



Jersey County Natural Hazards Mitigation Plan

December 2015



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2015 Jersey County Hazard Mitigation Plan

TABLE OF CONTENTS

Page Number:

Plan Overview	PO-1
CHAPTER 1	1-1
1.1. Introduction.....	1-1
1.2 Jersey County Profile	1-2
1.3 Planning Process.....	1-8
1.4 References.....	1-18
CHAPTER 2 – Risk Assessment	2-1
2.1. Overbank Flooding.....	2-1
2.2. Flood Profile.....	2-6
2.3. Severe Thunderstorms	2-31
2.4. Severe Winter Storms.....	2-36
2.5. Tornadoes	2-40
2.6. Earthquakes	2-44
2.7. Drought.....	2-47
2.8. Extreme Heat.....	2-49
2.9. Wildfires, Landslides, and Erosions.....	2-50
2.10. Summary of Hazards.....	2-57
2.11 Impact.....	2-57
2.12 References.....	2-58
CHAPTER 3 - Hazard Mitigation Goals	3-1
3.1. Goals and Objectives.....	3-1
3.2. Goals and Guidelines.....	3-3
3.3. Periodic Studies, Surveys and Involvement of the Public.....	3-4
3.4. Review and Reaffirmation of Hazard Mitigation Goals.....	3-15
3.5 Re-Affirmed Goals	3-18
3.6 References.....	3-20
CHAPTER 4 – Preventive Measures	4-1
4.1. Building Codes	4-1
4.2. Manufactured Homes	4-3
4.3. Subdivision Regulations.....	4-4
4.4. Code Enforcement and Administration	4-5
4.5. Planning.....	4-5
4.6. Retrofitting for Multiple Hazards.....	4-10
4.7. Insurance	4-8
4.8. The Government’s Role	4-10
4.9. Conclusions	4-13
4.10. Recommendations	4-13
CHAPTER 5 – Property Protection	5-1
5.1. Keeping the Hazard Away	5.1

5.2. Retrofitting	5-3
5.3. Building Retrofitting	5-5
5.4. Insurance	5-7
5.5 Recommendations	5-9
5.7 References	5-7
CHAPTER 6 – Natural Resource Protection	6-1
6.1. Introduction	6-2
6.2. Floodplain and Storm Water Management.....	6-3
6.3. Flash Flooding and Drainage System Maintenance	6-2
6.4. Dams and Levees.....	6-3
6.5. Erosion and Sedimentation Control.....	6-5
6.6. Wetland Protection	6-8
6.7. River and Stream Restoration.....	6-8
6.8. Open Space Preservation	6-9
6.9. Farmland Protection	6-8
6.10 Best Management Practices.....	6-11
6.11 Dumping Regulations.....	6-12
6.12 Urban Forestry.....	6-11
6.13 Watershed Planning.....	6-12
6.14 Recommendations	6-15
6.15 References.....	6-16
CHAPTER 7 – Emergency Warning and Response	7-1
7.1. Introduction	7-1
7.2. Threat Recognition and Warning	7-1
7.3. General Information	7-3
7.4. Emergency Response.....	7-5
7.5. Critical Facilities Protection	7-6
7.6. Post – Disaster Recovery and Mitigation	7-7
7.7. Recommendations	7-8
7.8 References.....	7-8
CHAPTER 8 – Public Information	8-1
8.1. Community Newsletter/Direct Mailing	8-1
8.2. Technical Information	8-2
8.3. Public Information Program Strategy.....	8-3
8.4. Public Information Summary	8-3
8.5. References	8-5
CHAPTER 9 – Action Plan	9-1
9.1. Goals.....	9-2
9.2. Guidelines.....	9-2
9.3 Identified Action Items.....	9-3
9.4 Administrative Action	9-4
9.5 Plan Maintenance.....	9-9

Plan Overview

Jersey County is susceptible to natural hazards that threaten life, health and has caused heavy property damage. While the county has experienced its share of damage from tornadoes, straight line winds and flash flooding, the most devastating and prolonged flood of 1993 stands without equal. Jersey County is positioned at the crossroads of three mighty rivers, the Mississippi, Missouri and the Illinois. The county found itself at the center of a historic flood. In 2003, Jersey County and participating municipalities banded together to better understand the hazards that effect the county and the impact they have on the residents and their property. In 2008 a Plan was developed to identify ways to reduce those impacts. The Federal Emergency Management Agency (FEMA), through the Disaster Mitigation Act of 2000 and the Stafford Act¹ require that a community develop and adopt a FEMA approved natural hazard mitigation plan in order to be eligible for hazard mitigation grant funds. These requirements are spelled out in 44 CFR (Code of Federal Regulations) Part 201. The DMA 2000 and the Stafford Act require that the mitigation plan be updated every five years to maintain grant eligibility.

This 2015 plan is the update of the 2008 plan. It is multi-jurisdictional and has been adopted by Jersey County, City of Jerseyville, City of Grafton, Village of Elsay and Village of Fieldon. The multi-jurisdictional plan meets all FEMA requirements including the National Flood Insurance Program and the Community Rating System (CRS).² Communities participating in the CRS can earn credit towards discounts in flood insurance premiums for their residents.

“Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.”

FEMA

This Plan: This Multi-Hazard Mitigation Plan, referred to as the Plan, will study and identify activities the public and private sector can do to reduce property damage, save lives and reduce health issues related to a natural hazard. The selected strategies are consistent with mitigation goals and objectives developed by the planning team.

The update of the Plan was based on discussions and meetings of the participating municipalities and the public was encouraged to participate. The Committee focused on six hazards along with some minor hazards and their impact on people, property, critical facilities, and the local economy. The following table was prepared indicating the hazards impact on health and safety, assets and the economy:

¹ <http://www.fema.gov/hazard-mitigation-assistance>

² <http://www.fema.gov/community-rating-system>

Impact of the Hazards

Hazard Profile	Area of Damage	Annual Frequency	Measured Hazard	Property Damage	Critical Facilities	Economic Impact
Earthquakes	County-wide	<1 %	Low	Medium	Masonry & glass damage, roads	Businesses, transportation
Base Flood Severe Thunderstorms	Floodplain	1 %	Medium	Medium	2	Minor
	County - wide	100 %	High	Minor	Communications	Electrical outage, hail damage
Winter Storms	County-wide	100 %	High	Minor	Emergency disruption	Business & school closures
Tornadoes	County-wide	35 %	Major	Major	Hospitals, schools & assembly halls	Utilities, communications, debris removal & crop damage
Drought	County-wide	1%	Medium	Medium	NA	Crop, Business, livestock
Mines/Mudslides Wildfires/Field-fires	County-wide	< 1 %	Low	Minor	NA	Minor
	Anywhere	< 1 %	Low	Minor	NA	Crop damage

This Jersey County Multi-Hazard Plan 2015 update is an examination of natural hazards that face Jersey County and its municipalities. It establishes goals, evaluates and highlights the existing mitigation activities in process and recommends an action plan for the County and the municipalities for the next five years. Some of the action items are ongoing and some will be new as they are contingent on the availability of staff and funding. In the development of the Plan the County has tried to be consistent with federal mitigation planning requirements and the Community Rating System. The Plan will continue to be monitored and updated every five years.

Using the hazard analysis, it was decided that severe thunderstorms, tornadoes, winter storms, floods and were the highest concern. After review of other plans and goals, the following goals and guidelines were set:

GOALS

- ❖ Minimize loss of life by encouraging residents to assume some responsibility for their protection.
- ❖ New developments of public services, critical facilities should not be exposed to possible damage from natural hazard events. Focus on updating critical facilities.
- ❖ Identify existing buildings for mitigation against damage from natural hazard events.
- ❖ Local initiatives should focus on protecting citizens and public property.

- ❖ Develop partnerships with local municipalities and private stakeholders to improve better mitigation measures with available funding.
- ❖ Enforce mitigation measures, specifically on repetitive loss structures thereby preserving open space in hazardous areas, especially where they are sensitive natural areas and agricultural land.

GUIDELINES

- ❖ Develop an improved way of delivering warnings to the public especially those living in rural areas, design public education campaigns to make the public aware about steps they can take to protect themselves from potential hazards.
- ❖ Encourage people to assume some responsibility for their own protection of life and property.
- ❖ Review security procedures for critical facilities and retrofit any existing facility deemed unreasonably susceptible to natural hazards.
- ❖ Seek county, municipalities, state and federal support for special projects.
- ❖ Preserve and restore open space by reducing damaged structures; protection of wetlands and farmland, erosion and sedimentation control.

ACTION PLAN

Chapter 9 focuses on the recommended action items to be implemented over the next five years. It summarizes the significant natural hazards that confront Jersey County, the goals of the mitigation plan and the actions that need to be implemented and the stakeholders responsible for the implementing the action items, and when they are to be completed. It is understood that the availability of funding may not be available to complete all of the action items listed in the Plan.

SUMMARY

The updated 2015 Plan members consisted of some of the original Hazard Mitigation Planning Committee whose members included representatives of County offices, participating communities, private stakeholders, and the public. The Committee also consists of some new members (a complete list will follow the end of chapter 1). The Jersey County Code Administrator office is responsible for the management of the Plan and reports to the Special Projects Committee which in turn makes recommendations to the County Board. In 2014 and 2015 the office experienced a turnover of personnel that were previously involved with the original creation of the 2008 Plan. The makeup of the Jersey County Board members that participated in the original Plan, are no longer serving on the committee due to a political election. There were some meetings scheduled for the purpose of the Plan update and involvement of the public and local leaders of the municipalities involved with the Plan, however turnout was low. In early 2015 Cindy Cregmiles was appointed the new Jersey County Code

Administrator. Mrs. Cregmiles was involved with the original Plan until leaving the office in 2012. In 2015 Ms. Cregmiles once again began the process of updating the information that was available to her; therefore the updated Plan encompasses information from 2008 to 2015.

References

www.FEMA.Gov/Hazard-Mitigation-Assistance

Feb. 2008 Multi-Hazard Mitigation Plan

www.fema.gov/community-rating-system

Chapter 1

1.1 Introduction

Natural disasters have played a significant role in the history of Jersey County. While the county has experienced its share of damage from tornadoes, straight line winds and flash flooding (the latter being responsible for the most deaths due to natural hazards), the devastating and prolonged flood of 1993 stands without equal. When the swollen rivers of the Mississippi, Missouri and Illinois overran their banks in the spring of 1993, Jersey County, positioned at the crossroads of these three mighty rivers, found itself at the center of a historic flood. Official records place the length of the 1993 flood at 195 days between April and October, but its impact on county and municipal government continues to this day. At its height, the Mississippi River crested at approximately 20 feet over flood stage in Grafton. Hundreds of residents were displaced, some permanently, by the floodwaters. The Jersey County Assessors Office recorded a reduction of property assessment of more than \$3 million due to damage caused by the flood.¹ Damage to agricultural land caused the County's crop production to fall by 3 percent from 1992 production levels in a year when state crop production rose by some two percent. Incalculable costs from disrupted transportation were also incurred. Approximately 35 miles of county roads were inundated, including the Great River Road, the main transportation route for goods and people between Jersey County and metro St. Louis communities on both sides of the Mississippi. During the flood, only five businesses out of 85 remained open in Grafton while all seven businesses in Elsah were closed.²

The impact of the 1993 flood has changed the entire character of some areas of the county. The City of Grafton experienced a loss of population and a change in its economic structure, but is experiencing continuing commercial and residential development. Restoration of damaged historic buildings in the Village of Elsah, itself a national registered historic landmark, took nearly ten years to complete. As we will document in this mitigation plan, significant steps have been taken to mitigate future floods, but continued flood related-mitigation efforts remain a priority.



Otter Creek 1993

¹ C.C. Hopper and Associates, *Draft of Economic Impact Analysis and Flood Recovery Strategy for Greene Jersey, and Calhoun Counties*

² C.C. Hopper and Associates.

While the 1993 flood provides us with an actual worst-case scenario for mitigation planning, flooding remains only one of several notable natural hazards facing the county. Indeed, the county's geographic position makes it susceptible to a mixture of natural hazards not found in a majority of U.S. counties. The U.S. Geological Survey reports that a group of scientists studying the New Madrid Seismic Zone, the seismic zone of most concern to Jersey County, estimates that an earthquake with magnitude 6 or larger has a 25 to 40 percent chance of occurring in the next 50 years.³ Historically, Illinois has witnessed over twenty major earthquake events, including a magnitude 5.1 in 1917 and a magnitude 5.2 earthquake in 1968. One significant seismic event which occurred in the last five years was a magnitude 5.2 earthquake which had an epicenter near Bellmont, Illinois, and could be felt as far away as St. Louis.⁴

County residents also keep a close watch on the skies, particularly in spring and summer months. A National Weather Service data shows that from 1991-2010; Illinois averaged 9 tornadoes per 10K square miles, a figure which tied it for third most of any state, trailing only Kansas and Florida and on par with states including Oklahoma, Iowa, and Mississippi.⁵ The State of Illinois is struck by on average 1.4 tornadoes a year that register as an F3 or higher. Over the past 60 years Jersey County has experienced 13 tornadoes, the strongest of which were three F2s.⁶ Combined, these statistics show that Illinois and Jersey County are regularly susceptible to the dangers of tornados.⁷ High winds, hail and flash flooding that accompany severe thunderstorms are also notable natural hazards of concern for county residents. Between January 1996 and February 2013, Jersey County has witnessed 134 such events, including a flash flood on May 5, 2003 that resulted in the county's only reported weather related fatality at that time in almost 20 years.⁸ Since 2003 the county experienced heavy rains in December of 2015 creating flooding and flash flooding of creeks. In Grafton the velocity of a creek swept a woman away as she attempted to cross the creek by foot to return to her home. Her body was discovered a month later miles down the Mississippi River.

Winter months bring the risk of various forms of dangerous winter precipitation to the county. Between January 2009 and December 2015, Jersey County saw 5 heavy snow events, 7 winter storms. As county residents know all too well from the summer of 2012, the county can also experience excessive heat and drought. Between January 1996 and February 2013, the county experienced 14 days of excessive heat.⁹ All five recorded drought events since 1996 have occurred between 2005 and 2012.¹⁰

³ U.S. Geological Survey. USGS,. Fact Sheet 2009-3071. August 2009.

⁴ Center for Earthquake Research and Information. Recent Earthquakes in the Central U.S. http://www.ceri.memphis.edu/mag5-2_041808/index.html (date accessed, October 1, 2012).

⁵ NOAA; s National Weather Service Storm Prediction Center WCM Page. Average Annual Tornadoes per 10K Square Miles per State (1991-2010). <http://www.spc.noaa.gov/wcm/#torclim> (date accessed, June 1, 2013).

⁶ Illinois State Water Survey. Tornado Maps of Each County and Illinois. <http://www.isws.illinois.edu/atmos/statecli/tornado/NewMaps/Tornadoes-Jersey-County-Illinois.png> (date accessed, June 29, 2013)

⁷ <http://www1.ncdc.noaa.gov/pub/data/cmb/images/tornado/clim/totavg-ef3-ef5-torn1991-2010.gif>

⁸ National Climatic Data Center Storm Events Database. Jersey County, IL. <http://www.ncdc.noaa.gov/stormevents> (date accessed, June 1, 2013).

⁹ National Climatic Data Center Storm Events Database. Jersey County, IL <http://www.ncdc.noaa.gov/stormevents> (date accessed, Dec. 2015). An excessive heat event is when the heat index is 105 degrees Fahrenheit or greater for

1.2 Jersey County Profile

Geologically, Jersey County is at the southern edge of the ice sheet of the Ice Age. The scrapping of the ice sheet followed by uplift and erosion define the shape of the land. One of the most prominent features of Jersey County and a significant tourist attraction are the bluffs along the southern and western edges of the county. The other prominent feature of the county is the rivers – the Mississippi, Illinois and Missouri.

The Mississippi River delineates the southern line of Jersey County. The Illinois River delineates much of the western line of the county, separating Jersey from Calhoun County. As the earth's crust uplifted, the great rivers eroded downward, carving the bluffs and meandering back and forth, creating floodplains. The western edge of the county drops from the bluffs on to the Illinois River floodplain (in an area known as Nutwood). The southern bluffs drop to the river (or the Great River Road, which hugs the base of the bluffs for nearly thirty miles). One can stand on these bluffs looking southward across the floodplain of St. Charles County (Missouri), the Missouri River, and the far bluffs in St. Louis County (Missouri). This entire expanse was covered to the treetops in the flood of 1993.

The county is also at the northern end of the New Madrid earthquake fault line. Perhaps the most important modern (in geologic terms) event was the series of New Madrid, Missouri earthquakes of 1811-12 that, according to the USGS, “were among the largest to strike North America since European settlement”¹¹ As the authors of this USGS report note, the area impacted by these events was 2-3 times as large as the 9.2 magnitude Alaskan earthquake and 10 times as large as the 7.8 magnitude 1906 San Francisco earthquake. The region continues to be active, with minor tremors being felt, albeit infrequently, in Jersey County.

On the south and west, Jersey County is defined by its bluffs and the hollows and ravines that are carved into them. These areas are generally the most natural parts of the county, home to Pere Marquette State Park, the largest in the state, and Principia College, which maintains much of its 2,600 acres in natural state (including in state-designated grasslands). Other portions of this area are protected by private landowners, such as the Great Rivers Land Trust, and conservation easements.

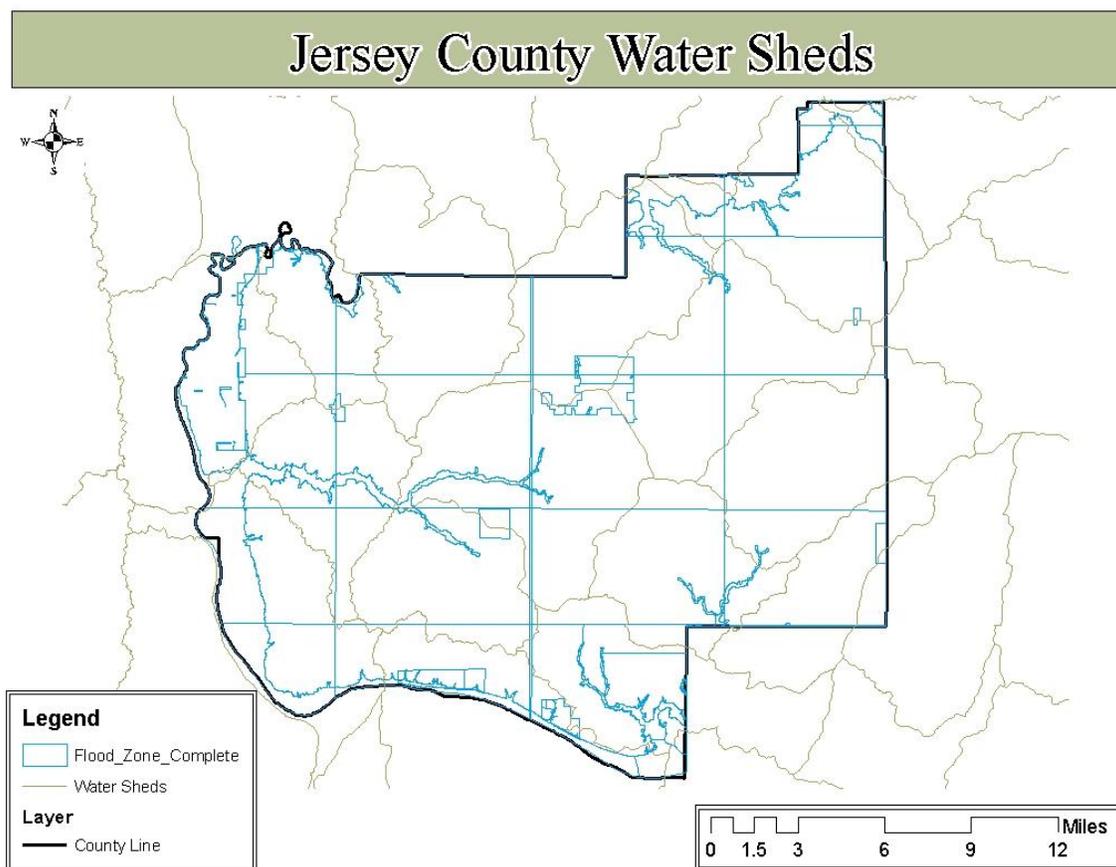
The county is crossed by three watersheds. Flowing westward to the Illinois River from the central Illinois plains along the northern border of Jersey (with Greene County) is the Macoupin Creek watershed. Flowing westward to the Illinois River across the center of the county is the smaller Otter Creek watershed. Flowing fanlike south to the Mississippi River is the Piasa Creek watershed as depicted in Fig.1.2.1

more than 3 hours a day for two consecutive days or when the heat index reaches 115 degrees Fahrenheit or more at any time during a day.

¹⁰ Richard L. Dart and Christina M. Volpi. *Earthquakes in the Central United States, 1699-2010*. Washington, D.C.: USGS. 2010, 5.

¹¹ Richard L. Dart and Christina M. Volpi. *Earthquakes in the Central United States, 1699-2010*. Washington, D.C.: USGS. 2010, 5.

Figure 1.2.1 Jersey County Water Sheds



Jersey County is approximately 700 feet above sea level. More obvious though is that upland Jersey County is about 250-300 feet above the Mississippi and Illinois Rivers. The designated elevation of Alton Lake, the expansion of the Mississippi River spreading along the southern edge of the county due to the Melvin Price Lock and Dam complex at Alton, is 419 above sea level. Jersey County is 241,546 acres. Twelve percent of the county is in federal-designated flood plain.¹²

Location, History, and Development

Jersey County is located in what is considered southwestern Illinois, overlooking the confluence of the Mississippi, Missouri, and Illinois Rivers. Though predominantly rural, the county is part of the St. Louis Standard Metropolitan Statistical Area. Depending on traffic, residents of Jersey County can reach downtown St. Louis for a Cardinals' baseball game, a Rams' football game, the symphony, or a flight from Lambert St. Louis International Airport in an hour's drive.

¹² Data obtained from the Jersey County Code Administrator's Office. June 2013.

Jersey County is not an origination or destination point for most of the transportation in, near or above the county. Instead, Jersey County is a transit region. This is an historical reality. Native Americans used the rivers and trails to move across and beyond the region. The Piasa Bird, a local symbol and school mascot, comes from the legend of a phoenix-like half-bird, half-dragon rising from the Great River. The hamlet on the opposite side of the Mississippi River from Principia College was aptly named Portage de Souix, crossing place for the Souix Indians.



Figure 1.2.2 Location of Jersey County in Illinois

Early explorers, including Joliet and Pere Marquette, after whom our state park is named, floated down the Illinois River. The two French explorers made landfall at a point just west of the City of Grafton. George Clark and Meriweather Lewis began their epic journal at the mouth of the Missouri River, within site of the Jersey County bluffs. Historical records suggest that a branch of the National Road, and extension of the turnpike that crossed through the Cumberland Gap in the early years of the Republic, terminated just east of the Village of Elsay.¹³

In 1821, with the establishment of Greene County, it ceased to be a part of Madison County, a relation it had held since the latter was formed by Gov. Edwards in 1818. The part of Greene County that now constitutes Jersey County, continued to be included in Greene County until August 5, 1839. The Enabling Act passed by the Legislature, February 28, 1839, provided that on August 5, following at an election held for that purpose, a proposition should be submitted to the voters of the latter county, for and against the separation of Jersey County from Greene County, for their determination. At that election, there were 1, 239 votes for and 714 against the proposition, a majority of 525 out of a total of 1, 953 votes. From 1821 until 1839, however, the history of Jersey County is naturally included in that of Greene, and is so given.¹⁴

Jersey County was not central to opening of the west, deferring to the great cities of Alton and St. Louis further south. However, the railroads had a major impact on the region. Ultimately, short lines connected most corners of the county, including hauling limestone from Grafton. Major national railroads crossed the county, which was originally part of neighboring Greene

¹³ Oscar Brown Hamilton, ed.. *History of Jersey County, Illinois*. Chicago: Munsell Publishing Co. 1919.

¹⁴ *Ibid*.

County. Greene, more than Jersey, was a crossing point between north-south and east-west lines. The Greene County town of Roodhouse, recalling the railroad Roadhouse, still has many of the tracks.¹⁵

The Mississippi, Missouri, and Illinois Rivers—three great commercial arteries—border or are within sight of Jersey County. Yet, today, except for two ferry services and private pleasure craft, commercial traffic bypasses the county. Jersey County is hopeful that the new “Westside” expressway, currently designated US 67, will make a positive contribution to the economic development of the county once it is completed. The limited, four-lane expressway is to connect the St. Louis region with the Quad Cities. Upon completion, it will be the only north-south expressway in the western side of the state. According to the Illinois Department of Transportation, as of FY 2012, more than \$929 million in improvement costs for this 220 mile corridor project have been awarded, with \$4.6 million programmed for FY 2013 and \$109 million for FY 2014 – FY 2019.¹⁶ In July 2013, a stretch of four lane travel between Delhi to Godfrey was finished, marking the most recently completed stage of the project within county lines.¹⁷ The Jersey County Business Association has been working with state transportation officials to “encourage the re-allocation of \$42 million of preliminary engineering and by-pass bridge construction to extend expressway constructions of U.S. 67 from New Delhi to Crystal Lake Road”¹⁸ with a hopeful completion of 2016. According to the National Pipeline Mapping System (<https://www.npms.phmsa.dot.gov/>) and the U.S. Energy Information Administration (<http://www.eia.gov/state/maps>), a hazardous liquid pipeline traverses approximately 15 miles of the county without terminals or access points within the county.

Jersey County has 594 miles of roads, both seasonal and all-weather. The roads include dirt, gravel, oil and chip, concrete, and blacktop. The roads include township, county, state, and federal roads. The roads are maintained by townships, the county, and the Illinois Department of Transportation. The county monitors the condition of its roads through the office of the County Highway Engineer. The County Highway Engineer maintains a database of all public county roads, regardless of jurisdiction. This database is cross maintained with the county’s GIS project and the county’s 911 program. The County Highway Engineer maintains a program of periodic inspections and upgrades, when funded by the County Board. The County Highway Engineer was an initial part of the Hazard Mitigation planning process and continues to be involved and committed to hazard mitigation. This individual is a member of the county’s Special Projects Committee that monitors the implementation of the Natural Hazards Mitigation Plan.

Jersey County is experiencing increased suburbanization, especially in the form of small housing developments. The scale of the developments is generally small, although the homes within the developments vary greatly in size. Jersey County has no zoning ordinance or land use controls,

¹⁵ Ibid.

¹⁶ Illinois Department of Transportation. U.S. 67 Corridor Project Overview. www.dot.state.il.us/us67/Overview.html (date accessed, July 3, 2013)

¹⁷ Robert Lyons. “U.S. 67 Expands to Three Lanes.” *Jersey County Journal*, May 31, 2013. On-line edition (date accessed, July 3, 2013).

¹⁸ Tom Bott. “Jersey Basks in Business Developments.” *Alton Telegraph*, September 13, 2012. On-line edition. (date accessed, July 3, 2013).

but does record annual building permits. The number of building permits for new homes and mobile homes from 2008-2015 is listed in Table 1.2.1¹⁹.

Table 1.2.1 Jersey County Building Permits for New Homes and Mobile Homes

<i>Year</i>	<i>New Home Construction</i>	<i>Mobile Homes</i>	<i>Commercial Construction</i>
2008	33	11	7
2009	23	11	1
2010	19	10	1
2011	17	10	1
2012	15	11	4
2013	15	9	2
2014	16	10	3
2015	12	8	2

Source: Jersey County Building Permit Administrator's Office, Dec. 2015

Governmental and Regulatory Structure

Jersey County is divided into 12 townships, and has six quasi-independent municipalities. There is no home-rule charter, so there is some overlapping jurisdiction. The county is divided into independently managed fire protection districts. For taxing purposes, there are separate districts (and governing bodies) for the library, the community hospital, and the community college (which is located in a neighboring county). There are separate water and sewer districts, with most of the county served by a rural water authority.

Unincorporated Jersey County has no zoning code. In the early 1990s, the Jersey County Board adopted a countywide zoning ordinance. The citizen response was immediate, vociferous, and at times deeply concerning to law enforcement. Citizens rejected zoning in a countywide referendum on January 14, 1991. Within six months, the county board abandoned efforts at zoning scheme. Jersey County has no land use ordinance. Currently, land development is limited by the state plat act (which requires platting of parcels less than five acres). Land use is limited by state laws, if any, such as the regulations on construction of landfills. Thus, there are no limitations on the development of hog farm factories, airstrips, landfills, or junkyards (to list a few that rise citizen ire).

Until 2004, the county had no building code. After intense negotiations, in 2005, the county building regulatory scheme moved to the requirement that new residential buildings use the BOCA Code National Electrical Building Code and the State of IL Plumbing Code. Further

¹⁹Data supplied by Jersey County Building Permit Administrator's office, Dec. 2015

deliberations ensued over the next three years and in 2008 the Jersey County Board adopted the 2006 ICC codes, which aligned the county with the city of Jerseyville and the city of Grafton. Also in August of 2004 Public Act 093-0936 (Illinois Energy Conservation Code for Commercial Buildings) was signed into law and became effective April 8, 2006. On October 9, 2007 the law was revised in favor of the International Energy Conservation Code. The act was amended in 2009 to include residential buildings which became effective in 2010²⁰. Any local government that issued permits for construction must adopt the code.

Jerseyville, the largest municipality in the county (population 8,465 per 2010 Census),²¹ has a land use plan, zoning, and a building code. They have hired a fulltime professional staffer to monitor and enforce both zoning and the ICC building code. The City of Grafton is the second largest municipality in the county (population 674 per 2010 Census),²² has both zoning and the 2006 ICC building code. It also employs a part-time building inspector. This advance, in the face of anti-regulatory sentiments, was one of the results of the flood of 1993. In 2011, the Village of Elsah also adopted the ICC codes and in January 2012, the Village of Elsah entered into an Intergovernmental Agreement²³ with Jersey County Board to authorize the county building code inspector to issue building permits and perform inspections on new construction within the corporate limits, however, the Zoning Board of Elsah must issue a Zoning Permit first, in keeping with the historical appearance aspects of the Zoning Ordinance.

In addition to the ICC, the most vigorous form of land use or building code regulation is the NFIP a federal program created by Congress to mitigate future flood losses. Participation in the NFIP is an agreement with the Federal Government that the community will adopt and enforce a floodplain management ordinance. The program stipulates construction requirements, including elevations, for structures. The local jurisdiction is responsible for application of the program and enforcement of the regulations. Failure of any structure can jeopardize participation in the program for all other structures.²⁴ Jersey County employs a full-time Certified Floodplain and Building Inspector to implement the programs.

Jersey County Critical Facilities

The critical facilities were identified by the County and each municipality for the update of the Plan. Jersey County uses and maintains the GIS and has layers for critical facilities. Hazardous materials, other than those being transported through the county, are not a significant concern for Jersey County. There are no nuclear generation, manufacturing, storage or disposal facilities in Jersey County. There are no EPA Superfund sites in Jersey County. While there are no chemical manufacturing sites in Jersey County, there are a number of chemical storage and distribution sites in the county. All of these sites involve chemicals, such as fertilizers, used in agriculture. There are only three bio-chemical sites in the county—the Jersey Community Hospital (including radiological), the Jersey Community High School (chemistry and biology

²⁰ Illinois Dept. of Commerce & Economic Opportunity <https://www.illinois.gov/dceo> (date accessed 4/9/15)

²¹ <http://censusviewer.com/city/IL/Jerseyville> (date accessed 6/10/2013)

²² <http://censusviewer.com/city/IL/Grafton> (date accessed, June 10, 2013).

²³ Intergovernmental Agreement dated Jan. 10, 2012; recorded on Jan. 19, 2012 Book 1748 Page 123

²⁴ Federal Emergency Management Agency. *National Flood Insurance Program: Answers to Questions About the NFIP*. FEMA F-084. March 2011.

labs for teaching), and Principia College (chemistry and biology labs for teaching). A complete listing of all critical facilities in the county is discussed in detail in Chapter 2.

1.3 The Planning Process

The Jersey County Multi-Jurisdictional Plan was first developed in 2004 and utilized the four phases or steps recommended by FEMA’s *Mitigation Planning How-To-Guides*. The 2015 Plan update utilized the 10-step process recommended by FEMA and the Community Rating System.

Step 2 of the planning process involves the public and their input, particularly residents and businesses of the mitigation planning area. In consultation with elected officials at the county and municipal levels, the original Hazard Mitigation Planning Team in 2004 proposed that the planning area should be defined as the entirety of Jersey County. Jersey County includes extensive unincorporated areas along with a number of incorporated jurisdictions—cities of Jerseyville and Grafton, and villages of Brighton, Elsah, Fieldon, and Otterville. Defining the entire county, including all incorporated areas, results by definition in a multi-jurisdictional plan. In 2008, a multi-jurisdictional plan was developed, approved by FEMA, and included the jurisdictions listed above with the exception of Brighton and Otterville (see explanation below). These same jurisdictions are part of this multi-jurisdictional plan update.

One of the first acts of the Hazard Mitigation Task Force in 2004 when the county’s original Natural Hazards Mitigation Plan was being developed was to approach each municipality and present the need for hazard mitigation planning, the proposal for multi-jurisdictional planning, and an invitation to join in the multi-jurisdictional plan. Each presentation was made before municipal boards and public, with opportunity for community participation and response.

In the summer of 2011, members of the planning team revisited each of these communities to remind, and in the case of public officials elected after the completion and adoption of the current mitigation plan, inform them of the need to update the plan. Planning team members reviewed the original impetus for the plan, leading goals of the plan, and process for updating the plan. They were also invited to participate in the planning process by providing periodic input on various aspects of the plan and data needed to ensure the most accurate portrayal of relevant features of their municipalities. Elected officials provided verbal support for this planning process and their jurisdiction’s inclusion in the updated multi-jurisdictional plan.

Table 1.3.3 Meetings and Public Hearings in June 2009 through April 2015 with Municipalities in Jersey County

<u>Jurisdiction</u>	<u>Special Projects Committee Representative(s)</u>
City of Grafton	John Williams, Professor, Principia College Cindy Cregmiles, County Code Administrator
City of Jerseyville	Brian Roberts, Professor, Principia College John Williams, Professor, Principia College Jeff Soer, City Building Inspector

Village of Elsayh	Linda Davidson, County Code Administrator’s Office Cindy Cregmiles, County Code Administrator Brian Roberts, Professor, Principia College
Village of Fieldon	Linda Davidson, County Code Administrator’s Office Brian Roberts, Professor, Principia College John Williams, Professor, Principia College

As they did prior to the adoption of the 2008 plan, all of the incorporated communities wholly inside the county concurred that a multi-jurisdictional plan was the appropriate approach. Consistent with FEMA’s rationale for developing multi-jurisdictional plans, municipalities determined that they possessed insufficient resources to develop a mitigation plan on their own. They decided to benefit from resources marshaled by the county with the acknowledgement that mitigation strategies would ultimately be consistent with local objectives. As noted above, care was taken to include members of the different incorporated communities in the planning process. Mayors or board presidents of almost all of the jurisdictions have participated routinely in task force activities and meetings. Only three municipalities, the City of Brighton, Village of Fidelity, and the town of Otterville, expressed some initial reluctance to engage in the process, but their exclusion from this process seemed appropriate given the fact that the much larger portion of the City of Brighton – both in land and population – is located in adjacent Macoupin County. The villages of Fidelity and Otterville have a very small population and chose not to participate. The public at-large has been included through their invitation to attend these open meetings and hearings. Surveys about natural hazards and hazard mitigation administered by plan researchers and the related news coverage of these surveys have also served as mechanisms of public involvement in the planning process. Several op-eds about the hazard mitigation planning process authored by Professor Williams have also appeared in the county’s leading news source, the *Jersey County Journal*. Sample copies of news coverage and op-ed pieces are included in the Appendix of this plan.

Planning Team



Figure 1.3.1 Jersey County Special Projects Committee Meeting

Since 2008, the county’s Special Projects Committee, an official county board committee, has been overseeing the bi-annual meetings with additional individuals from the public and private sectors as listed in Table 1.3.1. After the 2014 political election several of the committees were combined and renamed. As a result the new committee that will oversee the revised Plans is the Committee on County Service Offices and Public Safety, however for the sake of this Plan writing it will still be referred as Special Projects. Refer to Table 1.3.2

Table 1.3.1 Frequent Attendees at Special Projects Committee Meetings (2009-2015)

Jersey County Board Member (Committee Chair)	Mary Kirbach
Jersey County Board Member	Pam Heitzig
Jersey County Board Member	Jerry Wittman
Jersey County Board Member	Gary Hayes (2009-2013)
Jersey County Board Member	Rhonda Linders
Jersey County Board Member	Ron Henerfouth
Jersey County Floodplain Manager, Code Administrator & Plan Program Administrator	Mike Prough (2009-2013)
Jersey County Code Administrator’s Office	Cindy Cregmiles (2009-2012)
Jersey County Code Administrator’s Office	Linda Davidson (2009-2014)
Jersey County Code Administrator’s Office	Natalie Walsh (2013-2015)
Supervisor, Jersey County Highway Department	Tom Klasner
Professor, Principia College	John Williams
Professor, Principia College	Brian Roberts
Director, Great Rivers Land Trust	Ally Ringhausen
Building Inspector, City of Jerseyville	Jeff Soer
Resource Conservationist, Soil and Water Conservation District	Jeff Blackorby
Environmental Health Manager, Jersey County Health Department	Dale Bainter (2009-2013)
CEO, Jersey County Business Association	Alan Gilmore (2009)
City of Grafton	Tom Thompson
Town of Fieldon	Betty Duggan

Plan Coordinators, Investigators, Evaluators

The individuals who have worked on the development of the 2008 plan and its implementation (including monitoring and evaluation) as well as this updated 2015 plan, can be divided into two primary categories. Central to the process are the following individuals: Cindy Cregmiles, Jersey County Certified Floodplain Manager and County Code Administrator, Building Inspector and Mitigation Plan Project Administrator —responsible for overall management of the process; Linda Davidson, County Code Administrator’s Office—primary data collector and assistant editor; Brian Roberts, Principia College Political Science Professor —lead investigator, writer and editor; and John Williams, Principia College Political Science Professor —lead investigator, writer and editor.

Table 1.3.2 Attendees of the Special Projects Committee meetings to present

Jersey County Board Member	Rhonda Linders
Jersey County Board Chairman	Jerry Wittman
County Board Member	Mary Kirbach
County Code Administrator	Cindy Cregmiles
IT/GIS Coordinator	Linda Davidson
Jersey County Highway Dept. Engineer	Tom Klasner
Jerseyville Building Inspector	Jeff Soer
Jersey County Environmental Director	Doug King
Jersey County Health Department	Teresa Macias
Jersey County Emergency Services Director	Larry Mead
Citizen, retired bank President	John Hefner
Citizen, retired engineer	Dean Heneghan
Mayor of Jerseyville	William Russell
Mayor of Grafton	Tom Thompson
Mayor of Elsayh	Cy Bunting
Mayor of Fieldon	Betty Duggan
Principia College	Professor John Williams
Principia College	Brian Roberts
Trustee of Nutwood Levee District	William Eagleton
Trustee of Nutwood Levee District	Roderick DeVerger
Conservation Officer	Mark Wagner
Jersey County Board Member	Ron Henerfouth
Jersey County Board Member	Brian Kanallakan

The second collection of individuals include Special Projects Committee Members and other representatives from individuals from county and municipal governments units including mayors, building inspectors, health officials, natural resources management professionals, private land trust officials. These individuals have frequent updates on the impact of specific

hazards and the implementation of mitigation plan goals and strategies. They are important because of their professional positions and connections, including, for example, local mayors, city building inspectors, first responders, natural resource management officials and directors and supervisors of county and municipal government divisions (highways, public health, etc.). They have also provided assistance with policy development and policy evaluation (mitigation strategies).

Involvement of Principia College

With the success of the 2008 plan the county once again enlisted the help of the county's only institution of higher learning, Principia College, a small, private, four-year, undergraduate, Liberal Arts College for the 2015 update Plan. Professor John Williams, the chairman of the political science department at Principia College, is a longtime county resident who has served on several local or county boards and task forces. His familiarity with county government made him a natural initial point of contact for the plan. The Principia political science program is committed to educational principles of active learning—whereby students actively engage intellectually in their subject matter; experiential learning—whereby students solidify their theoretical learning by practical experience; and service learning – whereby students engaged in a learning experiences that also benefits a community. The department was familiar with the county, its politics, and its governmental structure. For more than a decade, political science students conducted public opinion polls, both by telephone and as voting day exit polls, and several students served on local campaigns as volunteers and as interns. Assisting with the hazard mitigation process was a logical extension of the educational strategy of the department. Professor Williams, in turn, enlisted the involvement of his colleague, Professor Brian Roberts, who serves as an instructor for the department's senior seminar in public policy analysis and, along with Professor Williams, an instructor in a required research methodology course and required American government and politics course. Over almost a decade, students from all three courses have been involved in the hazard mitigation project to some extent or another. Students have identified the risks facing the county, analyzed the plan's implementation, recommended new plan action items, conducted surveys of county resident awareness of natural hazards mitigation, and facilitated meetings of emergency responders. Professors Williams and Roberts also assumed key roles in the development of this plan, serving as members of the initial Planning Team in 2003 and regular participants in Special Projects Committee meetings – roles they have continued to this date. The county's successful partnership with the college was highlighted in a Ogilvy study of the Community Rating System (CRS) outreach activities.²⁵

During the planning process the county reached out to other agencies that included:

- National Weather Service Advanced Hydrologic Prediction Service
- Illinois Emergency Management
- Illinois Dept. of Natural Resources
- Illinois State Water Survey
- Federal Emergency Management Agency
- Illinois Revenue
- National Climatic Data Center

²⁵ Federal Emergency Management Agency. *Rethinking Outreach in the Community Rating System (CRS): Activity 330 Pilot Program*. Report Submitted by Ogilvy Public Relations Worldwide. January 29, 2010.

- Community Rating Service
- Census Bureau
- State of Illinois
- US Army Corps of Engineers
- Illinois Mitigation Plan

Emergency Responders Involvement

As Alessandra Jerolleman and John Kiefer note in their recent edited volume on hazard mitigation, mitigation is the first phase of emergency management. Response, meanwhile, involves activities aimed at saving lives and property under emergency situations.²⁶ As first responders are responsible for protecting lives during natural hazards ranging from tornadoes to ice storms, they are acutely aware of the complexities involved in responding to various natural hazards and the extent to which mitigation strategies could reduce the nature and level of their initial responses. Accordingly, first responders from the different levels of government in the county were invited to participate in a half-day session at Principia College in 2004. This session was one of the early planning sessions of the county's work on the original mitigation plan. Principia College political science professors Brian Roberts and John Williams and students in Dr. Roberts' upper-division Public Policy Analysis class served as the moderators for the session. Participants were informed of the purpose and process of mitigation planning in an initial plenary session. Breakout sessions were held for the purpose of collecting information about emergency response activities associated with the response to natural hazards.



First Responder's Meeting

A survey administered during the session asked respondents to respond to three questions from their perspective as a first-responder. Responders were asked to rank the likelihood of particular hazards, the extent of harm to individual health and safety, and the extent of damage to various existing structures resulting from a natural disaster. Extreme temperatures, flash floods, thunderstorms, winter storms, tornadoes, and straight-line winds were deemed most likely to occur. While less likely to occur, tornadoes and earthquakes were identified as the hazards capable of imposing the most harm on county residents and extent of damage to structures. The participants also shared insights about the challenges associated with responding to the various

²⁶ Alessandra Jerolleman and John J. Kiefer, eds. *Natural Hazard Mitigation*. Boca Raton, FL: CRC Press. 2013, 24.

hazards – challenges that included facets such as the disruption of communication, impediments to reaching those in need (e.g., high water, debris, treacherous surfaces). When added to the rest of the information and research gathered for Jersey County’s plan, the perceptions of first-responders provide an important perspective in designing mitigation strategies contained in the eventual 2008 mitigation plan.

In 2011, first responders in the county were once again invited to Principia College for a similar working session moderated by students in Professor Williams’ American Government and Politics course. Participants included county board members, mayors of local municipalities, law enforcement officials, the county’s emergency management director, county highway department director, staff from the County Code Administrator’s office and Flood Plain Manager’s office as well as the regional chief of the state conservation police.

Public Participation

Step 3 of the planning process was to obtain information from the citizens in an effort to solicit broader public input on natural hazards and hazard mitigation beyond notices of public meetings (county board, municipal governments), teams of Principia College students from a social science research methods course taught by either Professor Roberts or Professor Williams, have prepared, conducted, compiled and analyzed public opinion surveys of Jersey County residents on three different occasions since 2004. These surveys have been designed to obtain a more accurate assessment of county residents’ concerns about natural hazards, including steps they have taken, or might be willing to take, to mitigate the effects of these hazards. As such, these surveys constitute important components of efforts to develop appropriate mitigation actions – action items designed to minimize the loss of life and protect public health, infrastructure, and public as well as private property. All of the mayors in the other participating communities in the plan distributed questionnaires to residents in their area.

One important aspect of the survey was to discover Jersey County residents’ greatest concerns relating to natural disasters. Given a choice of natural disasters respondents perceived as likely to affect the county, respondents were most concerned about tornadoes (more than 90% in both 2004 and 2012; see Table (1.3.4), this despite the fact that no more than 19% in any one survey (2012) reported having been impacted by a tornado within the last five years of the time of the survey. Certainly some of this concern is attributable to occurrences of not only incidents in the county (see earlier section of this report), but the highly destructive and publicized tornadoes in locations such as Joplin, Oklahoma City and Tuscaloosa in recent years. The damage tornadoes are capable of causing to property and the potential they bring for loss of life also likely accounts for the high level of concern among county residents. Large hail, severe/straight-line winds, and severe winter storms followed closely as disasters of notable concern to respondents. These three were also the leading natural disasters respondents reported as having experienced – results consistent for all three surveys. Roughly 2/3 of respondents in 2004 and 2012 were concerned with flooding. Given the flood of 1993 and significant flooding in 2008, one might expect respondents to be even more concerned with flooding. However, it is important to realize that the majority of those surveyed in each instance do not live in the floodplain. Tests conducted with information from the surveys reveal that the residents living in the floodplain are collectively more concerned about flooding than those residing elsewhere in the county.

Table 1.3.4 Summary of Surveys of Jersey County Residents Experience with and Concern About Natural Hazards

Survey Year	2004	2009	2012
Sample size	306	213	207
	<i>Percentage of Respondents Reporting Experiencing Hazard in Past 5 Years</i>		
Drought	n/a	n/a	24%
Earthquakes	<1%	19%	19%
Floods	8%	10%	21%
Large Hail	29%	27%	39%
Severe Winter Storms	18%	42%	45%
Severe/Straight Line Winds	51%	66%	76%
Subsidence/Soil Erosion	5%	7%	2%
Tornadoes	8%	6%	19%
Wildfires	0%	1%	6%
	<i>Percentage of Respondents Concerned About Hazard</i>		
Drought	n/a	n/a	n/a
Earthquakes	60%	n/a	73%
Floods	60%	n/a	69%
Large Hail	90%	n/a	89%
Severe Winter Storms	81%	n/a	86%
Severe/Straight Line Winds	90%	n/a	88%
Subsidence/Soil Erosion	63%	n/a	76%
Tornadoes	93%	n/a	92%
Wildfires	43%	n/a	69%

Notes: Percentage concerned reflects those who were extremely, very, concerned and somewhat concerned. The 2009 survey, which was primarily focused on how county residents would like to obtain information from the county about natural hazard mitigation, did not ask residents how concerned they were about the hazards impacting the county.

While many respondents were concerned about natural disasters and have taken some steps to protect themselves, the survey revealed a need for public information on measures that would make them and their property less susceptible to hazard mitigation. A majority of those surveyed in 2004 and 2009 (56 percent in both instances) indicated that they had not received any information about natural disaster preparedness. Fortunately, the survey allows the Planning

Team to see what types of communication would be most effective in reaching the largest number of Jersey County residents. In 2004, well over half of those surveyed reported that they did not have Internet access. However, by 2012, 79 percent of respondents said they had Internet access (interestingly, 83% of 2009 respondents responded affirmatively). In 2012, 81% of respondents agreed that the county should have a county web page, an action item that was achieved in January, 2014. The county web page allows Jersey County officials to communicate information to large segments of the population at a fairly minimal cost, particularly compared to mailers or frequent advertisements. Survey results for all three years did, however, reinforce the popularity of the *Alton Telegraph*, *Jersey County Shopper*, *Jersey County Journal*, and St. Louis radio and TV stations (see Table 1.3.5). Respondents evaluated these options as being the most effective potential sources for disseminating disaster preparedness information. More details on how these surveys have informed past and current plan action items are provided in a subsequent chapter.

In addition to the surveys the public was invited to all committee meetings and board meetings with an open public comment period at the end of the meetings. The draft of the updated plan was made available to the public through the county’s web site and was on display at the municipality’s city halls and the county’s board office for public comment. Chapter 3 discusses in detail the process of presenting the findings from this phase to the public and soliciting public input on mitigation goals and objectives.

Table 1.3.5 Sources of Information Used to Learn about Government Action Re: Natural Hazard Mitigation (2012 survey)

Jersey County Journal	68.7%
Alton Telegraph	61.4%
Jersey County Shopper	50.7%
Internet and websites	31.8%
St. Louis radio and television stations	29.3%
Mail, brochures, notices	23.2%
WJBM radio	22.2%
St. Louis Post-Dispatch	15.2%
Public workshops or meetings	12.6%
County website	11.6%
Local schools	9.6%
Local businesses	9.6%

Since one of the chief goals of developing a hazard mitigation strategy is to protect the lives, health, and property of county residents, it was essential that input was gathered from local citizens. The information gathered in this survey should help planners to develop effective mitigation policies by providing information on local concerns, levels of preparedness, and the need for information.

Reports to County Board or Board committees: Team leaders routinely brief the County Board on the status of the planning process. The entire board is briefed at least annually and the Special Projects Committee is briefed at least twice each year in considerably more detail. On occasion, Team members have briefed other key County Board committees. One example was a committee charged with development of a countywide building code. This hearing, which featured a presentation by Prof. Williams on the importance of building codes in hazard mitigation, was attended by local contractors, home inspectors, bankers, and activists. Reports and meeting minutes can be found in the Appendix.

Coordination with Other Studies and Reports: Jersey County has only one countywide planning or operation document, the Emergency Operations Plan of the county's Emergency Services and Disaster Agency. The plan is either tested annually or reviewed after significant emergency or disaster incidents.

The county has no economic development plan, however in 2014 a proposal for the Illinois Enterprise Zone with neighboring counties and municipalities were being discussed. The Illinois Enterprise Zone Act took effect in December of 1982 and was amended in 2012. In 2014 the County, City of Jerseyville and City of Grafton submitted their applications for the zone. The City of Jerseyville has had an economic development or master plan for a number of years and as of 2012 a TIF plan was put in place to attract more economic growth in sections of the city. The City of Grafton has a TIF Economic Plan and a Comprehensive Plan, which was shared with the Planning Team.

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National Climatic Data Center Storm Events Database. Jersey County, IL

<http://www.ncdc.noaa.gov/stormevents> (date accessed, Dec. 2015). An excessive heat event is when the heat index is 105 degrees Fahrenheit or greater for more than 3 hours a day for two consecutive days or when the heat index reaches 115 degrees Fahrenheit or more at any time during a day.

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CHAPTER 2. Risk Assessment

Following the guidance provided in FEMA’s mitigation planning how-to guide, *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA 386-2), the Jersey County Hazard Mitigation Planning Team initially reviewed local records and existing mitigation plans, conducted informal interviews with local experts from the public and private sectors – including emergency responders and individuals at institutions of higher education – and researched data available on state and federal Websites to ascertain the natural hazards that posed any potential risk to Jersey County. The updated risk assessment of natural hazards over the past seven years has been analyzed based on new data and mapping. The profiles includes past occurrences, damages and probability of occurring in the future.

Jersey County has received nine (9) federal disaster declarations from January 1981 to May 2013 all due to flooding. From 2013 to 2015 the county received a gubernatorial disaster from flooding. The Illinois 2013 Natural Hazard Mitigation Plan has provided these hazard ratings:

County	Population	Severe Storms	Floods	Severe Winter Storms	Drought	Extreme Heat	Earthquake	Tornado
Jersey	22,571	High	Elevated	High	Guarded	High	Elevated	Elevated

2.1 Overbank Flooding:

Floods are certainly the most destructive natural hazards in Jersey County. The National Flood Insurance Program (NFIP) defines a flood as: **A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties...from [at least one of the following]:**

- Overflow of inland or tidal waters
- Unusual and rapid accumulation or runoff of surface waters from any source
- A mudflow

This broad definition allows for two general types of flooding: overbank flooding and flash flooding. Overbank flooding will be addressed in this section, while detailed information on flash flooding is classified under the broader section “Thunderstorm Profile.”

Overbank floods develop over a period of days. One or more of three factors causes them:

- 1) Too much precipitation in a watershed for the channels to convey
- 2) Obstructions in a channel, such as an ice jam or beaver dam
- 3) Large release of water when a dam, levee, or other obstruction fails.

Flooding may also occur in streets when a storm sewer is clogged or unable to handle heavy rainwater. This can cause sewer water to back up in basements creating an unhealthy environment. These problems are often

not related to overbank flooding or floodplain locations but rather by a flash flood not typically subject to flooding.

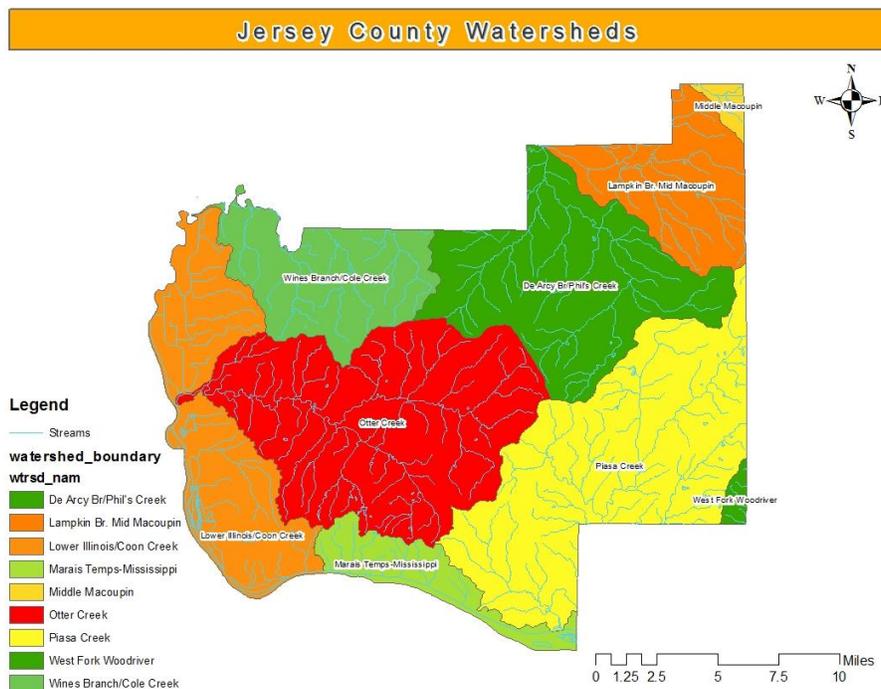
Precipitation: The most frequent cause of floods in Jersey County is the first factor. Jersey County receives an average of 39.71 inches of rainfall annually and an additional 15.44 inches of snowfall (generally, 7 inches of snow has the equivalent water content of one inch of rain).¹

Watersheds: Watersheds, the areas of land that drain into a lake, stream, or other body of water, are responsible for carrying rain and snowmelt to lower water channels. Smaller channels, or tributaries, carry water to larger channels until they reach the lowest body of water or main channel. In Jersey County, the main channels are the Illinois and Mississippi Rivers. Any one of these channels may overflow its banks as a result of too much precipitation. When this happens, a flood has been created.

Ice Jams: occur when warm weather and rain break up frozen rivers or any time there is a rapid cycle of freezing and thawing. The broken ice floats downriver until it is blocked by an obstruction such as a bridge or shallow area. Ice jams have not been a problem in Jersey County since the main river channels are deep and do not contain many bridges. Debris sometimes clogs shallower creeks in Jersey County. Although this is an area of concern, it has not historically led to major flooding events.

Levees: are designed to contain water when significant flood events occur. When levees break, hundreds of acres of land can be inundated and destroyed. A total of 19 Illinois levees failed during the Great Midwestern Flood from July 7 to August 3, 1993. Jersey County’s Nutwood Levee was one of those broken during this period.

Figure 2.1.1 Jersey County Water Sheds



Source: Jersey County Geographic Information System

¹ "Jerseyville, IL Weather" www.usa.com/jerseyville-il-weather

There are 5 major rivers or watersheds in Jersey County. They are the Mississippi River, the Illinois River, Macoupin Creek, Piasa Creek, and Otter Creek. Some of these extend into adjacent counties. (Figure 2.1.1)

The type of land in the watershed area has a major impact on the over bank flooding. If the terrain is steep the more the rain water will run off into the stream. If there is more impervious concrete then the less ground there is to absorb the rain water and the ground can become more saturated thus causing flooding.

Floods along the Illinois and Mississippi Rivers last for days or weeks while floods in other areas of the county are much shorter in duration. The lower Illinois River, in particular, is unique due to its natural, relatively low slope. Due to this low slope, floodwaters are slow to rise and stay for long periods of time. Specifically, the river's water overflows its banks about 90 days out of each year.² Ice jams have not been a problem in Jersey County since the main river channels are deep and do not contain many bridges. Debris sometimes clogs shallower creeks in Jersey County. Although this is an area of concern, it has not historically led to major flooding events.



Figure 2.1.1 Pump Station Road (Otter Creek Twp.) 10-2014

Flash floods: Flash floods are often generated by heavy rain falls in a relatively short time period. Narrow and smaller watersheds are more vulnerable to flash flooding. The velocity of the water is highly dangerous and can sweep away a vehicle with only one foot of water. Flash flooding is the leading cause of deaths as a result.

On July 12th and 13th of 2010 and area called Nutwood which is located in Rosedale Township saw 3 inches of rain in a short time causing flash flooding on several roads including IL Route 16 and 5 to 6 inches of rain with damaging winds and hail occurred during the late morning through the evening hours on October 2, 2014 that incurred extensive flash flooding all through the county's watersheds.³ In December of 2015 the area received over 10 inches of rain in one week, with 5 to 8 inches just in 2 days. Most floods develop slowly, however this flood was distinguished as a major flood due to the quick development and velocity of the water.

Safety: Flooding is the number one severe weather killer nationwide as shown on the National Weather Service graph. Nationally, 75% of the presidential disaster declarations are the results of floods. The most dangerous type is flash flooding. First, people may be killed as the result of being trapped in a vehicle. Sometimes people ignore travel warnings or try to drive around road barriers. When they do this, they inadvertently place themselves in a dangerous situation because cars float and can be swept away in less than two feet of moving water.

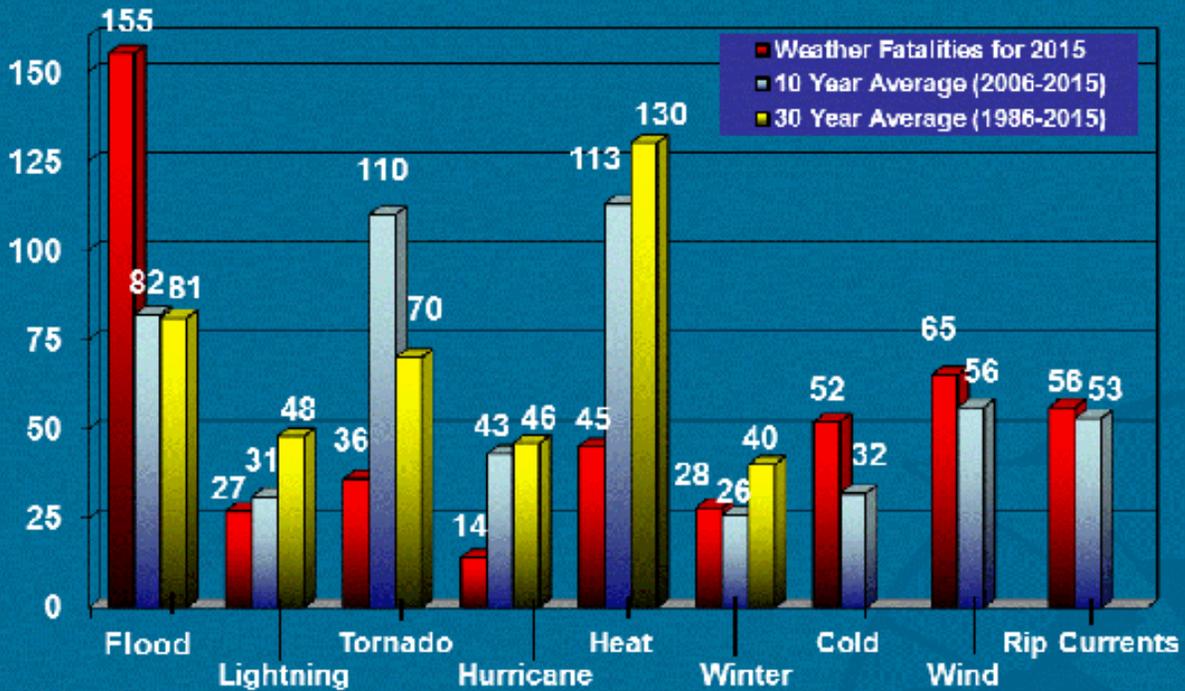
On Sunday, December 28, 2015 a local Grafton women was reported missing after leaving an establishment to walk a short distance to her home. The creek that she must cross to get to her home had become a raging torrent of water that drains into an underground tunnel eventually emptying into the Mississippi River at Grafton. Officers searched for days only to discover that she had drowned.

² Draft of Jersey County Hazard Mitigation Plan, 2008

³ NOAA Storm Events Database 2015



Weather Fatalities



Source: www.nws.noaa.gov 3/18/15

Another common damage is erosion in areas that are most prone such as fields for agriculture purposes or bluffs and ravines. In urban areas sanitary sewer backups are caused by infiltration of storm water into the sanitary sewer pipes by failures with sump pumps, inappropriate connections to sanitary sewer lines or drainage issues.

Fourteen people in Illinois have died from floods since 1995. Creeks and rivers rise and wash away the road bottom making floodwater much deeper than it initially appears. Second, electrocution causes many flood deaths. Electrical current is conducted through floodwaters when power lines are downed. Third, people may die simply by drowning in floodwaters. Finally, floods indirectly cause deaths through gas leaks, unsound structures, and fires. Fire fighters may have difficulty reaching a fire if they have to travel through a flooded area. Table 2.1.1 is a list of roads in Jersey County that will flood during flash flooding or over bank flooding.

Table 2.1.1 Flooded Roads

Township	Flooded Road	Flash Flood Road	Low Crossing Road	Flood Water Source
Elsah	Beltrees Rd.			Piasa Creek
	Mill St.-Elsah			Piasa Creek
	Mill Creek Park			Piasa Creek
	Lockhaven Rd.			Mississippi River
English		Hickory Log Rd.		Macoupin Creek
		Costello Rd.		Macoupin Creek
Fidelity		Oak Rest Rd.		Piasa Creek
Jersey	Range Line Rd.	Range Line Rd.		Macoupin Creek
	IL Rt. 16 West	IL Rt. 16 West		DeArcy Br/IL River
Mississippi		Little Piasa Rd.		Piasa Creek
Otter Creek		Pump Station Rd.		Otter Creek
		Dabbs North Rd.		So. Fork Otter Creek
			Shiloh Hollow	So. Fork Otter Creek
			Union Forest	So. Fork Otter Creek
Piasa		E. Bartlett Rd.		Piasa Creek
		Teney Hollow		Piasa Creek
		Mitchell Creek Rd.		Piasa Creek
Quarry	Main St. -Grafton	N. Springfield St.		Miss. River/Otter Creek
	All Rds. So. Of Main St.			Mississippi River
	IL Rt. 100 West			Illinois River
	Chautauqua			Mississippi River
Richwood		Sugar Creek Rd.		Sugar Creek
		Reddish Ford Rd.		Sugar Creek
	Spankey Ln.			Macoupin Creek
		Fieldon Hollow		Otter Creek
Rosedale			Fieldon Hollow	Spring Creek
	IL Rt. 100			Illinois River
	Coon Creek Rd.			Illinois River
	Otter Creek W	Otter Creek W		Otter Creek
	Eagleton Park Rd.			Illinois River
	Riverview Ln.			Illinois River
	Stump Lake Rd.			Illinois River
Ruyle			Huff Ln.	Macoupin Creek
			N. Apple Trees Rd.	Macoupin Creek

Source: Jersey County Highway Dept.

2.2 Flood Profile

Flooding is the single most damaging weather hazard in Illinois. Ever-increasing heavy precipitation since the 1940s has led to increased flood peaks on Illinois Rivers. Flood losses in Illinois, \$257 million annually since 1983, are the third highest in the nation. Within Illinois and the Midwest, flood losses have been increasing at a greater rate than elsewhere in the nation. Over a 45-year period (1955 - 1999), Illinois had \$5.195 billion in flood losses, and 74% of these losses have occurred since 1985.

Table 2.2.1 Loss Estimation

Loss Estimation According to Hazus-MH for Floods								
County	Rank	Total Losses (\$Thousands)	Total Exposure (\$Thousands)	Loss Ratio	Loss Index	Flood Score	Flood Vulnerability Rating	Flood Vulnerability Rating
Jersey	63	36090	328308	0.11	0.32	0.78	0.43	Average

Source: 2013 Illinois Hazard Mitigation Plan

In an area that is normally dry and receives a heavy amount of rainfall it is natural for streams and rivers to flood. During the course of the first half of June, 2008, much of the Midwestern U.S. received copious amounts of rainfall as one storm system after another traversed the region. Precipitation received across the Upper Mississippi Basin from December 2007 through May 2008 was the 2nd wettest in the year of 1895 to present record. During the month of June, over 1100 daily precipitation records were broken throughout the Midwest.

Figure 2.2.1



The majority of these records occurred in Iowa, Illinois, Wisconsin and Missouri. For the month, 78 stations reported their wettest day in any June on record and 15 of these stations set a new all-time record for the wettest 24 hour period for any month on record.

Exhibit 2.2.1 maps out Jersey County's regulatory floodplains and floodways that encompassed over 28,702 acres. The 2013 Illinois Hazard Mitigation Plan reports that the 100-year floodplain proportional area as of July 1, 2013 is 20 – 29%. Jersey County uses the base flood as the regulatory requirement and flood insurance rate base. Mapped regulatory floodplains are defined as the area of land, which is inundated with water during 100 year flood events.

MAP OF FLOOD ZONES DESIGNATIONS FOR JERSEY COUNTY

Zone A

Zone A is the flood insurance rate zone that corresponds to the 1 – percent – annual – chance floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone AE

Zones AE are the flood insurance rate zones that correspond to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding with a constant water-surface elevation (usually areas of ponding) where average depths are between 1 and 3 feet. The BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. The depth should be averaged along the cross section and then along the direction of flow to determine the extent of the zone. Average flood depths derived from the detailed hydraulic analyses are shown within this zone. In addition, alluvial fan flood hazards are shown as Zone AO on the FIRM. Mandatory flood insurance purchase requirements apply.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent -annual-chance floodplain, and to areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No base flood elevations or depths are shown within this zone.

Frequency and History of Floods: Jersey County can flood in any season, but floods are most common during the spring and summer months. Floods have been caused by localized storms and heavy rainfall or snowmelt upriver along the Illinois and Mississippi Rivers. The probable frequency of floods varies with the crest level or type of flood expected. In fact, the name of a flood is indicative of its probability of occurring in a given year. For example, a 200-year flood has a 1/200 (0.5%) chance of occurring in any given year. The term

“100-year flood” has caused much confusion for people not familiar with statistics. Another way of looking at it is to think of the odds that a base flood will happen sometime during the life of a 30-year mortgage (26% chance). A list of flood types and probabilities are presented in Table 2.2.2.

Table 2.2.2: What Are the Odds of a Flood?

Chance of Flooding over a Period of Years				
Time Period	Flood Size			
	10-Year	25-year	50-year	100-year
1 year	10%	4%	2%	1%
10 years	65%	34%	18%	10%
20 years	88%	56%	33%	18%
30 years	96%	71%	45%	26%
50 years	99%	87%	64%	39%

Even these numbers do not convey the true flood risk because they focus on the larger, less frequent, floods. If a house is low enough, it may be subject to the 10- or 25-year flood. During the proverbial 30-year mortgage, it may have a 26% chance of being hit by the 100-year flood, but the odds are 96% (nearly guaranteed) that a 10-year flood will occur during the 30 year period. Compare those odds to the only 5% chance that the house will catch fire during the same 30-year mortgage. Over the last couple decades, significant floods have occurred with regularity. A listing of the most significant events follows below in Table 2.2.3:

Table 2.2.3 Local Flood History

<i>INCIDENT PERIOD</i>	<i>PEAK HEIGHT (Grafton)</i>	<i>TYPE OF DECLARATION</i>
<i>2-5 December 1982</i>	431.49 ft.	Federal #674
<i>1 June 1983</i>	432.9 ft.	Federal #684
<i>23 February – 5 May 1985</i>	431.34 ft.	Federal #735
<i>21 September – 8 October 1986</i>	433.49 ft.	Federal #DR-776
<i>13 April – 22 October 1993</i>	441.99 ft.	Federal (Great Midwest Flood) #997
<i>9 April – 4 May 1994</i>		Federal #1025
<i>15 May – 15 June 1995</i>	434.29 ft.	Federal #1053
<i>21 April – 23 May 2002</i>	431.89 ft.	Federal #1416
<i>04 June – 29 June 2008</i>	434.60 ft.	Federal #1771
<i>April – 2013</i>	436.35 ft.	State
<i>June - 2015</i>	436.83 ft.	State
<i>December - 2015</i>	436.50 ft.	State

Local Flood History: The Great Midwest Flood of 1993 stands out as a disaster for the entire Midwest region. There were over \$18 billion in flood-related damages and 10,300 square miles in nine states were inundated. Although the flood’s direct cause seems to be rain extending from April through July, there were other contributing factors. The upper drainage basin of the Mississippi River experienced a wet autumn in 1992. During the winter, precipitation was heavier than normal and temperatures were lower than normal. Floods began along the Redwood River in Minnesota as the snow began to melt earlier than usual. The previous year’s lower than average temperatures had not allowed as much evaporation to take place so the melting snow was

not easily absorbed by the soil. Repeated heavy spring thunderstorms arrived in April compounding the problem. These thunderstorms from Minnesota to Missouri brought higher than normal precipitation during the first half of 1993. From June to July, a stationary high-pressure system dominated preventing rainfall from being distributed throughout the northeastern states. In May, Illinois received four inches of rain. In June, Illinois had eleven days with at least 20 reports of daily precipitation greater than two inches.⁴ The state experienced its wettest June-July period on record since 1895. The same record-breaking precipitation was common in other states in the upper Mississippi River basin and Midwest.



Source: *Calhoun Herald* 1993 Salvage Auto IL Rt. 16 West

Floodwaters crested in Jersey County during August. The river was nearly 20 miles wide where the Missouri and Mississippi Rivers normally converge at Grafton. The two rivers merged almost 20 miles north of their normal point. The flood in Grafton lasted for 195 days.

The spring flood of 1994 was less than a year from the Great Midwest Flood. The hardest hit counties were along the Illinois River. A Federal Disaster Declaration was declared for 16 counties in Illinois only to be amended later to include 19 more counties.

The state of Illinois experienced severe storms from April to May in 2002. They produced high winds, tornadoes, flash flooding and riverine flooding throughout the state. The Governor declared 102 counties a disaster and on May 21st the President issued a federal disaster for 68 counties.

The “Great Flood of 08” affected 7 states and once again Jersey County was declared a federal disaster. The damage was extensive to crops, businesses and homes. Several cabins along the Illinois River sustained damage over 50% and were either removed or elevated, therefore the floods of 2013 and 2015 caused minor damage to structures.

National Flood Insurance: The NFIP is a federal program providing property owners living in participating communities the ability to purchase insurance protection against losses from flooding. A participating community agrees to adopt and enforce a floodplain management ordinance with the federal government. The insurance is designed to provide an alternative to disaster assistance. Unincorporated Jersey County participates in the Community Rating System and as of May 2015 is rated as a Class 5 and ranked third in the Illinois in points.⁵ An examination of the National Flood Insurance Policies and Flood Insurance claims indicate the number of active policies and insurance coverage for Unincorporated Jersey County.

⁴ Nani G. Bhowmik, “The 1993 Flood on the Mississippi River in Illinois,” *Illinois State Water Survey*, <<http://www.sws.uiuc.edu/pubdoc/MP/ISWSMP-151.pdf>> (1 June 2004).

⁵ Lou Ann Patellaro, ISO/CRS Specialist 10/9/15

Table 2.2.4 National Flood Insurance policies in force

Policy Year	Policy Holders	Policy Contracts	Premiums	Total Coverage (Whole \$)	Average Coverage	Average Premium
2009	115	115	73,759	8,366,000	72,748	641
2010	126	126	83,791	9,590,000	76,111	665
2011	119	119	73,870	9,144,000	76,840	620
2012	106	106	66,915	8,740,000	82,453	631
2013	105	105	68,743	9,157,000	87,210	654
2014	103	103	78,497	9,369,000	90,961	762

Source: FEMA Data Base

Repetitive Losses: In 1995 the State of Illinois was ranked 5th in the nation for repetitive flood insurance claims. It also ranked 3rd in the nation for the number of communities with repetitive loss properties. Jersey County was ranked #1 as one of the worst counties for repetitive loss structures. Prior to and after the 1993 flood the county did not have any process or ordinance in place to track the structures located in the floodplain. Residents that had been flooded moved back in or in some cases rebuilt in the same area. There were 1585 closed paid flood losses for unincorporated Jersey County since 1978 and approximately 100 unpaid claims that were closed.

In 2002 a full time floodplain coordinator was hired to bring the county back into compliance by adopting a state modeled floodplain ordinance and clearing over 42 violations in the floodplain. After 2002 any new development in the floodplain had to meet FEMA requirements. Following the 2008 flood there were 85 flood claims with a reported loss of just over \$4 million. The total loss paid out from 1978 to 2008 has been \$15.5 million of which another 54 claims of \$1.5 million benefit claimants used ICC coverage. In addition 53 claims for \$325 thousand were paid out on manufactured homes. In Elsah, there are 32 NFIP policies in force. Since 1978 there have been 40 paid losses in Elsah for a total of \$514,008.; and in Grafton there are 58 policies in force. From 1978 there have been 600 paid out losses for a total of \$5,887,211. A part of the almost \$6 million is \$145,000 paid in Grafton to post-Firm buildings.⁶ Table 2.2.5

Table 2.2.5 NFIP Claims Report as of 2015

Year	Location	# NFIP Claims	\$ Paid Out
1978-2007	Jersey County	1585	\$11,500,000
2008	Jersey County	192	\$5,825,000
2009	Coon Creek	1	\$4,640
2010	Coon Creek	2	\$14,752
2011	Coon Creek	1	\$1,750
2013	Shady Oaks	1	\$108,787
	Powerline	1	\$51,217
	Lockhaven	1	Active
	Coon Creek	3	\$64,356
	Spankey	7	\$60,215
2015	Coon Creek	1	\$4,761
	Spankey	3	\$43,702
County Total		1798	\$17,679,000
1978-2015	Elsah	32	\$5,14,008
1978-2015	Grafton	600	\$5,887,211
Total		2430	\$24,080,219

⁶ Frank Shockey, Senior Natural Hazards Program Specialist FEMA Dist. 5
Jersey County Natural Hazard Mitigation Plan

As of February of 2012 there were 83 repetitive loss leased cabins remaining in the floodplain and another 14 located on private land; 10 of these Corps cabins were demolished and 58 were elevated with 29 repetitive loss structures remaining. See Table 2.2.6

Table 2.2.6 Remaining Repetitive Loss Structures

Currently, Unincorporated Jersey County, Elsah, and Chautauqua have 649 structures located in the floodplain (refer to table 2.2.9). After the 1993 flood FEMA identified 151 properties in Jersey County on their repetitive loss list and 18 were considered severe repetitive losses. In Grafton there are 89 RL properties identified with 56 mitigated and 32 remaining. Elsah has 3 RL properties on the list, with no mitigation

Community	Repetitive Properties	# Of Losses	Total Payments
<i>Coon Creek</i>	2	11	\$143,654
<i>Powerline</i>	6	23	\$86,272
<i>Beltrees</i>	1	2	\$15,106
<i>Shady Acres</i>	1	2	\$8,974
<i>Piasa Haven</i>	2	4	\$78,614
<i>Hannah Subdivision</i>	3	7	\$61,184
<i>Spankey</i>	2	9	\$51,905
<i>Lockhaven</i>	3	8	\$242,373
<i>Harbor Dell</i>	1	6	\$116,392
<i>Otter Creek</i>	7	27	\$256,244
<i>Shady Oaks</i>	1	2	\$8,826
Total	29	101	\$1,070,194

There are several different programs that encourage communities to identify the cause of repetitive loss properties and develop a plan to mitigate the losses. FEMA identifies repetitive loss property as and insurable building that received 2 or more claims of more than \$1000 within any 10 year period since 1978. The programs used for mitigation were buyouts through grants, elevation or demolition. The latter was attributed to local floodplain compliance and Increased Cost of Compliance coverage.

Table 2.2.6 Type of Remaining Repetitive Loss Structures Left

Using the Increased Cost of Compliance coverage under the Standard Flood Insurance Policy, a policyholder can file a claim that will help to pay for the cost to elevate, Floodproof, demolish or relocated the building when the state or local government declares the building to be over 50% damaged⁷ to comply with floodplain management and ordinance regulations (this Plan meets FEMA’s repetitive loss criteria).

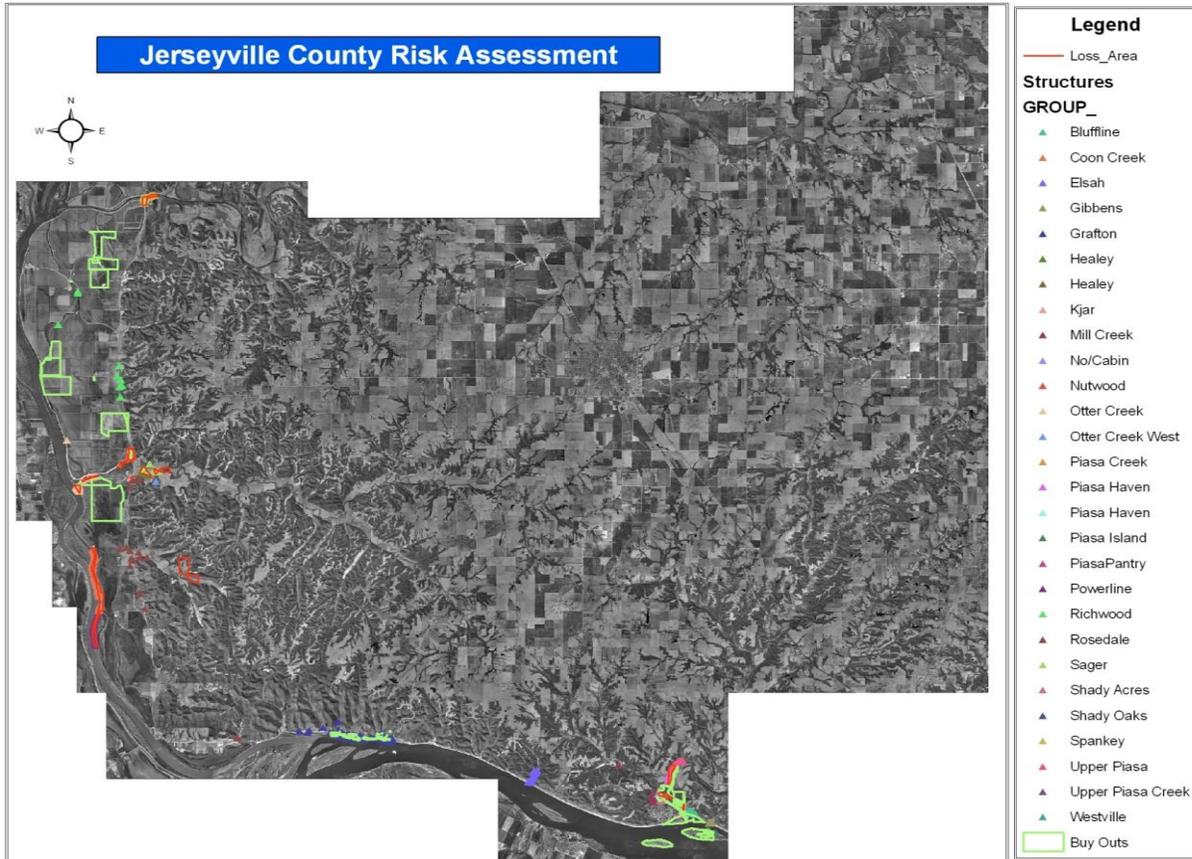
Location	Type of Structure	Number of Structures	Number of Claims
Beltrees Rd.	Junk Yard	1	2
Coon Creek Subdivision	USACE Cabin	1	11
Hannah Lease Property	Leased Cabins	3	7
Harbor Dell	Commercial	1	6
	USACE cabins	2	8
Lockhaven			
Otter Creek Subdivision	USACE cabins	6	27
Piasa Haven Subdivision	Residence	2	4
Powerline Subdivision	USACE cabins	8	23
Shady Acres	USACE cabins	1	2
Shady Oaks	USACE cabins	1	2
Spankey	Residences	2	9

Source: Jersey County Code Administrator

⁷ www.fema.gov/community-rating-system
Jersey County Natural Hazard Mitigation Plan

Each repetitive loss area is mapped out using the GIS system. All past and present structures located in the floodplain have electronic files containing the history of the structure. These files are hyper-linked to their location on the GIS system. The map below marks the location of a high risk area and maps the buy out properties.

Figure 2.2.8 Risk Assessment Map of Unincorporated Jersey County



Source: Jersey County GIS

Inventory of structures currently located in flood areas of the County

LOCATION	H	MH	Camp	Sh	B	Pb	Com	Club	G	Gr	S	Pmp	AC	Ot	TOTALS
Lockhaven Rd.	1	1		4	1		1	3						1	12
Eldred Blacktop						2									2
Beltrees Rd/Upper Piasa	4			2		1	1	3	2	1					14
Piasa Haven	11	3		6				2	6					1	29
Piasa Island								1							1
Shady Oaks				2				10							12
Shady Acres & Millcreek Park	6	11	1	4		1			8					1	32
North Bluffline	6	5		2					2						15
West Bluffline	2	1													3
Powerline Subdivision								30							30
Elsah (including Historic Elsah)	210			15		1			16					57	299
Chautauqua	17														17
Sager-Widaman	5	3		1					3						12
Healey Park	4	2		1				3	2						12
Route 100 (No. of Nutwood)				4		6				7					17
Route 100 (So. of Nutwood)	3	1		1	1	1			1	3	1		1		13
Otter Creek W					1										1
Otter Creek		1		1				11				1			14
Hannah								6		1					7
Sandridge Rd.				2	1	1				9					13
Spanky	8	2		2	1				2						15
Coon Creek								32							32
Route 16	1			2		2	1		1	6	1				14
Powers Rd.	1					1									2
Glades Access Rd.						1				2					3
Nutwood	8	4							3		6				21
Westville Club								6						1	7
TOTALS	287	34	1	49	5	17	3	107	46	29	8	1	1	61	649

Table 2.2.5 Structures Located in the Jersey County Floodplain

KEY:

- H- Houses
- MH-Mobile Homes
- Camp- Camps
- Sh- Sheds
- B- Barns
- Pb- Pole barns
- Com- Commercial
- Club- Clubhouses
- G-Garages
- Grain-Grain Bins
- S- State Park
- Pmp- Pump Station
- AC- Animal Confinement
- Ot- Other Structures

Source: Jersey County Floodplain Coordinator

Flood Impacts and Costs: While the Great Midwest Flood of 1993 was disproportionately destructive when compared to other floods, its extensive effects provide a useful lens through which to analyze the potential impacts and costs of Jersey County floods. It provides a worst-case scenario for county planners. The flood's impact falls into five general categories: safety, health, property damage, economics, critical facilities, transportation, and repetitive loss areas. Awareness of a flood's impacts and costs is a constructive first step toward mitigating the impact of future floods.

Safety: Floods can imperil human life in a number of ways. First, people may be killed as the result of being trapped in a vehicle. Sometimes people ignore travel warnings or try to drive around road barriers. When they do this, they inadvertently place themselves in a dangerous situation because cars float and can be swept away in less than two feet of moving water. Creeks and rivers rise and wash away the road bottom making floodwater much deeper than it initially appears. The previous table 2.2.7 lists the roads that will become flooded with high water and residents are warned to find alternate routes. Second, electrocution causes many flood deaths. Electrical current is conducted through floodwaters when power lines are downed. Third, people may die simply by drowning in floodwaters. Finally, floods indirectly cause deaths through gas leaks, unsound structures, and fires. Fire fighters may have difficulty reaching a fire if they have to travel through a flooded area.

In the Great Midwestern Flood of 1993, a total of 52 people were killed nationwide. In Jersey County, there was one fatality attributable to drowning. The death toll was minimal due to early flood warnings and because 2,400 county residents were evacuated and sought safety on higher ground. Nevertheless, there were two hospitalizations and 196 flood-related injuries.

The Midwest Flood of 2008 caused significant agricultural loss and property damage in Iowa, Illinois, Indiana, Missouri,

Minnesota, Nebraska and Wisconsin with rainfall totals ranging from 4 to over 16 inches. A total of 24 people were killed.⁸

In June of 2015 Illinois set new record for rainfall at 8.71 inches breaking the 1902 record of 8.27 inches. The heaviest rain fell along the Illinois River where major flooding broke gauge records⁹. Again in December of 2015 the Midwest was engulfed by dangerous flooding levels that were being compared to The Great Flood of 1993. The storm system that swept Illinois and Missouri claimed over 40 lives, five of those were in Illinois. Inmates of nearly 3,700 from a Menard state prison in Illinois had to be transferred and employees and emergency work crews filled sandbags to prepare for possible flooding. The maximum security prison was on



⁸ www.ncdc.noaa.gov/billions/events

⁹ Illinois State Water Survey – NCEI dated July 2, 2015

lockdown. The US Coast Guard closed a five-mile portion of the Mississippi River and Illinois Department of Transportation closed several roads and highways including Route 100 which runs through Grafton.¹⁰

Swift water raged in Spankey, a riverside community located on the banks of the Macoupin Creek which is two miles east of the Illinois River. After a weekend of constant heavy rain the creek went from a 10 foot deep creek to a 30 foot creek making it impossible for families to evacuate the area. Jersey County law officials and QEM Fire Department both put out a call for emergency assistance. Alton Fire Department responded with a trained rescue team. The crew formulated a plan and with the assistance of a local person with a commercial fishing boat they were able to rescue ten people, two of which were under age children. They made four different trips to rescue the people and some of their pets.¹¹

Health: Although not always reported, health problems are a serious concern during floods. Specific problems vary with stages of the flood. When floodwaters are present they carry dirt, oil, animal waste, and various chemicals from lawns, farms, and industrial sites upstream. The ground can become so saturated with water during a flood period that sewer lines are infiltrated. Often sewers back up when floodwaters seep into basements. Partially treated sewage is a direct threat to health and may contaminate surface waters. This occurs because high ground water reduces the soil's ability to treat wastewater. Well sources may become contaminated with this untreated wastewater. People relying on the water supplies may then unknowingly consume sewage-contaminated water. During the flood of 1993, the Jersey County Health Department received over 100 requests for information regarding sewage clean-up. In response, the Department provided consultation and literature regarding clean-up procedures.¹²

Once floodwaters have subsided, stagnant pools of water may breed mosquitoes and wet sections of buildings breed mold and mildew. These two hazards are especially detrimental to the health of young children and senior citizens. To counter this danger in the 1993 flood, 1,392 tetanus shots were given to county residents.¹³ Other health hazards will arise if buildings are not cleaned quickly and properly after a major flood.

After the 2008 flood, there were meetings with the Jersey County Health Departments' Director of Environmental Health, FEMA, and Illinois Department of Public Health Program Manager for Private Sewage Disposal, United States Army Corp of Engineers, Illinois Office of Water Resources and Jersey County. The topic of debate was the issue of sewage disposal in the floodplain. The aforementioned collaborated and determined the septic systems in question were failed in regards to multiple aspects of the applicable rules and codes including the *Illinois Private Sewage Disposal Licensing Act and Code* and the *Jersey County Floodplain Ordinance*.

On October 30, 2009 a letter from the Illinois Department of Public Health (IDPH) was issued state wide to local health departments, environmental health directors and units of local government to reiterate and clarify how flooding relates to the Private Sewage Disposal Licensing Act and Code.¹⁴ The IDPH determined that it would be a violation of the Code to install a new or repair a private sewage system disposal or component of a system that will be affected or have a public health impact on the surface waters moving over the property as they were deemed to be in a state of failure when it is covered by surface water. Any new development in the floodplain requires the old septic to be removed and replaced with a sealed system.

¹⁰ *The Guardian* Jan. 2016

¹¹ www.riverbender.com *Swift Water Rescue*

¹² Jersey County Health Department.

¹³ Jersey County Health Department.

¹⁴ 225 ILCS 225; 77 IL Administrative Code Part 905

Jersey County was one of several counties declared a Federal Disaster after the 2008 flood. Grant funds became available to private individuals located in the floodplain to replace their failed septic with a state approved sealed system. There were 12 private sewage disposal systems removed and replaced with the new sealed system with funds totaling \$149,923.64. The US Army Corp of Engineers directed its leased cabin area in the floodplain to follow the codes thereby another 148 septic systems along the Illinois River and Piasa Creek were removed at the expense of the lessee and replaced with new systems. (Figure 2.2.6)

Long-term psychological impacts are also possible after a flood. They may come in the form of sleeplessness, increased irritability, or anxiety. Cleaning up after a flood and dealing with the loss of many personal items is a difficult, stressful experience by anyone’s standards, but especially if one is unprepared or uninsured.

Figure 2.2.6 Original Septic Systems Removed



Source: Jersey County Health Department

Property Damage: There are two major types of property damage from flooding: structural damage and crop damage. Structural damage can take place when deep or fast-moving waters push a building off its foundation. More frequently, flood damage is caused by the weight of standing water. Water and saturated soil together exert pressure on basements that cause basement floors and walls to crack and lift up in sections. Soaking is another common problem. Wood and other materials swell after sitting in water and when they finally dry, they often crack, split, or warp.

Jersey County faced high costs for structural damage in 1993. In the Grafton area, 190 of 300 total homes (63%) had water in them, and 750 of the city’s 950 residents were forced to evacuate. In Elsah, 28 of the 70 total homes (40%) were affected by the flood. The Jersey County Assessors Office recorded that the 1993 property assessments were reduced by over \$3 million and after the 2008 flood the assessments were reduced by over \$1.1 million due to damage caused by the floods.¹⁵ A breakdown of these reductions follows below. Some county residents were covered by flood insurance to rebuild or renovate their homes. Many did not have flood insurance because floodwaters had never reached so high. A federal buyout was made available to enable citizens to rebuild or purchase a home.

¹⁵ Jersey County Supervisor of Assessments

During the 2008 and 2013 floods a number of homes and businesses in Grafton, Elsah and unincorporated Jersey County were exposed to 2 to 4 feet of flood water. The Jersey County Code Administrator's office red tagged over 100 structures resulting in 46 elevations and 34 demolitions¹⁶. The year 2015 brought two major floods in June and December with another 5 demolitions and 3 elevations.



After the 2008 flood the City of Grafton received IEMA funds for eight buyouts, 4 residents, 3 commercial and 1 warehouse totaling \$1,747,600.00.¹⁷

Table 2.1.7 Assessment Reduction 2000-2015								
Year	Location	Reduction	Year	Location	Reduction	Year	Location	Reduction
2008	Coon		2011	Coon		2014	Coon	
	Creek	60740.00		Creek	0.00		Creek	0.00
	Powerline	55950.00		Powerline	0.00		Powerline	0.00
	Westville			Westville			Westville	
	Club	7000.00		Club	11135.00		Club	0.00
	Shady			Shady			Shady	
	Oaks	25200.00		Oaks	9000.00		Oaks	0.00
Lockhaven	0.00	Lockhaven	0.00	Lockhaven	0.00			
Total	148890.00		Total	20135.00		Total	0.00	
2009	Coon		2012	Coon		2015	Coon	
	Creek	16605.00		Creek	10230.00		Creek	0.00
	Powerline	81520.00		Powerline	0.00		Powerline	0.00
	Westville			Westville			Westville	
	Club	11765.00		Club	0.00		Club	0.00
	Shady			Shady			Shady	
	Oaks	15215.00		Oaks	0.00		Oaks	9025.00
Lockhaven	10735.00	Lockhaven	11135.00	Lockhaven	17800.00			
Total	223155.00		Total	21365.00		Total	26825.00	
2010	Coon		2013	Coon				
	Creek	53135.00		Creek	18570.00			
	Powerline	58320.00		Powerline	0.00			
	Westville			Westville				
	Club	0.00		Club	0.00			
	Shady			Shady				
	Oaks	9295.00		Oaks	10915.00			
Lockhaven		Lockhaven	0.00					
Total	120750.00		Total	29485.00		Total Loss	590605.00	

Source: Jersey County Assessor – Jersey County Code Administrator

¹⁶ Jersey County Code Administrator Office

¹⁷ Treasurer of the City of Grafton, Grafton City Hall, Grafton, IL 2015

Economic Impact: Not only does flooding affect business sales, loss of inventory and loss of tourism, it also causes long term problems. Flooding creates several types of impacts to the communities due to flooded roads, ferry closures, bridge repairs, damages to public property and the cost to local governments to clean up the debris and repair the structures.

The December 2015 heavy rains caused the Mississippi and Illinois Rivers to rise 10 ft. in just 3 days. As the floodwaters recede communities begin to assess the damages. Jersey County submitted over a million dollars in losses. The following are a list of submitted losses; however these figures are not final and confirmed:

Nutwood Levee District	\$300,000	Quarry Township	\$100,000
City of Grafton	\$300,000	Jersey County Rural Water	\$100,000
Elsah Township	\$300,000		
Jersey County Government, Rosedale Township and Piasa Township			\$50,000

These figures underscore the fact that floods have an economic impact to local municipalities and the county. It should be pointed out that the flood of 2008 had a lasting economic impact on the municipalities of Elsah and Grafton.

Table 2.1.8 Economic Impact: Annual Retail Sales¹⁸

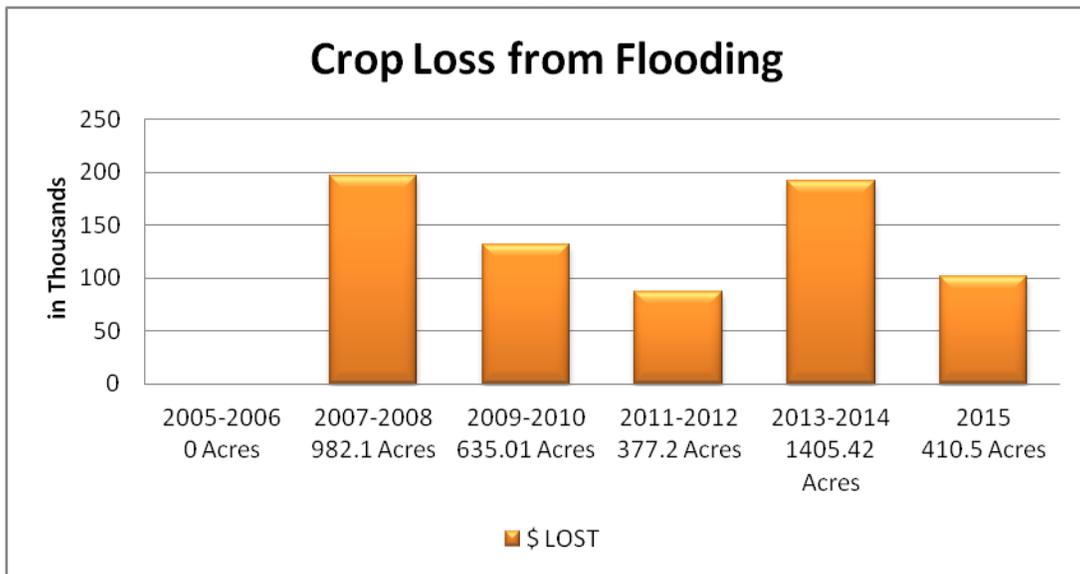
Municipality	2008	2009	2010	2011	2012	2013	2014	2015
Elsah	6,097.00	4,648.00	11,078.00	5,547.00	6,041.00	6,097.00	30,764.00	21,629.00
Fieldon	12,492.00	12,241.00	11,641.00	9,660.00	10,580.00	12,492.00	9,931.00	12,005.00
Grafton	336,980.00	221,258.00	265,805.00	304,860.00	330,732.00	336,980.00	379,524.00	432,442.00
Jersey County	246,353.00	442,767.00	202,969.00	247,391.00	213,210.00	246,353.00	259,863.00	278,463.00
Jerseyville	3,596,586.00	3,439,446.00	3,108,273.00	3,509,119.00	3,583,346.00	3,596,586.00	3,642,490.00	4,236,436.00
Totals	4,198,508.00	4,120,360.00	3,599,766.00	4,076,577.00	4,143,909.00	4,198,508.00	4,322,572.00	4,980,975.00
% Difference		-1.86%	-12.63%	13.25%	1.65%	1.32%	18.85%	13.22%

The exact cause of flood damage is hard to estimate. Businesses often have to close because of inaccessibility of roads due to flooding, loss of inventories and employees or other residents protecting or cleaning up their own homes. A municipality will have the added economic burden of expenses for hiring individuals to sandbag, clean-up of debris and repairs to public property.

¹⁸ Illinois State Revenue – Standard Industrial Classification Code Reporting
Jersey County Natural Hazard Mitigation Plan

Crop damage due to flooding was the direct cause of falling agricultural output in 1993. Jersey County’s crop production was worth \$34.5 million in 1993, a 3 percent decline compared to production levels in 1992. Table 2.1.9 points out the number of acres of crops lost due to flooding. Crop damage in the flood years of 2008 and 2012 were the highest compared to normal crop loss due to drought, heat, wind, hail or cold wet weather. Corn and soybeans were two main commodities of loss, in 2008 \$195 thousand in crop loss was reported and in 2013-14 a reported \$192 thousand was lost.¹⁹

Table 2.1.9



Source: USDA-RMA Public Web Site

Critical Facilities and Infrastructure: Some development can be more important than others, and these are considered “critical facilities.” They are buildings and infrastructure whose exposure or damage can affect the well being of populated areas. The impact of a tornado or a flood on a hospital is greater than on a residential dwelling or commercial business. There are usually two kinds of facilities that a community would consider “critical” during and after a flood:

- Those that are vital to flood response activities or critical to the health and safety of the public before, during, and after a flood, such as a hospital, emergency operations center, electric substation, police stations, fire stations, nursing homes, schools, vehicle and equipment storage facilities, or shelters.
- Those that, if damaged, would make the disaster a bigger problem and its impacts much worse, such as a hazardous materials facility, power generation facility, water utilities, or wastewater treatment plant.

¹⁹ USDA, RMA Public Web Site

For the purpose of this Plan the critical facilities referred to are as follows:

1. Health facilities: hospitals, nursing homes and veterinarian facilities.
2. Emergency response facilities: police and fire stations, public work sites, communication facilities.
3. Utilities: water and wastewater treatment plants, electrical substations and gas stations
4. Schools/college
5. Assembly halls: churches, theaters and banquet halls.
6. Bridges/ferries: affected by the 100-year flood base
7. Correctional facilities

2.1.8 Category of Critical Facilities

CRITICAL FACILITES					
Municipalities	Public Safety & Security	High Density Occupancy	Transportation	Utilities	Total
Elsah	4	4		1	9
Fieldon	2	4		1	7
Grafton	5	4		1	10
Jerseyville	15	22	4	5	46
Unincorporated area	11	10	5	3	29
Total	37	44	9	11	101

Source: Office of Jersey County Code Administrator, Jersey County GIS
2015

Inventory of Assets: Essential facilities are critical to the health and welfare of the whole citizens of the county and are essential following a hazard. They are listed by the following categories with maps to follow:

Public Safety and Security

Medical

Jersey Community Hospital and Wellness Center, 400 Maple Summit Road, Jerseyville, IL 62052 (618-498-6402). It is a full service hospital with 67 inpatient beds and 24-hour emergency room coverage.
McDow Memorial Clinic, 270 Maple Summit Road, Jerseyville, IL 62052 (618-498-2032)
Illini Medical Associates, 390 Maple Summit Road, Jerseyville, IL 62052 (618-498-2101)
Jersey County Health Department, 1307 St. Hwy 109, Jerseyville, IL 62052 (618-498-9565)
Jerseyville Manor (Nursing Home), 1251 N. State Street, Jerseyville, IL 62052 (618-498-6441)
Jerseyville Nursing & Rehab, 1001 S. State Street, Jerseyville, IL 62052 (618-498-6496)
Willow Rose Rehab & Health Center, 410 Fletcher, Jerseyville, IL 62052 (618-498-7837)

Public Safety & Security

Jersey County Sheriff Department, 201 W. Pearl, Jerseyville, IL 62052 (618-498-6881)
Jerseyville Police Department, 200 S. Jefferson, Jerseyville, IL 62052 (618-498-2131)
Grafton City Police Department, 118 East Main St., Grafton, IL 62037 (618-786-3354)
Jerseyville Fire Department, 115 E. Prairie, Jerseyville, IL 62052 (618-498-2141)
QEM Fire District, 14905 Elsah Road, Grafton, IL 62037 (618-786-3300)
Fieldon Fire Protection District, West Locust St., Fieldon, IL 62031 (618-498-6881)
Rosedale Fire District, 20919 State Highway 100, Fieldon, IL 62031 (618-376-3471)
IL Dept. of Corrections, 17808 State Highway 100 W., Grafton, IL 62037 (618-786-2371)

Communications

Grafton Communications Inc., 301 Commerce Dr., Jerseyville, IL 62052 (618-639-4841)
Principia sub-station, 1 Maybeck Pl., Elsah, IL 62028 (618-374-2131)
AT&T (800-800-464-7928)
Grafton Technologies, Main St., Grafton, IL 62037 (618-639-4841)
Ameritech (800-244-4444)
Frontier (800-921-8101)
Verizon (800-483-4000)
WJBM Radio 1480, 1010 Shipman Rd, Jerseyville, IL 62052 (618-498-8255)
WTPC Radio channel 28, Principia College, Maybeck Pl., Elsah

Government

Jersey County Courthouse, 201 W. Pearl, Jerseyville, IL 62052 (618-498-5571)
Jersey County Administration Building, 200 N. Lafayette St., Jerseyville, IL 62052 (618-498-5571)
Grafton City Hall, 118 Main St., Grafton, IL 62037 (618-786-3344)
Jerseyville City Hall, 115 E. Prairie, Jerseyville, IL 62052 (618-498-3312)
Fieldon Village Hall, St. Highway 16, Jerseyville, IL 62052
Piasa Town Hall, 17973 Lageman Ln., Brighton, IL 62012
Jersey Township Hall, 720 St. Highway 16, Jerseyville, IL 62052 (618-498-3719)
Ruyle Township Hall, 29886 Kemper Rd., Medora, IL 62063 (618-498-2370)
Elsah Civic Hall, 51 Mill St., Elsah, IL 62028 (618-374-1568)
Rosedale Township Hall, 13579 Rosedale Rd., Grafton, IL 62037

High Density Occupancy: Assembly Halls, Churches, Motels, Schools

Schools

Jersey Community High School, 801 N. State St., Jerseyville, IL 62052 (618-498-5521)
Illini Middle School, 1101 S. Liberty, Jerseyville, IL 62052 (618-498-5527)
Jerseyville East Elementary, 201 N. Giddings, Jerseyville, IL 62052 (618-498-3814)
Jerseyville West Elementary, 1000 W. Carpenter, Jerseyville, IL 62052 (618-498-4322)
Grafton Elementary, 1200 Grafton Hills, Grafton, IL 62037 (618-786-3388)
Holy Ghost School, 309 N. Washington, Jerseyville, IL 62052 (618-498-4910)
St. Francis Xavier School, 412 S. State St., Jerseyville, IL 62052 (618-498-4823)
Principia College, 1 Maybeck Place, Elsah, IL 62028 (618-374-2131)

Churches

First Church of Christ Scientist, LaSalle St., Elsah, IL 62028
Elsah United Methodist Church, Selma Square, Elsah, IL 62028 (618-567-0629)
Church of the Nazarene, 285 Maple Summit Rd., Jerseyville, IL 62052 (618-498-3538)
Fieldon United Church, 205 1st St., Fieldon, IL
Fieldon Baptist Church, 104 N. Public Rd., Fieldon, IL 62031(618-376-3710)
Fieldon Temple Association, 207 W. Locust, Fieldon, IL 62031
St. Mary's Church, 17581 State Hwy 16, Fieldon, IL 62031 (618-498-3416)
First Assembly of God, 500 Cross, Jerseyville, IL 62052 (618-498-9597)
St. Patrick's Church, 10 N. Evans, Grafton, IL 62037 (618-786-3512)
Peace United Church of Christ, 23098 Glenda, Jerseyville, IL 62052 (618-498-2262)
St. Francis Church, 506 S. State St., Jerseyville, IL 62052 (618-498-3518)
Jerseyville Church of Christ, 24439 US Highway 67, Jerseyville, IL (618-498-8133)
Hope Lutheran Church, 1009 N. State St., Jerseyville, IL 62052 (618-498-3423)
Eastland Baptist Church, 23027 Cherry Ln., Jerseyville, IL 62052 (618-498-6919)
Gospel Assembly Church, 601 S. June St., Jerseyville, IL 62052 (618-498-7356)
Holy Ghost Church, 306 N. Washington, Jerseyville, IL 62052 (618-498-3416)
Grace Community Baptist Church, 910 W. County Rd., Jerseyville, IL 62052 (618-498-6201)
First United Methodist Church, 1200 S. Liberty, Jerseyville, IL 62052 (618-498-2621)
First Baptist Church, 200 W. Pearl, Jerseyville, IL 62052 (618-498-3602)
Cross Roads Community Church, 16453 Highway 111, Brighton, IL 62012
Otterville Southern Baptist, 103 E. Main St., Otterville, IL 62052
Bethel Baptist Church, 29515 Kane Rd., Jerseyville, IL 62052

Assembly-Motels

Frontier Lodge, 730 S. State St., Jerseyville, IL 62052 (618-498-6886)
Aerie's Lodging & Conference Center, 800 Timber Ridge, Grafton, IL 62037 (618-786-8439)
Tara Point Inn, 1 Tara Point Dr., Grafton, IL 62037 (618-786-3555)
Susnig Center, 401 Mound St., Jerseyville, IL 62052 (618-498-2222)
American Legion Worthey Post 492, Veterans Memorial Pkwy., Jerseyville, IL
Whalen-Hill American Legion Post 648, 14258 Scenic Hill Dr., Grafton, IL 62037 (618-786-3381)
Pere Marquette Lodge, 15780 W. State Hwy 100, Grafton, IL 62037 (618-786-2331)
Super 8 Motel, 1303 State Hwy. 109, Jerseyville, IL 62052 (618-498-7888)
Stadium Theater, 124 E. Pearl, Jerseyville, IL 62052 (618-498-4711)

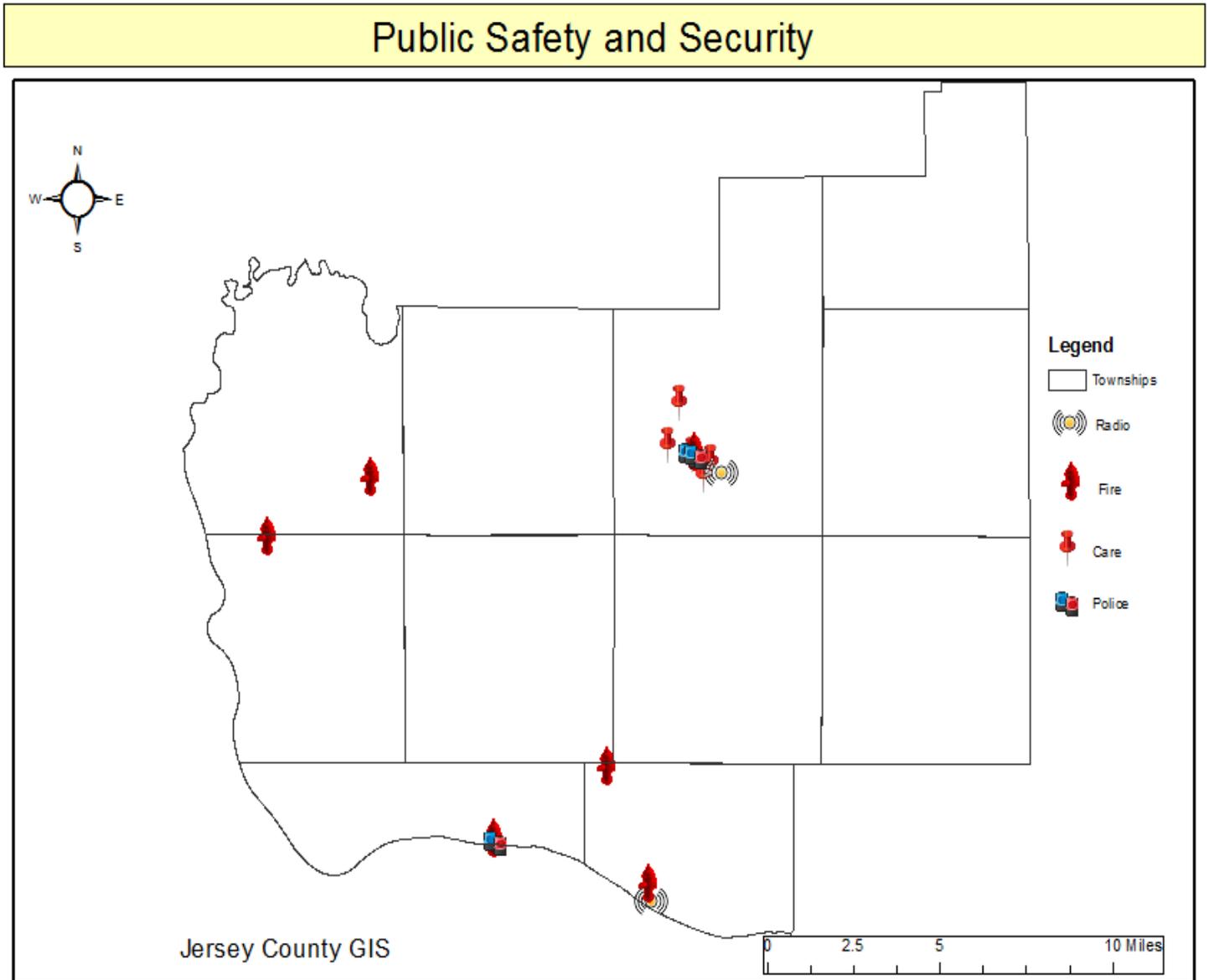
Transportation

Brussels Ferry, 16211 Illinois Route 100, Grafton, IL 62037 (618-786-3636)
Jersey Community Hospital Heliport (27IL), Maple Summit Rd., Jerseyville, IL 62052 (618-498-6402)
Community School Dist. 100 Bus Facility, 1110 W. County Rd., Jerseyville, IL 62052 (618-498-9866)
Jerseyville Aviation Inc. Airport (OLL1), US Hwy 67, Jerseyville, IL 62052 (618-498-9062) (private)
Koenig Airport (OLL3), 25486 Dow Rd., Dow, IL 62022 (618-885-5415) (private)
William E. Koenig Airport (01IS) (private)
Raymond Rla Airport (LL49), 19244 US Hwy. 67, Jerseyville, IL 62052 (618-498-4028)
(private)
Dept. of Corrections Heliport (8IS3) State of IL, 17808 St. Highway 100 W., Grafton, IL 62037 (618-786-2371) (private)
Jersey County Highway Dept., 722 State St., Jerseyville, IL 62052 (618-498-9074)

Utilities

Jerseyville North Sewer Plant, W. Fairgrounds Ave., Jerseyville, IL 62052
Jerseyville Water Works, 115 E Prairie, Jerseyville, IL 62052 (618-498-3211)
Jersey County Rural Water, 1009 IL Route 16, Jerseyville, IL 62052 (618-498-9534)
Village of Fieldon Water Dept., W Locust St., Fieldon, IL 62031 (636-662-2557)
Grafton Water Works, 235 Grafton Hills Dr., Grafton 62037 (618-786-3616)
Rosedale Township Water Plant, Waterworks Rd., Fieldon, IL 62031
MJM Electric Coop, Rosedale Sub-Station, 20690 State Hwy 100, Fieldon, IL 62031 (800-648-4729)
Central ILL Public Service Co., Maple Summit Rd. Sub-Station, Jerseyville, IL 62052
Central ILL Public Service Co., 24015 N. Centennial Rd. Sub-Station, Jerseyville, IL 62052

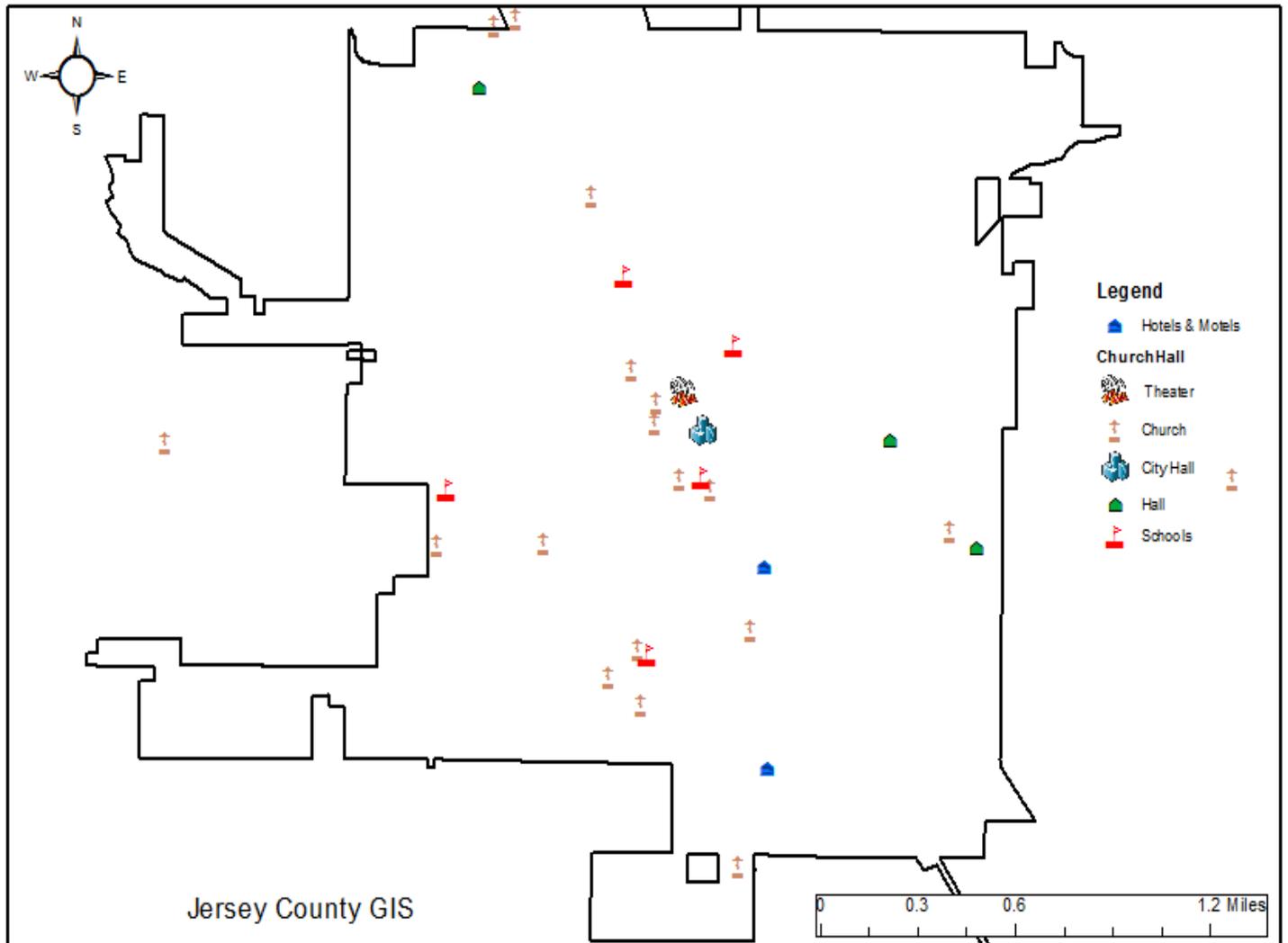
2.1.9 Critical Facilities



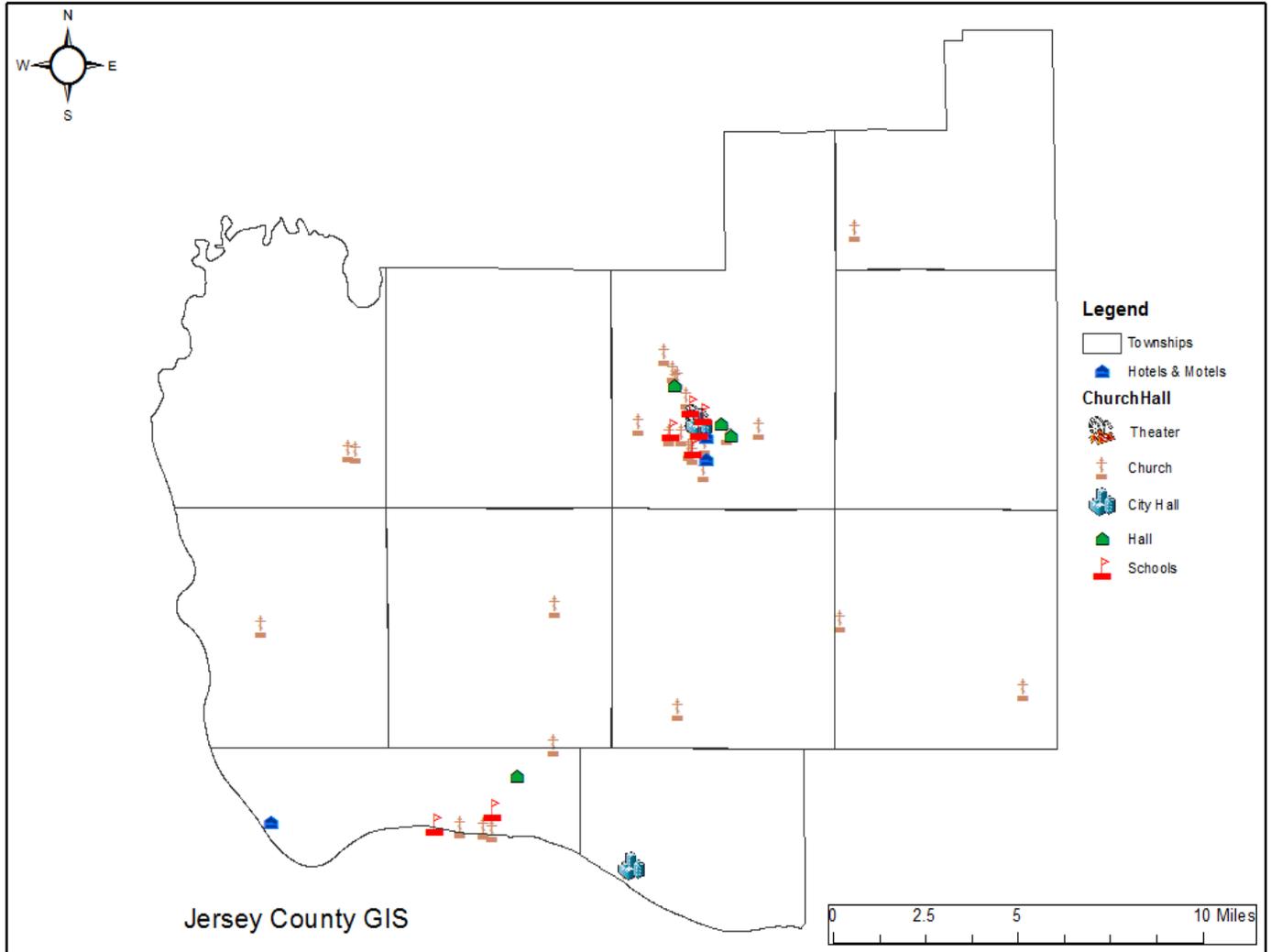
Source: *Jersey County GIS*

High Density Occupancy

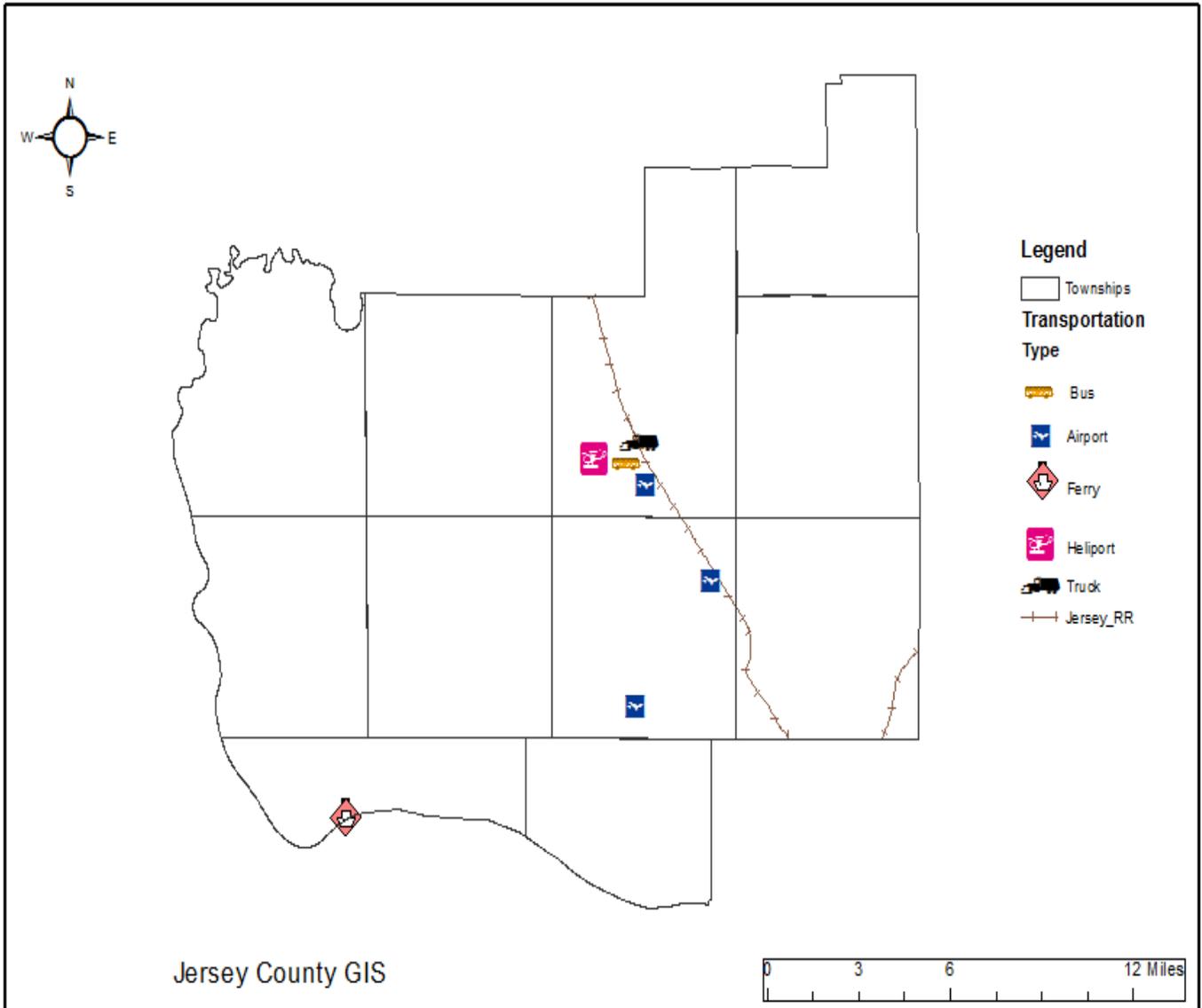
City of Jerseyville



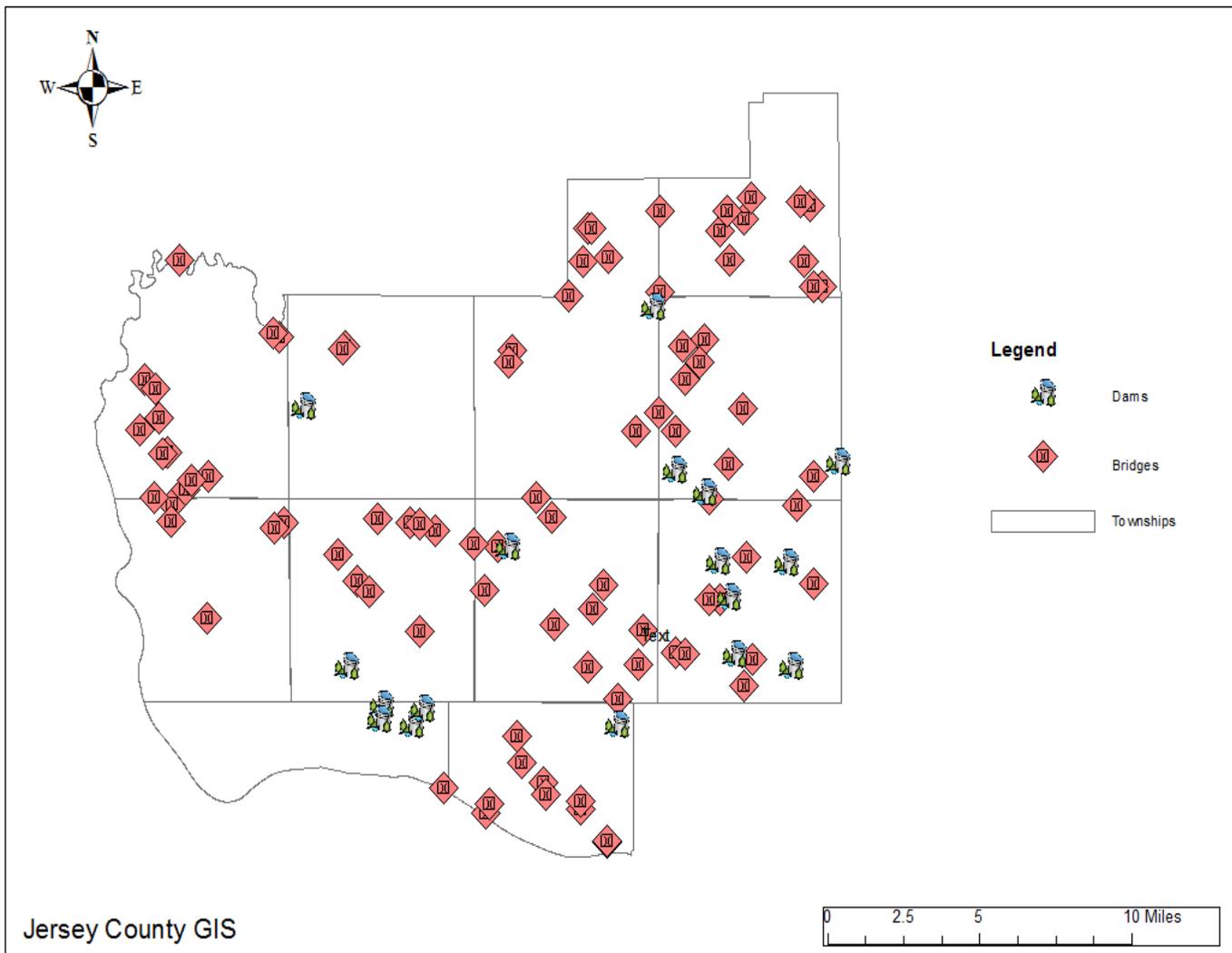
High Density Occupancy



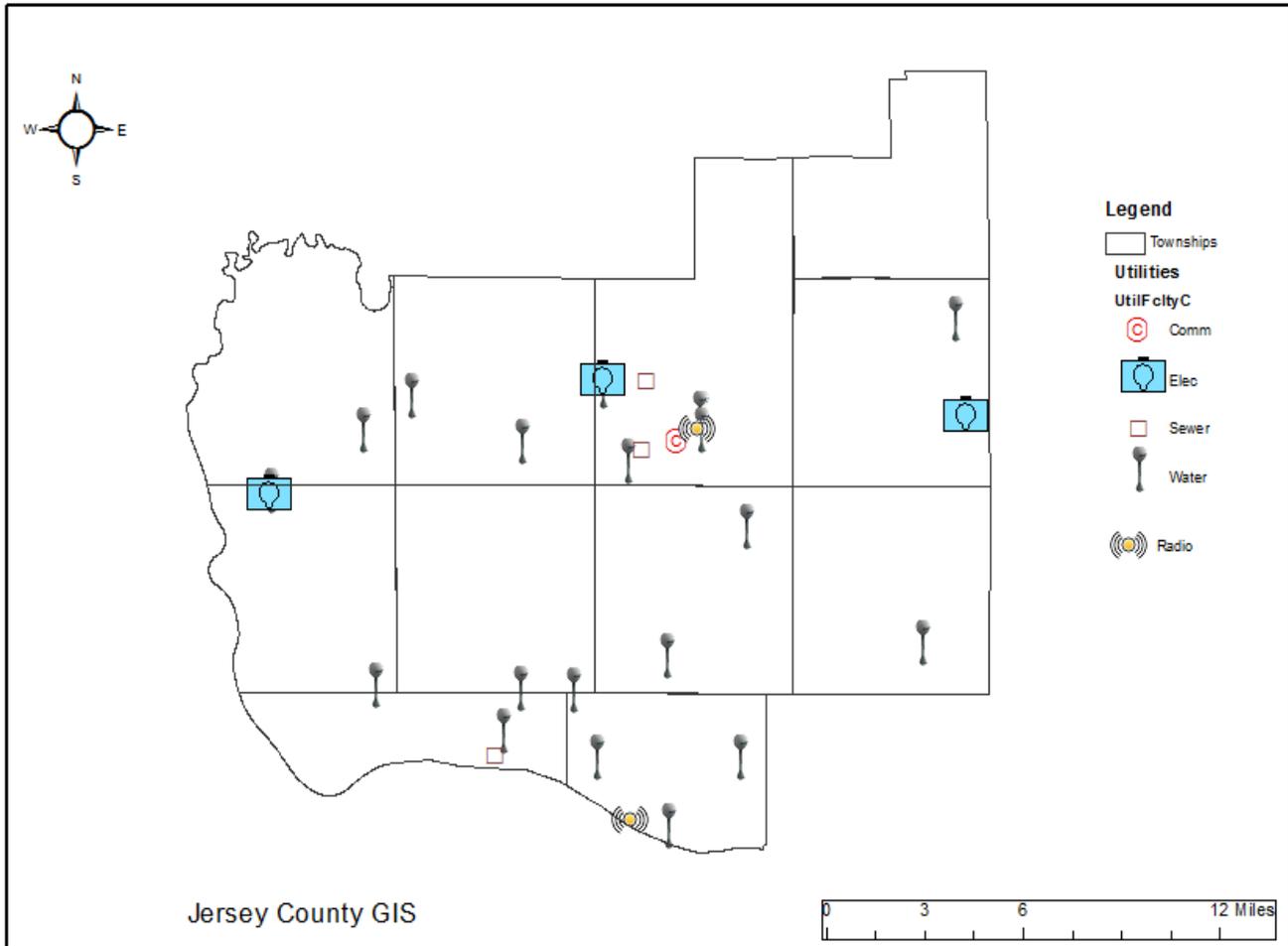
Transportation



Dams and Bridges



Utilities





Transportation: The Great River Road is the main transportation route for goods and people between Jersey County and Alton or the St. Louis area. This road was completely submerged in 1993. In addition, 30 – 35 miles of county roads were inundated. This not only restricted commerce in the area, but also made it difficult for workers who still had jobs to commute. The Jersey County Highway Department is responsible for maintaining all of the 120 miles of roads and 29 bridges in the highway system, in addition the department assists the 11 townships of the county in maintenance and construction of their 378 miles of highways and 56 bridges. Not only do people rely on roads to get to their destination, many rely on bridges and ferries to cross county or

Grafton 4-way stop December 2015

state lines while commuting to work. The Joe Page Bridge which connects Calhoun County with Jersey County was closed for several weeks while the IL Department of Transportation brought hundreds of thousands of tons of rock to build up the road at the entrances of the bridge from Hardin into Jersey County. Once in Jersey County the commuters would have to find alternate routes which were lengthy and costly. The Kampsville ferry and Brussells ferry were also closed when the water reaches 25.5feet

Although flood waters were not as high in 2008, 2013 and 2015 as in 1993, it still had immense impact on local roads in several counties in Illinois. Local ferries were closed for several weeks as were the waterways to barge traffic. The loss of transportation can have a lasting effect as clean up and repairs can take several weeks before they can be used again. In August of 2015 the City of Grafton formed a Grafton Disaster Committee comprised of the mayor and alderpersons with possible sub-committees to deal with more specific issues. The purpose of the meetings will be to set long-term goals. One top issue will be the discussion of flood routes through the city as the 2015 floods left areas of Grafton isolated. They will review past disasters and determine what was successful and what area will need to improve on.

Development Trends: Residential and agricultural development predominates in the Jersey County floodplain. Through good floodplain management and adopting a stringent ordinance will set the standards imposed by the county government as a responsive and responsible step toward reducing the property damage caused by floods. They explain why the floodplain in Jersey County is not being heavily developed at this time. Other municipalities such as Grafton require any new development to be elevated above the base flood elevation and the Village of Elsah is essentially land locked for any new development.

Although the floodplain is not heavily developed, it is important to be aware of and monitor those structures already in the floodplain. Originally there were roughly 874 buildings in the floodplain but in using stringent standards there are now only 649 currently located here. See table 2.2.5

As Unincorporated Jersey County is a participating community in the NFIP, property owners have the ability to purchase insurance protection against losses from flooding. The County also participates in the CRS and is currently a class 5; thereby due to monitoring development within the floodplain the policy holders receive a 25% CRS class discount on their premiums.²⁰

²⁰ Community Rating System/Community Overview/9-22-14
Jersey County Natural Hazard Mitigation Plan

Developments is certainly encouraged within the County, and as the rural areas are becoming more urban provisions were made to manage storm water runoff so that the new development does not create flood problems. In September of 2009 an ordinance was passed to provide for the control of storm water drainage and detention, soil erosion, and sediment control within the unincorporated areas of Jersey County.

The Mayor of Elsah reported at the bi-annual 2011 meeting that the village had made application for the IKE Grant for infrastructure use; however the application was not awarded. If the grant had been approved the plan called for elevation a section of the roadbed near the South entrance of the village and repairs to improve the storm water drainage throughout the village. They had requested their village attorney to develop an appropriate Comprehensive Sewage Diagram Assessment Plan to map all tanks and lateral fields using the grant funding. The project will have to be postponed until they can find other means of funding.

2.3 Severe Thunderstorms

General Information about Thunderstorms: Thunderstorms, as a weather phenomenon, are relatively simple to define. Thunder is the sound that results from lighting. Therefore, a thunderstorm is composed of two elements: thunder and lighting. These storms are typically 15 miles across and roughly 30 minutes in duration. Although all thunderstorms may be considered dangerous, “severe thunderstorms” are of specific interest to those involved in hazard mitigation because they inflict the most physical damage. The National Weather Service classifies thunderstorms as “severe” if they:

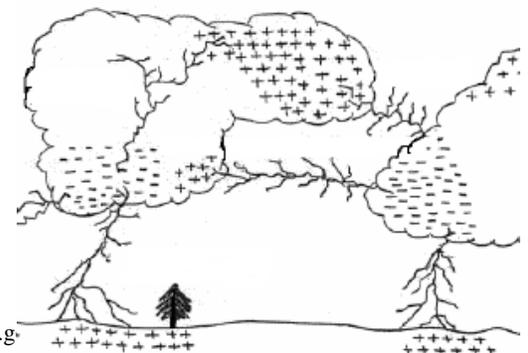
- produce a tornado
- produce winds of at least 58 miles per hour (50 knots) or
- produce hail at least $\frac{3}{4}$ of an inch in diameter

According to the Federal Emergency Management Agency (FEMA), thunderstorms are formed when “moisture, rapidly raising warm air and a force capable of lifting air such as a warm or a cold front combines.”²¹ Throughout the day, sun warms the earth’s surface. As the surface warms, the surrounding air also warms. Since warm air is lighter than cool air, this warm air rises in an *updraft*. If the updraft is also moist it will condense into a cumulus cloud and grow in size. Very large cumulus clouds contain water that is very heavy. Raindrops begin to fall when the updraft can no longer support them. Cool, dry air entering the cloud creates a *downdraft* because the cool air is relatively heavy. This downdraft pulls the raindrops through the cloud and creates rain below. At this point the cumulous cloud has become cumulonimbus. The change from cumulonimbus cloud to thunderstorm cell occurs with the addition of lightning and thunder.

Thunderstorms are incubators for other hazards. These include lightning, hail, straight-line winds, flash flooding and tornadoes. In order to fully understand the force of thunderstorms, one must explore each of these phenomena.

All thunderstorms produce lightning. Although lightning can take place from cloud-to-cloud, within a cloud, and cloud-to-air, the most dangerous type of lightning is cloud-to-ground. Lightning originates in thunderstorms 15,000 to 25,000 feet above sea level. This is the area of cumulonimbus

Figure 2.3.1



²¹ FEMA, “Hazards Backgrounder: Thunder and Lightning,” FEMA, 11 February 2003, <<http://fema.gov>> 13, 2004.

clouds where raindrops drift upward and turn into ice. Scientists cannot explain exactly how lightning is formed, but they have determined it is a rapid electrical discharge created when positive and negative charges build up within the cloud. The energy in this discharge heats the air to over 50,000°F in less than a second. The charge moves downward in 50-yard sections until it finds something to connect with. Once this channel is close to an object on the ground, a surge of electricity from the ground jumps upward towards the clouds creating the visible lightning strike we see.

Hail ranges in size from smaller than a pea to larger than a softball. Updrafts within the thunderstorm cell create hail when water is carried to higher altitudes where freezing occurs. Eventually the ice particles become too heavy to be supported by the updraft. At this point, hail falls to the ground.

<i>Severe Storm Loss Estimate</i>					
<i>County</i>	<i># of Severe Storms 1950-2015</i>	<i>Total Recorded Loss</i>	<i>Average \$ in Property Damage per Event</i>	<i>Annual Probability of Event</i>	<i>Estimated Annual Loss</i>
Jersey	222	\$5,791,500.00	\$482,625.00	341.5%	\$78,100.00

Source: 2013 Illinois Hazard Mitigation Plan

According to the Illinois Emergency Management Agency (IEMA), “most thunderstorm damage is caused by straight-line winds which can exceed 100 mph.”²² The updrafts and downdrafts of a thunderstorm cell can be intense. Sometimes downdrafts or “downbursts” can generate winds speeds of 57 miles per hour. The record strength of a downburst was 160 miles per hour.

Flash flooding is sudden flooding that takes place as the result of heavy, sustained rainfall on saturated soil. Hard, frozen ground may also cause this run-off. Flash flooding is caused by either a slow moving thunderstorm or thunderstorms that repeatedly hit the same area. It may also be cause when a dam or levee breaks. Flash floods are the most dangerous kind of flood due to their unpredictability and high water velocity. In fact, they are the number one weather-related cause of death in the United States. Approximately 200 deaths per year occur from flash flooding and over 50% of flood-related drowning is vehicle-related.²³

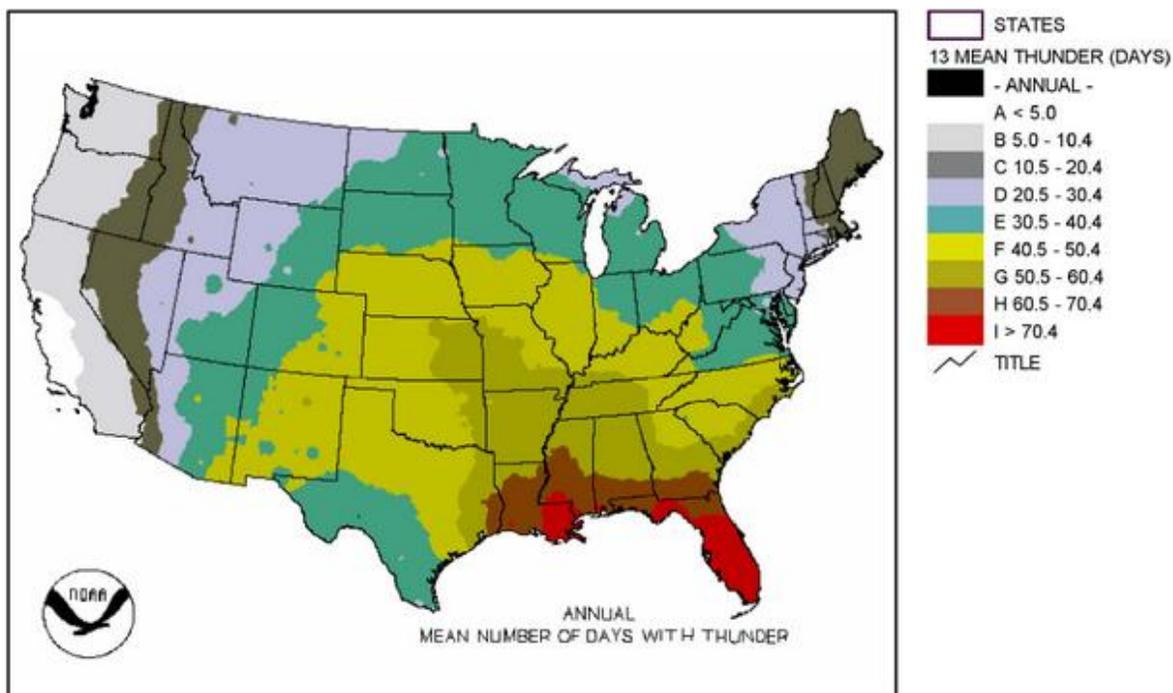
Tornadoes are another product of severe thunderstorms. While they are a significant and dangerous weather phenomenon, please see the section in this document titled “Tornado Profile” for more in-depth information.

Frequency and Historical: Illinois averages 29 tornadoes annually. Peak months are April, May and June (63% of the total), but tornadoes have occurred in all months. Although Illinois averages four tornado related fatalities per year, the number varies widely from year to year. Thunderstorms account for 50 to 60 percent of annual precipitation and are common in Illinois with an average of 60 storms (far northeast) to 80 storms (southwest). Nearly half of all thunderstorm days occur during June, July and August. Similarly, the average number of cloud-to-ground lightning strikes per square mile ranges from five (northeast) to more than 11 strikes

²² IEMA, “Thunderstorms,” *IEMA*, 2001, <<http://www.state.il.us/iema/Thunderstorms.htm>> (3 April 2004).

²³ Flood Statistics <<http://floodsafey.com>>

(southwest). Some thunderstorms produce hail, and annual average hail-days decrease from 3.3 days (southwest) to less than 1.8 days (northeast).²⁴



Events: Over the past ten years all counties in Illinois have experienced more than 500 storm related events with 35.114 million in damages, 4 deaths and 1 injury.²⁵ These storms occur most often during the spring and summer months in afternoons and evenings. Thunderstorms are more common at these times because the warmer air in these seasons is key to the growth of thunderstorms.

The National Climatic Data Center (NCDC) does not keep specific records on severe thunderstorms. Rather, it divides thunderstorm-related phenomena into three areas: tornados, thunderstorm winds, and hail. When these elements are tallied in accordance with the National Weather Service’s criteria for severe thunderstorms, the sum of their union show there have been 222 severe storm events in Jersey County over the past 65 years. Of these 222 events, 98 produced thunderstorm winds, 77 produced hail, and 15 produced tornados.²⁶ Additional minor thunderstorms have taken place; however, they have not been recorded because NCDC only records the largest, most severe events. It is more difficult to say exactly how many total thunderstorms have taken place. Generally speaking, thunderstorms are recorded based on whether thunder is heard, and this is a subjective evaluation. The sound of thunder may be distorted by atmospheric conditions, noises, and barriers between the thunder and the listener. Nonetheless, severe thunderstorms are more important than regular thunderstorms to hazard mitigation planners.

²⁴ www.ncdc.noaa.gov March 2016

²⁵ National Climatic Data Center

²⁶ IBID

Since hail and thunderstorm winds are essential components of a severe thunderstorm, records of these events follow, as recorded by NCDC:

Reported Lightning Strikes in Jersey County

Years	2006	2007	2008	2009	2010	2011
Lightning Flashes	393	362	1203	680	695	900

Reported Hail Events in Jersey County

Years	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Hail	9	1	7	2	5	7	1	1	2	3

Reported Thunderstorm with High Winds in Jersey County

Years	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Thunderstorms/Winds	4	3	2	2	2	2	1	0	2	0

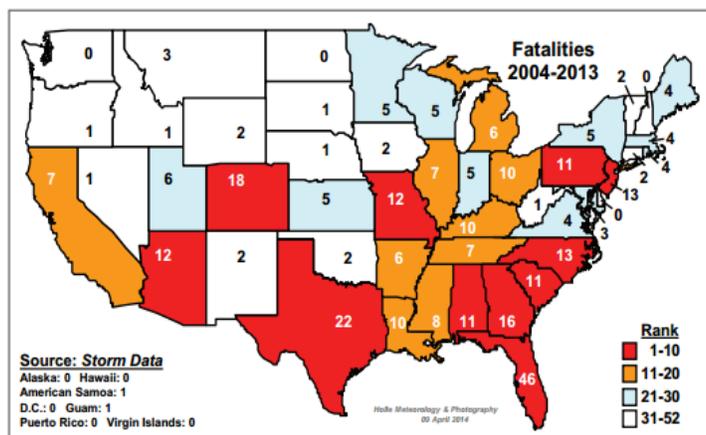
The lists of hail and thunderstorm wind events are extensive and show that most of these events have past without notable damage. At least one thunderstorm wind event is worthy of mention. On November 20, 1994, straight-line winds were responsible for blowing down large trees along the Great River Road east of Grafton. Although wind speeds were not documented, winds were strong enough to blow off one roof near New Delhi. This incident explains the \$2,000 figure under “property damage.” It is also worth mentioning the June 14, 1998 thunderstorm, which had wind speeds of 70 knots. Although no damage figure was recorded, numerous eyewitnesses attest to the fact there was severe damage to trees. These witnesses suggest there was property damage as well. The largest reported hail stone measuring 2.00 inches occurred on June 25, 2011 in Grafton.

Thunderstorm Impacts and Costs

Health and Safety: Thunderstorms are known nationally for causing injuries and fatalities. One cause of death during thunderstorms is flash flooding. There was one recorded incident of a 79-year-old man being killed in the May 8, 2003 flash flood in Fieldon. He and his truck were swept off a bridge when he tried to cross the flooded Sugar Creek.²⁷ There is no health reported issues related to lightning other than the potential for tetanus arising from injuries from flying debris or serious burns. However, survivors of a lightning strike can suffer long term or permanent disabilities and depression or memory loss.

In the state of Illinois alone, the average number of cloud-to-ground flashes from 2005 to 2014 is 800,737. In 2014 there were 798,616 flashes. These cloud-to-ground flashes have a density of 14.2 square miles.

Lightning Fatalities by State, 2004-2013



²⁷ NCDC, “Storm Events,” 2015

Property Damage: In 2011 a strong cold front moved into Jersey County triggering showers and thunderstorms with numerous reports of large hail. Lightening struck a house in Jerseyville causing a fire that destroyed the home resulting in damages of \$150 thousand, luckily the homeowners were not home at the time.

Much of the damage caused by thunderstorms can be quantified. Winds in the form of tornadoes or downbursts can rip apart both small and large buildings. In these cases, the damage inflicted on each building varies with the specific wind load for that building. A building's wind load is a quantity that measures how much wind pressure it can take. Thunderstorm winds are also known to be extremely dangerous to aviation. Large hail is recognized nationwide as causing over \$1 billion in damage to buildings, vehicles, and crops each year.

Jersey County has experienced about \$4,000 in recorded property damage over the past 50 years. The first instance was due to high winds blowing off a roof on November 20, 1994. The second instance was due to flash flooding on May 16, 1995.²⁸ Since then the total dollar figure for property damage has risen considering the frequency of severe thunderstorms in the county. In 2007 & 2008 the Jerseyville area experienced flash flooding. On the west side of town, Maple Summit Road was covered by 3 feet of water, and by 2 ½ feet by the hospital. Damages to property were estimated to be around \$60K.²⁹ The total dollar for property is damage is not very high. There are two possible reasons for this. First, Jersey County has been fortunate not to incur large property damage expenses as the result of severe thunderstorms. Second, data regarding damage incurred as a result of severe thunderstorms is not being collected in a systematic way and some vital information is slipping through the cracks.

Vulnerable Critical Facilities: Severe thunderstorms have the potential to impact those Jersey County critical facilities without backup generators. Arguably the most significant disruptions caused by thunderstorms are critical infrastructure such as communication lines, electrical lines, towers and signal lights; however the utility companies are quick with recovery of electrical use. Impacts to property damage and critical facilities are considered moderate.

Economic Consequences: Not all economic costs can be documented. Damages to homes range from replacement of siding roof and window repairs. High winds and hail can cause damage to crops such as wheat and corn, businesses may have to close due to loss of power and critical facilities are subject to disruption, however the economic impact due to severe storms are considered low.

²⁸ NCDC.

²⁹ Storm Events/event details/NCDC

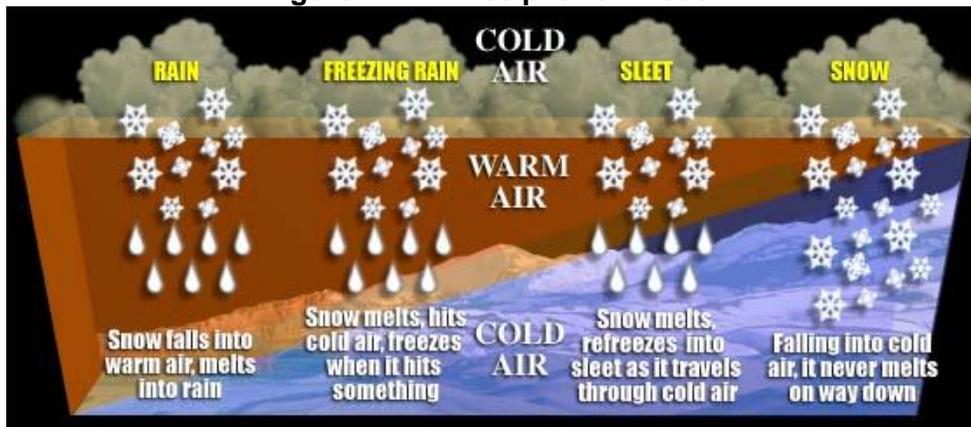
2.4 Severe Winter Storms

Severe Winter Storm Loss Estimates					
County	# of Severe Winter Storms 1960-2015	Total Recorded Loss (\$Thousands)	Average \$ in Property Damage Per Event	Annual Probability of Event	Estimated Annual Loss
Jersey	44	\$1,570,174	\$68,268	44.20%	\$30,196
<i>Source: Illinois Hazard Mitigation Plan</i>					

General Information about Winter Storms: Severe winter storms in Illinois produce more total damage than any other form of short-term severe weather, including tornadoes, lightning, and hail. A winter storm is an event in which the main types of precipitation are snow, sleet or freezing rain. Just like any other storm at different seasons of the year, the right combination of ingredients is necessary for a winter storm to develop. The three basic ingredients are as follows:

- Cold air. Below freezing temperatures in the clouds and near the ground are necessary to make snow and or ice.
- Lift. A lift of warm air will raise the moist air to form the clouds and cause precipitation. When warm air collides with cold air it is being forced to rise over the cold dome.
- Moisture. To form clouds and precipitation. Air blowing across a body of water, such as a large lake or the ocean, is an excellent source of moisture.

Figure 2.4.1 Precipitation Model



(Source: University of Nebraska <http://hpcsun.unl.edu/nebraska.html>)

Precipitation resulting from winter storms can take various forms. The chart (figure 2.4.1) above distinguishes between rain, freezing rain, sleet, and snow. During rainstorms, snow begins to fall but immediately melts into rain. During ice storms, rain falls in a liquid form until it passes through a cold, shallow layer of air above the earth’s surface. The rain droplets freeze on impact with the ground, producing a surface coat of ice called glaze. The formation of sleet, also called ice pellets, occurs when raindrops or melted snowflakes freeze as they pass through a below-freezing layer of air above the ground. Sleet does not generally stick to roofs, trees, and wires, but often bounces upon impact. The consistency of sleet is similar to dry sand.

The most common winter precipitation in Illinois is snow, and it is important to distinguish between the various types of snowfall that can occur. The different *snow classifications* are defined by the National Weather Service in Table 2.4.2.

Table 2.4. 2. Snow Classifications

Heavy Snow	Refers to either the intensity or amount of snow. When used in reference to intensity, heavy snow is that which reduces visibility to less than 5/16 statute mile (about 1/4 mile). The National Weather Service issues a heavy snow warning if amounts of 6 or more inches are expected in a 12-hour period, or 8 or more inches in a 24-hour period.
Blizzard	A winter storm characterized by winds of at least 35 mph and accompanied by considerable falling and/or blowing snow that reduces visibilities to less than a 1/4 mile. These conditions must prevail for 3 or more hours.
Snow Flurries	Snow falling for short durations at intermittent periods and resulting in generally little or no accumulation. Flurries may at times be heavy enough to greatly reduce visibility for brief periods.
Snow Squall	A brief, intense fall of snow of a showery nature, usually accompanied by gusty surface winds.
Snow Showers	Snow falling at varying intensities for brief periods of time. Some accumulation possible.
Blowing Snow	Visibility intermittently 1/4 mile or less with sustained winds of 25 to 30 mph.
Drifting Snow	Strong winds blowing snow that is falling or loose snow into significant drifts.

(Source: National Weather Service)

Frequency and Historical Events: Illinois averages five severe winter storms during the November – April period; although as many as 18 storms have occurred in one winter (1977- 1978) and as few as two (1921 – 1922). January seems to be the most month favored; however December, February, and March are close behind. Studies indicate the number of times a severe winter storm has occurred and the dates they occurred on most frequently. The study revealed that December 24, 25, and 26, and March 2 and 3 are high incident periods. There are 2 in 10 chances that a severe storm will occur somewhere in the United States on these dates.

Since 1976, residents of Illinois have lived through three of the most severe winters of the century. The winter of 1977- 1978 holds the distinction of being the worst, followed by the winter of 1981-1982 then the winter of 1978-1979. These three winters produced a total of 53 severe winter storms.

Historical Weather for Jersey County 2008-2015

Year	Lowest Temperature (F)	Coldest Maximum Temperature (F)	Average Minimum Temperature (F)	Mean Temperature (F)	Total Snowfall (In)	Max 24hr Precipitation (In)	Max 24hr Snowfall (In)
2015	-2	8	18.7	27.6	0.30	0.42	0.30
2014	-11	-3	9.8	21.0	26.60	0.60	12.00
2013	7	16	22.4	31.9	1.00	1.73	1.00
2012	4	20	22.8	32.8	1.00	0.71	1.00
2011	-7	16	15.3	23.9	11.00	0.46	6.00
2010	-12	14	15.5	22.6	3.50	0.56	3.50
2009	-4	10	14.8	23.8	4.10	0.60	3.00
2008	0	16	19.2	29.6	0.00	2.63	0.00

Ice Storms: An ice storm is a storm which results in the accumulation of at least .25” of ice on exposed surfaces. From 1997 to 2012 Illinois had 385 ice storm events affecting 101 counties. The longest event lasted 34 days. In Mercer County a direct death occurred on February 24, 2007 due to an ice laden tree branch that fell directly on a 70 year old male. Over all the cost of the events were estimated at 6.472 million.³⁰ Residents in Jersey County were without power for 5 days or more from the heavy ice and several inches of snow that were drifting from high winds. Costs to local governments and insurance companies were extremely high.

The massive snow and ice storm of December 2006 led to 19 deaths with thousands of injuries. Power lines were torn down from the ice storm in Illinois and Missouri leaving customers without power for six days. The slow recovery raised government concerns, and Illinois and Missouri launched investigations of how the power companies handled repairs. Governors of three states declared portions of their states as major disaster areas including 49 counties in Illinois.

Health and Safety: Winter storms can kill without breaking Climatological records. The danger is present year to year. Since 1936, snowstorms have caused about 200 deaths per year and in some instances even 300 deaths per year. Of these deaths, usually 70% are from automobile and other accidents; 25% are caused by overexertion, exhaustion, and consequent heart failure from shoveling snow, pushing cars, and other snow – related physical labor. The remaining 5% are deaths due to home fires, carbon monoxide poisoning from stalled cars, electrocution from downed wires, and building collapse, and exposure to the cold. More often than not 50% of the individuals are over the age of 60 and 75% are males.³¹

Blizzards can take a terrible toll on livestock. The livestock, especially young livestock should be moved into a sheltered area and extra feed should be placed in the feeding area before the storm arrives. Autopsies of cattle killed by winter storms have shown the cause of death to be dehydration; therefore, the water tanks should be heated.

Severe winter storms are often combined with other natural disasters such as severe winds. Winter storm conditions can be exacerbated by blinding wind, driven snow, severe drifting, and dangerous wind chills. Also,

³⁰ National Climatic Data Center; Storm Events Database

³¹ *Weather Almanac (Vol 1) Winter Weather*

accumulations of broken pieces of river ice caught in a constricted channel, called an ice jam, can form and cause severe flooding.

Property Damage and Critical Facilities: Severe winter storms produce more damage than any other short-term severe weather phenomenon, including tornadoes, lightning, and hail. Winter storms, particularly ice storms, cause great natural resource damage to trees. Freezing temperatures can damage crops and kill unprotected livestock. Historically winter storms would cause roofs to collapse, however, with today's building codes adopted by the county damage to buildings are less likely and therefore the newer constructed buildings do not see a major impact by severe storms.

Winter storms disrupt emergency and medical services by immobilizing ambulances and preventing access to hospitals. Responses by the fire department and police are delayed. Bridges and overpasses become very dangerous as ice freezes over the surface of the roads. Perhaps the most significant disruption caused by severe winter storms, especially ice and freezing rainstorms, involves the damage to utilities. Power lines can become coated with heavy layers of ice. Citizens can be left without power for days.

The impact to buildings and critical facilities is considered moderate.

Economic Disruption: Adverse weather conditions produce several economic conditions during a winter season, however some sectors benefit from the harsh winter conditions. These can include utilities with large sales of natural gas and electricity, and private snow removal firms. Vehicle accidents and damaged buildings create income for local body shops and construction companies.

The following constitutes a list of the many economic disruptions which are caused by winter storms. This collection is certainly not exhaustive.

- Airport closures
- Highway closures
- Large costs to state, county, and local highway departments for snow removal
- Schools closures
- Loss of sales and closures of businesses
- Freezing rivers caused by prolonged cold spells disrupt shipping
- Shipments of food delayed
- Commuter trains and buses delayed
- Mail delayed
- Ice and heavy snow damages to utility poles and power lines
- Long period of freezing temperatures can cause damage to agriculture

The impact to the local economy is considered low.

2.5 Tornadoes

General Information about Tornadoes: A tornado is a revolving column of air reaching vertically from a thunderstorm down to the ground and come from mainly two types of thunderstorms; super cell and non-super cell. Tornadoes that come from a super cell thunderstorm are the most common, and the most dangerous. A rotating updraft is a key to the development of a super cell, and eventually a tornado. Tornadoes can contain wind speeds from 40 mph to 300 mph or more. Damage paths can potentially be in excess of 50 miles long and one mile wide. Tornadoes can move at up to 70 mph.³²

Tornadoes do most of their damage by picking up debris and launching it through the air. Often, missile-like objects hit with enough force to break through windows and sometimes even walls. As defined by the National Weather Service, Jersey County is located in a high-risk zone, the highest possible rating for any county. The risk factor is calculated by considering how many tornadoes occur per 1,000 square miles and what wind zone the county falls in. Jersey County averages 1-5 tornadoes per 1,000 square miles and can have winds up to 250 mph. measuring at a F5 placing it in the high-risk category.³³

Wind Shears: When winds at two different levels above the ground blow at different speeds or in different directions a column of air begins to rotate. An example of wind shear that can eventually create a tornado is when winds at the ground level come from the southwest at 5 mph, but higher up at 5000 ft. above the same location, the winds are blowing from the southeast at 25 mph. An invisible tube of air begins to rotate horizontally. The rising air within the thunderstorm tilts the rotating air from horizontal to vertical. Once the updraft is rotating and being fed by warm, moist air flowing in at ground level, a tornado can form.³⁴

Table 2.5.1. The Fujita Tornado Scale

Fujita Scale		Enhanced Fujita Scale* * In use since 2007	
F-0	40–72 mph winds	EF-0	65–85 mph winds
F-1	73–112 mph	EF-1	86–110 mph
F-2	113–157 mph	EF-2	111–135 mph
F-3	158–206 mph	EF-3	136–165 mph
F-4	207–260 mph	EF-4	166–200 mph
F-5	261–318 mph	EF-5	>200 mph

The Fujita scale is the most widely accepted classification scale of tornado strength. It is based on the damage done to structures and buildings in addition to the estimated wind speed generated by the tornado. The original F-scale has been updated by a team of meteorologists and wind engineers and went into effect on February 1, 2007. The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage and uses

³² Federal Emergency Management Agency, *State and Local Mitigation Planning How-To Guide: Understanding Your Risks*, (FEMA 386-2, August 2001), 2-20.

³³ Tornado Project, “Storm Shelters,” 2000, <<http://www.tornadopproject.com/safety/shelters.htm>> (26 January 2004).

³⁴ NSSL, “Severe Weather 101 (Dec. 2015)

three-second gusts to estimate the point of damage.³⁵The exact terms of the Fujita scale are outlined below along with the potential damage a tornado of each rating could cause.

Frequency and History of Tornadoes: In terms of absolute tornado counts, the United States leads the list with an average of over 1,000 tornadoes recorded each year. Illinois averages around 64 tornadoes per year based on data of 1998-2007. Tornado season is usually March through May in Illinois and although they can occur at any time of the year or day it is usually in the afternoons and evenings with 50% occurring between 3 p.m. and 7 p.m. In the last 129 years, Jersey County has seen 19 tornadoes³⁶.

As seen in table 2.5.2 nearly all of the recorded tornadoes in Jersey County have resulted in property damage and occurred generally in the afternoon.

Table 2.2.2 History of Jersey County Tornadoes

<i>Date</i>	<i>Time (CST)</i>	<i>F/EF Scale</i>	<i>Length (Miles)</i>	<i>Maximum Width (Yards)</i>	<i>Killed</i>	<i>Injured</i>	<i>Property Damage</i>
<i>4/24/1880</i>	6:10 PM	F4	18	500	1	N/A	N/A
<i>5/18/1883</i>	8:15 PM	F2	3	50	2	15	N/A
<i>3/18/1927</i>	11:55 PM	F2	0.1	30	0	0	\$2,000
<i>4/19/1941</i>	12:30 PM	F2	0.5	50	0	1	N/A
<i>3/26/1948</i>	1:45 PM	F2	14	100	0	N/A	\$75,000
<i>3/30/1949</i>	9:15 PM	F2	10	400	0	0	N/A
<i>3/6/1961</i>	1:30 AM	F1	118	75	0	1	N/A
<i>9/24/1961</i>	5:00 PM	F1	N/A	N/A	1	0	>\$500
<i>12/21/1967</i>	1:15 AM	F1	1.5	125	0	0	>\$5,000
<i>6/1/1970</i>	5:35 PM	F1	0.25	20	0	0	>\$5,000
<i>5/1/1983</i>	5:15 PM	F2	0.2	17	0	1	>\$500,000
<i>5/1/1983</i>	5:23 PM	F2	0.5	75	0	1	>\$500,000
<i>11/15/1988</i>	9:15 PM	F1	0.2	50	0	0	>\$50,000
<i>11/17/1990</i>	3:20 PM	F1	0.5	400	0	0	>\$50,000
<i>7/18/2000</i>	6:30 PM	F0	0	40	0	0	Unknown
<i>6/13/2009</i>	4:20 PM	F0	1	40	0	0	Unknown
<i>9/6/2007</i>	1:15 PM	EF0	1	50	0	0	Unknown
<i>3/8/2009</i>	9:56 AM	EF2	1	100	0	0	Unknown
<i>3/8/2009</i>	9:57 AM	EF0	4	40	0	0	Unknown
<i>8/31/2012</i>	1:36 PM	EF0	18	40	0	0	Unknown
<i>6/4/2014</i>	4:25 PM	EF0	1.44	30	0	0	Unknown

Source: NOAA Storm Events Database 2015

In 1961 an F1 tornado caused a woman to drown when she became trapped under a cabin cruiser that had capsized.³⁷

³⁵ Enhanced F Scale for Tornado Damage; National Weather Service St. Louis, MO

³⁶ Illinois State Water Survey; State Climatologist Office for Illinois; "Tornadoes in Illinois – An Introduction"

³⁷ National Weather Service, "NWS St. Louis Tornado Climatology," Jersey County.

<<http://www.crh.noaa.gov/lx/climate/torcli/jersey.htm>> (30 April 2003).

There have been fifteen reported tornado-related injuries in Jersey County since 1948; however, there has not been a tornado-related injury in Jersey County since 1983. Despite these statistics, residents of Jersey County cannot assume that this trend will continue. According to National Weather Service reports, the largest recorded tornado in Jersey County history occurred in 1880 - an F4 tornado. It struck on April 24, 1880 at 6:10 p.m. This devastating tornado traveled 18 miles through Jersey County, and came only four miles from Jerseyville, passing to the northwest. It was estimated to have been 500 yards wide, and would have created extensive damage had it passed through more populated areas. One person was killed and 10 were injured.³⁸

Only three years later, an F2 tornado struck near Grafton. It was much smaller, traveled only three miles, and was 50 yards wide. However, this tornado cut directly through several small homes. In the end, 15 people were injured and three people were killed.³⁹

The two previously mentioned events exemplify the uncertainty and unpredictability of tornadoes. They can occur anywhere at any time. Often, the size of a tornado does not accurately translate into the amount of damage it creates. If a small tornado strikes a critical facility or residential area, it can do much more damage than a larger tornado that touches down in an uninhabited area, despite the fact that crops and livestock can be destroyed in uninhabited areas.



March 8, 2009 tornado damage on Coon Creek Rd., Fieldon, IL

Source: Jersey County Code Administrator

The other prominent tornado occurred on May 26, 1917 and came very close to striking Jersey County. It passed through Pike County and Macoupin County (Jersey County's neighbor to the northeast). The tornado became known as the Mattoon-Charleston tornado and covered 175 miles in approximately 4 hours and 40 minutes. Its speed was estimated at 35 miles per hour. This tornado was very devastating because it struck without warning. There were 101 deaths, 638 injuries, and damages were estimated at \$2.5 million (1970 dollars).⁴⁰

³⁸ National Weather Service, "NWS St. Louis Tornado Climatology," [Jersey County](http://www.crh.noaa.gov/lx/climate/torcli/jersey.htm). <<http://www.crh.noaa.gov/lx/climate/torcli/jersey.htm>> (30 April 2003).

³⁹ National Weather Service, "NWS St. Louis Tornado Climatology," [Jersey County](http://www.crh.noaa.gov/lx/climate/torcli/jersey.htm). <<http://www.crh.noaa.gov/lx/climate/torcli/jersey.htm>> (30 April 2003).

⁴⁰ Federal Emergency Management Agency, [Hazard Mitigation Strategy Report](#), (FEMA-DR-1110-IL, 30 June 1996), 4.

Tornado Impacts and Costs

Safety: Although only 5 people have been killed and approximately 33 injured in Jersey County in the last 124 years, the tornado threat is very real. Tornadoes have wreaked havoc in Illinois, including counties very close to Jersey County. There have also been incidents of deadly tornadoes very recently. The city of Jerseyville had begun replacing its tornado system in 2008 with a new system from Global Technical Systems Inc. When there is a tornado warning in Jersey County the new system will sound three cycles of three minutes, but when the tornado is heading for Jerseyville the new system will sound a different tone constantly until all is clear. The city has purchased one siren each year and now has a total of five sirens.

General safety precautions could help residents to avoid injury. Being careful when entering any structure that has been damaged, wear sturdy shoes or boots, long sleeves and gloves when handling or walking on debris. Beware of exposed nails and broken glass, do not touch downed power lines, do not use generators, pressure washers, grills, camp stoves, or other gasoline, propane, natural gas, or charcoal burning devices in your home, basement, garage or camper as carbon monoxide is an odorless, colorless gas that can cause sudden illness and death. They should also cooperate fully with public safety officials.

Health: The main health concern when dealing with tornadoes is physical injury received from airborne debris. Whether the victim is indoors or outdoors, airborne debris is the main cause of injury. Another major cause of injury occurs when buildings collapse or when mobile homes are uplifted and destroyed.

A study of injuries after a tornado in Marion, Illinois, showed that 50% of the tornado-related injuries were suffered during rescue attempts, cleanup, and other post-tornado activities. Other common causes of injury include falling objects and heavy, rolling objects.⁴¹ Tornadoes can damage critical structures, which causes widespread damage. Tornadoes shut down power if they knock down power lines. Sewage systems could also be disrupted. Damage to dams or other related structures leads to flooding. Tornadoes create fires in residential or non-residential areas. Since Jersey County borders the Mississippi River, barges and personal watercraft could be damaged. As mentioned before, a woman was killed in 1961 when she was trapped underwater following an F1 tornado. Following tornadoes, buildings that have become unstable can collapse. This happens hours or even days following the actual tornado event.

Building Damage: Every building has a specific wind load that signifies its strength in regard to wind pressure. If that wind load is exceeded, the structure begins to fail. Furthermore, airborne debris can cause extensive damage to the sides or top of a building, facilitating its failure even further.

A building that is in the direct path of a tornado is more likely to be destroyed. In the cases of stronger tornadoes, buildings in the direct path of a tornado are often completely destroyed regardless of the building's wind load or strength. Structures that are near, but not in the direct path of, a tornado can be preserved if proper steps are taken to ensure their stability.

As shown in Figure 4, those living in mobile homes are the most likely to be injured or killed in the event of a tornado. However, poorly built permanent homes can be just as dangerous. In addition, homes built on crawlspaces and buildings with large-span roofs (such as barns) are most likely to take considerable damage during a tornado.⁴²

⁴¹ CDC "*Saving Lives, Protecting People*"

⁴² Tornado Project, "Safety," 2000, <<http://tornadoproject.com/safety.htm>>

In Jersey County, most of the damaged buildings in the past have been mobile homes, large farmhouses, or barns.

Critical Facilities: There are a variety of critical facilities in Jersey County in addition to residential facilities. Such facilities include schools, government buildings, police stations, fire stations, electrical facilities, airports (especially hangars), hazardous materials plants (fertilizer plants, bulk plants), and hospitals. Schools represent a particularly important facility for multiple reasons. Schools often contain large amounts of people and are often most crowded during peak tornado hours - mid to late afternoon.⁴³ Schools also have large-span buildings like gymnasiums that are more susceptible to damage. A third factor is that schools are mostly composed of young children. Large numbers of children are more difficult to move to safe areas quickly, especially if there are a limited number of adults present. Schools can also be very expensive to rebuild.

Economic Impact: The most widespread impact brought about by tornadoes is damage to homes, businesses and infrastructure. A major industry in Jersey County is agriculture, and damage to farm outbuildings can severely damage the output of a private farm. Damage to businesses often forces them to go bankrupt, which is a common side effect of a tornado strike. Cleanup, disposal, and rebuilding can also be very expensive. You may refer to Table 2.5.2 for the property damage incurred by previous recorded tornadoes in Jersey County.

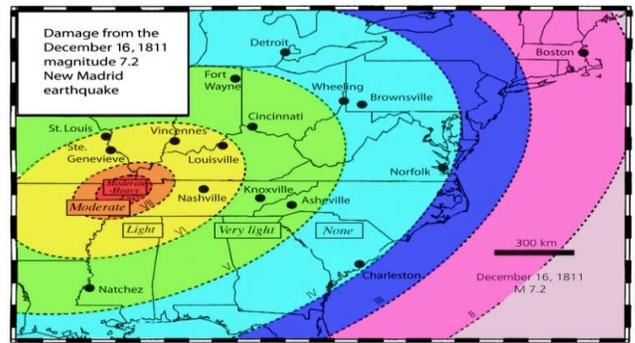
Taking into consideration that there are likely a number of tornadoes missing from the database prior to 1948 and that 4 of the recorded tornadoes did not have information available regarding property damage, it is fair to say that the county has sustained more than \$1.2 million in property damage since 1880.

The impact of a tornado causing widespread damage in Jersey County is high.

2.6 Earthquakes

For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as plates move slowly over, under, and past each other. Most of the time, this movement is gradual. However, sometimes the plates lock together, creating tension. When the accumulated energy grows strong enough, the plates break free, causing the ground to shake. This sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface is an earthquake.⁴⁴

According to at least one estimate, a repeat of the New Madrid earthquakes of 1811-12, one of the largest earthquakes in U.S. history, could cost an estimated \$60 billion in property losses in current dollars. The same report projected that an estimated 4,900 people in the Central United States would die from the event and 460,000 would be left homeless.⁴⁵ Reference to the potential impact of another intense event along the New Madrid fault line is of particular interest to residents of Jersey County given the county's position along this fault line and its continued activity to date.



⁴³ National Weather Service, "NWS St. Louis Tornado Climatology," Jersey County.

<<http://www.crh.noaa.gov/lx/climate/torcli/jersey.htm>> (30 April 2003).

⁴⁴ Effgen, Christopher. "Geological Information about Illinois." *The Disaster Center's Illinois Page*. 28 June 2003,

<<http://www.disastercenter.com/illinois/illinois.htm>>

⁴⁵ Beatley, Timothy and Philip Berke. "Time to Shake up Earthquake Planning" *Issues in Science and Technology*.

The impact an earthquake has is typically measured in terms of intensity. The common measurements are the Richter Scale and the Modified Mercalli Intensity (MMI) scale. The Richter Scale is a measurement of the magnitude or the amount of energy released by an earthquake. A magnitude is measured by seismographs. The MMI is based on the earthquake’s intensity; however the MMI varies, depending on the location of the earthquake’s epicenter. Table 2.6.1

Table 2.6.1		Earthquake Measurement Scales
Mercalli	Richter	Felt Intensity
I	0-4.3	Not felt except by a few people under special conditions
II		Felt by a few people on upper floors, notice swinging objects
III		Felt more indoors. May hear rumbling sound
IV	4.3-4.8	Felt both indoors and out, dishes, doors rattle
V		Felt by everyone. People are waken, dishes and windows break
VI	4.8-6.2	People become frightened, heavy objects will move
VII		People run inside, buildings may be damaged depending on construction
VIII	6.0-7.3	Heavy furniture is overturned, masonry cracks, moving cars uncontrolled
IX		Buildings shift and partially collapse, pipes will break
X		Wood and masonry structures are destroyed, ground is badly cracked
XI	7.3-8.9	No structures left, landslides, wider cracks in the ground, high waves
XII		Total destruction, objects thrown in the air, ground rises and falls, waves

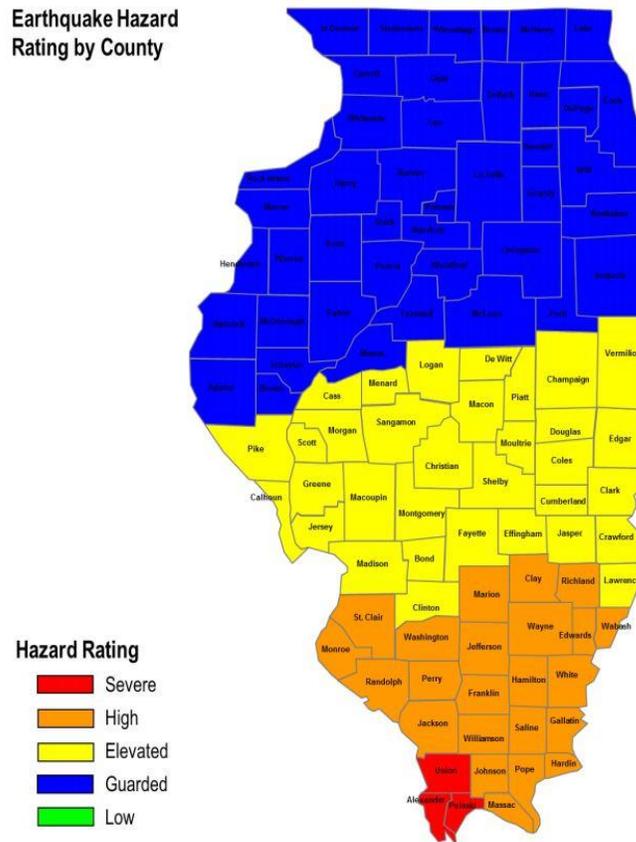
Source: Jersey County Code Administrator Office

Frequency and History of Earthquakes: Seventy to seventy-five damaging earthquakes occur every year in the world. In the United States, Alaska experiences the greatest number of large earthquakes; however, most of these quakes are located in uninhabited areas. California experiences the most frequent damaging earthquakes. The largest earthquakes felt in the contiguous United States were along the New Madrid Fault Line in Missouri where a three-month series of quakes from 1811 to 1812 included three quakes above a magnitude of 8 on the Richter Scale. This region has more earthquakes than any other part of the United States east of the Rocky Mountains.

In June of 2011 a magnitude 3.9 earthquake occurred near Sullivan Missouri at approximately 3:10 a.m. local time. This earthquake was felt in 3 states by nearly 3500 people including Jersey County.⁴⁶ The figure 2.6.2 maps the hazard rating of counties in Illinois. Jersey County lies mostly in zone VIII, meaning that earthquakes in this area are generally destructive. The northernmost tip of Jersey County lies in zone VII, meaning that earthquakes here are very strong.

⁴⁶ Mo. Dept. of Natural Resource/Geological Survey
 Jersey County Natural Hazard Mitigation Plan

Figure 2.1.3 IEMA Regions and Earthquake Zones



Source: IESD & National Environment Agency

Health and Safety: The main concern would be caring for injuries from falling debris and burns from fires. As with any hazard, finding sufficient shelter for injured and homeless, medical supplies, water and a way to communicate would be a main priority.

Damage and Economic Impact: The extent of how much damage to buildings would depend on the age and construction methods used at that time. Most generally masonry structures with little reinforcement will sustain the most damage as they are not flexible enough to sway and heavy tremors.

The local businesses would be affected by loss of inventory, possible water lines rupturing and fires. Local governments would face massive costs to clean and repair roadways and fallen debris.

The impact to Jersey County is considered low.

2.7 Drought

Drought is a weather-related natural disaster. It affects almost all regions for months or years. Drought is an insidious hazard of nature and is related to a deficiency of precipitation over an extended period of time, usually for a season or more. It is related to the timing of precipitation. Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with drought.

<i>Loss Estimation for Drought</i>					
<i>County</i>	<i># of Droughts 1990-2012 (NCDC)</i>	<i>Total Recorded Loss (NCDC)</i>	<i>Average \$ in Crop Damage per Event(NCDC)</i>	<i>Annual Probability of Event</i>	<i>Estimated Annual Loss</i>
Jersey	222	\$5,791,500.00	\$482,625.00	341.5%	\$78,100.00
<i>Source: 2013 Illinois Hazard Mitigation Plan</i>					

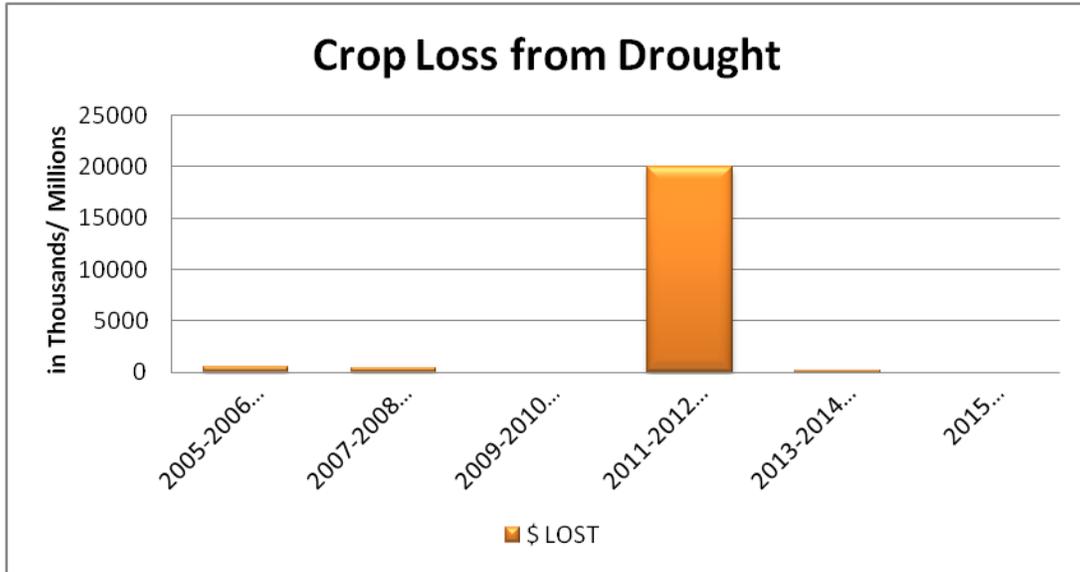
Drought definitions are of two types: (1) conceptual, and (2) operational. Conceptual definitions help understand the meaning of drought and its effects. Drought that is a lengthy period of deficient precipitation causes extensive damage to crops, resulting in a loss of yield. The operation definition for agriculture may compare daily precipitation to evaporation to determine the rate of soil-moisture depletion. This type requires hourly, daily, monthly, or other time scale to obtain data such as crop yields. Mapping of the current drought status can be found on the U.S. Drought Portal through the web site at www.drought.gov.

The probability of Jersey County experiencing a drought can be hard to identify. The only known reported years of the County and its municipalities experiencing a severe drought was during the months of August, September and October of 2005, and July, August, September in 2012. The table 2.7.1 indicates the \$ loss of crops from 2008 to 2015.

Impacts: Drought produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the area that is experiencing a physical drought. This is due to the fact that water is integral to society's ability to produce goods and provide services. An example of the impacts of a drought is as follows:

- a reduction in crop, rangeland, and forest productivity income
- increased prices for food and building goods
- unemployment
- reduced tax revenues
- foreclosures on loans to farmers and businesses
- migration to another area
- disaster relief programs

Figure 2.7.1



Source: RMA Public Website

Health & Safety: Drought happens over a period of time thereby giving residents time to prepare for a possible water shortage, due to wells drying up or the public water systems being compromised.

Economic: The largest impact economically would be to the agriculture industry with loss of crops and produce. Without water livestock will also be impacted. If the drought is severe enough to reduce the municipalities water supplies it may cause for emergency action which would be costly to local governments.

Figure 2.7.2 Detailed Loss Report by Year and Commodity

	2008			2009			2010			2011		
	Corn	Soybeans	Wheat	Corn	Soybeans	Wheat	Corn	Soybeans	Wheat	Corn	Soybeans	Wheat
Excess Moisture	597.1 K	272.7 k	0	552.3 K	204.2 K	29.1 K	88.2 K	100.3 K	54.4 K	312.4 K	87.8 K	0
Drought	0	0	0	0	0	0	0	0	0	487.6 K	240.5 K	14.4 K
	2012			2013			2014			2015		
	Corn	Soybeans	Wheat	Corn	Soybeans	Wheat	Corn	Soybeans	Wheat	Corn	Soybeans	Wheat
Excess moisture	121.5 K	4.1 K	0	724.1 K	74.6 K	8.5 K	144.3	220.9 K	0 K	1.05 M	208.7 K	166 K
Drought	18.6 M	254.4 K	0	132.5 K	42.3 K	0	0	0	9 K	0	0	0

Source: <http://www.rma.usda.gov/data/cause.html> Legend: K= Thousand, M= Million

Critical Facilities: Buildings would not be in danger of a drought. Reference to loss of drinking water once again would be most costly.

The impact of drought in Jersey County is considered medium.

2.8 Extreme Heat

Extreme heat can be dangerous to individuals in the way that they are exposed and can affect them differently. In an area where temperatures hover over 10 degrees or more above the average high temperature for several days to weeks is above 90 degrees is usually defined as a heat wave. Extreme heat is the number one weather related killer in the United States. It causes more deaths than floods, lightning, tornadoes or hurricanes.

2.8.1 Impacts: One of the most pervasive impacts in Illinois will be a significant demand for electricity. Electricity demands at its peak drives prices up. Air conditioning is responsible for the largest portion of Illinois’ consumption and electricity demand peaks in July. If summers are hotter there is more strain on the electricity system and the higher the cost. This in turn could require the construction of more electrical plants.⁴⁷

Extreme heat not only impacts just humans. Livestock are vulnerable to extreme heat as are crops. As temperatures rise crop yields tend to decline. In the future crops may need more irrigation methods.

Table 2.8.2

NWS Heat Index		Temperature (°F)															
		80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
Relative Humidity (%)	40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
	45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
	50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
	55	81	84	86	89	93	97	101	106	112	117	124	130	137			
	60	82	84	88	91	95	100	105	110	116	123	129	137				
	65	82	85	89	93	98	103	108	114	121	128	136					
	70	83	86	90	95	100	105	112	119	126	134						
	75	84	88	92	97	103	109	116	124	132							
	80	84	89	94	100	106	113	121	129								
	85	85	90	96	102	110	117	126	135								
	90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127											
100	87	95	103	112	121	132											

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution
 Extreme Caution
 Danger
 Extreme Danger



Health and Safety:

Higher temperatures also make the pollution in the air worse, causing eye and throat irritations and lung damage. Heat kills by pushing the human body beyond its limits. Sweating does nothing to cool the body unless the water is removed by evaporation and high humidity blocks this. Therefore, the body is not able to cool itself and must work harder to maintain a normal temperature.

Young children, the elderly and overweight individuals or chronically ill taking medications are usually the victims of heat stroke. The National Weather Service provides a heat index indicating the likelihood of a heat disorder from prolong exposure and strenuous activity. See table 2.8.2

⁴⁷ igpa.uillinois.edu/system/files/Preparing-for-Climate-Change-in-Illinois
 Jersey County Natural Hazard Mitigation Plan

In Illinois, the most severe event happened in 1995 which resulted in 583 fatalities. The period of extreme heat started on July 11th and extended from June 21 through August 10, 1995. From 1958 to 2015 Jersey County and surrounding counties reported 15 events of excessive heat. The year 2007 was the first and only real heat wave of the summer beginning on August 4th and lasted until August 16th. High temperatures were consistently from the middle 90's to around 100 with a heat index of 105 to 110 degrees. Three deaths were reported due to no air conditioning in the homes. There were also 9 heat related injuries reported. In the year 2011 another 2 deaths were reported.

Damages to Buildings/Critical Facilities: Heat has little effect on buildings, other than the demand for on electric utilities and water mains.

Economic Impact: Demands on utility companies may increase rates; water companies experience a larger demand for irrigations of agriculture and golf courses. Many schools and sports are cancelled due to excessive heat.

Excessive heat is considered a medium hazard.

2.9 Wildfires, Landslides, and Erosion

Land subsidence can cause injury to lives and damage to property, although the latter is more likely. Subsidence occurs when the surface ground collapse due to empty space below. We are familiar with stories of sinkholes, sometimes caused by underground erosion due to broken pipes, and the collapse of abandon mines beneath new subdivisions. Generally, land subsides slowly giving people opportunity to escape the hazard. Landslides tend to occur much faster, taking people by surprise before they can escape the hazard. Landslides occur when rocks, soil, or earth are loosened, often as a result of long-term conditions. In most instances landslides are initiated by intervening events, such as earthquakes or flash flooding. Landslides are both the result and the cause of erosion. Erosion, therefore, can be an indication of potential landslide conditions.

2.9.1 Hazard Profiles: There are two other sets of hazards generated by the human activity that results in land subsidence and landslides. The first set is the hazards generated by the on-going operation of the mines and quarries, including explosions and flying debris. The second set is hazards created to the environment, both as the result of on-going and long-abandoned operations. These hazards include pollution to air and ground water, as well as toxic materials.

It must be noted that the loss of valuable topsoil, which could be interpreted as “soil erosion,” has been a concern of Jersey County and its farmers for many years. Thus, it is possible that the concern over “soil erosion” relates to the economic harm to the agricultural industry rather than disaster caused by erosion, such as landslides.

Land subsidence, landslides, and soil erosion are complex processes. We have structured our discussion of these hazards into two major categories, based on causation—man-made conditions and naturally occurring conditions. While the results of subsidence, slides and erosion may be the same, the nature of their occurrence and the mitigation strategies are quite different. Within the category of man-made conditions, we examine active and abandoned mines, active and abandoned quarries, and active and abandoned wells.

Table 2.9.2 Potential Sources of Land Subsidence and Associated Risk

Activity:	Number:	Level of Risk		
		Subsidence	Environmental	Physical Harm
Active Mines	none	none	none	none
Abandoned Mines	70	low	none	very low
Active Quarries	2	low	low	low
Abandoned Quarries	numerous	low	none	low
Active Wells	unknown	low	low	low
Abandoned Wells	unknown	low	low	medium

Source: *Directory of Coal Mines For Jersey County, IL (January 2015)*

Within the category of naturally occurring conditions, we examine soil erosion, landslides, collapse of bluffs, and natural caves and caverns. We understand that the first two hazards can also result from human activity, which is discussed within those hazards. However, it appears that the most frequent and reoccurring cause of these two hazards is flash flooding, resulting from severe weather,

Naturally-occurring Hazards: As noted in the introduction, the section on land subsidence, landslides and soil erosion is divided into two categories—man-made and naturally-occurring. Among the latter are soil erosion, landslides, bluffs and bluff collapse, and natural caves and caverns. Soil erosion and landslides can occur as the result of human activity. Because their causes may be both human and natural, they have been included under naturally-occurring hazards.

Soil erosion: Soil erosion can be an important causal factor in landslides. Thus, signs of soil erosion may be an important indicator of the potential for future landslides. Soil erosion can be caused by poor farming practices, lost of vegetation and ground cover, human activity (such as excavation of dirt), and flash flooding. Flash flooding, as noted in a separate section, is most likely to occur in one of the county’s three watersheds—Piasa Creek (southeast), Otter Creek (central and west), and Macoupin Creek (north).

As noted in the introduction, soil erosion can be equated, especially in farming communities, with the erosion of valuable topsoil. In recent decades, stakeholders have been aggressive addressing the issue of loss of topsoil—individual farmers, soil and water conservation districts, state extension services. Private citizens and organizations have begun to play an increasingly important role in Jersey County. For example, one of the largest private owners of land in at-risk topography—Principia College—has been active in removing acreage from cultivation as well as engaging in other mitigation activities. These activities are directed and managed by the College’s Department of Biology and Natural Resources.

An even more important factor is the Great Rivers Land Trust (GRLT), the largest and most active land trust in the St. Louis metropolitan region and one of the most important land trusts in the State of Illinois. GRLT has purchased 548 acres in the county and is involved in land reclamation and land preservation activities. Partnering with the Illinois-American Water Company, GRLT is directing the management of the Piasa Creek Watershed. Their goal, working with private landowners, is to substantially reduce soil discharge into the

creek. This is accomplished through an array of soil erosion mitigation strategies, including purchasing conservation easements (to prevent future harmful development), grass and tree planting, stream bank and watercourse reconstruction and management, and withdrawing at-risk acreage from cultivation.

Landslides: Most of Jersey County is not subject to landslides. Based on FEMA descriptions, portions of Jersey County are subject to one of two types of landslides. The first and most frequent type of landslides is slides of rock and mud during and following thunder storms, particularly in flash flood prone areas. The other type of landslides is rock slides due to underlying ground conditions.

There are no records, at this level of research, of any significant landslides in Jersey County unrelated to storms which was noted by FEMA as one of the primary causes of landslides. In Jersey County, landslides are considered within the hazard of thunder and violent storms. The landslides send small rock and mud slides that block roads. They appear to occur under the same weather conditions as flash flooding, which has caused loss of life. Therefore, the Hazard Mitigation Planning Team decided to consider landslides, as a hazard, as a subset of thunderstorms and violent weather.

Landslides can also be caused by earthquakes (which were covered earlier in the chapter) and the removal of underlying support (through underground erosion or human activity such as mining). The latter can cause soil subsidence. Because soil subsidence as a result of extensive underground mining has been a hazard in other parts of the state (including neighboring counties) the Hazard Mitigation Planning Team drafted a separate chapter on the subject. Landslides, most often are the formation of rock slides along the limestone bluffs in the southern edge of the county.



Source: Jersey County Code Administrator 2008 mud slide

Heavy rains during the month of April in 2008 created a mudslide in Grafton. The mudslide forced the family to leave their home and threatened to knock out electrical power to the town. As a precaution the Mayor, Tom Thompson, ordered a part of Illinois 100 to be closed. Water carried mud and gravel hundreds of feet down the bluff, clogging storm drains. According to the Illinois State Geological Survey an engineering geologist responded to a request to evaluate the settling for IEMA. A scarp developed in the Hannibal Shale, which is about 50 to 60 feet thick in the area of the Grafton Quadrangle and overlies Silurian age dolomite. A perched

groundwater table, due to the large amount of rainfall and a small pond, contributed to the slide. Jointing of the carbonate rocks above the Hannibal Shale yielded a lot of water, which further exaggerated the earth slump landslide.

The affects of the December 2015 heavy rains once again created a collapse of the bluff with mud spilling on to the roadway of Illinois Rt. 100, closing the road for weeks. In the wake of the mudslide Grafton hired an engineering firm to study the failure. The workers could not begin clearing the mud due to the unstable conditions of the slope. When it was deemed safe enough they placed a large concrete retaining wall measuring 4 ft by 2ft to hold back the possibility of another mudslide.

At a City Hall meeting in Grafton, the engineer reported that it could take up to two months to clear the debris near the residences. The homeowner of one residence has not been able to return to her home. The main task will be to understand why the slope has become unstable and draft solutions to prevent future slides.⁴⁸ The City of Grafton estimates the accumulated expenses as of December 2015 to be \$80 thousand.⁴⁹



2015 Mudslide in Grafton along Illinois Rt. 100

Wildfires and Field-fires: The FEMA document, *Understanding Your Risks: Identifying Hazards and Estimating Losses*, lists wildfires as one of the seven major categories of natural hazards. Wildfires are fires in wild or undeveloped areas, including forests and grassland. We generally know wild fires as forest fires. Wildfires, however, are not the only non-structural fires that can cause wide spread damage to property and even life in Jersey County.

Field fires are of agricultural areas, including fields of crops or grazing land. Field fires can be ignited by the same causes as wild fires. Most field fires, however, are man-made, with the intention of burning wide areas of ground. The danger of field fires comes when they are out of control, frequent fanned by high winds.

Wild and field fires can be caused by many sources. Lightning appears to be a predominant natural cause. In Jersey County, lightening most frequently occurs before or during thunderstorms (thunderstorms are the source,

⁴⁸ *Jersey County Journal* December 2015

⁴⁹ Mayor Tom Thompson, City of Grafton

in various forms, of some of the county's most significant hazards and are covered in a separate chapter). As a result, fire caused by lightning can be suppressed by concurrent or subsequent rain. Fires, including the only known wild fire, can also be caused by man. As noted, field fires are frequently started by farmers to burn stubble and field debris. However, farm machinery can cause field fires as well. In 2007 a combine sparked a weekend fire in Jerseyville and burned about 80 acres and damaged a two-story frame home and threatened two historic homes. The fire began in a partially harvested soy field with flames jumping the road in a cornfield, spreading into another bean and a corn field.



Local farmers assisted the fire departments by bringing their disc harrows to turn up the ground and create fire breaks. No one was injured and the amount of loss to crops was unavailable.

Wildfires: Jersey County is a rural county of 377 square miles. 16 percent of the land is either under cultivation or used for livestock. 49 percent of the land is developed—in villages, towns, cities, and unincorporated communities. 35 percent of the land is in forest, ungrazed grasslands, or dense wooded areas. Much of this latter land is located in rugged south and southwestern parts of the county, or along watersheds of Piasa, Otter, and Macoupin Creeks. Two of the largest tracts of undeveloped land are located within Pere Marquette State Park, the largest state park in the Illinois system (located in the southwestern corner of the county), and on extensive land owned by Principia College (located on the southern edge of the county).

Principia College maintains a student-operated and led fire brigade. The fire brigade does not operate during summer and other breaks, which can be rated as high fire seasons due to drier conditions. The preparation of the brigade to respond to fires varies based on level of student interest and participation.

Pere Marquette State Park does not have its own fire suppression organization. However, park officials have contingency plans for responding to wild fires within the park. Park officials have given their opinion that park fire incidents occur because of man-made causes and could also not recall any fires due to natural causes. However, in the history of Pere Marquette State Park, there was a significant fire which occurred the day of November 17, 2011 affecting nearly 1,500 acres of timber at the park. The wildfire was first reported in timber at the easternmost section of the park and was thought to be brought under control on November 18th, but due to high winds the fire rekindled and spread. Rain showers on November 20th helped to douse out the fire. Responders consisted of IDNR, Conservation Police, State Fire Marshall, Illinois State Police, Jersey County Sheriff, IDOT, US Fish & Wildlife Service and the quick response of firefighters from than half-dozen local and regional departments and fire protection districts.

The second worst fire happened on the evening of October 27, 1974. The fire originated near the immediate vicinity of an abandoned car in Pere Marquette State Park, Jersey County, Sections 8 & 5, East Quarry Township, T6N-R12W. The size of the fire involved 345 acres of all upland oak and hickory timber situated on rugged topography. The weather was described as a partly cloudy day, temperature 74, 51% humidity with 18 m.p.h. wind south by southwest gusting to 30 m.p.h. The fire was reported at 9:35 a.m. on October 28, 1974. Work action started at 10:30 a.m. when fire was approximately 60 acres in size. Fire was controlled by 7:30 p.m. Total fire action time was 9 hours and 10 minutes. Park personnel patrolled perimeter of fire until 10:30 p.m. when rain thoroughly came through the area. Fifty-five (55) men fought this fire with an average of 40

men working on the fire at any one time.

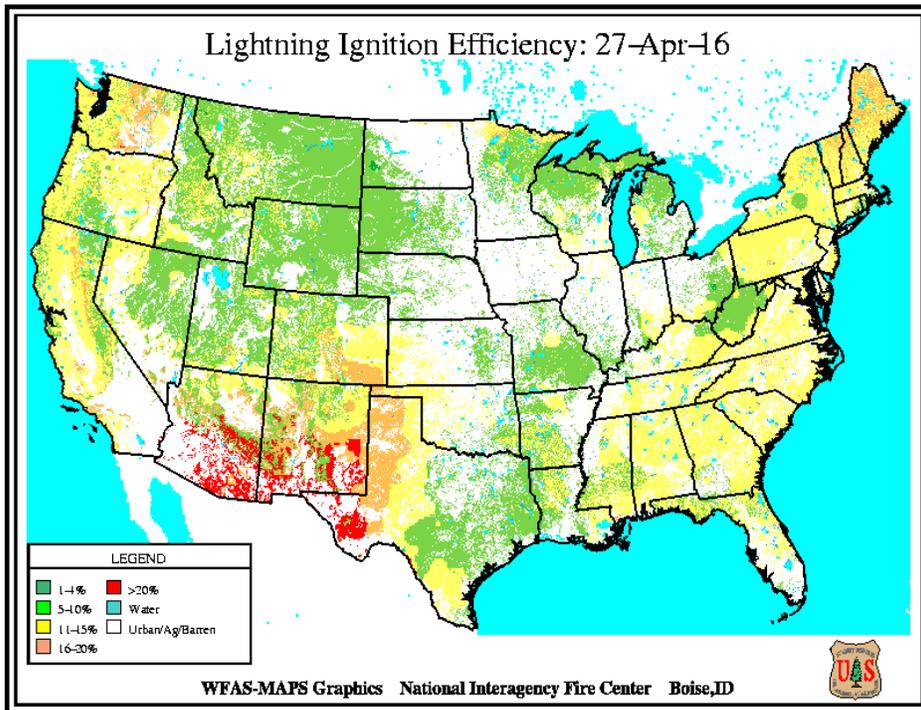
In 1978, the Department of Conservation undertook a rehabilitation operation at Pere Marquette State Park on the area damaged in 1974. This fire shows that we have a potential for a significant fire in this area of the county. Incidents, however, remain to be very few. Indeed, interviews with area fire-related emergency responders indicated that very little fire damage has occurred in Jersey County related to natural causes.

Jersey County, including its largest city, is covered only by volunteer fire departments. Both the state park and the college are located within the Quarry-Elsah-Mississippi Fire District. QEM may be the most developed and trained fire department in Jersey County. QEM is based at the newly constructed fire suppression training center, part of the fire training education program of Lewis and Clark Community College. QEM mutual aid agreements with neighboring departments, including the partially professionalized department of Godfrey and the fully professional department of Alton.

Between January 1, 1965, and November 3, 2000 (FEMA, August 2001), no Forest Fire Presidential Disaster Declarations were issued covering Jersey County (nor anywhere else in Illinois).

Health and Safety: Wildfires have the potential to cause smoke inhalation and burns to the body and if trapped death. Burning embers, especially in high wind areas, can ignite other buildings or areas.

November 19, 2011 fighting park fire
Aerial view of Pere Marquette fire



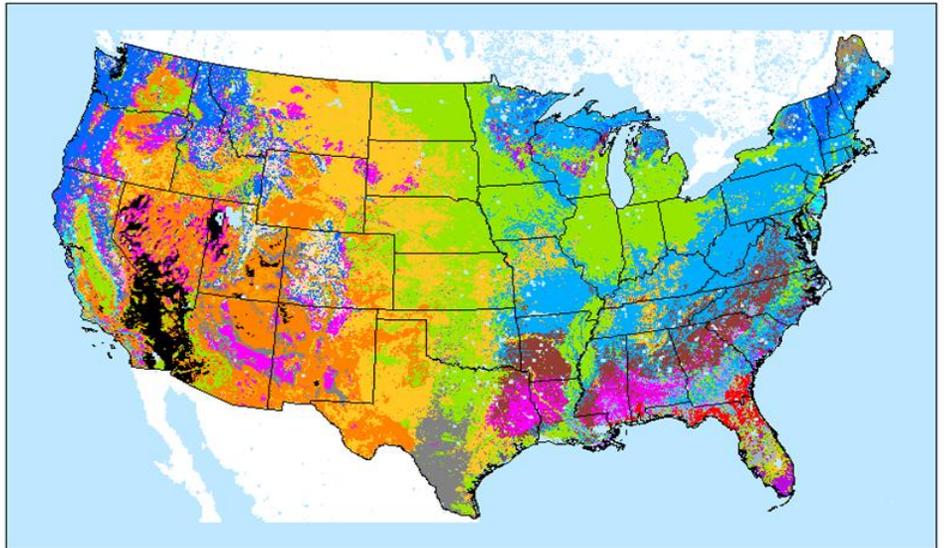
Landslides, wild fires and field fires are considered low.

WFAS-Map - Lightning

US NFDRS Fuel Model Map

Legend

(0) - Outside US
(1) A - Western Annual Grass
(2) B - Chapparel
(3) C - Pine Grass Savannah
(4) D - Southern Rough
(5) E - Hardwood Litter
(6) F - Intermediate Brush
(7) G - Short Needle, Heavy Dead
(8) H - Short Needle, Normal Dead
(9) I - Heavy Slash
(10) - Intermediate Slash
(11) K - Light Slash
(12) L - Western Perennial Grass
(13) Agriculture
(14) N - Sawgrass
(15) O - High Poossin
(16) P - Southern Pine
(17) Q - Alaska Black Spruce
(18) R - Hardwood Litter, Summer
(19) S - Tundra
(20) T - Sagebrush-Grass
(21) U - Western Pines
(22) Water
(23) Barren
(24) Marsh



Map legend revised October 2010

Fuel Model Map - Drought

2.10 Summary of Hazards

Having profiled the various hazards deemed to pose the greatest threat to the county. Of the hazards profiled in this chapter, only flooding has a more localized impact in the county. All other hazards (severe thunderstorms, tornadoes, etc.) are capable of affecting the entire county, however, the total impact on specific communities and location such as critical facilities would entirely be difficult to determine. Therefore, it is recommended that each critical facility within the municipalities and unincorporated areas of the county be researched further for vulnerability. This recommendation is based on the availability of funds and staffing and the cooperation of the stakeholders.

2.10.1 Hazard Profile

Hazard	Area of Damage	Annual Frequency	Measured Hazard	Property Damage	Critical Facilities	Economic Impact
Base Floods	Floodplain	1%	Medium	Medium	Power, water plants	Business/road closure
Severe Thunderstorms	County-wide	100%	High	Medium	Power, communications	Business, hail damage to buildings
Winter Storms	County-wide	100%	Medium	Medium	Power, communications	Business, transportation
Tornadoes	County-wide	<10%	High	High	Hospitals, schools & assembly halls	Utilities, communication, crop damage, debris removal
Earthquakes	County-wide	<1%	Low	Low	Utilities, hospitals, communications	Business, transportation, infrastructure
Excessive Heat	County-wide	.1%	Medium	Low	Low	Utilities, agriculture, livestock
Mines/Mudslide	Bluffs, local areas	<1%	Low	Low	NA	Business, transportation
Wild/Field Fires	Anywhere	<1%	Low	Minor	NA	Crop damage
Drought	County-wide	1%	Medium	Medium	Hospitals, water plants	Crop, business, livestock

2.11 Impact

The impacts of these eight hazards, floods, severe thunderstorms, winter storms, tornadoes, earthquakes, mudslides, wild fires and drought were reviewed and summarized as follows:

- ✓ health and safety
- ✓ economic
- ✓ damage to critical facilities
- ✓ property damage

Potential Dollar Loss

Over 24 million dollars has been lost since 1978 on vulnerable structures due to repetitive loss areas that the NFIP has paid out in claims. With this update the potential loss will be much less due to sound floodplain management and protection of natural resources.

Methodology

The methodology used to estimate potential dollar losses to vulnerable structures is as follows: most current tax assessors' record of the value of land and improvements, current market value of similar improvement and current estimates of value of land improvements by owner of land structures that are exempt from taxation (school districts; local private college; churches; government bodies). We have also used historical data of losses and amounts of insurance on improvements and contents. Overall, we have data on the hazards affecting the county as a whole, however to measure the impact on the individual communities and locations, such as critical facilities, requires additional effort on participating municipalities.

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Jersey County Journal December 2015

Mayor Tom Thompson, City of Grafton

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Mo. Dept. of Natural Resource/Geological Survey

CHAPTER 3. Hazard Mitigation goals

Chapter Two of this plan documents the diversity and likelihood of the natural hazards that has affected Jersey County, and estimates the economic and human cost of such events. Successful and widely supported planning must have citizen input and involvement. Citizens should have input on the goals, objectives and strategies of any mitigation efforts. This chapter documents the original and continuing efforts of Jersey County to solicit and respond to its citizens and their concerns.

The goals for this plan were established by the Jersey County Hazard Mitigation Planning Team. They are consistent with state natural hazard mitigation goals and reflect the input of citizens of Jersey County and municipalities participating in this multijurisdictional plan. This chapter documents the process utilized by the committee to review the original goals set by the previous planning efforts and review current community priorities for the revised Plan. During the update process it became apparent that some of the goals were still relevant and did not need to be changed. The current list of goals and objectives is located at the end of this chapter.

3.1 Original Goals and Objectives

Goal 1 Minimize Loss of Life

Objectives:

- Develop improved systems of delivering warnings about natural hazards to county residents, particularly those in rural areas.
- Develop improved communication systems for emergency responders that will allow them to respond to incidents occasioned by the occurrence of various natural hazards.
- Develop public education campaigns designed to educate residents about steps they can take to minimize the impact of various natural hazards.
- Conduct periodic tests of the county's emergency operation plan.
- Adopt uniform countywide building codes that promote the development of commercial and residential structures capable of withstanding acceptable levels of natural hazard impact.

Goal 2 Protect Public Health

Objectives:

- Develop public education efforts designed to educate the public about measures individual citizens can take to reduce the health risks associated with various natural hazards before, during and after the occurrence of such hazards.
- Improve the following programs with eye to the health risks occasioned by hazards determined most likely to affect the county: sanitation, disease surveillance, vector control, vaccination.

Goal 3 Protect and Develop Infrastructure

Objectives:

- Adopt uniform countywide building codes that promote the development of commercial and residential structures capable of withstanding acceptable levels of natural hazard impact.
- Perform regular maintenance on transportation infrastructure including roads and bridges.
- Review building inspection procedures to ensure appropriate attention to hazard mitigation related features.
- Improve sewage and wastewater treatment infrastructure.
- Review building evacuation procedures posted in all county-owned buildings.
- Review evacuation routes on a regular basis to ensure appropriate access in the event of their use.
- Improve communication systems through the use of federal and state grants and private initiatives.

Goal 4 Protect Public Property and Critical Facilities

Objectives:

- Review building inspection procedures to ensure appropriate attention to hazard mitigation related features.
- Adopt uniform countywide building codes that promote the development of public buildings capable of withstanding acceptable levels of natural hazard impact.
- Retrofit any existing critical facility deemed unreasonably susceptible to natural hazards.
- Ensure that all public buildings are appropriately insured.
- Review security of critical facilities.

Goal 5 Protect Private Property

Objectives:

- Adopt uniform countywide building codes that promote the development of public buildings capable of withstanding acceptable levels of natural hazard impact.
- Adopt zoning ordinances that minimize the risk of exposure to the most prevalent natural hazards.
- Conduct public information campaigns designed to educate citizens about the potential benefits of the following activities: retrofitting, floodproofing, insuring property.

3.2 Goals and Guidelines

Having completed hazard profiles and loss estimates for the hazards identified as posing the greatest risk to the county, the Hazard Mitigation Planning Team devised a process to present the findings from this phase of the mitigation planning process to the public and solicit public input on mitigation goals and objectives. In preparation for routine and special reports to the County Board and Committee, staff and consultants periodically conducted studies and surveys of citizens and stakeholders, and met with various organizations, including all of the municipal governing bodies.

July 9, 2008 Organization of a Hazard Mitigation Planning Team: The Team is responsible for monitoring and evaluating the implementation of the Plan and updating the Plan participants.

- The Jersey County Board designated individuals to serve on a sub-committee Planning Team as a liaison between the Hazard Mitigation Planning Team and the Board (see Appendix);
- Formed a sub-committee for a Stormwater Management Ordinance to monitor new construction when ten thousand square feet or more of ground is being disturbed. The ordinance would have provisions on drainage ponds, silt fences and requirements for subdivision developments. The ordinance was adopted in September of 2009.(see Appendix)
- The city of Grafton already has a Plan in force as of July 1994. In March of 2009 the city of Grafton adopted the Illinois Energy Conservation Code.

February 11, 2009 First Responders and Government Officials debriefing of 2008 Flood: Since the original Plans expiration, Jersey County was declared a Federal Disaster after the area experienced major flooding in the spring and summer of 2008. Part of the ongoing effort to save lives and limit property damage in the wake of such a disaster, the JCHMP team held a flood mitigation review meeting on Wednesday, February 11, 2009 at Principia College. The purpose of the meeting was to review responses by all key individuals and organizations involved in responding to this disaster, identifying both successes and areas in need of improvement. Information obtained from this meeting would be used to strengthen both emergency operation procedures and mitigation actions identified in the county's' Multi-Jurisdictional Natural Hazard Plan. Invitation and participants list are located at the end of this chapter.

Participants identified the following "successes":

- ✓ Grafton, Elsay and the County used elevation maps to manage evacuations and sand-bagging efforts;
- ✓ Flood stage information provided by the Corps of Engineers was timely and useful;
- ✓ Mayors were pleased with overall inter-agency cooperation;
- ✓ County floodplain management policies and practices reduced damage;
- ✓ There was sufficient law enforcement, including full complement of IDNR Conservation Police on the rivers.

Participants identified several issues or problems:

- ✓ Coordination of road closings and openings with IDOT;

- ✓ Enforcement of road closings;
- ✓ Delivery of electricity for levee pumps, quarries for preparing rock and sand, and normal summer usage.

2009 Consultation on FEMA Community Rating System (CRS) 330 Series (Outreach Projects): In 2009, Jersey County served as one of the national pilot communities to field test a proposed six-part approach for activities and credit under Activity 330. FEMA was in the process of evaluating and revising its approach to the 300 Series of Public Information activities and how activities under this series were credited. An initial assessment of the credited activities conducted in 2007 provided recommendations for areas of revision and additional attention. The pilot program was managed under contract to the consulting firm of Ogilvy Public Relations Worldwide.¹ The pilot program research involved a number of telephone conferences, coupled with site visits by the consulting team. The consulting team from Ogilvy worked with Mike Prough and Cindy Cregmiles of Jersey County and Brian Roberts and John Williams of Principia College.

The pilot project consisted of an extensive workbook to be completed by the local natural hazards mitigation team. The workbook covered community objectives and project scope, preliminary self-assessment, pilot refinement of objectives and scope, check-ins and log, and a “six-element approach”: outreach self-assessment, basic communications and outreach tools and channels, stakeholder engagement, outreach strategy and integrated plan, target audiences and special opportunities, and evaluation and program refinement. The primary purpose of the consultation was to evaluate the Ogilvy six-element proposal. The secondary purpose was to benefit Jersey County through participation in the six-element process.

The Jersey County team completed the workbook review by December 2009. The Jersey County report is included in Chapter 9 on Public Information. The Ogilvy team reported back: “Mike & Cindy—Bringing Jersey County from the brink of expulsion from the NFIP to a community in good standing using creative and effective approaches to flood plain management is a true success story. Clearly your energetic and committed leadership is making a difference.” The team also reported: “John & Brian—your partnership with the County is a model for ways other communities can collaborate and a great way to combine classroom teaching with practical experience.” The Ogilvy team provided no further feedback to the substantive Jersey County self-report.

3.3 Periodic Studies, Surveys and Involvement of the Public

Introduction: Periodic Reporting to Jersey County Board and Committee on County Service Offices and Public Safety, All Meetings Open to Public, Administration of Mitigation Plan: The relevance of the original natural hazards mitigation goals and objectives has been in the forefront of the minds of those charged with managing and implementing the Jersey County Natural Hazards Mitigation Plan. The primary responsibility for implementation and oversight of the Plan rests with the Jersey County Board, which has delegated specific responsibility to the Committee on County Service Offices and Public Safety (herein referred to as the Committee) of the Board. Following the recommendation of the Plan, the Committee puts plan implementation,

¹ www.ogilvypr.com

oversight and review on its agenda at least twice each year. Every routine meeting of the Committee, as well as any special sessions or workshops, is announced to the public, which is invited to attend and (as appropriate) participate, under the requirements of the Illinois Open Meetings Act and other relevant statutes. Electronic minutes are kept of every meeting.

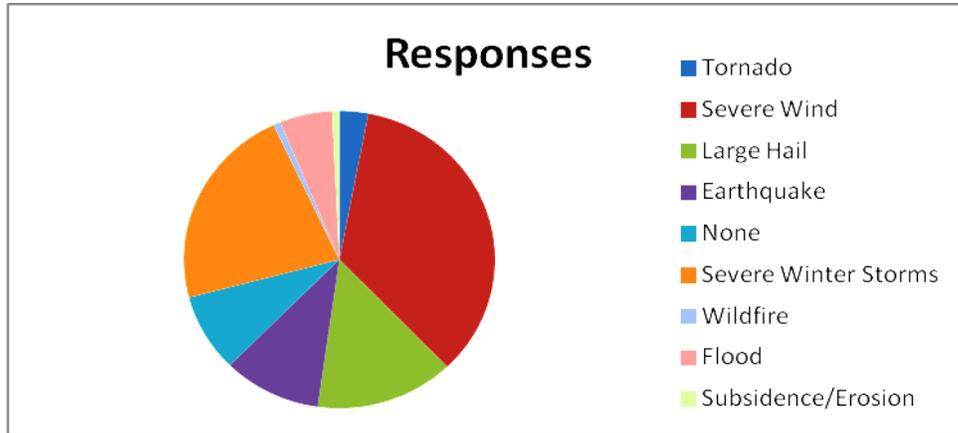
Specific implementation of the plan has been delegated to the County Code Administrator, and advised by faculty from the Political Science Department at Principia College. The Code Administrator, and advisors, meets at periodic intervals to review the plan's implementation and prepare presentations for the Committee and the entire Jersey County Board. Reports to the latter body have been at least annual. Presentations to the Board have been more frequent in response to specific activities, issues or requests. In addition, county offices, other government agencies and relevant stakeholders reported on their progress semi-annually.

Phase 2: May 16, 2009 Public Survey: On May 16, 2009, a city wide survey was sponsored by the Jersey County Board's Special Projects Committee. The purpose of the survey was to help the county design a more effective public education campaign about steps citizens and businesses can take to prepare for and respond to natural disasters. Survey results would aid in the evaluation process of JCNHMP to improve coordination and risk reduction activities throughout the county. With the support of the NHM team, a team of students from Principia College's Political Science Department, a twenty question survey was designed. Volunteers from the Jersey Community High School National Honor Society students, Principia College students, and three major businesses assisted in handing out surveys to the public. In addition, the county distributed surveys to county and local government offices. In all, 213 surveys were collected. A key question asked, "*In the past five years, which of the following natural disasters has your household experienced? (Check ALL that apply)*". The questions offered an array of natural disasters for selection.

This question provides a detailed analysis of what natural hazards Jersey County residents have experienced (or remember experiencing) in the past five years of living in the county and its municipalities. Understanding the types of disasters that people recall experiencing helps to emphasize what people feel are the biggest threats to the county, which assist the county in understanding what type of information to distribute. It seems that county residents have almost no recollection of the earthquake in mid 2008 (only 41 out of the 213 respondents recalled this event). Severe winter storms from the winter of 2008 was more memorable than the earthquake that same year (89 out of 213), but still low for how severe the storms were. This lack of attention to natural disaster points to the low public salience of the issue.

Question: In the past five years, which of the following natural disasters has your household experienced?

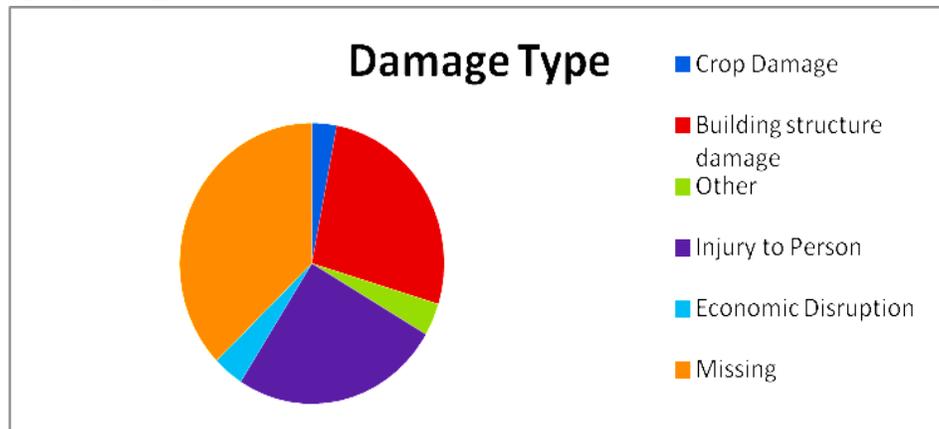
Table 3.3.1



Question: What kind of damage from natural disasters are you most concerned about?

Beyond demographical questions, the survey provided information regard Jersey County residents understanding of natural disasters, priorities in natural disaster preparedness, and the best methods to convey information to county residents. This question aimed to understand citizens priorities in hazard mitigation; it also sought to understand what levels of knowledge county residents had of natural disaster damage. According to the data (listed in Table 3.3.2) collected, Jersey County residents are most concerned with damage to building and structure damage (33.3%). A close secondary priority (31.9%) was injury to person. These two answers were reversed from the 2004 study signaling a slight change in priority. Unfortunately 21.6% of the data is missing due to participants either leaving the question blank or checking multiple options (directions state “check only one”). According to the survey, these two topics should be the main focus of information being delivered to the citizens regarding hazard mitigation.

Table 3.3.2



Executive Summary of May 2009 Mitigation Survey of Phase 2: One of the action items of the Plan involves developing and implementing a public education program regarding natural hazard mitigation. In August of 2009 a team of upper-division Principia students enrolled in a Public Policy Analysis course, reviewed the county's current efforts to implement, monitor and evaluate activities associated with four Action items. In addition to descriptive accounts of these ongoing projects, the students developed recommendations designed to improve these activities. The findings were delivered by formal presentations to the public, stakeholders and the County Board. Based on the reports and subsequent conversations, the Special Projects Committee made seven recommendations to the County Board. Some recommendations require formal actions by the County Board; including allocations for staffing and financial resources and in other instances, these recommendations propose actions that can be taken directly by specific county government offices. The Executive Summary and Recommendations are at the end of the chapter.

August 18, 2009, Executive Summary of May 2009 Public Survey:

- Acknowledgment that few respondents have great knowledge of hazards;
- Jersey County residents for the most part are unaware of the efforts to educate them on safety to home and health;
- A majority of respondents would like to have more information on safety;
- Discovered how the residents receive most of the news media via local newspapers, however they would prefer to receive hazard information by mail;
- Over 80% did have computer access
- Only 77 of 213 thought the Internet was an effective method of communication and less than 17% were aware of the county's web site.
- If the county were to depend on the Internet for information, they would need to develop a large advertisement campaign of the sites.

September 2, 2009 Open to the Public Committee Meeting:

- Jersey County selected one out of four counties in the US to participate in the CRS outreach activities revision project. Their output will be used for rewrite of the current point system in the new manual;
- Illinois of Public Health and Jersey County agree that septic systems that were inundated by flood water are deemed to be failed. The County Health Department Sewage Code is more stringent than the States'. Letters were mailed to all residents in the floodplain;
- Discussed the roll the Soil and Water Conservation Office plays in inspections and a fee schedule for storm water management.

January 13, 2010 Open Bi-Annual Meeting: Committee members met to discuss the items to present to the public and Board:

- Overview of the ten action items;
- Questioned why City of Jerseyville has not adopted a Stormwater Management Ordinance;
- Discussion of a future public questionnaire;
- Representative of Great Rivers Preservation reported the watershed covers approximately 78 thousand acres with 60% being located in Jersey County;

- New addition to the county jail will be considered a critical facility
- Utility companies are currently taking steps to remove tree limbs from utility lines;

January 24, 2010 Open Special Projects Committee Accomplishments of the 10 Action Items and Plan Update: A public meeting was scheduled sponsored by the Special Projects Committee in August to discuss the Accomplishments of the 10 Action Items:

- Sept. 8, 2009 the Board passed the Stormwater Management Ordinance Action #5;
- County and Grafton adopted the 2006 ICC codes and 2009 IECC code Action #1 & 3'
- Annual educational brochures to land owners in the county at a cost of \$577.00 to the Code Administrator Office, Action #4 & 9
- Reported that the 5 year leases were renewed on preservation of open space areas Act. #5
- City of Jerseyville purchased acreage located in a floodplain and created a recreational lake, which in turn allows water to drain it the lake. Act. #5 & 10
- City of Jerseyville purchased warning sirens to minimize loss of life.

Updates to the Plan were also provided by the County Engineer, Tom Klasner as to the ongoing culvert and bridge maintenance (Action #2), Jersey Co. Health Department, Dale Bainter also gave update as to the mosquito prevention classes and certification for administering mosquito pellets in stagnant water, Jersey County Code Administrator discussed the mitigation of USAC E cabins following the 2008 flood, the grant obtained to replace private septic systems that were deemed failed from flood waters and the remaining repetitive loss properties. Jeff Blackorby with the Soil and Water Conservation Office gave update on the new NPDS permits issued since 2010 and the cost of the service. Per the passing of the Stormwater Management Ordinance, the State issued permits are required. Public was invited to ask questions, no response.

August 3, 2010 Public Bi-Annual Multi-Hazard Mitigation Meeting:

- Requested the Board appoint County Code Administrator as the Plan's administrator;
- Update of county web-site, design is finished however still looking for funding;
- County Administrator explained informational requirements and asked for help from individuals;
- Reports from stakeholders regarding their accomplishments
- Also held a joint meeting on the Stormwater Management

November 23, 2010: several stakeholders were asked for their summaries as to what type of mitigation projects or outreach programs have been implemented. Larry Mead, the Jersey County ESDA Coordinator, has held public information meetings at the Quarry-Elsah-Mississippi Fire Department. Mr. Mead is a trained Family Protection Plan speaker. Members of the public, county officials, community leaders, hospital representatives, engineers, and officers of the Sheriff Department attend the meetings. Jeff Blackorby of the USDA Service Center, Betty Duggan, Mayor of Fieldon, Lynn Schreiber, President of the Village of Elsah, Jeff Soer, Building and Zoning Department of Jerseyville, and Tom Thompson, Mayor of Grafton.

December 14, 2010 Multi-Hazard Mitigation Meeting:

- Discussion of time line for the work to be prior to expiration date

February 7, 2011 Public Meeting by Special Projects Committee:

- Discussion of action item of web site, no response from request of grant money
- Chairman made motion to use money for update of Plan toward the web site
- HAZUS classes offered at Emmetsburg
-

February 8, 2011 Open Grafton City Hall Meeting: The Council announced that the city is making preparations for spring flooding due to the heavy ice and snow storm that blanketed the area.

June 8, 2011 Public Meeting by Special Projects Committee:

- Discussion of how the public would view the web site to be user-friendly, the Chairman of the committee would be meeting with the company that will be doing the web design.
- The Chairman also suggested that placing a public survey in a local “shopper newspaper” that we might have a better response from the public; it was also discussed that the web site would also be an excellent tool.
- City of Jerseyville is still working on a storm water management ordinance, and three creek restorations have been completed.
- City of Jerseyville is still using the 2006 ICC codes and is not sure they want to move to the 2009.
- Jeff Blackorby of the Soil and Water Conservation reported that the water disaster issues have lessened but the wind disasters have increased due to less rainfall and less construction. There are 700 more acres being placed in the CREP, with another 400 acres in Nutwood, but these acres are still under water and the warm season grasses cannot be planted.
- There were 47 water control basins placed in 2010 and another 70 will completed in the county.

November 3, 2011 “Frontline Responders Workshop,” Review of Natural Hazards by First Responders: In review of the county’s response to natural disasters, a “frontline workshop” was held on the campus of Principia College. The workshop was sponsored and organized by the college’s Political Science Department. The frontline workshop involve two specific groups of people—both at the front line of any response to natural hazards—first responders (such as police, fire, and public health), and local government officials (mayors, county department directors, and other relevant administrators). Participants included the following first responders, government officials, and other parties:

- Lorna Hagen, Jersey County Health Department
- Dale Bainter, Jersey County Health Department
- Larry Mead, Jersey County ESDA Coordinator
- Larry Bear, Jersey Community Hospital Administrator
- Gary Hayes, Vice Chair, Jersey County Board
- Larry Keller, member, Jersey County Board
- Sonny Renken, Jersey Community Hospital EMT/ambulance service
- Cy Bunting, Mayor Village of Elsay
- Tom Klasner, Jersey County Highway Engineer
- Mark Kallal, Jersey County Sheriff
- Kevin Klaas, Jersey County Sheriff Department
- Chris Sullivan, Grafton Police
- Mike Prough, County Floodplain Manager
- Cindy Cregmiles, Code Administrator Office
- Linda Davidson, staff, Code Administrator Office

- Roger Kirby, Major, Jerseyville Police Department
- John W. Williams, chair, Political Science Department
- Bryan White, Director, Campus Security Office, Principia College
- Mark Mackintosh, QEM Fire Department
- Matt Donatelli, student recorder, Principia College
- Cameron Douglas, student recorder, Principia College
- Mariana Leite, student recorder, Principia College
- Mark Wagner, IDNR Conservation Police

The first step was to review the hazards that Jersey County had experienced since the adoption of the natural hazards mitigation plan in February of 2008. The workshop identified the following:

- “Grafton flood” of 2008
- Earthquake of 2008 (Wabash fault)
- Tornado at The Glades
- Severe summer storm of (causing extensive damage to trees throughout Jerseyville)
- Hail storm
- Several severe ice storms
- Assorted straight line winds
- Mud slide in Grafton
- Lightning strikes
- Flash flooding
- Gas explosion
- Snow storm
- Drought

The second step was to engage in separate discussions among the first responders and local government officials. The local government officials and department directors identified the following concerns, issues or potential problems:

- Develop a comprehensive list of contacts to disseminate information
- Identify services available to the county from regional and state agencies; comprehensive contact lists and list of resources
- Coordinate communication with the County Code Administrator for tracking disasters using GIS
- Extend certification training, such as CERT
- Expand inter-departmental training
- Develop procedure for notification of public health department as food services can be contaminated due to disasters, natural or man-made
- Develop procedure to handle radio traffic which is exceptionally heavy during disaster and communication is confusing; communications frequencies get overwhelmed when everybody tries to use one channel
- Provide correct information for news media to relay to the public
- Respond to storm water and flash flooding effects on Elsayh village

- Develop response for deterioration, terrorism or vandalizing the ammonia pipe line that runs through the county
- Implement Reverse 911 – expensive, but would be helpful
- Develop plan for air support from neighboring jurisdictions such as St. Louis County and Illinois state police; both can be contacted by local police
- Documentation of potential problem areas
- Cell service has improved in Elsah; inactive AT&T tower in Grafton
- Improvements have been made on repetitive loss; still working on the floodplain
- Generally prepared for flooding – loss of water has been an issue in past; In '93 Alton's water went out, and Principia College's swimming pool was used to hold spring water; Anheuser-Busch brought water from across the river
- Need to make clear to the public the difference between aquifer and raw (river) water
- Communications getting better – change from disaster to all-hazard approach
- More partnerships developing; for example, Principia College has been brought up fairly regularly in discussions as a place to take injured/displaced people, and as emergency water supplier
- Jersey County is generally able to respond well for isolated events, but doesn't document it as well as they could
- Need to recognize that there are more inline winds than circular (tornados) winds
- Risk of planes crashing in fields and forests
- Communication between departments – not just between the County and (e.g.) Grafton; contacting the Sheriff's Dept. is not the same as contacting the County

The first responders identified the following concerns, issues or potential problems:

- Windstorms: Straight line winds seem to be the most dangerous
 - How can we respond?
 - We can make people aware to watch the news/weather
 - Problems that stop us from making a public announcement
 - Windstorms come so fast that it is difficult to warn a community
 - Communities are at a higher risk for windstorms
- Earthquakes:
 - Seems to be the biggest risk/concern at this moment.
 - It's important to know what to do with an earthquake; children in grade schools are becoming educated; kids are doing drills at schools regularly; kids seem to be a very important asset to building a safer community
 - 5 year program to regulate drills
- Flooding:
 - In 2008, half of Grafton was cut off; food had to be given to people by boat; people who were sick had to be taken to hospitals by boat
 - In 2008 more men were out in the river to patrol to make sure that the people were okay

- People are getting lost within the flood; transportation is being cut off by the big floods
- 1993 big flood, The levy system was not the best
- Manpower seems to be the biggest problem when it comes to flood compared to transportation; not enough manpower to control the situations
- Field fires:
 - Communication is a big problem when it comes to field fires; it is a technical issue; need an alternative use of communication when it comes to making police departments/fire departments aware of what is going on
- Ice Storms:
 - Do we have shelters for ice storms? Yes, but they haven't had to be used in a major way since 1993
 - What about the issue with heat? People are losing power, therefore they don't have any heat that keeps them warm; when that happens, shelters are used
 - Electricity seems to go off the most when winter storms start up
- Heat waves:
 - Jerseyville has set up cooling centers in the past
- Additional comments:
 - Red Cross: they have a short list of what they do when natural disasters occur
 - Cross training with EMS, and other departments so that they can work together and become more prepared; departments should know how to do certain things with other departments
 - A county website for alerts; the Jerseyville police department has a website to inform citizens; if the websites begin have crossed links with other departments then people become more aware
 - Digital warning signs along highways.

January 24, 2012 Public Bi-Annual Meeting: Discussion of the dollar amount citizens may be saving on their homeowner insurance premiums due to the county being in the CRS. Question from the public as to how the mitigation plan helps the county, wasn't this government interference. The Mayor of Elsau responded by asking if the fire department responds to a house fire would this be considered government interference. Mr. John Williams explained that with having a Plan in place is proving to big government that "this is us, doing for ourselves."

2012 Survey of Jersey County Voters: In March 2012, two hundred and seven Jersey County residents were surveyed about their recent experience with nine types of natural disasters, extent of concerns with eight major types of natural hazards, knowledge about disaster planning and steps toward mitigation of the impact of natural disasters, and use of media to learn about local government. The surveys were conducted of voters at four voting precincts on the day of the March 2012 Illinois primary election. These citizens cared enough about the civic health of their community to participate in primary election voting. The four precincts, two in the county seat and two in rural counties, have a pattern of voting "with" the county; that is, these precincts

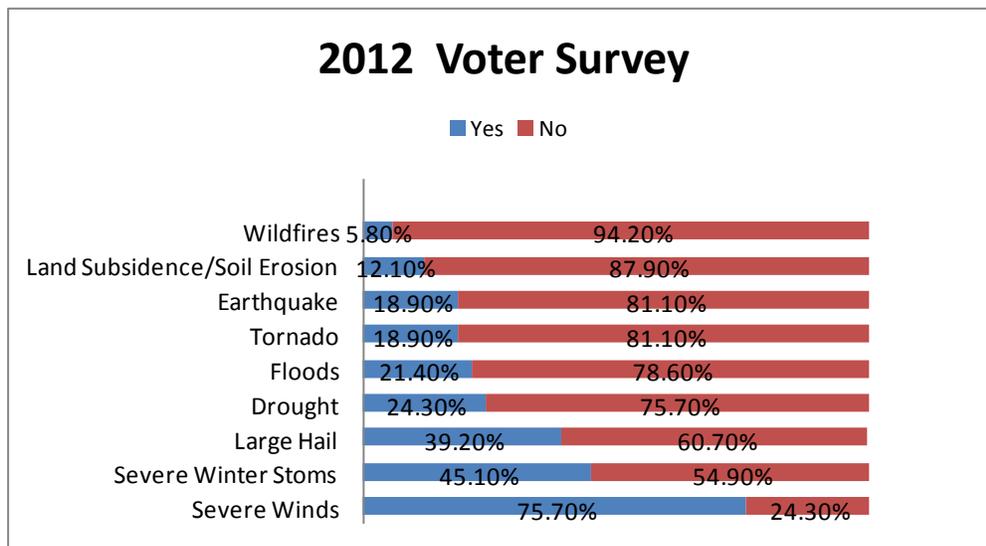
reflect the pattern of voting of the county as a whole and, as a result, may be a useful reflection of the county. The survey was conducted by the Political Science Department of Principia College, Elsah, and Jersey County, Illinois.

One hundred, twenty three respondents (59.4%) live in or near Jerseyville, the county seat and only metropolitan area of the county. The remaining 84 respondents (40.6%) live in the rural areas in the center and southeast of the county. There were slightly more men than women (109, 52.9% to 97, 47.1%). Almost 40% had high school education, with another 37% having college education and 16% have post-graduate education. Over 70% of the respondents have lived in Jersey County for at least 20 years. The average as well as median age is 61. The respondents reflect an older, stable population. The education level may be skewed somewhat due to the presence of a private liberal arts college in one of the two rural voting precincts.

The survey was undertaken prior to the Midwest drought of the summer of 2012, so the respondents might give a higher response to experience with drought if the survey had been conducted in the fall.

Over the past five years, respondents have experienced the following natural hazards:

Table 3.3.4



By the nature of the selection of the precincts that were surveyed, the parts of the county traditionally struck by river flooding (as in Grafton and Elsah in 2008) were not studied, so the responses to experience with flooding may be underreported. Less than 7% of the respondents acknowledged that they lived in a flood plain.

Like river flooding, land subsidence or soil erosion and wildfires can be geographically isolated to certain parts of the county. By nature of the precincts selected, the part of the county that experienced a wildfire (in and about the state park near Grafton) in 2012 was not studied. Rural residents reported significantly greater experience with flooding and earthquakes than Jerseyville residents.

Respondents were asked about their level of concern about future natural hazards:

	Extremely Concerned	Very concerned	Concerned	Somewhat concerned	Not concerned
Tornados	23.2%	32.0%	25.8%	10.8%	8.2%
Straight-line winds	18.0	24.9	30.2	15.3	11.6
Severe winter storms	13.2	14.3	28.0	30.7	13.8
Land subsidence	10.4	15.4	27.5	22.5	24.2
Large hail	9.6	16.6	28.5	24.1	11.2
Wildfires	6.6	9.4	23.2	29.3	31.5
Earthquakes	5.8	5.8	23.8	37.0	27.5
Floods	5.3	16.0	24.6	23.0	31.0

The relatively low level of concern over wildfires and flooding may be a result of the survey process, though hazards that tend to be geographically limited (including soil subsidence, wildfires, and flooding) appear to stir less concern than the hazards that can have a county-wide impact, particularly storms.

Rural respondents expressed a greater concern about earthquakes, severe winter storms, straight line winds, and tornados than did Jerseyville residents.

Reflecting the rural and conservative nature of the region, with its strong commitment to property rights and smaller government, respondents felt that disaster planning should occur at the state and local levels rather than the federal level. Nevertheless, they acknowledge the role of state and local government over individual planning.

Question: Disaster planning should occur at the...

	Yes	No
Federal level	45.2%	54.8%
State level	60.9	29.1
Local level	69.0	31.0
Individual level	40.6	59.6

Most respondents are aware that Jersey County has building codes (91.8%). Most respondents agree (or agree strongly) that uniform building codes result in better construction (62.9%); only 13.9% disagreed or disagreed strongly. Most respondents would support hazard mitigation if it reduced insurance rates (very supportive at 20.3%, supportive at 44%, and somewhat supportive at 30.8%). There was a clear distinction between rural and urban respondents with regard to both knowledge and understanding of building codes. Jerseyville residents were more knowledgeable about the existence of the codes and the impact of building codes on the quality of building construction. Jerseyville has had building codes and building code enforcement for a substantial period of time. The county adopted building codes and established code enforcement in the last decade.

September 27, 2012 Bi-Annual Open Special Projects Meeting: An update of the Plan status was reported. The ten action items were discussed as to which items had been accomplished and

some will be on-going such as maintaining current building codes. Also the committee discussed requests for grant money through IKE. Refer to Appendix for minutes of meeting.

March 26, 2013 Open Special Projects Meeting: Presentation of the web site providers and the needs of the offices.

June 27, 2013 Open Special Projects Meeting: Update on the Hazard Mitigation Plan. The county had previously applied for a HMPG for the update. The grant had been approved and was put into place in May of 2013.

July 17, 2013 Open Special Projects Meeting: Discussion of the offices and fees for the county web site (action item)

August 5, 2013 Open Public Meeting: Updating the new county board members about the purpose and requirements of a Multi-Hazard Mitigation Plan. He stressed that was essential that a Plan should be in place and without a Plan there may not be any federal assistance if a disaster should happen.

October 30, 2013 Special Projects Meeting: The committee met to go over past discussion on the web site. There was more detail discussion of information to be placed on such as links for the public to use.

April 29, 2015 Open Meeting to the Public: Committee met to discuss and recommend the 2015 updated Multi-Hazard Mitigation Plan be placed on the agenda at the May 12th County Board meeting. The Plan has been on the county web-site for display and once approved by the Board it will be on display for 30 days in the Jersey County Board Office.

3.4. Review and Reaffirmation of Hazard Mitigation Goals

In preparation for the review and resubmission of the Jersey County Natural Hazards Mitigation Plan, the Hazard Mitigation Team designed and implemented a process of education and involvement of the public and local officials. The first step was the design of the process and approval by the Special Projects Committee. The next step was a briefing of the entire Jersey County Board, followed by public briefings:

City of Grafton	John Williams, Professor, Principia College
City of Jerseyville	Brian Roberts, Professor, Principia College
	Jeff Soer, City Building Inspector
	John Williams, Professor, Principia College
Village of Elsay	Linda Davidson, County Code Administrator's Office
	Brian Roberts, Professor, Principia College
Village of Fieldon	Linda Davidson, County Code Administrator's Office
	Brian Roberts, Professor, Principia College
	John Williams, Professor, Principia College

Next, the Team began the process of identifying, reviewing, researching, revising, and expanding Chapter 2 on Hazard Profiles and Loss Estimation that the county and municipalities are subject to. The Team decided to include Excessive Heat in the updated Plan risk assessment based on research of the crop loss and deaths that occurred over the past years. The review process was already well underway and the Team had engaged the Political Science Department at Principia College, primarily through the Public Policy Analysis class, to undertake biennial evaluation of the progress of the Plan's implementation (see discussion in Chapter 2). In addition, Dr. Brian Roberts of the Principia Political Science Department undertook or supervised extensive additional research into the various hazards through the beginning of 2013. Using research conducted through the summer of 2012, Dr. Roberts revised and compiled a new Summary of Risk Assessment Research, derived from the original prepared in June 2004. The revised information is in Table 3.4.1.

Instead of breaking into smaller groups, however, the workshop functioned as a committee of the whole. First, the participants reviewed the original set of goals and objectives. Second, the participants received and reviewed the Summary of Risk Assessment (Table 3.4.1). Third, the facilitator guided a discussion of the current goals and objectives, specifically seeking amendments—by addition or subtraction of items—to the original list. In summary, the participants decided not to add or subtract any items from the original list. The discussion, rather, focused on shifting ranking of hazards (with new hazards such as drought and wildfires appearing on the master list) and mitigation strategies, their feasibility, and priority. Finally, using the “dot system” from the first workshop, participants were asked to vote on their priority for the five goals. The participants, representing county and local governments and agencies, and private citizens and organizations, agreed to re-affirm the original set of five goals and objectives. It should be noted that a number of the original objectives have been accomplished. The last section lists the five goals and objectives, with notation of which have been accomplished under the original plan.

Table 3.4.1 Updated Summary of Risk Assessment

Hazard	Probability of Occurrence	Area of Hazard	Level of Safety Hazard	Level of Property Damage	Vulnerable Critical Facilities
Earthquake	5-9% of quake 7.5 M or higher within next 15 years; County located in PGA zone of 6g (on scale of 0-180)	Felt county-wide, but the major impact would be in urban areas	Low	Minor; primarily confined to masonry structures; household items not secured	Masonry structures most vulnerable, therefore all critical facilities vulnerable to differing levels of damage.
Drought	Moderate to extreme experienced in 2012; above average probabilities forecast through May 2013	County-wide	Low	Moderate to major for agricultural property; minor to moderate hydrological impact also possible	None
Floods (overbank)	50 yr. = 2% yr. 100 yr. = 1% yr.	Floodplain (direct)	Medium	Moderate - Major	Emergency response; municipal bldgs; schools in floodplain
Land subsidence	Low	Impact varies according to soil conditions and slope of land	Low	Minor	N/A
Severe Thunderstorm	Several each year containing various degrees of wind, hail, lightning	Every part of county is vulnerable	Med - High	Minor	Communications vulnerable to disruption; possible loss of power
Severe Winter Storm	One severe snowstorm on avg. every other year	Every part of county is vulnerable	High	Minor	Communication vulnerable to disruption; loss of power
Tornado	20% chance per year (all recorded have been F1 or F2)	Every part of county is vulnerable	Medium	Med - High	Schools and other large span buildings
Excessive Heat	Greater than 1% chance	County-wide	Medium	Low	Schools, utilities
Wildfire	Extremely low (county located in light fuel region)	More densely wooded areas	Low	Low	None

In September 2012, the Team invited representatives of the various constituencies and stakeholders to a workshop to review and update the goals and objectives of the County’s plan. The invitation list included original members of the Natural Hazards Mitigation Team, replacement members, county and municipal officials, and representatives of various government agencies and private organizations. The workshop was structured as an abbreviated form of the original workshop, thoroughly described in section 3.1.

3.5 Re-Affirmed Goals

Goal 1 Minimize Loss of Life

Objectives:

- Develop improved systems of delivering warnings about natural hazards to county residents, particularly those in rural areas. ACCOMPLISHED IN JERSEYVILLE; NEEDS TO BE ACCOMPLISHED THROUGHOUT COUNTY
- Develop improved communication systems for emergency responders that will allow them to respond to incidents occasioned by the occurrence of various natural hazards. UNDERWAY
- Develop public education campaigns designed to educate residents about steps they can take to minimize the impact of various natural hazards. INITIAL STEPS TAKEN; WEBSITE ESTABLISHED
- Conduct periodic tests of the county's emergency operation plan. ON-GOING
- Adopt uniform countywide building codes that promote the development of commercial and residential structures capable of withstanding acceptable levels of natural hazard impact. ACCOMPLISHED

Goal 2 Protect Public Health

Objectives:

- Develop public education efforts designed to educate the public about measures individual citizens can take to reduce the health risks associated with various natural hazards before, during and after the occurrence of such hazards.
- Improve the following programs with eye to the health risks occasioned by hazards determined most likely to affect the county: sanitation, disease surveillance, vector control, vaccination.

Goal 3 Protect and Develop Infrastructure

Objectives:

- Adopt uniform countywide building codes that promote the development of commercial and residential structures capable of withstanding acceptable levels of natural hazard impact. ACCOMPLISHED
- Perform regular maintenance on transportation infrastructure including roads and bridges. ON-GOING
- Review building inspection procedures to ensure appropriate attention to hazard mitigation related features. ACCOMPLISHED
- Improve sewage and wastewater treatment infrastructure. UNDERWAY IN JERSEYVILLE
- Review building evacuation procedures posted in all county-owned buildings. ON-GOING
- Review evacuation routes on a regular basis to ensure appropriate access in the event of their use. ON-GOING
- Improve communication systems through the use of federal and state grants and private initiatives.

Goal 4 Protect Public Property and Critical Facilities

Objectives:

- Review building inspection procedures to ensure appropriate attention to hazard mitigation related features. ACCOMPLISHED
- Adopt uniform countywide building codes that promote the development of public buildings capable of withstanding acceptable levels of natural hazard impact. ACCOMPLISHED
- Retrofit any existing critical facility deemed unreasonably susceptible to natural hazards.
- Ensure that all public buildings are appropriately insured.
- Review security of critical facilities.

Goal 5 Protect Private Property

Objectives:

- Adopt uniform countywide building codes that promote the development of public buildings capable of withstanding acceptable levels of natural hazard impact. ACCOMPLISHED
- Adopt zoning ordinances that minimize the risk of exposure to the most prevalent natural hazards.
- Conduct public information campaigns designed to educate citizens about the potential benefits of the following activities: retrofitting, flood proofing, and insuring property.

3.6 Conclusion

2003-2008—the year the initial Jersey County multi-jurisdictional natural hazards mitigation plan was implemented, Jersey County experienced an example of each of the expected natural hazards:

- The “Grafton flood” of 2008, one of the top three floods in county history;
- In winter of 2011 the county was blanketed with a massive ice and snow storm;
- The flood of 2013, cresting higher than the 2008 flood;
- Two more floods in 2015, the first in June and the surprise flood in December with flood waters once again cresting higher than 2008.
- Earthquake of 2008, with epicenter across the state on the Wabash fault;
- A confirmed tornado (one of the first) at The Glades, along the Illinois River floodplain;
- Severe summer storm, with wind causing extensive damage to trees particularly in Jerseyville and a confirmed tornado in Carrollton in 2015;
- Drought which cost the agriculture industry millions in 2012
- Hail storm;
- Several severe ice storms as well as a major snow storm;
- Assorted straight line winds;
- Soil subsidence in the form of a mud slide in Grafton (caused by man-made conditions);
- Lightning strikes; and
- Flash flooding.

These goals are consistent with the goals in the other County's plans, Jersey County Stormwater Management Plan and the Ordinance for Development in the Floodplain, the City of Jerseyville Economic Plan and Grafton's Stormwater Management Plans.

3.6 References

www.ogilvypr.com

Building Inspector of Grafton, Grafton City Hall

Jersey County Board Minutes

Chapter 4. Preventive Measures

The objective of preventive measures is to protect new construction from hazards and see that future development does not increase potential losses. The building, zoning and planning, and/or code enforcement offices usually administer preventive measures. They include the following:

- Building Codes
- Standards for Manufactured Homes
- Planning and Zoning
- Subdivision Regulations
- Open Space Preservation
- Floodplain and Storm water Management

Hazards Addressed
➤ Flood
➤ Tornado
➤ Winter Storms
➤ Thunderstorms
➤ Earthquake
Drought

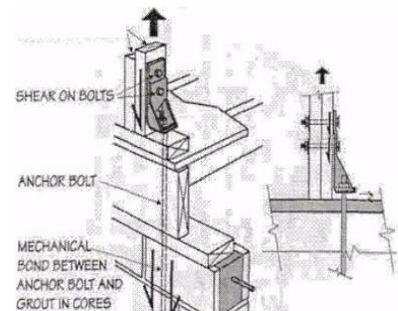
4.1. Building Codes

Building codes provide one of the best methods of addressing all the hazards in this plan. They are the prime measure to protect new property from damage by earthquakes, tornadoes, high winds, and snow storms. When properly designed and constructed according to code, the average building can withstand the impacts of most of these forces.

Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code. Provisions that should be included are:

- ✓ Making sure roofing systems will handle high winds and expected snow loads, Providing special standards for tying the roof, walls and foundation together to resist the effects of wind (see illustration),
- ✓ Requiring new buildings to have tornado "safe rooms,"
- ✓ Including insulation standards that ensure protection from extreme heat and cold as well as energy efficiency,
- ✓ Regulating overhanging masonry elements that can fall during a quake,
- ✓ Ensuring that foundations are strong enough for earth movement and that all structural elements are properly connected to the foundation; and to prevent sewer backup in new basements.

Model Building Codes: Some communities in Illinois are working with various versions of the National Building Code of the Building Officials (BOCA). The predominate model of building being adopted by communities are the International Codes Series. All of the participating municipalities have adopted the International Code Series.



Both builders and inspectors need to know the details of proper anchoring to protect new buildings from high winds

Tornado standards: After a disaster, FEMA often sends a Building Performance Assistance Team to evaluate how well buildings built to code held up. A recent evaluation of wind and tornado damage concluded that the BOCA and CABO codes should be amended to incorporate wind load standards ASCE 7-95 and 7-98. The new I-codes have already incorporated these standards into their codes.

The Institute for Business and Home Safety (IBHS) has also reviewed the I-codes with respect to hazards such as hurricanes, floods, hail, and tornadoes. The IBHS recommends that the International Residential Code should be amended to increase design for wind loads to meet hurricane resistant standards.¹

Fortified Homes: IBHS has a set of recommendations to strengthen a building to better resist the impacts of natural hazards. The specific requirements for a "Fortified" home are available through the IBHS website at www.ibhs.com. A Fortified Tornado Windstorm Protection Checklist, provided on the website, defines nearly 20 standards, such as the size and depth of anchor bolts and materials of windows and skylights.



IBHS has researched the cost for implementing the Fortified program. The following table shows the increased cost of constructing a "Fortified" home. For less than 10% above the cost of the average home, a builder can incorporate all of the recommended criteria for a safer building.

	Standard Home	“Fortified Home”	Incremental Cost
Impact resistant windows & doors	\$5,450	\$15,500	\$10,050
Garage doors	\$650	\$1,250	\$600
Roof decking	\$650	\$1,750	\$1,100
Sealing roof joints	\$0	\$650	\$650
Roof covering	\$2,350	\$3,350	\$1,000
Concrete/steel down pours	\$0	\$500	\$500
Fortified inspection costs	\$0	\$1,000	\$1,000
Total incremental cost			\$14,900
Percentage of base cost			9.8%
Cost of a home meeting the “Fortified” code recommendations			

Flood standards: The I-Codes have a section on flood protection that communities must adopt separately.

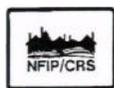
Thunderstorm standards: The IBHS also supports stronger codes for roofing standards so they can better resist damage from hail. It recommends that communities adopt the Underwriters Laboratory Standard 2218, to increase the impact resistance of roofing

¹ <https://disastersafety.org/fortified/>

Code Administration: Just as important as the code standards is the enforcement of the code. There were many reports of buildings that lost their roofs during Hurricane Andrew because sloppy construction practices did not put enough nails in them. Adequate inspections are needed during the course of construction to ensure that the builder understands the requirements and is following them.

There is a national program that measures local building code natural hazard protection standards and code administration. The Building Code Effectiveness Grading Schedule (BCEGS) is used by the insurance industry to determine how well new construction is protected from wind, earthquake and other non-flood hazards. It is similar to the 10-year old Community Rating System and the century-old fire insurance rating scheme: building permit programs are reviewed and scored, a class 1 community is the best, and a class 10 community has little or no program.

Local implementation: Jersey County is at the present using the 2006 ICC codes along with the City of Jerseyville, Fieldon, Grafton, and Elsay. The office of the Jersey County Code Administrator, City of Jerseyville, Elsay and the City of Grafton conducts a 7-point inspection of all new construction projects to make sure that the codes are being adhered to. Fieldon is a very small village and funding is not available for an inspector. The county is a member of the CRS and currently has a rating of Class 5. Jersey County is also member of the BCEGS and has a Building Code Effectiveness Grading Classification of 4 for 1 and 2 family residential property and 4 for commercial and industrial property.



CRS credit: The Community Rating System provides flood insurance discounts to those communities that implement various floodplain management activities that meet certain criteria. Comparing local activities to those national criteria helps determine if local activities should be improved.

The Community Rating System encourages strong building codes. It provides credit in two ways: points are awarded based on the community's BCEGS classification and points are awarded for adopting the International Code series. Up to 120 points are possible.

The CRS also has a prerequisite for a community to attain a CRS Class 8 or better: the community must have a BCEGS class of 6 or better. To attain a CRS Class 4 or better, the community must have a BCEGS class of 5 or better. In other words, a strong building code program is a must to do well in the Community Rating System.

4.2. Manufactured Homes

Manufactured or "mobile" homes are usually not regulated by local building codes. They are built in a factory in another state and are shipped to a site. They do have to meet construction standards set by the US Department of Housing and Urban Development. All mobile type homes constructed after June 15, 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards. These standards apply uniformly across the country and it is illegal for a local unit of government to require additional construction requirements. Local jurisdictions may regulate the location to these structures and their on-site installation.

Hazards Addressed	
➤	Flood
➤	Tornado
	Winter Storms
➤	Thunderstorms
	Earthquake
	Drought

As is well known, the greatest mitigation concern with manufactured housing is protection from damage by wind. The key to local mitigation of wind damage to mobile homes is their installation.

Following tornadoes in Oklahoma and Kansas, FEMA's Building Performance Assistance Team found that newer manufactured housing that had been anchored to permanent foundations performed better. They also found that newer homes are designed to better transmit wind up-lift and overturning forces to the foundation. Unfortunately, they also found that building officials were often unaware of manufacturer's installation guidelines with respect to permanent foundations.

Local implementation: The Illinois Mobile Home Act and Manufactured Home Tiedown Code are enforced by the Illinois Department of Public Health. The State code includes equipment and installation standards. Installation must be done in accordance with manufacturers' specifications. There is a voluntary program for installers to be trained and certified. Following the installation of a manufactured home, installers must send the state a certification that they have complied with the State's tie down code. Currently, Jersey County follows the Illinois Mobile Home Act and Manufactured Home Tiedown Code for installation requirements. Any mobile home located with the special hazard floodplain area is required to be elevated two feet above the base flood elevation. The County Code Administrator does inspections of the piers and foundations and a final inspection are performed for connections and proper tie downs. In addition to code standards to protect the mobile home from high winds is the need to protect the occupants. There is no state or federal requirements for shelters in mobile home parks. The City of Jerseyville and Elsay no longer allows mobile home installation.



CRS credit: Up to 50 points are provided for enforcing the floodplain management requirements in mobile home parks. Additional points are possible for other special regulations, such as prohibiting manufactured housing in the floodway. There are no CRS credits for manufactured housing standards for hazards other than flooding.

4.3. Subdivision Regulations

Subdivision regulations govern how land will be subdivided and sets construction standards. These standards generally address roads, sidewalks, utilities, storm sewers and drainage ways. They can include the following hazard protection standards:

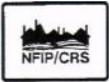
- Requiring that the final plats show all hazardous areas.
- Road standards that allow passage of fire -fighting equipment and snow plows
- Requiring power or phone lines to be buried
- Minimum water pressures adequate for fire fighting
- Requiring that each lot be provided with a building site above the flood level
- Requiring that all roadways be no more than one foot below the flood elevation.

Hazards Addressed
➤ Flood
➤ Tornado
➤ Winter Storms
➤ Thunderstorms
➤ Earthquake
➤ Drought

Illinois Compiled State Statutes: Chapter 55, Section 5/3-5029 requires that all subdivision plats must indicate whether any part of the subdivision is in a special flood hazard area.

Local implementation: Jersey County uses its Subdivision Ordinance for any new development outside the mile and one half of each municipality. The Jersey County Subdivision Ordinance

was last amended in 2007. The City of Jerseyville also uses its' Subdivision Ordinance and Zoning Ordinance for any new development inside the city and it was last updated in 2012. Elsayh and Fieldon are currently land locked for any construction of a subdivision and would need to consider annexing their city corporate limits. However, they have zoning in their communities. Jersey County and the City of Jerseyville also use the Soil and Water Conservation District office to do storm water run-off implementation for each subdivision. All of the aforementioned ordinances can be viewed on the municipalities' web site.



CRS credit: Up to 25 points are provided for requiring that new streets in a floodplain be elevated to no more than one foot below the flood elevation. There are no CRS credits for requirements for hazards other than flooding.

4.4. Code Enforcement and Administration

The enforcement of a uniform construction standard promotes the building of safe and durable structures that are safeguarded from natural disasters such as earthquakes, tornadoes, high winds, and snow storms, as well as other disasters like fires and electrical malfunctions. Enforcement of building codes also plays a vital role in public safety and loss prevention. They contribute to the durability of buildings and help maintain quality of life and property values. In addition, building codes protect the substantial investment of home and business owners against poor workmanship and fraud. The uniformity of building codes allows building and materials manufacturers to operate on a larger scale, cutting costs and passing the savings on to consumers. Building codes are generally enforced at the local level through code administration.

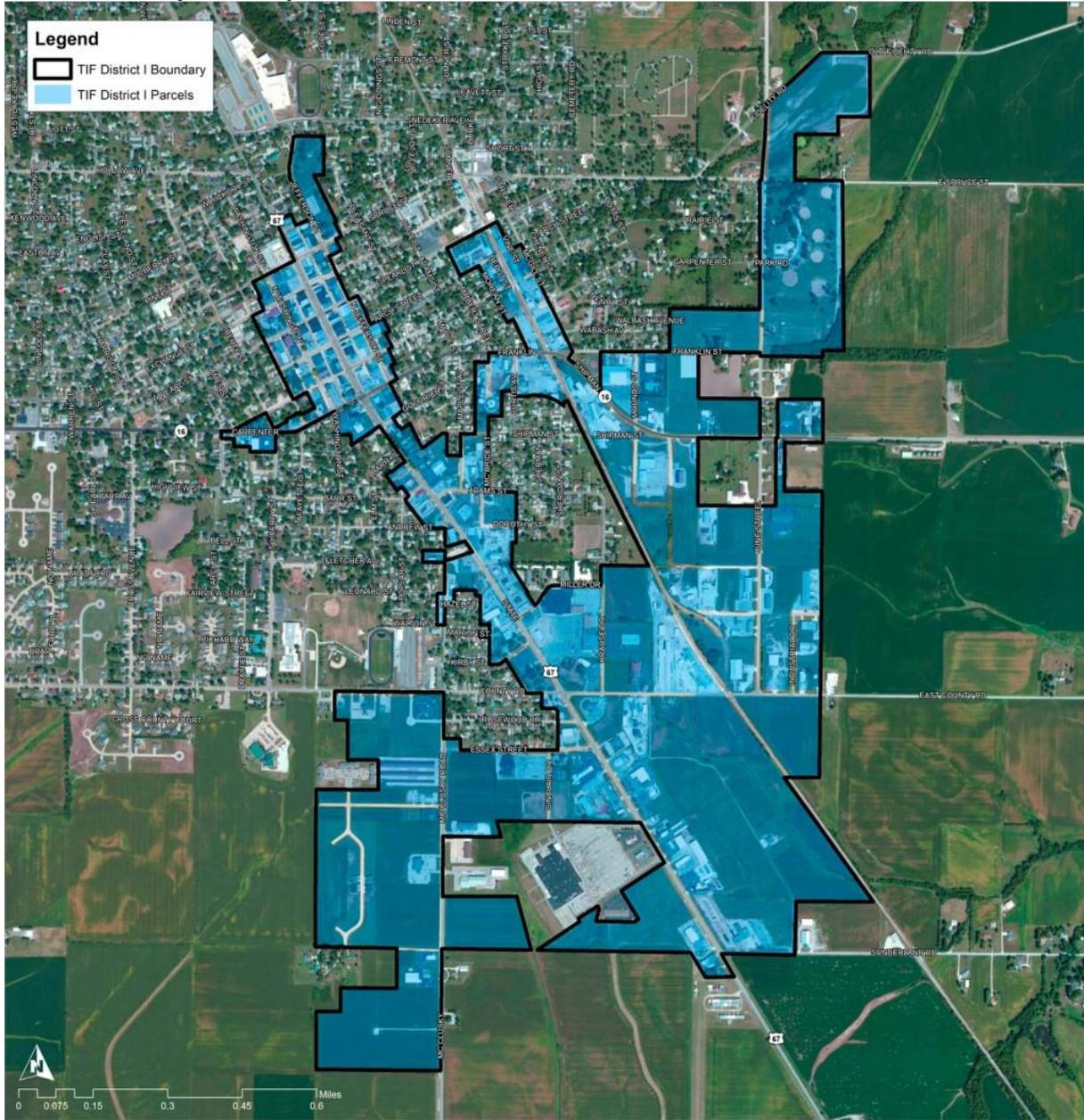
A code administration program ensures compliance with proper design and construction practices by conducting inspections throughout the building process. It also provides peace of mind to the buyer who is relying on safe, sound construction. Code administration departments are usually funded by permit fees. The fees for building permits average less than one percent of the total construction costs. Properly trained plan reviewers and building inspectors are vital to the enforcement of a uniform code and the protection of consumers.

Planning: Building codes provide guidance on how to build in hazardous areas. Planning activities direct development away from these areas, especially floodplains and wetlands. They do this by designating land uses that are more compatible to the natural conditions of the land, such as open space or recreation. They can also benefit by simply allowing developers more flexibility arranging improvements on a parcel of land through the planned development approach.

Hazards Addressed
➤ Flood
➤ Tornado
➤ Winter Storms
➤ Thunderstorms
➤ Earthquake
➤ Drought

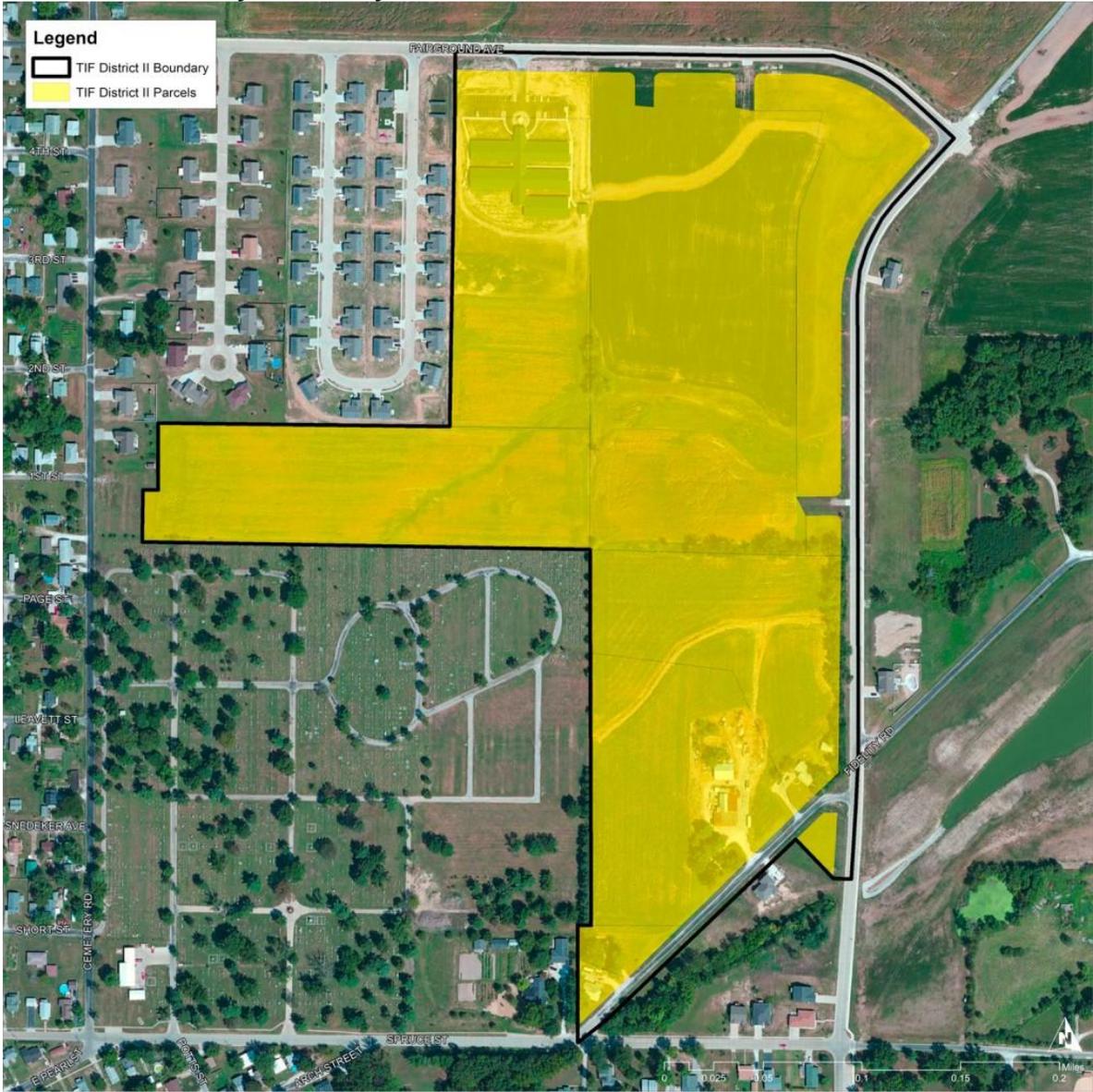
Comprehensive Plans: The City of Jerseyville passed an Economic Development Plan adding two different Tiff Districts (Table 4.4.1 & 4.4.2). Grafton already has Tiff in place which expires in 2017 (Table 4.4.3 & 4.4.4). These plans are the primary tools used by communities to address future development. They can reduce future flood related damages by indicating open space or low density development within floodplains and other hazardous areas. Unfortunately, natural hazards are not always emphasized or considered in the specific land use recommendations.

Table 4.4.1 City of Jerseyville Tiff District 1



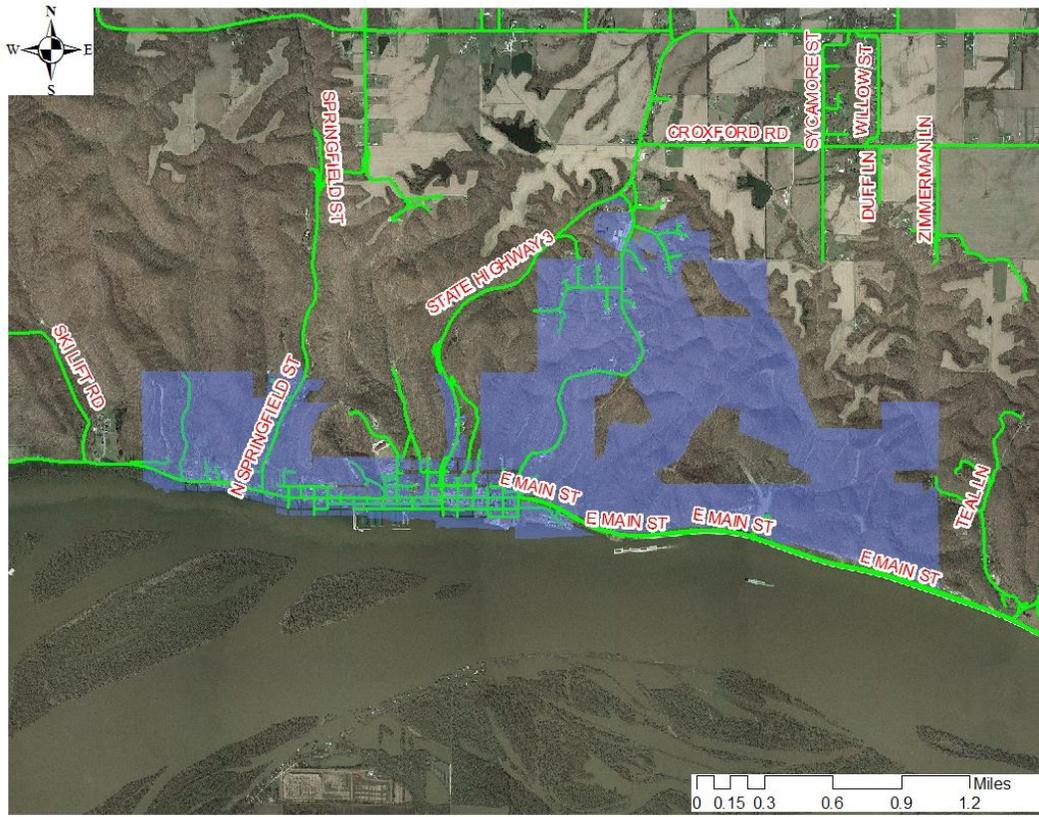
Source: Jersey County Supervisor of Assessments GIS

Table 4.4.2 City of Jerseyville Tiff District



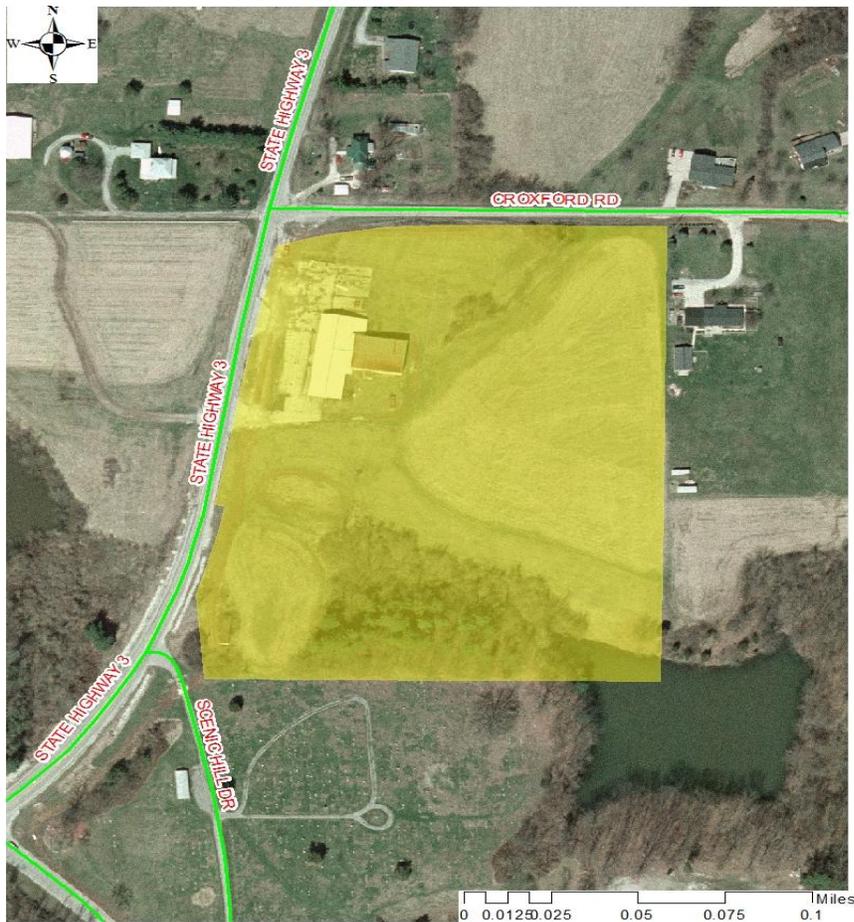
Source: Jersey County Supervisor of Assessments GIS

Table 4.4.3 City of Grafton Tiff District

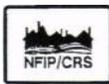


Source: Jersey County Supervisor of Assessments GIS

Table 4.4.4 State Highway 3 Annexed Grafton Tiff District



Source: Jersey County Supervisor of Assessments GIS



CRS credit: Up to 100 points are provided for regulations that encourage developers to preserve floodplains or other hazardous areas from development. There is no credit for a plan, only for the enforceable regulations that are adopted pursuant to a plan.

4.6. Retrofitting for Multiple Hazards

Retrofitting is a way of modifying an existing site or building to minimize or even prevent damage. There are a variety of techniques to do this. This section looks at the measures that can be implemented to protect existing buildings from damage by floods, sewer backup, earthquakes, tornadoes and high winds, and winter storms.

Flood retrofitting: Flood retrofitting measures include **dry flood proofing** where all areas below the flood protection level are made watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings (doors, windows, and vents) are closed, either permanently, with removable shields, or with sandbags.

Hazards Addressed
➤ Flood
➤ Tornado
➤ Winter Storms
➤ Thunderstorms
➤ Earthquake
Drought

Dry flood proofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under State, FEMA and County regulations. Dry flood proofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. Owners of buildings located outside the regulatory floodplain can always use dry flood proofing techniques. The alternative to dry flood proofing is **wet flood proofing**: water is let in and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage.

For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater, and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms.

Wet flood proofing has one advantage over the other approaches: no matter how little is done, flood damage is reduced. Thousands of dollars in damage can be prevented by simply moving furniture and electrical appliances out of a basement.

A third flood protection modification addresses flooding caused by overloaded sanitary or combined sewers. Four approaches may be used to protect a structure against sewer backup: floor drain plugs, floor drain stand-pipes, overhead sewers, and backflow protection valves.

The first two devices keep water from flowing out of the lowest opening in the building, the floor drain. They cost less than \$25. However, if water becomes



deep enough in the sewer system, it can flow out of the next lowest opening, such as a toilet or tub, or it can overwhelm a drain plug by hydrostatic pressure and flow into the building through the floor drain. The other two measures, overhead sewers and backflow protection valves keep water in the sewer line during a backup. These are more secure, but more expensive (\$3,000-\$4,000).

Earthquake retrofitting: Earthquake retrofitting measures include removing masonry overhangs that will fall onto the street during shaking. Bracing the building provides structural stability, but can be very expensive.

Less expensive approaches may be more cost-effective for an area like Jersey County that faces a relatively low earthquake threat. These include tying down appliances, water heaters, bookcases and fragile furniture so they won't fall over during a quake and installing flexible utility connections.

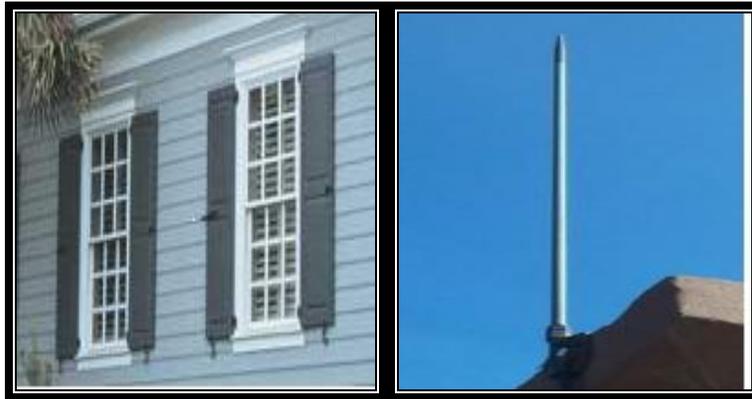
While these simple and inexpensive measures may be cost effective for a home or business, they may not be sufficient for protection of critical facilities. Fire stations need to be sure that they can open their doors and hospitals must be strong enough to continue operating during the shocks and aftershocks.

Tornado and severe storm retrofitting: Tornado retrofitting measures include constructing an underground shelter or "safe room" to protect the lives of the occupants. Their worth has been proven by recent tornadoes in Oklahoma, as shown in the photo to the right. They can be installed for approximately \$3,000.

Another retrofitting approach for tornadoes and **high winds** is to secure the roof, walls and foundation with adequate fasteners or tie downs. These help hold the building together when the combination of high wind and pressure differences work to pull the building apart.

A third tornado and high wind protection modification is to strengthening garage doors, windows and other large openings. If winds break the building's "envelope," the pressures on the structure are greatly increased.

Retrofitting approaches to protect buildings from the effects of **thunderstorms** include storm shutters, lightning rods (illustrated to the right), and strengthening connections and tie-downs (similar to tornado retrofitting). Roofs could be replaced with materials less susceptible to damage by hail, such as modified asphalt or formed steel shingles.



Winter storm retrofitting: measures include improving insulation on older buildings and relocating water lines from outside walls to interior spaces. Windows can be sealed or covered with an extra layer of glass (storm windows) or plastic sheeting. Roofs can be retrofitted to shed heavy loads of snow and prevent ice dams that form when snow melts.

Protecting Utilities: burying utility lines is a retrofitting measure that addresses the winds from tornadoes and thunderstorms and the ice that accompanies winter storms. Installing or incorporating backup power supplies minimizes the effects of power losses caused by downed lines. "Retrofitting" the trees that hang over power lines is discussed in Section 6.13. Urban Forestry. Surge suppressors protect delicate appliances during thunderstorms.

4.7 Insurance

Technically speaking, insurance does not mitigate damage caused by a natural hazard. However, it does help the owner repair, rebuild and (hopefully) afford to incorporate some of the other mitigation measures in the process.

Insurance has the advantage that, as long as the policy is in force, the property is protected and no human intervention is needed for the measure to work. A standard **homeowner's insurance**

policy will cover a property for the hazards of tornado, wind, hail, and winter storms. Separate endorsements are usually needed for earth movement (e.g., earthquake) coverage.

Although most homeowner's insurance policies do not cover a property for flood damage, an owner can insure a building for damage by surface flooding through the National Flood Insurance Program. **Flood insurance** coverage is provided for buildings and their contents damaged by a "general condition of surface flooding" in the area.²

Some people have purchased flood insurance because it was required by the bank when they got a mortgage or home improvement loan. Usually these policies just cover the building's structure and not the contents. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building. There is limited coverage for basements and the below grade floors of bi-level and tri-levels.

Several insurance companies have **sump pump failure or sewer backup coverage** that can be added to a homeowner's insurance policy. Each company has different amounts of coverage, exclusions, deductibles, and arrangements. Most are riders that cost extra. Most exclude damage from surface flooding that would be covered by a National Flood Insurance policy.

Larger local governments can self-insure and absorb the cost of damage to one facility, but if many properties are exposed to damage, self-insurance can be a major drain on the treasury. Communities cannot expect Federal disaster assistance to make up the difference. Under Section 406(d) of the Stafford Act.

If an eligible insurable facility damaged by flooding is located in a [mapped floodplain] ... and the facility is not covered (or is underinsured) by flood insurance on the date of such flooding, FEMA is required to reduce Federal disaster assistance by the *maximum* amount of insurance proceeds that would have been received had the buildings and contents been fully covered under a National Flood Insurance Program (NFIP) standard flood insurance policy.

[Generally, the maximum amount of proceeds for a non-residential property is \$500,000.]

[Communities] need to:

Identify all insurable facilities, and the type and amount of coverage (including deductibles and policy limits) for each. The anticipated insurance proceeds will be deducted from the total eligible damages to the facilities.

Identify all facilities that have previously received Federal disaster assistance for which insurance was required. Determine if insurance has been maintained. *A failure to maintain the required insurance for the hazard that caused the disaster will render the facility ineligible for Public Assistance funding....*

[Communities] *must* obtain and maintain insurance to cover [their] facility - buildings, equipment, contents, and vehicles - for the hazard that caused the damage in order to receive Public Assistance funding. Such coverage must, at a minimum, be in the amount of the eligible project costs. FEMA will not provide assistance for that facility in future disasters if the requirement to purchase insurance is not met. - FEMA Response and Recovery Directorate Policy No. 9580.3, August 23, 2000

² www.nfipservices.com

In other words, the law expects public agencies to be fully insured as a condition of receiving Federal disaster assistance.

Local implementation: Data on private insurance policies are not available. Flood insurance has been available in Jersey County, Grafton, Elsah and the City of Jerseyville since the 1974.



CRS Credit: There is no credit for purchasing flood or basement insurance, but the Community Rating System does provide credit for local public information programs that explain flood insurance to property owners. The CRS also reduces the premiums for those people who do buy NFIP coverage.

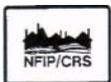
4.8 Open Space Preservation

Keeping the floodplain and other hazardous areas open and free from development is the best approach to preventing damage to new developments. Open space can be maintained in agricultural use or can serve as parks, greenway corridors and golf courses.

Capital improvement plans and comprehensive land use plans can identify areas to be preserved through any or all of the following means:

- Acquisition,
- Dedication by developers,
- Dedicating or purchasing an easement to keep the land open, and
- Specifying setbacks or buffer zones where development is not allowed.

Local implementation: Jersey County has over 234 buyout properties that are open space and deed restricted. These properties were purchased after the 1993 flood using state and federal money. The City of Jerseyville purchased land located in the floodplain and developed a lake for storm water retention and recreational use. Grafton uses open space property for a park or parking lots.



CRS credit: Preserving flood prone areas as open space is one of the highest priorities of the Community Rating System. Up to 700 points can be given, based on how much of the floodplain is in parks, forest preserves, golf courses, undeveloped floodway or other uses that can be depended on to stay open. Additional credit is provided if there are deed restrictions on the parcels.

4.9 Floodplain and Storm Water Management

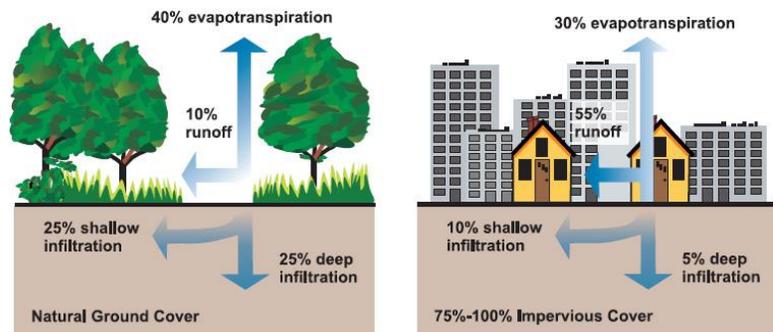
Development in floodplains is development in harm's way. New construction in the floodplain increases the amount of development exposed to damage and can aggravate flooding on neighboring properties. Development outside a floodplain can also contribute to flooding problems. Stormwater runoff is increased when natural ground cover is replaced by urban development (see graphic). Development in the watershed that drains to a river or creek can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality.

Hazards Addressed	
➤	Flood
	Tornado
➤	Winter Storms
➤	Thunderstorms
	Earthquake
	Drought

Stormwater management encompasses two approaches to protecting new construction from damage by surface water.

- Regulating development in the floodplain to ensure that it will be protected from flooding and that it won't divert floodwaters onto other properties; and
- Regulating all development to ensure that the post-development peak runoff will not be greater than under pre-development conditions.

Most communities participate in the National Flood Insurance Program (NFIP). The NFIP and the Illinois Department of Natural Resources set minimum requirements for regulating development in the floodplain. All new buildings must be protected from the base or 100-year flood and no development can cause an increase in flood heights or velocities.



Storm water runoff regulations require developers to build retention or detention basins to minimize the increases in the runoff rate caused by impervious surfaces and new drainage systems. Generally, each development must not let storm water leave at a rate higher than that under pre-development conditions.



CRS credit: Preserving flood prone areas as open space is one of the highest priorities of the Community Rating System. Up to 700 points can be given, based on how much of the floodplain is in parks, forest preserves, golf courses, undeveloped floodway or other uses that can be depended on to stay open. Additional credit provided if there are deed restrictions on the parcels.

4.9 The Government's Role

Property protection measures are usually considered the responsibility of the property owner. However, local governments should be involved in all strategies that can reduce flood losses, especially acquisition and conversion of a site to public open space. There are various roles the County or a municipality can play in encouraging and supporting implementation of these measures.

Government facilities: One of the first duties of a local government is to protect its own facilities. Fire stations, water treatment plants and other critical facilities should be a high priority for retrofitting projects and insurance coverage. Often public agencies discover after the disaster that their “all-hazard” insurance policies do not cover the property for the type of damage incurred. Flood insurance is even more important as a mitigation measure because of the Stafford Act provisions discussed above.

Public Information: Providing basic information to property owners is the first step in supporting property protection measures. Owners need general information on what can be done. They need to see examples, preferably from nearby. Public information activities that can promote and support property protection are covered in Chapter 9.

Financial Assistance: Communities can help owners by helping to pay for a retrofitting project. Financial assistance can range from full funding of a project to helping residents find money from other programs. Some communities assume responsibility for sewer backups, street flooding, and other problems that arise from an inadequate public sewer or public drainage system. Less expensive community programs include low interest loans, forgivable low interest loans and rebates. A forgivable loan is one that does not need to be repaid if the owner does not sell the house for a specified period, such as five years. These approaches don't fully fund the project but they cost the community treasury less and they increase the owner's commitment to the flood protection project. Often, small amounts of money act as a catalyst to pique the owner's interest to get a self-protection project moving. The more common outside funding sources are listed below. Unfortunately, the last three are only available after a disaster, not before, when damage could be prevented. Following past disaster declarations, FEMA, the Illinois Emergency Management Agency (IEMA) and the Illinois Department of Natural Resources have provided advice on how to qualify and apply for these funds.

Pre-disaster funding sources

- FEMA's Pre-Disaster Mitigation (PDM) grants (administered by IEMA)
- FEMA's Flood Mitigation Assistance (FMA) grants (administered by IEMA)
- Community Development Block Grant (administered by the Department of Commerce and Economic Opportunity)
- Illinois Department of Natural Resources
- Conservation organizations, such as the Conservation Foundation and CorLands, although generally these organizations prefer to purchase vacant land in natural areas, not properties with buildings on them.

Post-disaster funding sources

- Insurance claims
- The National Flood Insurance Program's Increased Cost of Compliance provision (which increases the claim payment to cover a flood protection project required by code as a condition to rebuild the flooded building)

Post-disaster funding sources, Federal disaster declaration needed

- FEMA's disaster assistance (for public properties, however, after a flood, the amount of assistance will be reduced by the amount of flood insurance that the public agency should be carrying on the property) (administered by IEMA)
- Small Business Administration disaster loans (for non-governmental properties)
- FEMA's Hazard Mitigation Grant Program (administered by IEMA)

Mandates: Mandates are considered a last resort if information and incentives aren't enough to convince a property owner to take protective actions. An example of a retrofitting mandate is the requirement that many communities have that downspouts be disconnected from the sanitary sewer line.

There is a mandate for improvements or repairs made to a building in the mapped floodplain. If the project equals or exceeds 50% of the value of the original building it is considered a "substantial improvement." The building must then be elevated or otherwise brought up to current flood protection codes.

In Unincorporated Jersey County SFHA it is a mandate that any new or replaced septic system must be a flood-proofed system. As Jersey County has an agreement with Elsay to issue permits, the same mandate would apply. Grafton has its own sewer plant.

Another possible mandate is to require less expensive hazard protection steps as a condition of a building permit. For example, many communities require upgraded electrical service as a condition of a home improvement project. If a person were to apply for a permit for electrical work, the community could require that the service box be moved above the base flood elevation or the installation of separate ground fault interrupter circuits in the basement.

Local implementation: Jersey County has used HMPG grants as well as DECA grants to buy out properties in the floodplain as well as the City of Grafton. Jersey County has also used PDM grants to locate 1138 structures in the floodplain and obtain the lowest floor elevation shots. Jersey County has also used the ICC claims process to elevate 3 residential structures throughout the Floodplain. After disasters Jersey County has used other government grants to clean out roadways and ditches to aid drainage and reduce ponding.



CRS credit: Except for public information programs, the Community Rating System does not provide credit for efforts to fund, provide incentives or mandate property protection measures. The CRS credits are provided for the actual projects, after they are completed (regardless of how they were funded or who instigated them). On the other hand, in order to participate in the CRS, a community must certify that it has adequate flood insurance on all properties that have been *required* to be insured. The minimum requirement is to insure those properties in the mapped floodplain that have received Federal aid, as specified by the Flood Disaster Protection Act of 1973.

4.10 Conclusions

Building Code Ordinances, floodplain ordinances, mobile or manufactured home ordinances as well as subdivision ordinances provide protection for future buildings and development within the County. Fieldon, Elsah and Jerseyville have zoning ordinances and Jerseyville also has an Economic Development Plan. Following the State Mobile and Manufactured Homes tie-down and protection from flooding regulations as well as the State's adoption of the International Residential Code makes it easier for County's to adopt their own codes. Although Jersey County does not have a zoning ordinance, it does have a Land Use and Subdivision Committee that regulates development and growth. The County has also adopted the 2006 ICC Codes and the 2012 IECC (Illinois Energy Conservation Code).

4.10.1 Recommendations:

1. Jersey County and local municipalities permitting officials need to be educated on current regulatory standards for installation of mobile homes, new state statutes, and new adopted ordinance.
2. Jersey County engages in comprehensive land use planning and appropriate regulations. Still moving forward. County is considering zoning regulations.
3. Jersey County joined the Community Rating System and within two years after joining the Insurance Services Offices they bettered their classification, from a class 8 to a class 5. Other municipalities should consider joining the CRS.
4. Jersey County and local municipalities should work together on code enforcement, building code language and sharing of GIS information. GIS information is shared with Grafton, Jerseyville, and Elsah and is also available on the county's website.
5. Appropriate Jersey County and municipality officials and organizations engage in an aggressive public information and education program aimed at the retrofitting of residential and business structures.
6. The City of Grafton must continue to monitor new construction in the floodplain according to the guidelines set forth in the ordinances.

References

<https://disastersafety.org/fortified/fortified-home/>

<https://www.nfipservices.com>

www.illinois.gov/iema/

www.illinois.gov/dceo/servicesguide/searchpages/

www.dnr.illinois.gov/

www.dph.illinois.gov

Chapter 5. Property Protection

Property protection mitigation measures are used to modify a building or property subject to damage. Property protection measures fall under the following approaches:

- Modify the site to keep the hazard from reaching the building
- Modify the building (retrofit the building) so it can withstand the impacts of the hazard
- Insure the property to provide financial relief after the damage occurs

The word “building” can refer to residential, commercial or industrial structures, or it can mean infrastructure facilities (roads, bridges, culverts, water plants) or other public structures. These property protection measures are usually implemented by the property owner, although in many cases technical and financial assistance can be provided by a government agency.

5.1 Keeping the Hazard Away

For the hazards considered in the Plan, flooding is the one hazard that can be kept away from a building. Acquisition ensures that buildings in a flood prone area will cease to be subject to damage. Acquisitions are based on grants from a government agency and the cost is not paid by the property owner. Once the land is acquired it will become open space and used for public recreational activities. The major impact of hazards is to people and improved property. Properties, in some cases can be modified so the hazard does not reach the damage-prone improvements. A fire break is one example of this approach, keeping brush and other debris that can fuel a fire away from the structure so fire may not reach it.

Hazards Addressed
• Flood
Tornado
Winter Storms
• Thunderstorms
• Wild/Field Fires
Drought

Barriers: Flood protection barriers can be built of dirt or soil (“berms”) or concrete or steel (“floodwall”). The design of a barrier must be carefully planned so as not to create water runoff on a neighboring property. Factors to be included in the design should be how porous the soil or ground is and how long the floodwater will stay. If the water stays up for an hour or two the design needs to account for leaks, seepage of water underneath, and the amount of rainfall inside the perimeter.

Barriers can only be built so high. They can be overtopped by higher water than expected and if made of soil they will erode and settle over time if not properly sloped, covered with grass and maintained. Floodwalls are susceptible to cracking and weakening over time and may lose its watertight seal. Barriers need careful design and maintenance and owners would be wise to insure the building in case of failure.



Relocation: Obviously, moving a building to higher ground and out of the floodplain is the surest and safest way to protect it from flooding. The cost may vary depending on the design of the building, for example a small stick built building would be less costly and easier to move than a building made of brick or stone and irregularly shaped.

Elevation: Raising a building above the flood level can be the almost effective as relocation. Water flows under the building, causing no

damage to the structure or contents. It is more economical than moving a building to a new neighborhood. Elevation is compliant with floodplain regulations that require new substantially improved, or substantially damaged buildings or 50% of its actual cash value.

The disadvantage to elevation is that the structure is not as aesthetically pleasing when raised 4 to 15 feet in height. Basements below ground are not allowed in the floodplain and if an existing building has one it must be filled in to protect the walls from water pressure which may deter the owner from the elevation method. All utilities and electrical must be elevated above the highest floor as well.

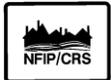


If not braced and anchored properly the elevated structure is exposed to other hazards that may cause greater impact than flooding. The possibility of high winds and earthquakes must be factored into the design of the elevation and should be planned by a certified engineer.

Demolition: If a building has been heavily damaged and susceptible to future damage, it is safest for homeowners to relocate. Acquisition, followed by demolition, is another approach for buildings that are not worth protecting due to major damage. Demolition should also be considered for houses that are heavy and larger making it difficult and more costly to relocate. The cost of the demolitions are usually paid for by the government and the land is turned into open space for recreational purpose for the community.

Local implementation: Following the 1993 flood several parcels with structures were purchased by government funds. In Grafton 103 homes were bought, in the rest of Jersey County 116 structures were purchased. After the 2008 flood another 8 structures in Grafton were bought

out using IEMA funds. The County oversaw 58 elevations of US Army Corps of Engineer leased site cabins and over 15 demolished. The 2013 flood resulted in demolition and elevation of cabins and in 2015 there have been requests to demolish 2 private homes and 3 more cabins. All of the elevations were completed according to requirements of the NFIP and the Ordinance for Development in the Floodplain. The county has a flood protection elevation for the first floor of all buildings of two feet above the established base flood elevation. Grafton and Elsie have a one foot flood protection elevation above the established base flood elevation



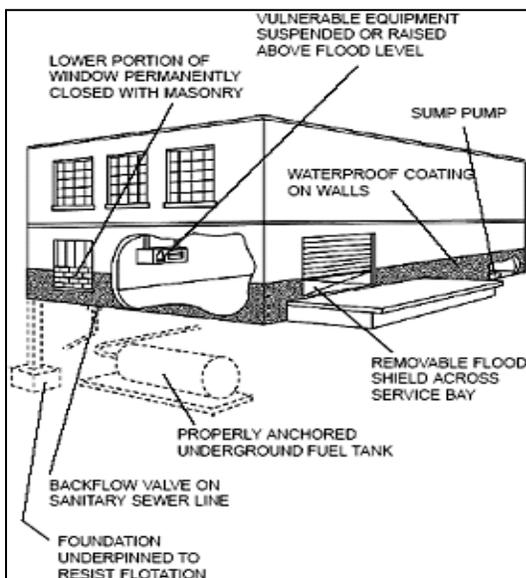
CRS Credit: The Community Rating System provides the most credit points for acquisition and relocation because this measure permanently removes the buildings from the floodplain. The score is based on the number of buildings removed compared to the number remaining (Activity 520-Acquisition and Relocation).

5.2 Retrofitting

Another alternative to keeping hazards away from buildings is to modify or “retrofit” the site or building to minimize or even prevent damage. There are a variety of ways to achieve this. These are measures that can be implemented to protect existing buildings from damage by floods, sewer backup, earthquakes, tornadoes and high winds and severe summer and winter storms.

Hazards Addressed
• Flood
• Tornado
• Winter Storms
• Thunderstorms
• Earthquake
Drought

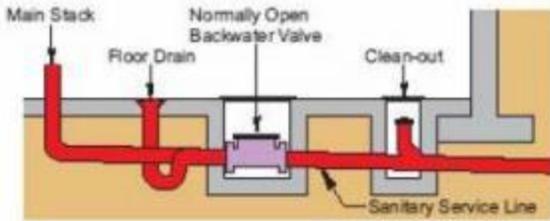
Flood retrofitting: Flood retrofitting measures include **dry floodproofing** where all areas below the flood protection level are made water tight. Walls are coated with waterproofing compounds or plastic sheathing. Openings such as doors, windows or vents are closed permanently or have removable shields, or with sandbags.



Dry floodproofing of new and existing non-residential buildings in the floodplain is permitted under State, FEMA and County regulations. Buildings of a residential nature may also be dry floodproofed as long as there is no substantial damage or improvements on the structure.

Wet floodproofing: The alternative to dry floodproofing is wet floodproofing. Anything that can be damaged by a flood is removed or elevated above the flood level. The walls are replaced with materials that are flood resistant. For example,

BACKWATER VALVE INSTALLATION

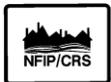


concrete block walls installed instead of wooden studs and gypsum wallboard. All appliances are permanently relocated to a higher floor or may be raised on concrete platform such as blocks or bricks. Thousands of dollars can be saved by simply moving furniture and electrical appliances out of the basement.

Sewer backup: Another flood protection modification addresses flooding caused by overloaded sanitary or combined sewers. There are four approaches that can be used to avoid sewer backup. Floor drains plugs, floor drain stand-pipes, overhead sewers, and backflow protection valves. The first two devices keep water from flowing out of the lowest opening in the building, the floor drain. They are relatively low in cost, however, if water becomes deep enough in the sewer system, it can flow out of the next lowest opening, such as a toilet or tub, or it can overwhelm a drain plug by hydrostatic pressure and flow into the building through the floor drain. The other two measures, overhead sewers, and backflow protection valves keep water in the sewer line during a backup. These are more secure but more costly.

For dry and wet floodproofing, and sewer backup prevention it is important to consider what type of contents are suitable for keeping in basements or crawl spaces. Valuables or keepsakes (photographs) should be kept elsewhere.

Local implementation: The City of Jerseyville has retrofitted most of the sewer lines with backflow protection valves; the City of Grafton has dry floodproofed commercial buildings along the Mississippi River. These buildings are constructed of concrete block with garage overhead doors that can be raised and the inside of the building can be power washed. Appliances are easily removed if there are reports of rising water. The County does not have a sewer system in the floodplain. After 2008 flood all septic systems located in the floodplain had to replace with an engineered design sealed system and a Floodproof Certificate. Any new development requires the same.



CRS credit: Credit for dry and wet floodproofing and sewer backup protection is provided in Activity 530 (Flood Protection). These measures are considered less secure than barriers, elevation, relocation or acquisition, therefore not as many points are given.

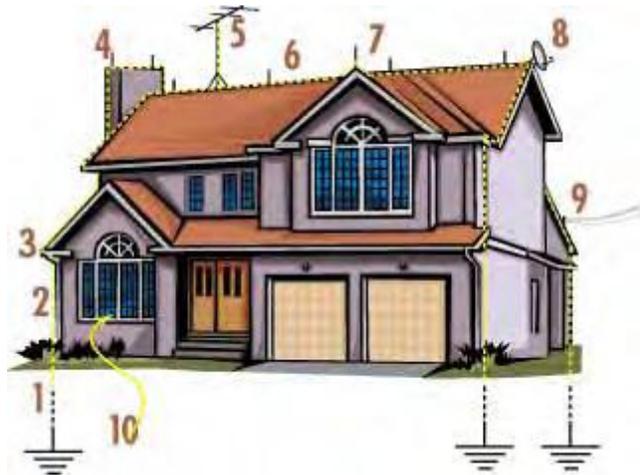
5.3 Building Retrofitting

Tornado retrofitting: One of the measures of retrofitting is to include construction of a “safe room” to protect lives of the occupants. Safe rooms can be built in a basement at the time of new construction or added to an existing home by connecting all parts of the shelter together (walls, roof and foundation) using adequate fasteners or tie downs. These will hold the safe room together when the combination of high wind and pressure differences work to pull the walls and ceiling apart. The walls are made out of plywood and metal sheeting to protect individuals from flying debris.

Another approach to retrofitting for tornadoes and high winds are to secure the roof, walls and foundation with adequate fasteners or tie downs. This measure is also used to manufactured homes. A third measure is to strengthen garage doors, windows and other large openings. If the wind breaks the buildings envelope, the pressures on the structure greatly increase. Impact-resistant glass is also recommended. Burying of utility lines is also a retrofitting measure that addresses high winds from tornadoes and summer storms and thus the less likely of loss of power.

Summer thunderstorm retrofitting: The approaches to protect public or private buildings from damaging storms include:

- storm shutters
- lightning rods
- strengthening connections and tie-downs
- impact-resistant glass in windows or Low-E Storm windows
- surge protectors at electrical outlets
- roofs made of materials less susceptible to damage by hail (asphalt or formed steel shingles)



Winter storm retrofitting: replacing or improving insulation values in older buildings and insulation of water lines, duct work and low-e thermal windows to reduce the use of energy and increase the comfort of the building. Roofs can be retrofitted to shed heavy loads of snow and prevent ice dams that form when snow melts.

Earthquake retrofitting of buildings: there are two types of hazards for buildings and people, the hazard of damage to the structure itself and damage to its contents. The following is an example of retrofitting for a structure, but could be quite costly:

- remove masonry overhangs that will fall onto a street or sidewalk during shaking
- bracing the walls of the building to provide more stability
- bolting sill plates to the foundation
- replacing windows with more shatter resistant glass

The following are examples of retrofitting of non-structural measures that are less costly:

- securing appliances, water heaters, book cases, and any fragile décor such as mirrors, pictures, any upright furniture that will not fall
- installing latches on cabinet doors and drawers
- anchoring any flammable tanks or cylinders
- flexible utility connections for water or gas

These approaches can be cost effective and the structure will still be pleasing to the eye and most importantly they will save lives during an earthquake event.

These same measures may not be as effective for **critical facilities**. Retrofitting for critical facilities should be done on a case by case basis according to the facilities purpose. For example, a hospital must be strong enough to handle aftershocks from an earthquake.

Earthquake retrofitting for infrastructure and lifelines: the definition of “lifelines” per FEMA is *the public works and utility systems that support human activities; individual, family, economic, political, and cultural. The various lifelines can be classified under the following five systems: electric power, gas and liquid fuels, telecommunications, transportation, and water supply and sewers.*

These five critical facility systems should be prioritized. Consideration should also be given to outside agencies including state, federal and private owners of utility systems or communications. The Illinois Emergency Management Agency (IEMA) offers a multitude of information of before a disaster and after and FEMA’s Ready.Gov web site also provides information for preparing for a disaster and how to prepare an emergency supply list.

Local implementation: Jersey County and its municipalities rarely endure earth movement due to earthquakes however; the Jersey County Code Administrator office does provide pamphlets on being prepared for a possible earthquake. The ESDA coordinator also has “family preparedness” meetings. Most new single family residences with basements do provide a safe room. Mobile homes that are placed in the county must be permitted and placement is inspected to meet the States tie down act. Any new critical facilities are required to be designed to account for possible multi hazards. All of the municipalities Subdivision Ordinances disclose where natural water ways are located and if there is any part in the floodplain. Flood insurance has been available in the communities since 1978.



CRS credit: retrofitting for protection of a structure from hazards other than flooding is not credited under the CRS.

5.4 Insurance

The National Flood Insurance Program (NFIP): is a Federal program created by Congress in 1968 to mitigate future flood losses nationwide through sound, community-enforced building and zoning ordinances. It has been broadened and modified over the years into the Flood Insurance Reform Act of 2004. Its purpose was designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and its contents. The NFIP does not mitigate the damage caused by a natural hazard, but it does help the owner to repair, rebuild and possibly afford to incorporate other mitigation measures. A homeowner's standard insurance policy will cover damage from tornados, wind, hail, and winter storms and separate endorsements are available for earthquake coverage.

Besides Jersey County there are three participating communities in the NFIP, the City of Grafton, Village of Elsay, and the City of Jerseyville. Flood insurance is required as a condition of certain types of federally backed aid and bank loans or mortgages for buildings located in the 100-year floodplain. These policies usually cover the building and not the contents. Renters can buy contents insurance even if the owner does not have building coverage. There is limited coverage for basements or below grade additions. Flood insurance is available to anyone in a participating NFIP community. If the building is located outside of the floodplain the premiums are usually lower.

Illinois Residential Real Property Disclosure Act: This act went into effect on October 1, 1994, requiring a seller to tell a potential buyer if the property is located in a floodplain or if he is aware of any flooding or basement leakage, or if the seller has flood insurance.¹ The drawback to this is the seller may not be aware a problem and is willing to state this on the disclosure form.

There are ramifications of not having flood insurance on an eligible insurable public facility damaged by flooding and is located in a mapped floodplain zone. FEMA is required to reduce Federal disaster assistance by the *maximum* amount of insurance proceeds that would have been received had the building and contents been fully covered under the NFIP. The maximum amount of coverage is \$500,000 thousand for non-residential. If property owners were required to have flood insurance after receiving disaster assistance from a previous flood and had dropped their coverage, they would lose their right to any future disaster assistance.

Community Rating Service: The Community Rating Service (CRS) was established by FEMA in 1990. Its purpose is to recognize floodplain management strategies that go beyond the NFIP minimum requirements. A NFIP community may volunteer to join the CRS. After the

¹ www.ilga.gov/legislation/

application process the community is given a class rating. Ratings are class ten to a class one, with class one being excellent. As a reward for going beyond the minimum requirements the communities residents and property owners will qualify for a flood insurance premium reduction that ranges from 5% to 45% savings. CRS credit is determined under four activities:

- Public information
- Mapping and regulations
- Flood damage reduction
- Flood preparedness

Local implementation: Unincorporated Jersey County joined the CRS in 2008 beginning with a Class 7 after application. The County has been a Class 5 for four years. Currently there are 62 communities in Illinois that are participating in the CRS. Jersey County is ranked third in the state in points (2,746) with a \$24,837 savings to NFIP policy holder’s premiums.² Grafton, Elsah and Jerseyville are non-participants.



CRS credit: Credit is given under the Public Information Activity 310 to 260.

5.5 Repetitive Loss Properties

In Chapter 2 explains the criteria for designation of the County’s repetitive loss properties – two federal flood insurance claims of at least \$1,000 in any ten year period. These properties deserve special attention because they are more prone to flooding than other areas in the county. Protection of these properties is a priority with FEMA and IEMA mitigation funding programs.

Hazards Addressed
• Flood
Tornado
Winter Storms
• Thunderstorms
Earthquake
Drought

In 2007 Jersey County identified 18 severe repetitive properties (SRL). FEMA has defined the SRL group as NFIP-insured residential property that has met at least 1 of the following paid flood loss criteria since 1978, regardless of ownership:

- 4 or more separate claim payments of more than \$5,000 each (including building and contents payments); or
- 2 or more separate claim payments (building payments only) where the total of the payments exceed the current value of the property

In either case, 2 of the claim payments must have occurred within 10 years of each other. Multiple losses at the same location within 10 days of each other are counted as 1 loss, with the payment amounts added together.³

² ISO/CRS Specialist, Lou Ann Patellaro, CFM 10/9/15 e-mail

³ *Guidance for Severe Repetitive Loss Properties*; www.fema.gov

In 2004, through the Flood Insurance Reform Act of 2004,* Congress directed FEMA to develop a program to reduce future flood losses. Under the SRL Grant Program funds were provided to state and local governments from FEMA as the source. Offers were to be made to the NFIP-insured owners for mitigation projects that would reduce future flood losses through:

- Acquisition or relocation of at-risk structures and conversion of the property to open space;
- Elevation of existing structures; or
- Dry floodproofing of historic properties.

In 2007 a cost/benefit study was conducted on the 18 SRL properties and application for a grant was submitted. Unfortunately the application was denied as the properties were all structures located on USACE leased ground and were not eligible for Federal funding. Ironically all 18 SRL structures were mitigated after the 2008 flood with Increased Cost of Compliance endorsement of their NFIP policies.

Local implementation: FEMA's NFIP data base reports Unincorporated Jersey County with 29 repetitive loss structures, Grafton has 33, and Elsay currently has 3 repetitive properties that have yet to be mitigated. All of Jersey County's RL properties are identified and electronic files are attached to the mapped area. An outreach mailing is sent annually to all repetitive loss properties in the County.

5.6 Recommendations

- Each municipality should have educational public information brochures/mailings designed specifically for their municipality.
- Elsay should consider retrofitting its historical houses.
- Other NFIP communities should consider joining the CRS program.
- Septic issues need to be addressed in the Village of Elsay by trying to find funding for the project.
- Grafton should be more stringent on development within the floodplain and seek individuals that may want to voluntarily sell their structures through grant funding and in turn the property becomes open space.
- Each public entity should protect its own publicly-owned facilities with the appropriate mitigation measures.
- The county and municipalities should encourage property protection by property owners by allowing incentives.
- Repetitive loss properties should be monitored and be mitigated.
- Each public entity should evaluate its own properties exposure to damage from hazards and a priority should be placed on determining the critical facilities vulnerability and whether these properties are adequately insured.

- Jersey County and municipalities should seek funding in support of safe rooms for mobile home parks.

* 7/2013 – Biggert Waters Flood Insurance Reform Act of 2012 eliminated the SRL program. Information is available at www.fema.gov/media-library/assets/documents/33634

5.7 References

www.fema.gov/media-library/assest/documents/33634

www.ilga.gov (765 ILCS 77/Art. 1) *Residential Real Property Disclosure Act*

FEMA NFIP Database

ISO/CRS Specialist, Lou Ann Patellaro, CFM 10/9/15 e-mail

Guidance for Severe Repetitive Loss Properties; www.fema.gov

www.ilga.gov/legislation/

CHAPTER 6. Natural Resource Protection

6.1 Introduction

Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of the land, such as fields, floodplains or wetlands, to be better realized.

Natural and beneficial functions of watersheds, floodplains and wetlands include:

- Reduction in runoff from rainwater and snow melt in pervious areas
- Infiltration that absorbs overland flood flow
- Removal and filtering of excess nutrients, pollutants, and sediments
- Storage of floodwaters
- Absorption of flood energy and reduction in flood scour
- Water quality improvement
- Groundwater recharge
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

Hazards Addressed
➤ Flood
➤ Winter Storms
➤ Thunderstorms

As development occurs, many of the above benefits can be achieved though regulatory steps for protecting natural areas or natural functions. This chapter covers natural resource protection programs and standards that can help mitigate the impact of natural hazards, while they improve the overall environment. Seven areas are reviewed:

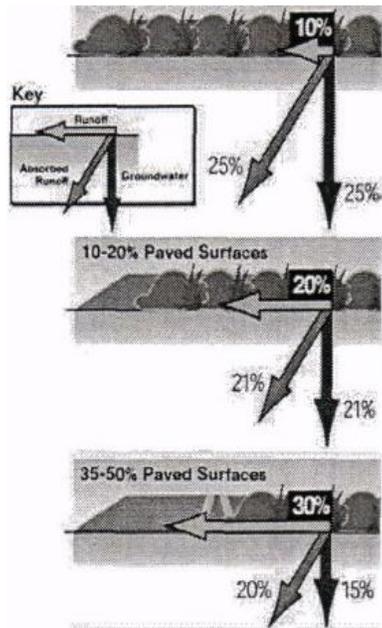
- Wetland protection
- Erosion and sedimentation control
- River and stream restoration
- Best management practices
- Dumping regulations
- Urban forestry
- Farmland protection

This chapter reviews the strategies for protection of natural resources, implementation of specific strategies in Jersey County, and two significant regional multi-strategy projects. The first project, the Piasa Creek Watershed Project, managed by the independent, non-profit Great Rivers Land Trust, covers thousands of acres in three counties and has been in successful operation for over a decade. The second project, the Otter Creek Watershed Project, has been recently initiated by the Jersey County Soil and Water Conservation District in response to the success of the Piasa Creek project.

6.2 Floodplain and Storm Water Management

Floodplain management in Jersey County is the responsibility of the county government through its office of floodplain management. Storm water management is the share responsibility of the county and the various municipalities, primarily through various storm water and open space ordinances and planning.

Development in floodplains is development in harm's way. New construction in the floodplain increases the amount of development exposed to damage and can aggravate flooding on neighboring properties.



Development outside a floodplain can also contribute to flooding problems. Stormwater runoff is increased when natural ground cover is replaced by urban development (see graphic). Development in the watershed that drains to a river can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality.

- Stormwater management encompasses two approaches to protecting new construction from damage by surface water:
- Regulating development in the floodplain to ensure that it will be protected from flooding and that it won't divert floodwaters onto other properties, and
- Regulating all development to ensure that the post-development peak runoff will not be greater than under pre-development conditions.

Most communities participate in the National Flood Insurance Program (NFIP). The NFIP and the Illinois Department of Natural Resources set minimum requirements for regulating development in the floodplain. All new buildings must be protected from the base or 100-year flood and no development can cause an increase in flood heights or velocities.



Storm water runoff regulations require developers to build retention or detention basins to minimize the increases in the runoff rate caused by impervious surfaces and new drainage systems. Generally, each development must not let storm water leave at a rate higher than that under pre-development conditions.

CRS credit: CRS credit is provided for both higher regulatory standards in the floodplain and runoff management standards for new developments. Credit is based on how those standards exceed the minimum NFIP requirements.

6.3 Flash Flooding and Drainage System Maintenance

The reduction of the probability and impact of flash flooding is the share responsibility of county and local government and private landowners. The detrimental impact of flash flooding county-wide has been reduced by the educational and management efforts of two organizations—the Jersey County Soil and Water Conservation District and the Great Rivers Land Trust. Drainage system construction and maintenance is the responsibility of the county, municipal and township governments, primarily through their highway departments or road commissioners.



2015 Otter Creek flash flooding on to road

- A community's drainage system includes its stream channels, ditches, swales, culverts, and detention ponds. Drainage system maintenance is an ongoing program to clean out blockages caused by an accumulation of sediment or overgrowth of weedy, non-native vegetation or debris, and remediation of stream-bank erosion sites. This system can be very effective at reducing the threat of local flooding from smaller storms, even if all it does is remove trash and debris.
- Cities and counties usually accept responsibility for maintaining facilities on public property and drainage districts have a duty over their own channels. In Illinois, the responsibility for drainage maintenance on private property, where no easements have been granted, is with the individual private owner. This often results in very little maintenance being accomplished.

6.4 Dams and Levees

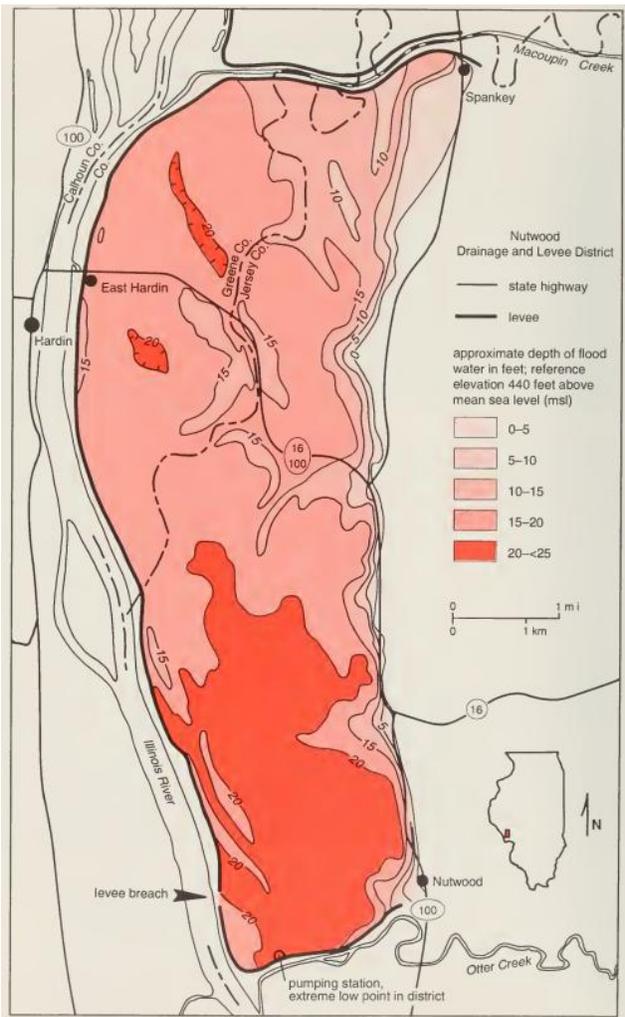
Within Jersey County, the construction of dams is a private activity undertaken by individual landowners. Two organizations are available to provide guidance and, when available, financial assets and other resources—the Soil and Water Conservation District (directed at farmers) and the Great Rivers Land Trust (primarily within the boundaries of the Piasa Creek watershed).

There are several considerations when evaluating the use of dams:

- There is a threat of flooding the protected area should the dam fail.
- There is a constant expense for management and maintenance of the facility.
- They may fail to prevent floods that exceed their design levels.
- Sediment deposition may occur and reduce the storage capacity over time.
- They can impact water quality as they are known to affect temperature, dissolved oxygen and nitrogen, and nutrients.
- If not designed correctly they may cause backwater flooding problems upstream.

The dams of Jersey County are earthen dams almost entirely for farm ponds and water retention. Many of these dams also serve to retard the flow of flood waters and reduce soil erosion. Jersey County has only one dam that has been identified as a potential hazard. It is the Airstrip Reservoir Dam – IL0065 located at north of Grafton. Maintenance and inspections have been done for the dam of Grafton.

Levees: Floodplains are usually excellent agricultural lands because they contain nutrient-rich sediments deposited by many floods. Soil moisture is commonly abundant because the river is so close and the water table is shallow. There has been a long history of protecting these agricultural assets through private and government projects that drain excess water from the floodplains and build levees.



The floodplains are divided into drainage and levee districts; each is managed by a local governing body. There are four drainage districts along the Illinois River. The Southern- most drainage and levee district in Illinois is the Nutwood Drainage and Levee District.

The Nutwood Drainage and Levee District currently protects 10,360 acres of primarily agricultural land and 20 residences ¹located in Jersey and Greene Counties on the left bank of the Illinois River between river miles 15.2 and 23.7 above the mouth of the Illinois River. It is a federally constructed levee providing for a 4 percent chance of exceedance (25-year even).

On July 18, 1993 the Nutwood Levee was overtopped and breached in its southwestern segment. Flood stage is 25 feet at the Hardin gauge. On the 18th the water rose to 37 feet; over-topping the levee. The river crested at 42.3 feet. Because of the break, 10,300 acres of the district flooded to depths of more than 20 feet.² In the December 2015 flood the Illinois River was pressing against its sides again with worries that the levee would once

again be breached as the Illinois River was expected to rise to 37 feet, however, in 2010 the U.S. Army Corps of Engineers raised 11.4 miles of the existing levee 3 feet more.

¹ www.myjournalcourier.com/news/84373/nutwood-district

² *The Great Flood of 1993*; Illinois State Geological Survey

6.5 Erosion and Sedimentation

Sedimentation is the deposit of sand and silt in the channel. Sedimentation raises the channel bottom and forms sand bars and islands. As a result, there is less room in the channel to carry higher flows, resulting overbank flooding (either due to flash flooding upstream or back-flow from the Illinois and Mississippi Rivers. In Jersey County, sand and silt come from two main sources: erosion of upstream riverbanks, and farms and construction sites in the watershed.

Erosion and siltation has been significantly reduced throughout a third of the county as a result of the Piasa Creek Watershed Project, funded by the Illinois American Water Company and managed by the Great Rivers Land Trust. This project is described in detail below. The success of the Piasa Creek Watershed Project has encouraged the county Soil and Water Conservation District to undertake a similar project in the Otter Creek Watershed, which is smaller in size, though entirely within Jersey County. The Piasa Creek project has been underway of 15 years, suggesting the time span and resources need to accomplish the intended impact. As discussed elsewhere, northern Jersey County is within the Macoupin Creek Watershed, which as of this date does not have a land management scheme.

Farmlands and construction sites typically contain large areas of bare exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along stream banks and shorelines as the volume and velocity of flow or wave action destabilize and wash away the soil.



Sediment suspended in the water tends to settle out where flowing water slows down. It can clog storm sewers, drain tiles, culverts and ditches and reduce the water transport and storage capacity of river and stream channels, lakes and wetlands. When channels are constricted and flooding cannot deposit sediment in the bottomlands, even more is left in the channels. The result is either clogged streams or increased dredging costs.

Not only are the drainage channels less able to do their job, but the sediment in the water reduces light, oxygen, and water quality and often brings chemicals, heavy metals and other pollutants.

There are two principal strategies to address these problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices.

If erosion occurs, other measures are used to capture sediment before it leaves the site. Silt fences, sediment traps and vegetated filter strips are commonly used to control sediment transport. Runoff from the site can be slowed down by terraces, contour strip farming, no-till farm practices, hay or straw bales, constructed wetlands, and impoundments (e.g., sediment basins and farm ponds).



Slowing surface water runoff on the way to a drainage channel increases infiltration into the soil and reduces the volume of topsoil eroded from the site.

Local implementation: Jersey County and the City of Jerseyville work closely with Water and Soil Conservation Dept. on all subdivision and building in the floodplain. The county also follows state requirements so if a developer changes over one acre of ground they have to put up silt fences and follow state requirements.

Following the Flood of 1993, the City of Grafton acquired approximately 235 acres of property for a new residential and commercial development. During the process of preparing to develop this land, the city put into place several ordinances to protect the city's natural resources. In July of 1994 the city council passed a soil erosion and sediment control ordinance. The purpose of the ordinance was to safeguard persons, protect property, prevent damage to the environment and promote the public welfare by guiding, regulating and controlling the design, construction, use and maintenance of any development or other activity which disturbs or breaks the topsoil or otherwise results in the movement of earth on land situated in the city. It is the intentions of the ordinance that the delivery of sediment from sites affected by land disturbing activities be limited, as closely as practicable, to that which would have occurred if the land had been left in its natural undisturbed state.

The Nutwood Drainage and Levee District has applied for a Community Development Block Grant in the amount of \$600,000 to replace the pump system. A public hearing was held in July for written comments until August 7, 2015 at the office of the Greene County Board. The grant has been approved.



CRS credit: Storm water ordinance's erosion and sedimentation control provisions qualify for 35 points, the maximum credit for programs that do not address erosion from farmland.

Jersey County Soil and Water Conservation District: Since its establishment in 1951, the Jersey County Soil and Water Conservation District has assisted landowners, particularly farmers, with a wide variety of services and activities. The district works with the Natural Resources Conservation Service of the U.S. Department of Agriculture to advance conservation and land management practices throughout Jersey County. Under these programs, the SWCD survey, design and construct erosion control structures, funded primarily through cost-share assistance from the state and federal governments. SWCD also works with farmers and operators to develop comprehensive farm management systems and enhance their practices through a variety of government programs. These programs include the Conservation Reserve Program (CRP), the Conservation Practices Program, the Environmental Quality Incentive program (EQIP), the Wetlands Reserve Program, the Wildlife Habitat Improvement Program (WHIP), and the Conservation Reserve Enhancement Program. SWCD provides assistance in soil erosion control, water quality enhancement, pasture and hay-land establishment, wildlife habitat improvement, tree planting and timber stand improvement, reduce and no-till farming, pond site and pond construction guidelines and criteria, filter strips, riparian

buffers and grass waterways.

The SWCD is funded by the State of Illinois and supported by Jersey County government and farmer related businesses. Funding also comes from contracts for service from the District. The SWCD rents various types of conservation equipment (including drills, scrapers and pond aerators), and sells fish to stock ponds, pond aerators and fountains (to improve water quality), and trees. The district has a four person staff (including two conservationists, a soils technician, and an administrator). The district is governed by an eight person board, elected by members. In its 64th year, the District keeps contact with the community through an annual meeting and an annual “appreciation day,” as well as participation in community projects (such as the Natural Hazards Mitigation Planning team).

Table 6.5.1 Jersey County Soil and Water Conservation District

Jersey County SWCD annual reports:	2012	2013	2014
Individuals assisted	1550	854	854
Farm management plans developed	3155 acres	5554 acres	3183 acres
Farm management plans applied	4165 acres	2364 acres	3477 acres
Forest grassland management plans developed	3	4	0
Erosion reduction	16,660 tons	7086 tons	8692 tons
Wetlands creation, restoration, enhancement	384 acres	120 acres	40 acres
Wildlife habitat management applied	378 acres	450 acres	375 acres
Forest stand improvement	263 acres	130 acres	199 acres
Water and sediment control basins created	67	36	26
Grade stabilization structures	2	5	8
Tile for conservation structures	18,650 ft	13,000 ft	17,376 ft
Pond construction or maintenance	85	93	46
Cover crop acres planned	2508 acres	3200 acres	3100 acres
Cool season grass planting	66.5 acres	2505.1 acres	2356 acres
Warm season grass planting	37.0 acres	546.0 acres	329.2 acres
Hardwood tree plantings	325.5 acres	328.3 acres	300.1 acres
Wildlife habitat plantings	406.1 acres	784.8 acres	652.3 acres
CRP waterways		195.6 acres	189.7 acres
Wetlands restoration		2.3 acres	2.3 acres
Wildlife food plots		95.9 acres	84.5 acres
Living snow fence		4.5 acres	4.5 acres
Cool season field border strips	38.4 acres	188.7 acres	155.7 acres
Riparian tree plantings	318.7 acres	321.6 acres	278.2 acres
Warm season quail habitat buffers	529.5 acres	518.2 acres	571.9 acres
Total CRP Practices	5915.0 acres	5534.4 acres	4,924.4 acres

6.6 Wetland Protection

Wetlands are often found in floodplains and depression within a watershed. Wetlands receive and store floodwaters, thus slowing and reducing downstream flows. They also serve as a natural filter, which helps to improve water quality, and provide habitat for many species of fish, wildlife, and plants. As found in other parts of the United States, wetlands can also serve as barriers against surges of water.



Wetlands that are determined to be part of the waters of the United States are regulated by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (US EPA) under Section 404 of the Clean Water Act. Before a “404” permit is issued, the plans are reviewed by several agencies, including the Corps and the U.S. Fish and Wildlife Service. Each of these agencies must sign off on individual permits. If a permit is issued by the Corps, the impact of the development is typically required to be mitigated. Wetland mitigation can include creation, restoration, enhancement or preservation of wetlands elsewhere. Wetland mitigation is often accomplished within the development site, however, mitigation is allowed off-site and sometimes in another watershed. The appropriate type of mitigation is addressed in each permit.

A 1993 study by the Illinois State Water Survey concluded that for every one percent increase in protected wetlands along a stream corridor, peak stream flows decreased by 3.7 percent.

Local implementation: In Jersey County we have a group of investors called Great River Road Land Trust that does several projects in the wetlands. One of their projects is coming up in this plan. For every acre that Jersey County takes out of wetland for roads or construction we replace it with wetlands somewhere else in the county. County Environmental Health Director works closely to put out mosquito packets in the wetland areas to reduce risk.

The City of Grafton presently has designated wetlands areas, particularly, at the west end of the city along the bike trail. The city will soon begin construction of the Marquette and Joliet Wetlands Nature Walk, a grant funded project that will provide an elevated walkway allowing visitors to view the natural habitat of a semi-controlled wetlands.



CRS credit: The Community Rating System focuses on activities that directly affect flood damage to insurable buildings. While there is no credit for relying on the Corps of Engineers’ 404 regulations, there is credit for preserving open space in its natural condition or restored to a state approximating its natural condition. The credit is based on the percentage of the floodplain that can be documented as wetlands protected from development by ownership or local regulations.

6.7 River and Stream Restoration

Jersey County has three primary streams—Macoupin Creek, Piasa Creek and Otter Creek, each with an extensive network of tributaries. These three creeks form the three watersheds that cover Jersey County (aside for a few minor streams that flow directly into the Illinois or Mississippi Rivers).

There is a growing movement that has several names, such as “stream conservation,”

“bioengineering” or “riparian corridor restoration.” The objective of these approaches is to return streams, stream banks and adjacent land to a more natural condition, including the natural meanders. Another term is “ecological restoration” which restores native indigenous plants and animals to an area.

A key component of these efforts is to use appropriate native plantings along the banks that resist erosion. This may involve retrofitting the shoreline with willow cuttings, wetland plants, and/or rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

In all, restoring the right vegetation to a stream has the following advantages:

- Reduces the amount of sediment and pollutants entering the water
- Enhances aquatic habitat by cooling water temperature
- Provides food and shelter for both aquatic and terrestrial wildlife
- Can reduce flood damage by slowing the velocity of water
- Increases the beauty of the land and property value
- Prevents property loss due to erosion
- Provides recreational opportunities, such as hunting, fishing, and bird watching
- Reduces long term maintenance costs

Studies have shown that after establishing the right vegetation, long term maintenance costs are lower than if the banks were concrete. The Natural Resources Conservation Service estimates that over a ten year period, the combined costs of installation and maintenance of a natural landscape may be one-fifth of the cost for conventional landscape maintenance, e.g., mowing turf grass.

Local implementation: In Jersey County we have several streams and creeks to maintain with the help of local townships and our County Highway Engineer maintains the creeks and streams along with local landowners that work together to clear log and brush jams before they become a threat. We work closely with the Corp of Engineers to regulate river conditions throughout Jersey County.



CRS credit: The Community Rating System focuses on activities that directly affect flood damage to insurable buildings. However, there are credits for preserving open space in its natural condition or restored to a state approximating its natural condition. There are also credits for channel setbacks, buffers and protecting shorelines.

6.8 Open Space Preservation

Keeping the floodplain and other hazardous areas open and free from development is the best approach to preventing damage to new developments. Open space can be maintained in agricultural use or can serve as parks, greenway corridors and golf courses. Another approach related to space preservation in the regulation of water run-off; such as requirements for major commercial developments to have rain retention ponds; and to provide for natural space mitigation (for example, if development impacts natural wetlands).

Capital improvement plans and comprehensive land use plans can identify areas to be preserved through any or all of the following means:

- Acquisition,

- Dedication by developers,
- Dedicating or purchasing an easement to keep the land open, and
- Specifying setbacks or buffer zones where development is not allowed.

Local implementation: Jersey County has over 1,563 acres that are open space. The City of Jerseyville expanded in a park district with the construction of a recreational lake, which preserves significant open space while service as a rain retention basin.

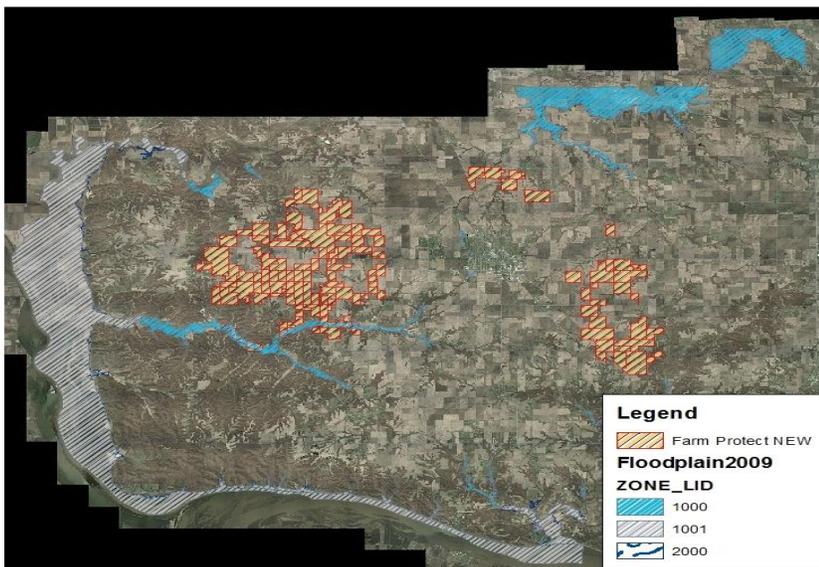


CRS credit: Preserving flood prone areas as open space is one of the highest priorities of the Community are one of the highest priorities of the Community Rating System. Up to 700 points can be given, based on how much of the floodplain is in parks, forest preserves, golf courses, undeveloped floodway or other uses that can be depended on to stay open. Additional credit provided if there are deed restrictions on the parcels.

6.9 Farmland Protection

Farmland protection is quickly becoming an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime, unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural uses.

Many programs are available to Jersey County farmers and agriculturalists, including the Conservation Reserve Program (CRP), the Conservation Practices Program, the Environmental Quality Incentive program (EQIP), the Wetlands Reserve Program, the Wildlife Habitat Improvement Program (WHIP), and the Conservation Reserve Enhancement Program (CREP). These programs were extended under the 2014 Farm Bill, though the last program in the list—CREP—is limited to lands in the Illinois River Watershed, which includes both the Macoupin Creek and Otter Creek watersheds, but excludes the Piasa Creek Watershed. These programs are managed through the Soil and Water Conservation District.



Frequently, farm owners sell their land to residential or commercial developers and the property is converted to non-agricultural land uses. With development comes more buildings, roads and other infrastructure. Urban sprawl occurs, which can create additional storm water runoff and emergency management difficulties. Farms on the edge of cities are often appraised based on the price they could be sold for to urban developers. This may drive farmers to sell to developers

because their marginal farm operations cannot afford to be taxed as urban land.

The Farmland Protection Program in the United States Department of Agriculture’s 2002 Farm Bill (Part 519) allows for funds to go to state, tribal, local governments and to nonprofit organizations to help purchase easements on agricultural land to protect against the development of the land. Eligible land includes crop-land, range-land, grass-land, prairie-land, and forest land that are part of an agricultural operation. Certain lands with historical or archaeological resources are also included.

The hazard mitigation benefits of farmland protection are similar to those of open space preservation. Preventive measures:

- Farmland is preserved for future generations
- Farmland in the floodplain keeps damageable structures out of harm’s way
- Farmland keeps more storm water on site and lets less runoff downstream
- Rural economic stability and development is sustained
- Ecosystems are maintained, restored and/or enhanced
- The rural character and scenic beauty of the area is kept

Local implementation: The City of Grafton and the City of Jerseyville have been working on a new Comprehensive Plan, land use plan and a new zoning map. This plan should be completed and adopted by their City Councils. In the city’s of Grafton and Jerseyville Zoning is applied to control farm land protection. In the 1980s Jersey County set up a farmland protection committee that oversees the land that was dedicated to that program. It takes a 2/3rd vote to remove the land once it is placed into farmland protection. Jersey County also has 20,000 acres of floodplain that is in protection under and levee district. The Nutwood levee district is to undergo an elevation in the next few years. An increase height of 3-5 ft. it had failed in 1993 and the farmland was flooded. Jersey County has very little in the way of stream cleanup and protection. It does have some outside groups that are willing to take on large projects and follow compliance.



CRS credit: Credit is given to preserving open space in the floodplain, regardless of why it is being preserved. Credit is also provided for low density zoning of flood prone areas. Agricultural zones that require minimum 10 or 20 acre lots would qualify.

6.10 Best Management Practices

The term “best management practices” (BMPs) refers to design, construction and maintenance practices and criteria that minimize the impact of storm water runoff rates and volumes, prevent erosion, protect natural resources and capture non point source pollutants (including sediment). They can prevent increases in downstream flooding by attenuating runoff and enhancing infiltration of storm water. They also minimize water quality degradation, preserve beneficial natural features onsite, maintain natural base flows, minimize habitat loss, and provide multiple uses of drainage and storage facilities.

Hazards Addressed
➤ Flood
Tornado
Winter Storms
➤ Thunderstorms
Earthquake
Drought

Local implementation: Jersey County and the City of Jerseyville are in contact at all times with our local Soil and Water Conservation District who offer advice and services to the county and municipalities.

The City of Grafton passed an ordinance providing for the control of storm water runoff. The purpose of this ordinance is to diminish threats to public health, safety and welfare caused by runoff of excessive storm water from new development and redevelopment. This excessive storm water could result in the inundation of damageable properties, the erosion and destabilization of downstream channels, and the pollution of valuable stream and lake resources. The cause of increases in storm water runoff quantity and rate and impairment of quality is the development and improvement of land.



CRS credit: A storm water ordinance would receive up to 40 points for requirements that protect channel banks and lakeshores from development through setbacks or buffer zones and for requiring storm water management facilities to incorporate BMP.

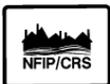
6.11 Dumping Regulations

Dumping regulations address solid matter, such as shopping carts, appliances and landscape waste that can be accidentally or intentionally thrown into channels or wetlands. Such materials may not pollute the water, but they can obstruct even low flows and reduce the channels' and wetlands' ability to convey or clean storm water.

Many cities have nuisance ordinances that prohibit dumping garbage or other “objectionable waste” on public or private property. Waterway dumping regulations need to also apply to “non objectionable” materials, such as grass clippings or tree branches which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

Many people do not realize the consequences of their actions. They may, for example, fill in the ditch in their front yard not realizing that it is needed to drain street runoff. They may not understand how regarding their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, a dumping enforcement program should include public information materials that explain the reasons for the rules as well as the penalties.

Local implementation: Being a small community like Jersey County we do not see too much stream dumping. When it does occur the Floodplain Coordinator works with the County Highway Dept. to get the job cleaned up as soon as possible. The City of Jerseyville has a full time Code Enforcement Officer to keep track of dumping.



CRS credit: The CRS provides up to 30 points for enforcing and publicizing a regulation that prohibits dumping in the drainage system. As currently written, the Jersey County Storm Water Ordinance would not receive this credit.

6.12 Urban Forestry

The major damage caused by wind, ice and snow storms is to trees. Downed trees and branches break utility lines and damage buildings, parked vehicles and anything else that was under them. An urban forestry program can reduce the damage potential of trees. The cities in central Illinois are prone to ice storms and have initiated programs that select species that are resistant to ice and storm damage.

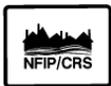
Urban foresters or arborists can select hardier trees which can better withstand high wind and ice accumulation. Only trees that attain a height less than the utility lines should be allowed along

the power and telephone line rights-of-way. Just as important as planting the right trees is correct pruning after a storm. If not done right, the damaged tree will not heal properly, decay over the next few years, and cause a hazard in the future. A trained person should review every damaged tree to determine if it should be pruned or removed

By having stronger trees, programs of proper pruning, and on-going evaluation of the trees, communities can prevent serious damage to their tree population. A properly written and enforced urban forestry plan can reduce liability, alleviate the extent of fallen trees and limbs caused by wind and ice build-up, and provide guidance on repairs and pruning after a storm.

Local implementation: Local utility companies are now in the process of clearing tree limbs away from utility lines and have been an ongoing process. In the County it is every man for himself but in the city of Jerseyville they do have pickup procedures for residence. Grafton also has similar methods.

In the fall of 2006, the City of Grafton started a riverfront improvement project with the planting of indigenous trees and native grasses. In an effort to become a Tree City USA, the City of Grafton along with the Grafton Chamber of Commerce is presently planning an Arbor/May Day celebration. This should become an annual event with emphasis on meeting the four required standards to become Tree City USA.



CRS credit: Being a part of the National Flood Insurance Program, the CRS recognizes only activities that affect flood damage. It does not provide credit for projects or programs that only affect damage from other types of hazards.

6.13 Watershed Planning

Jersey County is covered by three significant watersheds: Piasa Creek, Otter Creek, and Macoupin Creek. Piasa Creek covers 7800 acres of eastern Jersey County and portions of western Madison County (Godfrey Township), and southwestern Macoupin County. The creek has several branches—including Rocky Fork, Mill Creek, and Little Piasa. It empties into the Mississippi River at Lockhaven in the southwest corner of the county. Piasa Creek has a history of riverine flooding, backing up from the Mississippi River, as well as flash flooding on its tributaries. The creek is used for recreational purposes, including small boating (including canoe and kayak), fishing and hunting in the wetlands. The watershed is a mixture of agricultural and undeveloped (forests, wetlands, etc) land, with some urbanization.

The watershed is managed through private-public cooperation, supervised by Great Rivers Land Trust, through a multi-year program of funding by the Illinois American Water Company. The original program was designed to reduce sediment flow into the Mississippi River. The program has been highly successful. Original ten-year program met its sediment reduction goal by the sixth year. As a result of the successful cooperation, the water company has extended its support of the program for another decade.

Many strategies are used to reduce soil erosion, loss of top soil, and movement of sedimentation. Many acres have been placed—through public and private efforts—into land protection programs—wetland preservation and mitigation, conservation reserve lands, wildlife habitat programs, stream protection, tree-planting, forest buffers, etc. The Great Rivers staff has

identified one of the most significant problems in the watershed has been “field edge gullying” in which water runoff has caused significant erosion along the edge of fields, creating or expanding gullies. This runoff has the most significant damages as the result of severe storms, such as thunderstorms. In effect, severe storms and thunderstorms, causing flash flooding, have an impact on an important economic asset of Jersey County—our agricultural land. Connected with the erosion are loss of valuable top soil and the loss of tillable acreage to gullying. Downstream, flash flooding damages the ecosystem and water quality through sedimentation. Flash flooding has also cause damage to developed properties, personal injury, and loss of life.



The Piasa Creek Watershed Project: The Piasa Creek Watershed covers approximately 78,000

acres, or 121.9 square miles, in portions of Jersey, Madison and Macoupin Counties. Almost the entire Macoupin County portion of the watershed (12%) is devoted to intense agricultural practices. The Jersey County portion of the watershed (62%) is predominantly intense agriculture with the exception of areas of steeper topography and stream corridor, which are primarily grasslands and forest cover. The Madison County portion of the watershed (26%) is the only segment with any significant urban population.

Otter Creek Water Shed Project: The Jersey County Soil and Water Conservation District (through the NRCS field office) has been working on the Otter Creek Water Shed Project as time and resources allow. In early 2014, the SWCD held a landowners meeting to discuss the watershed boundaries and identify landowner concerns. The SWCD staff has started field inventories to collection soil erosion information on twenty four separate 160 acres parcels. The staff plans to investigate twenty gully sites and twenty-two stream bank erosion sites. The soil loss information will be tabulated by the NRCS state staff using the Rapid Assessment Point Method (RAP-M). The goal of the project is to obtain dedicated funding for landowners within the watershed boundaries to undertake conservation practices such as sediment basins, dry dams, and appropriate waterways, using cost-share funding.

6.14 Recommendations

1. Jersey County and local municipalities promulgate and enforce appropriate regulation of subdivisions, open spaces, and storm water run-off. The County adopted a Stormwater Management Ordinance in 2009.
2. Jersey County, and local municipalities, engages in comprehensive land use planning.
3. Jersey County adopts and enforces various ordinances, including anti-dumping and storm water management.
4. Appropriate Jersey County organizations engage in and expand open space, agricultural lands, and urban forest programs.
5. Jersey County enhances and continues the implementation of their program of bridge, culvert, and structure monitoring maintenance.
6. Appropriate Jersey County organizations, such as Great Rivers Land Trust, expansion of watershed preservation scheme from the Piasa Creek Watershed to the Macoupin Creek and Otter Creek watersheds.
7. The City of Grafton should continue to enforce erosion control, sediment control and storm water runoff ordinances. Keep the public informed about the use of retention basins to control gully erosion, reduce sediment and improve water quality.

Local implementation: The City of Grafton and the City of Jerseyville have been working on a new Comprehensive Plan, land use plan and a new zoning map. This plan should be completed and adopted by their City Councils. In the city's of Grafton and Jerseyville Zoning is applied to control farm land protection. In the 1980s Jersey County set up a farmland protection committee that over sees the land that was dedicated to

that program. It takes a 2/3rd vote to remove the land once it is placed into farmland protection. Jersey County has very little in the way of stream cleanup and protection. It does have some outside groups that are willing to take on large projects and follow compliance.

6.15 References

Great Rivers Land Trust, www.greatriverslandtrust.com

The Great Flood of 1993, Illinois State Geological Survey (March 1994)

Blitzkrieg of a flood hits Jersey County; Dec. 30, 2015 *Jersey County Journal*

www.mvs.usace.army.mil Nutwood Drainage and Levee District

Chapter 7 Emergency Warning and Response

7.1 Introduction

Emergency services measures protect people during and after a disaster. A good emergency management program addresses all hazards, and it involves all municipal and/or county departments.

In Illinois all counties and those communities with populations greater than 10,000 are required by law to have a state-accredited emergency services and disaster program. Jersey County has adopted the National Incident Management System (NIMS). At the state level, programs are coordinated by the Illinois Emergency Management Agency (IEMA). Jersey County emergency services are coordinated through the county's ESDA coordinator.

Hazards Addressed
➤ Flood
➤ Tornado
➤ Winter Storms
➤ Thunderstorms
➤ Earthquake
➤ Wildfires

An emergency operations plan (EOP) ensures that all response needs are addressed and that all response activities are appropriate for the expected threat. EOPs should be reviewed annually to keep contact names and telephone numbers current and to make sure that supplies and equipment that will be needed are still available. EOPs should be critiqued and revised after disaster and exercises to take advantage of the lessons learned and changing conditions. The end result is a coordinated effort implemented by people who have experienced working together so that available resources will be used in the most efficient manner.

This chapter reviews emergency services measures following a chronological order of responding to an emergency. It starts with identifying an oncoming problem (threat recognition) and goes through post-disaster activities.

7.2 Threat Recognition and Warning

Threat recognition is the key. The first step in responding to a flood, tornado, storm or other natural hazard; is or know when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

Floods: A flood threat recognition system predicts the time and height of the flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.



On largest rivers, including the Mississippi, the measuring and calculating is done by the U.S. Corps of Engineers or the National Weather Service which is in the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Support in NOAA's efforts is provided by cooperating partners from state and local agencies.

Forecasts of expected river stages are made through the Advanced Hydrologic Prediction Service (AHPS) of the National Weather Service. Flood threat predictions are disseminated on the NOAA Weather Wire or NOAA Weather Radio. NOAA Weather Radio is considered by the federal government as the official source for weather information.

On smaller rivers, locally established rainfall and river gages are needed to establish a flood threat recognition system. The National Weather Service may issue a “flash flood watch.” This means the amount of rain expected will cause standing water and other flooding on small streams and depressions. These events are so localized and so rapid that a “flash flood warning” may not be issued, especially if no remote threat recognition equipment is available.

In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

Jersey County uses real time flood gauges at Hardin and Grafton IL to determine what properties are in a flood situation. We have all 1100+ structures lowest floor determinations so when the river gage mark is at the 433 elevation we will know every residence that is flooded.

Tornadoes and Thunderstorms: The National Weather Service is the prime agency for detecting meteorological threats, such as tornadoes and thunderstorms. Severe weather warnings are transmitted through the Illinois State Police’s Law Enforcement Agencies Data System (LEADS) and through the NOAA Weather Radio System.¹ As with floods, the Federal agency can only look at the large scale, e.g., whether conditions are appropriate for formation of a tornado. For tornadoes and thunderstorms, local emergency managers can provide more site-specific and timely recognition by sending out National Weather Service trained spotters to watch the skies when the Weather Service issues a watch or warning.²

Winter Storms: The National Weather Service is again the prime agency for predicting winter storms. Severe snow storms can often be forecasted days in advance of the expected event, which allows time for warning and preparation. Though more difficult, the National Weather Service can also forecast ice storms.

Local implementation: Jersey County uses GIS to overlay flood data as well as storm data. This capability allows the identification of properties that will flood, which roads will be under water, and which critical facility will be affected for a given prediction. With this information, an advance plan can be prepared that shows problem sites and determines what resources will be needed to respond to the predicted flood level. The local news stations also send out reports via radio and television. Jersey County Governments’ web site also has direct links to numerous sites including NOAA, U.S. Army Corps of Engineers and the National Weather Service’s hydrologic map for the Jersey County area. The Jersey County Sheriff Department receives notification from the Illinois State Police, the notification is then passed to emergency managers and first responders.

The City of Jerseyville uses sirens that will repeat the warning message that is typed in depending on the type of emergency.

The City of Grafton has the capability of monitoring the river stage on the “Grafton Gauge”. It is located at mile 218. The US Army Corps of Engineers web site also provides up-to-the-minute river stage advisories. The City of Grafton has a river stage forecast schedule that defines at what river level the floodwaters will inundate a particular intersection. Grafton also uses the “Voice Shot” system which is an automated telephone notification. When an impending emergency is predicted the Chief of Police will record an emergency message that is in turn phoned to all of the citizens. The Chamber of Commerce provides the same service for the business owners.

¹ www.ptb.state.il.us

² www.fema.gov/national-incident-management-system



CRS credit: Credit can be received for utilizing the gauges listed on the previous page. The actual points are based on how much of the community’s floodplain is subject to flooding by the gauged stream.

Other weather hazards: The Jersey County Sheriff Department’s dispatch center receives other severe weather alerts from the LEADS system. These alerts are issued by the Illinois State Police who monitor NOAA Weather Wire, or through their monitoring of NOAA weather radios.

7.3 General Information

After the threat recognition system tells the Emergency Management Agency (EMA) and municipalities that a flood, tornado, thunderstorm, winter storm or other hazard is coming, the next step is to notify the public and staff of other agencies and critical facilities. The earlier a greater number of people can implement protections measures if the warning is more specific.

Hazards Addressed
➤ Flood
➤ Tornado
➤ Winter Storms
➤ Thunderstorms
➤ Earthquake
➤ Wildfires
➤ Drought

The National Weather Service issues notices to the public using three levels of notification:

Watch: conditions are right for flooding, thunderstorms, tornadoes or winter storms.

Warning: a flood, tornado, etc. has started or has been observed.

Advisory: issues special weather statements

A more specific warning may be disseminated by the community in a variety of ways. The following are the more common methods:

- Outdoor warning sirens
- Sirens on public safety vehicles
- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Door-to-door contact
- Mobile public address systems
- E-mail notifications



Multiple or redundant systems are most effective - if people do not hear one warning, they may still get the message from another part of the system. Each has advantages and disadvantages:

- Radio and television provide a lot of information, but people have to know when to turn them on.
- NOAA Weather Radio can provide short messages of any impending weather hazard or emergency and advise people to turn on their radios or televisions, but not everyone has a

Weather Radio.

- Outdoor warning sirens can reach many people quickly as long as they are outdoors. They do not reach people in tightly-insulated buildings or those around loud noise, such as at a factory, during a thunderstorm, or in air conditioned homes. They do not explain what hazard is coming, but people should know to turn on a radio or television.
- Automated telephone notification services are also fast, but can be expensive and do not work when phone lines are down. Nor do they work for unlisted numbers and calling screener services, although individuals can sign up for notifications.
- Where a threat has a longer lead time (e.g., flooding along the Fox River), going door-to-door and manual telephone trees can be effective.

Just as important as issuing a warning, is telling people what to do. A warning program should have a public information aspect. People need to know the difference between a tornado warning (when they should seek shelter in a basement) and a flood warning (when they should stay out of basements).

Storm ready: The National Weather Service established the Storm Ready program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public.³ To be officially Storm Ready, a community must:

- Establish a 24-hour warning point and emergency operations center
- Have more than one way to receive severe weather warnings and forecasts and to alert the public
- Create a system that monitors weather conditions locally
- Promote the importance of public readiness through community seminars
-
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Being designated as a Storm Ready community by the Weather Service is a good measure of a community's emergency warning program for weather hazards. It is also credited by the Community Rating System.

NOAA Weather Radios: NOAA Weather Radio is a nationwide network of radio stations that broadcasts warnings, watches, forecasts and other hazard information 24 hours a day. For Jersey County, information comes from the National Weather Service office in St. Louis, MO.

NOAA weather radios can be very effective for notifying people, businesses, schools, care facilities, etc., of weather threats. They have a monitoring feature that issues an alarm when activated by the Weather Service.

³ www.stormready.noaa.gov

Local Implementation: The Jersey County Emergency Services and Disaster Agency is the lead agency in the county for organizing emergency warning and information. The basic structure of ESDA's activity is the "Warning/Emergency Information Annex" of Jersey County's Emergency Operations Plan, approved by the County Board July 2003. The annex describes the warning systems in place in the jurisdiction and the procedures of initiating their use. The most frequent use of a warning system is the activation of the warning siren for the City of Jerseyville during the tornado season. The ESDA Coordinator has conducted a Hazard Identification Risk Analysis (HIRA) as required by the state in addition to the biennial update and rewrite of the EOP which was submitted to IEMA in 2015 and subsequently approved.



CRS credit: Community Rating System points are based on the number and types of warning media that can reach the community's flood prone population. Depending on the location, communities can receive up to 25 points for the sirens and the County's Emergency Alert Radio System and more points if there are additional measures, such as telephone trees. Being designated as a Storm Ready community can provide 25 more points.

7.4 Emergency Response

The protection of life and property is the foremost important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries. Typical actions and responding parties include the following:

- Activating the emergency operations center (ESDA, Sheriff and local police)
- Closing streets or bridges (police, IL Dept. of Transportation, public works)
- Shutting of power to threatened areas (utility companies)
- Passing out sand and bags (public works, ESDA)
- Ordering an evacuations (chief elected officer)
- Holding children at school/releasing children from school (school administrator)
- Opening evacuation shelters (Red Cross)
- Monitoring water levels (ESDA, Certified Floodplain Manager)
- Security and other protection measures (local law enforcement agencies)

Once the threat is recognized, the first priority is to alert others through the warning system. The second priority is to respond with actions that can prevent or reduce damage or injury. When resources at the local and state level are insufficient to deal with a large scale flood emergency or other natural hazard the federal government can provide assistance.

Response plans ensure that all response activities are appropriate for the expected hazard. The EOP is supported by annexes, standard operating procedures and other guidance documents that cover the details of various aspects of emergency response, such as communication, evacuation, sheltering, damage assessment, and severe weather.

Earthquake Response Plan: Earthquakes can cause the most extensive damage without much warning, unlike riverine flood and tornadoes. Therefore, the Jersey County Emergency Services and Disaster Agency devoted a specific annex to the county’s Emergency Operations Plan to earthquake preparedness and response. The only other “hazard specific” annex pertains to responses to terrorism. The EOP was approved by the County Board in July 2003. The Earthquake Annex discusses the nature of the earthquake hazard and provides pre- and post-earthquake checklists for each segment of the emergency response community, including law enforcement, communications, medical and mortuary services, damage assessment, public health, public information, fire services, search and rescue, and emergency operations. Jersey County is one of the counties in Illinois that is required to have a specific Earthquake Annex in the EOP plain due to our exposure. The Annex was updated and approved by IEMA in 2015.⁴

Special Needs Residents: This jurisdiction acknowledges that there are populations with special requirements that must be considered in disaster response. These include the mobility impaired, hearing impaired, blind or visually handicapped, developmentally disabled and the elderly.

The Jersey County Health Department has been assigned the responsibility for identifying this segment of the population, and insuring that disaster services will be available for these individuals. Coordination has been made with the facilities where large numbers of these citizens live to insure that adequate procedures have been developed. Every attempt will be made to find these residents an equivalent facility or to provide the support they require.

The County Health Department will maintain the lists of special needs residents. The school district has coordinated with agencies that own vehicles that can safely transport these residents for use in the event of an evacuation. The Health Department has arranged for appropriate medical care.

Local Implementation: Municipalities are responsible for warnings in their incorporated areas, and the fire protection districts for their areas of service. Grafton’s Chief of Police and the Mayor of Grafton would be the emergency coordinators. Elsay’s President along with the County ESDA Coordinator would implement their plan. The City of Jerseyville’s Mayor, Police Chief and Fire Chief would be responsible for their emergency plan. If the severity of any emergency were to exceed any municipalities’ capability, the County emergency management will provide additional assistance.



CRS Credit: CRS credits are given for the effectiveness use of GIS mapping in the development of response plans. In its current state the Jersey County Emergency Operations Plan and the annex receives minimal points.

7.5 Critical Facilities Protection

Protecting critical facilities during a disaster is the responsibility of the facility owner or operator. However, if they are not prepared for an emergency, the rest of the community could be impacted. If a critical facility is damaged, workers and resources may be unnecessarily drawn

⁴⁴ Larry Meade ESDA Coordinator; e-mail 2015

away from other disaster response efforts. If such a facility is adequately prepared by the owner or operator, it will be better able to support the community's emergency response efforts.

Most critical facilities have full-time professional managers or staff who is responsible for the facility during a disaster. Some have their own emergency response plans. Illinois state law requires hospitals, nursing homes, and other public health facilities to develop such plans. Many facilities would benefit from early warning, response planning, and coordination with community response efforts.

Local implementation: The EOP identifies emergency operations centers, local government – owned buildings, schools, nursing homes, and other public and private health facilities and hospitals. However, the plan should focus on coordinating with the facilities' managers and forms of better communication methods.



CRS credit: The Community Rating System gives the same weight to critical facility protection as it does to the rest of the community's flood response plan. CRS credit focuses on coordinating the community's efforts with the facilities' managers and helping them develop their own flood-specific emergency plans. The County and the municipalities would receive 10 points for maintaining a current contact list. An additional 40 points are available if all the flood prone facilities developed their own flood response plans and coordinated them with government response efforts.

7.6 Post-Disaster Recovery and Mitigation

After a disaster, communities should undertake activities to protect public health and safety facilitate recovery and help prepare people and property for the next disaster. Throughout the recovery phase, everyone wants to get "back to normal." The problem is, "normal" means the way they were before the disaster, exposed to repeated damage from future disasters

Appropriate measures include the following:

Recovery actions

- Patrolling evacuated areas to prevent looting
- Providing safe drinking water
- Monitoring for diseases
- Vaccinating residents for tetanus
- Clearing streets
- Cleaning up debris and garbage
- Regulating reconstruction to ensure that it meets all code requirements

Mitigation actions

- Conducting a public information effort to advise residents about mitigation measures they can incorporate into their reconstruction work
- Evaluating damaged public facilities to identify mitigation measures that can be included during repairs
- Acquiring substantially or repeatedly damaged properties from willing sellers
- Planning for long term mitigation activities
- Applying for post-disaster mitigation funds

Monitoring for diseases:

- Vaccinating residents for tetanus
- Clearing streets
- Cleaning up debris and garbage
- Regulating reconstruction to ensure that it meets all code requirements

Mitigation actions

- Conducting a public information effort to advise residents about mitigation measures they can incorporate into their reconstruction work
- Evaluating damaged public facilities to identify mitigation measures that can be included during repairs
- Acquiring substantially or repeatedly damaged properties from willing sellers
- Planning for long term mitigation activities
- Applying for post-disaster mitigation funds

7.7 Recommendations

1. Jersey County and local municipalities join together to establish a county-wide hazard warning system (in particular, tornado warning).
2. Appropriate Jersey County organizations develop and engage in public education programs regarding potential natural hazards.
3. The City of Grafton should review the existing outdated emergency response pamphlets/mitigation plans. They should be updated and combined into one useful reference manual.
4. An annual review of response plans and procedures should be conducted. Incorporate post-disaster procedures for public information, reconstruction regulations and mitigation project identification.
5. The City of Grafton should have formalized Agreements with public facilitators such as schools and churches for use of these buildings as temporary shelters and storage facilities during emergencies, i.e. flooding, tornadoes, winter storm power outages, etc.
6. The City of Grafton needs to initiate a community wide warning system. Educate the public on what the sirens and warnings mean and what steps they should take to protect themselves.

7.8 References

www.ptb.state.il.us

www.fema.gov/national-incident-management-system

www.stormready.noaa.gov

Larry Meade Jersey County ESDA Coordinator; e-mail 2015

CHAPTER 8 Public Information Activities

Mitigation of all natural hazards can be accomplished through effective public information activities. A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renter, businesses, and local officials about hazards and ways to protect people and property. Public information includes activities such as:

- Library and website resources
- Outreach projects
- Technical assistance

Most individual property owners usually implement property protection measures, therefore, a community mitigation program should include measures to encourage and assist owners in protecting their property from flood damage and how to protect lives and property from other hazards. The challenge is to have these efforts effectively reach their intended audience. Numerous government agencies and non-profit organizations publish public information regarding hazards and hazard mitigation. These can be used for outreach purposes.

8.1 Community Newsletters/Direct Mailing

Direct mailing: research has proven that outreach projects work. One of the most effective types of outreach projects are materials mailed or distributed to everyone in the community or, in the case of floods, to floodplain property owners.

People need to be told what they can do about the hazard, so projects should include information on safety, health and property protection measures. Research has also shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, the outreach projects should be locally designed and tailored to meet the conditions of the local area.

News media: local newspapers can be strong allies in efforts to inform the public. A press release or story idea may be all that is needed to garner the interest of a local reporter. For example, after a tornado in another community, people and the media become interested in their own vulnerability to a possible tornado and how they should protect themselves and their property. Local radio stations and cable TV channels can also be of help especially if video of the damage is broadcast.

Library and web site: Community libraries are a good source for residents to seek information about flooding and flood protection. Maintaining and updating library resources with this information is an effective public information strategy, since most people turn to the library when they want to research a topic. In addition libraries sometimes will sponsor their own public information campaigns that might include displays, lectures and newspaper articles. It would be feasible for a municipality to arrange one of these informational campaigns on flooding.

Other projects: There are other examples of public outreach projects such as:

- School programs
- Presentations at meetings of neighborhood, civic business groups
- Displays in public buildings or shopping malls
- Signs in parks, along trails and on waterfronts that explain the natural features (such as the river) and their relation to hazards such as flooding
- Brochures available in municipal buildings and libraries
- Special meetings such as floodproofing open houses

Local implementation: Grafton City Hall sends monthly newsletters out with their utility billing. In 2013 a Disaster Committee was formed by the Grafton Alderman consisting of members of the public, Chief of Police, Mayor, maintenance department, and two Aldermen. The committee meets on a need basis and is open to the public.

In Jersey County, the County Code Administrators' office annually mails brochures to all property owners in the county and special brochures to homeowners in the floodplain. The brochures are on display in the government building and each floor along with retrofitting references, emergency supply checklists, floodproofing techniques and other hazard information. The County Code Administrator has a "Flood" tab on the county's web site with flood information and links to State and Federal web sites (FEMA, IEMA). The ESDA coordinator has brochures sponsored by the Red Cross that are available for different age groups and covers provides safety measures for fire, floods, winter storms and other hazards. The ESDA coordinator also prepares speeches on family preparedness.



CRS credit: The CRS provides up to 290 points for outreach projects on flood topics, 100 of those points are for having public information program strategy. This Plan qualifies for the strategy credit.

8.2 Technical Assistance

Hazard information: Providing map information to inquirers is an important public information activity. Many benefits stem from providing information to residents and business owners to make them aware of the potential hazards so they may take steps to avoid problems and/or reduce their exposure to flooding.

Communities can easily provide map information from FEMA's Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies. They may also assist residents in submitting requests for map amendments and revisions when they are needed to show that a building is outside the mapped floodplain. In one-on-one sessions with property owners, community officials such as code enforcement staff or building inspectors can provide advice and information on identifying flood hazards at the site, correcting local drainage problems, floodproofing, dealing with contractors, and explain insurance.

Local implementation: The Jersey County Code Administrator office provides mapping service to the public, lenders, insurance agents and appraisers. Letters detailing the mapping

service are mailed annually to the businesses and a log is kept on the inquiries and on site visits. Annual brochures are also mailed to the public advertising the mapping service. The Jersey County Code Administrator is responsible for maintaining the FIRMs and mapping.

The Jersey County Health Department provides technical guidance related to septic system failure and well contamination.

Grafton and Elsayh are responsible for mapping information in their communities.



CRS credit: The Community Rating System provides 140 points for providing map information to inquirers. The community must keep the maps up to date. Up to 71 points are available for providing one-on-one flood protections assistance to residents and businesses and making site visits. Both services must be publicized.

8.3 Public Information Program Strategy

The development of a public information program strategy is an approach to improve the effectiveness of the community's public information efforts. A public information program strategy involves the review of local conditions, local public information needs, and a recommended action plan of activities. A strategy should consist of the following parts, which are incorporated into this plan.

- The local hazards – discussed in Chapter 2
- The property protection measures appropriate for a specific hazard – discussed in Chapter 2 and Chapter 5
- Hazard safety measures appropriate for the local situation as shown on page 7-13
- The public information activities currently being implemented within the communities, including those by non-government agencies – discussed in Chapter 7 Section 7.8 – 7.8.2
- Goals for the community public information programs are covered in Chapter 3
- The outreach projects that will be done in each year to reach the goals of Chapter 9's Action Plan
- The process that will be followed to monitor and evaluate the projects is in Chapter 10

8.4 Public Information Summary

The Hazard Mitigation committee discussed several topics to focus on potential public information. The committee also evaluated ways of distributing public information and materials. Based on the questionnaires that was distributed to the public and the response, the committee came to these conclusions and recommendations:

1. The following topics should be covered in public information activities.
 - How the area is exposed to natural hazards

- What people should do to protect themselves and their health
 - What people can do to protect their property
 - What government agencies are doing and how they can help
2. Sample articles, with illustrations, on these topics should be prepared and distributed to all interested parties, such as public information offices, webmasters, permit offices, reception desks, and neighborhood organizations.
 3. The following media should be used to convey these messages. They are listed in priority order as recommended by the Mitigation Planning Committee.
 - Articles in newsletters and mass mailings
 - Websites
 - Newspaper articles
 - Educational programs in schools
 - Library references
 - Handouts, protection guides
 - Technical advice and visits by staff
 4. Each County office and municipality should review their current public information activities and incorporate the messages in them, where appropriate.
 5. The County should provide an order form for local libraries to order free state and federal hazard mitigation publications.
 6. Community websites should include information and links to other sites to cover as many topics as possible. It should also include a system for users to determine the flood hazard for their properties.
 7. Jersey County community leaders develop and implement a comprehensive program of public information and education with regard to hazard mitigation.

Flood Safety

- Do not walk through flowing water. Drowning is the number one cause of flood deaths. Currents can be deceptive; six inches of moving water can knock you off your feet. Use a pole or stick to ensure that the ground is still there before you go through an area where the water is not flowing.
- Do not drive through a flooded area. More people drown in their cars than anywhere else. Don't drive around road barriers; the road or bridge may be washed out.
- Stay away from power lines and electrical wires. The number two flood killer after drowning is electrocution. Electrical current can travel through water. Report downed power lines to the Police or Sheriff by calling 911.
- Look out for animals that have been flooded out of their homes and who may seek shelter in yours. Use a pole or stick to poke and turn things over and scare away small animals.
- Look before you step. After a flood, the ground and floors are covered with debris including broken bottles and nails. Floors and stairs that have been covered with mud can be very slippery.
- Be alert for gas leaks. Use a flashlight to inspect for damage. Don't smoke or use candles, lanterns, or open flames unless you know the gas has been turned off and the area has been ventilated.
- Carbon monoxide exhaust kills. Use a generator or other gasoline-powered machine outdoors. The same goes for camping stoves. Charcoal fumes are especially deadly -- cook with charcoal outdoors.
- Clean everything that got wet. Flood waters have picked up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food, flooded cosmetics, and medicine can be health hazards. When in doubt, throw them out.
- Take good care of yourself. Recovering from a flood is a big job. It is tough on both the body and the spirit and the effects a disaster has on you and your family may last a long time.

8.5 References

www.jerseycountyillinois.us

Are You Ready? A Guide to Citizen Preparedness, FEMA 2002

CRS Coordinator's Manual 2013

www.jerseyville-il.us

www.city-data.com/city/grafon-Illinois.html

www.elsah.org/

www.jerseyvillelibrary.org/

Chapter 9 Action Plan

This chapter contains the 2015 Jersey County Natural Hazards Mitigation Action Plan. The action items presented in this Chapter were developed from the original February 2008 Plan. The Hazard Mitigation Planning Committee's meetings and discussions and the list of recommendations presented in Chapter 4 through 6. Some of the Plans recommendations may be selected for implementation when resources become available and others may serve as a "building block"

9.1. Goals

The following five goals, generated by Jersey County residents, provide overall direction for the identification and implementation of the elements of this action plan.

Goal 1 Minimize Loss of Life

Objectives:

- Develop improved systems of delivering warnings about natural hazards to county residents, particularly those in rural areas.
- Develop improved communication systems for emergency responders that will allow them to respond to incidents occasioned by the occurrence of various natural hazards.
- Develop public education campaigns designed to educate residents about steps they can take to minimize the impact of various natural hazards.
- Conduct periodic tests of the county's emergency operation plan.
- Adopt uniform countywide building codes that promote the development of commercial and residential structures capable of withstanding acceptable levels of natural hazard impact.

Goal 2 Protect Public Health

Objectives:

- Develop public education efforts designed to educate the public about measures individual citizens can take to reduce the health risks associated with various natural hazards before, during and after the occurrence of such hazards.
- Improve the following programs with eye to the health risks occasioned by hazards determined most likely to affect the county: sanitation, disease surveillance, vector control, vaccination.

Goal 3 Protect and Develop Infrastructure

Objectives:

- Adopt uniform countywide building codes that promote the development of commercial and residential structures capable of withstanding acceptable levels of natural hazard impact.
- Perform regular maintenance on transportation infrastructure including roads and bridges.
- Review building inspection procedures to ensure appropriate attention to hazard mitigation related features.

- Improve sewage and wastewater treatment infrastructure.
- Review building evacuation procedures posted in all county-owned buildings.
- Review evacuation routes on a regular basis to ensure appropriate access in the event of their use.
- Improve communication systems through the use of federal and state grants and private initiatives.

Goal 4 Protect Public Property and Critical Facilities

Objectives:

- Review building inspection procedures to ensure appropriate attention to hazard mitigation related features.
- Adopt uniform countywide building codes that promote the development of public buildings capable of withstanding acceptable levels of natural hazard impact.
- Retrofit any existing critical facility deemed unreasonably susceptible to natural hazards.
- Ensure that all public buildings are appropriately insured.
- Review security of critical facilities.

Goal 5 Protect Private Property

Objectives:

- Adopt uniform countywide building codes that promote the development of public buildings capable of withstanding acceptable levels of natural hazard impact.
- Adopt and/or maintain County ordinances that minimize the risk of exposure to the most prevalent natural hazards.
- Conduct public information campaigns designed to educate citizens about the potential benefits of the following activities: retrofitting, flood proofing, and insuring property.

9.2. Guidelines

A number of Illinois jurisdictions have provided examples to guide Jersey County in the preparation of our hazard mitigation plan. From the examples we have identified the following seven guidelines to guide us in reviewing mitigation measures, recommendations (found at the end of Chapters 4-9), and the action items in this chapter.

Guideline 1. Focus natural hazards mitigation efforts on tornadoes, floods, thunderstorms and winter storms.

Guideline 2. Encourage people to assume some responsibility for their own protection.

Guideline 3. New developments should not create new exposures to damage from natural hazards.

Guideline 4. Local initiatives should focus on protecting citizens and public property.

Guideline 5. Seek county, state, and federal support for special projects.

Guideline 6. Preserve open space in hazardous areas, especially where they are sensitive natural areas and agricultural land.

Guideline 7. Be consistent with existing plans.

Each action item has four subheadings: a summary of the recommendation for action; a discussion of the action; an indication of the person or agency responsible for the action; and means for assessing the effectiveness of the action. Each of the action items is cross referenced to Chapters in the mitigation plan. The authorities responsible for implementing these actions fall into three categories:

- Jersey County legislative bodies—laws and regulations
- Jersey County executive authorities—law enforcement
- Jersey County civic bodies—public information campaigns

9.3 Jersey County Has Identified Ten Action Items

The core hazard mitigation team, chaired by the county code administrator and the chair of the political science department at Principia College, reviewed the preliminary hazard mitigation report and compiled several dozen possible mitigation actions suggested in the report. The core team consulted with various county officials to assess the political receptiveness of the potential actions, given the difficult fiscal situation of the county and deep reluctance of citizens to tolerate increased taxes. The core hazard mitigation team pared the list of potential mitigation actions to ten items.

Following the priority setting meeting, the core mitigation team reviewed the prioritization and revised each of the proposed actions to incorporate input from the meeting. Representatives from the core team then met with the county board chair to review the proposed actions. Central to this discussion was the cost and the possible sources of funding for the various actions. Based on their discussion, one action item was removed from the list in recognition that the item would not be able to gain sufficient support from the county board at the current time. The team and county board chair agreed that the item should remain on the agenda of the hazard mitigation team for continued consideration and, especially, identification of financial resources beyond the county.

The team also discussed with the county board chair the appropriate overall structure for implementing, monitoring, evaluating, and updating the plan. While each action will have its own designated implementation authority and may have separate and independent sources of funding and resources, the county will retain overall responsibility and authority for the plan.

The following ten proposed hazard mitigation actions—in priority order—reflect alignment with mitigation goals, ability to mitigate hazards, appreciation of the cost of the actions, and an understanding of the political realities of the current situation.

9.4 Administrative Action

Action Item 1: This Jersey County Multi-Natural Hazards Mitigation Plan adoption

Adoption of the Plan by resolution of the County Board, City Councils, and Village Trustees. Each agency resolutions should adopt the action items pertinent to the community and assign a person responsible. (Chapter 1 and 10)

Cost: Staff time

Deadline: Accomplished

Benefits: Adoption of the Plan ensures that all stakeholders are authorized to implement action items with available resources. Adoption is also a requirement for recognition of the Plan by mitigation funding programs, including the Disaster Mitigation Act of 2000, the FEMA Flood Mitigation Assistance Program and the CRS.

Action Item 2: Plan Monitoring and Maintenance

The Special Projects Committee recommended to the County Board that the Plan would be overseen by the Jersey County Code Administrator. Meetings will be scheduled at least once a year to evaluate and monitor progress on implementation of the Plan. Jurisdictions participating in the Plan must report annually on its action and goals and any changes that may affect the Plan to the Administrator. The Jersey County ESDA coordinator will also assist with the Plan. (Chapter 1 and 10)

Cost: Staff time

Benefit: A monitoring system helps ensure that the entities and offices responsible for the actions meet their deadlines. Monitoring of the plan would make certain the success of the on-going program as it is critical that the plan remains relevant.

Action Item 3: The Committee on County Service Offices and Public Safety:

This committee will be responsible for making recommendations to the County Board on matters of evaluation of the Natural Hazards Mitigation Plan. The Committee would be an advisory body and meet at least annually with the Hazard Mitigation Planning Committee. Other duties include reviewing mitigation proposals, hearing resident concerns about flood protection and passing the concerns on to the appropriate entity. Scheduled meetings will be published in a newspaper of general circulation. The Special Projects Committee will also oversee the five year update requirement. (Chapter 1 and 10)

Authority: Committee on County Service Offices and Public Safety and the County Board Chairman

Cost: Staff time.

Benefit: Evaluation of the plan is required by the Community Rating System. Continued evaluation of the plan would include changed conditions and progress within the County and municipalities, allowing for revisions to the plan.

9.3.2 Mitigation Plan Action Items

Action Item 4: Jersey County, and local municipalities, should improve and enforce a nationally recognized building code. (Chapters 4, 5)

Jersey County, Elsay, Fieldon, and Grafton have adopted a series of I-codes. Future code revisions should be pursued to strengthen new buildings against hazards. Local communities should consider joining the Building Code Effectiveness Grading Schedule (BCEGS). The program is designed to evaluate code implementation efforts with particular emphasis on hazard mitigation. The county and municipalities should consider funding for safe rooms.

Deadline: Ongoing action item

Cost: Staff time.

Benefit: Building codes cannot be effective unless they are administered and enforced properly. Training the county and municipal staff will provide the best method of understanding the codes and procedures. This will also benefit property owners to understand the importance of the building code standards for new construction. This Action item will improve the hazard protection standards for new construction and will ensure a consistent set of building standards across the County.

Authority: Jersey County Board and City Councils of concerned municipalities. Enforcement of Ordinance to be carried out by the Jersey County Code Administrator and local building inspectors.

Item Action 5: Continue with maintenance of bridge, culvert, and structure monitoring and maintenance. (Chapter 6)

Using Jersey County GIS resources County Highway Dept. design and implement program of monitoring and maintenance of bridges, culverts and other transportation structures.

Deadline: In progress and ongoing.

Cost: In County budget (Motor Fuel Tax Fund); cost sharing with townships.

Benefit: Averting damage to property and structures can be obtained by making sure culverts and streams are not blocked. Even in a small rainstorm a blocked culvert or storm sewer can become deadly.

Authority: Jersey County Board, Jersey County Highway Engineer.

Action Item 6: Jersey County Authorities identify and enforce structure requirements in all future critical facilities construction.

Prepare a checklist for critical facilities to complete to identify if they provide enough protection should they become exposed to a natural hazard. They may be in need of retrofitting. (Chapter 5 Section 5.2)

Deadline: Ongoing

Cost: Staff time and increased construction costs to meet standards (based on projects).

Benefit: Evaluation of current critical facilities provides valuable information for the future development of other facilities as to withstanding future hazard exposures.

Authority: Critical facilities owners, Jersey County Board, local municipalities.

Action Item 7: Monitoring and updating the GIS flood layers and the County and municipalities web sites with information and links for property protection references and measures.

Deadline: Underway (annual mailings). Other communities should design a public campaign for their community needs and utilize their web sites to include floodplain mitigation information and property protection measures.

Cost: Staff time; printing, postage, web site host cost

Benefit: Provide more information to the public and educate the public on steps to take to insure safety from hazards. The State of Illinois provides a web site on disaster preparedness (refer to 5-A in Appendix). (Chapter 7)

Authority: Jersey County, IT personnel, municipalities and web hosts.

Action Item 8: Jersey County, and local municipalities continue to enforce appropriate regulation of subdivisions, dumping, and storm water run-off.

Deadline: Subdivision Ordinance was passed on 9/11/07 by the Jersey County Board and Stormwater Management Ordinance passes in 9/8/2009

Cost: Staff Time

Benefit: Subdivision regulations protect and reduce impact of dumping and storm water run-off. Protecting open space is beneficial in averting damage to other properties. Keeping streams, including drainage ditches, free of debris and dumped material benefits the stream's ability to

convey water, reduced erosion and sedimentation, protects the riparian environment and can reduce flood damage. (Chapter 4 and 6)

Action Item 9: Continuing to engage and expand open space, agricultural lands, and urban forest program. Watershed protections to be developed for Macoupin Creek and Otter Creek watersheds.

Deadline: In progress and ongoing

Cost: The costs vary for each project; individual agencies or organizations will bear the cost for each project.

Benefit: Residents will benefit from the understanding of natural watersheds that will provide protection of property, and improved health and safety during minor and major flood events. Development and agriculture have led to a reduction of stream capacity, and upstream flooding. A restoration of stream capacity may mitigate upstream damage and with regular maintenance it will protect structures and property. With urban forestry programs the loss of power and damage to vehicles and buildings from falling limbs is prevented. Protection of the watersheds is a cost-effective approach to addressing existing and future flood problems. (Chapters 6, 7 and 8) (Chapter 6)

Authority: Jersey County Board, municipalities, IDNR and other public and private agencies.

Action Item 10: Jersey County continues and enhances its effective floodplain management program.

Properties that are exposed to flood damage should be protected through property protection measures that should include acquisition, elevation, or floodproofing. Priority should be given to repetitive loss properties, but all floodplain properties including critical facilities should be included. (Chapter 5 and Chapter 6)

Deadline: Underway and ongoing

Cost: Staff time and technology upgrades. County has been successful of obtaining grants to pay for GIS system, identified by each project.

Benefit:

- better floodplain management
- better monitoring of hazard impact areas (i.e. areas susceptible to fresh flooding)
- removing people from hazard area not only saves lives but saves cost
- exposure to of NFIP will be reduced
- reduction in emergency response as structures are protected or removed from flood prone areas

Authority: Jersey County Board, County Code Administrator, Grafton Floodplain manager.

Action Item 11: Jersey County authorities continue or update a full inventory of critical facilities, which should include schools and other large gathering places (in addition to hospitals and public safety facilities). The inventory should indicate the status of each facility and the retrofitting needs.

The county and municipal agencies along with federal, state and private institutions should ensure that the design or modification of critical facilities should account for all natural hazards and adjacent land uses. Critical facilities in the floodplain should be protected to the 500-year flood event.

Deadline: To be completed over a 4 year period. (Deadline is dictated by availability of funds for staff time and the cooperation of the owners).

Cost: Staff time

Benefit: Keeping critical facilities operational when a disaster strikes is essential to public safety and health. An assessment of the facilities exposure to damage would provide valuable information for future development. This Plan expanded on the list of critical facilities to include churches and assembly halls. (Chapter 5 Sec. 5.3 and Chapter 8 Sec. 7.7.3)

Authority: County, municipal, townships, and federal and state agencies responsible for critical facilities.

Action Item 12: Continue to engage in public information and education program aimed at the retrofitting of residential and business structures, and protection of public and private property, safety measures and understanding of the floodplain.

A countywide natural hazards public information strategy should be developed for the use of the County, municipalities, townships and institutions. The public information strategy should be consistent with the recommendations by the CRS program. (Chapter 4 Sec. 4.9 and Sec. Chapter 7 Sec. 7.8)

Deadline: Ongoing

Cost: Staff time, printing, postage costs

Benefit: There are many benefits to having a well-informed public. The more information that is provided to the public the more aware they are as to what they should do to keep safe and possible death. More self help measures should be implemented if people know about them and are motivated to pursue them. The publications should cover these types of topics:

- Safety and emergency protection measures
- Protection of their property
- Understanding of floods and why the floodplain is regulated
- Importance of wetland protection

Authority: Hazard Mitigation Committee, heads of municipalities and local agencies

9.5 Plan Maintenance

The continuance of the Jersey County Multi-Hazard Mitigation Plan Committee and the Special Projects Committee is necessary for implementation of the Action Plan. As discussed in Chapter 1 the committee was developed for the development of the original 2008 Plan and the 2015 updated Plan. The committee has met twice a year to track implementation of the action items discussed in the Plan. The meetings were recorded to keep track of the suggestions for the development of the Plan. All meetings were open to the public and they were encouraged to participate.

APPENDIX

Health Department Annual Update.....	1-A
Survey Request to Business Owners	2-A
2009 Survey.....	2-B
Study of Survey.....	2-C
January 2010 Bi-Annual Public Meeting.....	3-A
Appointment of Plan Overseer.....	4-A
August 2010 Bi-Annual Public Meeting.....	5-A
Agenda.....	5-B
August 2010 Health Department Update.....	5-C
August ESDA Coordinator Update (E-Mail).....	5-D
August 2010 Publication Notice.....	5-E
August 2010 Jersey County Highway Department.....	5-F
August 2010 Village of Elsah Update.....	5-G
August 2010 City of Grafton Update.....	5-H
August 2010 Town of Fieldon.....	5-I
December 2010 MHMP Update	6-A
Proposed Time Line and Meeting Review.....	6-B
February 2011 Bi-Annual Public Meeting.....	7-A
June 2011 County Board Report.....	8-A
Publication of ICC Code Adoption by Elsah.....	9-A
November 2011 Invitation to First Responders Meeting.....	10-A
First Responder Mailing List.....	10-B
First Responder Meeting Minutes.....	10-C
First Responder Exercise Evaluation.....	10-D
January 2012 Bi-Annual Public Meeting.....	11-A
January 2012 B-Annual Agenda.....	11-B
January 2012 Memo on Status of Action Items.....	11-C
Grafton Statement of Intent.....	12-B
Elsah Statement of Intent.....	13-A
2012 Public Survey.....	14-A
2012 Survey Summary	14-B
September 2012 Public Meeting.....	15-A
September 2012 Prioritizing the Hazards.....	15-B
September Meeting Minutes and Sign In Sheet.....	15-C
February 2013 Scope of Work Update.....	16-A
February 2013 City of Jerseyville Update.....	16-B
May 16, 2013 IDNR Congratulations on State Award from ASFPM.....	17-A
June 2013 Special Projects Meeting on Action Item.....	18-A
July 2013 Special Projects Meeting on Action Item.....	19-A
July 2013 Special Projects Meeting on Action Item.....	20-A
August 2013 Special Projects Meeting -Public.....	21-A
October 2013 Special Projects Meeting-Public.....	22-A
December 2013 Special Projects Meeting-Public.....	23-A

December 2013 Special Projects Committee Meeting-Public.....23-A
June 2014 Special Projects Committee Meeting-Public.....24-A
April 2015 Open Public Meeting.....25-A
June 2015 State of Illinois Gubernatorial Disaster Proclamation.....26-A
City of Grafton Resolution to Adopt the Plan.....27-A
Jersey County Resolution to Adopt the Plan.....28-A
Village of Elsay Resolution to Adopt the Plan.....29-A
City of Jerseyville Resolution to Adopt the Plan.....30-A
Village of Fieldon Resolution to Adopt the Plan.....31-A