Department of Energy (DOE). Characteristics such as number and size of garages, type of foundation, and number of stories are modified by region. U.S. Census Bureau data that are publically distributed do not include specific housing information; rather, the data provided are aggregated to the census tract (which has about 4000 people), thus reducing the scale and resolution of flood damage estimates which are building specific.

Loss estimates from HAZUS-MH are based on both site-specific analysis as well as aggregate analysis. Aggregate loss estimates, including general building stock analysis, are based on the assumption that structures are evenly distributed across census blocks. It is possible to have underestimates of damage in some areas as well as overestimates of damage in other areas. These damage estimates are more reliable over larger areas than at the census block level. This analysis is meant to assess the risk of flood hazard at the county level in order to serve as a planning aid. Performing a flood analysis at the census block level with small numbers of buildings makes damage analysis estimates sensitive to rounding errors.

Damages to aggregate building stock are based upon regional models that categorize each building into a structural class. It is assumed that each structural class will respond in a similar way to specific flooding depths. Loss estimates for aggregate structural losses need to be viewed as averages for a group of similar buildings rather than as exact estimates to individual structures.

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software, which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific flood.

Results of the HAZUS-MH flood analyses are presented in the following tables.

Essential Facilities List

Figure 56 identifies the essential facilities that were used for the analysis. A complete list and map of the essential facilities are included in the Appendix.

Figure 56: Essential Facilities List

Facility	Number of Facilities
Medical Care Facilities	8
Emergency Centers	1
Fire Stations	13
Police Stations	9
Schools	22

Essential Facilities Damage

The HAZUS-MH analysis identified the Dallas City Rural Fire Protection District station, located within the unincorporated community of Niota, to be at risk for moderate flooding damages. A map of the essential facilities potentially at risk to flooding is shown in Figure 57.

Figure 57: 1% Annual Chance Flood Boundary and Essential Facilities at Risk



Essential facilities located within the flood boundary are at risk for damages similar to those of other buildings located within the flood risk area. These damages include structural failure, water damage, and loss of facility functionality. Not only is the structure vulnerable to damage, the contents and staff are also at great risk. A complete list of all the essential facilities is included in Appendix X. A map of the essential facilities is included in Appendix X.

General Building Stock

HAZUS estimates that there are 12,148 buildings in Hancock County, which have an aggregate total replacement value of 1,387 million dollars (2006 dollars). Table X.2 and Table X.3 present the relative distribution of the replacement value with respect to the general occupancies for Hancock County and by the 1% Annual Chance Flood Scenario, respectively.

Figure 58: Building Exposure by Occupancy Type for Hancock County

Occupancy	Exposure (\$1000)	% of Total
Residential	992,247	71.5%
Commercial	60,150	11.5%
Industrial	35,328	2.60%
Agricultural	106,588	7.70%
Religion	52,699	3.80%
Government	10,963	0.80%
Education	29,060	2.10%
Total	1,387,035	100.00%

Figure 59: Building Exposure by Occupancy Type for the 1% Annual Chance Flood Scenario

Occupancy	Exposure (\$1000)	% of Total
Residential	210,574	77.90 %
Commercial	26,905	9.90 %
Industrial	2,773	1.00 %
Agricultural	16,265	6.00%
Religion	10,743	4.00%
Government	1,377	0.50%
Education	1,785	0.70%
Total	270,422	100.00%

General Building Stock Damage

The HAZUS Flood Model methodology for estimating direct physical damage (e.g., repair costs) to the general building stock is fairly simple and straightforward. For a given census block, each occupancy class (and foundation type) has an appropriate damage function assigned to it (i.e., 1-story, no basement), and computed water depths are used to determine the associated percent damage. This percent damage is multiplied by the full (and depreciated) replacement value of the occupancy class in question to produce an estimate of total full (and depreciated) dollar loss. The “damage states” are derived from the percent damage (e.g., 1-10% damage is considered slight, 11-50% damage is considered moderate, and 51-100% is considered substantial damage).

HAZUS estimates that about 19 buildings will be at least moderately damaged. This is more than 8% of the total number of buildings in the scenario. An estimated 3 buildings will be completely destroyed. Table X.4 below summarizes the expected damage by general occupancy for the buildings in Hancock County.

Figure 60: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	%	Count	%								
Occupancy	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Agriculture	0	0.00	1	50.0	0	0.00	1	50.0	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	1	5.56	0	0.00	2	11.1	4	22.2	8	44.4	3	16.7
Total	1		1		2		5		8		3	

Building-Related Losses

The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The total building-related losses were approximately 23.17 million dollars. Table X.5 below provides a summary of the losses associated with building damages.

Figure 61: Building-Related Economic Loss Estimates (Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	6.55	1.00	0.09	0.81	8.45
	Content	3.68	2.85	0.13	2.06	8.72
	Inventory	0.00	0.07	0.02	0.22	0.31
	Subtotal	10.23	3.92	0.24	3.09	17.48

Shelter Requirements

HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS also estimates the number of displaced people that will require accommodations in temporary public shelters. The model estimates 160 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 35 people (out of a total population of 20,121) will seek temporary shelter in public shelters.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 2,573 tons of debris will be generated. Of the total amount, Finishes comprises 44% of the total, and Structure comprises 31% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 103 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Bibliography: *Upper Mississippi River System Flow Frequency Study Final Report*. January 2004, U.S. Army Corps of Engineers, Rock Island.

NATURAL HAZARDS –PROBABILITY AND ASSESSING VULNERABILITY

Hancock County, Illinois is a risk for multiple types of natural hazards, including floods, severe storms, tornados, severe winter storms, extreme temperature days, earthquake and drought. While natural hazards are unpredictable by nature, an analysis of historical data can provide insight as to the likelihood of those events occurring in the future. In addition, assessing the damage to building related to those events in a critical part of the planning process. The probability and vulnerability for flooding is included in the HAZUS Analysis.

The remaining Natural Hazards are assessed for probability below. Methodology for the probability analysis is tabulating the number of past events and dividing by the number of years the data covers. Data is available for different types of natural hazards over a varying number of years so for each type of natural hazard, a separate analysis is required.

Figure 62: Hancock County Natural Hazard Probability

Hazard	Extreme Temperature	Severe Storm / Hail	Drought	Earthquake	Winter Storm / Ice	Tornados
Number of Events*	12	105	82	0	76	26
Years of Data	13	55	38	55	14	55
Annual Probability	92%	100%+	100%+	0%+	100%+	47%

*Source: National Climate Data Center –Storm Events Database

As can be seen from the table, while earthquakes remain a low (but possible) risk for Hancock County, nearly every other natural hazard that affects the area has a high likelihood of occurrence. While these events are almost guaranteed to occur, their magnitude directly relates to the severity of vulnerability. While all extreme temperature days pose risk to life (either heat or cold), a small percentage of snow and ice events pose a widespread threat to life and property. According to the Illinois State Water Survey Map, the Hancock County only experiences a snow event of 6 inches or more on average every other year.

Drought, while common on a short term basis, varies in its impact. Of the 82 events cited above, only 14 had a significant water/energy impact, which represents the greatest threat to life and property, through shortages of potable water and water available to fight fires. Of those 82, however, 37 did have an agricultural impact, which represents one of the largest industries in Hancock County. The economic impacts of these events are significant.

The number of severe storms/tornados/hail that has directly caused risk to life and property is more difficult to totally assess, since many small damages go unreported. There have been 26 documented tornados in Hancock County since 1950 that have had property damage estimates ranging from \$1,000 to \$10,000,000 in property damage. Because of the added risk to life presented by tornados, the vulnerability should be considered high.

Hancock County has had no documented experience with earthquakes, but there always exists a possibility, however remote, that significant damage could be experienced from earthquakes.

Potential Loss Estimates

Two of the above natural hazards, extreme temperature and drought, have little to no impact on buildings in the county. A comprehensive analysis of the potential losses of flooding is included in the HAZUS analysis. To maintain consistency, total property exposure in the county is retrieved from the HAZUS data, which estimates there are 9,466 buildings in Hancock County, which represents a replacement cost of \$1,103,782,000. With these figures as a base, below are calculated loss estimates by type of event.

Severe Storms/Tornado

Severe storms present a risk to life and property from the presence of strong winds, lightening and hail. Additionally, in severe wind situations, damage to real property (i.e. Buildings) can occur directly from the wind and flying debris. For estimation purposes, if one third of the county was affected by a severe storm event, and 2% of the buildings sustained damage, a loss estimate could be calculated as follows:

$\$1,103,782,000(\text{replace value of buildings}) \times .33(33\% \text{ of the county}) \times .02 (2\% \text{ of buildings affected}) = \$7,284,961(\text{Replacement Value of buildings exposed to damage})$

The potential loss from tornados is often more severe in damage, but on a smaller scale geographically. If a tornado affected 10% of the land area of the county(assuming equal dispersion of buildings on land), and in that 10% area 50% of the buildings were damaged at 75% of value, a potential loss could be estimated as follows:

$\$1,103,782,000(\text{replace value of buildings}) \times .1 (10\% \text{ of County}) \times .5 (50\% \text{ of Buildings}) \times .75 (75\% \text{ Damage to Buildings}) = \$41'391,825 \text{ Damage Estimate}$

Regardless of building damage, the potential of damage to the electrical supply infrastructure is a primary concern during a severe storm event. In addition to potential damage from wind, lightening and falling trees, lives and businesses can be disrupted for significant periods of time due to storm damage.

Winter Storms

Severe winter storms have the potential to paralyze a community, from power outages, immobilization, and potential vehicle accidents. Hancock County has experienced several ice storms in recent years that have left significant portions of the county without power for significant periods of time. Hancock County does, however, experience on average 6 winter storms per year. Since 1995, property damage estimates from winter storms have totaled only \$100,000 from three separate events. The bulk of this damage, \$80,000 was recorded for a severe ice storm that occurred in the early morning hours January 5, 2005. If an average were taken of the average property damage from the Winter Storms since 1995, and average property loss assessment could be calculated as follows:

$\$100,000 (\text{total reported property loss})/84 (\# \text{ of winter storms})= \$1190 (\text{average loss})$

Additional expenses for winter storms include snow removal, road treatment, labor hours and other public expenditures related to severe winter storms.

CHAPTER 3 – MITIGATION STRATEGY

HANCOCK COUNTY LOCAL HAZARD MITIGATION GOALS AND OBJECTIVES

After having reviewed the risk assessments for each hazard and the results of the focus groups, documented existing plans and ordinances, identified critical facilities, and confirmed socioeconomic data the Task Force met to formulate goals and objectives for the plan.

Goal 1. Protect Life and property

Objective 1.a. Implement procedures and actions that will protect life and property in the event of a natural hazard. This includes making homes, businesses, infrastructure, and other types of property less prone to natural hazard damage.

Objective 1.b. Identify areas that have been repeatedly damaged in natural hazards and suggest alternative locations or other actions that might limit that susceptibility.

Objective 1.c. Increase awareness about insurance availability for catastrophic hazards.

Objective 1.d. Encourage procedures designed to minimize risk by supporting development plans that take natural hazards into account.

Goal 2. Public Awareness

Objective 2.a. Design and implement natural hazard education programs for the citizens of Hancock County

Objective 2.b. Create natural hazard mitigation resources (brochures, websites, etc.) for the public

Goal 3. Natural Systems

Objective 3.a. Preserve Natural Resources in such a way that they serve natural hazard mitigation purposes.

Objective 3.b. Encourage the implementation of natural hazard mitigation planning with watershed protection, land use planning, and other planning issues.

Goal 4. Partnerships and Implementation

Objective 4.a. Develop communication and coordination systems for the various agencies potentially involved in natural hazard mitigation.

Objective 4.b. Maintain and improve communication and cooperation between residents, government, and the private sector

Objective 4.c. Incorporate natural hazard mitigation into community plans and regulations

Goal 5. Emergency Services

Objective 5.a. Create policies that ensure the protection of critical facilities like clinics, police stations, and fire departments.

Objective 5.b. Ensure that different emergency agencies coordinate with one another.

MITIGATION ACTIONS – PRIORITIES AND IMPLEMENTATION

The list of project examples were presented to the Steering Committee. It was suggested to the community representatives that the list be used as a basis for discussion with community leaders on projects that would be appropriate for their village or city. The project ideas came from people who had spent several months considering the subject of natural hazards. Additionally, project ideas generated from focus group participants were included. Of course, communities were not limited to the projects on the list.

The projects were prioritized within the county by using the following method. It is important to recognize that the implementation of all actions is desirable regardless of prioritized order. Actions assigned to Priority A have a permanent or more far-reaching affect than actions under Priority B, although both address the most significant natural hazards in the County. Priority C actions all address the less significant natural hazards. Priority J actions are ready for implementation within the next year and can be accomplished within existing budgets. All actions will aid in the mitigation effort and should be implemented as opportunities arise.

Project Prioritization Method

Priority A projects permanently eliminate property damages and/or eliminate or reduce injuries and deaths in a specific area OR have a high probability to systematically reduce property damages, injuries and deaths across a wide area. Priority A projects address the most significant natural hazards – extreme heat, flood, severe storm, tornado, and winter storm.

Priority B projects reduce property damages in a specific area OR have the potential to reduce property damages, injuries and deaths across a wide area OR educate the public on disaster preparedness and mitigation. Priority B projects address the most significant natural hazards – extreme heat, flood, severe storm, tornado, and winter storm.

Priority C projects eliminate or reduce property damages, injuries and deaths from the less significant natural hazards OR educate the public on disaster preparedness and mitigation related to the less significant natural hazards – dam failure, drought, earthquake and mine subsidence.

Priority J projects can “just be done” without requiring outside funding and are able to be implemented within one year of Plan adoption. These can be one-time projects or ongoing projects and may address any hazard.

COST/BENEFIT ANALYSIS

A cost/benefit analysis will be needed for any of these projects to be implemented. A cost/benefit analysis will be performed at the time of project selection. The committee assigned preliminary cost/benefit assessments to each identified project, using general terms of **high**, **medium**, and **low** related to both the cost and benefit. A **high** rating on cost means it is unlikely the jurisdiction could accomplish the project without outside funding, while a **high** rating on benefit relates to how well the project would mitigate the situation. A **low** cost rating, conversely, means that is likely the jurisdiction can accomplish the project without outside funding.

JURISDICTIONAL PROJECT GRID

In the project grid below, whenever Hancock County is listed alone, the implication is that the project would apply to unincorporated areas. Specific municipalities are listed if their representatives identified the project as needed in their respective communities. Whenever 'ALL' is included under community it signifies value for that project to all incorporated municipalities in the county.

The project grid is sorted by project type. This format will allow quick reference to jurisdictions as they prioritize their mitigation efforts. Each project is also identified as to which of the goal areas it addresses, the position who is responsible for the goal, the proposed schedule, as well as the cost benefit. The codes under Hazard are: **F = Flood**; **FF = Flash Flooding**; **T = Tornado**; **SS = Severe Storms**; **ET = Extreme Temperatures**; **E = Earthquake**; and **D = Drought**. The codes under Benefit / Cost are: **H = High**; **M = Medium**; and **L = Low**. Whenever **ESDA Director** is cited under **Lead / Contact**, the implication is that person will be assisted by the municipal employees assigned that role as well who meet regularly with the County ESDA Director.

Coordination Projects

Figure 63: Coordination Projects

Goal	Jurisdiction	Hazard	Possible \$	Project	Priority	Lead	Time Frame	Cost/Benefit
4a	Hancock County	All	Local	Continue Multi-Jurisdictional Mitigation Committee to coordinate and guide long term recovery efforts and mitigation activities within the county. The existing Hancock County MVP Committee will serve as this committee. Responsibilities will include, but are will not be limited to: 1) Host annual Mitigation Plan Meeting as required by FEMA; 2) identify new funding streams and projects being initiated within the county; 3) coordinate and lead the long term economic recovery in the event of a disaster..	J	ESDA, MVP Group	Ongoing	H/L
2 a & b	Hancock County; All	All	Local	Develop a disaster education "map" indicating what current disaster related educational programs are being delivered within Hancock County by what group; identify gaps in educational delivery; and identify potential programs to fill these gaps	j	ESDA; Health Dept; Extension	2017 - continuing	L/H

Education Projects

Figure 64: Education Projects

Goal	Jurisdiction	Hazard	Possible \$	Project	Priority	Lead	Time Frame	Cost/Benefit
2a	Hancock County; All	All	Local	Develop and conduct a citizen awareness campaign regarding protection from natural hazards	B	ESDA Director / Public Health Dept / Extension / Red Cross	Ongoing	H/L
2a,b	Hancock County; All	All	Local	Educate public and disseminate information regarding all hazards to population through town hall meetings, presentations to groups, and displays	B/C	ESDA Director Public Health Dept / Extension / Red Cross	Ongoing	H/L
4b	Hancock County; All	All	Local	Provide information to local cable and public radio and television stations regarding emergency warning and public service announcements	B/C	ESDA Director Public Health Dept / Extension / Red Cross r	Ongoing	H/L
2a,b	Hancock; All	All	Local	Distribute information regarding hazards and safety procedures to all school districts annually	B/C	ESDA Director Public Health Dept / Extension / Red Cross	Ongoing	H/L
4b	Hancock County	T/SS/ET	Local	Maintain and educate Storm Spotter program volunteers	B	ESDA Director Public Health Dept / Extension / Red Cross	Ongoing	H/L

4a	Hancock County; All	All	Local	Educate employees, officials and community volunteers on the protocol developed for emergency situations.	J	ESDA / County Health Dept / Extension	Ongoing	H/L
1a	Hancock County; All	All	Local	Continue public education campaign to inform residents on what to do and where to go in the event of an emergency.	J	ESDA / County Health Dept / Extension	Ongoing	H/L
2b	Hancock County; All	Earth-quake	Local	Educating Public on earthquake damage, and what to look for in case of Earthquake	J	ESDA / County Health Dept / Extension	Ongoing	H/L
2b	Hancock; all	All	Local	Assess # of CPR First Aid trainers and develop an ongoing training schedule designed to increase the # of CPR/First Aid Trained Individuals	J	Health Dept	Ongoing	M/H

Emergency Management Projects

Figure 65: Emergency Management Projects

Goal	Jurisdiction	Hazard	Possible \$	Project	Priority	Lead	Time Frame	Cost/Benefit
1a	Hancock County; Elvaston; West Point; Ferris; Warsaw	T / SS	Funding Search	Establish a county wide early warning system for natural hazards.	B	ESDA Director	2017-18	H/H
5b	Hancock County; All	All	Funding Search	Identify and implement an improved emergency response communication system	B	ESDA Director / Emergency Responders	2017-2020	H/H
1a	Hancock County; All	All	Funding Search	Assess current placement of portable defibrillators throughout the county and fill gaps; encourage countywide training on their usage; map locations	B/C	ESDA / Emergency Response Agencies	2017-2021	H/M

4b	Hancock County; All	All	Local	Update NIMS Training for elected and appointed officials.	J	ESDA Director / County Officials	2017-ongoing	H/L
4b	Hancock County; All	All	Local	Encourage the use of NOAA all-hazard radios in residences and business throughout unincorporated area	B	ESDA Director	Ongoing	H/L
4a	Hancock County; All	All	Local	Adopt policies and procedures delineating chain of command for emergency situations.	B/C	ESDA / Village Board	2017	H/L
2b	Hancock County; All	D/EH	Local	Develop a list of water source locations and water hauling services to address ag water needs.	J	ESDA	2017	H/L
1d	Hancock County; All	All	Local	Develop and distribute (to officials) a map of hazardous material storage, confinement structures, and other potentially volatile items for response and recovery purposes	B	ESDA/Local officials	2020	L/M
5b	Hancock County	All	Local	Create a large animal emergency response team with specific training in animal health, animal relocation, and epidemiology to work with emergency responders when there is a significant animal emergency.	B	ESDA/Farm Bureau/Vets	2020	M/M
5b	Hancock County; All	All	Local	Develop a Release of information to be included in Home Health Care informational packets for Home Health Agencies to provide information to emergency responders regarding home bound/venerable populations in the event of a disaster/power outage.	J	ESDA/Health Dept.	2017-2018	L/H
1d	Hancock County	All	Local	Work with institutions and large facilities to develop appropriate evacuation protocol that will reduce the likelihood that individuals will be unaccounted for in the evacuations of facilities.	J	ESDA	2017/18	L/H
1.a.	Hancock County	All	Local	Investigate and potentially implement the "Emergency Action Tube Project" by a volunteer Group such as Boy Scouts or 4-H. (See Farm and Dairy.Com)	J	ESDA/Extension/Community Clubs	2017/18	L/H

Policy Projects

Figure 66: Policy Projects

Goal	Jurisdiction	Hazard	Possible \$	Project	Priority	Lead	Time Frame	Cost/Benefit
1b	Hancock County; All	F / FF	Funding Search	Identify and permanently mark roadways that flood frequently with appropriate signage.	B	County Highway Department / Village & City Public Works / Township Highway Commissioners	2017	M/M
1a	Hancock County; All	All	Funding Search	Establish "check-in" policy and procedure for vulnerable populations in the event of extreme weather and/or power outage.	J	Social Service Agencies / Public Health Dept	2017	M/M
4c	Hancock County; All	All	Funding Search	Establish and maintain a Comprehensive Plan for the county, incorporating mitigation activities and Brownfield assessment into the planning.	J	County Board	2020	M/M
4a	Hancock County; All	All	Local	Establish policies and procedures for documenting volunteer hours in disaster response.	J	ESDA Director	2017	H/L
1c	Hancock County; All	F	Local	Maintain NFIP Participation Status; adopt or amend floodplain management regulations to comply with NFIP requirements and review periodically	J	County Board / City Councils / Village Boards	Ongoing	H/L
4c	Hancock County; Hamilton; Carthage; Nauvoo; Warsaw	All	Local	Review and update Building Codes to ensure that newly constructed dwellings, infrastructure, and public facilities are designed and built to be disaster resistant.	B/C	County Board / City Councils / Village Boards	2017-2020	H/L

1a	Hancock County; Carthage; Nauvoo; Hamilton	T/SS	Local	Require the construction of storm shelters in existing and new mobile home developments	A	County Board / City Councils / Village Boards	2017	H/L
1	Hancock County; All	All	Local	Establish animal management system	J	County Board / City Councils / Village Boards / Humane Society	2017-2022	H/L
4c	Hancock County; All	T / SS / E	Local	Adopt building regulations that require wind-resistant and earthquake-resistant construction measures for critical facilities that house vulnerable populations or that house volatile liquids or hazardous waste	B/C	County Board / City Council / Village Board	2017-2018	H/L

Infrastructure/Construction Projects

Figure 67: Infrastructure/Construction Projects

Goal	Jurisdiction	Hazard	Possible \$	Project	Priority	Lead	Time Frame	Cost/Benefit
1d	Hancock County; All	T/SS/ET	FEMA	Develop multipurpose shelter facilities for areas of dense rural population.	A	County Board / Townships / Village Board / City Council / ESDA Director	2017-2022	H/H
3b	Hancock County; Niota	F	Funding Search	Establish and implement inspection and maintenance policies and procedures for the levee system throughout the county.	B	County Board / Drainage District	2017-2022	H/M

5a	Hancock County; All	T/F	Funding Search	Identify critical Facilities that need generators, as well as private concerns (i.e. confinements, etc) and purchase to have available during power outages	B	ESDA Director/ Business Owners/ City Officials	2017-2021	H/M
4c	Hancock County; All	T/SS	Local	Tree Program- removal of old trees, pruning/topping	B	County Board / City Councils / Village Boards	Ongoing	M/M
1a	Hancock County; All	All	Funding Search	Backup generator: inventory existing stock, determine both new and replacement needs and cost	B	County Board	2017-20-21	H/H
3a	Hancock County; Hamilton; Carthage; Elvaston	FF	Local	Dredging and defoliation of small streams and straightening of streams	J	County Board / City Councils / Village Boards / Public Works Dept	Ongoing	M/M
1	Hancock County	SS/FF	Local	Identify and prioritize needed improvements to county maintained roads that flood in heavy rainstorms, blocking or impairing road use and through access by vehicular traffic	J	County Highway Dept	2017	H/L
1b	Hamilton	F	Funding Search	Elevate approach of Hwy 136 at Keokuk Bridge	B	State and Federal Legislators / City Council	2017-2021	H/H
1b	Hancock County; Pontoosuc; Dallas City; Hamilton; Warsaw	F	FEMA	Facilitate and support buyout/elevation projects for severe repetitive loss properties in the floodplains throughout the county.	A	County Board / FEMA	2010	H/H

CHAPTER 4 – MONITORING, EVALUATING, MAINTENANCE STRATEGY

A crucial element of the Hancock County Hazard Mitigation Plan is the maintenance and implementation of the plan. The Hancock County Emergency Services Director will be responsible for the record keeping and maintenance of the plan. This responsibility will include calling and facilitating the annual plan meeting, surveying the participating jurisdictions for progress on jurisdictional goals, and maintaining detailed records for plan updates.

There are currently regular meetings held with all municipal ESDA Coordinators attending, and maintenance will become a regular agenda item. One such meeting will be designated as the annual meeting of the planning committee. At that time the Hancock County ESDA Director will facilitate discussion surrounding the progress of established goals from the FEMA approved plan, assist with the identification of new and emerging project ideas from each of the communities, and facilitate discussion of new issues that may have arisen of the past year that affect the plan. Additional municipal representatives will be encouraged to attend, especially members of the respective governing boards, so that communication can be eased.

Records of these annual meetings will be maintained within the Hancock County ESDA office, and compiled for plan updates within the five year update time frame. In addition to maintaining records for the plan updates, the ESDA Director will also serve as a resource for the participating jurisdictions to identify potential funding streams for identified projects within the plan, and referring communities to resources and assistance to moving projects from plan to completion.

Under the current Flood Map, the communities of Hamilton, Warsaw, Nauvoo, Elvaston, La Harpe, Dallas City and Pontoosuc, as well as Hancock County, participate in the National Flood Insurance Program (NFIP). Maintaining active status in NFIP will be a portion of the plan maintenance strategy. Jurisdictions adopting the plan are required to maintain active status to continue to be covered by the plan. This continued participation will be monitored by the ESDA Director.

The ESDA Director will also provide assistance and guidance to each jurisdiction in additional planning processes, ensuring that the components of newly developed plans and ordinances are consistent with the components of the Multi-Jurisdictional Hazard Mitigation Plan. This will provide a resource for jurisdictions in planning activities such as comprehensive planning, strategic planning, or other plans that may be developed by participating jurisdictions.

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APPENDIX

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APPENDIX A: JURISDICTIONAL PARTICIPATION

A.1 INITIAL LETTER OF INVITATION

September 12, 2016

Dear Mayor:

The Hancock County Emergency Management Agency and University of Illinois Extension are once again working on the Multijurisdictional Natural Hazards Mitigation Plan for the County, and are inviting you to be part of the Steering Committee. As you may remember, the plan was created in 2010, and now needs to be updated to continue eligibility for Mitigation Grant dollars from FEMA should project funding be requested.

Please find enclosed the materials from the first Steering Committee meeting on September 22 (last week). **To be included in the plan, each jurisdiction needs to attend 50% of the steering committee meetings.** The remaining schedule is below.

- Sept. 22, 2016 - 1 pm-3 pm Hancock County Extension Office, Carthage
- Oct. 27, 2016 - 6 pm – 8 pm Hancock County Extension Office, Carthage
- Nov. 10, 2016 – 12 – 2 pm Hancock County Extension Office, Carthage
- Jan. 12, 2017 – 6pm – 8pm Hancock County Extension Office, Carthage

As you may note, the meetings were scheduled to vary the times in order to accommodate as many schedules as possible. During the plan update process, two public meetings will also be held one on September 29, and one on January 26, both at the Extension Office as well. These meetings are crucial to public involvement in the process, so we will be encouraging all jurisdictions to promote the meetings.

As in the original planning process, Extension Staff will be facilitating focus groups for key stakeholder groups, focusing on specific needs of a variety of sectors, including agriculture, education, and human services. The Illinois State Water Survey will also update the County wide HAZUS data to determine potential risks from flooding, earthquake, etc.

Please contact Shelby Crow at University of Illinois Extension, 217.223.8380 to confirm your participation, or to indicate your jurisdictional designee.

Kind Regards,

Shelby Crow

A.2 SAMPLE PARTICIPATION RESOLUTION

WHEREAS, adopting a natural hazards mitigation plan would benefit the City/Village of _____ by identifying activities that could mitigate the impact of hazards events on the citizens of the City/Village and provide eligibility for the City/Village to receive federal hazard mitigation grant funding; and

WHEREAS, the City/Village of _____ has limited resources to undertake the preparation of a hazards mitigation plan; and

WHEREAS, Hancock County has received a grant from the Federal Emergency Management Agency to prepare a multi-jurisdictional hazards mitigation plan for Hancock County; and

WHEREAS, University of Illinois Extension is preparing a multi-jurisdictional hazards mitigation plan in accordance with 44 FEMA requirements at 44.C.F.R. 201.6; and

WHEREAS, University of Illinois Extension will provide opportunities for public participation and comment during the planning process and prior to adoption;

NOW THEREFORE, the _____ City Council / Village Board authorizes Hancock County on behalf of the City/Village of _____ to prepare the Hancock County Multi-jurisdictional Local Hazards Mitigation Plan which shall be reviewed and considered for adoption by the _____ City Council / Village Board upon completion. A representative from the City/Village of _____ will be appointed by the Mayor/Village President to participate in meetings, provide information needed for the plan, facilitate opportunities for public involvement, and act as a liaison between the multi-jurisdictional hazards mitigation planning steering committees and the City Council / Village Board.

ADOPTED this _____ day of _____, 2016 at the meeting of the _____ City Council / Village Board.

(Signature)

Mayor/Village President, City/Village of _____

A.3 SAMPLE PLANNING MEETING AGENDAS

Hancock County Hazard Mitigation Committee

September 22, 2016

Hancock County Extension Office

1pm

Welcome and Introductions	Jack Curfman
Jurisdictional Participation Requirements and Benefits	
Explanation of the process, scope of work and timeline	Carrie /Shelby
Match Documentation	Carrie /Shelby
Community Profiles and Historical Weather Data	Carrie /Shelby
Review of plan goals from 2010 and any potential updates	Carrie /Shelby
Public Meeting Agenda and information	Carrie /Shelby
Adjourn	

Hancock County Hazard Mitigation Committee

October 27, 2016

Hancock County Extension Office

6pm

Welcome and Introductions	Jack Curfman
Jurisdictional Responsibilities	Carrie
HAZUS	ISWS
Critical Facilities locations	
Updates since 2010	
Project Grids from 2010	Carrie /Shelby
Adjourn	

Hancock County Hazard Mitigation Committee

November 10, 2016

Hancock County Extension Office

12pm

Welcome and Introductions

Jack Curfman

Review of Process to date

Carrie

Project Grids by Jurisdiction

ISWS

Current Project Status

Updates/Additions since 2010

Next Steps

Adjourn

Hancock County Hazard Mitigation Committee

January 26, 2017

Hancock County Extension Office

6pm

Welcome and Introductions

Jack Curfman

Review of Process to date

Carrie

Draft Plan Review

Public Meeting Plan

Next Steps

Adjourn

A.4 STEERING COMMITTEE ATTENDANCE LOG

Name	Jurisdiction	Meetings Attended	Meeting #1	Public Meeting #1	Meeting #2 (Oct 27)	Focus Groups (November 10)	Meeting #3 (November 10)	Focus Groups (November 8) 1 hour	Steering Committee (make-up)	Meeting #4	Public Meeting #2
James Damron	Basco	2			X		X				
Marty Husband	Bentley	2						X		X	X
Lindsay Schlotterbeck	Bowen	2			X					X	X
Jack Curfman	Carthage	6	X	X	X	X		1		X	X
Gary Waddell	Carthage	1	X								
Jim Nightingale	Carthage	5		X	X		X		X	X	X
Kevin Six	Dallas City	4	X	X	X					X	X
Terry Pope	Ferris	3				X			X	X	X
Jean Massey	Hamilton	2							X	X	X
Max Owsley	LaHarpe	2			X					X	X
Gary Shanks	Nauvoo	1			X						
Charles Gilbert	Nauvoo	1					X				
Chris Sanson	Plymouth	3	X				X		X		
Bob Durand	Pontoosuc	3	X	X						X	X
Mike Heisler	Warsaw	3			X					X	X
Larry Wood	West Point	2			X						
Ron Clampit	West Point	1								X	X

A.5 SAMPLE STEERING COMMITTEE MINUTES

Planning Meeting #1

Hancock County Hazard Mitigation Plan Update

September 22, 2016

Hancock County Extension Office

Meeting Notes

Meeting was called to order at 1 pm by Carrie McKillip of U of I Extension. Jack Curfman introduced himself and asked those attending to introduce themselves as well. Carrie proceeded to give the attendees a history of the mitigation plan and update process.

Present: Jack Curfman, Chris Sanson, Bob Durand, Gary Waddell, Kevin Six, Shelby Crow, Carrie McKillip

Carrie informed members present of jurisdictional participation requirements and benefits. To be covered by the plan, each jurisdiction has to participate in the planning process and attend 50% or more of the planning meetings.

Carrie and Shelby explained the scope of work and reminded representatives of the meeting schedule. The schedule had been previously sent to each mayor in advance of the first meeting. The last public meeting is scheduled for 1/26/17. The last public meeting will be an opportunity for the public to comment on the final plan update.

Carrie thoroughly discussed and clarified match and match documentation needed for the 25% county match Hancock is responsible for. Shelby volunteered to keep a spreadsheet of meeting attendees and time and mileage.

Community Profiles and Historical Weather data was presented by Carrie and the data was included in all of the packets as well. Carrie wanted to ensure data presented was accurate and asked if any errors were noticed to please bring it to the attention of the group.

The group spent time reviewing plan goals from 2010 and addressing potential updates as well as brainstorming appropriate projects to include. Five goals were adopted in 2010. Every project needs to be tied to one of the five goals adopted. Some ideas considered were to continue/maintain participation agreements, to look for opportunities to construct tornado shelters, to look for opportunities in new and existing construction to include wind-resistant safe rooms and to construct tornado shelters in trailer parks.

An action item is to think about goal areas and address issues that need to be added or amended.

The first public meeting will be held on October 27. Carrie asked participants to encourage as many people as possible to attend.

Focus groups will be held in November. The group identified 3-4 groups including emergency services, education, agriculture and healthcare/non-profits.

The meeting adjourned at 2:41

Planning Meeting #2
Hancock County Hazard Mitigation Plan Update
October 27, 2016
Hancock County Extension Office
Meeting Notes

Meeting was called to order at 6 pm by Carrie McKillip of U of I Extension. Jack Curfman introduced himself and asked those attending to introduce themselves as well. Carrie proceeded to give the attendees a history of the mitigation plan and update process.

Present: Jack Curfman, Kevin Six, Mike Heisler, Maureen Crawford, Lindsay Schlotterbeck, Larry Wood, Gary Shanks, Max Owsley, James Damron, James Nightingale, Carrie McKillip, Shelby Crow

Carrie reviewed jurisdictional participation requirements and benefits. She reiterated that to be covered by the plan, each jurisdiction has to participate in the planning process and attend 50% or more of the planning meetings.

Illinois Soil and Water reviewed HAZUS, looked at Critical Facilities and Updates since 2010.

Brad and Lisa requested that each mayor review the critical facilities in their jurisdictions and bring any changes to the next meeting.

One significant change from 2010 is that replacement cost of structures has been replaced with fair market value.

The group looked over the project grids from 2010. Carrie charged attendees to look at the project grid so it can be updated at the November meeting.

The group brainstormed scenarios such as earthquake mitigation. There are two scenarios with the New Madrid fault including structural damage to bridges and overpasses in Hancock county as well as housing evacuees from other parts of impacted locations in Southern Illinois and Missouri.

Other issues mentioned included the existence heating and cooling centers and communication of existing resources to the general public in the case of extreme weather conditions. Is there a plan for an extended period of cold, heat or power outage?

The meeting adjourned at 7:30 pm. Next meeting will be November 10. There will be focus groups prior to the November meeting as well.

Planning Meeting #3

Hancock County Hazard Mitigation Plan Update

November 10, 2016

Hancock County Extension Office

Meeting Notes

Meeting was called to order at 12 pm by Carrie McKillip of U of I Extension. Jack Curfman asked those attending to introduce themselves.

Present: Jack Curfman, James Damron, James Nightingale, Chris Sanson, Charles Gilbert, Carrie McKillip, Shelby Crow

Carrie reviewed the history of the mitigation plan, update process, and stated where we were, to date, with the plan update. HAZUS data was shared with the group as a follow-up to the last meeting. A few items were noted to be added to the essential facilities list in Carthage.

Carrie went through the project grids, line by line, by jurisdiction to get feedback from the steering committee on the status of projects identified in the 2010 plan. A copy of the project grid will be emailed to the steering committee for their further review. A discussion was held regarding the formatting of the project Grid, and it was determined that a functional sort of the projects rather than jurisdiction. This sort was determined since so many of the projects overlap jurisdictions.

The meeting adjourned at 1:30 pm. Two additional focus group sessions will be held on December 8.

Planning Meeting #4
Hancock County Hazard Mitigation Plan Update
January 26, 2017
Hancock County Extension Office
Meeting Notes

Meeting was called to order at 5:30 pm by Carrie McKillip of U of I Extension. Jack Curfman asked those attending to introduce themselves.

Attendees: Shelby Crow, Carrie McKillip, Max Owsley, Ron Clampit, Bob Durand, Kevin Six, Mike Heisler, Jack Curfman, Terry Pope, Jean Massey, Lindsay Schlotterbeck, Donald Husband, Jim Nightingale and Maureen Crawford.

Carrie reviewed the process with attendees and presented a draft plan for review. Steering committee members reviewed all parts of the plan and commented on needed changes. Carrie urged them to look at the plan after the meeting as well and email changes to Jack or Shelby.

Jack reminded jurisdiction representatives to send in hours worked on the plan in their local communities for the grant match.

Mayor's Meeting

Hancock County Hazard Mitigation Plan Update- Make Up Meeting

December 8, 2016

Plymouth Town Hall

Meeting Notes

Meeting was called to order at 6 pm by Shelby Crow of U of I Extension. Jack Curfman asked those attending to introduce themselves.

Attendees: Shelby Crow, Jack Curfman, Marty Husband, Jim Nightingale, Terry Pope, Jean Massey, Chris Sanson

Shelby updated those in attendance of progress of the hazard mitigation plan since the last meeting in Carthage. Two new jurisdictions attended who had been previously unable to participate. Both provided additional content and edits to the plan.

Those in attendance discussed potential uses of the plan and potential jurisdictional projects once the plan is accepted and adopted. Shelby passed around the county employer list and asked the group to ensure it was as up-to-date as possible.

The meeting adjourned at 7:30 pm. Next meeting for the Hazard Mitigation project will be held in January, 2017.

A.6 SAMPLE ADOPTION RESOLUTION

RESOLUTION _____

WHEREAS, the Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan has been prepared by the University of Illinois Extension working with the Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan Steering Committee; and,

WHEREAS, the Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and,

WHEREAS, the Village / City of _____ is a local unit of government that has afforded the citizens an opportunity to comment and provide input to the Plan and the actions in the Plan; and,

WHEREAS, the _____ Village Board / City Council has reviewed the Plan and affirms to participate in the Workgroup that will review the Plan every year and update it no less than every five years;

NOW THEREFORE, BE IT RESOLVED by the _____ Village Board / City Council that the Village / City of _____ adopts the Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan as this jurisdiction's Multi-hazard Mitigation Plan, and resolves to execute the actions in the Plan.

ADOPTED this _____ day of _____, 2017 at the meeting of the _____ Village Board / City Council.

_____, President

APPENDIX B: MEDIA

B.1 PRESS COVERAGE

Local Radio:

WCAZ Radio – Shelby Crow Guest Spots

8/17/16 – Interview – Public Meeting September

12/21/16 – Interview – Planning Process

1/4/17 - Interview – Public Meeting January

Sample Press Release:

For Immediate Release

August 16, 2016

Contact: Shelby Crow, U of I Extension
217.223.8380
sschoon@illinois.edu

Hancock County Mitigation Plan Update to begin in September

Carthage, IL. Hancock County will begin the process to update the Multi-Jurisdictional Hazard Mitigation Plan the has covered the county since 2010. According to the county Emergency Management Director, Jack Curfman, the county has once again contracted with University of Illinois Extension to facilitate the plan. “With funding from a FEMA Grant, we have been able to once again leverage funds to keep the planning process local, by partnering with University of Illinois Extension.”

Each Jurisdiction in Hancock County is invited to participate, and participation is required in order to be covered under the mitigation plan. According to Extension Community Development Educator Shelby Crow, “We have scheduled the four main planning meetings at a variety of times, to try to accommodate different schedules. Our first meeting is scheduled for September 22, and we hope to have participation from every community within the county, as well as county officials.” In addition to Crow, Extension Educator Carrie McKillip, based out of the Galesburg Extension Office will assist in updating the plan.



**PLANNING FOR THE FUTURE IN
THE EVENT OF A DISASTER**

**WE NEED YOUR INPUT AND IDEAS TO
UPDATE THE MULTI-JURISDICTIONAL
HAZARD MITIGATION PLAN**

September 29, 2016

6 pm

Hancock County University of Illinois

Extension Office

550 North Madison

For more information call U of I Extension Office at 309.734.5161

B.2 NEWSPAPER ARTICLES

APPENDIX C: PUBLIC PARTICIPATION

C.1 PUBLIC MEETING MINUTES

Public Meeting Minutes

Public Meeting 1

Hancock County Hazard Mitigation Plan Update

September 29, 2016

Hancock County Extension Office

Meeting Notes

Meeting was called to order at 6 pm by Carrie McKillip of U of I Extension. Jack Curfman introduced himself and asked those attending to introduce themselves as well.

Attendees: James Nightingale, Mike Heisler, Kevin Six, Bob Durand, Maureen Crawford, Jack Curfman, Shelby Crow and Carrie McKillip.

Carrie McKillip explained why Hancock County was going through the planning process. She went on to explain what the plan was and what to expect from the planning process.

Carrie explained data that was included in participant packets, including community profile information and historical weather data provided by Zach Kennedy of U of I Extension.

The group brainstormed mitigation ideas. Carrie answered questions regarding mitigation projects and what could and could not be included in the plan.

The meeting adjourned at 7:45 pm.

Notes submitted by Shelby Crow

Public Meeting 2

Hancock County Hazard Mitigation Plan Update – Public Meeting #2

January 26, 2017

Hancock County Extension Office

Meeting Notes

Meeting was called to order at 6 pm by Carrie McKillip of U of I Extension. Jack Curfman introduced himself and asked those attending to introduce themselves as well.

Attendees: Shelby Crow, Carrie McKillip, Max Owsley, Ron Clampit, Bob Durand, Kevin Six, Mike Heisler, Jack Curfman, Terry Pope, Jean Massey, Lindsay Schlotterbeck, Donald Husband, Jim Nightingale and Maureen Crawford.

Curfman provided a progress report on the plan update as well as a detailed explanation of who the plan covers and why it is required.

Shelby and Carrie explained the next steps. After the public meeting all suggested changes will be made to the plan and edited by the team a final time. At that point, Carrie will submit the plan to IEMA. Once the plan has been accepted and approved from FEMA, local jurisdictions will adopt the plan. Final, bound copies will be provided to each jurisdiction.

The meeting adjourned at 7:30 pm.

Notes submitted by Shelby Crow

C.2 HANCOCK LOCAL HAZARD MITIGATION PLANNING PARTICIPATION SUMMARY

PARTICIPATOIN EVENTS	# ATTENDING
Steering Committees Held	5
Public Meetings Held	2
Public Meeting Attendance	22
Focus Groups Held	4
Focus Group Invitees	80
Focus Group Attendance	17

C.3 FOCUS GROUPS: SAMPLE INVITATION LETTER

The Hancock County Emergency Management Agency and University of Illinois Extension are working on the Multijurisdictional Natural Hazards Mitigation Plan for the County. We are targeting industries crucial to Hancock County and are holding several focus group discussions.

We are inviting you to be part of the Education Focus Group at 1 PM on December 8 at the Hancock County

Extension Office in Carthage. Please confirm your attendance by emailing Shelby Crow (sschoon@illinois.edu).

The original plan was created in 2010, and now needs to be updated to continue eligibility for Mitigation Grant dollars from FEMA should project funding be requested.

The initial steering committee meeting was held September 22. The steering committee meeting schedule is below.

- Sept. 22, 2016 - 1 pm-3 pm Hancock County Extension Office, Carthage
- Oct. 27, 2016 - 6 pm – 8 pm Hancock County Extension Office, Carthage
- Nov. 10, 2016 – 12 – 2 pm Hancock County Extension Office, Carthage
- Jan. 12, 2017 – 6pm – 8pm Hancock County Extension Office, Carthage

As in the original planning process, Extension Staff will be facilitating focus groups for key stakeholder groups, focusing on specific needs of a variety of sectors, including agriculture, education, and human services and emergency response. The Illinois State Water Survey will also update the County wide HAZUS data to determine potential risks from flooding, earthquake, etc.

Please contact Shelby Crow at University of Illinois Extension, 217.223.8380 or via email for additional questions.

C.4 ISSUE GROUPS: SAMPLE AGENDA

Hancock County Local Hazard Mitigation Plan Health & Human Services Issue Group Thursday, December 8, 2016

1. What is the impact of the following hazards on this issue area?
 - a. Flooding
 - b. Severe storms
 - c. Tornado
 - d. Winter storm (snow, ice, etc.)
 - e. Drought
 - f. Extreme heat
 - g. Earthquake

2. What can be done to reduce (mitigate) the impact of those natural hazards on this issue area?
For example, a siren in a community would help reduce the impact of a tornado on people and property. Think both specifically and generally and anything goes.
 - a. Flooding
 - b. Severe storms
 - c. Tornado
 - d. Winter storm (snow, ice, etc.)
 - e. Drought
 - f. Extreme heat
 - g. Earthquake

3. What other groups of people should we be speaking with?

C.5 ISSUE GROUPS: PROJECT GRID

(designed to both collect information and prompt discussion)

HEALTH & HUMAN SERVICES ISSUE GROUP

Name: _____

Date: _____

Natural Hazard	Effects on people/property	Possible mitigation strategies
Severe storms (thunder, wind, hail)		
Flooding		
Drought		
Extreme temperatures		
Earthquake		
Tornado		
Winter storm (snow, ice)		
Flash flooding		

Additional comments:

C.6 ORGANIZATIONS AND INDIVIDUALS INVITED TO ISSUE-BASED FOCUS GROUPS

Agriculture & Natural Resources

- Animal Control, Mike Wright
- Beef Producers, Chuck Lucie
- County Veterinarian, Dr. Steve Renard
- Farm Bureau, Carla Mudd
- Humane Society, Anissa Sadeghi
- Hunt Drainage District, Sam Zumwalt
- Hunt Drainage District, John Hofmeister
- IEPA, Todd Huston
- Kibbe Biological Station, Jim Lamer
- Pork Producers, Joe Scheetz
- Prairie Hills RC&D, Dave King
- Soil & Water Conservation District, Betty Buckert
- FSA, Dick Burling
- NRCS, Lori Bollin

Education, Health & Culture

- Augusta Eagle, Editor
- Carl Sandburg Community College, Deborah Miller
- Carthage Elementary School, Superintendent
- LaHarpe Elementary School, Superintendent
- Dallas City Elementary School, Superintendent
- Carthage Public Library, Amy Gee
- Nauvoo-Warsaw Jr. High, Principal
- Warsaw-Nauvoo High School, Principal
- Nauvoo Elementary, Principal
- Warsaw Elementary, Principal
- Greater West Central Library District, Librarian
- Hamilton CUSD, Dr. James Jackson, Superintendent
- Hamilton Public Library, Nancy Denton
- Hancock County Historical Society, President
- Hancock County Journal Pilot, Joy Swearingen
- Hancock County Quill, Dessa Rodeffer
- Illini West HS District, Superintendent
- Joseph Smith Historic Site, Lachlan Mackay
- Kibbe Museum, President
- LaHarpe Carnegie Public Library, Monica Carpenter
- Nauvoo Library, Gaby Berry
- Nauvoo New Independent, Jane Langford
- Nauvoo Restoration, Inc, / Carthage Jail, Lee Noe
- Nauvoo State Park, Reagan Ramsey
- Nauvoo School, Principal
- Regional Office of Education, John Meixner
- Southeastern CUSD, Todd Fox, Superintendent
- Warsaw Public Library, Librarian

Health & Human Services

- Arnell Drug, Steve Arnell
- Hamilton-Warsaw Clinic, Manager
- Blessing Hospice, LeAnn Meeks
- Hancock County Health Dept, Teresa Beeler
- County Nursing Home, Judy Klein
- Davier Nursing Home, Lisa Trego
- Denman's, Manager
- Family Rural Health Clinic, Monica Crim
- Hancock County Sheltered Care, Vicky Carriger
- Keokuk Area Medical Equipment, Manager
- McHugh Drug, Bob McHugh
- Memorial Hospital, Kurt Krekel
- Mental Health Centers of Western Illinois, Roxie Oliver
- Montebello Manor, Rebecca Bliss
- MORE Medical Supply, Ryan Jacquot
- Nauvoo Pharmacy, Luann Haas
- Wear Drug, Craig Wear
- Western Illinois Regional Council, Kevin Wiehardt

Public Safety

- 911, Maria Hopp
- Air Evac, John Landis
- Augusta Fire Dept, Frank Advise
- Augusta Fire Protection Dist, Frank Advise
- Bowen Fire Protection Dist, Dave Campbell
- Carthage Fire Dept, Scott Carle
- Carthage Police, Gary Waddell

- County Ambulance Service / EMS, Perry Cameron
- County Sheriff, John Jefferson
- Dallas City Fire Dept, Carl Thompson
- Dallas City Police, Dennis Hillyer
- Fire Marshal, James Tunney
- Hamilton Fire Dept, Steve Helenthal
- Hamilton Police, Walter Sellens
- LaHarpe Ambulance, Eric Palmer
- LaHarpe Fire Dept, Jerry Brown
- LaHarpe Police, Justin Livingston
- National Weather Service, Donna Dubberke
- Nauvoo Ambulance, Dan Gallaher
- Nauvoo Fire Dept, Dan Gallaher
- Nauvoo Police, Don Faulkner
- Red Cross, Betty Redineus
- State Police, Mike Inman
- State Police, Capt. Bob Elliott
- Tri-County Fire Protection District, Mark Kelly
- Warsaw Fire Dept, Steve Siegrist
- Warsaw Police, Brandon Norris
- West Point Fire Protection District, Jim Hubbard

C.7 ISSUE GROUPS: SUMMARY

Agriculture Focus Group Notes
 Hancock County Hazard Mitigation Plan Update
 November 10, 2016
 Hancock County Extension Office
 Meeting Notes

Meeting was called to order at 10 am by Carrie McKillip of U of I Extension. Jack Curfman introduced himself and asked those attending to introduce themselves as well.

Carrie explained the history of the Hazard Mitigation plan as well as the current plan update process. Carrie posed several questions to the group to gather input on project ideas for hazard mitigation in Hancock county.

Project ideas that were identified include:

- Inventory animal confinement structures in the county and notify emergency responders of those structures
- Map farms in the county with locations of hazardous materials, breaker boxes, fuel tanks, etc.
- Coordinate an ag response team with an ability to act quickly and work with large animal vets on procedures
- Enhanced 911 and rural response training for 911 responders

Other issues identified were communication issues in times of emergency. Drafting a document of procedures would help alleviate some issues. It was also noted to work with the County Sheriff's office to alert media of issues of water/sewer issues.

Natural Hazard	Effects on People/Property	Mitigation Strategies
Severe Storms		Communication Strategies Crop Insurance and Educating farmers on various riders of CI. Generators for animal confinements.
Drought	Water/Well issues Livestock	List of water source locations and water hauler services. Generators for well water (WITH PROPER CONNECTIONS)
Extreme Heat	Could lead to water shortage	DOA permitting requires cooling systems for animal confinements.
Earthquake	Bridge/Overpass shutdown Rural water issues	Educating the public on what to look for, structurally, in the case of an earthquake.
Winter Storms		Ensuring efficient clearing of roads.

Emergency Response Focus Group
Hancock County Hazard Mitigation Plan Update
November 10, 2016
Hancock County Extension Office
Meeting Notes

Meeting was called to order at 9 am by Carrie McKillip of U of I Extension.

Carrie explained the history of the Hazard Mitigation plan as well as the current plan update process. Carrie posed several questions to the group to gather input on project ideas for hazard mitigation in Hancock county.

Issues that were identified included snow removal on country road. It was noted that the state does a great job with highway snow removal, but at times, county roads are impassable during heavy snowfall.

One issue identified was the scenario of gas stations being unable to provide fuel to snow removal vehicles and emergency service vehicles during a power outage. A project idea was identified to ensure at least one gas station in each town had a generator to keep critical vehicles on the road.

Augusta has done a good job of identifying elderly and individuals with medical needs to be able to check in with them during extreme weather situations. It was noted that there may be an informal system in place through churches or neighborhoods but no other jurisdiction has a resource book in place.

Natural Hazard	Effects on People/Property	Mitigation Strategies
Severe Storms		Designated tornado shelters with a communicated process Work with media to alert public of shelter locations.
Floods		Buyouts Elevations Signage for all roads subject to high water in heavy rains.
Extreme Heat/Cold		Heating and Cooling Centers available and identified. Education to public about center locations. Increase stock of water/Gatorade during extreme heat.
Earthquake	Bridges/Overpasses shut down – the state has committed to building a temporary road to Memorial Hospital in the event of an overpass shutdown.	Earthquake insurance for homeowners. Provide info to the public about earthquake insurance.

Tornados		Shelters in each town with signage and procedures in place.
Ice Storms		Adequate amount of generators in place to ensure continuity of critical services.

Social Service Focus Group
Hancock County Hazard Mitigation Plan Update
December 8, 2016
Hancock County Extension Office
Meeting Notes

Meeting was called to order at 10 am by Carrie McKillip of U of I Extension.

Carrie explained the history of the Hazard Mitigation plan as well as the current plan update process. Carrie posed several questions to the group to gather input on project ideas for hazard mitigation in Hancock County. There was a great deal of discussion on HIPPA Requirements, identifying Vulnerable populations, etc.

Natural Hazard	Effects on People/Property	Mitigation Strategies
Severe Storms	Medical needs with no power	Designated tornado shelters with a communicated process Work with media to alert public of shelter locations. Call System. Check on Your Neighbors.
Floods		Buyouts Elevations Signage for all roads subject to high water in heavy rains.
Extreme Heat/Cold	Vulnerable Populations may be affected	Heating and Cooling Centers available and identified. Education to public about center locations. Increase stock of water/Gatorade during extreme heat. Implement Call system for Vulnerable.
Earthquake	Bridges/Overpasses shut down – the state has committed to building a temporary road to Memorial Hospital in the event of an overpass shutdown.	Earthquake insurance for homeowners. Provide info to the public about earthquake insurance.
Tornados	Power Outages	Shelters in each town with signage and procedures in place.
Ice Storms	Power Outages	Adequate amount of generators in place to ensure continuity of critical services.

A great deal of discussion surrounded developing a check system for vulnerable populations. Jack Curfman will work on issue to be able to develop a release for social service to use upon intake, that would allow sharing information in a disaster situation.

Education Focus Group
Hancock County Hazard Mitigation Plan Update
December 8, 2016
Hancock County Extension Office
Meeting Notes

Meeting was called to order at 10 am by Carrie McKillip of U of I Extension.

Carrie explained the history of the Hazard Mitigation plan as well as the current plan update process. Carrie posed several questions to the group to gather input on project ideas for hazard mitigation in Hancock County. A focus of the conversation included tornado hazards, as well as active shooter scenarios.

Carl Sandburg College at Carthage also discussed the need for accurate head count information, since student come and go throughout the day and evenings. Several Options were discussed, but no definitive answer was determined. Sandburg will develop their own plan and communicate with the Hancock County Emergency Management.

Natural Hazard	Effects on People/Property	Mitigation Strategies
Severe Storms	Travel danger and facility damage.	Designated tornado shelters with a communicated process Notify all students and staff to move to severe storm/tornado locations. Call System if classes are canceled.
Floods	na	
Extreme Heat/Cold	Student comfort	NA for air conditioned facilities. Early dismissal if no air conditioning, or if temp makes it hazardous for bus stops
Earthquake	na	
Tornados	Power Outages	Cancel Classes
Ice Storms	Power Outages	Cancel Classes

Hancock County Local Hazard Mitigation Planning

IDEAS FOR HAZARD MITIGATION

Will this idea affect a specific community? Yes No

If yes, which one(s)? _____

What hazard will the idea mitigate?

Flood Flash Flood Severe Storms Winter Storms

Earthquake Tornado Extreme Temperatures

Please describe your idea for mitigation:

(Optional) If the Steering Committee has questions about your idea, how can they contact you?

Name _____ Phone _____

E-mail _____

If you would prefer to take this home to think it over and mail later, please send it to: *Shelby Crow, U of I Extension-Hancock, 550 N. Madison, Carthage, IL 62321.*

APPENDIX D: MATCH LOG

Name	Jurisdiction	Total Mileage	Fed Mileage Reimbursement Rate	Mileage	Meetings Attended										Total Hours per person	Match Amount		
					Meeting #1 (1.5 hours)	Meeting #2 (Oct 27) (1.5 hours)	Meeting #3 (November 10) (1.5 hours)	Steering Committee (make-up Meeting) (1.5 hours)	Public Meeting #2	Public Meeting #1 (1.5 hours)	Meeting #4 (November 8)	1 hour Focus Groups (November 8)	1.5 hour Focus Groups (November 9)	1.5 hour Focus Groups (November 10)				
James Damron	Basco	34	\$0.54	\$18.36	2		1.5									5	\$ 225.15	
Marty Husband	Bentley	30	\$0.54	\$16.20	2							1.5	1			1	5.5	\$ 247.67
Lindsay Schlotterbo	Bowen	66	\$0.54	\$35.64	2		1.5									1	5.5	\$ 247.67
Jack Curfman	Carthage	157	\$0.54	\$84.78	6	1.5	1.75	1								1	55.25	\$ 965.30
Gary Waddell	Carthage		\$0.54	\$0.00	1	1.5											2.5	\$ 112.58
Jim Nightingale	Carthage		\$0.54	\$0.00	5	1.5	1.75					1.5	1			1	12.75	\$ 574.13
Kevin Six	Dallas City	128	\$0.54	\$69.12	4	1.5	1.75									1	10.75	\$ 484.07
Terry Pope	Ferris	36	\$0.54	\$19.44	3			1									7.5	\$ 337.73
Jean Massey	Hamilton	44	\$0.54	\$23.76	2							1.5	1			1	5.5	\$ 247.67
Max Owsley	LaHarpe	46	\$0.54	\$24.84	2											1	5.5	\$ 247.67
Gary Shanks	Nauvoo	46	\$0.54	\$24.84	1												2.5	\$ 112.58
Charles Gilbert	Nauvoo	46	\$0.54	\$24.84	1				1.5								2.5	\$ 112.58
Chris Sanson	Plymouth	132	\$0.54	\$71.28	3	1.5						1.5					7.5	\$ 337.73
Bob Durand	Pontoosoc	108	\$0.54	\$58.32	3	1.5	1.75									1	8.25	\$ 371.50
Mike Heisler	Warsaw	102	\$0.54	\$55.08	3											1	8.5	\$ 382.76
Larry Wood	West Point	64	\$0.54	\$34.56	2											2	5.5	\$ 247.67
Ron Clampit	West Point	32	\$0.54	\$17.28	1											1	3	\$ 135.09
Shelby Crow			\$0.54	\$0.00												1	4.5	
Carrie McKillip			\$0.54	\$0.00												1	4.5	
Maureen Crawford	Carthage		\$0.54	\$0.00					1.5	1						1	4.5	\$ 202.64
Bryan Stevens			\$0.54	\$0.00													1	\$ 45.03
Kristin Huls	Carthage		\$0.54	\$0.00													1	\$ 45.03
Amber Wactyoth	Carthage		\$0.54	\$0.00													1	\$ 45.03
Rob Blondolino	Carthage		\$0.54	\$0.00													1	\$ 45.03
Kate Rhoads	Quincy	84	\$0.54	\$45.36													1	\$ 45.03
Tyler Wilson	Carthage		\$0.54	\$0.00													1	\$ 45.03
Kurk Kregel	Carthage		\$0.54	\$0.00													1	\$ 45.03
Amy McAllister	Carthage		\$0.54	\$0.00												1	1	\$ 45.03
Debra Miller	Carthage		\$0.54	\$0.00												1	1	\$ 45.03
Totals				\$623.70														\$5,997.40
Total Match																		

*Illinois Bureau of Labor Statistics May 2015 State Occupational Employment and Wage Estimates
https://www.bls.gov/oes/current/oes_il.htm#11-0000
 11-1021 General and Operations Manager Median Hourly Wage

APPENDIX E: SAMPLE MUTUAL AID AGREEMENT

Mutual Aid Agreement – Adams County

THIS AGREEMENT is entered into and among the various governmental and non governmental entities whose officials have subscribed hereto on the _____ day of _____, 2010.

In consideration of the mutual commitments given herein, each of the Signatories to this Mutual Aid Agreement agree to render aid during a disaster to any of the other Signatories as follows:

1. The below signed parties will, upon request and whenever possible, furnish assistance with equipment, supplies, and/or personnel within the territorial limits of the other entities who are party to this agreement.
2. It is understood by the parties hereto that the primary responsibility of each is to protect its own territory and that each party hereto may maintain standby equipment within its own territory and, in the event of a call within its own territory, refuse to respond to a request for aid from the other parties.
3. Equipment and personnel at the site of an emergency/disaster shall be under the sole control and direction of the officer in command of the responding party furnishing such equipment and personnel, and such officer shall have the absolute right to remove such equipment and personnel at such time as he/she shall decides to do so. However, the chain of command of the requesting party shall be in overall command of all parties' personnel and equipment responding to such emergency/disaster, and shall direct the activities of all parties and equipment for the incident.
4. Each party hereto waives any and all claims against the other parties for loss, damage, personal injury, or death that may arise in consequences of the performance of the terms of this agreement, and no party or person shall under any circumstance, be held liable for any loss or damage by reason of any failure to effectively perform at any emergency/disaster in the territory of another party.
5. The rendering of assistance under the terms of this Agreement shall not be mandatory if local conditions of the responding units prohibit response. It is the responsibility of the responding units to immediately notify the requesting party of the inability to respond; however, failure to immediately notify the requesting party of such inability to respond shall not constitute evidence of noncompliance with the terms of this section and no liability may be assigned. No liability of any kind or nature shall be attributed to or be assumed, whether expressly or implied, by a party hereto, its duly authorized agent and personnel, for failure or refusal to render aid. Nor shall there be any liability of a party for withdrawal of aid once provided pursuant to the terms of this Agreement.
6. It is hereby understood that the responding party will be treated as contract labor / equipment and will be reimbursed (e.g. regular and overtime labor, equipment, materials and other related expenses as applicable, including loss or damage to equipment) at the adopted usual and customary rates.
7. This Agreement shall become effective when all parties have executed the agreement by signatures, and shall remain in full force and effect thereafter for the period of 10 years. Either party hereto may withdraw from this agreement by giving written notice to the other parties of its withdrawal upon a date not less than thirty (30) days prior to the date of withdrawal.

FOR ROAD DISTRICTS

Road Commissioner
Beverly Township Road District

Road Commissioner
Camp Point Township Road District

Road Commissioner
Columbus Township Road District

Road Commissioner
Ellington Township Road District

Road Commissioner
Gilmer Township Road District

Road Commissioner
Houston Township Road District

Road Commissioner
Liberty Township Road District

Road Commissioner
McKee Township Road District

Road Commissioner
Mendon Township Road District

Road Commissioner
Payson Township Road District

Road Commissioner
Riverside Township Road District

Road Commissioner
Burton Township Road District

Road Commissioner
Clayton Township Road District

Road Commissioner
Concord Township Road District

Road Commissioner
Fall Creek Township Road District

Road Commissioner
Honey Creek Township Road District

Road Commissioner
Keene Township Road District

Road Commissioner
Lima Township Road District

Road Commissioner
Melrose Township Road District

Road Commissioner
Northeast Township Road District

Road Commissioner
Richfield Township Road District

Road Commissioner
Ursa Township Road District

FOR ADAMS COUNTY

Chairman
Adams County Board

County Engineer
Adams County

Director
Adams County Emergency Services

Sheriff
Adams County

Public Health Administrator
Adams County Health Department

Ambulance Director
Adams County Ambulance

FOR DRAINAGE/LEVEE DISTRICTS

Lima Lake Drainage District

Indian Grave Drainage District

South Quincy Drainage District

Sny Island Drainage District

FOR VILLAGES:

Village Camp Point

Village of Clayton

Village of Coatsburg

Village of Columbus

Village of Golden

Village of LaPrairie

Village of Liberty

Village of Lima

Village of Loraine

Village of Mendon

Village of Payson

Village of Plainville

Village of Ursa

FOR SCHOOL DISTRICTS

Camp Point Unit School District #3

Mendon Community School District #4

Griggsville / Perry School District #4

Barry Unit School District #1

Southeastern School District #1

Payson Community School District # 1

Liberty School District # 2

Quincy School District #172

John Wood Community College

FOR PARK DISTRICTS

Bailey Park District

Beverly Township Park District

Liberty Township Park District

Quincy Park District

FOR CITY OF QUINCY

Mayor
City of Quincy

Police Chief
City of Quincy

Fire Chief
City of Quincy

Gary Sparks
Director, Administrative Services

FOR OTHER NON GOVERNMENTAL ENTITIES

Adams County Chapter
American Red Cross

Salvation Army

Blessing Hospital

Quincy Medical Group

Quincy University

Facilities of Local Importance

Places of Large Assembly

<u>Community</u>	<u>Name of Facility</u>
Augusta	Augusta Senior Citizens Club
Augusta	Hancock County Fair Grounds
Basco	Community Center
Carthage	Legacy Center
Hamilton	Hamilton Community Center
Hamilton	Wildcat Springs Campground
La Harpe	La Harpe Community Club House
Nauvoo	Nauvoo Illinois Temple
Plymouth	Plymouth Community Center
Warsaw	Bolt Community Center

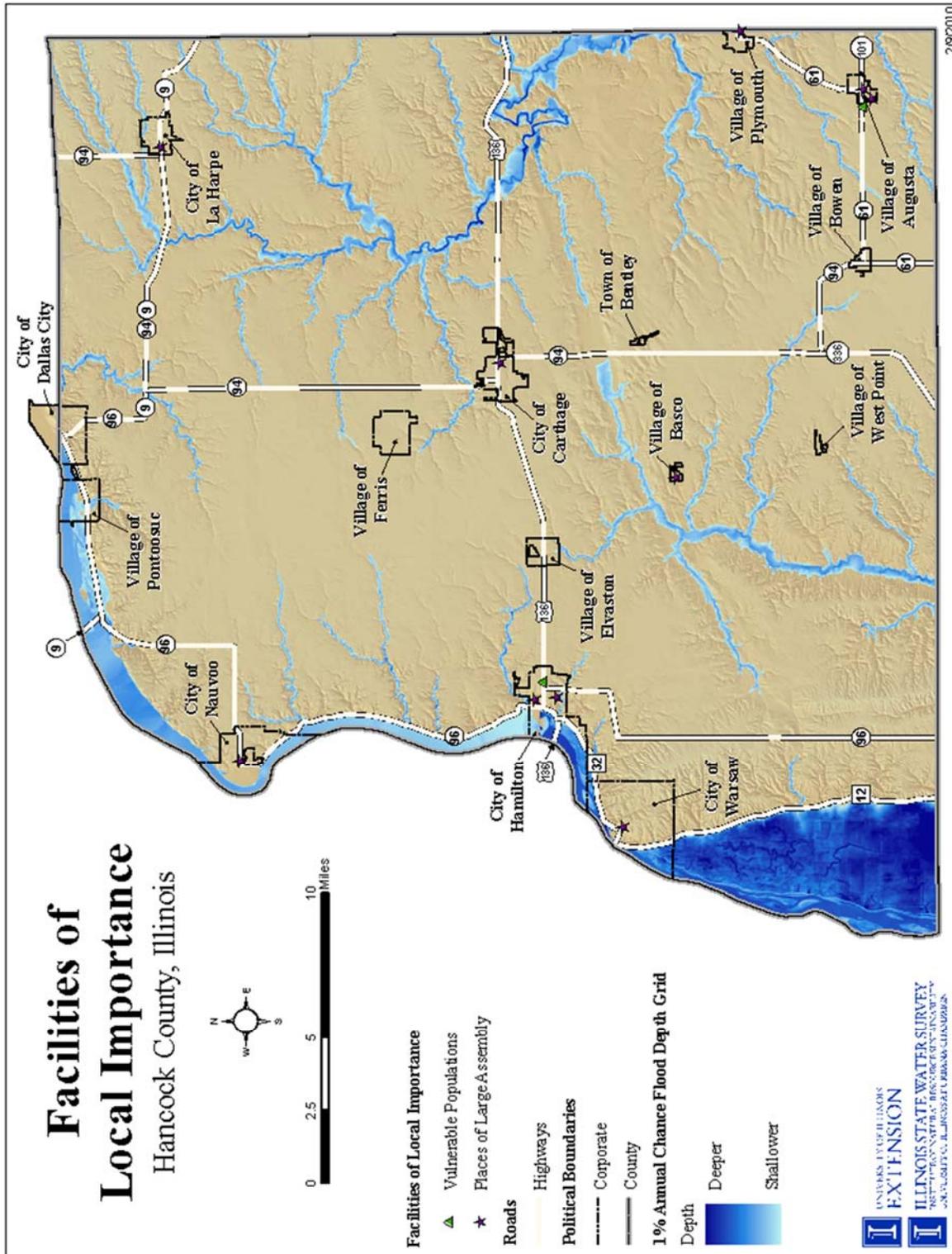
Vulnerable Populations

<u>Community</u>	<u>Name of Facility</u>
Hamilton	Montebello Healthcare Center

Other Community Identified Structures

<u>Community</u>	<u>Name of Facility</u>
Augusta	Augusta Farmers Co-op
Bowen	Chem Gro Inc
Bowen	Ursa Farmers Co-op
Carthage	Mental Health Centers of Western IL
Carthage	West Central FS, Inc.
Hamilton	Monterosa Mobile Home Park
Hamilton	Rivercross Mobile Home Park
Nauvoo	Colusa Grain Elevator
Nauvoo	Joseph Smith Historical Site
Nauvoo	LDS Visitors Center
Nauvoo	Nauvoo State Park Ranger Station
Nauvoo	Temple Visitors Center
West Point	FS Fertilizer

F.3 FACILITIES OF LOCAL IMPORTANCE MAP



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APPENDIX G: MAPS OF PARTICIPATING JURISDICTIONS

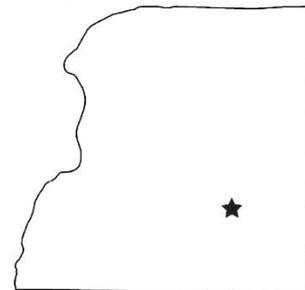
Bentley, Hancock County



Legend

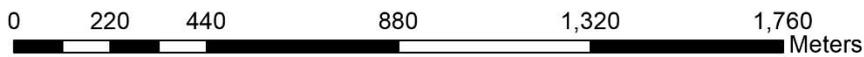
-  Municipal Boundary
-  Streams and Rivers

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Data from:
 U.S. Census Bureau TIGER/Line
 USGS National Hydrography Dataset

Map produced by:
 University of Illinois Extension
 Community and Economic Development

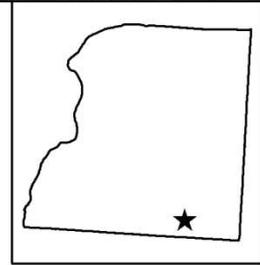


Bowen, Hancock County

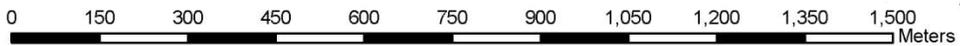


- Legend**
- County Boundary Line
 - Places-Municipalities
 - School
 - Airport or Airfield
 - Golf Course
 - Government Center
 - Hospital/Hospice/Urgent Care Facility
 - Primary Road
 - Ramp
 - Secondary Road
 - Local Neighborhood Road, Rural Road, City Street
 - Alley/Private Drive/Service Drive
 - Vehicular Trail (4WD)
 - Airport or Airfield
 - Railroad Feature (Main, Spur, or Yard)
 - Ferry Crossing
 - Powerline
 - Perennial Shoreline
 - Intermittent Shoreline
 - Stream/River
 - Canal, Ditch or Aqueduct
 - Lakes/Rivers

1:11,073



All data from 2008 US Census TIGER/Line
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 2003 DEM elevation data from USGS
 Datum and Projection:
 WGS84 UTM Zone 18N
 Map produced by
 University of Illinois U.C. Extension C-205
 January 2009

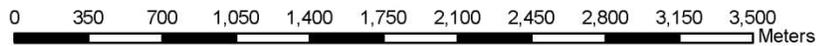
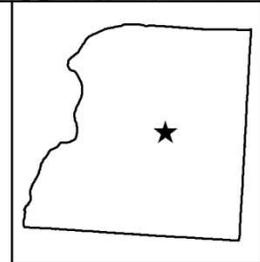


Carthage, Hancock County



- Legend**
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 - Stream/River
 - Canal, Ditch or Aqueduct
 - Lakes/Rivers

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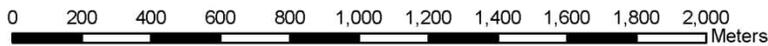
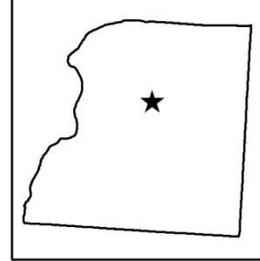
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 Map produced by
 University of Illinois U.C. Extension C-205
 January 2009

Ferris, Hancock County



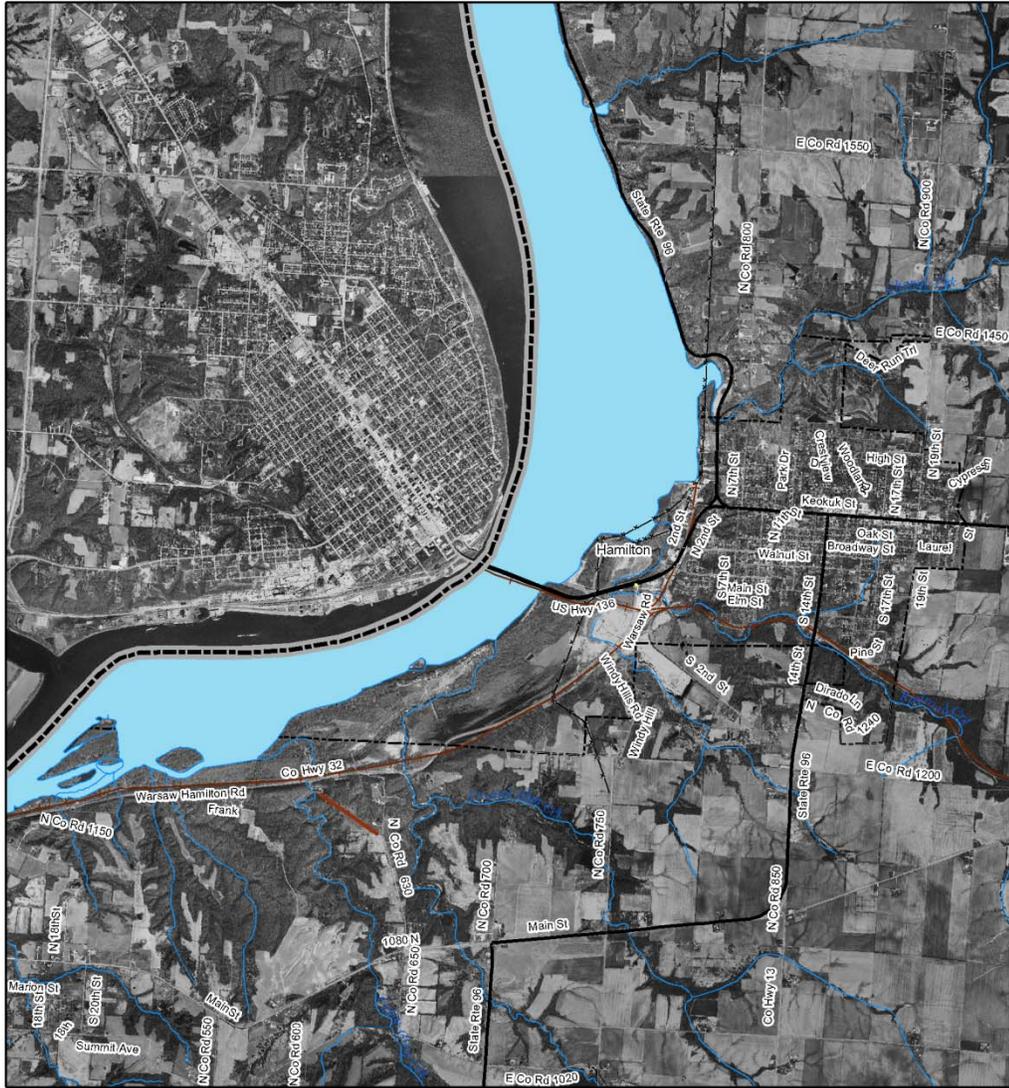
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1:18,767



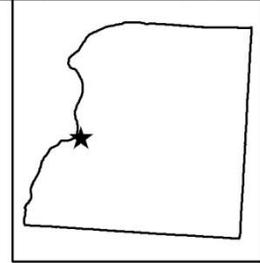
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 January 2009

Hamilton, Hancock County

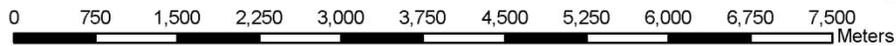


- Legend**
- County Boundary Line
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 - Intermittent Shoreline
 - Stream/River
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 - Lakes/Rivers

1:59,728



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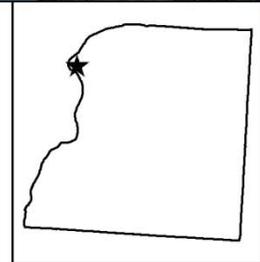


Nauvoo, Hancock County

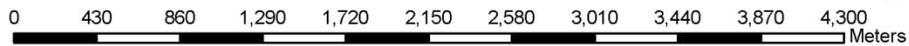


- Legend**
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 - Stream/River
 - Canal, Ditch or Aqueduct
 - Lakes/Rivers

1:33,759



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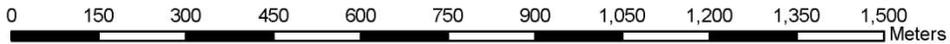
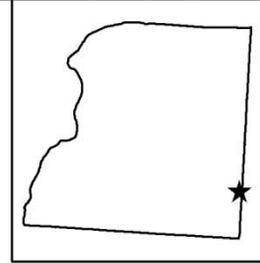


Plymouth, Hancock County



- Legend**
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 - School
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 - Golf Course
 - Government Center
 - Hospital/Hospice/Urgent Care Facility
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 - Stream/River
 - Canal, Ditch or Aqueduct
 - Lakes/Rivers

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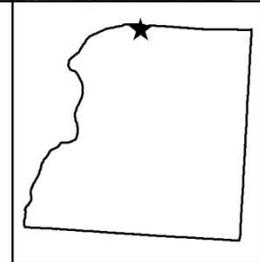
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 January 2009

Pontoosuc, Hancock County

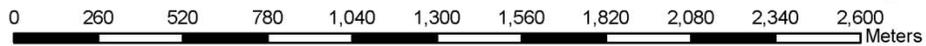


- Legend**
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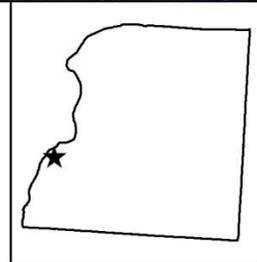


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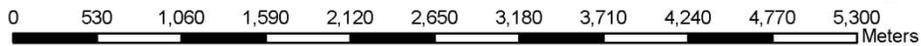


- Legend**
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 - Canal, Ditch or Aqueduct
 - Lakes/Rivers

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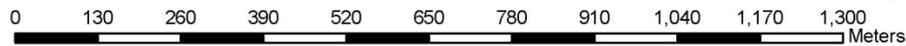
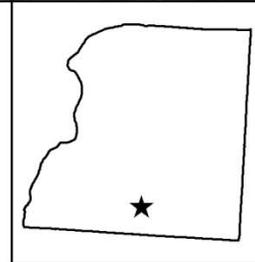


West Point, Hancock County



- Legend**
- County Boundary Line
 - Places-Municipalities
 - School
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1:10,234



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 Datum and Projection
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 Map produced by
 University of Illinois U-C Extension C-DCS
 January 2009