2015

Natural Hazards Mitigation Plan

County of Kane

Natural Hazards Mitigation Plan

Contents

Executive Summary ES-1

1. Introduction

1.1. Original Planning Approach 1-3
1.2. 2015 Plan Review and Update Process..... 1-7
1.3. Land Use and Development..... 1-10
1.4. Critical Facilities..... 1-12
1.5. References..... 1-14

2. Hazard Analysis

2.1. Overbank Flooding 2-1
2.2. Historical Flooding 2-10
2.3. Impact of Flooding..... 2-13
2.4. National Flood Insurance Program 2-17
2.5. Economic Impact 2-23
2.6. Tornadoes..... 2-26
2.7. Earthquakes..... 2-33
2.8. Thunderstorms 2-37
2.9. Winter Storms 2-40
2.10. Conclusions..... 2-44
2.11. References..... 2-46

3. Goals

3.1. Setting the stage..... 3-1
3.2. Setting directions 3-5
3.3. Goals and Guidelines..... 3-7

4. Preventive Measures

4.1. Building Codes 4-1
4.2. Manufactured Homes..... 4-5
4.3. Planning and Zoning..... 4-6
4.4. Subdivision Regulations 4-10
4.5. Open Space Preservation 4-11
4.6. Stormwater Management..... 4-13
4.7. Conclusions..... 4-16
4.8. Recommendations..... 4-16

4.9. References 4-18

5. Property Protection

5.1. Keeping the Hazard Away 5-1
5.2. Retrofitting 5-4
5.3. Insurance 5-7
5.4. The Government's Role 5-8
5.5. Repetitive Loss Properties and Analysis 5-11
5.6. Conclusions 5-15
5.7. Recommendations 5-15
5.8. References 5-16

6. Resource Protection

6.1. Wetland Protection 6-1
6.2. Erosion and Sedimentation Control 6-4
6.3. River Restoration 6-5
6.4. Best Management Practices 6-7
6.5. Dumping Regulations 6-9
6.6. Urban Forestry 6-10
6.7. Farmland Protection 6-11
6.8. Conclusions 6-13
6.9. Recommendations 6-14
6.10. References 6-14

7. Emergency Services

7.1. Threat Recognition 7-1
7.2. Warning 7-4
7.3. Response 7-7
7.4. Critical Facilities Protection 7-11
7.5. Post-Disaster Recovery and Mitigation 7-11
7.6. Conclusions 7-13
7.7. Recommendations 7-14
7.8. References 7-15

8. Structural Projects

8.1. Reservoirs and Detention 8-2
8.2. Levees and Floodwalls 8-5
8.3. Channel Improvements 8-7
8.4. Crossings and Roadways 8-9
8.5. Drainage and Storm Sewer Improvements 8-9
8.6. Drainage System Maintenance 8-10
8.7. Conclusions 8-11

8.8. Recommendations 8-12
8.9. References 8-12

9. Public Information

9.1. Outreach Projects 9-1
9.2. Real Estate Disclosure 9-4
9.3. Library and Web Sites 9-5
9.4. Technical Assistance 9-6
9.5. Public Information Program Strategy 9-7
9.6. Conclusions 9-9
9.7. Recommendations 9-9
9.8. References 9-10

10. Action Plan

10.1. Program Action Items 10-5
10.2. Public Information Strategy 10-42
10.3. Administrative Action Items 10-43
10.4. Action Items Completed Since the 2009 Update 10-46
10.5. Action Items Removed at the Jurisdictions request 10-52

11. Plan Update

11.1. 2015 Plan Update 11-1
11.2. Guidelines for the Next plan Update - 2020 11-6

Appendices

Appendix A. County and Municipal Resolutions
Appendix B. Annual Reports
Appendix C. The Community Rating System

Natural Hazards Mitigation Plan

Executive Summary

1. Introduction

Kane County Illinois is subject to natural hazards that threaten life and health and have caused extensive property damage. Floods struck the County in 1993, 1996, 2007, 2008, 20113 blizzards in 1999, 2000, and 2011, and tornadoes in 1990, 1991, 1993, 2003, 2004, 2009, and 2010. To better understand these hazards and their impacts on people and property, and to identify ways to reduce those impacts, the County's Department of Environmental Management and Office of Emergency Management jointly undertook this *Natural Hazards Mitigation Plan.*

July 18, 1996, Blackberry Creek Flood
Source: Chris Dagiantis, Kane County Development Department

Kings Road and Amarillo in Carpentersville, August 23, 2007
Source: Carpentersville Fire Department

Mitigation activities need funding. A mitigation plan is now a requirement for Federal mitigation funds. Section 104 of the Disaster Mitigation Act of 2000 (42 USC 5165) states that after November 1, 2003, local governments applying for *pre*-disaster mitigation funds must have an approved local mitigation plan. After November 1, 2004, a plan will also be needed for *post*-disaster mitigation funds under the Hazard Mitigation Grant Program. These requirements are spelled out in 44 CFR (Code of Federal Regulations) Part 201.

This *Plan* was prepared by the Natural Hazards Mitigation Planning Committee, created by a resolution of the Kane County Board. The Committee's members include representatives of County offices, interested municipalities, and public and private stakeholder organizations.

The *Plan* identifies activities that can be undertaken by both the public and the private sectors to reduce safety hazards, health hazards, and property damage caused by natural hazards. It focuses on the five major natural hazards facing Kane County: floods,

tornadoes, earthquakes, thunderstorms and winter/ice storms. **The full *Natural Hazards Mitigation Plan* can be reviewed or downloaded at www.kcoem.org**

2. Hazard Analysis

The Kane County Natural Hazards Mitigation Planning Committee performed an analysis of the five major natural hazards, severe storms, floods, severe winter storms, earthquake, and tornado to identify those natural hazards that have, in the past, and in all likelihood will continue to impact Kane County with various levels of severity and frequency in the future.

Kane County has received ten (10) federal disaster declarations since 1990; five (5) for flooding events, three (3) as a result of blizzards or severe winter storms, and two (2) resulting from tornadoes.

The 2013 Illinois Hazard Mitigation Plan gave Kane County the following hazard ratings:

County	Population	Severe Storms	Floods	Severe Winter Storms	Drought	Extreme Heat	Earthquake	Tornado
Kane	515,269	Severe	Elevated	High	Guarded	Guarded	Guarded	Elevated

3. Goals

Based on the hazard analysis, the Committee selected tornadoes, floods, thunderstorms and winter storms as the primary concerns. After a review of other plans and goals, the following goals and guidelines were set for the planning process:

Goal 1. Protect the lives and health of the citizens of Kane County from the effects of natural hazards.

Goal 2. Encourage self-help and self-protection measures to mitigate the effects of natural hazards on private property.

Goal 3. Protect critical facilities and public infrastructure with public funds.

Goal 4. Identify specific projects to mitigate damage where cost-effective and affordable.

Goal 5. Reduce the number of repetitively damaged existing structures

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.

4. Preventive Measures

The Committee reviewed a variety of mitigation measures to protect new construction from hazards and see that future development does not increase potential losses. It was found that building code standards and their enforcement were generally good, but could be improved. Land use plans, zoning ordinances and subdivision standards could better address natural hazards. Training would improve enforcement of mobile home installation and the County's stormwater management ordinance.

5. Property Protection

Property protection measures are used to modify buildings or property subject to damage. They include acquisition, barriers, retrofitting, and insurance. These measures are implemented by the property owners, so appropriate government activities include public information, technical assistance and financial support. Special attention is given to designated repetitively flooded areas. Government offices need to protect their own properties, including making sure they are adequately insured for all hazards.

6. Resource Protection

Resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. They include preserving wetlands and farmland, erosion and sedimentation control, preventing dumping in streams and urban forestry. Except for dumping, the County and the municipalities have very effective regulatory programs. Urban forestry programs are encouraged to protect utility lines during wind and ice storms.

7. Emergency Services

It was concluded that warning programs are good, although more could be done for rural areas and for flood warning on smaller streams. Most emergency response plans do not have hazard-specific procedures. As with the other measures, public education can help greatly. Informed people can find out what the threats are on their own and can take appropriate actions to protect themselves and their property.

8. Structural Projects

Most past projects, such as levees and reservoirs have been successful in controlling flooding, but at a cost. They are expensive and, without property precautions, they can be environmentally destructive. They only protect to a specified design level (a levee in Montgomery was overtopped by the July 1996 flood). The Committee identified the greatest need was to set criteria to ensure structural projects do not adversely affect other properties or natural functions. It also recommended a formal and regular program of drainage system maintenance.

9. Public Information

Almost every measure reviewed would benefit from a public information program. The Committee reviewed outreach projects, real estate disclosure, providing background information to libraries and on websites, and providing technical assistance. Top messages to convey were identified and the most effective media to convey those messages are listed.

10. Action Plan

Chapter 10 is the culmination of the Committee's work. It includes 10 programmatic action items, 2 public information action items, and 3 actions to administer and support a County-wide mitigation program to reach the four goals.

The original planning committee was replaced by a standing Mitigation Coordinating Committee to monitor execution of the *Plan* and act as a forum for hazard mitigation ideas and issues.

10.1. Program Action Items

1. **Building Code Improvements:** Adopt the latest International series of codes, the new national standard that is being adopted throughout the country. Additional code revisions should be pursued to strengthen new buildings against damage by high winds, tornadoes and hail.

2. **Improved Code Enforcement:** Develop and conduct training for building department staff on the natural hazards aspects of the International Codes, regulation of mobile home installation, and the new County stormwater ordinance and its flood and natural resource protection provisions.

3. **Review of Plans and Development Regulations:** When they are up for revision, comprehensive plans, land use plans, and zoning and subdivision ordinances should incorporate mitigation provisions.

4. **Retrofitting Incentives:** Establish a program of technical assistance and financial incentives to encourage property protection measures on private property.

5. **Repetitive Loss Projects:** Protect buildings in the five priority repetitive loss areas through acquisition or elevation. Seek funding support.

6. **Drainage Maintenance:** Implement a formal and regular drainage system maintenance program.

7. **Urban Forestry:** Implement an urban forestry program that qualifies the municipality to become a Tree City, USA.

8. **Flood Threat Recognition:** Determine whether it would be worthwhile to add rain and stream gages and develop a central gage monitoring capability for flood and flash flood predictions.

9. **Improved Emergency Response:** Conduct a review of emergency response plans and programs to identify where additional activities are needed to respond to natural hazards.

10. **Flood Control Projects:** Implement flood control projects, including farm drainage and bridges and culverts improvements, where they prove to be the most appropriate approach to reduce flood damage, but make sure they meet certain criteria.

10.2. Public Information Strategy Action Items

11. **Hazard Mitigation Materials:** Prepare background information, articles, and other explanations of hazard mitigation topics and provide them to County, municipal, and private offices for use in presentations, newsletter articles, webpages, brochures and other outreach projects.

12. **Outreach Projects:** Prepare and disseminate outreach projects based on the materials provided under action item 12. Such projects should include articles in newsletters, news releases, directed mailings, handouts, websites, and displays.

10.3. Administrative Action Items

13. ***Plan* Adoption:** Adopt this *Natural Hazards Mitigation Plan* by passing a resolution. The County's resolution creates the Mitigation Coordinating Committee. The municipal resolutions adopt each action item that is pertinent to the community and assign a person responsible for it.

14. **Mitigation Coordinating Committee:** Convert the Natural Hazards Mitigation Planning Committee to a permanent advisory body. It would act as a forum for hazard mitigation issues, monitor implementation of this *Plan*, and report on progress and recommended changes to the County Board and each municipality.

15. **Community Rating System:** Following a workshop, each municipality and the County would review floodplain management activities currently undertaken and

those recommended by this *Plan* and decide whether to apply for a Community Rating System flood insurance premium rate discount for its residents.

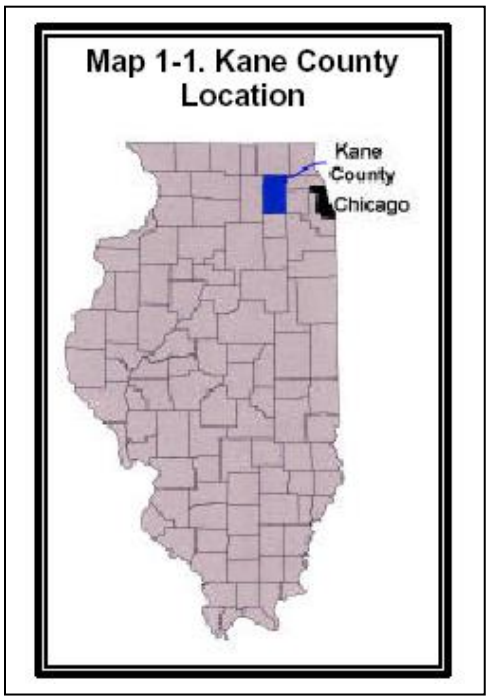
10.4. Action Items Completed Since the 2009 Update: list of all the action items jurisdictions have completed since the last update.

10.5 Action Items Removed at the Jurisdictions Request: list all action items that have been removed since the last update at the jurisdictions request.

Chapter 1. Introduction

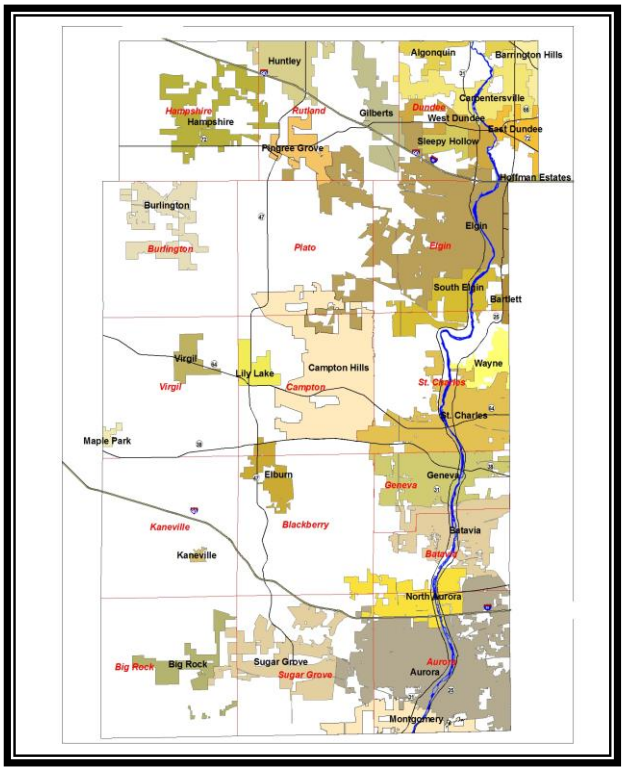
Introduction:

Kane County is located in northeastern Illinois, 20 miles west of the City of Chicago. The County measures 30 miles north to south and 18 miles east to west and covers 522 square miles. Kane County's topography slopes from rolling hills in the northwestern part of the County to the Fox River Valley which runs north to south through the eastern quarter of the County.



Kane County's topography was formed 10,000 - 12,000 years ago by the last glacial movement in the region. When the ice sheet receded it left behind rolling morainal hills, level outwash plains, the drainage basins of the Kishwaukee and Fox Rivers, and other features associated with glacial recession.

The drainage basin of the Fox River influences the varied landscape in the eastern portion of the county. The county's central portion has a gentle rolling terrain with hilly ridges. The topography of the western and southern portion of the county is generally flat.



In the eastern portion of the county, the Fox River flows southerly through the entire length of the county. The land bordering the Fox River is steepest in the north where high bluffs overhang its banks. As the river continues south the land gradually descends to an elevation of 630 feet in the Village of Montgomery, the lowest elevation in the county.

When this plan was first published in 2003 the United States Census Bureau reported Kane County's population to be 453,855. Since that time Kane County's population has grown by approximately 16.18% with an estimated population in 2014 of 527,306.

Political jurisdictions include 16

townships and 30 municipalities. The majority of the incorporated municipalities are located where development is concentrated along the Fox River in the eastern third of the County. Approximately 25% of the County's land area and 81% of the population is contained within the 30 municipalities.

The problem: Kane County Illinois, is subject to natural hazards that threaten life and health and have caused extensive property damage.

> *"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

Moderate flooding occurred within Kane County in 1996, 1997, and 1999 with flooding resulting in a Federal Disaster Declaration occurring in 1993, 1996, 2007, 2008, and again in 2013; blizzards resulting in a Federal Disaster Declaration occurred in 1999, 2000, and 2011. Tornadoes identified as either EF0 to EF1 occurred in 1991, 2003, 2004, 2009, and again in 2010 while tornadoes resulting in a Federal Disaster Declaration occurred in 1990 and 1993.

To better understand these hazards and their impacts on property and the population, and to identify ways to reduce those impacts, the County's Department of Environmental Management and Office of Emergency Management jointly undertook this *Natural Hazards Mitigation Plan.*

"Hazard mitigation" does not mean that all hazards are prevented and it does not suggest complete elimination of the damage or disruption caused by such incidents. Natural forces are powerful and most natural hazards are well beyond our ability to control. Mitigation does not mean quick fixes. It is a long-term approach to reduce hazard vulnerability. Mitigation is a long-term approach to making a community less vulnerable to a natural hazard while reducing the consequence issues associated with that hazard.

Why we plan? Every community faces different hazards and every community has different resources and interests to bring to bear on its problems. Because there are many ways to deal with natural hazards and many agencies that can help, there is no one solution or cookbook for managing or mitigating their effects.

Planning is one of the best ways to correct these shortcomings and produce a program of activities that will best mitigate the impact of hazards and meet other needs. A well-prepared plan will ensure that all possible activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with each other and with other goals and activities, preventing conflicts and reducing the costs of implementing each individual activity.

Mitigation activities need funding. A mitigation plan is a requirement for Federal mitigation funds. Section 104 of the Disaster Mitigation Act of 2000 (42 USC 5165) states that as of November 1, 2003, local governments applying for *pre*-disaster mitigation funds must have an approved local mitigation plan. Similarly, as of November 1, 2004, a plan is also needed for *post*-disaster mitigation funds under the Hazard

Mitigation Grant Program. These requirements are spelled out in 44 CFR (Code of Federal Regulations) Part 201.

Therefore, a mitigation plan will both guide the best use of mitigation funding and meet the prerequisite for obtaining such funds from the Federal Emergency Management Agency. FEMA also recognizes local planning efforts through its Community Rating System, a program that reduces flood insurance premiums in participating communities.

This *Plan:* This is a multi-year *Plan* identifying activities that can be undertaken by both the public and the private sectors to reduce safety hazards, health hazards, and property damage caused by natural hazards. The *Plan* focuses on the five major natural hazards facing Kane County: floods, tornadoes, earthquakes, thunderstorms and winter/ice storms. It fulfills the Federal mitigation planning requirements, qualifies for Community Rating System credit and provides the County and its municipalities with a blueprint for reducing the impacts of these natural hazards on people and property.

The information contained within this plan could support other County and municipal planning initiatives. These plans could include the County's Emergency Operations Plan, Land Resource Management Plan, and municipal emergency response or operating plans. The goals, guidelines, hazard analysis, action items and information on natural disasters discussed in this plan could be incorporated into these county or municipal plans, when appropriate.

1.1. Original Planning Approach

This *Plan* is the product of a rational thought process that reviews alternatives and selects and designs those that will work best for the situation. This process is an attempt to avoid the need to make quick decisions based on inadequate information. It provides carefully considered directions to County government and to the participating municipalities by studying the overall damage potential and ensuring that public funds are well spent.

Planning Committee: This *Natural Hazards Mitigation Plan* was developed under the guidance of a Natural Hazards Mitigation Planning Committee, created by a resolution of the Kane County Board on November 12, 2002. Municipalities within Kane County were originally invited to participate in the committee and interested municipalities passed a resolution stating their commitment to the plan development. The Committee's members included representatives of County offices, interested municipalities, and public and private stakeholder organizations.

Planning Committee meeting

The member jurisdictions/organizations who originally participated in the creation of this plan are shown in the table on the next page.

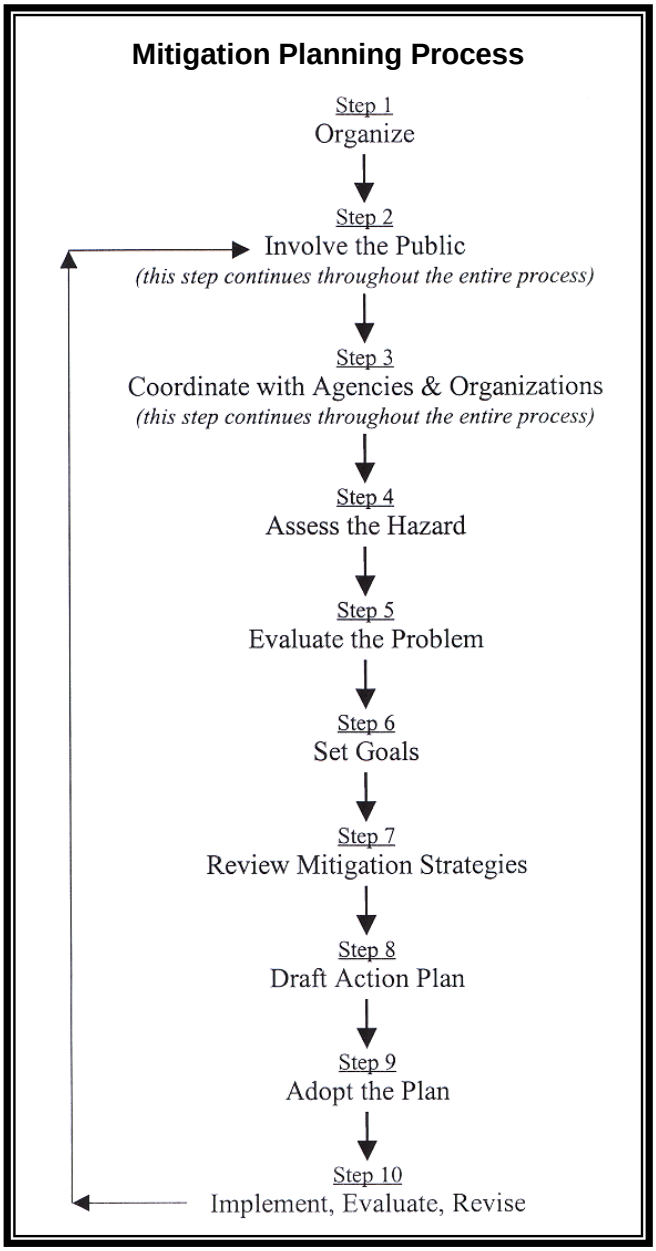
Original Natural Hazards Mitigation Planning Committee	
Agency/Organization	**Participant**
Committee Chair	Laura Ross
County Departments	
Environmental Management	Karen Kosky, Steve Garrison
Emergency Management	Alan Choutka
Development	
Water Resources	Paul Schuch, Souts Thavong
Transportation	Bob Skidmore
Health	Fred Carlson
GIS Technologies	Jason Verachtert
Municipalities *	
Algonquin	Craig Arps
Aurora	Mark Flaherty
Batavia	Don Gatske
Big Rock	Doug Porch, Sandy Bell
Burlington	Debra Walsh, Mary Ann Wilkison
Carpentersville	Jon Mensching
East Dundee	David Kitzmiller
Elburn	David Morrison
Elgin	Chad Butzow, John Loete
Geneva	Betty Collins
Gilberts	Michael Joswick
Hampshire	Ed Szydlowski
Huntley	John Ciombor, Keith Schaedel, Keith Mallegni
Lily Lake	Heather Gravlin
Maple Park	Claudia Tremaine
Montgomery	Mike Pubentz
North Aurora	Dan Nelson, Mike Glock
Sleepy Hollow	Stephen Pickett
South Elgin	Richard Babica
St. Charles	Greg Chismark, Craig Hanson
Sugar Grove	Brad Sauer
Virgil	Jean Hardt
Wayne	Carol Schoengart
West Dundee	Frank Buhrmann
Stakeholders	
Kane County Townships	Ron Johnson
American Red Cross of Greater Chicago	Mary Anne Hoeller
American Red Cross, Fox River Chapter	Ken Robertson
The Conservation Foundation	Ksenia Rudensiuk

* The Villages of Barrington Hills, Bartlett and Hoffman Estates have only small portions of their corporate limits in Kane County and opted to not participate. Other than Pingree Grove, all other Kane County municipalities passed the participation resolution.

The Committee first developed the plan from December 2002 through September 2003. The plan development included the hazards and their effects on people and property, consideration of a variety of ways to reduce and prevent damage, and recommendations for the most appropriate and feasible measures for implementation.

Technical support for the development and implementation of the Natural Hazards Mitigation plan was provided by the Kane County Office of Emergency Management, the Environmental and Water Resources Division and the Department of GIS Technologies. French & Associates, Ltd., a hazard mitigation consulting firm, provided technical support for the development of the original 2003 plan.

Planning process: The Natural Hazards Mitigation Planning Committee followed a standard 10-step process, based on guidance and requirements of the Federal Emergency Management Agency (FEMA). This process is summarized in the flow chart to the right.



Public Involvement: Step 2 of the planning process was to obtain input from the public, particularly residents and businesses that have been affected by natural hazards. The public was invited to participate through several concurrent means, including:

- Contact with Committee members and their organizations
- A standing invitation to attend Committee meetings
- Press releases.
- A special website,
- A public meeting was held on September 4, 2003, to receive comments on the draft plan

Coordination: Existing plans and programs were reviewed during the planning process. It should be underscored that this plan does not replace other planning efforts, such as the County's comprehensive plan, stormwater management planning and the Local Emergency Planning Committee (which focuses on hazardous materials). This plan

complements those efforts and, as noted in later chapters, builds on their recommendations.

During the planning process, contacts were made with regional, state, and federal agencies and organizations. On November 26, 2002, a letter was sent to a variety of stakeholder organizations as well as the following agencies to determine how their programs affect or could support the County's mitigation efforts.

– US State Geological Survey
– U.S. Fish & Wildlife Service
– U.S. Army Corps of Engineers
– National Weather Service
– Federal Emergency Management Agency
– Illinois Emergency Management Agency
– Northeastern Illinois Planning Commission
– Illinois Department of Natural Resources
– Illinois State Water Survey

In most cases, these agencies did not provide any information or comments in response to this effort. Direct discussions with several of them did prove quite helpful.
At the end of the planning process, each of these agencies was sent a notice requesting their review of the draft *Plan.* They were advised that the draft could be reviewed on the County's website and they were asked to provide any comments in time for the September 4, 2003, public meeting. This notice also went to all municipalities in the County (including the four that did not sign up to participate), all 16 townships, and the adjoining counties of McHenry, Lake, Cook, DuPage, Will, Kendall, and DeKalb.

Hazard assessment and problem evaluation: The Committee tackled steps 4 and 5 of the planning process concurrently during the months of January and February, 2003. The hazards reviewed were based on the Office of Emergency Management's 2001 *Kane County Hazard Analysis.* It scored natural and man-made hazards for their likelihood of occurring, their potential impact, and the vulnerability of the County to them. It found five natural hazards had an overall score of "high" or "medium."

Major Natural Hazards

	Time of Occurrence				Last Major Event	
Natural Hazard	**Fall**	**Winter**	**Spring**	**Summer**	**Year**	**Location**
Flood	X	X	X	X	2013	Center County
Tornado	X		X	X	1993	North County
Earthquake	X	X	X	X	1912, 2010	County-wide
Thunderstorm & Hail	X		X	X	2007	Center / North County
Winter & Ice Storm		X			2011	County-wide

The hazard data and the Committee's findings and conclusions are covered in Chapter 2 of this *Plan*. Chapter 2 assesses each hazard – what causes it and the likelihood of occurrence – and the impact of the hazard on human development, i.e., how vulnerable Kane County is to damage.

Goals: The Committee conducted a goal setting exercise at its March meeting. The goals were then drafted and revised at subsequent meetings. The results are discussed in Chapter 3 of this *Plan*.

Mitigation Strategies: The Mitigation Planning Committee considered everything that could affect the impact of the hazards and reviewed a wide range of alternatives. The Committee's work and the subsequent plan document explored six general strategies for reaching the goals. These strategies are the subject of Chapters 4 – 9 in this *Plan*.

- Preventive – e.g., zoning, building codes, and other development regulations
- Property protection – e.g., relocation out of harm's way, retrofitting buildings, insurance
- Resource protection – e.g., wetlands protection, urban forestry programs
- Emergency services – e.g., warning, sandbagging, evacuation
- Structural projects – e.g., levees, reservoirs, channel improvements
- Public information – e.g., outreach projects, technical assistance to property owners

Action plan: After the many alternatives were reviewed, the Committee drafted an "action plan" that specifies recommended projects, who is responsible for implementing them, and when they are to be done. The action plan is included in Chapter 10 of this *Natural Hazards Mitigation Plan*.

1.2. 2015 Plan Review and Update Process

Capitalizing on the success of the original planning process, the 2015 plan review team incorporated a similar strategy employing a whole-community approach. Representatives from County government, the participating municipalities, and public/private sector stakeholder organizations reviewed the current plan document and suggested areas that required revisions.

Updated statistical information was obtained utilizing the "Quality of Kane" 2040 Plan, the hazard analysis from the 2014 Kane County Emergency Operations Plan, the Kane County 2030 Land Resource Management Plan, along with current information obtained from the State of Illinois and FEMA.

This information was then reviewed and the goals and objectives were found to still be consistent with community hazard mitigation priorities.

The County and each participating municipality then supplied status reports of existing mitigation projects in their jurisdictions, which are included in this report, along with providing any new projects that could be undertaken within the next several years.

Once this plan is adopted the County and each participating municipality will have the opportunity to reach out to neighboring communities, along with our regional partners, to identify commonalities with their mitigation objectives. This will allow for an opportunity to form partnerships to enhance local and regional hazard mitigation projects.

The table below lists the participating agencies/organizations of the 2015 Natural Hazard Mitigation Plan review team.

Natural Hazards Mitigation Planning Committee as of May 2015 for Update	
Agency / Organization	**Participant**
County Departments	
Emergency Management	Don Bryant
Emergency Management	Sean Madison
Environmental & Water Resources	Ken Anderson
GIS Technologies	Jason Verachtert
Transportation	Bill Edwards
Development & Community Resources	Mark VanKerkhoff
Municipalities	
Algonquin	Craig Arps / Michele Zimmerman
Aurora	Joseph Jones
Batavia	Gary Holm
Big Rock	Tim May
Burlington	Jeaneen A. Bennett
Campton Hills	Laura Andersen
Carpentersville	Jon Mensching
East Dundee	Tim Wilson
Elburn	Steve Smith
Elgin	Tim Maroder
Geneva	Dustin Schultze
Gilberts	Louis Rossi
Hampshire	Mike Reid
Lily Lake	Jesse Heffernan
Maple Park	Liz Peerboom
Montgomery	Mike Pubentz
North Aurora	Mike Glock
Pingree Grove	Carol Lussky
Sleepy Hollow	Stephen Pickett
South Elgin	Paul Kruse
St. Charles	Paul Bumba
Sugar Grove	Pat Rollins
Virgil	Katie Kralka
Wayne	Daniel Callahan
West Dundee	Randy Freise
Stakeholders	
American Red Cross, Fox River Chapter	Emily Krettler

1.3. Land Use and Development

Hazard mitigation is primarily concerned with development: where are the people, the buildings that they live and work in, and the infrastructure that serves them? The table to the right shows the breakdown of developed and undeveloped/agricultural areas for the whole county.

Kane County Land Uses	
Land Use	**Percent**
Agricultural	83%
Mining/quarrying	> 1%
Open space	3%
Vacant	2%
Total Undeveloped	88%
Residential	8%
Commercial/industrial	> 1%
Institutional/government	1%
Transportation/utilities	2%
Total Developed	12%

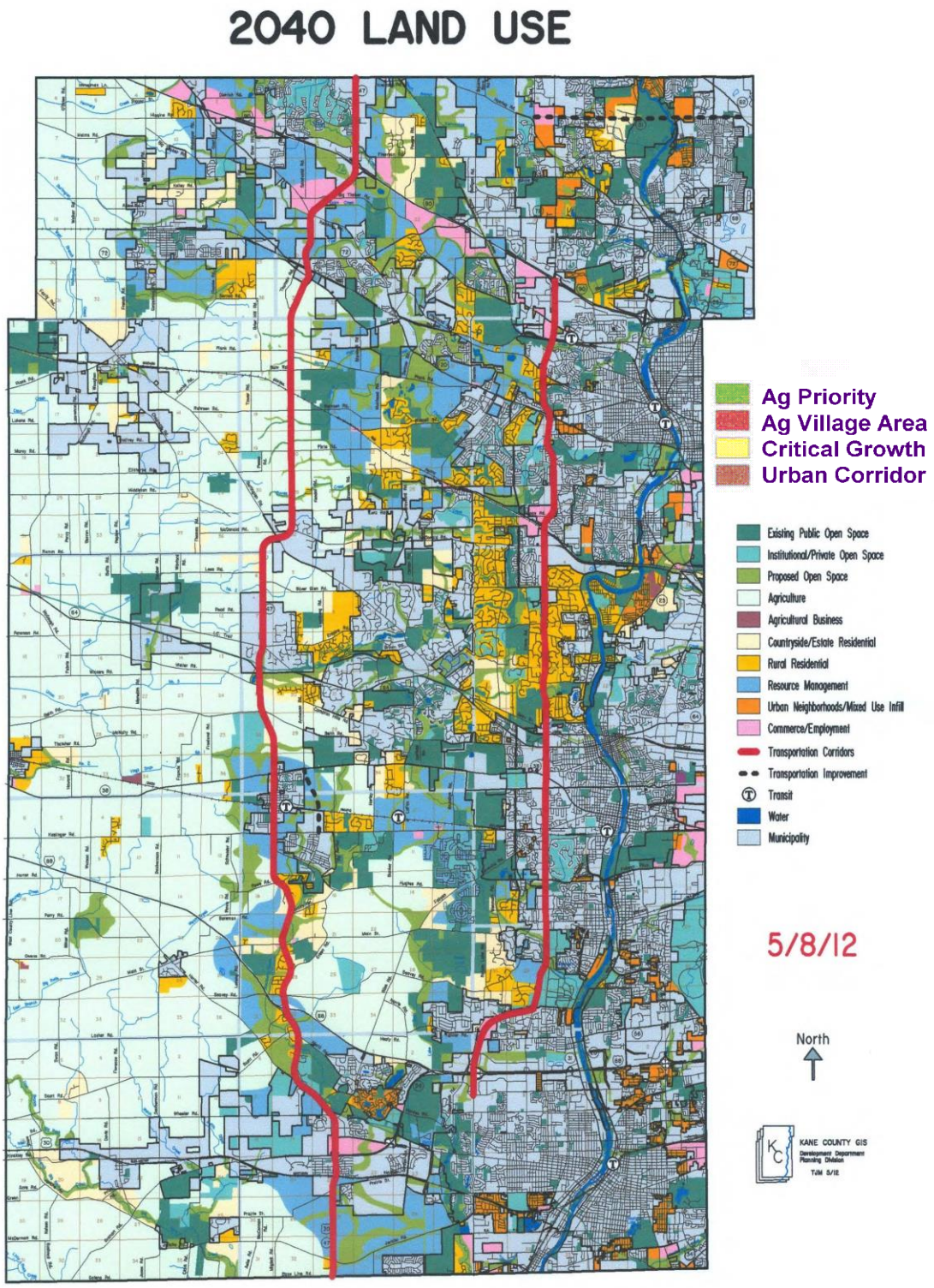
Source: 2030 Land Resource Management Plan

The "Undeveloped" land use category includes agricultural land, which is not really "undeveloped." Agricultural land includes things such as farmhouses, nurseries, agricultural businesses, and improved farmland. However, there is not a concentration of buildings and infrastructure exposed to damage by natural hazards, so it is treated as undeveloped for this *Plan's* purposes. Ten western and central townships account for 87% of the County's agricultural land. The undeveloped land use category also includes mining, quarrying, open space and vacant land, all of which suffer little during a flood, tornado or other disaster.

The "Developed" land use category includes residential and commercial development, such as homes, businesses, and factories. Almost all (99%) of the residential development in Kane County is single-family homes. The institutional/government category includes public facilities, schools, churches, hospitals, etc. More that 2/3 of the institutional/ government area is located in Geneva and Batavia Townships and includes Fermilab, Mooseheart and Marmion Academy. Transportation and utilities are ~~the~~ major components of the County's infrastructure. This includes roads and highways, power sources and distribution, and water and sewage treatment and distribution.

Almost eighty-eight percent (88%) of the County's land area is considered undeveloped. However, since 1990 Kane County saw a 61.48% increase in population, and since the County population continues to grow, it is certain that development will continue to extend westward. Accordingly, this hazard mitigation plan addresses activities that can protect future development from natural hazards. This is discussed in Chapter 6.

The *2030 Land Resource Management Plan* addresses managing this growth and preventing suburban sprawl by designating land use strategy areas. These are shown, on the next page.



The Urban Corridor, the municipalities along the Fox River from Algonquin on the north to Montgomery on the south, is experiencing what can best be described as a "renaissance", a new urban focus for a new century. The historic development patterns along the Fox River continue expanding along with the growing population of the cities and villages. Today these municipalities are home for about 80% of the county's population. (*2030 Land Resource Management Plan*)

West of the Urban Corridor is the Critical Growth Area, where most of the major new developments are occurring.

The theme of "refinement" is applied to the Critical Growth Area both in terms of refining the geographic area and the diversity and extent of development activities. The geography of the Critical Growth Area has been enlarged because of several factors: westward expansion of the Urban Corridor; approval of Facility Planning Area boundaries by IEPA; recognition of the growth of Hampshire, Sugar Grove and Elburn; unincorporated land use changes approved by the county; major open space acquisitions and enhancement of the greenway system; and the 2030 population, household and employment projections. The Critical Growth Area faces the greatest challenges to sensible, managed growth. It is where we have the greatest opportunity to incorporate Smart Growth principles and "Priority Places" into community development decisions. (*2030 Land Resource Management Plan*)

The western half of Kane County is considered the Agricultural/Village Area. The County's objective in that area is to preserve the farmland and small town atmosphere. Development will be directed to the other two strategy areas, through zoning, farmland preservation, and control of expansion of public facilities, such as sewers and wastewater treatment.

When the Planning Commission reviewed the Conceptual Land Use Strategy, they concluded that no theme was more appropriate for the Agricultural/Rural Village Area than "recommitment". As our population grows and the Urban Corridor and Critical Growth Areas expand, we need to re-new efforts to prevent premature conversion of farmland to other uses and recommit to preserving agricultural areas and open space. (*2030 Land Resource Management Plan*)

1.4. Critical Facilities

When dealing with natural disasters, some development is more important than others, and these are considered to be "critical facilities." Critical facilities are buildings and infrastructure whose exposure or damage can affect the well being of a larger group. For example, the impact of a flood or tornado on a hospital is greater than on a home or most businesses.

Generally, critical facilities fall into two categories:

- Buildings or locations vital to public safety and the disaster response and recovery effort, such as police and fire stations and telephone exchanges, and
- Buildings or locations that, if damaged, would create secondary disasters. Examples of such buildings or locations are hazardous materials facilities and nursing homes.

Critical facilities are not strictly defined by any agency. For this mitigation planning effort, seven categories of critical facilities were used:

1. Hazardous materials sites. These have been broken into two categories based on USEPA classifications: those with "extremely hazardous substances" (EHS) and those without. These definitions are in 40 CFR Part 355, Appendices A and B, which also defines their "threshold planning quantities," i.e., how much of the substance qualifies to being a concern. EHS includes well over 100 substances, from acetone to zinc phosphide
2. Health facilities: hospitals and nursing homes.
3. Emergency response facilities: police and fire stations, public works sites, etc.
4. Utilities: water and wastewater treatment plants, electrical substations, etc.
5. Schools.
6. Places of assembly, such as theaters and casinos.
7. Bridges that would be inundated during the base or 100-year flood. These are discussed more in Chapter 2, section 2.2.

The distribution of these facilities by municipality is shown on the table on the next page. Most of these are plotted on Maps on the following pages.

Critical facility (fire station) affected by a flood

Chapter 2 discusses critical facilities that are impacted by each natural hazard. For some hazards, such as floods, affected critical facilities can be readily identified since we can predict where a flood is likely to be. For other hazards, such as tornados, the impact on critical facilities can only be broadly identified. But for all hazards and for all critical facilities, hazard mitigation measures can be identified and this is done throughout Chapters 4 through 9.

1.5. References

1) *2030 Land Resource Management Plan*, Kane County Development Department

2) *"Quality of Kane" – Kane County 2040 Plan*, Kane County Development Department

3) *2014 Emergency Operations Plan – Hazard Analysis*, Kane County Office of Emergency Management

4) *Computer-Aided Management of Emergency Operations (CAMEO),* 2014 hazardous materials data.

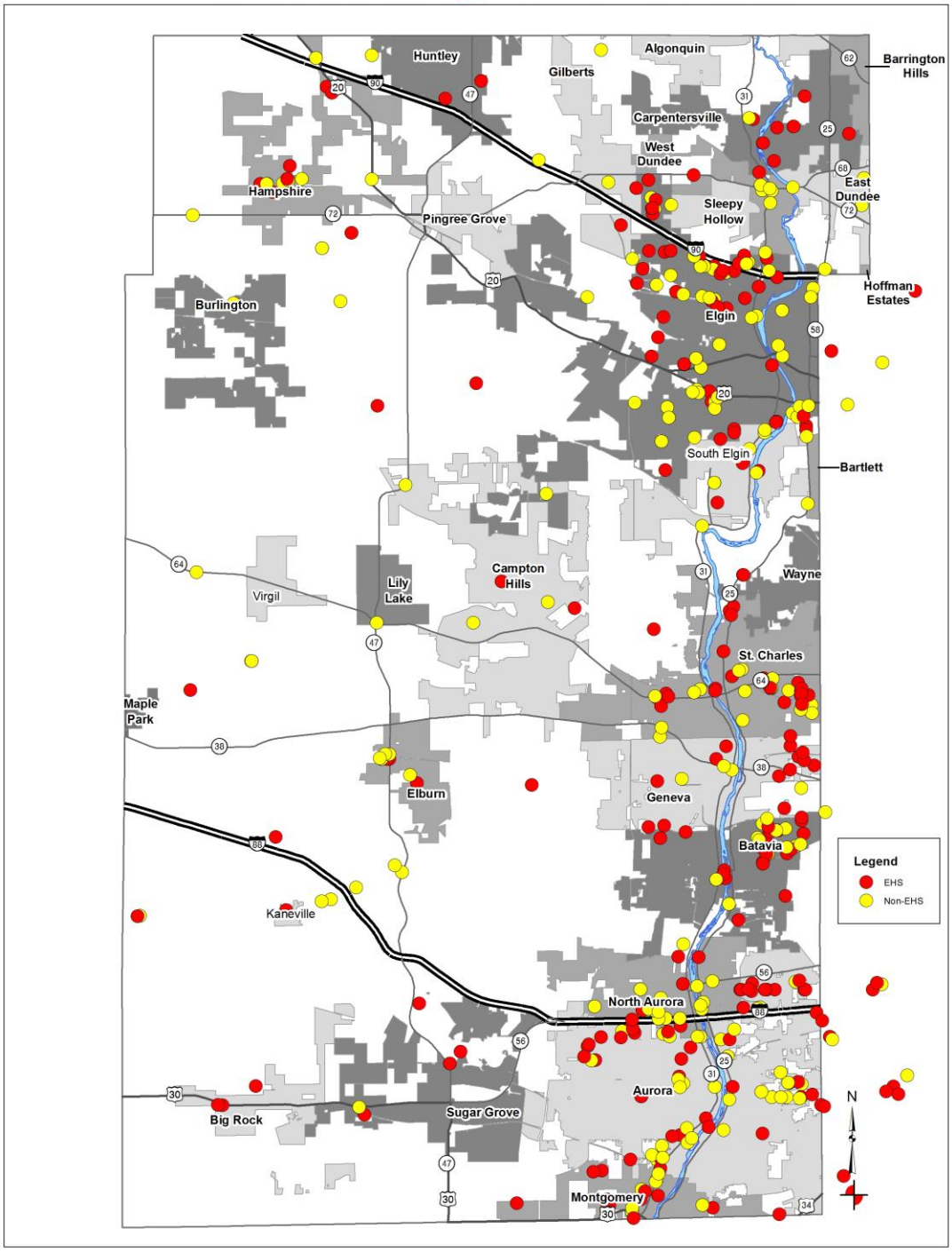
5) Survey of County offices and municipalities, Spring 2013

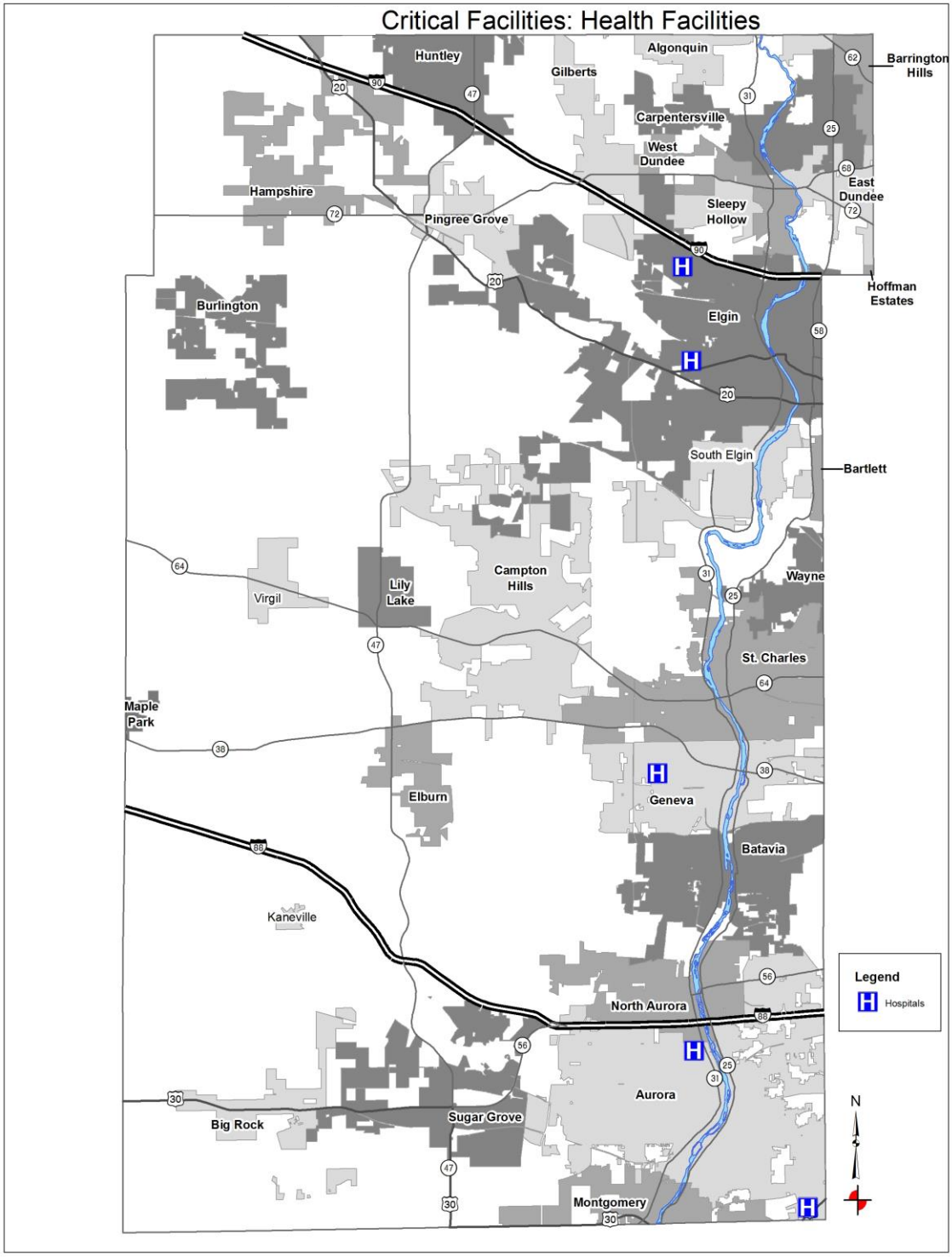
6) Critical facilities data provided by participating municipalities and County offices.

7) *State and Local Plan Criteria under the Disaster Mitigation Act of 2000*

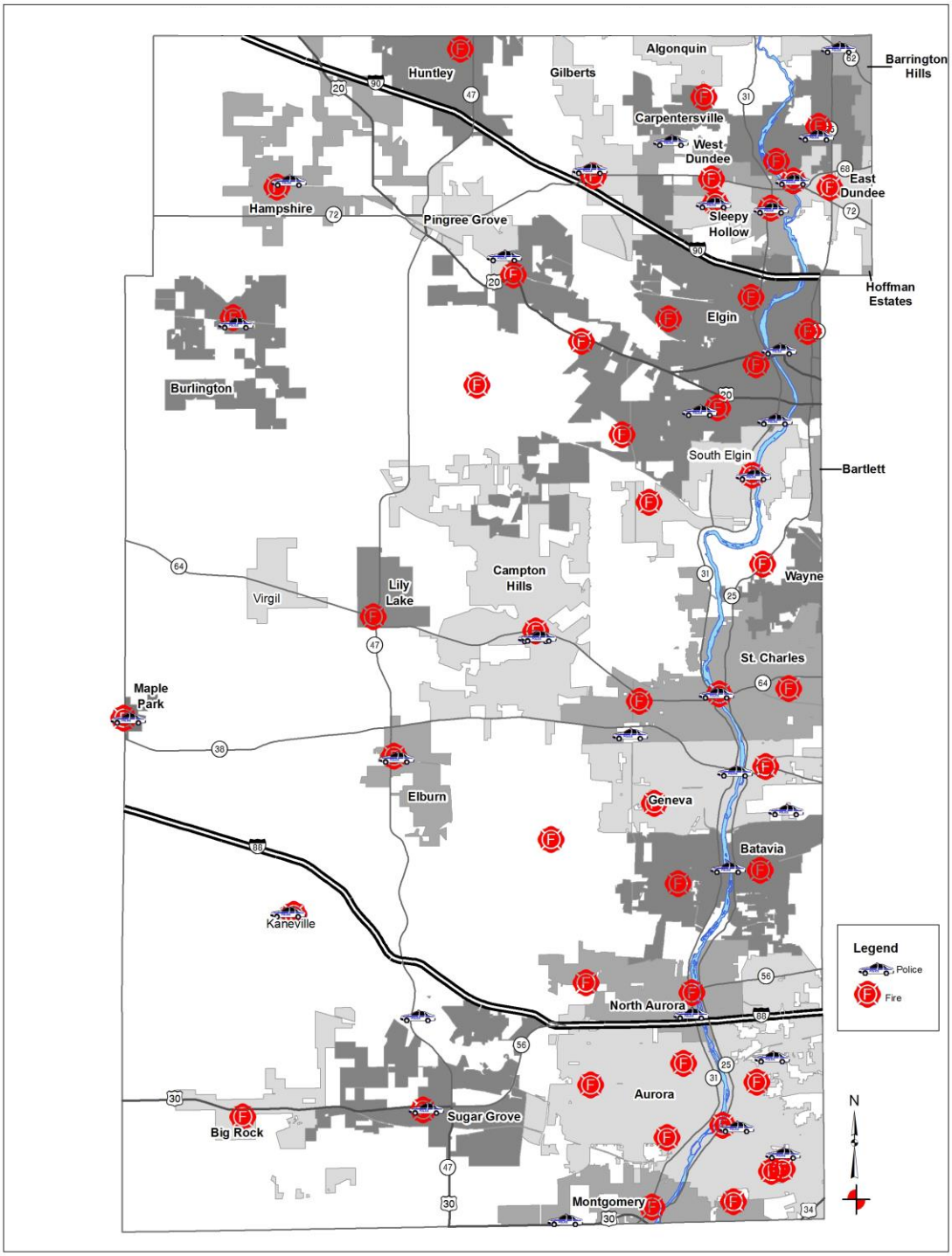
8) *Getting Started – Building Support for Mitigation Planning*, FEMA-386-1

Kane County Hazardous Materials Sites

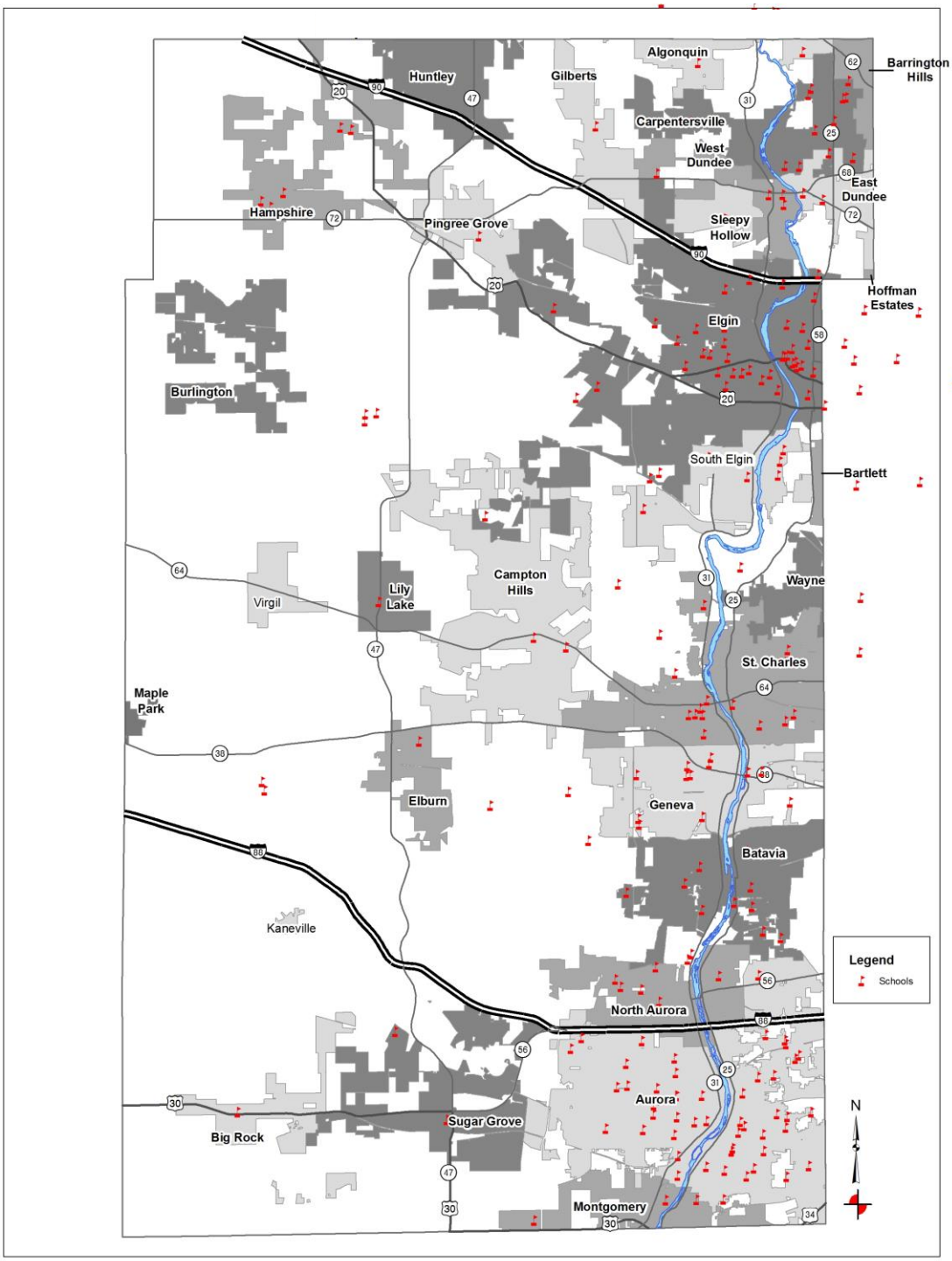



Critical Facilities: Health Facilities
Huntley
Algonquin
Barrington Hills
Gilberts
Carpentersville
West Dundee
East Dundee
Hampshire
Sleepy Hollow
Pingree Grove
Hoffman Estates
Burlington
Elgin
South Elgin
Bartlett
Campton Hills
Lily Lake
Virgil
Wayne
St. Charles
Maple Park
Elburn
Geneva
Batavia
Kaneville
North Aurora
Aurora
Big Rock
Sugar Grove
Montgomery
Legend
Hospitals
N

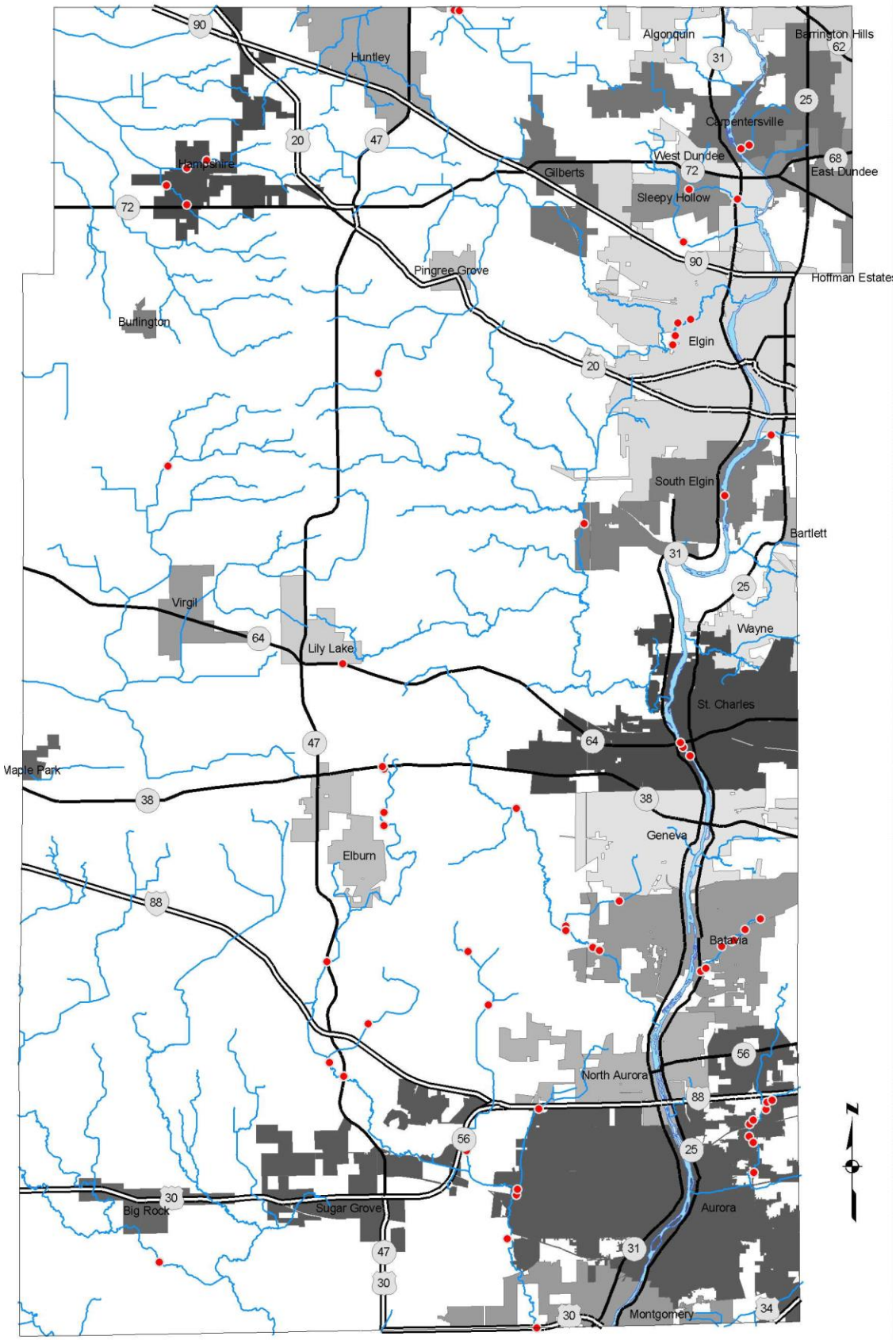
Critical Facilities: Emergency Response Facilities



Critical Facilities: Schools



Critical Facilities: Bridges Affected by the Base Flood



Chapter 2. Hazard Analysis

The Kane County Natural Hazards Mitigation Planning Committee performed an analysis of the five major natural hazards, severe storms, floods, severe winter storms, earthquake, and tornado to identify those natural hazards that have, in the past, and in all likelihood will continue to impact Kane County with various levels of severity and frequency in the future.

Kane County has received ten (10) federal disaster declarations since 1990; five (5) for flooding events, three (3) as a result of blizzards or severe winter storms, and two (2) resulting from tornadoes.

The 2013 Illinois Hazard Mitigation Plan gave Kane County the following hazard ratings:

County	Population	Severe Storms	Floods	Severe Winter Storms	Drought	Extreme Heat	Earthquake	Tornado
Kane	515,269	Severe	Elevated	High	Guarded	Guarded	Guarded	Elevated

2.1. Overbank Flooding

A simple definition for flooding is too much water in the wrong place. Since water circulates from clouds to the soil to streams to rivers to the oceans and returns to the clouds, a scientific definition of a flood is an imbalance in the hydrological system with more water flowing through the system than the system can draw off,

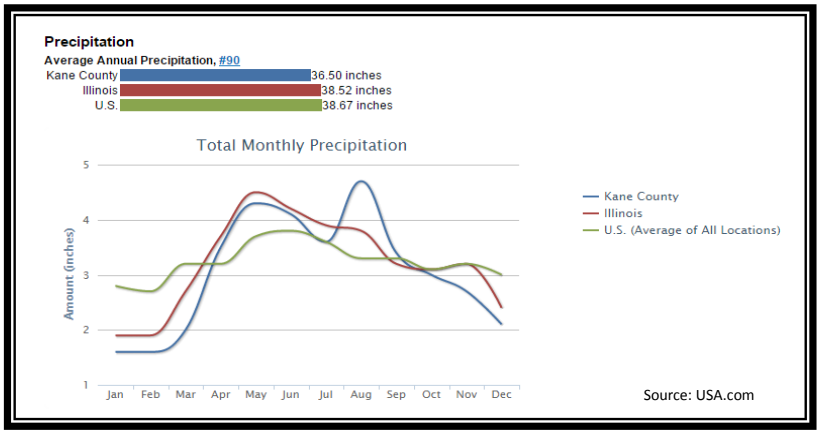
The most common and most damaging floods occur along rivers and streams. This is called overbank flooding and can be caused by one or more of three factors:

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

All three of these factors are reviewed in this section, but most floods are caused by the first: too much precipitation in the watershed.

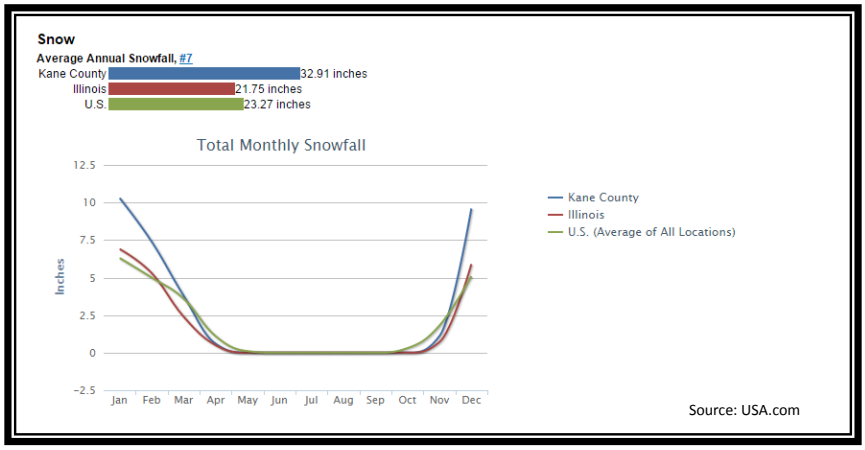
Flooding can also occur in streets when rainwater can't flow into a storm sewer. Basements can flood when rainwater can't flow away from the house or when the sewers back up. These problems are usually caused by heavy local rains and are often not related to overbank flooding or floodplain locations.

Precipitation: On average Kane County receives approximately 69.41 inches of precipitation annually in the form of rain or snow.



The annual average precipitation rate for Kane County is 36.5 inches with an annual average snowfall of 32.91 inches (generally, 7 inches of snow has the equivalent water content of one inch of rain). When compared to the average annual rain/snow amounts for the State of Illinois and the United States, Kane County receives 15.16% and 12.06% more rain/snow precipitation respectively.

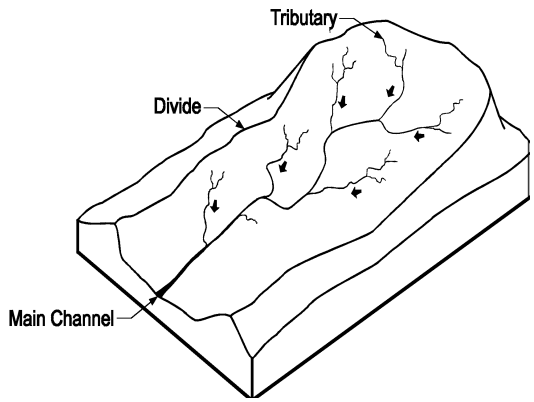
However these rain/snow averages are not spread out evenly over the year. The amount of rain/snow that falls varies from storm to storm and varies over any given area.



Watersheds: A "watershed" is an area of land that drains into a lake, stream or other body of water. The runoff from rain or snowmelt is collected by smaller channels (tributaries), which send the water to larger channels and eventually to the lowest body of water in the watershed (main channel). When a channel receives too much water, the excess flows over its banks and into the adjacent area – causing a flood.

Kane County has 12 major watersheds, which are shown in Map 2-1. Data on these watersheds are displayed in the table on page 2-5.

Many of the major watersheds in Kane County extend into neighboring counties. In the case of the Fox River, the watershed begins in Wisconsin. A number of the watersheds, such as Tyler Creek and Mill Creek, flow into the Fox River. Other watersheds, such as Coon Creek or Union Ditch, flow to the west and eventually make their way to the Kishwaukee River. Within these 12 major watersheds are smaller sub-watersheds that drain into the tributaries. All of these streams have adjacent floodplains that are inundated during a flood.



A watershed includes all land that drains to a common channel

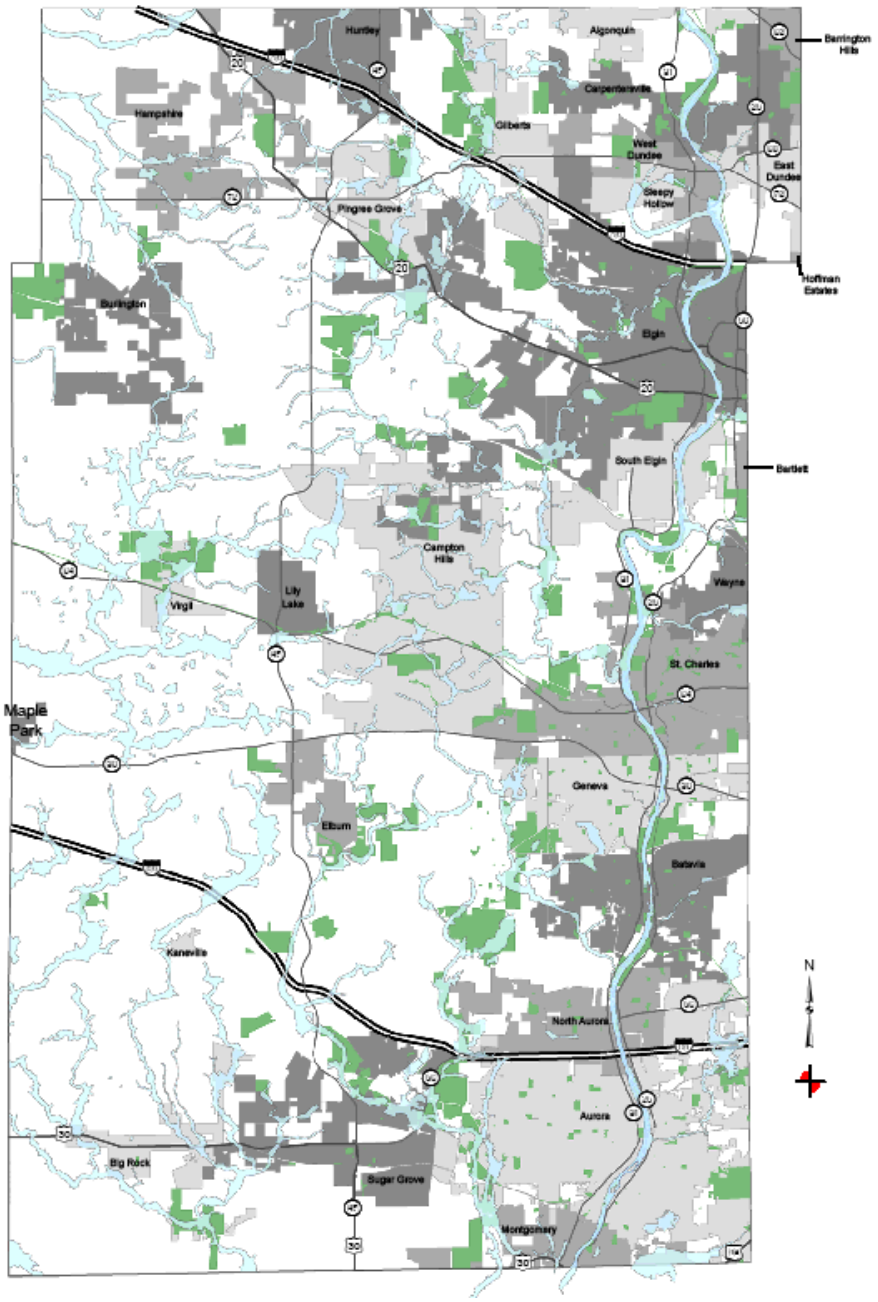
All but three of the watersheds listed above eventually flow into the Fox River. Coon and Eakin Creeks and Union Ditch flow generally west out of the County to the Kishwaukee River. All other watersheds are "subwatersheds" of the Fox River watershed. This means that almost 75% (388 square miles) of the county is part of the Fox River watershed. The North Fox River and South Fox River watersheds listed above include the land that run off directly into the main stem of the Fox River or into its immediate tributary streams.

Flood Depths Above Channel Bottom		
Stream	10-Year	100-Year
Fox at Montgomery	10	12
Fox at St. Charles	9	11.5
Fox at Carpentersville	9	12
Blackberry Creek	7-9	8-9
Ferson Creek	5	6
Otter Creek	5	6
Tyler Creek	6	8
Jelkes Creek	3.5	4.5
Welch Creek	6	9
Hampshire Creek	4	5

Map 2-1. Kane County Watersheds and Floodplains

(Note: this map does NOT show the watershed divides)

Source: Kane County GIS



Watershed and Floodplain Data				
Watershed Name	**Area (sq.mi.)**	**Percent Developed**	**Area of Floodplain (sq. mi)**	**Percent of Watershed on Floodplain**
Big Rock-Welch Creek	86.2	6.3	9.9	11.5
Blackberry Creek	61.6	17.1	5.5	8.9
Coon Creek	47.6	7.9	3.8	8.0
Eakin Creek	25.6	8.0	1.9	7.5
Ferson-Otter Creek	53.9	28.9	4.8	8.9
North Fox River	61.5	53.3	4.3	6.9
South Fox River	38.5	69.1	2.2	5.8
Mill Creek	30.9	27.7	3.2	10.3
Tyler Creek	40.0	10.3	4.1	10.2
Union Ditch	62.5	5.4	9.8	16.6
Indian/Waubonsee Creek	13.2	41.2	1.7	13.0
DuPage River	2.5	18.5	N/A	N/A
Total	524.0	23.4%	51.2	10.2

The Fox River itself has a much larger watershed upstream of Kane County. The river originates in Wisconsin and travels through McHenry and Lake County before it reaches Kane County. The Fox River watershed, where it enters Kane County, is about 1,410 square miles.

As with most major rivers and watersheds in Illinois, the Fox River responds more slowly to rain and runoff than do the other, smaller, streams in the County. But when floods do occur on the Fox River, the duration of the flooding can extend from days into weeks. Other flooding throughout the County may only last for hours.

Watershed development: The condition of the land in the watershed affects what happens to the precipitation. For example, more rain will run off the land and into the streams if the terrain is steep, if the ground is already saturated from previous rains, if the watershed is significantly covered with impervious pavement and parking lots, or if depressional storage areas have been filled in.

The table above shows which watersheds are more developed. Because of the urban development, these watersheds (e.g., Indian/Waubonsie Creek) will usually flood more quickly than the rural watersheds (e.g., Union Ditch). In rural watersheds, more rain and snow can soak into the ground rather than run off quickly into the creeks and rivers.

The North and South Fox River watersheds have the highest percentage and the most concentration of development in the County. The majority of the Fox River watershed above Kane County, however, consists of open space and agricultural land.

Flash floods

Flash floods are generated by severe storms that drop significant rainfall in a short time. All flash floods strike quickly and end quickly. Areas with steep slopes and narrow stream valleys are particularly vulnerable to flash flooding, as are the banks of small tributary streams. In hilly areas, the high-velocity flows and short warning time make flash floods hazardous and very destructive.

Intersection of Kings Road and Amarillo in Carpentersville
August 23, 2007

In urban areas, flash flooding can occur where impervious surfaces, gutters and storm sewers speed runoff. Flash floods also can be caused by dam failure, the release of ice-jam flooding, or the collapse of a debris dam.

The floodplains mapped by the National Flood Insurance Program and shown on Map 2-1 are for watersheds greater than one square mile. Flash floods often occur in smaller watersheds and are therefore not shown on most floodplain maps.

Obstructions: Obstructions can be channel obstructions, such as small bridge openings or log jams, or floodplain obstructions, such as road embankments, fill and buildings. Channel obstructions will cause smaller, more frequent floods, while floodplain obstructions impact the larger, less frequent floods where most of the flow is overbank, outside the channel.

Obstructions can be natural or manmade. Natural obstructions, like log jams, can be cleared out or are washed away during larger floods. The greater problem is manmade obstructions, which tend to be more permanent. They are discussed in Chapter 4's section on floodways.

Ice jams

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. An ice dam forms, blocking the channel and causing flooding upstream. Ice jams present three hazards:

- Sudden flooding of areas upstream from the jam, often on clear days with little or no warning,
- Sudden flooding of areas downstream when an ice jam breaks. The impact is similar to a dam break, damaging or destroying buildings and structures.

– Movement of ice chunks that can push over trees and crush buildings.

Ice jam flooding in Kane County occurs mostly on the Fox River. Studies have determined that ice jams will begin to form on the Fox when there have been 60 or more "degree freezing days" and over 1,000 cubic feet per second of flow in the Fox River. With these conditions, frazil ice begins to form.

"Frazil ice" consists of small particles of ice formed in highly turbulent, super cooled water, such as river rapids or riffles, during cold, clear winter nights when the heat loss from the water to the atmosphere is very high. As the frazil particles are transported downstream, they join together to form flocs that eventually rise to the surface where they form frazil pans or floes. Frazil is often described as slush ice because of its appearance. The ice flows downstream and accumulates, and can eventually form a dam. Flow and more ice can build up behind the ice dam.

The East and West Dundee areas have been most susceptible to ice jams. Winter freezing and flow conditions through January and February allow frazil ice to form in the Fox and travel downstream towards the Interstate 90 Bridge. An ice dam can then form causing the river to back up and flow out of its banks. Homes are then flooded and residents need to evacuate from the Richardson Subdivision in unincorporated East Dundee.

Typical ice jam along the Fox River
January 10, 2010

From 1988 to 2007 two ice booms were installed in the Fox River: one in the Carpentersville pool and the other in East Dundee. The ice booms operated to skim any frazil ice off of the river to allow a smooth sheet of ice to form. The use of ice booms were discontinued in 2007.

The flows in the Fox River in northern Kane County are partially influenced by the operation of the McHenry Dam with a goal to keep the flow below 1,000 cubic feet per second when conditions are favorable for ice jams to develop. These measures were taken to reduce the ice jam threat in the Dundee area.

Dam failure

Dams are made to hold back large amounts of water. If they fail or are overtopped, they can produce a dangerous flood situation because of the high velocities and large volumes of water released. A break in a dam can occur with little or no warning on clear days when people are not expecting rain, much less a flood. Breaching often occurs within hours after the first visible signs of dam failure, leaving little time for evacuation.

Dam failures are usually caused by either structural problems with the dam or by hydrologic problems. Structural problems include seepage, erosion, cracking, sliding and overturning that are a result of the age of the dam or lack of maintenance. Hydrologic problems typically occur when there is excessive runoff due to heavy precipitation. A dam failure can occur if the dam has to impound (hold back) more water than it was designed to, or if the spillway capacity is inadequate for the amount of water needing to pass downstream.

A dam can suffer a partial failure or a complete failure, but the potential energy of the water stored behind even a small dam can cause loss of life and great property damage downstream. The following factors influence the impact of a dam failure:

- Level of failure (partial or complete)
- Rapidity of failure (sudden or gradual)
- Amount of water released
- Nature of the development or infrastructure located downstream.

In Illinois, dams are categorized in one of three classes, according to the degree of threat to life and property in the event of dam failure:

Class I – Dams located where failure has high probability for causing loss of life or substantial economic loss in excess of that which would naturally occur downstream of the dam if the dam had not failed.

Class II – Dams located where failure has moderate probability for causing loss of life or may cause substantial economic loss in excess of that which would naturally occur downstream of the dam if the dam had not failed.

Class III – Dams located where failure has low probability for causing loss of life or minimal economic loss in excess of that which would naturally occur downstream of the dam if the dam had not failed or where there are no permanent structures for human habitation.

Kane County Dams

Stream	Name	IDNR Class	IDNR ID	Approx. Height*
Blackberry Creek Trib. E	Lake Prestbury Dam	III	IL 00924	4.5 ft.
Ferson Creek	Spillway			6.5 ft.
Ferson Creek	Spillway			7 ft.
Ferson Creek	Dam (near Private Drive)			8 ft.
Ferson Creek	Concrete Dam			4.5 ft.
Ferson Creek	Campton Lake Dam	III	IL 00908	---
Fox North Tributary	Woodland Creek Dam	III	IL 50123	---
Fox North Trib. (East)	North Lake Dam	III	IL 00923	--
Fox River	Montgomery Dam	II	IL 00920	7 ft.
Fox River	Aurora (near North Avenue)			4 ft.
Fox River	Aurora – West Dam	III	IL 00918	8.5 ft.

Fox River	North Aurora Dam	II	IL 00917	8 ft.
Fox River	Batavia Dam	II	IL 00915	6.5 ft.
Fox River	Geneva Dam	III	IL 50087	7.5 ft.
Fox River	St. Charles Lake South Dam	II	IL 00913	8 ft.
Fox River	South Elgin Dam			9 ft.
Fox River	Elgin/Kimball Dam			16 ft.
Fox River	Carpentersville Dam	III	IL 00909	10 ft.
Indian Creek	Fermilab Main Injector Dam	III	IL 50350	--
Jelkes Creek	Jelkes Creek Dam			2.5 ft.
Jelkes Creek	Jelkes Creek Dam			2.5 ft.
Jelkes Creek	Tara Lake Dam	I	IL 00906	--
Mill Creek	Mooseheart Lake Dam	II	IL 00907	13.5 ft.
Mill Creek or Mill Cr. Trib	Fox Mill Lagoon Dam	III	IL 50337	--
Mill Creek Tributary	Eaglebrook Country Club #1	III	IL 50269	--
Mill Creek Tributary	Eaglebrook Country Club # 2	III	IL 50270	--
Otter Creek Tributary	Spring Valley Lake Dam	III	IL 00910	--
Sleepy Creek	Pine Lake Dam	II	IL 50046	-
Tyler Creek	Lyle Avenue Dam	III	IL 50275	--
*Approximate height is taken from the FEMA Flood Insurance Study *Source: Illinois Department of Natural Resources, FEMA Flood Insurance Study*				

The Illinois Department of Natural Resources (IDNR) Dam Safety Section has 20 of Kane County's dams in its inventory. IDNR has identified the Tara Lake dam on Jelkes Creek as a Class I Dam due to the high probability of life or property loss should a failure occur. Six dams are rated as Class II dams and 13 dams are Class III.

Other Kane County dams that are not included in the IDNR inventory are considered low hazard dams. These dams were not included in the inventory primarily because their height was less than 25 feet and they had less than a 50 acre-foot impounding area. If these dams were added to the inventory, they would be Class III dams.

2.2. Historical flooding

Recent Floods				
Month	**Year**	**Location**	**Watershed**	**Declaration**
June	1981	Aurora, Montgomery	Blackberry, Fox Tribs.	State
December	1982	Fox River	Fox River	State
July	1983	Aurora, Montgomery, Elgin, Sugar Grove	Blackberry, Indian, Welch, Fox Tribs.	State
Sep - Oct	1986	North end of County	Fox Tribs.	Federal
Jan - Feb	1988	East & West Dundee	Fox River – (Ice Jam)	State
March	1993	Fox River	Fox River	State
May	1996	Fox River	Fox North, South	State
July	1996	South end of County	Blackberry, Indian, Tribs	Federal
February	1997	Elgin, St. Charles	Fox North Tribs.	---
June	1999	Hampshire Township	Coon Creek	---
August	2007	Center/North county	Fox River, Ferson-Otter, Tyler	Federal
September	2008	Center County	Fox River, Ferson-Otter, Blackberry	Federal
April	2013	Entire County	Fox River & Southern Fox Watershed	Federal
Source: Illinois Emergency Management Agency				

Loss Estimation According to Hazus-MH for Floods								
County	**Rank**	**Total Losses ($Thousands)**	**Total Exposure ($Thousands)**	**Loss Ratio**	**Loss Index**	**Flood Score**	**Flood Vulnerability Index**	**Flood Vulnerability Ration**
Kane	97	702320	8717526	0.08	0.22	0.39	0.12	Low
Source: 2013 Illinois Hazard Mitigation Plan								

Kane County can flood in any season. Floods have been caused by localized storms, rain over several days on saturated ground, and ice jams. Winter flooding can also occur when rain hits frozen ground and cannot be absorbed. There have been no records of recent floods caused by dam failure.

Over the last two decades, a significant flood has occurred in Kane County on the average of every other year. Many of them received a state or federal disaster declaration.

1996 flood: The July 1996 flood was the most recent "benchmark" flood to hit Kane County in recent years and was due to a combination of wet conditions (July was the wettest month on record for Aurora) and heavy local rain. Record rainfall came from several subsequent thunder-storms tracking along the same west to east stalled low-pressure front.

The heaviest rainfall concentrated over southeastern Kane County and northeastern Kendall County. An Aurora rain gage recorded 16.91 inches in 24 hours, a record for the state. Record peak flows were recorded at 19 stream flow gages in the area. The US Geological Survey estimated that the flooding was greater than a 100-year flood on Blackberry Creek near Yorkville and the Fox River at Dayton.

West of Aurora, July 18, 1996
I-88 at Orchard Road

Source: Chris Dagiantis, Kane County Development Department

West of Aurora, July 18, 1996
Blackberry Creek

Source: Chris Dagiantis, Kane County Development Department

Future flood risk: Past floods are indications of what can happen in the future, but flood studies and mitigation plans are based on the *statistical risk* of future flooding. Flood studies extrapolate from historical records to determine the statistical potential that storms and floods of certain magnitude will recur. Such events are measured by their "recurrence interval," i.e., a 10-year storm or a 50-year flood.

These terms are often misconstrued. Commonly, people interpret the 50-year flood definition to mean "once every 50 years." This is incorrect. Statistically speaking, a 50-year flood has a 1/50 (2%) chance of occurring in any given year. In reality, a 50-year flood could occur two times in the same year, two years in a row, or four times over the course of 50 years. It is possible to not have a 50-year flood over the course of 100 years. Kane County has had several different flood studies. The official floodplain study for insurance and regulatory purposes is the *Flood* FEMA uses the "base" flood as the basis for its regulatory requirements and flood insurance rate setting. This *Plan* uses the base flood, too. The base flood is the one percent (1%) chance flood, i.e., the flood that has a one percent (one out of 100) chance of occurring in any given year. The one percent chance flood has also been called the 100-year flood.

Another term used is the "500-year flood." This has a 0.2% chance of occurring in any given year. While the odds are more remote, it is the national standard used for protecting critical facilities, such as hospitals and power plants.

The regulatory floodplain: The area inundated by the base flood is the "regulatory floodplain." FEMA maps (called Flood Insurance Rate Maps or FIRMs) also call this the

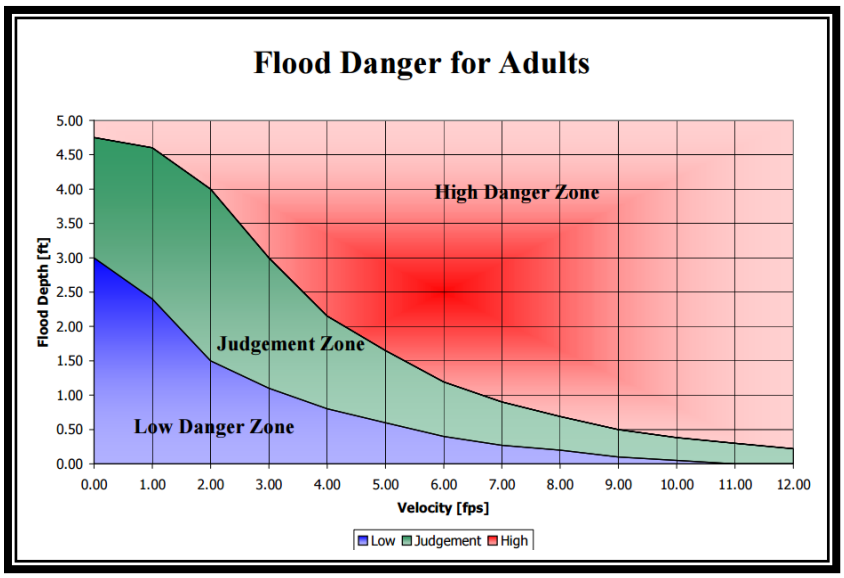
Special Flood Hazard Area or the A Zone. The base floodplains for Kane County are the ones shown on Map 2-1. An example of a FIRM is shown to the left.

The central part of the floodplain is called the "floodway." The floodway is the channel and that portion of the adjacent floodplain which must remain open to permit passage of the base flood. Floodwaters generally are deepest and swiftest in the floodway, and anything in this area is in the greatest danger during a flood. The remainder of the floodplain is called the "fringe," where water may be shallower and slower.

Floodways are also subject to special development regulations, as explained in Chapter 6. Because of the extra hazard and the special regulations, this *Plan* looks at floodway data separately from data for the fringe areas and those floodplains where the floodway has not been mapped.

Depth: The table to the right shows depths above channel bottoms. Actual overbank flood depths are several feet lower. There is only 1 – 2 feet in difference between the 10-year and 100-year flood levels. There is a 1.5 foot difference between the 100- and 500-year flood levels on the Fox and, in most places, only a ½ foot difference on the other streams. These figures show that flood depths in Kane County are relatively shallow, as would be expected in flat northern Illinois.

Velocity: The speed of moving water, or velocity, is measured in feet per second. Flood velocity is important to mitigation because the faster water moves, the more pressure it puts on a structure and the more it will erode stream banks and scour the earth around a building's foundation.



The FEMA Flood Insurance Study includes the "average floodway velocity" for those streams that were studied in detail. This figure is helpful in determining the relative hazard of an area, but is not an accurate indication of the velocity of a flood at any individual site. Sites close to the channel will probably have higher velocities than this figure and sites at the fringe of the floodplain will be subject to lower velocities.

In Kane County, the average floodway velocities are less than five feet per second, except in two areas. They are higher on the smaller streams at bridge and culvert crossings and they are slightly higher on the Fox below the confluence of Indian Creek. Otherwise,

most of the county's streams are subject to flooding at less than five feet per second, where velocity is not considered a problem for construction of buildings and facilities.

While buildings may be easy to protect in areas of low velocities, people are not always safe. The total impact of moving water is related to the depth of the flooding. Studies have shown that deep water and low velocities can cause as much damage as shallow water and high velocities (see graph). Again, the summary data presented in this *Plan* should be augmented by site-specific data, such as depths and velocities, when looking at mitigation alternatives at any single location.

2.3. Impact of Flooding

Past and future flood impacts are discussed in this section. Impacts are reviewed under four categories: impact on people (e.g., safety and health), damage to buildings, damage to critical facilities, and economic disruption (damage to businesses and infrastructure).

Safety: A car will float in less than 2 feet of moving water and can be swept downstream into deeper waters. This is one reason floods kill more people trapped in vehicles than anywhere else (see table). Victims of floods have often put themselves in perilous situations by ignoring warnings about travel or mistakenly thinking that a washed-out bridge is still there.

People die of heart attacks, especially from exertion during a flood fight. Electrocution is a cause of flood deaths, claiming lives in flooded areas that carry a live current created when electrical components short out. Floods also can damage gas lines, floors, and stairs, creating secondary hazards such as gas leaks, unsafe structures, and fires. Fires are particularly damaging in areas made inaccessible to fire-fighting equipment by high water or flood-related road or bridge damage.

Warning and evacuation: The threat to life posed by a flood can be avoided if people can evacuate before the waters reach their buildings or close

Flood Related Deaths, Illinois and United States

	Vehicle		Outdoors		Indoors		Total	
	IL	US	IL	US	IL	US	IL	US
1995	0	39	1	35	0	6	1	80
1996	0	79	2	39	0	13	2	131
1997	1	46	0	60	0	12	1	118
1998	0	75	1	40	0	21	1	136
1999	0	26	1	34	0	8	1	68
2000	3	24	1	13	0	0	4	37
2001	1	24	0	20	0	4	1	48
2002	0	28	2	20	0	1	2	49
2003	1	39	0	40	0	7	1	86
2004	0	45	0	35	0	2	0	82
2005	0	18	0	24	0	1	0	43
2006	0	32	0	41	0	3	0	76
2007	0	50	0	4	0	33	0	87
2008	3	39	1	1	1	42	5	82
2009	3	33	0	1	1	22	4	56
2010	1	45	0	8	0	50	1	103
2011	3	68	1	5	0	40	4	113
2012	0	10	0	0	0	19	0	29
2013	4	37	0	4	0	41	4	82
Total	20	757	10	424	2	325	32	1506

Deaths are from river and flash floods. Most of the deaths are from flash floods. *Source: National Weather Service*

their evacuation routes. This requires advance notice that a flood is coming and a system to disseminate flood warnings. Flood warning programs are discussed in Chapter 7. Only on the Fox River is there enough lead time to allow protective steps, such as sandbagging, to be taken.

Other, smaller, streams rise so fast during a heavy local rain, that expensive systems of remote rain and stream gages would be needed to provide adequate notice to emergency managers. Even then, there would be little time for people to do much more than escape to high ground.

Bridges: A key evacuation and safety concern is when roads and bridges go under water. Generally, the larger the road, the more likely it will not flood, but this is not always the case.

Scott Road, Welch Creek, July 20, 1996

Source: Chris Dagiantis, Kane County Development Department

A review of the Flood Insurance Rate Map and accompanying flood profiles identified 58 bridges and culverts that will be underwater during a base flood.

A bridge does not have to be under water to be damaged or to cut off an evacuation route. In some cases the bridge is high, but the access road may be flooded. In other cases, the bridge or culvert can be washed out. This is especially dangerous if a person drives on a flooded road and assumes that the bridge is still there.

There are bridges and culverts in areas that are not included in the Flood Insurance Rate Map study areas, such as those located along small tributary streams.

The following have been identified by the municipalities and township road commissions as obstructing or impeding the flow water during flood events:

- Batavia: culverts along the Mill Creek Tributary
- Batavia: bridges and culverts along Mahoney Creek and its tributaries
- Big Rock Township: Granart Road at Big Rock Creek
- Burlington Township: Middleton Road
- Elgin: State Street bridge piers at the Fox River
- Geneva Township: Wenmoth Road along Mill Creek
- Lily Lake: State Route 64, east of State Route 47 along Ferson Creek
- Montgomery: US 30 at Blackberry Creek (several structures)
- Montgomery: Railroad structure downstream of U.S. Route 30 at Blackberry Creek
- Plato Township: Rohrsen Road
- Rutland Township: Kruetzer Road bridge
- South Elgin: McDonald Road at Otter Creek
- South Elgin: State Street at the Fox River
- St. Charles: Prairie Street at the Fox River

– St. Charles: State Route 64 at the Fox River
– West Dundee: State Route 31 on Sleepy Creek

Health: While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry whatever was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where cattle and hogs are kept can contribute polluted waters to the receiving streams.

Post-flood silt, mold and mildew

Flood waters saturate the ground which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment lead to overloaded sewer lines which back up into low lying areas and some homes. Even though diluted by flood waters, raw sewage can be a breeding ground for bacteria, such as e coli, and other disease causing agents. Because of this threat, the Kane County Health Department gave tetanus shots to people affected by the July 1996, August 2007, and September 2008 floods.

The second type of health problem comes after the water is gone. Stagnant pools become breeding grounds for mosquitoes, and wet areas of a building that have not been cleaned breed mold and mildew. A building that is not thoroughly and properly cleaned becomes a health hazard, especially for small children and the elderly. The Kane County Health Department states some people reported upper respiratory problems that they believe were caused by molds that grew after the July 1996 flood.

Another health hazard occurs when heating ducts in a forced-air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants.

If the water system loses pressure, a boil order may be issued to protect people and animals from contaminated water. Following the July 1996 flood, the Kane County Health Department tested private wells in rural areas and distributed bottled water to their owners.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

> "These follow-up studies show a consistent pattern of increased psychological problems among flood victims for up to 5 years after the flood. The findings regarding non-psychiatric morbidity are less consistent, but many of the reported morbidity problems such as hypertension and cardiovascular disease-and even leukemia and lymphoma-may be stress related." – *The Public Health Consequences of Disasters*, page 74.

Following the July 1996 flood, 16 shelters were opened to house displaced families. Another measure of the impact on people and the disruption flooding causes is applications for Federal disaster assistance. After the July 1996 flood, 6,568 Kane County families applied for various types of individual assistance, such as temporary housing and "unmet needs," i.e., funds needed for things that insurance and other sources of assistance do not provide.

In Kane, DuPage and Kendall Counties, the American Red Cross opened eleven service centers to assist families following the July 1996 flood. Over the course of the flood and the recovery, the Red Cross served over 43,000 meals to families, workers and volunteers. The total cost to the Red Cross temporary housing, meals, and other assistance was in excess of $1.2 million. Three deaths were associated with the July 1996 disaster. Three people were hospitalized and 65 people were injured as a result of the flood.

Building damage: In a few situations, deep or fast moving waters will push a building off its foundation, but this is rare and Kane County has few areas where the depths and velocities are that high. More often, structural damage is caused by the weight of standing water, known as "hydrostatic pressure."

Soaking damages most household contents

Basement walls and floors are particularly susceptible to damage by hydrostatic pressure. Not only is the water acting on basement walls deeper, but a basement is also subject to the combined weight of water and saturated earth. In addition, water in the ground underneath a flooded building will seek its own level, resulting in uplift forces that can break a concrete basement floor.

Due to the relatively low velocities and shallow flood depths in the County, the most common type of damage inflicted by a flood is caused by soaking. When soaked, many materials change their composition or shape. Wet wood will swell and, if dried too quickly, will crack, split or warp. Plywood can come apart. Gypsum wallboard will fall apart if it is bumped before it dries out. The longer these materials are wet, the more moisture, sediment and pollutants they will absorb.

Soaking can cause extensive damage to household goods. Wooden furniture may become so badly warped that it cannot be used. Other furnishings such as upholstery, carpeting, mattresses, and books usually are not worth drying out and restoring. Electrical

appliances and gasoline engines will not work safely until they are professionally dried and cleaned.

In short, while a building may look sound and unharmed after a flood, the waters can cause a lot of damage. As shown in the above photo, to properly clean a flooded building, the walls and floors should be stripped, cleaned, and allowed to dry before being recovered. This can take weeks and is expensive.

After the September 2008 flood, houses in Elgin's Poplar Creek subdivision sustained three to four feet of flood water on the main floor of the structures. As a result of the water damage the Elgin Code Department red tagged 39 homes in the area displacing approximately 140 people.

2.4. National Flood Insurance Program

The NFIP is a Federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. Participation in the NFIP is based on an agreement between local communities and the Federal Government that states if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas, the Federal Government will make flood insurance available within the community as a financial protection against flood losses.

Some of the municipalities participating in this plan also participated in the Community Rating System program.. As of May 1, 2014 there were five CRS communities within Kane County which has increased by two since 2008.

Community Number	*Community Name*	*CRS Entry Date*	*Current Effective Date*	*Class*
170322	Carpentersville, Village of	10/01/2006	10/01/2011	6
170327	Hampshire, Village of	05/01/2011	05/01/2011	7
170332	South Elgin, Village of	10/01/2012	10/01/2012	5
170330	St. Charles, City of	10/01/1994	10/01/2011	5
170333	Sugar Grove, Village of	10/01/2006	10/01/2011	6

A source for damage data is past claims paid by the National Flood Insurance Program. These are shown in the table on the next page.

Flood insurance claims figures do not include items not covered by a flood insurance policy, such as landscaping and automobiles, and the value of lost family heirlooms. They also do not include damage to uninsured or underinsured properties. With these caveats in mind, the two tables show:

- The hardest hit communities within Kane County have been Montgomery and unincorporated Kane County.
- The most expensive floods were July 1983, September 1986, and July 1996.
- The July 1996 flood not only affected the most properties, it caused the most damage per property.
-

NFIP Policy and Claims Report 2015 Kane County					
Community	***# of Policies***	***Total Coverage***	***Total Premium***	***Total Claims Since 1978***	***Total Paid Since 1978***
Carpentersville	37	$6,278,500	$42,033	10	$16,707
Geneva	27	$8,631,500	$21,133	8	$155,371
Gilberts	5	$1,032,000	$3,394	1	$6,351
Hampshire	15	$3,159,100	$12,622	8	$28,330
Montgomery	64	$12,566,00	$74,893	125	$2,643,764
North Aurora	15	$3,466,100	$10,423	16	$54,382
Sleepy Hollow	37	$9,992,600	$33,660	5	$2,725
South Elgin	100	$20,801,700	$101,857	46	$565,255
Sugar Grove	12	$3,920,000	$6,874	3	$5,087
West Dundee	16	$4,472,200	$29,285	4	$55,462
Algonquin	121	$22,884,100	$128,768	63	$295,943
Huntley	26	$7,978,000	$23,747	3	$713
Kane County	309	$68,883,400	$329,977	171	$2,317,058
Lily Lake	1	$350,000	$542	0	$0
Elburn	3	$420,000	$847	0	$0
Big Rock	1	$350,000	$460	0	$0
Campton Hills	18	$4,907,000	$13,046	1	$0
County Totals	807	$180,092,200	$833,561	464	$6,147,148
Illinois Totals	47,138	$8,891,737,900	$44,679,023	47,767	$495,480,124
	Source: FEMA 2015				

Building age: The *Comprehensive Stormwater Management Plan* noted an interesting fact:

> The oldest areas of most of the towns (built prior to the early part of this century) are generally not subject to flooding. The areas of newest development (eighties and nineties) also do not appear to be subject to significant flooding. Those areas developed during the fifties and sixties appear to be the most subject to flooding.

It appears that early developments avoided problem areas and newer development is being managed more wisely (and is subject to floodplain and stormwater management regulations).

Communities Participating in the National Flood Insurance Program Kane County				
Community	Init FHBM Indeified	Init FIRM Identified	Curr Eff Map Date	Reg-Emer Date
Algonquin	03/08/74	03/16/81	08/03/09	03/16/81
Aurora	06/14/74	06/15/79	08/03/09	06/15/79
Batavia	06/10/76	09/02/81	08/03/09	11/20/81
Big Rock		12/20/02	07/17/12	01/08/03
Burlington		12/20/02	(NSFHA)	12/20/02
Campton Hills		08/03/09	07/17/12	12/10/08
Carpentersville	03/22/74	08/17/81	08/03/09	08/17/81
East Dundee	05/17/74	03/16/81	08/03/09	03/16/81
Elburn		12/20/02	07/17/12	09/30/92
Elgin	05/03/74	03/01/82	08/03/09	03/01/82
Geneva	08/09/74	08/03/81	08/03/09	08/03/81
Gilberts	05/07/76	12/20/02	08/03/09	12/20/02
Hampshire	03/26/76	03/02/81	08/03/09	03/02/81
Kane County	05/14/76	03/01/82	07/17/12	03/01/82
Lily Lake	05/14/76	06/16/92	07/17/12	12/20/02
Maple Park		08/04/87	07/17/12	10/07/87
Montgomery	12/26/73	08/15/79	01/08/14	08/15/79
North Aurora	03/01/74	03/16/81	08/03/09	03/16/81
Pingree Grove		12/20/02	08/03/09	09/29/08
Sleepy Hollow	04/12/74	06/15/82	08/03/09	06/15/82
South Elgin	04/05/74	07/07/78	08/03/09	07/16/81
St. Charles	03/15/74	09/02/81	08/03/09	09/02/81
Sugar Grove	03/08/74	03/04/88	07/17/12	09/30/76
Virgil	05/14/76	06/02/92	07/17/12(M)	12/20/02
Wayne	08/15/75	12/01/81	08/03/09	10/03/94
West Dundee	04/05/74	12/01/81	08/03/09	12/01/81

Source: FEMA 2015

Floodplain Building Data						
	Total Number of Buildings		Flood Insurance Claims			Estimated Dollar Loss ++
	Floodplain **	Floodway	Total Claims	Average Structural + Claim	Average Contents + Claim	
Algonquin *	132	1	29	$5,527	$1,156	$102,000
Aurora *	707	190	156	$13,665	$5,064	$18,028,500
Barrington Hills *	0	0	2	$18,331	0	$0
Bartlett *	0	0	0	0	0	$0
Batavia	59	18	1	$2,473	0	$1,504,500
Big Rock	15	0	0	0	0	$382,500
Burlington	0	0	0	0	0	$0
Carpentersville	100	11	2	$3,422	0	$2,550,000
East Dundee *	123	6	6	$3,585	$2,698	$3,136,500
Elburn	2	0	0	0	0	$51,000
Elgin *	219	54	28	$4,221	$2,797	$5,584,500
Geneva	56	7	0	0	0	$1,428,000
Gilberts	8	1	0	0	0	$204,000
Hampshire	43	8	2	$2,505	0	$1,096,500
Hoffman Estates *	0	0	0	0	0	$0
Huntley *	3	0	2	$274	$439	$76,500
Lily Lake	8	0	0	0	0	$204,000
Maple Park *	1	0	0	0	0	$25,500
Montgomery *	131	16	99	$20,314	$6,457	$3,340,500
North Aurora	11	8	12	$3,570	$50	$280,500
Pingree Grove	0	0	0	0	0	$0
St. Charles *	186	20	18	$5,288	$2,233	$4,743,000
Sleepy Hollow	56	6	1	0	$2,725	$1,428,000
South Elgin	172	79	6	$2,022	$913	$4,386,000
Sugar Grove	8	1	2	$2,487	$113	$204,000
Virgil	3	0	0	0	0	$76,500
Wayne *	7	2	0	0	0	$178,500
West Dundee	59	19	1	$9,644	$3,509	$1,504,500
Unincorporated areas	644	184	66	$6,715	$3,903	$16,422,000
County total	2,625	631	433	$11,928	$5,061	$66,937,500

* *Data may include figures for areas of the municipality outside of Kane County and claims outside the mapped base floodplain.*

** *The number of buildings in the floodplain (2nd column) includes buildings in the floodway.*

\+ *Structural coverage includes the furnace, built-in cabinets, wall-to-wall carpeting, etc.*

++ *Estimated dollar loss is the estimate of total building damage from a 100-year or base flood. It is the number of buildings in the base floodplain times $25,500, the average cost per flooded building.*

Repetitive Losses: There are several different definitions of a "repetitive loss property." This *Plan* uses the Community Rating System's definition, in part because data is readily available: Any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. Two of the claims paid must be more than 10 days apart but within 10 years of each other. These properties are important to the National Flood Insurance Program and the Community Rating System because repetitive loss properties are 1.3% of all policies, but are expected to account for 15% to 20% of future losses.

There are several FEMA programs that encourage communities to identify the causes of their repetitive losses and develop a plan to mitigate the losses (this *Plan* meets FEMA's repetitive loss planning criteria).

There are 35 repetitive loss properties in Kane County in 5 municipalities and the unincorporated areas. The Privacy Act prohibits publishing the exact locations or addresses of insured properties in a public document. These properties were used to identify 18 repetitive loss *areas*. A repetitive loss *area* contains one or more properties on the FEMA list plus adjacent properties with the same or similar flooding conditions. They range in size from one building that appears to be the only one subject to repetitive flooding to 112 similarly situated properties.

Sixteen of the 18 areas are located on Map 2-3 (the last two are in Algonquin, but outside Kane County). Areas 4, 5, 13, 17 and 18 consist of single non-residential buildings. The other 13 areas are all single family homes. These buildings have a variety of foundation types, flood depths, and planned improvements. Four areas (1, 8, 9, 16) are in the mapped regulatory floodway.

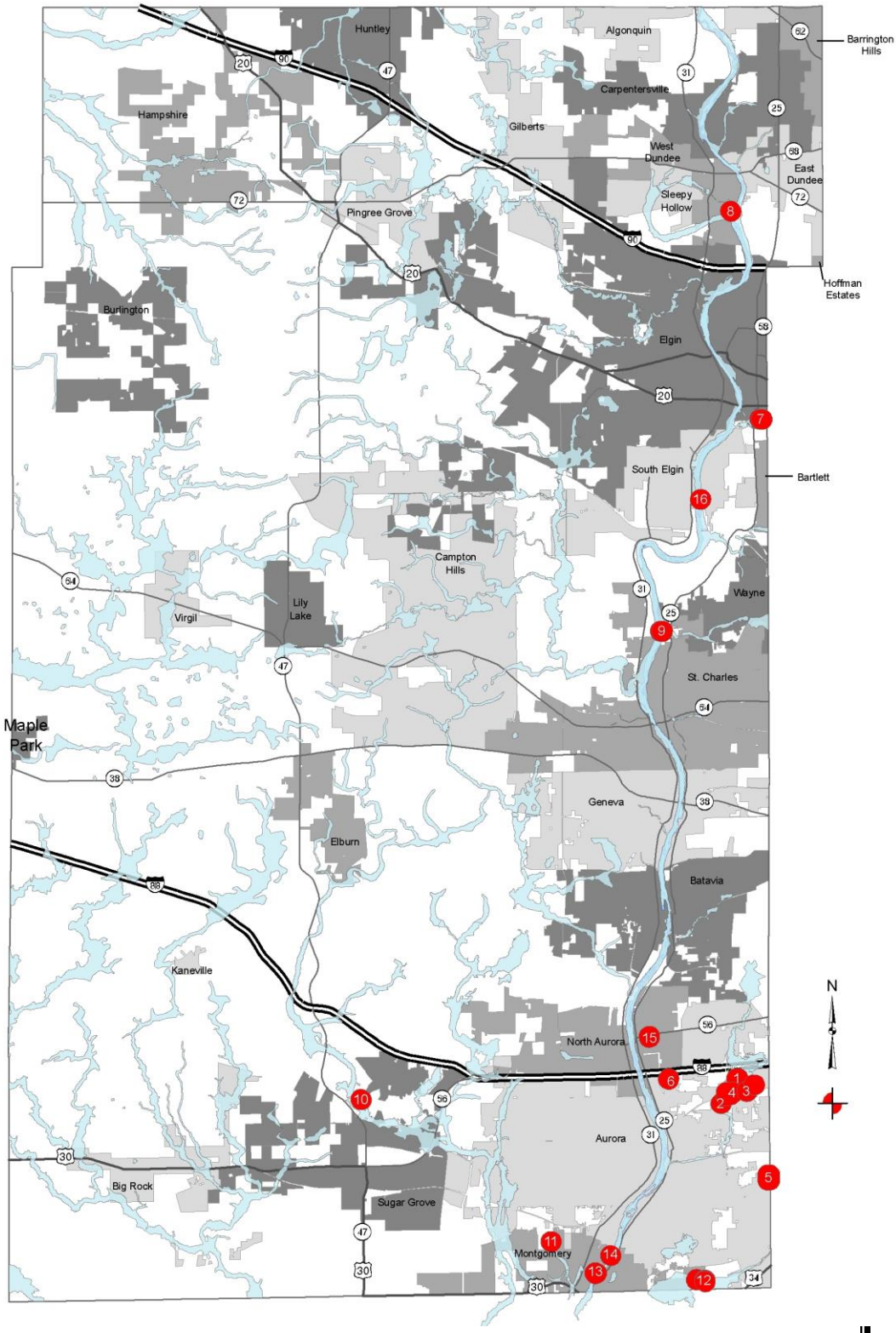
Most of the properties have only received two claims. One property in area 2 and one in area 5 have received claim payments 7 and 9 times, respectively, but the total paid on these two only equal 36% and 10% of their total property values, so they are a long way from any building code requirements that would mandate flood protection.

It is noted that three properties on FEMA's list have been cleared. The field survey identified other properties in repetitive loss areas 7 and 12 that have been acquired or retrofitted. Forty homes were purchased in area 12 following the 1996 flood.

Repetitive Loss Summary

Community	Building Payments	Contents	Total Payments	Average Payment	Losses	Properties
Algonquin	137,294.83	6,392.63	143,687.46	14,368.75	10	4
Hampshire	6,475.89	0	6,475.89	3,237.95	2	1
Kane County	725,398.29	132,271.63	857,669.92	22,570.26	38	16
Montgomery	453,278.57	77,312.62	530,591.22	21,223.65	25	7
North Aurora	9,286.00	0	9,286.00	4,643.00	2	1
South Elgin	75,138.72	11,518.77	86,657.49	7,221.46	12	6

Map 2-3. Repetitive Loss Areas



Critical facilities: Critical facilities that could be impacted by flooding are relatively easily identifiable – they are located in the floodplain. Critical facilities are discussed on pages 1-10 – 1-19. The maps of the seven types of facilities were overlain on the GIS floodplain layer to determine how many and what types of critical facilities are subject to overbank flooding. The results are shown in the table on the next page.

The table shows that while there are hundreds of critical facilities in Kane County, a relatively small number are in either the mapped floodplain or the 500-year floodplain (the 500-year flood is considered the most appropriate protection level for critical facilities). The GIS review also found only five critical facilities in mapped floodways: three emergency response facilities and two places of assembly (the riverboat casinos).

2.5. Economic Impact

As with flooded roads, public expenditures on flood fighting, sandbags, fire department calls, clean up and repairs to damaged public property affect all residents of the County, not just those in the floodplain. Here are some examples of public expenditures from the July 1996 flood:

- Lily Lake spent over $5,000 repairing roads and ditches
- Batavia spent over $131,000, including $37,000 in landfill fees for depositing debris and $41,000 in damage to critical facilities
- The Blackberry Township Road District spent $30,000± repairing roads and bridges
- Geneva spent over $20,000 on repairs to storm sewers and other public property.
- Geneva city crews responded to 125 “flood calls” on July 17 – 19.
- FEMA and the State paid $1,674,000 in disaster assistance grants to 1,504 families (Individual and Family Grant Program) and $20,742,320 for temporary housing.

The following bridges were repaired or replaced after the 1996 flood at the noted costs

- Scott Road bridge at Welch Creek (replacement cost: $268,000)
- Swan Road bridge at Big Rock Creek (repair cost: $61,545)
- Jericho Road bridge at Big Rock Creek (repair cost: $77,000)

A Presidential disaster declaration in 1996 provided disaster assistance to local governments and non-profit organizations, in addition to the payments to families affected by the flood. The types of damage and costs suffered by public agencies from the 1996 flood are displayed on the table on the next page.

While the costs were itemized on the 75% FEMA share, Federal assistance is not available for smaller, more localized floods and it cannot be counted on in the future. A recent law now requires that public agencies purchase insurance on floodprone buildings. The amount of insurance that should be carried is deducted from disaster assistance payments.

Businesses: Floods also cause other problems that are not as easy to identify as damage to buildings and critical facilities. Businesses that are disrupted by floods often have to be closed. They lose their inventories, customers cannot reach them, and employees are often busy protecting or cleaning up their flooded homes.

Several municipalities have reported that they had businesses that were flooded, but no dollar impact was estimated.

Transportation: Loss of road access is a major flood impact that affects all residents and businesses, not just those who own property in the floodplain. Sometimes the loss is temporary, such as during the flood.

Sometimes the loss of transportation lasts well after the disaster. When roads, bridges or railroads are washed out by a flood, it can be weeks or months before they are repaired and reusable.

FEMA Disaster Assistance Payments to Public Agencies, July 1996 Flood								
Applicant	**FEMA $ Assistance Received**	**A. Debris Removal**	**B. Emergency Measures**	**C. Roads and Bridges**	**D. Water Control Facilities**	**E. Buildings and Equipment**	**F. Utilities**	**G. Parks, Rec, and Other**
Aurora (City)	2,562,979	X	X	X	X			
Aurora (Township)	61,616							
Aurora East School Dist. 131	432,296		X			X		
Aurora Met. Exp. Aud. Authority	69,286		X			X		
Aurora Twp. Highway Dept.	196,344	X	X	X				
Batavia (City)	129,715	X	X	X	X	X	X	
Big Rock Twp. Highway Dept.	23,274			X				
Blackberry (Township)	27,675			X				
Campton (Township)	15,639			X				X
Elburn (Village)	48,035	X	X	X	X	X	X	X
Fox Valley Park Dist.	73,525	X			X			X
Geneva (City)	72,836	X	X	X	X		X	
Geneva Park Dist.	10,218							X
Geneva Twp. Road District	25,924	X	X	X	X			
Ill. Math & Science Academy	150,197					X		
Kane Co. Div. of Transportation	427,987		X	X	X			
Kane Co. Forest Preserve Dist.	37,863	X	X	X	X	X		X
Kane Co. Health Dept.	14,445		X					
Kane Co. Sheriff Office	2,139		X			X		
Kane County	54,132					X		
Kaneland Comm. Sch. Dist. 302	11,514					X		
Lily Lake (Village)	5,779			X			X	
Maple Park (Village)	7,724					X	X	
Montgomery (Village)	452,577	X	X	X				
Montgomery/Countryside Fire Dist.	21,978		X			X		
North Aurora (Village)	29,924	X	X	X				
Quad County Urban League	8,254					X		
Science and Technology Center	1,182					X		
Sugar Grove (Township)	17,467	X						
Sugar Grove (Village)	47,044	X	X	X				
Waubonsee Community College	33,901					X		
West Aurora School Dist. 129	1,000	X	X			X		
Kane County Total	$5,074,469							
Source: FEMA								

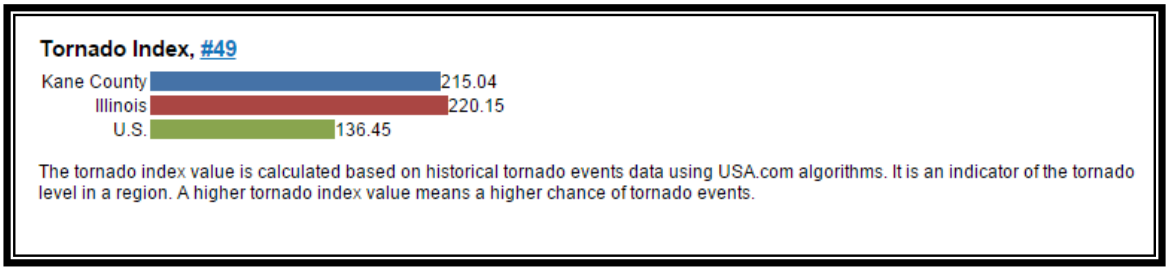
Trends: Flood problems can increase if floodprone areas are developed without accounting for the hazard. "Approximately 65% of the existing mapped floodplain occurs in land uses that are available for development (agriculture and vacant)" (*Comprehensive Stormwater Management Plan*, page 37). Flooding can also increase if the increase in stormwater runoff that accompanies urban development is not managed.

The trend in Kane County is for more development, especially in the Critical Growth Area in the central portion of the County. Chapter 4 discusses activities that can help ensure that new development does not aggravate existing flooding and create flood problems.

2.6. Tornadoes

A tornado is a swirling column of air extending from a thunderstorm to the ground. Tornadoes can have wind speeds from 40 mph to over 300 mph. A majority of tornadoes have wind speeds of 112 mph or less.

The risk of tornado damage in Kane County is about the same as the Illinois average and is much higher than the national average.



The hazard: Debris hurled by the wind can hit with enough force to penetrate walls. Tornadoes create localized low-pressure areas that can make a building explode. Windows, chimneys and roofs are the most vulnerable parts of buildings to tornado damage.

Tornado Loss Estimates

County	**# of Tornadoes 1951-2012**	**Total Recorded Loss**	**Average $ in property damage per event**	**Annual Probability of Event**	**Estimate Annual Loss**
Kane	23	$6,225,000	$270,652.17	37.1%	$100,403.23

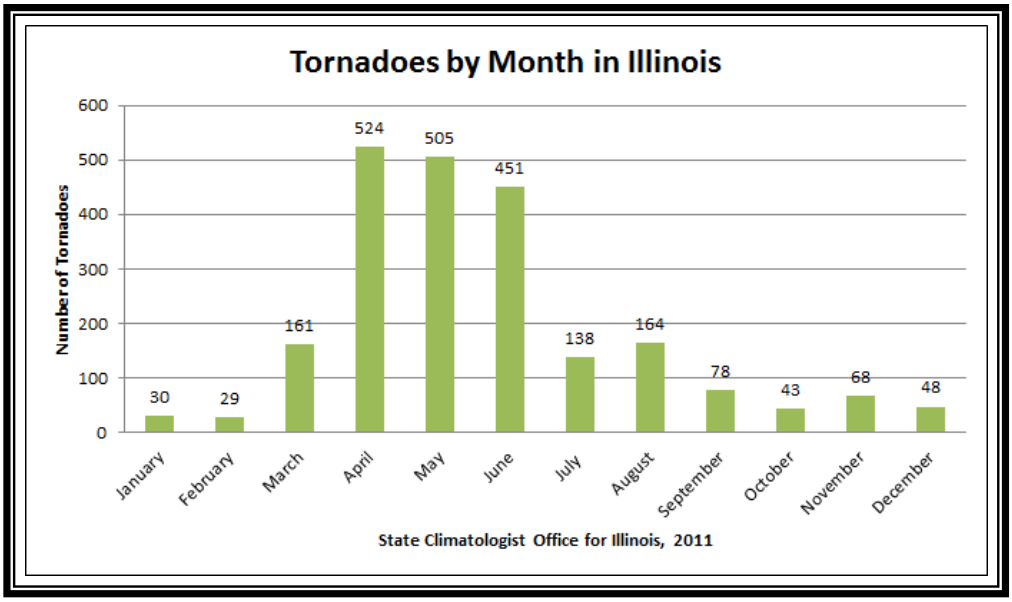
Source: 2013 Illinois Hazard Mitigation Plan

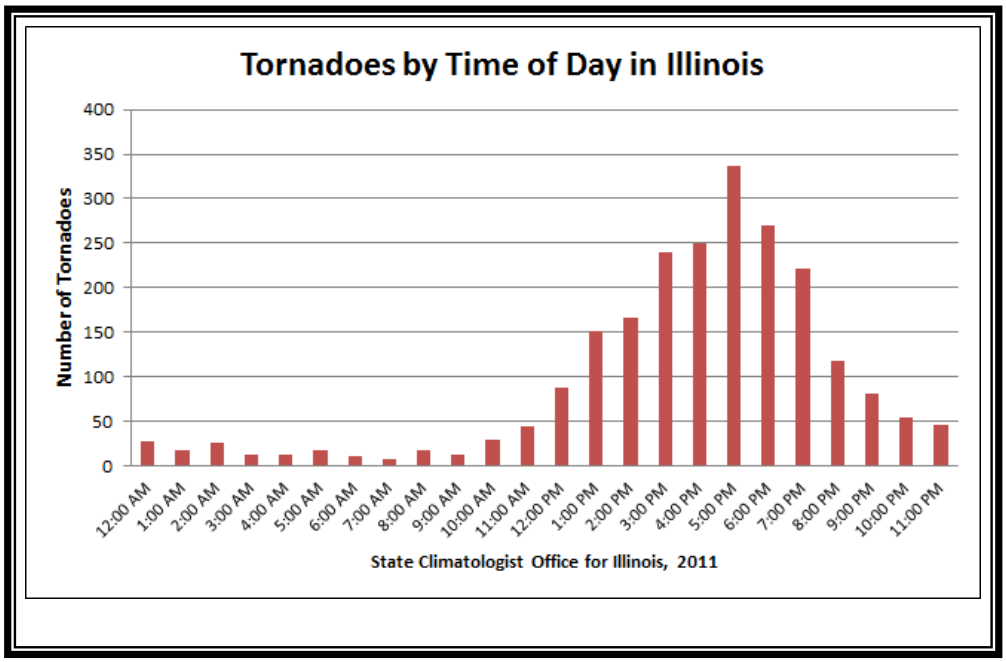
Tornadoes can move forward at up to 70 miles per hour, pause, slow down and change directions. Most have a narrow path, less than a 100 yards wide and couple of miles long. However, damage paths can be more than 1 mile wide and 50 miles long.

Illinois Tornado Statistics 1950 - 2013	
Number of Tornados:	2,257
Fatalities:	244
Injuries:	4,915
Longest Path:	156.7 Miles

Frequency: On average 1253 tornadoes occur each year in the United States. Illinois is tied for 9th in the United States with an average of 26 tornadoes per year. Tornadoes are most likely to occur in April through June, but a tornado can occur at any time. Over half hit between 3:00 and 7:00 p.m.

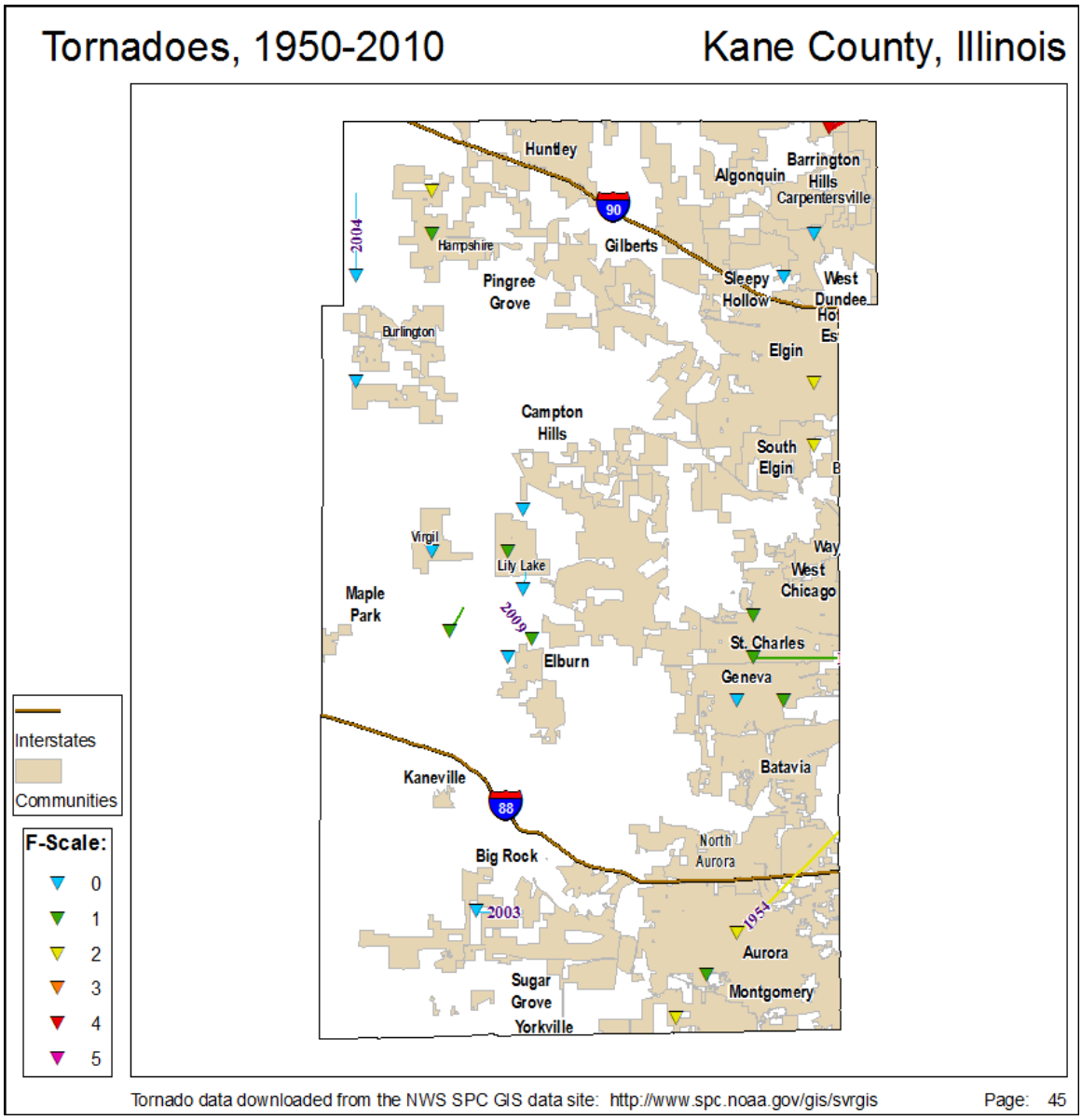
There are no official recurrence intervals calculated for tornadoes.





Historical Events: Since 2000, Kane County has had 7 NWS confirmed tornadoes. These are listed on the next page.

Date	Time	Fujita Rating
5/28/2003	14:19:00	0
5/10/2004	16:55:00	0
8/24/2004	17:13:00	0
8/24/2004	17:21:00	0
8/19/2009	17:00:00	1
8/19/2009	17:15:00	0
10/26/2010	5:55:00	1



Deadly F5 tornado hit Plainfield on Aug. 28, 1990

The best known tornado to strike in northern Illinois was the one that hit northwestern Will County on August 28, 1990. It was part of a storm that developed in Wisconsin at 12:00 p.m. At 1:42 a tornado was spotted northwest of Rockford. It was followed by a golf-ball size hail in Rockford and DeKalb County. At 3:30 the twister hit Plainfield and the Joliet area. The storm and high winds moved on into Indiana.

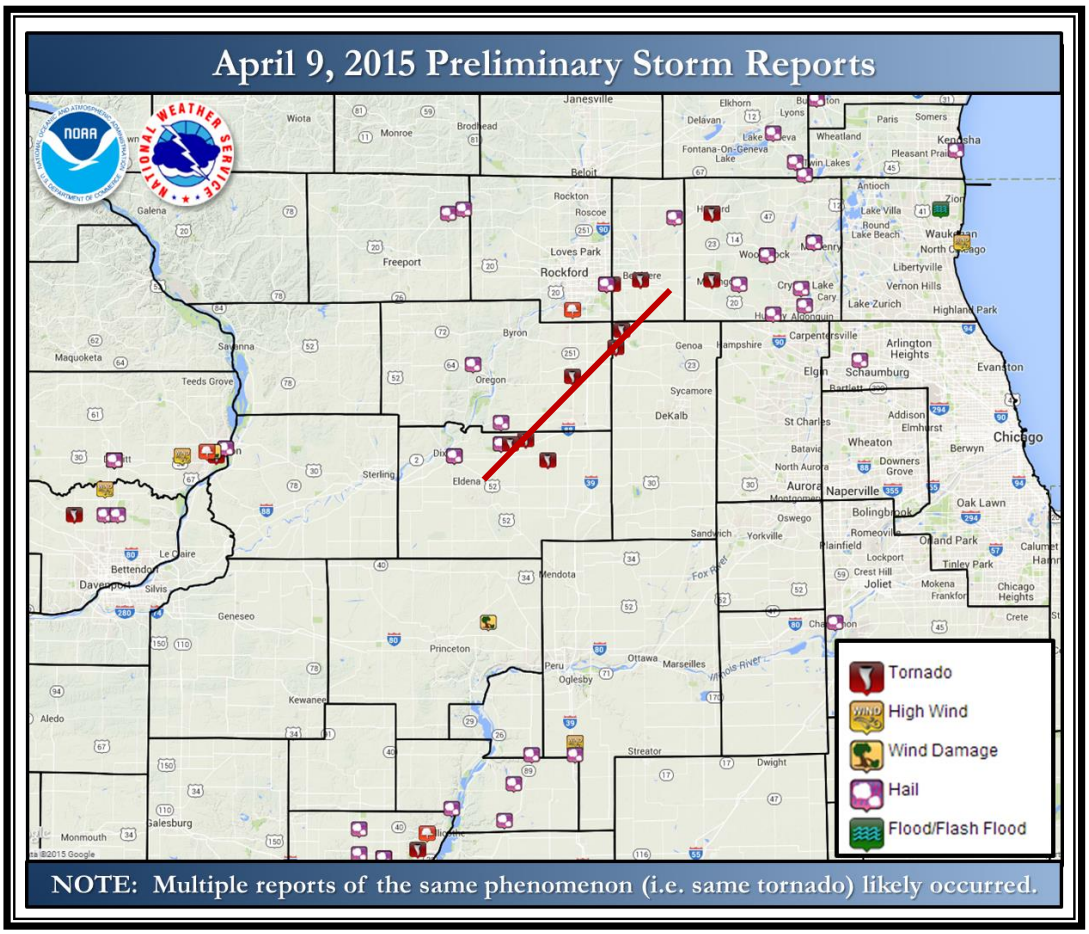
The tornado had winds up to 300 miles per hour, giving it a Fujita rating of F-5. It cut a path of destruction 20 miles long and from 200 yards to half a mile wide. Its impacts are highlighted on page 2-28.

In Kane County, storm damage was most severe at the Aurora airport, where winds of 94 mph were recorded. Planes were flipped over and hangers were damaged. The high winds toppled mature trees in Aurora.

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

Most of the damage, however, was to Will County and three schools in Plainfield. More than 1,200 homes and buildings and at least 50 businesses were damaged or destroyed. Damage to three schools in Plainfield left 1,600 students without classrooms. Luckily, the tornado hit after school had been let out, although there were some deaths among participants in after-school activities.

More recently, on April 9, 2015 an EF-4 tornado, with peak winds estimated at 200 mph, formed north of Franklin Grove in Illinois, was on the ground for 49 minutes and traveled 30.2 miles northeast, passing through the northern portion of the town of Rochelle and then destroying the community of Fairdale in DeKalb County. This storm pasted within 20 miles of the Village of Hampshire in Kane County.



April 9, 2015 Fairdale tornado

The likelihood of a tornado hitting somewhere in the county is 0.3 (30%) in any given year. Assuming a tornado affects one square mile and there are 524 square miles in Kane County, the odds of a tornado hitting any particular square mile in the County is 1 in 1,750 each year or a 0.0006% chance.

Safety: Although recent tornadoes in Kane County did not kill anyone, tornadoes are still killers. The August 1990 twister caused 28 deaths. The table below shows the tornado related fatalities in the United States for the last five years and where they occurred. The number of people who live in mobile homes is far smaller than the number who live in permanent homes, however they have practically the same number of deaths.

The table shows that the residents in mobile homes are at the greatest risk. There are seven mobile home parks within Kane County.

Health: The major health hazard from tornadoes is physical injury from flying debris or being in a collapsed building or mobile home. Based on national statistics for 1970 – 1980, for every person killed by a tornado, 25 people were injured and 1,000 people received some sort of emergency care. The August 1990 twister injured 350 people.

Within a building, flying debris or missiles are generally stopped by interior walls. However, if a building has no partitions any glass, brick or other debris blown into the interior is life threatening. Following a tornado, damaged buildings are a potential health hazard due to instability, electrical system damage, and gas leaks. Sewage and water lines may also be damaged.

Building damage: Although tornadoes strike at random, making all buildings vulnerable, three types of structures are more likely to suffer damage:

- Mobile homes,
- Homes on crawlspaces (more susceptible to lift), and
- Buildings with large spans, such as airplane hangers, gymnasiums and factories.

Structures within the direct path of a tornado vortex are often reduced to rubble. However structures adjacent to the tornadoes path are often severely damaged by high winds flowing into the tornado vortex, known as inflow winds. It is here, adjacent to the tornado's path where the building type and construction techniques are critical to the structures survival.

In 1999, FEMA conducted an extensive damage survey of residential and non-residential buildings in Oklahoma and Kansas following an outbreak of tornadoes on May 3, 1999, which killed 49 people. The assessment found

- The failure for many residential structures occurred where the framing was attached to the foundation or when nails were the primary connectors between the roofing and the walls. A home in Kansas was lifted from its foundation where the addition of nuts to the bolts anchoring the wood framing to the foundation may have been all that was needed to have kept this from happening.

- Roof geometry also played a significant role in a building's performance.
- Failure of garage doors, commercial overhead doors, residential entry doors or large windows caused a significant number of catastrophic building failures.
- Manufactured homes on permanent foundations were found to perform better than those that were not on solid walls.

Critical facilities: Critical facilities are discussed on pages 1-10 – 1-19. Because a tornado can hit anywhere in the County, all of them are susceptible to being hit. Schools are a particular concern, though for two reasons:

- They have large numbers of people present, either during school or as a storm shelter, and
- They have large span areas, such as gyms and theaters.

The 1990 Plainfield tornado was an unfortunate example of this. It struck the Plainfield High School, Grand Prairie Elementary School, St. Mary Immaculate Church and the gymnasium to the Church's elementary school. Cost to repair the two public schools was estimated at up to $35 million. The cost for the church and its school was $5 million.

Large span buildings were also affected in 1990. In addition to the schools and their gyms, hangers at the Aurora airport and Joliet's Essington Road Fire Station were damaged. At this time, we do not know which critical facilities in Kane County may have large span structures.

Economic Impact: The major impact of a tornado on the local economy is damage to businesses and infrastructure. A heavily damaged business, especially one that was barely making a profit, often has to be closed. The post-disaster damage report stated that at least 50 businesses were destroyed by the 1990 tornado.

Infrastructure damage is usually limited to above ground utilities, such as power lines. The 1990 tornado knocked out two 345,000 volt transmission towers, leaving 65,000 Com Ed costumers without power. Damage to phone lines left 14,000 customers without service. Damage to utility lines can usually be repaired or replaced relatively quickly.

Damage to roads and railroads is also localized. If it can't be repaired promptly, alternate transportation routes are usually available. Transportation was disrupted when highways were closed during the August 1990 storm due to high winds and debris.

Public expenditures include search and rescue, shelters, and emergency protection measures. The large expenses are for repairs to public facilities and the clean up and disposal of debris. Most public facilities are insured, so the economic impact on the local treasury may well be small.

Clean up and disposal can be a larger problem, especially with limited landfill capacity near the damage site. Preliminary damage assessments for public expenditures after the 1990 tornado totaled $4 million, 2/3 of that for debris clearance.

2.7. Earthquakes

Earthquakes are one of nature's most damaging hazards. Earthquakes, and the potential damage from earthquakes, are more widespread that people realize. Earthquakes are caused by the release of strain between or within the Earth's tectonic plates. The severity of an earthquake depends on the amount of strain, or energy that is released along a fault or at the epicenter of an earthquake. The energy released by an earthquake is sent to the earth's surface and released.

There are several common measures of earthquakes, including 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. Magnitude is measured by seismographs. The Modified Mercalli Intensity is an observed measurement of the earthquake's intensity felt at the earth's surface. The MMI varies, depending on the observer's location to the earthquake's epicenter.

Earthquake Measurement Scales

Mercalli	Richter	Felt Intensity
I	0-4.3	Not felt except by a very few people under special conditions. Detected mostly by instruments
II		Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III		Felt noticeably indoors. Standing automobiles may rock slightly.
IV	4.3-4.8	Felt by many people indoors, by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V		Felt by nearly everyone. Many People are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	4.8-6.2	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII		Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction,
VIII	6.0-7.3	Damage is slight in specially designed structures, considerable in ordinary buildings, great in poorly built structures. Heavy furniture is overturned.
IX		Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X		Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Landslides occur on steep slopes.
XI	7.3-8.9	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII		Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: *Multi-Hazard Identification and Risk Assessment*

An earthquake's intensity depends on the geologic makeup of the area and the stability of underlying soils. The effects of earthquakes can be localized near its epicenter or felt significant distances away. For example, a 6.8-magnitude earthquake in the New Madrid Fault in Missouri would have a much wider impact than a comparable event on the California Coast. The thick sandstone and limestone strata of the central United States behave as "conductors" of the earthquake's energy, and tremors can be felt hundreds of miles away. By contrast, the geology of the West Coast allows the energy to be dissipated relatively quickly which keeps the effects of an earthquake more localized.

Earthquakes can trigger other types of ground failures which could contribute to the damage. These include landslides, dam failures, and liquefaction. In the last situation, shaking can mix groundwater and soil, liquefying and weakening the ground that supports buildings and severing utility lines. This is a special problem in floodplains where the water table is relatively high and the soils are more susceptible to liquefaction.

The Modified Mercalli and Richter Scales are compared in the table on the previous page, but it is important to note that the Mercalli Intensity varies based on the observer's proximity to the epicenter. Using the example of a 6.8-magnitude earthquake event at the New Madrid Fault, the intensity in St. Louis may be "IX", but in Kane County the intensity may be observed as a "VI."

Historical events: In the United States, the most frequent reports of earthquakes come from the West coast, but the largest earthquakes felt in the US occurred in Missouri in 1811 and 1812 along the New Madrid Fault. The Great New Madrid Earthquakes are the benchmarks from which all earthquakes in the Midwest are measured. An important fact is that the earthquakes of 1811 and 1812 were not single events. Rather the earthquakes were a series of over 2,000 shocks in five months.

Five of these quakes were larger than a magnitude of 8 on the Richter Scale, which totally destroyed the town of New Madrid. The earthquakes caused the land to roll in visible waves that raised and sank land as much as 20 feet. The tremors of these earthquakes were no doubt felt throughout all of Illinois, since the quakes are said to have rung church bells in New England.

There was a report of a quake at Fort Dearborn (Chicago) in August 1804. On October 31, 1895 an earthquake near Charlestown, Missouri measured 6.2 on the Richter Scale and caused damage up to level IX on the MMI Scale. The US Geological Survey website, "Earthquake History of Illinois" provides the following reports:

> Among the largest earthquakes occurring in Illinois was the May 26, 1909, shock which knocked over many chimneys at Aurora. It was felt over 500,000 square miles and strongly felt in Iowa and Wisconsin. Buildings swayed in Chicago where there was fear that the walls would collapse. Beds moved on their casters…. [G]as line connections broke at Aurora. [This was listed as an MMI VII.]
>
> In January, 1912 an MMI VI occurred "Near Aurora, Freeport, Morris, and Yorkville, Illinois…The highest intensity was reported at those towns in Kane, Stephenson, Grundy, and Kendall Counties, respectively. Slight damage to chimneys was

reported at Batavia and Geneva, Ill., north of Aurora, in Kane County. Two distinct shocks were observed at some places.

Frequency: About 200 earthquakes happen each year in the New Madrid seismic zone, but most are too small to be felt by people. The larger ones are listed in the table to the right. None of these caused much damage in the affected areas of the state.

Recent Earthquakes Felt in Illinois

Richter	Date	Epicenter
5.0	May 10, 1987	Near Lawrenceville IL
4.5	Sep. 28, 1989	15 miles south of Cairo, IL
4.7	Apr. 27, 1989	15 miles SW of Caruthersville, MO
4.6	Sep. 26, 1990	10 miles south of Cape Girardeau, MO
4.6	May 3, 1991	10 miles west of New Madrid, MO
4.2	Feb. 5, 1994	Lick Creek-Goreville Area
4.2	June 28, 2004	8 miles E of Troy Grove, IL
3.6	Jan. 2, 2006	2 miles NNW of Equality, IL
5.2	April 18, 2008	5 miles NNE of Bellmont, IL
3.8	February 10, 2010	2 miles ENE from Virgil, IL

Source: Illinois Hazard Mitigation Plan /, US Geological Survey

Small earthquakes ranging in magnitude from 3.0 to 5.0 on the Richter scale occur about once every 20 years in Kane County. The most significant of these was the May 26, 1909.

Although it is estimated that the earthquakes of 1811 and 1812 are likely to occur once every 500 to 600 years, it is still likely that a damaging earthquake (6.0 to 7.6 on the Richter Scale) is likely to occur in this lifetime. The table to the right shows the estimated probability of damaging earthquakes in Illinois.

According to the Central U.S. Earthquake Consortium, Kane County is in an earthquake intensity zone of VI (MMI Scale) for a 7.6-magnitude earthquake along the New Madrid Seismic Zone. There is a 19% – 29% chance that the County will be hit with an earthquake with a MMI intensity of VI over the next 35 years. This would be slightly less than a 1% chance in any given year. As noted in the table on page 2-32, this level of quake would be felt by everyone, but would cause minor structural damage.

Probability of Earthquake Event in The New Madrid Seismic Zone

Richter	Year 2000	Year 2035
6.3	40% - 63%	86% - 97%
7.6	5.4% - 8.7%	19% - 29%
8.3	0.3% - 1.0%	2.7% - 4.0%

Source: Illinois State Geological Survey

It is important to note that the level of damage is dependent on the location of the earthquake. There are faults and other potential sources of a quake closer to Kane County than New Madrid, Missouri.

Safety: Approximately 1,600 people have been killed by earthquakes in the US since colonial times, 1,000 of them were in California and 700 of those were in the 1906 San Francisco quake. “Trauma caused by partial or complete collapse of human-made structures is the overwhelming cause of death and injury in most earthquakes.” (*The Public Health Consequences of Disasters, pages 18 – 19.*)

Vulnerable buildings, roads, bridges and utility lines and the unpredictability and instantaneous nature of earthquakes can result in enormous losses of life. The table to the right shows the number of deaths in the larger quakes in the United States over the last 30 years. Note that some earthquakes with high Richter ratings, such as the one at Big Bear Lake, have low death counts because they occurred in unpopulated areas.

US Earthquakes Deaths since 1970-2014

Year	Location	Richter	Deaths
1971	San Fernando, CA	6.4	65
1975	Hawaii	7.2	2
1983	Borah Peak, ID	6.5	2
1987	Whittier, CA	5.9	8
1989	Loma Prieta, CA	7.1	63
1991	Arcadia, CA	6.0	2
1992	Landers, CA	7.4	3
1994	Northridge, CA	6.9	60
1995	Wyoming	5.3	1
2003	San Simeon, CA	6.6	2

Source: US Geological Survey
Data on this page is current as of December 2014

Because the greatest potential for loss of life is to people within a collapsing building, the threat to Kane County residents is directly related to the condition of the buildings. This is discussed below under building damage. Other life safety threats include collapsing roads and bridges, flooding from dam breaches, fires from ruptured gas lines, and release of hazardous chemicals from broken storage tanks or trucks.

Health: The main health concerns from earthquakes arise from sheltering people and caring for injuries. These would be the same as for other quick and destructive hazards, such as tornadoes.

Building damage: Generally, wood frame buildings and structures on solid ground fare best during an earthquake. Wood frame buildings are flexible enough to withstand ground shaking and swaying. Evaluations of recent earthquakes found that damage was primarily caused to:

- Unreinforced masonry structures,
- Older buildings with some degree of deterioration,
- Buildings without foundation ties.
- Multi-story structures with open or “soft” first floors, and

Most building codes have standards related to the first three concerns. This means that the most threatened buildings are older ones (built before current codes), masonry ones, and taller ones with open first floors.

In addition to the building type, damage is related to the underlying soils. Buildings on solid ground fare better, while those on loose or sandy soils will suffer more from shaking. These can be found in floodplains. If there is enough water present, the shaking can liquefy the underlying soils, which removes the support under the foundation.

Given the relatively low threat of a quake at a MMI scale of VII or greater, the threat to buildings in Kane County would be limited to large, older, unreinforced masonry structures. There is no readily available data on the number and location of these types.

Critical Facilities: Damage to critical facilities would be similar to damage to other types of buildings. However, sometimes, just a little damage can render the facility useless. Example: a minor shift in a fire station can effectively clamp the doors shut. If the fire trucks cannot get out, the fire department's critical duties cannot be performed.

Economic Impact: As with tornadoes, the major impact of an earthquake on the local economy is damage to businesses and infrastructure. Public expenditures for repairs to public facilities and clean up and disposal of debris can be high, especially if the structures are not insured for earthquakes.

Damage to infrastructure and utilities can be very high. Roads and bridges can suffer substantial damage. Subsurface pipes, such as water and gas lines, can break. Water supply dams can be breached. Power poles can fall. While these can all be repaired, it may take a long time depending on how widespread the damage is. The longer it takes, the greater the economic impact and likelihood that some businesses will not recover.

2.8. Thunderstorms

Thunderstorms are most likely to happen in the spring and summer months and during the afternoon and evening hours but can occur year-round and at all hours. The biggest threats from thunderstorms are flash flooding and lightning. In most cases, flash flooding occurs in small drainage areas where water quickly accumulates before it drains to the mapped floodplains discussed in sections 2.1 and 2.2. When taken together, these local drainage problems can be as great a problem as overbank flooding.

Thunderstorms bring lightning and local flash flooding

> Most municipalities have areas of flooding related to local drainage, some more than others. It appears that local drainage flooding is more problematic than overbank flooding in many municipalities….
>
> Local drainage problems are often the result of structures located in isolated depressions and former wetlands with no surface outlet. Other local drainage problems are associated with older developments (post World War II and pre-detention) that were constructed without effective stormwater drainage systems. (*Comprehensive Stormwater Management Plan*)

Severe Storm Loss Estimate

County	**Number of Severe Storms 1950-2012**	**Total Recorded Loss**	**Average $ in property damage per event**	**Annual Probability of Event**	**Estimated Annual Loss**
Kane	382	$1,620,800	$4,242.93	616.1%	$26,141.94

Source: 2013 Illinois Hazard Mitigation Plan

Lightning, which occurs during all thunderstorms, can strike anywhere. Generated by the buildup of charged ions in a thundercloud, the discharge of a lightning bolt interacts with the best conducting object or surface on the ground. The air in the channel of a lightning strike reaches temperatures higher than 50,000°F. The rapid heating and cooling of the air near the channel causes a shock wave which produces thunder.

Other threats from thunderstorms include downburst winds, high winds, hail and tornadoes. Downburst winds are strong, concentrated, straight-line winds created by falling rain and sinking air that can reach speeds of 125 mph (200 km/h).

Hailstones are ice crystals that form within a low-pressure front due to warm air rising rapidly into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation. The size of hailstones is a direct function of the severity and size of the storm. Significant damage does not result until the stones reach 1.5 inches in diameter, which occurs in less than half of all hailstorms.

Building damaged by microburst, July 7, 1994 storm in Aurora

Source: Aurora Emergency Management

The National Weather Service classifies a thunderstorm as severe if its winds reach or exceed 58 mph, produces a tornado, or drops surface hail at least 0.75 inch in diameter. Compared with other atmospheric hazards such as tropical cyclones and winter low pressure systems, individual thunderstorms affect relatively small geographic areas. The average thunderstorm system is approximately 15 miles in diameter (75 square miles) and typically lasts less than 30 minutes at a single location. However, weather monitoring reports indicate that coherent thunder-storm systems can travel intact for distances in excess of 600 miles.

Historical events: Generally, thunderstorms and their accompanying hazards do not warrant a disaster declaration or a lot of documentation. Based on the reports submitted by the municipalities, there have been many storms and they have had a variety of impacts.

Storms in July 1993 caused numerous flash flood events. Three to six inches fell over portions of McHenry, DeKalb, Kane, DuPage, and Cook counties on July 18-19. Some 500 residents below an earthen dam were evacuated in McHenry County after officials expressed concerns the dam might break. Fortunately the dam held. In DeKalb County, 300-400 residents of a trailer park were evacuated in Sycamore due to flash flooding of the Kishwaukee River.

Frequency: The Kane County area averages 60 – 70 thunderstorm events each year (*Multi Hazard Identification and Risk Assessment*, page 31). They average an hour in

duration. It is estimated that only five storms each year have the hailstorms and high winds to be considered a severe thunderstorm. Assuming the average severe storm affects 100 square miles, the odds of a severe thunderstorm hitting any particular square mile in Kane County are 1 to 1 or 100%.

Safety: The threat to life varies by the cause of death. Between 1995 and 2013, the National Weather Service reported 58 people in Illinois were killed by flash floods, wind and lightning brought by thunderstorms (see table). Hail rarely causes loss of life.

Most of these deaths can be prevented through safe practices. Much information has come out over the last 20 years about lightning safety, for example. Before 1990, an average of 89 people were killed by lightning each year. By 2000, this number had dropped to 52.

Thunderstorm Deaths, Illinois and United States

	Lightning		Wind		Flash Flood		Total	
	IL	US	IL	US	IL	US	IL	US
1995	1	85	2	38	0	60	3	183
1996	2	52	0	23	2	94	4	169
1997	1	42	0	37	0	86	1	165
1998	0	44	0	41	0	118	0	203
1999	2	46	0	29	0	60	2	135
2000	0	51	1	25	3	29	4	105
2001	5	44	1	17	0	35	6	96
2002	1	51	5	45	1	38	7	134
2003	0	43	0	43	1	67	1	153
2004	0	32	1	42	0	58	1	132
2005	1	38	0	22	0	28	1	88
2006	1	47	0	39	0	59	1	145
2007	1	45	4	34	0	70	5	149
2008	0	27	3	70	4	58	7	155
2009	0	34	1	47	2	33	3	114
2010	1	29	1	33	1	67	3	129
2011	0	26	1	76	2	69	3	171
2012	1	28	0	104	0	19	1	151
2013	2	23	0	36	3	60	5	119
Total	19	787	20	801	19	1108	58	2,696

Source: National Weather Service.

Health: No special health problems are attributable to thunderstorms, other than the potential for tetanus and other diseases that arise from injuries and damaged property. When lightning strikes a human being, serious burns or death are the common outcomes. For every person killed by lightning, three people are injured. For those who survive, their injuries can lead to permanent disabilities. 70% of the survivors suffer serious, long-term effects, such as memory loss, sleep disorders, depression, and fatigue.

Buildings: As with tornadoes, mobile homes are at a high risk to damage from thunderstorms. Wind and water damage can result when windows are broken by flying debris or hail. Lightning can cause direct damage to structures (especially those without lightning protection systems) and can cause fires that damage forests and structures. In 1993, damage from thunderstorm winds was $348.7 million and lightning caused an additional $32.5 million in damage.

Hail can inflict severe damage to roofs, windows and siding, depending on hailstone size and winds. One study of insured losses in St. Louis found that 75% of the dollar damage was to roofing, 12% to awnings, 6% to exterior paint, 4% to glass and 3% to siding (*Hail Loss Potential in the US*, page 2). The Village of Virgil reports that the May 12, 1998

hailstorm caused an average damage of $15,000 – $20,000 per home, with some as high as $100,000.

Of the nation's "Top Ten" hailstorms between 1994 and 2000, number 4 was the May 18, 2000, storm in the Chicago suburbs. A total of $572 million was paid in property claims.

Critical Facilities: Critical facilities are susceptible to the same damage and disruption from thunderstorms as other buildings. Emergency operations can be disrupted as thunderstorms and lightning affect radio communications and antennas are a prime target for lightning.

Economic Impact: Thunderstorms, flash flooding, wind and hail can all (or separately) destroy crops in the field. Long stemmed vegetation, such as corn and wheat, is particularly vulnerable to hail. Winds greater than 39 miles per hour can damage crops during the growing season. Lightning is one of the major causes of forest fires. Fortunately, these impacts are relatively localized.

Thunderstorms can impact transportation and utilities. Airplanes have crashed when hit by downbursts or lightning. Automobiles and their windshields are subject to damage by hail. Power lines can be knocked out by lightning or knocked down by wind and debris. Lightning can also cause power surges that damage appliances, electronic equipment and computers.

2.9. Winter Storms

Severe Winter Storm Loss Estimates					
County	**Number of Severe Winter Storms 1960-2012**	**Total Recorded Loss**	**Average $ in property damage per event**	**Annual Probability of Event**	**Estimated Annual Loss**
Kane	46	$4,166,905	$90,584.90	88.5%	$80,132.80
Source: 2013 Illinois Hazard Mitigation Plan					

The Illinois Emergency Management Agency defines a severe winter storm as a storm that meets one or more of the following criteria:

- A snowstorm that produces six inches or more of snow within 48 hours or less,
- An ice storm in which 10% of the cooperative National Weather Service stations in Illinois report glaze, and/or
- A snowstorm or ice storm in which deaths, injuries, or property damage occurs.

There are many ways for winter storms to form, but certain key ingredients are needed. First temperatures must be below freezing in the clouds and near the ground. There must be a source of moisture in the form of evaporating water. Then lift in the atmosphere causes the moisture to rise and form clouds of precipitation.

Winter storms in the Midwest are caused by Canadian and Arctic cold fronts that push snow and ice deep into the interior region of the United States. Our area is also subject to lake effect snowstorms that develop from the passage of cold air over the relatively warm surface of Lake Michigan which can cause heavy snowfall and blizzard conditions.

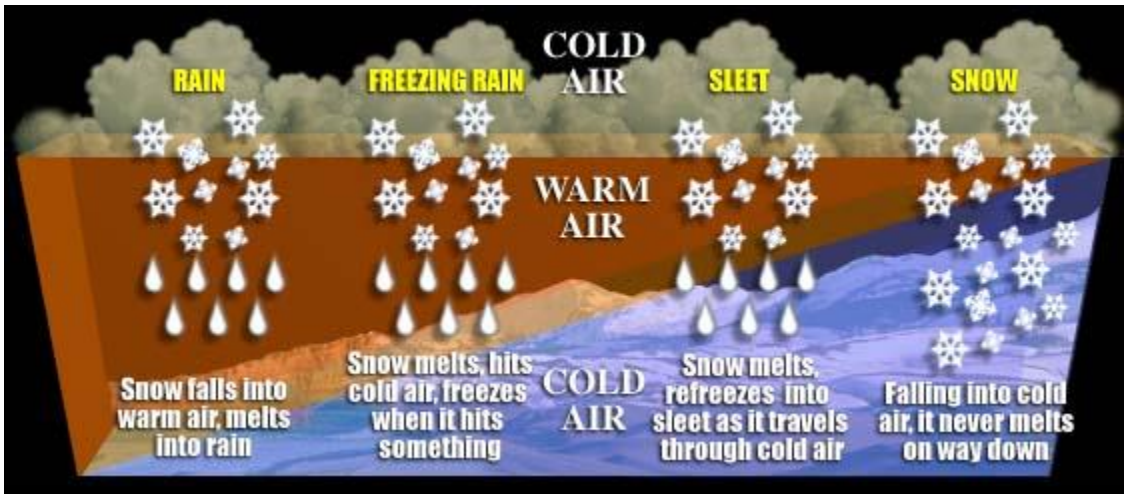
Winter storms can occur as heavy snowfalls, ice storms or extreme cold temperatures. Winter storms can occur as a single event or they can occur in combination which can make an event more severe. For example, a moderate snowfall could create severe conditions if it were followed by freezing rain and subsequent extremely cold temperatures. The aftermath of a winter storm can impact a community or region for weeks, and even months.

Snow: Heavy snowfalls can range from large accumulations of snow over many hours to blizzard conditions with blowing snow that could last several days. The National Weather Service's snow classification is in the table on the next page.

Snow Classifications	
Blizzard	Winds of 35 miles per hour or more with snow and blowing snow reducing visibility to less that ¼ mile for at least 3 hours.
Blowing Snow	Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
Snow Squalls	Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
Snow Showers	Snow falling at varying intensities for brief periods of time. Some accumulation possible.
Snow Flurries	Light snow falling for short duration with little or no accumulation.
Source: National Weather Service	

Ice Storms: An ice storm occurs when freezing rain falls from clouds and freezes immediately upon impact. Freezing rain is found in between sleet and rain. It occurs when the precipitation falls into a large layer of warm air and then does not have time to refreeze in a cold layer (near or below 32°F) before it comes in contact with the surface which is also near or below 32°F, as illustrated below.

Note that ice jam flooding is covered under the flood hazard. It is not related to ice storms, but the breakup of frozen rivers in later winter.



Source: University of Nebraska website, http://hpccsun.unl.edu/nebraska/icestorms.html

Reports on smaller recent winter storms are summarized in the table below.

Frequency: During the 20th century, there were at least two severe winter storms in Illinois each year. In an average year, five severe winter storms strike somewhere in the state. Due to the geographic latitude, and its proximity to the Great Lakes, most of these would hit Kane County, although ice storms are more common in the central part of the state, where temperatures are warmer. Therefore, the odds of a winter storm hitting Kane County in any given year are 1:1 or a 100% chance.

Safety: Winter storms bring the following two types of safety hazards:

- Weather related hazards, including hazardous driving and walking conditions and heart attacks from shoveling snow.
- Extreme cold, from the low temperatures, wind chill, and loss of heat due to power outages.

In the United States, the number of deaths peaks in midwinter and reaches a low point in late summer, but most deaths are

Winter Storm Deaths
Illinois and United States

	Winter Weather		Cold Related		Total	
	IL	US	IL	US	IL	US
1995	0	11	0	22	0	33
1996	1	86	5	62	6	148
1997	10	90	8	51	18	141
1998	2	68	0	11	2	79
1999	2	41	1	7	3	48
2000	1	33	0	15	1	48
2001	0	18	0	4	0	22
2002	0	17	0	11	0	28
2003	0	28	4	20	4	48
2004	1	28	17	27	18	55
2005	0	34	8	24	8	58
2006	0	17	1	2	1	19
2007	1	16	15	47	16	63
2008	0	21	26	44	26	65
2009	0	28	15	33	15	61
2010	0	21	18	34	18	55
2011	2	17	8	29	10	46
2012	0	11	3	8	3	19
2013	0	21	16	27	16	48
Total	20	606	145	475	165	1084

not directly related to the weather. The table to the right shows that winter storms have lead to more deaths in Illinois that any other natural hazard. Certain populations are especially vulnerable to the cold, including the elderly, the homeless, and lower income families with heating problems.

Health: About 70% of the injuries caused by snow and ice storms result from vehicle accidents and 25% occur to people caught out in the storm.

The effect of cold on people is usually made more severe by the impact of wind chill factors. Wind chill is reported as a temperature, but is not the actual temperature. Rather it is how wind and cold feel on exposed skin. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature.

Extreme cold can result in people and animals suffering from frostbite and hypothermia. Frostbite is damage to tissue caused by the effects of ice crystals in frozen tissue. Extremities (hands, feet, ears, nose) with more circulation difficulties are most frequently affected.

Injuries Related to Cold

- 50% happen to people over 60 years old
- More than 75% happen to males
- About 20% happen at home

Hypothermia is the lowering of the core body temperature. It is "clinically significant" when the body temperature is below 95°F. Severe hypothermia occurs when the body's temperature drops below 85°F, resulting in unconsciousness. If help does not come, death follows. Great care is needed to properly rewarm even mild cases.

Buildings: Historically, roofs would collapse due to heavy snow loads, but most buildings in Kane County are now constructed with low temperatures, snow loads and ice storms in mind. With today's energy consciousness, buildings are much better insulated than they were 50 years ago. Winter storms do not have a major impact on buildings.

Critical Facilities: The major impacts of snow and ice storms on property are to utilities and roads. Power lines and tree limbs are coated with heavy ice resulting in disrupted power and telephone service, often for days. Even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and over passes are particularly dangerous because they freeze before other surfaces.

Above ground lines are especially susceptible to damage by ice storms. The loss of power has a ripple affect to many other properties.

Source: Matthew Masek, University of Nebraska

Economic impact: Loss of power means businesses and manufacturing concerns must close down. Loss of access due to snow or ice covered roads has a similar effect. The effects are particularly difficult when the storm is widespread, like the ones in 1967 and 1979 were.

Prolonged periods of snow and cold temperatures can be damaging to agriculture. Fruit trees can be damaged by severe cold or ice accumulation, and livestock may freeze or be more susceptible to disease. Rapid melting of heavy snow cover in the spring can flood farmland and delay spring planting.

2.10. Conclusions

This chapter provides information on the five natural hazards that have the greatest impact on Kane County: floods, tornadoes, earthquakes, thunderstorms and winter/ice storms. Data on the hazards are provided in terms of severity, frequency and historical occurrences.

The impacts of these hazards are reviewed under four categories: impact on people (e.g., safety and health), damage to buildings, damage to critical facilities, and economic disruption (damage to businesses and infrastructure).

While it is hard to compare different natural phenomena, a general summary can show how they impact the County. This is done in the table on the next page, "Impact of the Hazards."

Frequency: The annual chance column in the table shows the likelihood of occurrence in any given year. These numbers are discussed in the "Frequency" section of each hazard.

Location: The location and area affected by a single occurrence is shown.

Safety: The safety hazard rating for thunderstorms and winter/ice storms is relatively high because each has killed 20 people in Illinois since 1995. Floods have resulted in 11 deaths and tornadoes 4 during the same time period. There have been no killer earthquakes in Illinois since 1995 and the 1% chance quake is only expected to cause minor damage to buildings.

Property damage: The property damage column is a factor of the estimated damage per structure times the number of structures likely to be damaged by the hazard. A tornado that will destroy 50 $100,000 homes produces $5 million in property damage, the same as a flood that causes $25,000 in damage to 200 homes.

Critical facilities: The types of critical facilities and infrastructure that are affected are listed.

Economic disruption: Typical impacts on businesses and utilities are listed in this column.

Overall, we have adequate data on the hazards affecting the County as a whole. However, to measure the impact on individual communities and locations, such as critical facilities, requires additional effort beyond the scope of this county-wide plan. It is recommended,

once funding is available, that each critical facility be investigated further to determine its vulnerability to damage by the hazards reviewed in this chapter.

Impact of the Hazards							
Hazard	**Annual Chance**	**Impact Location**	**Sq. miles Affected**	**Safety Hazard**	**Property Damage**	**Vulnerable Critical Facilities**	**Economic Disruption**
Base Flood	1%	Floodplains	57	Med	Major	18 facilities	Businesses, roads damaged/closed
10-year Flood	10%	Floodways	13	Med	Moderate	3 Emergency response facilities, 2 casinos	Roads closed
Dam Failure	< 1%	Floodplains	N/A	Med	Major	N/A	Businesses, roads damaged/closes
Tornadoes	30%	Anywhere	1	Med	Major	Schools, buildings with large spaces	Utility lines down
Earthquakes	1%	Urban areas	100	Low	Minor	Masonry structures, items on shelves, etc.	Minor impact
Thunderstorms	100%	Anywhere	100	High	Minor	Radio communications disrupted	Hail damage to crops, transportation disrupted, power surges
Winter Storms	100%	Anywhere	500	High	Minor	Power losses	Utility lines down, livestock threatened

2.11. References

1. "Federal Disaster and Emergency Assistance, 1990 – 2002, Kane County, Illinois," FEMA, 2003

2. Flood insurance claims records, Federal Emergency Management Agency, as of June 30, 2014

3. Flood Insurance Study and Flood Insurance Rate Map, Kane County and incorporated areas, FEMA, August 3, 2009 and July 17, 2012

4. *Floods of July 18-20, 1996 in Northern Illinois*, US Geological Survey, Open-File Report 97-425.

5. *Hail Loss Potential in the US*, Insurance Institute for Property Loss Reduction, 1995.

6. *Illinois Hazard Mitigation Plan*, Illinois Emergency Management Agency, 2013.

7. Institute of Business and Home Safety website, www.IBHS.org.

8. *Multi-Hazard Identification and Risk Assessment*, Federal Emergency Management Agency, 1997.

9. National Lightning Safety Institute website, www.lightningsafety.com

10. *River Mileages and Drainage Areas for Illinois Streams*, US Geological Survey, Water-Resources Investigations 79-111.

11. Survey of municipalities, Spring 2013.

12. *The Public Health Consequences of Disasters*, U.S. Department of Health and Human Services, Public Health Service, 1989.

13. Tornado Project Online, at web address: www.tornadoproject.com

14. *Understanding Your Risks – Identifying Hazards and Estimating Losses*, FEMA 386-2, 2001

15. University of Nebraska website, http://www.hprcc.unl.edu/nebraska/U_S_SEVERE.html

16. US Geological Survey website, "Earthquake History of Illinois," http://neic.usgs.gov/neis/states/illinois/illinois_history.html

17. US Geological Survey website, "Historic United States Earthquakes" http://earthquake.usgs.gov/regional/states/historical.php

Chapter 3. Goals

The goals for this planning effort were established by the Natural Hazards Mitigation Planning Committee. The goals were developed to reflect on current community priorities, to be consistent with current countywide planning efforts, and in consideration of the impact of each natural hazard that affects Kane County. On March 6, 2003, the original Committee conducted several exercises to outline the goals for this mitigation plan and to develop guidelines for funding and implementation.

During the update process in 2014/2015, the committee reviewed these goals and guidelines and determined that each one did not contradict the goals set in the other plans listed below under 3.1, are still in-step with current community priorities, and are still relevant. The goals and guidelines are also consistent with the current hazard analysis in chapter 2. Therefore the committee determined that the goals and guidelines did not need to be changed. The information below mostly outlines the actions of the original committee's development of the goals and guidelines.

3.1. Setting the stage

The Committee recognized that the goals of this plan need to be consistent and complement the goals of other Kane County planning efforts. In 1996, the 2020 Land Resource Management Plan was adopted and it set "Countywide Planning Goals." These Goals were updated in the 2030 Land Resource Management Plan, adopted in 2004. More recently the goals were updated as part of the 2040 Quality of Kane Plan adopted in 2013. In 1998, the Comprehensive Stormwater Management Plan was adopted. This countywide plan established goals to minimize stormwater damage and for watershed protection. The goals for these plans are listed on the next page.

After a review of the goals set by the previous County planning efforts, the Committee reviewed current community priorities in order to set the stage for determining the direction of the natural hazard mitigation strategies. The Committee was broken into five small groups of roughly equal size. Everyone was asked:

> What are the top five priorities for your community and Kane County? What do your community leaders hold as most important? Do not answer this from your personal views, but reflect the position of your city council, village board, County Board or organization's constituency.

Each person submitted his or her five suggestions to the group. Groups then consolidated their list into their five top community priorities. Each group then reported to the whole committee. The results were posted as reminders of what is important to Kane County. There was no attempt to develop a master list of community priorities. The exercise was to put people in a frame of mind, thinking about the future of the County, in preparation for the rest of the goal setting exercises.

2020 Land Resource Management Plan
Countywide Planning Goals

Employment: Kane County's present position as an economically balanced community (employment equal to labor force) should be maintained.

People: All types of people should be able to live in Kane County so that a labor force with diversified skills and training is available.

Housing: Housing of all sizes, types, and prices should be available.

Environmental Considerations: Every person has the right to live and work in an attractive and healthful environment.

Natural Resources: All development decisions should consider the conservation and wise use of the soil, air, water resources, and the natural environment of Kane County.

Agricultural Preservation: Support the conservation, protection, development, and improvement of agricultural land for the production of food and other agricultural products.

Historic Preservation: Protect and maintain local historic and cultural resources that contribute to the character of Kane County.

Transportation: Provide safe, efficient transportation systems compatible with land use.

Cooperative Planning: Work with the various jurisdictions located within Kane County to achieve a shared community vision.

Source: *2020 Land Resource Management Plan*, 1996, page 10

2030 Land Resource Management Plan
Countywide Smart Growth Planning Goals

1. Mix Land Uses
2. Take advantage of compact-building design
3. Create a range of housing opportunities and choices
4. Create walkable neighborhoods
5. Foster distinctive, attractive communities with a strong sense of place
6. Preserve open space, farmland, natural beauty, and critical environmental areas
7. Strengthen and direct development towards existing communities
8. Provide a variety of transportation choices
9. Make development decisions predictable, fair and cost effective
10. Encourage community and stakeholder collaboration in development decisions

Source: *2030 Land Resource Management Plan*, 2004, page 179

2040 Land Resource Management Plan
Countywide Planning Goals

Healthy Communities -- Improve the health of Kane County's citizens, including its children, by consciously making changes to the environment that support active living, healthy eating, and local food production.

Economic Prosperity -- Maintain and strengthen the County's economic edge and respond to demographic changes, workforce development, technology and the changing global economy.

Housing -- Create a range of housing opportunities and choices that meet the needs of the projected population growth and changing demographics.

Mobility and Connectivity -- Improve connectivity, construct needed infrastructure, and increase travel options that provide safe access to land uses for motorists, pedestrians, cyclists and public transportation patrons, while enhancing and improving the health of the population.

Agriculture: Food and Farm -- Expand production of locally grown foods, and support production agriculture and farmland preservation.

Green Infrastructure and Water Resources -- Enhance and expand the County's green infrastructure, protect the local water supply, and improve water quality through best management practices.

Land Use and Built Environment -- Collaborate with the municipalities to ensure that 50% of the area of the County is in agriculture and open space uses by 2040 by focusing compact, mixed use development within established urban areas, employment centers, and along transportation corridors.

Sustainability and Energy -- Promote quality of life, financial prosperity, innovative ideas and technologies while improving energy efficiency; and reducing fossil fuel emissions and energy use.

Historic Preservation -- Protect historic and cultural resources to preserve and revitalize community character.

Cooperative Planning -- Partner with the Chicago Metropolitan Agency for Planning, municipalities, and other stakeholders to coordinate planning efforts to meet regional and local goals.

Comprehensive Stormwater Management Plan Goals

1. Establish a unified stormwater management framework with uniform, countywide stormwater management standards.
2. Minimize and reduce stormwater damages to existing structures and land use, including agriculture to maximize the protection of public health, safety, and welfare.
3. Require adequate stormwater management measures for all new development to minimize increases in stormwater damages.
4. Encourage the development of an area-wide, unified emergency program with an emphasis on improved preparation and effective communication capabilities.
5. Identify, protect, and improve floodplains, waterways, lakes, ponds, wetlands, and groundwater recharge areas.
6. Protect and improve water quality.
7. Create, enhance, and promote public awareness and understanding of stormwater management issues to meet the Goals and Objectives of the Stormwater Management Program.
8. Identify and develop revenue sources to complete the goals and objectives, and to implement the adopted stormwater management program.
9. Develop and maintain a comprehensive data base for each watershed within the County.
10. Evaluate and encourage the continuation, where appropriate, of existing drainage districts. Promote and encourage reorganization of watershed based drainage districts which can provide for the implementation of the Countywide Stormwater Management Plan.

Source: *Stormwater Management Plan,* 1998, pages 4 – 6

The community priorities reported by the five groups were:

<u>Priorities selected by 3 groups</u>
Control/hold up the rate of growth
Improve roads and highways
Provide a safe place to live and work

<u>Priorities selected by 2 groups</u>
Improve schools and educational programs
Improve/get more businesses
Preserve historic and cultural resources
Protect natural resources, open space, parks
Improve municipal services
Develop commercial/industrial businesses
Improve quality of life

<u>Priorities selected by 1 group</u>
Improve/get more open space
Improve/get more recreation facilities
Preserve farmlands
Promote economic growth through development of new business
Enhance public infrastructure and cultural resources

One of the small groups during the 2003 goal setting exercises

The next step in setting the stage of current planning and mitigation efforts in Kane County was to complete the conclusions to the hazard analysis in Chapter 2 – that is, identify the impact of the natural hazards that the County is subject to.

Each person scored each hazard for its overall impact on his/her community. A score of 5 means it has a major impact and 1 means the hazard has little or no impact on the community. The groups tallied their scores and discussed the scores and why they ranked some hazards higher or lower than others.

Each group then reported to the whole committee. The results were tallied and are presented here:

Hazard	Total
Tornadoes	131
Base Flood	112
Winter Storms	100
Thunderstorms	98
10-year Flood	89
Dam failure	45
Earthquakes	28

Tallying the hazard votes

In the discussion that followed, it was noted that people feel that even though tornadoes have a low probability of occurrence and affect relatively small areas, they have a dramatic impact on those affected. Floods, on the other hand, are more common and widespread, but have less of an overall impact, especially on safety and health, and the damage is more predictable. Thunderstorms and winter storms were felt to be chronic problems that affect everyone.

Scoring was also reflective of the impacts that natural hazards can have on rural areas verses urban areas of the County. For example, rural areas may be unaffected by a 10-year flood while urban area may incur flood damage.

It was concluded in 2003 that four of the listed hazards deserved particular attention: tornadoes, floods, thunderstorms and winter storms. The other two have relatively minor impacts on the County and its residents. Dam failures threaten small areas of the County and earthquakes have a low risk of occurrence and little impact on people and property. These conclusions allowed completion of Chapter 2's hazard analysis.

3.2. Setting directions

After the stage was set, the Committee conducted three exercises to ask what the plan should focus on, how mitigation projects should be funded and implemented, and how those efforts should be prioritized.

The results of these exercises in 2003 set the direction of the mitigation planning effort.

For the first question, the group leaders asked each person for things that mitigation activities should focus on and why they are important. These were recorded and

discussed until each group settled on the five most important. These were reported out to the whole committee and posted. They are listed on the next page

Next, each group tackled the question "How should mitigation projects be funded and implemented?" Again, each person submitted his or her views to the groups and the group leaders obtained group consensus on the top five. These were also reported out to the committee and posted. They are listed on the next page.

The last exercise was a prioritization of the results of each group's recommendations. To do this, each person was given five blue and five red dots that they could use to vote on one or more of the things to focus on (red dots) and the ways to fund and implement mitigation measures (blue dots). They could put all five dots on one item or split them in any way.

Voting

The results of this last exercise are shown here, in order of preference. The number in front of each item is the number of votes that item received.

"What should the plan focus on?"

31 Protect people's lives
27 Protect public health
25 Protect public services (fire, police, etc.)
24 Protect critical facilities

20 Protect streets and utilities
13 Protect farmlands
7 Give special attention to elderly/disabled
7 Protect wetlands/natural areas

"How should mitigation projects be funded and implemented?"

20 Develop public/private partnerships
20 Make people aware of the hazards they face AND how they can protect themselves
18 Make people aware of how they can protect themselves
17 New developments should pay the full cost of protection measures
16 Protect critical facilities regardless of the cost

14 Seek user fees to fund measures
12 Protect life/safety regardless of the cost
12 Use county/municipal agencies to implement mitigation activities
8 Help people protect themselves
5 Use county/municipal funds to pay for mitigation activities
1 Benefit/Cost Review

For each of these exercises, the Committee members were given lists of possible responses. The exercises revealed important information to guide the planning effort,

both in what was selected from the list and what was not selected from the list. For example, the plan should focus on life/safety issues and protecting farmlands and natural areas over buildings and property.

Also, the cost of mitigation projects should be borne by those affected, where possible, rather than the public at large. The exception to this are projects that protect critical facilities and life/safety. It is also significant that options dependent on outside state and federal funding were not selected.

3.3. Goals and Guidelines

The exercises from the March 6, 2003 meeting on setting the stage and setting directions provided the guidance for establishing goals and guidelines for the planning effort. The goals and guidelines for development of the Kane County Natural Hazards Mitigation Plan are:

Goal 1. Protect the lives and health of the citizens of Kane County from the effects of natural hazards.

Goal 2. Encourage self-help and self-protection measures to mitigate the effects of natural hazards on private property.

Goal 3. Protect critical facilities and public infrastructure with public funds.

Goal 4. Identify specific projects to mitigate damage where cost-effective and affordable.

Goal 5. Reduce the number of repetitively damaged existing structures

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 there are sensitive natural areas and agricultural land.

Guideline 7. Be consistent with existing plans.

These goals and guidelines are consistent with the goals of the County's 2040 Land Resource Management Plan and the County's Stormwater Management Plan. The goals of this plan, however, appropriately focus on the health and safety associated with natural hazards and on the importance of people being able to protect themselves and their property from damage.

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. Building, zoning, 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
- Stormwater Management

4.1. Building Codes

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

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,

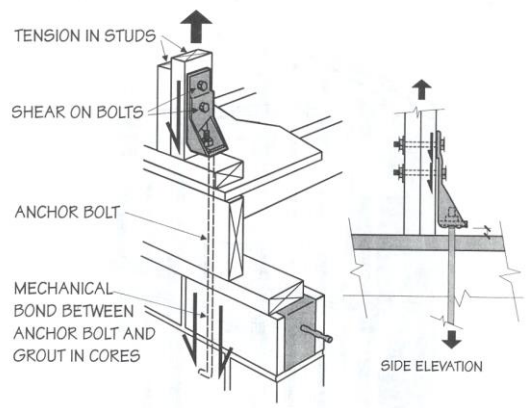


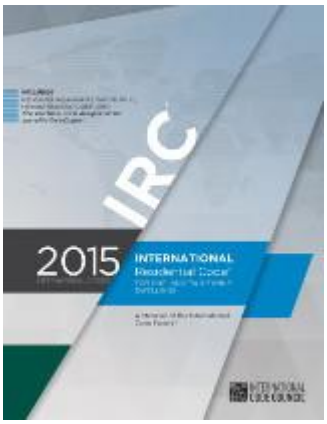
Fig. 14 - TYPICAL TIE-DOWN DETAIL TO FOUNDATION

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

Source: *Windstorm Mitigation Manual for Light Frame Construction*, page 95.

– Ensuring that foundations are strong enough for earth movement and that all structural elements are properly connected to the foundation, and
– Mandating overhead sewers for all new basements to prevent sewer backup.

Model Building Codes: Most communities in Illinois are working with various versions of the National Building Code of the Building Officials and Code Administrators (BOCA) and/or the One and Two Family Dwelling Unit Code published by the Council of American Building Officials (CABO). These standard building codes provide the basis for good building safety programs, especially protection from fire and electrical hazards. However, the BOCA and CABO codes are not "state of the art" when it comes to addressing natural hazards. They are being replaced by the new International Code series.



Model building codes are being replaced by the International Series

Tornado standards: Communities should adopt building codes that incorporate the latest information on wind load standards ASCE 7-95 and 7-98.

A local building code could require tornado safe room in all new construction. See FEMA publication "Taking Shelter from the Storm: Building a Safe Room for Your Home or Small Business (FEMA P-320, Fourth Edition/Dec 2014)" for more information.

The International Code Council's (ICC's) release of a consensus standard on the design and construction of storm shelters. This standard, the ICC/NSSA Standard for the Design and Construction of Storm Shelters (ICC 500) is a referenced standard in the 2009, 2012, and 2015 International Building Code and International Residential Code.

Flood standards: The I-Codes have a section on flood protection that communities must adopt separately. However, these building code standards are superceded by the Kane County Stormwater Ordinance, which is discussed in a later section of this chapter.

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 DisasterSafety.org. 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.

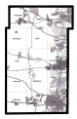
IBHS has researched the cost for implementing the Fortified program. The following table shows the increased cost of constructing a "Fortified" home. For less than 10% above the cost of the average home, a builder can incorporate all of the recommended criteria for a safer building.

	Standard Home	"Fortified" Home	Incremental Cost
Impact resistant windows and 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

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

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. Making sure a structure is properly anchored requires site inspections at each step.



Local implementation: The table below lists the building codes in use in Kane County. This provides summary data on the status of adoption and administration of building codes in Kane County.

Kane County Building Code Data		
Community	**Commercial Building Code**	**Residential Building Code**
Algonquin	2006 IBC	2006 IRBC
Aurora	2009 IBC	2009 IRBC
Batavia	2006 IBC	2006 IRBC
Big Rock	2006 IBC	2006 IRBC
Burlington	2012 IBC	2012 IRBC
Campton Hills	2012 IBC	2012 IRBC
Carpentersville	2006 IEBC	2006 IRBC
East Dundee	2006 IBC	2000 IRBC
Elburn	2003 IBC	2000 IRBC
Elgin	2000 IBC	2000 IRBC
Geneva	2009 IBC	2000 IRBC
Gilberts	2003 IBC	2003 IRBC
Hampshire	2006 IBC	2006 IRBC
Kane County	2012 IBC	2012 IRBC
Lily Lake	Same as Kane County	Same as Kane County
Maple Park	2006 IBC	2006 IRBC
Montgomery	2006 IBC	2000 IRBC
North Aurora	2006 IBC	2006 IR 1&2 DC
Pingree Grove	2003 IBC	(Not Listed)
Saint Charles	2009 IBC	2009 IRBC
Sleepy Hollow	2009 IBC	2009 IRBC
South Elgin	2015 IBC	2015 IRBC
Sugar Grove	2006 IBC	2006 IRBC
Virgil	Same as Kane County	Same as Kane County
Wayne	2012 IBC	2012 IRBC
West Dundee	2012 IBC	2012 IRBC
Data from List of Codes Used throughout the State of Illinois by City or County via http://www.illinois.gov/cdb/business/codes/Pages/BuildingCodesRegulations.aspx		
IBC = International Building Code, IRBC = International Residential Building Code, IEBC = International Existing Building Code; IR 1&2 DW = International Residential 1 & 2 Family Dwelling Code		

State property: Construction of state buildings and some other government buildings is exempt from municipal or county regulations. The Illinois Capital Development Board (CDB) is the construction management agency for state projects, such as prisons, college and university classroom buildings, mental health hospitals and state parks.

As of April 2015 the CDB website has the agency overseeing several projects on Kane County including the Illinois Math and Science Academy, Elgin Mental Health Center, St. Charles Youth Center, Elgin Community College and Aurora University. The agency also works with the Illinois State Board of Education and the Kane County Regional

Office of Education to administer grants for construction and renovation of elementary and secondary schools.

The CDB recognizes local building codes, but does not require a permit or inspection from the local building department. The agency will soon be adopting the International Codes for its use.

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.

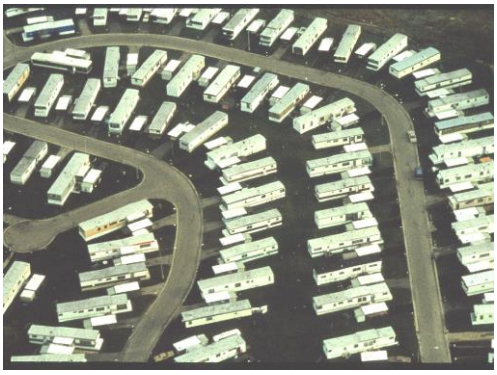
The Community Rating System encourages strong building codes. It provides credit in two ways: points are awarded based on the community's BCEGS classification and points are awarded for adopting the International Code series. The CRS also has minimum prerequisites for a community to attain a higher CRS Classification: to be a Class 6 or better, the community must have a BCEGS class of 5/5 or better; and to attain a CRS Class 4 or better, the community must have a BCEGS class of 4/4 or better. In other words, a strong building code program is a must to do well in the Community Rating System.

Hazards Addressed	
Y	Flood
Y	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

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.

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.



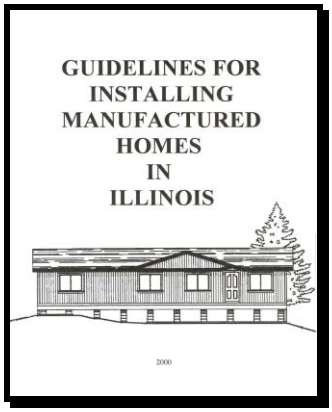
While there are national standards for construction of manufactured homes, their installation is a state or local responsibility

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 tiedown code. Inspections are only done if complaints are made regarding an installation.



The State sets minimum standards for installation of manufactured homes.

Because the state regulates installation of mobile homes and mobile home parks, many local officials believe that they cannot enforce other ordinances. Kane County mobile home park owners report that manufactured homes are installed with little or no contact with local permit officials. However, the Kane County Stormwater Ordinance applies to all structures, including manufactured homes.

In addition to code standards to protect the mobile home from high winds is the need to protect the occupants. There are no state or federal requirements for shelters in mobile home parks.

Mobile school classrooms are structures similar to manufactured homes. They, too, are regulated by the Illinois Department of Public Health, but the school must provide the Kane County Regional Office of Education with an architect's seal of compliance. Each year, there must be an inspection of the anchoring and a renewed evacuation plan signed by the superintendent of the school district. These provisions provide a higher level of protection than current procedures do for residential mobile homes.

CRS credit: Points are available for enforcing the floodplain management requirements in mobile home parks. Because the Kane County Stormwater Ordinance has these provisions, communities with mobile home parks could receive this credit. Additional points are possible for other special regulations, such as prohibiting manufactured housing in the floodway

4.3. Planning and Zoning

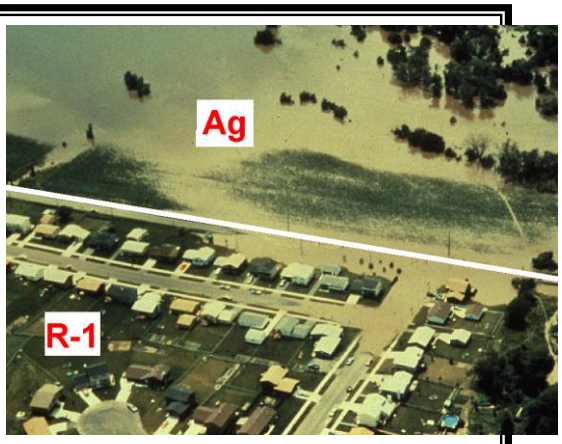
Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

Building codes provide guidance on how to build in hazardous areas. Planning and zoning 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 in arranging improvements on a parcel of land through the planned development approach.

Comprehensive Plans: 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.

Zoning Regulations: A zoning ordinance regulates development by dividing a community into zones or districts and setting development criteria for each zone or district. Zoning codes are considered the primary tool to implement a comprehensive plan's guidelines for how land should be developed.



A zoning ordinance should designate floodprone lands for agricultural, conservation, or other uses that suffer minimal damage from a flood.

Zoning ordinances usually set minimum lot sizes for each zoning district. Often, developers will produce a standard grid layout, such as that shown in the R-1 district to the right. The ordinance and the community can allow flexibility in lot sizes and location so developers can avoid hazardous areas.

One way to encourage such flexibility is to use the planned unit development (PUD) approach. The PUD approach allows the developer to easily incorporate flood hazard mitigation measures into the project. Open space and/or floodplain preservation can be facilitated as site designs standards and land use densities can be adjusted, as in the example below.

Capital Improvement Plans: A capital improvement plan will guide a community's major public expenditures for the next 5 to 20 years. Capital expenditures may include acquisition of open space within the hazardous areas, extension of public services into hazardous areas, or retrofitting existing public structures to withstand a hazard.

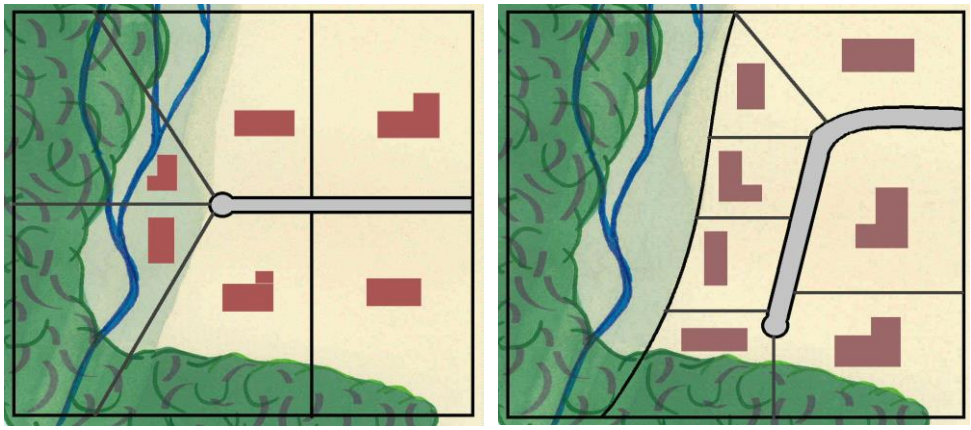
Local implementation: The table on the next page summarizes the findings of a review of comprehensive and land use plans adopted by the County and the municipalities. Almost all of the newer plans designate floodplains, wetlands or stream corridors for preservation for open space, recreational uses or habitat. An example of this is the St. Charles *Comprehensive Plan* adopted in 2013.

While, most of the zoning ordinances in the County allow planned unit developments, most have no corresponding district for the floodplain areas shown on the land use maps. Some make no mention of floodplains, generally because local floodplain ordinances (and now the County's stormwater management regulations) take precedence.

An exception to this is Algonquin's zoning ordinance which has a special overlay district for the western third of the Village. Floodplains, wetlands and similar features are designated "eco-corridors and protected areas." All development proposals must be planned developments and they "must preserve lands that are designated as eco-corridor areas" (Section 21.13.D.1.a).

Another zoning approach is Wayne's, which requires a minimum lot size of four acres in the western half of the Village. The streams run along the lot lines in many spots, allowing developers to build on the high ground and leave the floodplains for backyards.

CRS credit: CRS 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.



In the standard zoning approach (left), the developer considers six equally-sized lots without regard for the flood hazard. Two properties are subject to flooding and the natural stream is disrupted. An alternative, flexible, approach is shown on the right. The floodplain is dedicated as public open space. There are seven smaller lots, but those abutting the floodplain have the advantage of a larger open area. Four lots have riverfront views instead of two. These amenities compensate for the smaller lot sizes, so the parcels are valued the same.

Land Use Plans and Zoning Districts		
Municipality	**Plan**	**Zoning**
Algonquin	Large park proposed along the Fox River	Woods Creek Watershed Overlay District protects stream corridors
Aurora	Nothing special on floodplains	Park/open space district along the Fox River and Blackberry Creek
Batavia	Floodplains recommended for open space, corridors and PUDs	No special provisions
Big Rock	Newly incorporated, no plan	Being prepared
Burlington	Being revised	Being revised
Carpentersville	Open space along the Fox River	Manufacturing along the Fox
East Dundee	Undeveloped floodplains recommended for conservation	No special district. Separate floodplain ordinance is referenced
Elburn	Floodplains recommended for open space	Stream corridors shown as detention or "PUD golf course"
Elgin	Nothing special on floodplains	Many floodplains zoned as "community facility" district
Geneva	Most floodplains designated as open space or parks/recreation	Most floodplains zoned as low density residential
Gilberts	Draft plan: development in floodprone areas is "precluded"	Most floodprone areas are zoned agriculture or conservancy
Hampshire	1980 plan: open space corridors on stream channels, but no floodplains	Floodplains shown on zoning map, but no special use provisions
Huntley	Buffers along streams	No special provisions
Kane County	Floodplains and wetlands recommended for open space	Open space on streams and in wetlands as part of PUD process
Lily Lake	Floodplains encouraged for open space, recreation and habitat	No special provisions
Maple Park	Floodplains encouraged for open space, recreation and habitat	No special provisions
Montgomery	Stream corridors as "conservation"	No special provisions
North Aurora	Floodplain (Fox River) designated for public open space	No special provisions
Sleepy Hollow	Wetlands recommended for greenways, no mention of floodplains	No special provisions
South Elgin	Nothing special on floodplains	No special provisions
St. Charles	2013 Comprehensive Plan	No special provisions
Sugar Grove	Floodplains designated for open space/environmental corridor	No special provisions
Virgil	Nothing special on floodplains	Floodplains zoned for agriculture
Wayne	Being revised	Large lot districts allow avoidance of floodplain in many cases
West Dundee	Preserving drainage system is important to "maintain local character"	Some of the Sleepy Creek floodplain is zoned park & public
Source: Survey of municipalities		

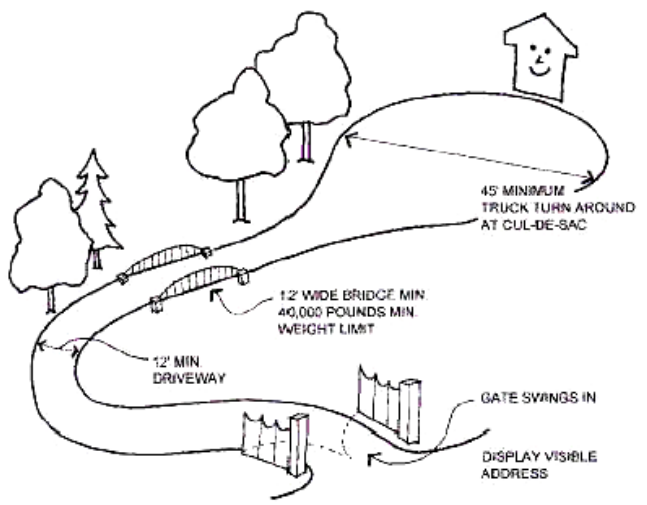
4.4. Subdivision Regulations

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

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

- Requiring that the final plat show all hazardous areas (as in the example on page 9-4).
- 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.

Local implementation: The Kane County Stormwater Ordinance states that "New and replacement water supply systems, wells and sanitary sewer lines may be permitted if all manholes or other above-ground openings located below the [flood protection elevation] are watertight." (§406(a)). Roads, bridges and culverts are not allowed to increase flood heights. Geneva's subdivision ordinance reserves the right to prohibit subdivisions in floodplains.



Subdivision regulations need to ensure that streets and other public facilities can handle emergency vehicles during an emergency *Source:* IBHS

Maple Park's ordinance is typical. It states "Electrical and telephone service shall be located underground wherever possible" (Section 16-206.A). The County's ordinance requires underground wires and cables in all new subdivisions (Section 19-114).

CRS credit: CRS 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.

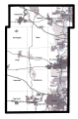
4.5. Open Space Preservation

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

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.

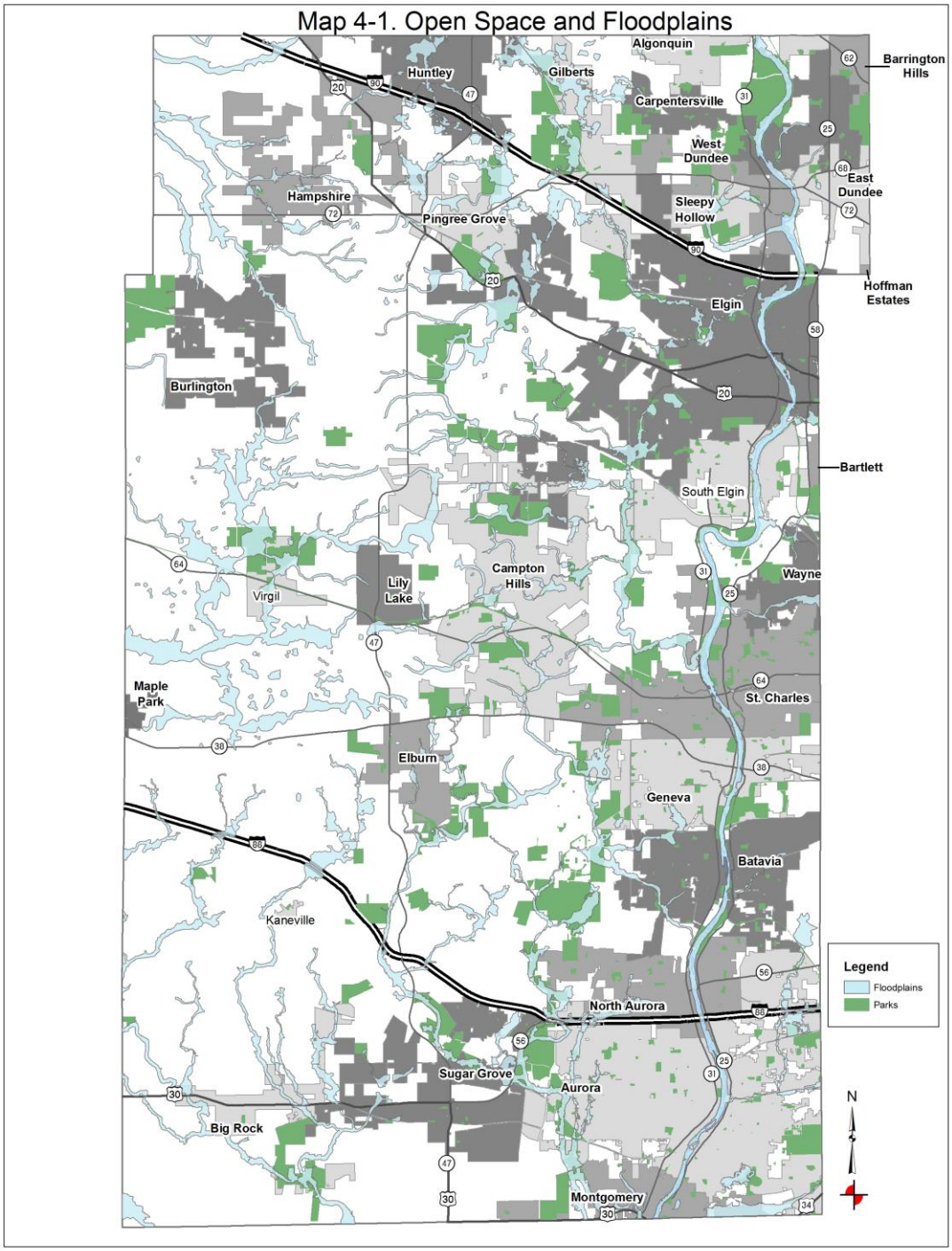


Local implementation: There are two kinds of open space: lands that are currently open, such as vacant and farm land, and lands that are preserved as open space, such as parks and forest preserves. As noted in Chapter 1, 88% of Kane County is open or undeveloped, but only 3% is preserved as open space.

Of the 36,786 acres of floodplain, 29,000 acres (79%) are open, but only 4,432 acres (12%) are preserved as open space. The map on the next page shows areas currently in forest preserve, park and other land uses designated as open space. Additional areas are kept open through ownership and regulation. For example, all mapped floodways should stay open because of the state law that prohibits new construction in them.

The Kane County *2040 Land Resource Management Plan* has a section on open space and a 2030 Open Space Map. The text notes the benefits of open space and, in particular, preserving it along waterways. Two of the Plan's policies, for example, are "Incorporate conservation and sustainability criteria in development controls and County ordinances to protect natural, scenic, historic, archaeological and environmental areas when making land use and development decisions" and Explore innovative opportunities to collaborate on the protection and enhancement of green infrastructure".

The Fox River Trail connects several riverfront parks and forest preserves



Legend: blue – floodplains. Green – parks and forest preserves

Continuing our green legacy into 2040, Kane County commits to aggressively promote an open space armature and greenway system, sometimes referred to as the green infrastructure network. Kane County reaffirms the commitment to open space and farmland preservation with the general goal that by 2040 at least 50% of the land in Kane County should still be in farmland and open space uses.

As the County and municipalities continue to face growth pressures, the preservation and expansion of open space, particularly along the Fox River and its tributaries, and promoting compact, mixed-use development to reduce land consumption will be key to achieving livable, sustainable, and healthy communities.

Some hazardous areas are kept open to be community assets, like Batavia's Riverwalk

Preserving agricultural land is discussed in Chapter 6.

The Kane County Stormwater Management Ordinance requires buffers along creeks, streams, lakes, wetlands and rivers. These buffers, roughly 50 feet in width, must be dedicated as easements on all newly platted lots. The maintenance responsibility for these easements must be recorded on the deeds.

CRS credit: Preserving floodprone areas as open space is one of the highest priorities of the Community Rating System. Significant 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.

4.6. Stormwater Management

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

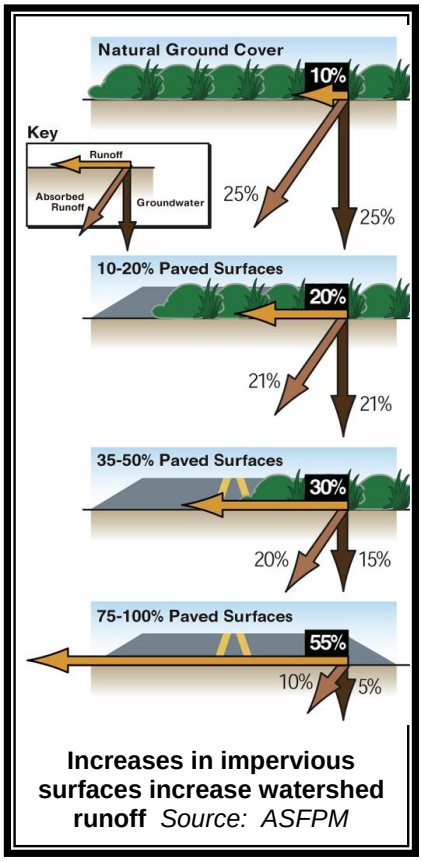
Development in floodplains is development in harm's way. New construction in the floodplain increases the amount of development exposed to damage and can aggravate flooding on neighboring properties.

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,

Storage ponds manage the increased runoff from new developments.

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:



Increases in impervious surfaces increase watershed runoff *Source: ASFPM*

- 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.

Stormwater 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 stormwater leave at a rate higher than that under pre-development conditions.

Local implementation: State law authorizes counties in Northeastern Illinois to set minimum stormwater management standards for all municipalities in the county. This is done by the Kane County Stormwater Management Division of the Environmental Management Department.

Floodplains: The October 2001 Kane County Stormwater Ordinance meets or exceeds all of the state and NFIP floodplain regulatory requirements. Each municipality is required to adopt the county's ordinance provisions. Most have adopted the ordinance and become "certified communities."

Having good regulations on the books is one thing, but it is even more important that local officials are properly administering them. Failure to fully enforce the floodplain development regulations is cause for probation or suspension from the NFIP. FEMA and the Department of Natural Resources periodically visit or contact communities to verify that staff understand and are enforcing the floodplain regulations.

The table on the next page shows the status of the most recent Community Assistance Contacts or Visits. It can be seen that most communities were found to be generally OK, that is, only a few minor problems were found in their administration or enforcement. In most cases, no problems were found.

Communities Participating in the National Flood Insurance Program Kane County				
Community	Init FHBM Indeified	Init FIRM Identified	Curr Eff Map Date	Reg-Emer Date
Algonquin	03/08/74	03/16/81	08/03/09	03/16/81
Aurora	06/14/74	06/15/79	08/03/09	06/15/79
Batavia	06/10/76	09/02/81	08/03/09	11/20/81
Big Rock		12/20/02	07/17/12	01/08/03
Burlington		12/20/02	(NSFHA)	12/20/02
Campton Hills		08/03/09	07/17/12	12/10/08
Carpentersville	03/22/74	08/17/81	08/03/09	08/17/81
East Dundee	05/17/74	03/16/81	08/03/09	03/16/81
Elburn		12/20/02	07/17/12	09/30/92
Elgin	05/03/74	03/01/82	08/03/09	03/01/82
Geneva	08/09/74	08/03/81	08/03/09	08/03/81
Gilberts	05/07/76	12/20/02	08/03/09	12/20/02
Hampshire	03/26/76	03/02/81	08/03/09	03/02/81
Kane County	05/14/76	03/01/82	07/17/12	03/01/82
Lily Lake	05/14/76	06/16/92	07/17/12	12/20/02
Maple Park		08/04/87	07/17/12	10/07/87
Montgomery	12/26/73	08/15/79	01/08/14	08/15/79
North Aurora	03/01/74	03/16/81	08/03/09	03/16/81
Pingree Grove		12/20/02	08/03/09	09/29/08
Sleepy Hollow	04/12/74	06/15/82	08/03/09	06/15/82
South Elgin	04/05/74	07/07/78	08/03/09	07/16/81
St. Charles	03/15/74	09/02/81	08/03/09	09/02/81
Sugar Grove	03/08/74	03/04/88	07/17/12	09/30/76
Virgil	05/14/76	06/02/92	07/17/12(M)	12/20/02
Wayne	08/15/75	12/01/81	08/03/09	10/03/94
West Dundee	04/05/74	12/01/81	08/03/09	12/01/81

Source: FEMA 2015

Runoff: The County's stormwater ordinance sets requirements for managing runoff from new developments. Stormwater storage facilities are required for single family residential developments over 3 acres and all other developments over 1 acre in size. Storage facilities must be designed to retain the first 0.75 inches of runoff from the connected impervious areas and infiltrate this water into the soil. The remaining runoff must be detained with a peak release rate of 0.1 cubic feet per second per acre of development.

The ordinance and supporting Technical Guidance Manual encourage site planning that reduces runoff and the impact of the development on the surrounding area. Examples include:

- Promoting the use of native vegetation within the runoff storage basins,
- Requiring buffers along streams, lakes, wetlands, etc.,
- Requiring retention or infiltration of the initial runoff, and
- Requiring existing depressional storage (areas not designated as floodplains) to be compensated for at a 1:1 ratio.

The County ordinance also allows for the development of watershed plans. Watershed plans look at the unique characteristics of each watershed and may adopt more or less stringent requirements than those in the County's ordinance. The ordinance provides for a fee-in-lieu of site runoff storage in the event a watershed plan recommends the use of a larger central basin. To date no watershed-specific requirements have been established. (Incorporate WSPs developed)

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.

The County's Stormwater Ordinance has the following provisions that would be recognized by the CRS (in addition to the provisions discussed in other sections):

- Buildings must be elevated to a level two feet above the base (100-year) flood elevation (although attached garages can be lower, reducing the CRS score),
- Fill must meet certain standards to protect it from erosion and scour,
- Flood storage lost due to filling and construction must be compensated for by removal of an equal volume of storage,
- Only appropriate uses are allowed in the floodway. Buildings are not appropriate uses,
- Standards for retention and detention basins,
- Requirements for erosion and sedimentation control, and
- The requirement to incorporate best management practices into all plans.

The County and all municipalities should receive points for these provisions of the Kane County Stormwater Ordinance which exceed minimum State and Federal requirements.

4.7. Conclusions

1. Building codes are the prime preventive measure for earthquakes, tornadoes, high winds, and snow storms. The majority of the communities within the County have

building codes that will provide some protection of future buildings from these hazards.

2. According to the Institute for Building and Home Safety, the International Residential and Building Codes do not adequately protect new construction from damage by tornadoes and hail.

3. State administration of installation of mobile or manufactured homes does not guarantee that they will be adequately tied down or protected from flooding and other hazards.

4. The majority of the comprehensive and land use plans address floodplains and the need to preserve these hazardous areas from intensive development. However, most zoning ordinances do not designate floodprone areas for any special type of land use.

5. Standards in subdivision regulations for public facilities should account for the hazards present at the site. New building sites, streets, and water systems should facilitate access and use by fire and emergency equipment.

6. At least 12% of the county's floodplain is open space in public ownership. However, 79% of the floodplain is still undeveloped and not preserved as open space. Therefore, preventive measures can have a great impact on the future flood damages.

7. The County's floodplain development and stormwater management regulations exceed minimum national and State standards and will be helpful in preventing flood problems from increasing.

8. Local permit officials need to be aware of their authorities and current regulatory standards for installation of mobile homes and the new County stormwater rules.

4.8. Recommendations

1. All communities should adopt the latest International series of codes, the new national standard that is being adopted throughout the country. Current efforts by multi-community organizations of building departments to develop local amendments for regional consistency should be pursued, provided they produce equivalent natural hazard protection features.

2. All communities should work to improve their BCEGS rating, with a target of reaching at least a Class of 5 or better in time for their next cycle visit by the Insurance Services Office. This is the level recognized by FEMA's Community Rating System as a minimum requirement for better CRS classes.

3. On a regional basis, municipal and County code enforcement staffs should work together to:

a. Develop building code language to strengthen new buildings against damage by high winds, tornadoes and hail,

b. Adequately regulate mobile home installation (so that newly installed mobile homes get the same level of attention as other types of new single-family homes), and

c. Understand and enforce the new County stormwater management and flood protection provisions.

4. On a regional basis, municipal and County planning and engineering staff should develop example subdivision ordinance language that requires new infrastructure to have hazard mitigation provisions, such as

    1) Streets and water systems that facilitate access and use by fire and emergency equipment,

    2) Buried utility lines, and

    3) Storm shelters in new mobile home parks.

5. Municipal comprehensive plans, land use plans and zoning ordinances should incorporate open space provisions that will protect properties from flooding and preserve wetlands and farmland. The *Kane County 2040 Plan* provides a guide for this. Subsequent County-wide plans should, too.

6. Offices responsible for design, construction or permitting critical facilities should ensure that the design accounts for natural hazards and adjacent land uses.

7. The public, developers, builders, and decision makers should be informed about the hazard mitigation benefits of these preventive measures and the procedures that should be followed to ensure that new developments do not create new problems.

4.9. References

1. *2020 Land Resource Management Plan,* Kane County Development Department, 1996.

2. Kane County 2040 Plan, adopted by the Kane County Board May 8, 2012

3. *City of St. Charles Comprehensive Plan,* St. Charles Plan Commission, 2013

4. *CRS Coordinator's Manual,* FEMA, 1999.

5. *Design and Construction Guidance for Community Shelters*, FEMA, 2000.

6. *Guidelines for Installing Manufactured Homes in Illinois*, Illinois Department of Public Health, 2000.

7. *Kane County Stormwater Ordinance*, Kane County Stormwater Management Committee, December 2001.

8. *Kane County Stormwater Technical Guidance Manual*, Kane County Stormwater Management Committee, January 2002.

9. *Midwest Tornadoes of 1999, Observations, Recommendations and Technical Guidance*, FEMA, Building Performance Assessment Report, Preliminary Report, July 13, 1999

10. *Multi-Hazard Identification and Risk Assessment*, Federal Emergency Management Agency, 1997.

11. Survey of municipalities, comprehensive plans, zoning ordinances, and BCEGS reports, Spring, 2003.

12. *Regulation of Factory Built Structures in Illinois*, Illinois Department of Public Health, 2000.

13. *Subdivision Design in Flood Hazard Areas*, American Planning Association and FEMA, PAS Report 473, 1997.

14. Websites of the Institute for Business and Home Safety (www.ibhs.org) and the Illinois Department of Public Health (www.idph.state.il.us).

15. *Windstorm Mitigation Manual for Light Frame Construction*, Illinois Emergency Management Agency, 1997

Chapter 5. Property Protection

Property protection measures are used to modify buildings or property subject to damage. Property protection measures fall under three approaches:

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

Property protection measures are normally implemented by the property owner, although in many cases technical and financial assistance can be provided by a government agency. These are discussed later in this chapter.

5.1. Keeping the Hazard Away

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

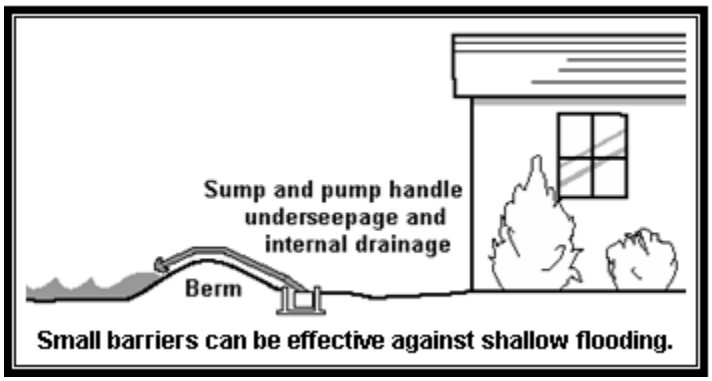
Generally, natural hazards do not damage vacant areas. As noted in Chapter 2, the major impact of hazards is to people and improved property. In some cases, properties can be modified so the hazard does not reach the damage-prone improvements. A fire break is an example of this approach – brush and other fuel are cleared away from the building so a fire may not reach it.

For the five hazards considered in this plan, flooding is the one hazard that can be kept away from a building. There are four common methods to do this:

- Erect a barrier between the building and the source of flooding,
- Move the building out of the floodprone area
- Elevate the building above the flood level
- Demolish the building.

New Developments: During the recent update The Kane County Environmental and Water Resources Division evaluated the possibility of new developments causing or exacerbating flooding problems. Since all new development must comply with the Kane County Stormwater Ordinance Division staff determined that new developments must plan for potential flooding problems. The plan for new developments will include a drainage system throughout the development and will also include areas for retention of flood water. Therefore the rapid growth within Kane County since this plan was first developed or any new developments should have minimal impact on current or future flooding.

Barriers: A flood protection barrier can be built of dirt or soil ("berm") or concrete or steel ("floodwall"). Careful design is needed so as not to create flooding or drainage problems on neighboring properties. Depending on how porous the ground is, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that falls inside the perimeter. This is usually done with a sump and/or drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier.



Small barriers can be effective against shallow flooding.

Barriers can only be built so high. They can be overtopped by a flood higher than expected. Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and maintained. A berm can settle over time, lowering its protection level. A floodwall can crack, weaken, and lose its watertight seal. Therefore, barriers need careful design and maintenance (and insurance on the building, in case of failure).

This low floodwall on the Des Plaines River has landscaping to minimize the adverse impact on the property's appearance.

Relocation: Moving a building to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost goes up for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings. However, experienced building movers can handle any job.

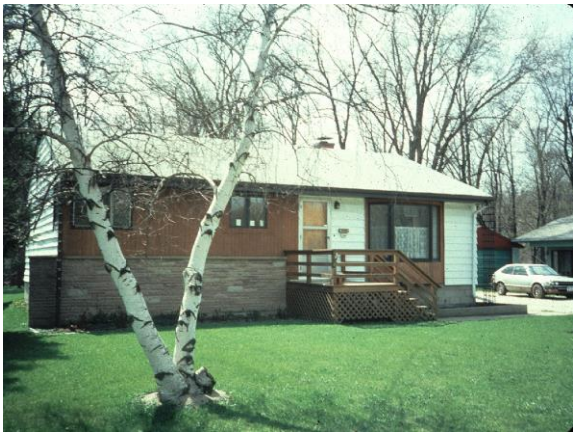
Small, wood frame buildings are the easiest to relocate

In areas subject to flash flooding, deep waters, or other high hazard, relocation is often the only safe approach. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new flood-free lot (or portion of the existing lot) available.

Building elevation: Raising a building above the flood level can be almost as effective as moving it out of the floodplain. Water flows under the building, causing little or no damage to the structure or its contents.

Raising a building above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation.

Elevating a building will change its appearance. If the required amount of elevation is low, the result is similar to putting a building on a 2- or 3-foot-high crawlspace (see example to the right). If the building is raised 4, 6, or more feet, owners are concerned that it will stick out like a sore thumb and may decline to implement an elevation project.



This house was elevated one foot above the base flood elevation of the Des Plaines River.

Another problem with this approach is with basements. Only the first floor and higher are elevated. The basement remains as the foundation. All utilities are elevated and the basement is filled in to protect the walls from water pressure. The owner loses the use of the basement, which may deter him or her from trying this approach.

A third problem with elevation is that it may expose the structure to greater impacts from other hazards. If not braced and anchored properly, an elevated building may have less resistance to the shaking of an earthquake and the pressures of high winds. Given the low threat of earthquakes and low flood depths in Kane County, careful design and construction should prevent these secondary problems.

Demolition: Some buildings, especially heavily damaged or repetitively flooded ones, are not worth the expense to protect them from future damage. It is cheaper to demolish them and either replace them with new, flood protected structures, or relocate the occupants to a safer site. Generally, demolition projects are undertaken by a government agency, so the cost is not borne by the property owner, and the land is converted to public use, such as a park.

This home was acquired and demolished by the Lake County Stormwater Management Commission. The site was cleared for open space.

Acquisition, followed by demolition, is most appropriate for buildings that are difficult to move—such as larger, slab foundation, or masonry structures—and for dilapidated structures that are not worth protecting.

One problem that sometimes results from an acquisition and demolition project is a "checkerboard" pattern in which nonadjacent properties are acquired. This can occur when some owners, especially those who have and prefer a waterfront location, prove reluctant to leave. Creating such an acquisition pattern in a community simply adds to the maintenance costs that taxpayers must support.

Local implementation: Following the 1996 flood, some 68 homes were purchased in Montgomery and Aurora with FEMA mitigation funds. The sites were cleared to provide recreation space and flood storage. Some homes on the Fox have been elevated.

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

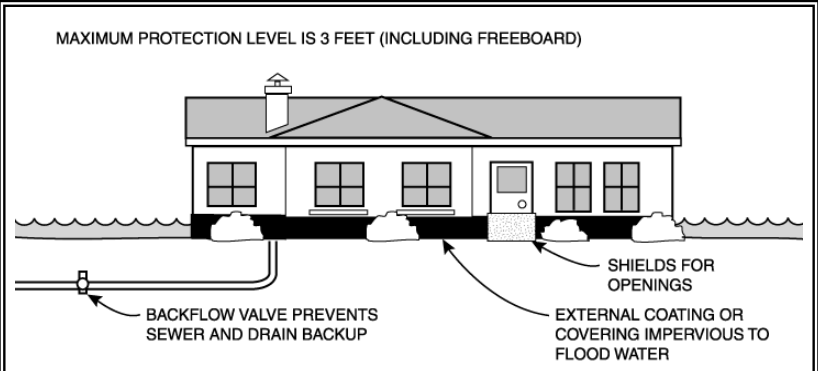
The CRS also credits barriers and elevating existing buildings (Activity 530 – Flood Protection). Elevating a building above the flood level will also reduce the flood insurance premiums on that individual building. Because barriers are less secure than elevation, not as many points are provided.

5.2. Retrofitting

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

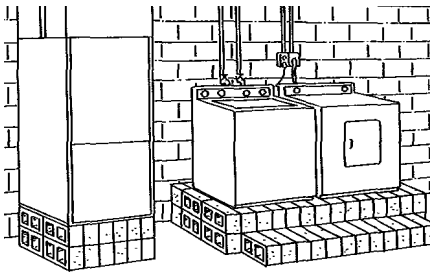
Section 5.1 focused on keeping the hazard from reaching a building or damage-prone part of a property. An alternative is to modify or "retrofit" the site or building to minimize or even prevent damage. There are a variety of techniques to do this. This section looks at the measures that can be implemented to protect existing buildings from damage by floods, sewer backup, earthquakes, tornadoes and high winds, and winter storms.

Flood retrofitting measures include **dry floodproofing** 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.



Dry floodproofed house

Dry floodproofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under State, FEMA and County regulations. Dry floodproofing 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 floodproofing techniques.



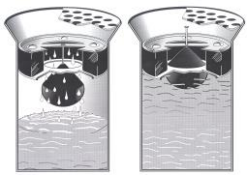
Wet floodproofed basement

The alternative to dry floodproofing is **wet floodproofing:** 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 floodproofing 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.

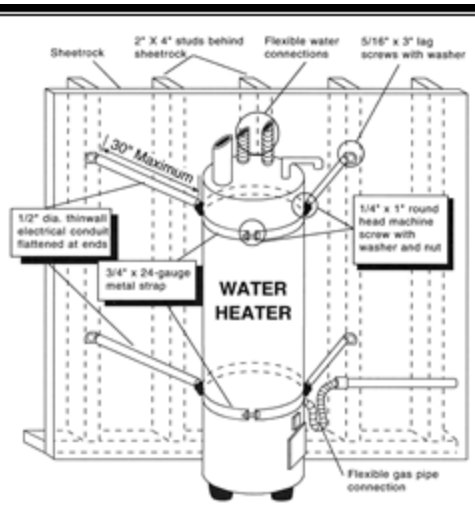


Floor drain plug

Local implementation: Committee members from Aurora, Elgin, North Aurora, South Elgin and St. Charles reported on retrofitting projects in their communities. Most of these related to sewer backup protection, but they also included regrading yards and floodproofing some homes.

CRS credit: Credit for dry and wet floodproofing and sewer backup protection or retrofitting is provided under Activity 530 (Flood Protection). Because these property protection measures are less secure than barriers and elevation, not as many points are provided.

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.



Source: The Homeowners Guide to Earthquake Safety

Less expensive approaches may be more cost-effective for an area like Kane 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.

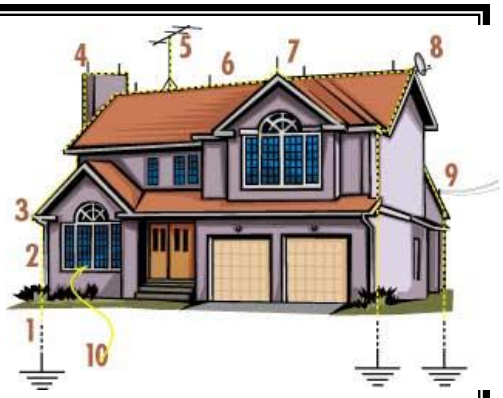
Tornado retrofitting measures include constructing an underground shelter or "safe room" to protect the lives of the occupants. Their worth has been proven by recent tornadoes in Oklahoma, as shown in the photo to the right.

Interior rooms can be reinforced and retrofitted to be tornado "safe rooms"

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-



Lightning protection measures

Source: State Farm Insurance

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.

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 6.6. Urban Forestry. Surge suppressors protect delicate appliances during thunderstorms.

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.

Local implementation: No retrofitting projects for non-flood hazards were reported to the Planning Committee.

NFIP/CRS

CRS credit: Retrofitting to protect a building for hazards other than flooding is not credited under the CRS.

5.3. Insurance

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

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.

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 bilevels and trilevels.

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

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 Kane County communities since the 1970's. On the average, only one in three floodplain properties in Kane County are covered by flood insurance.

Kane County has a commercial policy on its own properties with a $25,000 deductible. The flood and earthquake limit is $5,000,000; however both have a separate $50,000 deductible.

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.

5.4. The Government's Role

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

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 City of Guthrie, Oklahoma has a rebate program for installation of tornado shelters and safe rooms. The City provides up to $1,500 per house, which can cover the majority of the cost.

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)

Acquisition agent: The community can be the focal point in an acquisition project. Most funding programs require a local public agency to sponsor the project. The County or a municipality could process the funding application, work with the owners, and provide some, or all, of the local share. In some cases, the local government would be the ultimate owner of the property, but in other cases the Forest Preserve District or other public agency could assume ownership and the attendant maintenance responsibilities.

CorLands (the Corporation for Public Land) is an organization that can help Northeastern Illinois communities. It purchases and holds certain lands until a government agency or other party can take possession.

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.

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: As discussed in Chapter 1 there are hundreds of critical facilities, most of which have no special measures to protect them from flooding, tornadoes, and other natural hazards. One exception is Montgomery's Well 8 Water Treatment Plant. The Village retrofitted it by elevating key components above the flood level.

The Kane County Water Resources Department, the City of Aurora, and Village of Montgomery provide technical assistance to property owners interested in retrofitting.

Kane County, Aurora, Elgin, North Aurora, and St. Charles have financial assistance programs for retrofitting, mostly to help residents deal with sewer backup and local flood problems. St. Charles provides 25% of the cost and Elgin funds 50%. These levels have proven successful in getting property owners motivated to protect themselves. South Elgin used a state grant to help 27 homes install overhead sewers.

Kane County, Montgomery, Aurora and Elgin have been acquisition agents, facilitating buyouts of homes after the 1996 and other floods.

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.

5.5. Repetitive Loss Properties & Analysis

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

Chapter 2 explains the criteria for designation of the County's repetitive loss areas. These properties deserve special attention because they are more prone to damage by natural hazards than any other properties in the County. Further, protecting repetitive loss buildings is a priority with FEMA and IEMA mitigation

funding programs.

In 2004, the Kane County Department of Environmental Management secured grant funding from FEMA to carry out a floodprone property mitigation plan. A FEMA grant was awarded in the amount of $75,000. Kane County committed an additional $25,000 toward the project cost, bringing the project total cost to $100,000. Following is a description of the project. The 2004 Kane County Natural Hazard Mitigation Plan identified eighteen (18) repetitive loss areas. A repetitive loss area contains one or more properties on the FEMA list of properties receiving multiple flood insurance claims, plus adjacent properties with the same or similar flooding conditions.

The eighteen (18) repetitive loss areas in Kane County were reviewed for key factors that determined appropriate property protection measures. The criteria used were based on several studies that identified appropriate measures based on flood and building conditions. Following is a summary of the project's six goals, and a description of the results of each task.

GOAL 1) Collect information about properties in each repetitive loss areas

Additional information was collected for each property in the 18 Kane County Repetitive Loss Areas. Information was secured by means of review of assessor's data, on-site surveys, and personal communication with property owners during onsite surveys, and letters to property owners.

GOAL 2) Develop area mitigation plans that identify the most appropriate alternatives for each property

Data for each property was analyzed to determine the property's most probable flood hazard mitigation alternatives. Alternatives included acquisition, elevation, wet- and dry-floodproofing, and regional stormwater control projects. A "Repetitive Loss Area Analysis" was produced for each Area. The Analyses contained information on the problem background, neighborhood notification and data collection efforts, alternative mitigation measures, coordination efforts, and final findings and recommendations.

Area Analyses were not produced for Areas 6 and 10. Both areas contained just one property in isolated, unmapped areas. The property in Area 6 was believed to be a mistaken inclusion in the FEMA Rep Loss list. Memos are included with this final report regarding both of these isolated Areas.

GOAL 3) Review the findings with the neighborhoods

Neighborhood mailings and meetings were utilized to communicate the results of the Area Analyses to each Area. In areas where there was not enough interest to hold a neighborhood meeting, Kane County staff discussed the results directly with property owners who had questions about the report.

GOAL 4) Identify willing property owners

Through the neighborhood meetings and phone contact with individual property owners, a determination was made as to the properties which could become

feasible mitigation projects. Owners' willingness was then compared with the property's potential project benefit-cost ratio.

GOAL 5) Provide technical advice and financial incentives for lower cost measures

The Area Analyses provided information on low-cost mitigation measures for properties which would not qualify for FEMA flood hazard mitigation assistance.

GOAL 6) Apply for funding support for the more expensive measures of acquisition and elevation.

Kane County identified properties which yielded positive benefit-cost ratios and positive owner feedback regarding willingness to pursue a mitigation project. A PreDisaster Mitigation Grant application was submitted in February 2007 for five elevations and one acquisition. Due to internal FEMA rulings, the application was later modified to include only 3 buyout properties. FEMA awarded the grant to Kane County in 2008 and the County is pursuing the buyout of three properties.

While a cost/benefit study was not conducted for every property included in this analysis, the following guidelines show which measures are generally preferred for given structural conditions:

- "High hazard areas" are areas in the floodway or where the 100-year flood is two or more feet over the first floor.
- Buildings in high hazard areas or in less than good condition should be acquired and demolished.
- Buildings with basements and split level foundations in high hazard areas should be acquired and demolished. They are too difficult to elevate and the hydrostatic pressures on the walls from deeper flooding make them too risky to protect in place.
- Buildings subject to shallow flooding from local drainage should be protected through area-wide flood control or sewer improvement projects.
- Buildings in good condition on crawlspaces should be elevated or relocated.
- Buildings in good condition on slab, basement or split level foundations subject to shallow flooding (less than 2 feet) can be protected by barriers and dry floodproofing.
- Recent flood claims. Some properties have not had a flood insurance claim for 20 years, indicating that some measure has probably been put in place to protect the property from repetitive flooding.

These criteria are general and recommendations for individual structures should be made only after a site inspection. Other extenuating circumstances may also alter the recommendations. For example, the building in area 13 is an historic stone structure on the river. Its lower area could be wet floodproofed, providing partial flood protection without adversely affecting its historical appearance.

Upon completion of the Kane County Floodprone Property Analysis project, some general observations and results were developed. Based on the review criteria, acquisition and elevation are recommended in areas 7, 8, 9, 12 and 14.

Kane County Repetitive Loss Areas

	City	Name/Street	No. of Bldgs	Flood years	Foundation Type	High * Hazard	Tentative Recommended Measure **
1	Uninc. Aurora	Connie Court	7	81, 82, 83	Split-level	Yes	Drainage improvements have reduced repetitive flooding ***
2	Aurora	Austin Ave	1	78, 81, 82, 83, 85, 87, 96	Split level		Barrier/dry floodproof
3	Aurora	East View Estates.	2	85, 86, 90, 93, 96	Basement		Local drainage improvements
4	Aurora	Farnsworth	1	82, 83, 93, 96	Slab	Yes	Floodproof (only part of this large structure is floodprone)
5	Aurora	New York	1	79, 83, 84, 85, 87, 89, 90, 97, 00	Slab		Barrier/dry floodproof
6	Aurora	Sherwood	1	83, 87	Basement		Barrier/dry floodproof
7	Elgin	Illinois Ave	14	90, 97	Basement	Yes	Acquisition
8	Uninc. East Dundee	Fox River Drive	40	88, 94	Crawlspace	Yes	Acquisition
9	Uninc. St. Charles	Grove, Willow	17	79, 83, 86, 93, 94, 97	Crawlspace	Yes	Elevation
					Slab	Yes	Acquisition
10	Uninc. Sugar Grove	Kadeka	1	85, 87, 91, 93, 94	Slab		Barrier/dry floodproof
11	Uninc. Aurora	Lindenwood	7	87, 96	Basement		Local drainage improvements/ Barrier/dry floodproof
12	Montgomery	Park View Marveray	45	79, 81, 83, 96	Crawlspace	Yes	Elevation
					Basement	Yes	Acquisition
13	Montgomery	Mill Street	1	96, 97	Walk out basement	Yes	Wet floodproof
14	Montgomery	North River	19	96, 97	Crawlspace	Yes	Elevation
15	North Aurora	Butterfield	2	5/78, 9/78	Walk out basement	Yes	Acquisition/barrier ***
16	South Elgin	S. Riverside	31	79, 88	Crawlspace /Slab		Barrier/dry floodproof
17	Algonquin	Harrison	1	90, 95	Slab	Yes	Barrier/regrade ***
18	Algonquin	La Fox	1	79, 82	Basement	Yes	Acquire

* "High hazard" means properties are located in the floodway or the 100-year flood is two or more feet over the first floor.

** "Tentative Recommended Measure" is based on data collected from a windshield survey. A more detailed examination of each building is needed before funds are spent on a project.

*** While in a high hazard area, the repetitive flooding was caused by local drainage problems. *Source: Field surveys by French & Associates*

Other Actions
Kane County identified several repetitively flooded areas where neighborhood or regional drainage issues could be addressed rather than acquisition or elevation of single properties. Kane County's Division of Water Resources manages the Kane County Cost-Share Drainage program which enables residents in floodprone areas to seek County assistance to pay for drainage improvements which may reduce residents' floodprone status.

The results of Kane County's study of floodprone properties were also incorporated into the Kane County "KPASS" system; a database used by multiple County departments including the Kane County Development Department (permitting), zoning officials and inspectors, and stormwater ordinance administrators. In doing so, the flood risk information collected for each property in the study is now readily available to county staff who might be approached by property owners or others for permits, purchase information, or general information.

5.6. Conclusions

1. There are several ways to protect individual properties from damage by natural hazards. The advantages and disadvantages of each should be examined for each situation.

2. Property owners can implement some property protection measures at little cost, especially for sites in areas of low hazards (e.g., shallow flooding, sewer backup, earthquakes, thunderstorms and winter storms). For other measures, such as relocation, elevation and safe rooms, the owners may need financial assistance.

3. Local government agencies can promote and support property protection measures through several activities, ranging from public information to financial incentives to full funding.

4. It is unlikely that most government properties, including critical facilities, have any special measures to protect them from flooding, tornadoes, and other natural hazards.

5. Kane County is self-insured for all damage by floods and earthquakes and for damage from other hazards under $250,000. The 16 municipalities in the risk management pools should have adequate insurance coverage for the natural hazards. The other municipalities may or may not have sufficient insurance coverage.

6. Property protection measures can protect the most damage-prone buildings in the County: repetitive loss properties.

5.7. Recommendations

1. Public education materials should be developed to explain property protection measures that can help owners reduce their exposure to damage by natural hazards and the various types of insurance coverage that are available.

2. Because properties in floodplains will be damaged sometime, a special effort should be made to provide information and advice to floodplain property owners. Special attention should be given to repetitive loss and high hazard areas.

3. All property protection projects should be voluntary. Other than State and Federally-mandated regulations, local incentives should be positive, such as providing financial assistance.

4. A standard checklist should be developed to evaluate a property's exposure to damage from the hazards most prevalent in Kane County: flooding, high winds, lightning, hail and power losses from downed lines. It should include a review of insurance coverage and identify where more information can be found on appropriate property protection measures. The checklist should be provided to each agency participating in this planning process and made available to the general public.

5. Each public entity should evaluate its own properties using the standard checklist. A priority should be placed on determining critical facilities' vulnerability to damage and whether public properties are adequately insured.

6. Each public entity should protect its own publicly-owned facilities with appropriate mitigation measure(s).

7. Communities should establish cost-sharing programs, such as rebates, to encourage low cost (under $10,000) property protection measures on private property, such as:

   – Surface and subsurface drainage improvements,
   – Berms and regrading for shallow surface flooding,
   – Sewer backup protection
   – Relocating furnaces and water heaters out of basements
   – Tornado safe rooms
   – Installing lightning rods

8. The County and municipalities should seek State and Federal funding support for higher cost measures, such as elevation, relocation and acquisition of high priority properties. High priority properties are:

   – Those properties in repetitive loss areas 7, 8, 9, 12 and 14. If owners of these properties are interested, benefit-cost analyses should be run and outside funding should be applied for.
   – Critical facilities in the floodway or subject to flood depths of more than 2 feet

5.8. References

1. *Disaster Mitigation Guide for Business and Industry*, Federal Emergency Management Agency, FEMA-190, 1990

2. *Engineering Principles and Practices for Retrofitting Flood Prone Residential Buildings*, Federal Emergency Management Agency, FEMA-259, 1995.

3. *Flood Insurance Agent's Manual*, FEMA, 2000

4. *Flood Proofing Techniques, Programs and References*, U.S. Army Corps of Engineers National Flood Proofing Committee, 1991.

5. *Floodproofed Sites in Illinois*, French & Associates, 1992.

6. *Guide to Flood Protection in Northeastern Illinois*, Illinois Association for Floodplain and Stormwater Management, 1997.

7. *The Homeowners Guide to Earthquake Safety*, California Seismic Safety Commission, 2000

8. *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding.* Federal Emergency Management Agency, FEMA-312, 1998.

9. *Ice Storm Mitigation*, FEMA –860-DR-Illinois, Illinois Emergency Management Agency, 1990.

10. *Local Flood Proofing Programs*, U.S. Army Corps of Engineers, 1994.

11. Materials supplied by County offices and municipalities, Spring 2003.

12. State Farm Insurance website, www.statefarm.com/consumer/lightng.htm

13. *Taking Shelter from the Storm: Building a Safe Room Inside Your House*, Federal Emergency Management Agency, FEMA-320, 1998.

14. Windshield surveys of repetitive loss areas conducted by French & Associates, Ltd., 2003.

15. *Windstorm Mitigation Manual for Light Frame Construction*, Illinois Emergency Management Agency, 1997.

Chapter 6. Resource Protection

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 the following:

- 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

As development occurs, many of the above benefits can be achieved though regulatory steps for protecting natural areas or natural functions. The regulatory programs are discussed in Chapter 4. Preventive Measures. This chapter covers the 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 restoration
- Best management practices
- Dumping regulations
- Urban forestry
- Farmland protection

6.1. Wetland Protection

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

Wetlands are often found in floodplains and depressional areas of a watershed. Many 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.

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.

There are also nationwide permits that allow small projects that meet certain criteria to proceed without individual permits. Wetlands not included in the Corps' jurisdiction or that are addressed by a nationwide permit may be regulated against by local authorities.

If a permit is issued by the Corps or the County, 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.

Chicago area wetland

Some developers and government agencies have accomplished the required mitigation by buying into a wetland bank. Wetland banks are large wetlands created for the purpose of mitigation. The banks accept money to reimburse the owner for setting the land aside from development.

When a wetland is mitigated at another site there are drawbacks to consider. First, it takes many years for a new wetland to approach the same quality as an existing one. Second, a new wetland in a different location (especially if it's in a different watershed) will not have the same flood damage reduction benefits as the original one did.

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: There are several programs active in protecting wetlands in Kane County. An example of one's public information effort is on the next page, showing one of the benefits of protecting and restoring wetlands – protecting against another natural hazard, West Nile Virus.

Most wetlands in Kane County are subject to the Section 404 regulations and the provisions of the Kane County Stormwater Ordinance. The Kane County ordinance leaves wetland protection to the Corps of Engineers where applicable.

If the Corps does not have jurisdiction or if the Kane County standards exceed the Corps', then the provisions of the County Ordinance apply. Wetlands within agricultural land that have farm subsidies are under the responsibility of the Natural Resources Conservation Service.

Algonquin, Huntley, East Dundee, Elgin, Batavia, and Montgomery issue permits for wetland activities under the County's authority, using a third party consultant to perform the technical review.

Kane County began working in 2001 with the Northeastern Illinois Planning Commission, now known as the Chicago Metropolitan Agency for Planning (CMAP), the US EPA, the US Fish and Wildlife Service and other agency scientists and biologists to identify high-quality wetlands across the county. The project is called Advanced Identification of Aquatic Resources (ADID).

ADID aims to identify all wetlands within the county. Through field verification of the biology, habitat, water quality, groundwater, water supply, drainage, and stormwater functions, the most valuable wetlands in Kane County are identified and mapped. The ADID project was completed in 2003.

Both public and private wetland mitigation and restoration projects have been undertaken in Kane County. Several of these projects were constructed in conjunction with detention projects and they are highlighted in Chapter 8. Structural Measures.

The Kane County Forest Preserve District is responsible for large natural wetlands, such as the Dick Young Forest Preserve's Nelson Lake Marsh located in Batavia and Blackberry Townships. Currently, Kane County is coordinating an effort to restore more than 31 acres of the wetlands on the Dick Young Forest Preserve. The restoration effort includes the removal of drain tiles so that the natural wetland hydrology can be restored, allowing for the further development of wetland species and habitat. This effort is being funded from wetland violation money from the Corps and from direct funding from the County Board. Another large public wetland restoration site is the Braeburn Marsh Forest Preserve in Batavia and Geneva Townships.

An example of a large private wetland creation site is along Indian Creek near Kirk Road and Interstate 88, which is part of the development of an outlet mall in Aurora. This project also includes flood storage and stream restoration components. Indian Creek is

West Nile Virus and Wetlands
Wetland predators lower mosquito populations, WNV risk

West Nile is a mosquito-borne virus first detected in the United States in 1999 and in Illinois in 2001. Female mosquitoes transmit the virus mainly to birds, but also to other animals and occasionally to people. The threat to human health raises concerns about mosquito populations and the sites that breed them. **Some citizens are concerned that wetlands are part of the problem, but in fact, wetlands can be part of the cure.**

Healthy wetlands are home to fish, insects and birds that eat mosquitoes and keep their populations low. Furthermore, the species of mosquitoes responsible for transmitting West Nile Virus don't prefer wetlands but breed prolifically in stagnant water in discarded tires, birdbaths, and roof gutters. Such artificial containers lack the predators found in wetlands, and are located in or near urban areas, providing infected mosquitoes with easy access to human or animal hosts.

The presence of West Nile Virus in Illinois makes it more important than ever to protect and restore wetlands. Healthy wetlands can control mosquito numbers in addition to providing wildlife habitat, preventing flooding and purifying water.

Read on to learn more about mosquitoes and wetlands and what you can do around your home and community to decrease the risk of WNV.

Source: Fox River Ecosystem Partnership, Wisconsin DNR

converted from a straight ditch to a meandering stream through the created wetland.
Two wetland banks have been created in Kane County by a private developer through a permit from the Corps. One of the banks, located in the Otter Creek watershed, has been sold out. Two more banks are being planned. The purchase of the wetlands is open to agencies and developers throughout northeastern Illinois.

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.

6.2. Erosion and Sedimentation Control

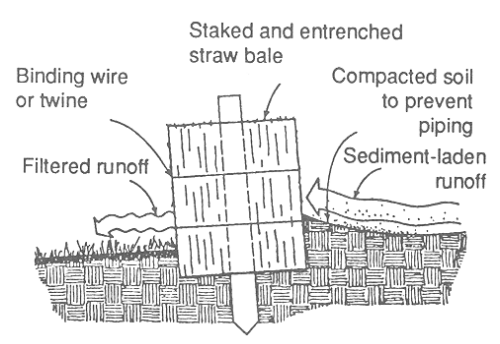
Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

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 streambanks 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. Sediment has been identified by the US EPA as the nation's number one nonpoint source pollutant for aquatic life.

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.



Straw bales catch sediment

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.

Erosion and sedimentation control regulations mandate that these types of practices be incorporated into construction plans. They are usually oriented toward construction sites rather than farms. The most common approach is to require applicants for permits to submit an erosion and sediment control plan for the construction project. This allows the applicant to determine the best practices for the site.

Local implementation: Standards for soil erosion and sediment control during and following project construction are significant components of the Kane County Stormwater Ordinance. Erosion and sediment control planning is required in the initial site planning process. The Ordinance also places an emphasis on efforts that prevent and reduce erosion rather than having to control sediments that are created due to construction.

CRS credit: The Kane County Stormwater Ordinance's erosion and sedimentation control provisions qualify for up to 40 points, the maximum credit for programs that do not address erosion from farmland.

6.3. River Restoration

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
	Thunderstorm
	Winter storm

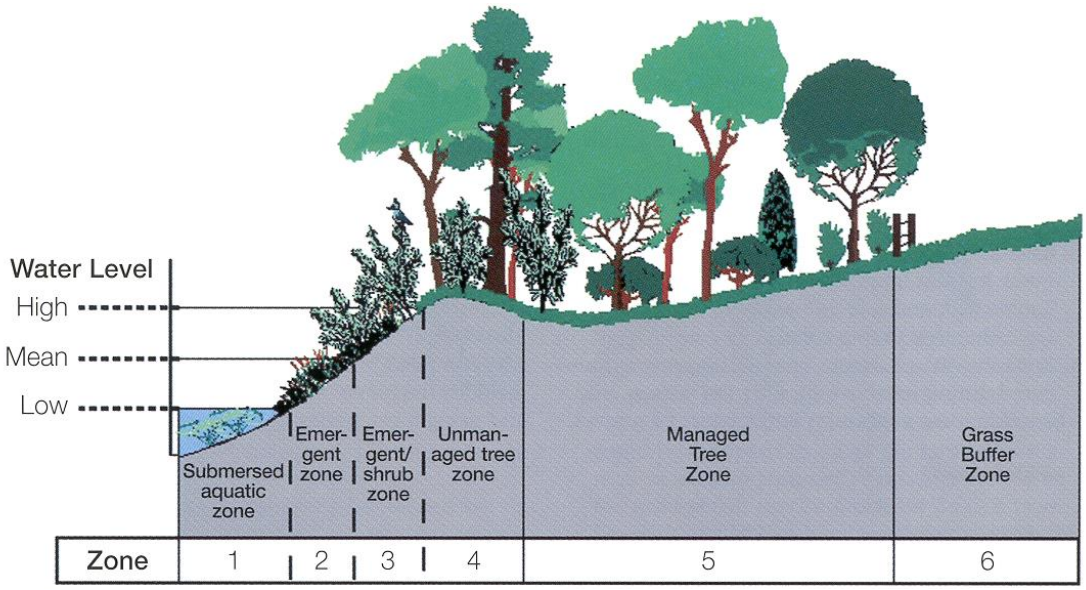
There is a growing movement that has several names, such as "stream conservation," "bioengineering" or "riparian corridor restoration." The objective of these approaches is to return streams, streambanks and adjacent land to a more natural condition, including the natural meanders. Another term is "ecological 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

The last bullet deserves special attention. 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.



Aquatic and riparian buffer plant zones

Different types of plants are used in different buffer zones along a channel. Zone 1 plants are normally submerged while zone 2 plants are inundated during much of the growing season. Zone 3 plants are water tolerant, but are flooded only during high water. By using the proper plants in each zone, they stabilize streambanks, filter polluted runoff, and provide habitat. *Source: Banks and Buffers – A Guide to Selecting Native Plants for Streambanks and Shorelines*, Tennessee Valley Authority

Restored retention basin

The traditional design (left) uses steep slopes and rock rip-rap to stabilize the shore line. The site is plagued with geese. The basin on the right had similar problems, but was retrofitted using natural plantings. It provides a more attractive setting and the tall grasses have kept geese away. (Sites are in Lake County)

Local implementation: Kane County has been active in pursuing and completing restoration projects. A section of Brewster Creek was restored when the YWCA dam at Camp Tu-Endie-Wei south of South Elgin was removed. This was a pilot dam removal project in Illinois, as it allowed for a gradual drawdown of a dam reservoir over a period of a year or more. The gradual drawdown allowed a channel to reform in the sediment deposits that are behind the dam, encouraging a more stable, naturally vegetated stream bank.

This dam on Brewster Creek was removed.

A section of Indian Creek near Kirk Road and Interstate 88 was also restored. The project took a portion of Indian Creek which was a straight ditch and converted it to a meandering stream through a large created wetland. This has resulted in more stable banks along the Creek and significant additional floodplain storage.

With funding from the US EPA, Kane County, and the villages of East Dundee, West Dundee and Carpentersville, sections of the Fox River and seven tributary streams to the Fox River were restored. The project extends from the north side of Carpentersville to the south end of East and West Dundee. The project involved streambank stabilization, habitat improvement, and streamside vegetation improvement.

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.

6.4. Best Management Practices

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

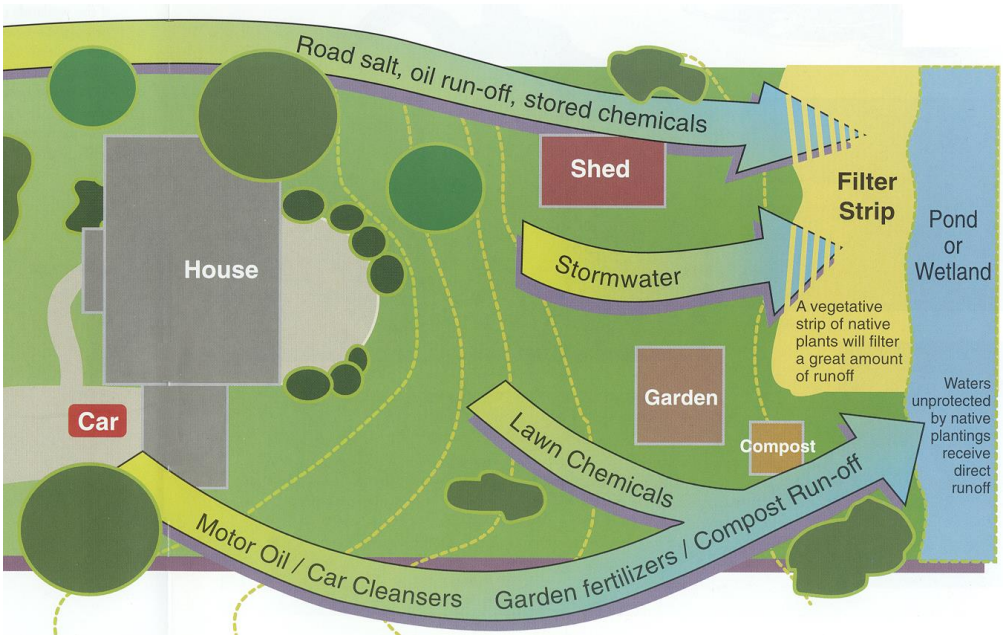
Point source pollutants come from pipes such as the outfall of a municipal wastewater treatment plant. They are regulated by the U.S. and Illinois Environmental Protection Agencies. *Nonpoint source* pollutants come from non-specific locations and are harder to regulate.

Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams.

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

Local implementation: Best management practices have been incorporated throughout the Kane County Stormwater Ordinance. The County has also begun work to meet the requirements of the Clean Water Act and the NPDES Phase II (National Pollutant Discharge Elimination System) requirements.

CRS credit: The Kane County Stormwater Ordinance would receive points for requirements that protect channel banks and lakeshores from development through setbacks or buffer zones and for requiring stormwater management facilities to incorporate BMPs.



BMPs slow stormwater runoff and improve water quality.

Source: Living With Wetlands, A Handbook for Homeowners in Northeastern Illinois

6.5. Dumping Regulations

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

BMPs usually address pollutants that are liquids or suspended in water that are washed into a lake or stream. 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 stormwater.

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 "nonobjectionable" 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 regrading 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.

Stream dumping public notice

Local implementation: The Kane County Stormwater Ordinance addresses the obstruction of waterways. Although the ordinance does not address dumping directly, it does regulate "the storage of materials and the deposit of solid or liquid waste." All such projects are prohibited if they cause an increase in flood heights.

Some communities, including Algonquin, Aurora, Batavia, Big Rock, East Dundee, Elburn, St. Charles, Sleepy Hollow, and West Dundee do have ordinances that prohibit the dumping of debris in or obstructing waterways.

CRS credit: The CRS provides points for enforcing and publicizing a regulation that prohibits dumping in the drainage system. As currently written, the Kane County Stormwater Ordinance would not receive this credit.

6.6. Urban Forestry

Hazards Addressed	
	Flood
Y	Tornado
	Earthquake
Y	Thunderstorm
Y	Winter storm

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.

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.

Trees are the first victims of ice storms

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. Such a plan helps a community qualify to be a Tree City USA.

TREE CITY USA.

Tree City USA is a program sponsored by The National Arbor Day Foundation in cooperation with the USDA Forest Service, Urban and Community Foresters and the National Association of State Foresters. These standards were established to ensure that every qualifying community would have a viable tree management plan and program. They were also designed so that no community would be excluded because of size.

To qualify for Tree City USA, a town or city must meet four standards:

1. A tree board or department – Someone must be legally responsible for the care and management of the community's trees. This may be a professional forester or arborist, an entire forestry department, or a volunteer tree board.

2. A tree care ordinance – The ordinance must designate the establishment of a tree board or forestry department and give this body the responsibility for writing and implementing an annual community forestry work plan.

3. A community forestry program with an annual budget of at least $2 per capita – A little investigation usually reveals that more than this amount is already being spent by the municipality on its trees.

4. An Arbor Day observance and proclamation

Source: www.arborday.org/programs/treeCityUSA

Local implementation: Many Kane County municipalities have the designation of "Tree City USA." As such, they have agreed to have a tree board or department, a tree care ordinance, and a community forestry program. Other communities in Kane County manage urban forestry through their public works departments. The Kane County Highway Department does regular maintenance along County rights-of-way. Commonwealth Edison inspects the utility lines on a rotating schedule throughout the County and when problems are found takes corrective action. Batavia, Geneva and St. Charles provide the electrical distribution within their corporate limits and provide the necessary tree inspection and maintenance.

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.

6.7. Farmland Protection

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

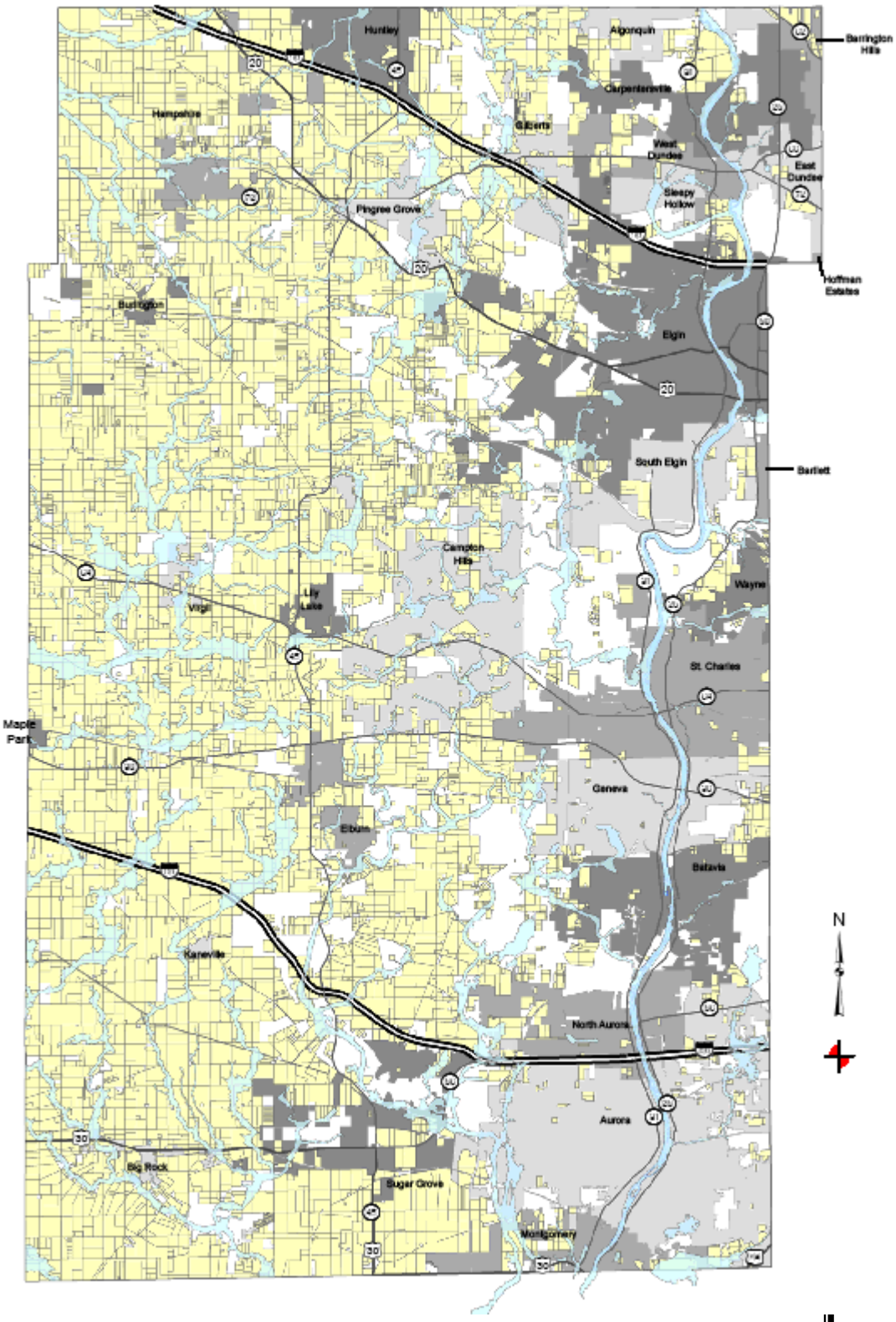
Farmland protection is quickly becoming an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime, unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural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

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 stormwater runoff and emergency management difficulties.

Preserving floodplain farmland prevents damage to buildings

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 cropland, rangeland, grassland, pastureland, and forest land that is part of an agricultural operation. Certain lands with historical or archaeological resources are also included.

Map 6-1. Kane County Farmland



Legend: Yellow – farmland, Blue – floodplain

The hazard mitigation benefits of farmland protection are similar to those of open space preservation, discussed in Chapter 4. Preventive Measures:

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

Local implementation: There are 168,541 acres of farmland in Kane County as of 2012, of which, 22,800 are also floodplain. The important relationship between floodplains and farmland can be seen in Map 6-1 on page 6-12. Farmland protection is part of Kane County's 2040 Land Use Plan. The long term planning goal is for prime farmland to be preserved in the western townships.

With the assistance of farm owners, local officials and farm consultants, Kane County developed the state's first farmland protection program. The County Board has the authority to either make a fee simple purchase, acquire development rights, or accept donated land. With funding from the Farm Bill, tax revenue from the Grand Victoria Casino, and County funds, the County began purchasing development rights from interested farm owners in 2002. The County is anticipating additional federal funding. Currently, applications from farmland owners exceed the level of available funding. As of mid 2008 the county has agricultural conservation easements on 34 farms on 4,655 acres. This has been accomplished using $18,053,800 in Riverboat funds and $8,803,142 in Federal Farm and Ranchlands funding

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 floodprone areas. Agricultural zones that require minimum 10 or 20 acre lots would qualify.

6.8. Conclusions

1. A hazard mitigation program can utilize resource protection programs to support protecting areas and natural features that can mitigate the impacts of natural hazards.

2. The current regulations on wetland protection, erosion and sediment control, and best management practices, have effective standards.

3. There are excellent examples of wetland protection and river and shoreline restoration projects managed by Kane County, the Kane County Forest Preserve District and the municipalities that demonstrate the benefits of these measures.

4. There is not a countywide ordinance that prohibits dumping in wetlands or other parts of the drainage system.

5. Some communities have urban forestry programs in place that can be effective against damage and power losses from wind and ice storms.

6. Preserving farmland in the floodplain and other hazardous areas will prevent damage to homes, businesses and other development.

6.9. Recommendations

1. All communities should enforce the wetland protection, erosion and sediment control and best management practices provisions of the County Stormwater Ordinance.

2. The public and decision makers should be informed about the hazard mitigation benefits of restoring rivers, wetlands and other natural areas. Myths about mosquitoes should be dispelled and restoration and protection techniques should be explained.

3. Each community should ensure that it has enforceable stream and wetland dumping regulations.

4. The public should be informed about the need to protect streams and wetlands from dumping and inappropriate development and the relevant codes and regulations.

5. Every community should implement an urban forestry program that qualifies them to become a Tree City, USA.

6. Municipal comprehensive plans, land use plans and zoning ordinances should incorporate open space provisions that will protect properties from flooding and preserve wetlands and farmland. The County's *2030 Land Resource Management Plan* provides a guide for this. Subsequent County-wide plans should, too.

6.10. References

1. *2002 and 2007 Annual Report*, Kane County Stormwater Management Committee

2. *Banks and Buffers – A Guide to Selecting Native Plants for Streambanks and Shorelines*, Tennessee Valley Authority, 1997

3. *Best Management Practices Guidebook for Urban Development*, Northeastern Illinois Planning Commission, 1992.

4. *CRS Coordinator's Manual*, Community Rating System, FEMA, 2002.

5. *Environmental Consideration in Comprehensive Planning,* Northeastern Illinois Planning Commission, 1994.

6. *Illinois Hazard Mitigation Plan,* Illinois Emergency Management Agency.

7. Kane County Forest Preserve, National Arbor Day, and other websites.

8. *Kane County Stormwater Ordinance*, Kane County, Illinois, December 11, 2001.

9. *Living With Wetlands, A Handbook for Homeowners in Northeastern Illinois*, The Wetlands Initiative, 1998

10. *Making our Urban Forests Safer,* Alabama Cooperative Extension Service, 2001.

11. *Protecting Nature in Your Community*, Chicago Wilderness and Northeastern Illinois Planning Commission, 2000.

12. *Reducing the Impacts of Urban Runoff – The Advantages of Alternative Site Design Approaches,* Northeastern Illinois Planning Commission, 1997.

13. *Stormwater management – The Benefits of Alternative Approaches*, South Suburban Mayors and Managers Association, 2000.

14. *Stream and Wetland Protection: A Natural Resource Management Priority in Northeastern Illinois,* Northeastern Illinois Planning Commission, 1991.

15. *Stream Corridor Restoration Principles, Processes and Practices*, Federal Interagency Stream Restoration Working Group, 1998. Copies available through the USDA Natural Resource Conservation Service.

16. Survey of municipalities, Spring, 2003.

Chapter 7. Emergency Services

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.

At the state level, programs are coordinated by the Illinois Emergency Management Agency (IEMA). In Kane County emergency services are coordinated through the Kane County Office of Emergency Management (OEM) in Geneva.

> The objective of preparing emergency plans is to define the capacity of County government to save the maximum number of lives, minimize injuries, protect property, and maintain and support economic activities essential to the survival and recovery from the emergency or disaster.
>
> *- Kane County Emergency Operations Plan*

Kane County municipalities that have emergency management programs generally coordinate them through their fire or police department or a separate emergency manager or Emergency Services and Disaster Agency coordinator. With two exceptions, when a municipality develops and adopts an emergency management plan, the plan is reviewed and approved by Kane County OEM for the State of Illinois. The two exceptions are the Cities of Aurora and St. Charles, which are accredited directly by IEMA.

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 recovery activities.

7.1. Threat Recognition

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

Hazards Addressed	
Y	Flood
Y	Tornado
	Earthquake
Y	Thunderstorm
Y	Winter storm

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 larger rivers, including the Fox, the measuring and calculating is done by the National Weather Service which is part of 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 is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain or imminent. 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.

Tornadoes and Thunderstorms: The National Weather Service is the primary 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), through the NOAA Weather Radio System and most recently through the Integrated Public Alert & Warning System (IPAWS) which send watch and warning information directly to a person's cell phone.

As with floods, the Federal agency can only look at the large scale, e.g., whether conditions are appropriate for the 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 storm spotters to watch the skies when the Weather Service issues a watch or warning.

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: Floods: On the larger streams, the United States Geological Survey (USGS) operates stream and rain gauges in cooperation with the Illinois Department of Natural Resources and the Kane County Environmental Management Department. For example, the Illinois Department of Natural Resources monitors the Fox River at the McHenry Lock and Dam and transfers this data to the USGS. USGS provides stream stage and stream flow information for the following sites in Kane County:

Real-time stream gage readings for the sites listed to the right can be accessed on the internet at the USGS website, http://il.water.usgs.gov/nwis-w/IL/ or http://waterdata.usgs.gov/il/nwis/current. This site tells the *current* stream conditions.

Stream Gages on the USGS Website

Fox River at Algonquin
Fox River at South Elgin
Fox River at Montgomery
Tyler Creek at Elgin
Ferson Creek near St. Charles
Mill Creek near Batavia
Blackberry Creek near Montgomery

The National Weather Service is able to issue a specific *prediction* of when and how high the river will crest. It does this for the Fox River at Algonquin, which can be accessed at http://waterdata.usgs.gov/il/nwis/uv/?site_no=05550001&PARAmeter_cd=00065,00060. NWS can also issue more general flood statements on smaller streams throughout the County.

Annex K of Kane County's *Emergency Operations Plan* addresses floods. Threat recognition, including weather and river conditions, are addressed in the annex with a "Pre-Emergency Operations Checklist" includes the web addresses for the stream gages at Algonquin, South Elgin and Montgomery. The stream gage at the Algonquin tailwater is used extensively to monitor the northern portion of the Fox River in the high flood prone communities.

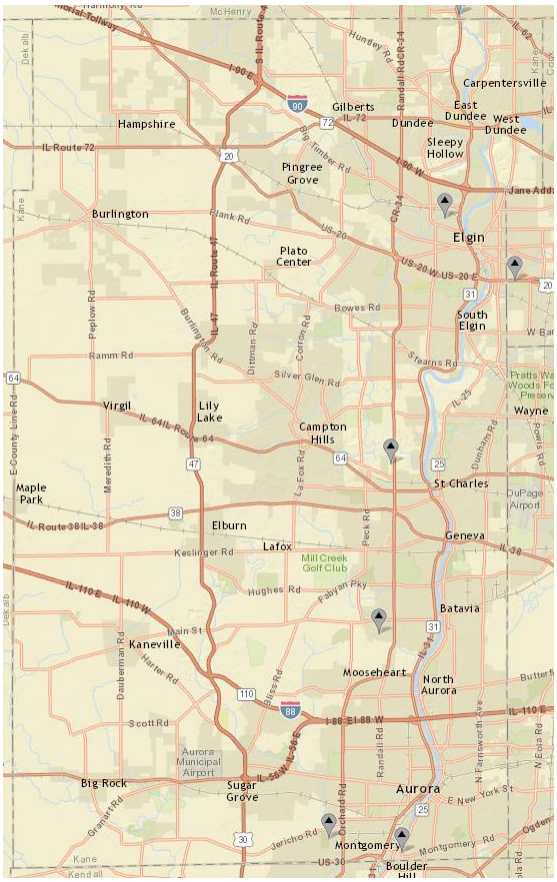
Other Weather Hazards: The threat of flash flooding can be foreseen by watching rain gages. There are many rain gages in Kane County that can be monitored.

Kane County OEM receives threat recognition information directly from NWS, or through monitoring of NOAA weather radio. The Illinois State Police also disseminate weather threats through the LEADS system to 911 dispatch centers around the state. Police and fire stations, schools and other public facilities may also receive NWS alerts through internet notification systems.

When conditions are appropriate, the Kane County OEM uses its formal organization of storm spotters. OEM conducts annual training on how to identify hazardous weather conditions and tornadoes.

CRS credit: Credit can be received for utilizing the gages 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. For example, South Elgin, located on the Fox River, would receive most of the possible credit while Elburn would receive none.

Stream Gage Locations - USGS



Source: http://maps.waterdata.usgs.gov/mapper/wateralert/

7.2. Warning

Hazards Addressed	
Y	Flood
Y	Tornado
	Earthquake
Y	Thunderstorm
Y	Winter storm

After the threat recognition system tells the OEM and municipalities that a flood, tornado, thunderstorm, winter storm or other hazard is approaching, the next step is to notify the public and staff of other agencies and critical facilities. The earlier and the more specific the warning, the greater the number of people who can implement protection measures.

The National Weather Service issues notices to the public using two 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.

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

- Outdoor warning sirens
- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- IPAWS mass cell phone 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.

- Newer cell phones come with the IPAWS system enabled at no extra cost to the user. The IPAWS message is generated by NWS and as long as the cell phone is turned on the user will receive the notification.
- Automated telephone notification services like CodeRED are also fast, but can be expensive and do not work when phones 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).

Stormready: The National Weather Service established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public. To be officially StormReady, 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 StormReady community, as is Kane County and the cities of Aurora, Batavia, and St. Charles 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.

Local implementation: The Kane County OEM and municipal emergency services are responsible for disseminating warning information to the public and notifying response personnel during an emergency. Once the threat is perceived, the County's 911 dispatch center then transmits the warnings to these offices, as well as schools, hospitals, government offices, business, and the general public through the following systems:

- The Emergency Alert Radio System (EARS) is a tone alert system designed to provide weather watch and warning information to schools, hospitals, government offices, business, and the general public.

- The Emergency Alert System (EAS) is a national warning system that utilizes broadcast radio and television stations and local cable television systems. In Kane County, activation of the EAS will only be initiated if the event affects a large area of the County such that it is impractical to warn affected residents using other means. The EAS works closely with radio stations WSCR (AM-670), WGN (AM-720), and WBBM (AM-780).
- Broadcast Fax, which has the capability of using 30 telephone lines to speed the faxes to the recipient list. A list of 150 recipients can be completed in just five minutes.
- Code RED is capable of placing up to 60,000 phone calls per hour to inform residents of what is taking place and provide important instructions on what to do next.

Incorporated areas: Municipalities are responsible for the installation and operation of warning sirens. Fire chiefs, mayors and police chiefs are authorized to activate these systems. Kane County OEM published *Guidelines for the Operation of Outdoor Warning Systems* to improve coordination and consistency in the use of sirens.

Aurora and South Elgin have provided most of their critical facilities (schools, hospitals, nursing homes and municipal facilities) with weather radios. Aurora also has its own municipally-owned AM station (1690) that broadcasts Weather Service notices and can be used to provide information to the public during and after a disaster.

Rural areas: Kane County OEM does not own or operate any type of outdoor warning systems. Therefore, most unincorporated areas do not have warning sirens. For rural and unincorporated areas, Kane County OEM holds that the most effective means of public warning are the IPAWS system, Broadcast radio and television, cable systems (EAS), the EARS tone alert radios and NOAA Weather Radios.

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 Kane County, information comes from the National Weather Service office in Romeoville, Illinois.

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.

OEM has recommended that all schools and manufactured home communities have Weather Radios. In 2002 the OEM received about 600 NOAA weather radios from IEMA. The radios were distributed to the Willow Lakes manufactured home community located in Elgin and to schools throughout the county.

StormReady: Kane County was Illinois' first StormReady County. Aurora, Batavia, and St. Charles have also received this recognition.

NFIP/CRS

CRS credit: Community Rating System points are based on the number and types of warning media that can reach the community's floodprone

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 StormReady community can provide 25 more points.

7.3. Response

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

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:

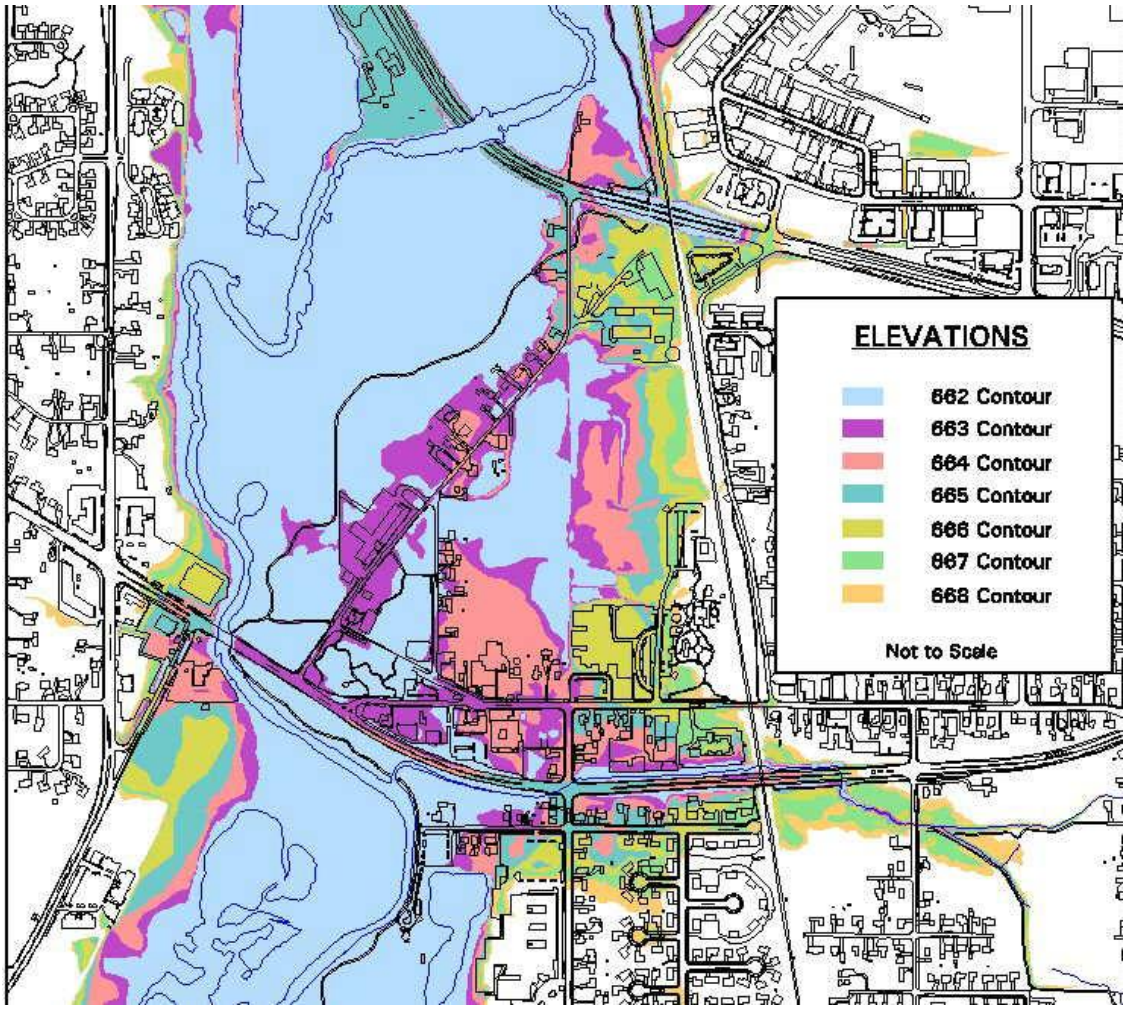
- Activating the emergency operations center (emergency management)
- Closing streets or bridges (police or public works)
- Shutting off power to threatened areas (utility company)
- Passing out sand and sandbags (public works or Emergency Management)
- Ordering an evacuation (mayor or County Board Chairman)
- Holding children at school/releasing children from school (school district)
- Opening evacuation shelters (Red Cross or local authority)
- Monitoring water levels (engineering)
- Security and other protection measures (police)

Emergency response planning will make flood response activities more efficient

An emergency action plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given various responsibilities.

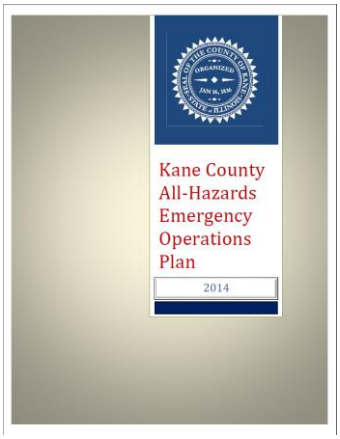
Planning is best done with adequate data. One of the best tools is a flood stage forecast map that shows what areas would be under water at various flood stages (see example, below). Emergency management staff can identify the number of properties flooded, which roads will be under water, which critical facilities will be affected, etc. 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.

Emergency response plans should be updated annually to keep contact names and telephone numbers current and to make sure that supplies and equipment that will be needed are still available. They should be critiqued and revised after disasters and exercises to take advantage of the lessons learned and changing conditions. The end result is a coordinated effort implemented by people who have experience working together so that available resources will be used in the most efficient manner.



This Flood Stage Forecast Map was developed for the Des Plaines River. Different flood levels are shown as color coded areas, so the emergency manager can quickly see what will be affected. Source: Village of Gurnee, Illinois

Local implementation: Kane County: The *Kane County Emergency Operations Plan* is designed to present a common platform for coordination of major response activities for all types of natural and technological hazards. It establishes the Incident Management System which assigns responsibilities during a disaster, such as communications, evacuation and public health. Implementation of the plan relies on the combined effort of Kane County departments and municipal emergency management agencies.



The *Emergency Operations Plan* is supported by annexes, standard operating procedures and other guidance documents that cover the details of various aspects of emergency response, such as communications, evacuation, sheltering, damage assessment, and severe weather

Annex K is specific to flooding and includes checklists of action items. It has a Pre-Emergency Operations Checklist with items like "Review county hazard analysis to determine possible locations of flood hazards." The County should not wait for a flood to implement this checklist. Other checklists are more specific and keyed to various stages at the Algonquin gage.

Kane County Municipalities: Sixteen Kane County municipalities have or will have emergency operation plans. However, most are not as complete or as well organized as the County's. State law requires an update and revision every two years, so many municipalities are currently in the process of plan development or revision. As communities update or develop plans, they are sent to OEM for review.

The table on the following page shows the office responsible for emergency response planning and management functions. Municipalities that do not have emergency operations plans rely on assistance from the Kane County Office of Emergency Management. If the severity or extent of an emergency were to exceed any municipality's capability, the County is able to provide additional resources.

CRS credit: In its current configuration, the *Kane County Emergency Operations Plan* and its Annex K would receive minimal CRS credit. Given the County's geographic information system capabilities, a more effective annex that covered more areas of the County and more response activities is feasible and would qualify for more points.

Kane County Emergency Management Plans and Emergency Operations Centers					
Community	**Emergency Operations Plan**	**Office**	**Emergency Manager**	**Emergency Operations Center**	**Special Procedures for Natural Hazards?**
Kane County	Yes	Office of Emergency Management	Director of Office of Emergency Management	Government Center – Building C	Yes
Algonquin	Yes	Police Department	Chief of Police	Village Hall	———
Aurora	Yes	Fire Department	Emergency Management Coordinator	EMA Office, Police & Court Building	Yes
Batavia	Yes	Fire Department	Fire Chief	Fire Station 1	No
Big Rock	No	———	———	———	———
Burlington	No	Fire Protection District	———	Fire Protection District station	No
Campton Hills	Yes	Village Administration	———	County	———
Carpentersville	Yes	Fire Department	Fire Chief	Public Works Facility	No
East Dundee	No	———	———	County	No
Elburn	No	———	County	County	———
Elgin	Yes	Fire Department	Assist. Fire Chief	City Hall	Dam failure plan
Geneva	Yes	ESDA	ESDA Coordinator	Fire Station 1	No
Gilberts	No	———	———	County	———
Hampshire	No	———	———	County	———
Huntley	Yes	City Hall	Police Chief	County	———
Lily Lake	No	———	County	County	———
Maple Park	No	———	County	County	———
Montgomery	No	———	County	Police Station	———
North Aurora	Yes	Police Department	Deputy Police Chief	Police Facility	Severe weather
Pingree Grove	No	———	County	County	———
Sleepy Hollow	No	———	———	County	———
South Elgin	Yes	Emergency Management	EMA Coordinator	City Hall	Advance notice of Fox flooding
St. Charles	Yes	Fire Department	EMA Coordinator	Fire Station 1	———
Sugar Grove	No	———	———	Village Hall	———
Virgil	No	———	County	County	———
Wayne	No	Police Department	County	County	No
West Dundee	Yes	Fire Department	Fire Chief	Public Safety Center	———

ESDA = Emergency Services and Disaster Agency; EMA = Emergency Management Agency; OEM = Office of Emergency Management

7.4. Critical Facilities Protection

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

Critical facilities are discussed in Chapter 1. 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 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 are 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 County plan identifies emergency operations centers and hospitals. However, neither the County's nor most of the municipal plans have procedures for coordination with critical facilities during a warning or emergency response or for helping facility managers develop their own emergency response plans.

Aurora sends "first responders" and city crews to critical facilities. The City did this in the 1996 flood and will continue to do so, but it is not formally identified in its plan.

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 points for maintaining a current contact list. Additional points are available if all the floodprone facilities developed their own flood response plans and coordinated them with government response efforts.

7.5. Post-Disaster Recovery and Mitigation

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

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

- Clearing streets
- Patrolling evacuated areas to prevent looting
- Providing safe drinking water
- Monitoring for diseases
- Vaccinating residents for tetanus
- 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

Regulating reconstruction: Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to re-enter and repair.

There is a special requirement to do this in floodplains, regardless of the type of disaster or cause of damage. The National Flood Insurance Program (and the County's stormwater ordinance) requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building's market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.

This requirement can be very difficult for understaffed and overworked offices after a disaster. If these activities are not carried out properly, not only does the community miss a tremendous opportunity to redevelop or clear out a hazardous area, it may be violating its obligations under the NFIP.

Local implementation: The Kane County OEM makes sure that federal, state and county regulations are implemented for health and safety. This includes the County Health Department testing water supplies and food services that were affected (Annex H of the *Kane County Emergency Operations Plan*).

Annex E, Disaster Intelligency/Damage Assessment, of the County's *Emergency Operations Plan*, provides a procedure for developing an inspection team and inspecting damaged structures and facilities. Building codes are to be enforced in unincorporated areas, and the annex highlights the need for municipalities to enforce their building codes. The pre-emergency checklist addresses floodplain regulations and mitigation opportunities. The recovery checklist also includes the following:

> "Establish, if necessary, new ordinances and land use regulations to lessen the impact of future disasters. In the case of a flooding disaster this will be coordinated with the Kane County Stormwater Management Planning Committee."

The larger municipalities have building inspection procedures through their building departments. West Dundee has the inspection procedures in its emergency plan. Geneva, St. Charles, Batavia, North Aurora and Elburn have signed a mutual aid agreement to help each other with building inspections after a disaster or emergency.

7.6. Conclusions

1. The flood threat recognition system is best on the Fox River. For other streams, local officials will need to augment the National Weather Service's general statements of possible flooding and utilize the rain gage network.

2. The threat recognition system for severe weather hazards (tornadoes, thunderstorms, and winter storms) is as effective as the County can have for the funding available.

3. The procedures and systems that the County and municipalities use to disseminate warnings are adequate for the urbanized areas, but additional systems could improve the likelihood that people will receive a warning in time.

4. The *Kane County Emergency Operations Plan* and its municipal counterparts have overall guidance on responding to many different kinds of hazards. These plans employ the nationally recognized "all hazards" concept for planning and disaster management.

5. Some emergency response plans do not cover critical facilities that will be affected by various types of hazards.

6. There are no specific plans or guidance documents on post-disaster inspections and capitalizing on post-disaster mitigation opportunities.

7.7. Recommendations

Mitigation Planning Committee members reviewing the conclusions and recommendations for this chapter.

1. Each community should appoint an emergency management coordinator or a liaison to the County's Office of Emergency Management to ensure effective coordination before, during and after emergencies and disasters.

2. The County and the individual municipalities should consider whether the exposure to flooding on their smaller streams warrants expansion of the local rain and stream gauging and flood threat recognition systems.

3. The County should evaluate whether to increase the number of rain gages in the western townships and tie them all together to improve the warning capabilities for flash flooding. The data collected would also help in evaluating and designing storm drainage networks.

4. The public should be educated on what the sirens and warnings mean and what steps they should take to protect themselves, pursuant to the County's *Guidelines for the Operation of Outdoor Warning Systems*.

5. County and municipal emergency managers should review their emergency response plans and programs and:

    a. Identify where additional activities are needed to respond to natural hazards. Flood stage forecast maps would help in areas subject to flooding.

    b. Ensure they have access to information on all critical facilities and update that information annually.

    c. Incorporate post-disaster procedures for public information, reconstruction regulation and mitigation project identification.

    d. Conduct a table top exercise at least once a year.

7.8. References

1. *CRS Coordinator's Manual*, Community Rating System, FEMA (FIA-15/2013)
2. *CRS Credit for Flood Warning Programs*, FEMA, 2006
3. *Guidelines on Community Local Flood Warning and Response Systems*, 2013
4. *Flood Warning Systems Manual*, National Weather Service, 2012
5. *Kane County Emergency Operations Plan*, Kane County Office of Emergency Management, 2014.
6. *Guidelines for the Operation of Outdoor Warning Systems*, Kane County Office of Emergency Management, 2003.
7. Information on StormReady communities can be found on the National Weather Service website, www.nws.noaa.gov/stormready/

Chapter 8. Structural Projects

Structural projects are usually funded by public agencies and constructed to protect people and infrastructure for damage due to natural hazards. Floodwater management is the primary focus of structural projects.

Structural projects have traditionally been used by communities to control or manage floodwaters. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. Six approaches are reviewed in this chapter:

- Reservoirs and detention
- Levees and floodwalls
- Channel improvements
- Crossings and roadways
- Drainage and storm sewer improvements
- Drainage system maintenance

Structural projects offer advantages not provided by other measures, but as shown below, they also have shortcomings. The appropriateness of using structural flood control depends on individual project area circumstances.

Pros and Cons of Structural Flood Control Projects

Advantages	Shortcomings
May provide the greatest amount of protection for land area used.	They disturb the land and disrupt natural water flows, often destroying wildlife habitat.
Because of land limitations, may be the only practical solution in some circumstances.	They require regular maintenance, which if neglected, can have disastrous consequences.
Can incorporate other benefits into structural project design such as water supply and recreational uses.	They are built to a certain flood protection level that can be exceeded by larger floods, causing extensive damage.
Regional detention may be more cost-efficient and effective than requiring numerous small detention basins.	They can create a false sense of security as people protected by a project often believe that no flood can ever reach them.
	Although it may be unintended, in many circumstances they promote more intensive land use and development in the floodplain.

Since structural flood control is generally the most expensive type of mitigation measure in terms of installation costs, maintenance requirements and environmental impacts, a thorough alternative assessment should be conducted before choosing a structural project.

In some circumstances smaller flood control measures may be included in a package of several recommended measures for a project area where non-structural measures would not be practical or effective.

Larger structural flood control projects have regional or watershed-wide implications and can be very expensive. Because of this, they are often planned, funded and implemented at a regional level by agencies, such as the Kane County Environmental Management and Building Departments, the Illinois Department of Natural Resources - Office of Water Resources, the U.S. Army Corps of Engineers, and the USDA Natural Resources Conservation Service. Much of these agencies' work has been coordinated over the past 25 years by the Resource Coordination Policy Committee, an informal organization of watershed steering committees and government agencies.

Over the years, flood control studies have been conducted for the Fox River, Indian Creek and Blackberry Creek. Other Kane County watersheds have been studied by the agencies listed above, but the purpose of those studies has been to map the 100-year floodplain, not determine how to control floodwaters.

CRS criteria: 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. Structural flood control projects that provide 100-year flood protection and result in revisions to the Flood Insurance Rate Map are not credited by the CRS in order to not duplicate the larger premium reduction provided by removing properties from the mapped floodplain.

In 2002, the CRS began crediting structural flood control projects that meet the following criteria:

- They must provide protection to at least the 25-year flood
- The design and construction must be certified by a licensed professional engineer
- They must meet certain environmental protection criteria
- They must meet Federal, State and local regulations, such as Corps of Engineers' 404 permit and State dam safety rules requirements
- They must meet certain maintenance requirements

These criteria ensure that credited projects are well-planned and permitted. Any of the first five measures reviewed in this chapter would be recognized under Section 531 of the *CRS Coordinator's Manual*. Credit points are based on the type of project, how many buildings are protected, and to what flood protection level.

8.1. Reservoirs and Detention

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower the flood height by holding back, or detaining, runoff before it can

flow downstream. Flood waters are detained until the flood has subsided, then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could help mitigate a drought).

Regional detention basins are more common in Northeastern Illinois than in-stream reservoirs

Reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins, are built to protect property from the impacts of new development (i.e., more runoff).

Regardless of size, reservoirs protect the development that is downstream from the reservoir site. Unlike levees and channel modifications, they do not have be built close to or disrupt the area to be protected. Reservoirs are most efficient in deeper valleys where there is more room to store water, or on smaller rivers where there is less water to store.

In urban areas, some reservoirs are simply manmade holes, excavated to store floodwaters (see photo, previous page). In some areas, costs have been reduced by using abandoned quarries as reservoirs. Reservoirs in urban areas are typically constructed adjacent to streams (though usually outside of the floodplain). When built in the ground, there is no dam for these retention and detention basins and no dam failure hazard. Wet or dry basins can also serve multiple uses by doubling as parks or other open space uses.

There are several considerations when evaluating use of reservoirs and detention:

- There is the threat of flooding the protected area should the reservoir's 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.

Local implementation: Several reservoirs have been built or are being planned. The larger ones are discussed here.

Fox River Watershed. The Stratton Lock and Dam in McHenry County controls the flows of the Fox River as it enters Kane County. The lock and dam is owned and operated by the Illinois Department of Natural Resources, Office of Water Resources. The Lock and Dam's function is twofold: the McHenry Dam controls the water level of the Fox Chain-of-Lakes in Lake and McHenry Counties, which allows for boating and other recreation in the lakes. The McHenry Dam also allows the Chain-of-Lakes to act as a reservoir which controls the flows of the Fox River into Kane County to alleviate flooding. This dual purpose means that the upstream needs and the downstream needs have to be balanced with one another in severe flood conditions.

Reservoir and Prairie Path Improvement

Source: City of Aurora

Blackberry Creek Watershed. In 2001, Aurora completed a reservoir and channel improvement project on Blackberry Creek from Galena Road to Jericho Road. The project protects over 150 homes in the Cherry Hills and San Souci Subdivisions. A series of lakes were constructed along the course of Blackberry Creek which provide 100-year flood storage (see photo). The project was enhanced by new pedestrian bridges for the Illinois Prairie Path and by the development of wetland areas. The total project cost including bridge replacements and storm sewer improvement was $2.5 million.

Currently, a Class I dam is proposed along Blackberry Creek Tributary D in Elburn as part of a development. If constructed as currently designed, the dam and the impoundment will provide regional flood control benefits.

Indian Creek Watershed. A flood control reservoir, located adjacent to Indian Creek and east of Farnsworth Road (south of Molitor Road), was completed in 1992 in the northeast portion of Aurora,. This 100-year capacity reservoir (310 acre-feet), protects 130 homes in Aurora and Aurora Township. It has performed well since its construction, though in the July 1996 flood it was completely inundated. The project was funded by the IDNR Office of Water Resources and sponsored by the City of Aurora. The estimated project cost was $5.4 million.

Also in the Indian Creek watershed, in 2004, a second major flood control and wetland restoration project was completed. As part of the Chicago Outlet Mall development, a flood control project was constructed consisting of 80 acres of wetland mitigation, and 32 acre-feet of detention storage volume. The resulting project has helped lower the base flood elevation and reduce the number of flooded structures.

Mill Creek Watershed. A wetland-detention project was constructed in 2002 along the McKee Tributary of Mill Creek in Batavia. This project served a dual purpose of protecting 50 to 75 existing homes from floodwaters and as the required detention for new development in the area. As development occurs around the area, developers

reimburse Batavia for their share of the project. The design of the detention and wetlands allowed for the consolidation of 60 acres of greenspace and wetlands.

Waubonsie Creek Watershed. In 1984, the Oakhurst Lake-Patterson Lake reservoir and wetland project was completed in the Oakhurst Forest Preserve in Aurora. The reservoir was a joint project between the City of Aurora, the Kane County Forest Preserve and the Fox Valley Park District and was constructed to allow for separation of storm and sanitary sewers in the neighborhoods to the west of the Forest Preserve.

Waubonsie Creek Reservoir

In 1979, a 50 acre-feet reservoir was completed along Waubonsie Creek in conjunction with a levee project to protect 60 – 100 homes in the Park View Estate and Marberry Manor subdivisions in the Village of Montgomery. The project was funded by IDNR's Office of Water Resources and sponsored by the Village.

The reservoir capacity was exceeded during the July 1983 flood event and both the reservoir and the levee were over-topped by the July 1996 flood. Though designed to the 100-year event (using TP-40) in 1979, the reservoir and the levee are no longer considered to be providing 100-year protection. This is due to an increased 100-year rainfall standard being used today (ISWS Bulletin 70 rainfall) and the significant upstream development in the watershed. Following the 1996 flood about 30 homes in the Park View Estates subdivision were acquired by Montgomery through a mitigation grant from IEMA.

Countywide. Since November 2000, detention has been required for all new development in Kane County. This means that small reservoirs are located throughout each watershed in conjunction with new residential and business development.

8.2. Levees and Floodwalls

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
	Thunderstorm
	Winter storm

Probably the best known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. They must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour.

Key considerations when evaluating use of a levee include:

- Removal of fill to compensate for the floodwater storage that will be displaced by the levee
- Internal drainage of surface flows from the area inside the levee.

- Cost of construction
- Cost of maintenance
- River access and views
- Creating a false sense of security (while levees may reduce flood damage for smaller more frequent rain events, they may also overtop or breach in extreme flood events and subsequently create more flood damage than would have occurred without the levee)

Levees placed along the river or stream edge degrade the aquatic habitat and water quality of the stream. They also are more likely to push floodwater onto other properties upstream or downstream. To reduce environmental impacts and provide multiple use benefits a setback levee (set back from the floodway) is the best project design. The area inside a setback levee can provide open space for recreational purposes and provide access sites to the river or stream.

Floodwalls perform like levees except they are vertical structures that require less land area for construction. Floodwalls are constructed of reinforced concrete, which makes the expense of installation cost prohibitive in many circumstances. Floodwalls also degrade adjacent habitat and can displace erosive energy to unprotected areas of shoreline downstream.

Local implementation: In 1979, a 3,000 foot levee was constructed in conjunction with the reservoir project along Waubonsie Creek discussed on the previous page. The project was funded by the IDNR Office of Water Resources and sponsored by the Village of Montgomery.

Though having been designed to provide 100-year flood protection in 1979, the levee is now considered to provide a lower level of protection. It was overtopped during the July 1996 flood. Following the 1996 flood about 30 homes in the Park View Estates subdivision were acquired by Montgomery through a mitigation grant from IEMA.

To bring it up to current standards, it would have to be raised four feet and other improvements would have to be made. The entire project would cost over $1.8 million.

Because 30 homes were purchased after the 1996 flood, the Park View Estates levee protects some empty lots.

8.3. Channel Improvements

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

By improving a channel's conveyance, more water is carried away at a faster rate. Three types of channel improvements are reviewed here: dredging the channel bottom; projects that make the channel wider, straighter or smoother; and diversion of high flows to another channel or body of water.

Dredging is often viewed as a form of conveyance improvement. However, it has the following problems:

Dredging

- Given the large volume of water that comes downstream during a flood, removing a foot or two from the bottom of the channel will have little effect on flood heights.
- Dredging is often cost prohibitive because the dredged material must be disposed of somewhere.
- Unless instream and/or tributary erosion are corrected upstream, the dredged areas usually fill back in within a few years, and the process and expense have to be repeated.
- If the channel has not been disturbed for many years, dredging will destroy the habitat that has developed.
- To protect the natural values of the stream, Federal law requires a Corps of Engineers permit before dredging can proceed. This can be a lengthy process that requires much advance planning and many safeguards to protect habitat.

Straightening, deepening and/or widening a stream or river channel, commonly referred to as "**channelization**" has traditionally been the common remedy for local drainage or flooding problems. Here are the concerns with this approach that need to be kept in mind:

Channel work

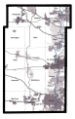
- Channelized streams can create or worsen flooding problems downstream as larger volumes of water are transported at a faster rate.
- Channelized streams rise and fall faster. During dry periods the water level in the channel is lower than it should be, which creates water quality problems and degrades habitat.

- Channelized waterways tend to be unstable and experience more streambank erosion. The need for periodic reconstruction and silt removal becomes cyclic, making channel maintenance very expensive.

On the other hand, properly sloped and planted channel banks are more aesthetically and environmentally appealing, and can prove cheaper to maintain than concrete ditches.

A **diversion** is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During flood flows, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

Diversions are limited by topography; they will not work in some areas. Unless the receiving water body is relatively close to the floodprone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive. Where topography and land use are not favorable, a more expensive tunnel is needed.



Local implementation:

Blackberry Creek Watershed. In the southwest area of the City of Aurora, channel improvements were made along Blackberry Creek from Manchester Road to Jericho Road. These improvements were made in conjunction with the reservoir and lakes project constructed south of the Cherry Hills Subdivision and west of Orchard Road (see page 8-4). The reservoir and channel improvement were completed in 2001. They were constructed to protect homes in the Cherry Hills and San Souci Subdivisions.

In Montgomery, a rerouting of the Blackberry Creek overflow through Crescent Lake would relieve flooding in the area due to the undersized culverts at U.S. Route 30. Residential flooding occurs as the Blackberry Creek overflow floodwaters make their way to the Fox River. This project is under consideration and is not yet included in Montgomery's capital improvement plan.

Indian Creek Watershed. In northeast Aurora, a channel improvement project was constructed along Indian Creek from the I-88 Toll Road to Molitor Road and Molitor Road to Farnsworth Road. Around 8,400 feet of channel were modified and this, in conjunction with the reservoir project, protects 130 homes in Aurora and Aurora Township. This project was completed in 2002 and was funded by the IDNR Office of Water Resources and sponsored by the City of Aurora.

Also in the Indian Creek watershed, in 2004, a second major flood control and wetland restoration project was completed. As part of the Chicago Chelsea Mall development, a farmed ditch was re-meandered to a more natural historical flow pattern through an ecological corridor providing 200 additional acre feet of regional floodplain storage volume.

Ferson-Otter Creek Watershed: In 1982, a channel improvement project was completed along Otter Creek to protect properties in Elgin. Almost 5,300 feet of channel were modified. The project was funded by the IDNR Office of Water Resources and sponsored by the City of Elgin.

Tyler Creek Watershed. In unincorporated Kane County, the portion of the north branch of Tyler Creek from north of I-90 to west of the Union Pacific Railroad was dredged in 2001 to improve flow through the stream below the Windmill Meadow Subdivision. The $22,000 cost of this project was shared between Kane County and the Village of Gilberts.

In 2003, a 1,500 feet channel dredging project is planned for the unincorporated section of the north branch of Tyler Creek from north of U.S. Route 20 to the Almora Heights Subdivision in Elgin to improve drainage. The cost estimate for the project is $20,000. (was this project ever done? If not, find another example)

Eakin Creek Watershed. In Rutland Township, the Kane County Water Resources Department dredged 3,700 feet of the South Branch of the Kishwaukee River near the Landing Subdivision in 2000. The cost of $20,000 was shared between the County, the homeowners and the Landings Airport.

8.4. Crossings and Roadways

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

In some cases buildings may be elevated above floodwaters but access to the building is lost when floodwaters overtop local roadways, driveways, and culverts or ditches. Several of these are listed in Chapter 2. Depending on the recurrence interval between floods, the availability of alternative access, and the level of need for access, it may be economically justifiable to elevate some roadways and improve crossing points.

For example, if there is sufficient downstream channel capacity, a small culvert that constricts flows and causes localized backwater flooding may be replaced with a larger culvert to eliminate flooding at the waterway crossing point. The potential for worsening adjacent or downstream flooding needs to be considered before implementing any crossing or roadway drainage improvements.

8.5. Drainage and Storm Sewer Improvements

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

Man-made ditches and storm sewers help drain areas where the surface drainage system is inadequate, or where underground drainageways may be safer or more practical. Storm sewer improvements include installing new sewers, enlarging small pipes, and preventing back flows. Particularly appropriate for depressions and low spots that will not drain naturally, drainage and storm sewer improvements usually are designed to carry the runoff from smaller, more frequent storms.

Because drainage ditches and storm sewers convey water faster to other locations, improvements are only recommended for small local problems where the receiving stream or river has sufficient capacity to handle the additional volume and flow of water. To reduce the cumulative downstream flood impacts of numerous small drainage projects, additional detention or run-off reduction practices should be provided in conjunction with the drainage system improvements.

A combination of restored wetland detention, vegetated swales, infiltration trenches and other best management practices that increase infiltration (reducing runoff), and improve water quality can be implemented in conjunction with stormwater system improvements. As shown in the photos below, these projects can have multiple benefits.

Drainage improvements do not have to be concrete channels.
They can include measures to improve infiltration and water quality.

Local implementation: The Kane County Environmental and Water Resources Division addresses existing drainage problems in the unincorporated areas of the County. Drainage problems are evaluated and prioritized depending on the severity of the problem. The Water Resources Division can provide technical assistance and cost sharing on certain drainage improvement projects.

CRS Criteria: The Community Rating System credits capital improvement plans that fund drainage improvements that reduce the need for maintenance or that eliminate bottlenecks, logjams and other maintenance problems.

8.6. Drainage System Maintenance

Hazards Addressed	
Y	Flood
	Tornado
	Earthquake
Y	Thunderstorm
	Winter storm

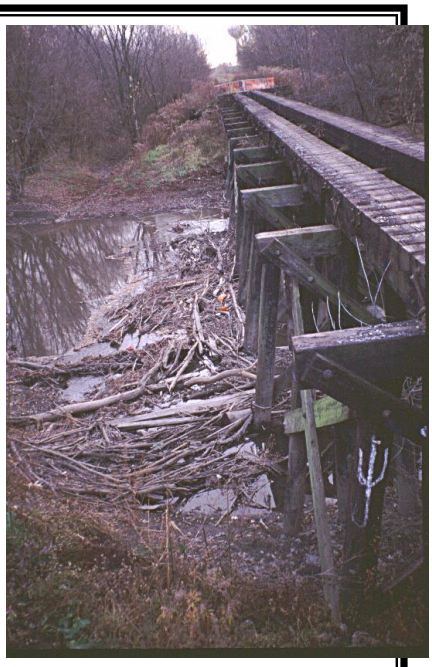
The drainage system may include detention ponds, stream channels, swales, ditches and culverts. Drainage system maintenance is an ongoing program to clean out blockages caused by an accumulation of sediment or overgrowth of weedy, non-native vegetation or debris, and remediation of streambank erosion sites.

"Debris" refers to a wide range of blockage materials that may include tree limbs and branches that accumulate naturally, or large items of trash or lawn waste accidentally or

intentionally dumped into channels, drainage swales or detention basins. Maintenance of detention ponds may also require revegetation or repairs of the restrictor pipe, berm or overflow structure.

Maintenance activities normally do not alter the shape of the channel or pond, but they do affect how well the drainage system can do its job. Sometimes it is a very fine line that separates debris that should be removed from natural material that helps form habitat. Therefore, written procedures that are consistent with state laws and environmental concerns are usually needed.

Government agencies usually accept responsibility for maintaining facilities on public property. However, in Illinois, the responsibility for drainage way maintenance on private property, when no easements have been granted, is with the individual private property owner. This often results in very little maintenance being accomplished.



Periodic inspections and debris removal are needed to prevent dams in streams

Local implementation: Kane County and municipalities have maintenance responsibility over drainageways under their jurisdiction. Most Kane County communities inspect drainage systems and provide maintenance on an as needed basis.

In the case of detention ponds, a property owners' association or the owner is responsible for maintenance on residential developments or commercial properties. Detention ponds on public properties are maintained by the appropriate government jurisdiction.

A regular inspection and maintenance program can remove debris before it becomes an obstruction to stream flows.

CRS Criteria: Community Rating System credit is provided for a formal drainage system inspection and maintenance program with published procedures that clearly identify what can be removed and what "debris" should be allowed to stay in natural channels. Up to 200 points are possible, but communities (like the County) that do not have formal written procedures and/or only respond on an as needed basis will not receive the credit.

8.7. Conclusions

1. Structural projects, especially reservoirs and channel improvements, have been used effectively to reduce flooding in urbanized areas of the county. They could be used further to address additional floodwater management areas of concern. However, it

should be understood that they can have adverse impacts on downstream properties and on the environment. They can also be very expensive.

2. There are many locations where bridge or culvert replacement or enlarging would reduce flood heights. However, as with structural projects, such work could increase flood problems downstream.

3. Local drainage and stormwater flooding (both in and outside the floodplain) would benefit from drainage system improvements and a formalized drainage maintenance program.

8.8. Recommendations

1. Structural flood control projects, including farm drainage and bridge and culvert improvements, should be pursued, provided they meet the following criteria:

    a. Each project's study looks beyond the immediate project site to ensure that no other properties will be adversely impacted.

    b. Each project should be based on a watershed master plan or, at a minimum, coordinated with other projects in the same watershed.

    c. Each project's study considers protecting the natural functions of the stream and floodplain, in addition to flood protection.

    d. Each project's study considers alternative non-structural approaches to protect the affected properties from flood damage.

    e. The design and construction is certified by a licensed professional engineer.

    f. Opportunities for stream and natural areas restoration are incorporated wherever feasible.

    g. Communities and property owners that may be affected by the project are notified.

    h. All relevant federal, state and local permits are obtained, including Corps of Engineer's 404 permits and IDNR floodway permits.

2. Each municipality and the Kane County Environmental Management Department should implement a formal and regular drainage system maintenance program modeled on CRS program guidance.

8.9. References

1. *Blackberry Creek Watershed Management Plan*, Blackberry Creek Watershed Resource Planning Committee, September 1999.

2. *Chain of Lakes Tributary Floodplain Evaluation for the City of Aurora*, Consoer Townsend Envirodyne Engineers, Inc., January 1998.

3. *CRS Coordinator's Manual*, Community Rating System, FEMA, 2013

4. *CRS Credit for Drainage System Maintenance*, FEMA, 2013

5. *Flood Insurance Study, Kane County, Illinois and Incorporated Areas*, Federal Emergency Management Agency, December 20, 2002.

6. *Floodplain Management Study, Blackberry Creek and Tributaries*, USDA Natural Resources Conservation Service, June 1989.

7. *Floodplain Management Study, Indian Creek and Tributaries*, USDA Natural Resources Conservation Service, February 1986.

8. *Our Community and Flooding, A Report on the Status of Floodwater Management in the Chicago Metropolitan Area*, Resource Coordination Policy Committee, 1998.

9. Survey of municipalities and County offices, Spring, 2003.

10. *Village of South Elgin, Illinois, 2001 Eastside Stormwater Master Plan*, Baxter & Woodman Consulting Engineers, October 2001.

Chapter 9. Public Information

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take the steps necessary to protect themselves and others.

This chapter starts with activities that reach out to people and tell them to be advised of the hazard and some of the things they can do. It then covers additional sources of information for those who want to learn more.

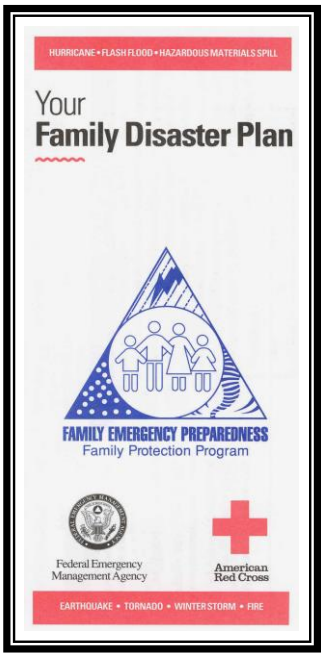
9.1. Outreach Projects

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

Technical assistance and library resources are not of much use if no one knows they exist. An outreach project can remedy this. Sending notices to property owners can help introduce the idea of property protection and identify sources of assistance.

Outreach projects are the first step in the process of orienting property owners to property protection and assisting them in designing and implementing a project. They are designed to encourage people to seek out more information in order to take steps to protect themselves and their properties.

Community newsletters/direct mailings: The most effective types of outreach projects are mailed or distributed to everyone in the community or, in the case of floods, to floodplain property owners.



Research has proven that outreach projects work. However, awareness of the hazard is not enough; 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, outreach projects should be locally designed and tailored to meet local conditions.

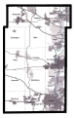
News media: Local newspapers can be strong allies in efforts to inform the public. Press releases and story ideas may be all that's needed to whet their interest. After a tornado in another community, people and the media become interested in their tornado hazard and how to protect themselves and their property. Local radio stations and cable TV channels can also help. These media offer interview formats and cable may be willing to broadcast videos on the hazards.

Social Media: Social Media websites such as Facebook, Twitter, Pinterest, tumblr, instagram, and many others have become part of everyday life. For the public that is interested and are willing to subscribe to the services, these outlets can be used for real-time updates and provide immediate access to information. It may be possible for the communities within Kane County to utilize these to quickly communicate with the residents.

The City of Aurora Emergency Management Agency has a Twitter account and some of what is available through this account includes: up to date information about emergency management responses, weather information, situation updates about incidents in our city, road closures and traffic information, classes and training opportunities.

Other approaches: Examples of other approaches include:

- Presentations at meetings of neighborhood, civic or 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 floods),
- Brochures available in municipal buildings and libraries, and
- Special meetings such as floodproofing open houses.



Local implementation: Most communities in Kane County use a newsletter to communicate with their residents.

Hazard information and protection advice have been included. Articles, such as Sugar Grove's, also address technical assistance provided by community staff and any financial assistance that may be available. During a disaster these brochures are available for any library or community center.

The May 2006 issue of Sugar Grove's newsletter contained the following:

W e a t h e r W a t c h

The Village of Sugar Grove would like to remind residents to be observant when there is the possibility of severe weather. If threatening weather approaches, seek shelter in a basement or interior room. If you are outdoors, seek shelter in a ditch or low-lying area. Do not try to outrun a storm. The Village and surrounding areas are equipped with outdoor warning sirens that are activated in the event of approaching severe weather. The primary purpose of these sirens is to warn anyone that may be outdoors to seek shelter from the approaching storm. The National Weather Service tracks weather and broadcasts weather information 24 hours a day, seven days a week. National Weather Service broadcasts can be received on weather alert radios. Weather alert radios can provide immediate notification of severe weather or other emergencies by activating a tone when a watch or warning is issued. Weather alert radios are available at many electronic and department stores. You can also purchase a Weather Alert Radio from the Sugar Grove Police Department. Please call the Sugar Grove Police Department non-emergency number at 630/466-4526 for information. The Village also reminds you to remember these weather words:

- A Severe Thunderstorm or Tornado **Watch** means that conditions are favorable for the development of severe weather, please listen to local radio or television stations for changes is status.
- A Severe Thunderstorm or Tornado **Warning** means that a storm has been spotted or is indicated on radar and that you should take shelter immediately.

Kane County Public Information Activities				
Municipality	**Community newsletter**	**Website**	**Website links for hazards**	**Technical assistance**
Algonquin	Yes	Yes	Yes	No
Aurora	Yes	Yes	Yes	Yes
Batavia	Yes	Yes	Yes	Yes
Big Rock	Yes	Yes	Yes	No
Burlington	No	Yes	No	No
Campton Hills	Yes	Yes	Yes	No
Carpentersville	Yes	Yes	No	No
East Dundee	Yes	Yes	No	Yes
Elburn	No	Yes	No	No
Elgin	Yes	Yes	No	Yes
Geneva	Yes	Yes	Yes	Yes
Gilberts	Yes	Yes	Yes	Yes
Hampshire	No	Yes	No	No
Huntley	Yes	Yes	No	Yes
Kane County	No	Yes	Yes	Yes
Kaneville	No	Yes	No	No
Lily Lake	Yes	Yes	No	No
Maple Park	Yes	Yes	No	No
Montgomery	Yes	Yes	No	Yes
North Aurora	Yes	Yes	No	Yes
Pingree Grove	Yes	Yes	No	No
Sleepy Hollow	Yes	Yes	No	No
South Elgin	Yes	Yes	No	Yes
St. Charles	Yes	Yes	No	Yes
Sugar Grove	Yes	Yes	Yes	No
Virgil	No	Yes	No	No
Wayne	Yes	Yes	No	No
West Dundee	Yes	Yes	No	No

The American Red Cross has a variety of brochures and publications on safety measures to take for fires, floods, winter storms, heat, etc. Their publications are tailored for different age groups. The Red Cross also conducts specialized programs on topics such as "Home Alone Safety," first aid and CPR, and what to do.

Kane County Emergency Management regularly post information about hazards on the agency Facebook page

CRS credit: The Community Rating System provides points for outreach projects on flood topics. A significant number of the available points are for having a public information program strategy. This *Plan* qualifies for the strategy credit (see Section 9.6)

9.2. Real Estate Disclosure

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

Many times after a flood or other natural disaster, people say they would have taken steps to protect themselves if only they had known they had purchased a property exposed to a hazard. Three regulations, one federal and two state, require that a potential buyer of a parcel be told of their exposure to a hazard.

Federal law: Federally regulated lending institutions must advise applicants for a mortgage or other loan that is to be secured by an insurable building that the property is in a floodplain as shown on the Flood Insurance Rate Map.

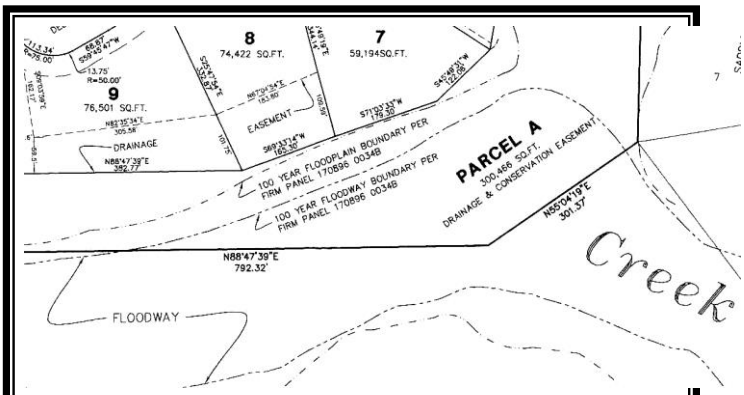
Flood insurance is required for buildings located within the base floodplain if the mortgage or loan is federally insured. However, because this requirement has to be met only 10 days before closing, often the applicant is already committed to purchasing the property when he or she first learns of the flood hazard.

Illinois Residential Real Property Disclosure Act: This law requires a seller to tell a potential buyer:

- If the seller is aware of any flooding or basement leakage problem
- If the property is located in a floodplain or if the seller has flood insurance
- If the seller is aware of a radon problem
- If the seller is aware of any mine subsidence or earth stability defects on the premises
- If the seller is aware of any structural defects

This State law is not wholly reliable because the seller must be aware of a problem and willing to state it on the disclosure form. Due to the sporadic occurrence of flood events, a property owner may legitimately not be aware of potential flooding problems with a property being sold or purchased. Practices by local real estate boards can overcome the deficiencies of these laws and advise newcomers about the hazard earlier. They may also encourage disclosure of past flooding or sewer problems, regardless of whether the property is in a mapped floodplain.

Illinois Compiled Statutes: Chapter 55, Section 5/3-5029 requires that all subdivision plats must show whether any part of the subdivision is located in the 100-year floodplain (see example).



Subdivision plat with flood hazard disclosure

Local implementation: Chicago area real estate offices report that local agents follow the legal requirements. The shortcoming of this approach is that it is dependent on the seller, not on an independent check of the flood map.

All Multiple Listing Service (MLS) entries read "Flood insurance may be required." This does not provide any help in disclosing the flood hazard. Even if Kane County wanted a change, the Service is a six county activity and many other real estate organizations would have to be convinced of the need to do it.

CRS credit: Communities would receive points for the two state laws. More points are available if real estate agents implemented a program that checked the FIRMs before a property was listed and provided the flood hazard information to house hunters. Additional points would be provided if local real estate agents gave out brochures that advised people to check out a property's hazards before they commit to a purchase.

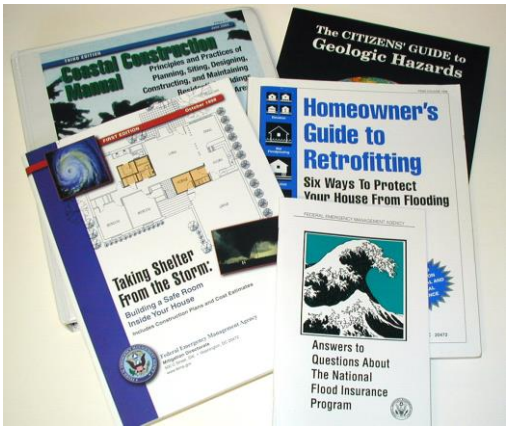
9.3. Library and Web Sites

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

The community library and local web sites are obvious places for residents to seek information on hazards, hazard protection, and protecting natural resources. Books and pamphlets on hazard mitigation can be given to libraries, many of them obtained free from state and federal agencies. Libraries also have their own public information campaigns with displays, lectures, and other projects, which can augment the activities of the local government.

Today, web sites are becoming more popular as research tools. They provide quick access to a wealth of public and private sites and sources of information. Through links to other web sites, there is almost no limit to the amount of up to date information that can be accessed by the user.

In addition to on-line floodplain maps, websites can link to information for homeowners on how to retrofit for tornadoes, earthquakes and floods and a "FEMA for Kids" site. This website teaches children how to protect their home and what to have in a family disaster kit.



There are many hazard protection references that can be put in libraries

Local implementation: Kane County libraries have a variety of references on natural hazards.

Kane County has used its website to keep users updated on the progress of the Mitigation Planning Committee. The site provides links for the public to places such as the Red Cross, FEMA, and the National Weather Service's updates on storm watches and warnings.

Communities with websites are listed in the table on page 9-3. Montgomery has placed a floodplain map on its website. Although the map is not regulatory, it does provide quick flood risk information to current and prospective residents. Most of the website links are for weather information or to FEMA and IEMA websites. Only the County's site has links to a variety of additional information on how people can protect themselves and their properties.

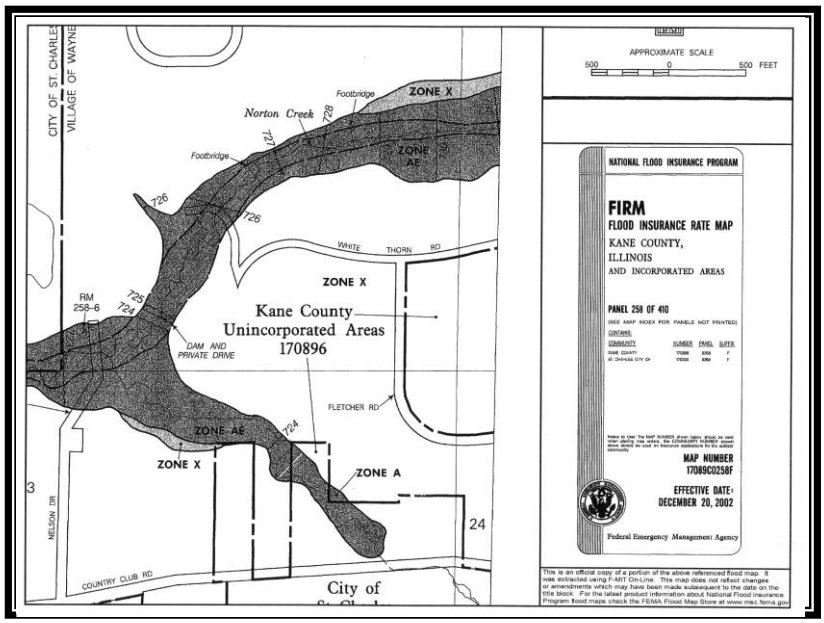
NFIP/CRS

CRS credit: The Community Rating System provides points for having a variety of flood references in the local public library and more for similar material on municipal web sites.

9.4. Technical Assistance

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

Hazard information: Many benefits stem from providing map information to inquirers. Residents and business owners that are aware of the potential hazards can take steps to avoid problems and/or reduce their exposure to flooding. Real estate agents and house hunters can find out if a property is floodprone and whether flood insurance may be required.



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.

Communities often supplement what is shown on the FIRM with maps that complement and clarify the FIRM and information on additional hazards, flooding outside mapped areas and zoning. When the map information is provided, community staff can explain insurance, property protection measures and mitigation options that are available to

property owners. They should also remind inquirers that being outside the mapped floodplain is no guarantee that a property will never get wet.

Property protection assistance: While general information provided by outreach projects or the library helps, most property owners do not feel ready to retrofit their buildings without more specific guidance. Local building department staffs are experts in construction. They can provide free advice, not necessarily to design a protection measure, but to steer the owner onto the right track.

Building or public works department staff can provide the following types of assistance:

- Visit properties and offer protection suggestions
- Recommend or identify qualified or licensed contractors
- Inspect homes for anchoring of roofing and the home to the foundation
- Provide advice on protecting windows and garage doors from high winds
- Explain when building permits are needed for home improvements

Local implementation: Kane County provides advice and technical assistance to property owner associations, municipal governments and other local government units for areas that experience flooding on a watershed or regional scale. The Kane County Health Department provides technical guidance related to septic system failure and well contamination.

Most Kane County municipalities respond to inquiries about whether properties are in the floodplain, but few advertise this service. Some provide technical assistance. Aurora has one of the more active programs (see box).

> The City of Aurora helps interpret floodplain maps, visits properties to advise property owners on how to protect themselves, and budgets $200,000 annually to assist residents with installing backwater valves and overhead plumbing.
>
> Following the 1996 flooding, Aurora held a floodproofing open house to quickly help the residents learn how to protect themselves from flooding, speak with FEMA representatives and find contractors to complete the work.

CRS credit: The Community Rating System provides points for providing map information to inquirers. The community must keep the maps up to date. Additional points are available for providing one-on-one flood protection assistance to residents and businesses and making site visits. Both services must be publicized.

9.5. Public Information Program Strategy

Hazards Addressed	
Y	Flood
Y	Tornado
Y	Earthquake
Y	Thunderstorm
Y	Winter storm

A public information program strategy is a document that receives CRS credit. It is a review of local conditions, local public information needs, and a recommended action plan of activities. A strategy consists of the following parts, which are incorporated into this plan.

- The local flood hazard – discussed in Chapter 2 of this plan.
- The property protection measures appropriate for a specific hazard – discussed in chapters 2 and 5.
- Flood safety measures appropriate for the local situation – discussed in the box on the next page.
- The public information activities currently being implemented within the community including those by non-government agencies – discussed in sections 9.1 – 9.4.
- Goals for the community's public information program – covered in Chapter 3.
- The outreach projects that will be done each year to reach the goals – in section 9.7's recommendations and Chapter 10's action plan.
- The process that will be followed to monitor and evaluate the projects – in Chapter 10's action plan.

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.

9.6. Conclusions

1. There are many ways that public information programs can be used so that people and businesses will be more aware of the hazards they face and how they can protect themselves. Many of them are currently being implemented by the County, municipalities, and Red Cross.

2. A community's staff can implement some of the public information activities. By making a few changes and formalizing its activities, a community can earn nearly 500 points under the Community Rating System.

3. Outreach projects, libraries and websites can reach a lot of people, but most communities are not including much hazard or mitigation information in their current activities.

4. The most important topics to cover in public information activities are:

   - Safety precautions during an emergency
   - Measures to protect health
   - Property protection measures one can take
   - What government agencies are doing and how they can help

5. The most appropriate ways to get the messages out are:

   - Articles in newsletters and mass mailings
   - Websites
   - Newspaper articles
   - Educational programs in schools
   - Handouts, protection guides
   - Library references
   - Technical advice and visits by staff

9.7. 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
   - Handouts, protection guides
   - Library references
   - 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.

9.8. References

1. *Are You Ready? A guide to Citizen Preparedness*, FEMA, 2014.

1. *CRS Coordinator's Manual*, Community Rating System, FEMA, 2013

2. *CRS Credit for Outreach Projects*, Federal Emergency Management Agency, 2013

3. *Floodproof Retrofitting: Homeowner Self-Protective Behavior*, Shirley Bradway Laska, University of Colorado, 1991.

4. Municipal websites and questionnaires, Spring 2003.

5. *Protecting Nature in Your Community*, Chicago Wilderness and Northeastern Illinois Planning Commission, 2000.

6. *Stormwater Management Public Information Resource Guide*, South Suburban Mayors and Managers Association, 1999

Chapter 10. Action Plan

The culmination of the Kane County *Natural Hazards Mitigation Plan* is this Action Plan. The general direction of the overall program is outlined here. Specific activities pursuant to the general direction are detailed in Sections 10.1 – 10.3. These sections assign recommended projects and deadlines to the appropriate agencies.

The overall directions can be summarized under the five goals established in Chapter 3:

Goal 1.	Protect the lives and health of the citizens of Kane County from the effects of natural hazards.
Goal 2.	Encourage self-help and self-protection measures to mitigate the effects of natural hazards on private property.
Goal 3.	Protect critical facilities and public infrastructure with public funds.
Goal 4.	Identify specific projects to mitigate damage where cost-effective and affordable.
Goal 5.	Reduce the number of repetitively damaged existing structures

The seven guidelines set parameters on the mitigation measures reviewed, the recommendations 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 there are sensitive natural areas and agricultural land.
Guideline 7.	Be consistent with existing plans.

General recommendations appear at the end of Chapters 4 – 9 for each of the six mitigation strategies. This chapter converts those general recommendations to specific action items, generally following the same order of mitigation strategy as Chapters 4 – 9.

Each action item starts with a short description. The next four subheadings list the responsible agency, the deadline for accomplishing the action item, the costs and the benefits.

All of the action items can be tied to the above listed goals and guidelines and the recommendation(s) in Chapters 4 – 9. These relationships are shown in the matrix at the

end of this chapter. The recommendations and the discussions in the earlier chapters provide more background and direction on these action items.

Section 10.1 addresses general program items and projects. Section 10.2 lists the public information action items and Section 10.3 reviews additional tasks needed to administer and support *Plan* implementation. Section 10.4 list action items that have been completed since the last update and section 10.5 list action items that the jurisdiction has requested be removed from the plan. The table on the last page of this chapter summarizes the action items.

Several action items refer to the Mitigation Committee. A plan is worthless if there is no instrument for ensuring that it is carried out. Accordingly, the creation of a permanent Mitigation Coordinating Committee was proposed to monitor the implementation of the *Plan*, report to the County Board and municipalities on its progress, and recommend revisions to this *Plan* as needed. This is explained in action item 14.Each jurisdiction that adopts this plan should identify mitigation programs and projects that could be implemented within their jurisdiction. As budgets and grant funding are constantly changing, jurisdictions should identify mitigation projects even if funding is not currently available. Jurisdictions have made significant progress implementing many of the action items identified in this chapter. Their progress is outlined in each of the yearly reports to the County Board.

Prioritizing Action Items – Each participating jurisdiction will need to prioritize their own action items. Each jurisdiction must look at each action item and determine if the action item is something the jurisdiction can complete given limited funds and staff time. In order to assist each jurisdiction with prioritization the committee recommends using an established method for evaluating mitigation projects. One such method that is recommended by FEMA is the STAPLEE method. STAPLEE is an acronym for a method that can be used to prioritize and review mitigation projects. The criteria used in this method are **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental feasibility. The table below suggests questions to answer and comments for each of the STAPLEE criteria. This table starting on the next page is from the FEMA State and Local Mitigation Planning How-To Guide series. Jurisdictions may contact the Kane County Office of Emergency Management for the complete Guide.

Criteria	Questions and Comments
Social	✓ Is the mitigation action socially acceptable? ✓ Will the action adversely affect any one segment of the population? ✓ What effects will the action have on the social, historic, and cultural environment of the community? Comments: If some of the population may be negatively affected by a proposed mitigation project, it may not be the best solution to the problem. Unless detrimental effects of a project on the disruption of community life can be minimized, the project under consideration may not be a good fit for the community.
Technical	✓ Is the proposed action technically feasible and does it provide the appropriate level of protection? ✓ What types of technical/professional expertise will be required to plan and implement the project? ✓ Will the action create more problems than it solves? ✓ How long will it take to complete the project? Is this a reasonable timeframe? Comments: In developing a mitigation project, the community must ensure that the project will actually mitigate the risk posed by a particular hazard. A project to protect one community asset at the expense of another or a project that will protect a structure from one hazard while making it more vulnerable to another hazard may not benefit the community.
Administrative	✓ Does the community have the capability (staff, expertise, time, funding) to implement the action? ✓ Can the community provide the necessary maintenance of the project? Comments: A complicated project that will demand a great deal of attention from already busy municipal staff will be difficult to implement successfully. If the administrative costs associated with a project are too great, the community can consider hiring additional

	staff, providing additional training for existing staff, implementing a less complicated project, or implementing a complex project in phases.
Political	✓ Is the mitigation action politically acceptable? ✓ Will the general public support or oppose this project? Comments: A highly visible project that is costly and does not have broad public support will be very difficult to implement. When committing to a controversial project, the community should prepare for the time and expense required to work through the controversy.
Legal	✓ Does the community have the authority to implement the proposed action? ✓ Will the action comply with local, State, and Federal environmental regulations? ✓ Do homeowner association bylaws apply to the project site? ✓ Is the action likely to be challenged by stakeholders whose interests may be adversely affected? Comments: Examine the project relative to Federal, State, Tribal, and local laws to determine whether there is potential for violating a law. If a project has the potential to violate a law, it may not be the best alternative.
Economic	✓ Do the costs of the action seem reasonable for the size of the problem and the likely benefits? ✓ What burden will be placed on the local economy to implement and maintain the action? ✓ Will the action generate additional jobs locally? Comments: When evaluating capabilities, the community should estimate the long-term annual cost of maintaining the project, such as the costs of mowing grass when property is acquired as part of a buyout project and used as a park (see Figure 7). FEMA will not pay for project maintenance. A project that will endanger public health or reduce employment opportunities is not likely to be widely supported.

	An action cannot be implemented without sufficient funding. Examine various avenues for funding a mitigation project; a costly mitigation project could be financially feasible if the community applies for and receives grant funds to supplement available community resources.
Environmental	✓ Is the proposed action in a floodplain or wetland or will it indirectly impact the natural and beneficial functions of a floodplain or wetland? ✓ How will the action affect the natural environment? ✓ How will the action affect utility and transportation systems? Comment: Unless detrimental effects of a project on the natural environment can be minimized, the project under consideration may not be a good fit for the community.

FEMA 386-9 Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects

10.1. Program Action Items

Each action item will include a brief description, the year the item was included in the plan, the responsible agency, a deadline, actual or estimated cost, and the benefit of the item. Action Items added to the plan during a previous update will also include a status for the item. Some of the action items will not have a specific date as a deadline as they will be ongoing and will continue through the next five years. A list of action items that have been completed or are being removed from the plan since the last update is included at the end of the chapter.

All of the original action items added in 2003 are generic in nature and most could apply to all of the participating jurisdictions. During the 2009 and 2015 updates jurisdiction added specific action items. Therefore some of the action items listed below will be generic in scope and could apply to all jurisdictions and some will be for a single jurisdiction.

Action Item 1. Building Code Improvements

Adopt the latest International series of codes, the new national standard that is being adopted throughout the country. Code revisions should be pursued to strengthen new buildings against damage by high winds, tornadoes and hail. Requiring tornado "safe rooms" in certain structures should be considered. Any code revisions should be consistent with the efforts undertaken by multi-community organizations of building department staff.

Year included in plan: 2003

Action item status: This action item is continuing.

Responsible agency: Kane County Development Department and building departments of municipalities. The organizations of building department staff should take the lead on drafting new code language.

Deadline: This action item will be continuous and each jurisdiction should adopt the latest building codes 18 months after they are published. This will allow "the bugs" to be worked out of the I-Codes, which has been a concern of many communities and will allow full review of the changes by each community.

Cost: Staff time.

Benefits: This will improve the hazard protection standards for new construction and will ensure a consistent set of building standards across the County. It will also assist communities to improve their BCEGS rating.

Action Item 2. Improved Code Enforcement

Develop and conduct training for building department staff on the natural hazards aspects of the International Codes, regulation of mobile home installation, and the County stormwater ordinance and its flood protection, wetland protection, erosion and sediment control and best management practices provisions.

Year included in plan: 2003

Responsible agency: Kane County Departments to develop training. Municipal building staff to participate.

Deadline: This action item will now be continuous. Each jurisdiction should continue to improve code enforcement by providing training to the code enforcement staff in the areas listed above. As the jurisdiction adopts the newest International series of codes; training should be provided to code enforcement staff as soon as possible.

Cost: Staff time

Benefits: A better educated staff will pay more attention to the details of factors vital to natural hazard mitigation when they review plans and inspect sites, such as ensuring that a structure is securely connected to the foundation. Training will also ensure that staffs understand new I-Code provisions, the County's stormwater ordinance and their responsibilities under the National Flood Insurance Program. A regular training program can improve BCEGS scores, too.

Action Item 3. Review of Plans and Development Regulations

When they are up for revision, comprehensive plans, land use plans, and zoning and subdivision ordinances should incorporate mitigation provisions, especially:

- Open space provisions that will protect properties from flooding, preserve wetlands, and enhance groundwater infiltration;
- Appropriate farmland preservation measures;
- Standards for streets and water systems that facilitate access and use by fire and emergency equipment;
- Requirements to bury utility lines; and
- Mandating storm shelters in new mobile home parks.

Year included in plan: 2003

Responsible agency: Kane County Departments, municipal planning, zoning, engineering and community development departments.

Deadline: This action item will be continuous and each jurisdiction should continue to incorporate mitigation provisions and strategies into plans as they are developed or updated.

Cost: Staff time

Benefits: By incorporating mitigation provisions into other plans and regulations, more offices will be implementing mitigation activities, hazardous areas will be avoided, and new developments will be better protected.

3.1 – Big Rock, Village of

The Village will adopt a *Subdivision Control Ordinance* and accompanying *Standard Specifications*.

Year included in plan: 2009

Responsible Agency: The Village of Big Rock's Plan Commission, Board of Trustees, and Administrative Office.

Deadline: January 1, 2010

Cost: Estimated $5 – $10,000 in legal and engineering review fees and staff time.

Benefits: The new Ordinance and Specifications will incorporate mitigation provisions, especially:

- Open space provisions that will protect properties from flooding, preserve wetlands, and enhance groundwater infiltration;
- Appropriate farmland preservation measures;
- Standards for streets and water systems that facilitate access and use by fire and emergency equipment;

- Requirements to bury utility lines; and
- Mandating storm shelters in new mobile home parks.

2015 Status Update: Currently the Village does not have any funding for this project. The Village is looking for grants so that we can move forward on our project's

3.2 – South Elgin, Village of

South Elgin has received free local assistance from CMAP to develop a Unified Development Ordinance. This Ordinance will include open space, floodplain, and other mitigation provisions.

Year included in plan: 2015

Responsible agency: South Elgin Community Development

Deadline: 2017

Cost: $5,000

Benefits: The Unified Development Ordinance will identify areas subject to special flood hazards as well as special flood hazard regulations thereby keeping future development safer during a flood.

Action Item 4. Retrofitting Incentives

Establish a program of technical assistance and financial incentives to encourage property protection measures on private property, such as:

- Surface and subsurface drainage improvements,
- Swales and regrading for shallow surface flooding,
- Sewer backup protection
- Relocating furnaces and water heaters out of basements
- Tornado safe rooms
- Installing lightning rods

Year included in plan: 2003

Responsible agency: Kane County Departments. Municipal offices to be designated by the community's adopting resolution.

Deadline: Each jurisdiction is encouraged to develop and implement incentive programs. It is understood that funding is limited, however when funding becomes available jurisdictions should consider implementing an incentive program.

Cost: The level of effort depends upon the size of the community but a 5/100 of 1% of the municipality's budget (0.0005) would be a good target.

Benefits: Using a 25% rebate level, for every dollar spent by the community, $4 will be spent to protect a property from damage. Communities have found this approach to protect against local drainage and sewer backup problems to be a real cost saver compared to public works projects to control drainage or replace sewer pipes.

4.1 – Big Rock, Village of

The Village is planning to work with homeowners on a property protection program for surface and subsurface drainage improvements.

Year included in plan: 2009

Responsible Agency: The Village Board of Trustees with the advice and administrative assistance from the Drainage Committee.

Deadline: Ongoing program

Cost: Unknown and Incremental.

Benefits: While certain subdivisions in the Village do not currently have access to drainage systems, other developed areas (Timberview and Welton Subdivisions) can access limited drainage tiles. The Village will work with the residents to identify small local projects on a cost share basis that will alleviate localized flooding without the necessity to undertake a major drainage project.

2015 Status Update: Currently the Village does not have any funding for this project. The Village is looking for grants so that we can move forward on our project's

4.2 – North Aurora, Village of

The village of North Aurora has identified a project to help residents install overhead sewer lines to prevent sewer backup. Overhead sewer means there are no direct openings to the sanitary sewer in the basement. All of the wastewater that is collected in the basement is discharged into a separate sump pit and pumped into the sanitary service line. The basement drainage is dependent on a pump and a continuous electric power supply. Generally, the plumbing from the fixtures on the main floor is installed just below the basement ceiling (hence, the term "overhead"), and is routed to the outside service line though an opening high up on the basement wall. Converting the plumbing to an overhead sewer is one of the most expensive ways to prevent basement backups. Nevertheless, it is generally considered to be the best method available. Only the residents who have experienced sewer back-ups and are concerned with taking an active role in resolving the problem will use the cost sharing program.

Year included in plan: 2009

Responsible Agency: Public Works

Deadline: This will be an ongoing project for a minimum of 11 years.

Cost: The average cost to install an overhead is between $5,000 and $8,000. The Village will pay half, or a maximum $4,000 per household.

Benefits: The Overhead will help prevent back-ups into basements during all rain events and other sewer blockages. This program will be offered on a Village–wide basis and therefore has the potential of helping the largest number of residents.

2015 Status Update: The village reviewed this action item for the 2015 update and updated the cost of installation. Current plans are to continue the program for a minimum of 11 years.

Action Item 5. Repetitive Loss Projects

Protect the buildings in repetitive loss areas 7, 8, 9, 12 and 14. These are the top priority areas based on the flood hazard and type of construction, as explained in the criteria on page 5-12. Acquisition is the recommended property protection approach for areas 7, 8, 9, and 12 and elevation is recommended for areas 9, 12 and 14. Properties in the other repetitive loss areas could be protected by retrofitting measures that could be funded for much less under the cost share program proposed in action item 4.

The specific measure to use on each property should be determined by an audit of the building and the owner's preferences. In each case, no action should be taken without the owner's full willing cooperation.

Year included in plan: 2003

Responsible agency: Kane County Departments (repetitive loss areas 8 and 9) and the appropriate office in Elgin (area 7) and Montgomery (areas 12 and 14).

Deadline: The Kane County Departments are continuing to work with IEMA and FEMA on the repetitive loss areas in the county.

Cost: Costs depend on individual property to be elevated or acquired. Staff time.

Benefits: FEMA and IEMA only fund projects where the benefits are shown to exceed the costs. A benefit/cost analysis must be run for each property in order to qualify for FEMA funds.

Action Item 6. Drainage Maintenance

Implement a formal and regular drainage system maintenance program. This would involve mapping the local drainage system, determining which areas can be accessed for inspection and maintenance, preparing procedures modeled on CRS program guidance, conducting an annual inspection and removing debris as needed. It would include

educating and working with homeowner associations and other non-governmental entities responsible for maintenance on their own properties.

The procedures would treat natural streams different from drainage ditches and developed areas different from vacant lands. Enforcing stream and wetland dumping regulations should also be a part of the program.

Year included in plan: 2003

Responsible agency: Municipal public works departments, township road districts, drainage districts. The Kane County Division of Transportation to be responsible for maintenance of roadside ditches under its jurisdiction

Deadline: Each jurisdiction is encouraged to develop and implement a drainage maintenance program and ensure that current maintenance programs are up to date and appropriate.

Cost: Staff time

Benefits: An obstruction to a channel, such as a plugged culvert, can result in overbank flooding during a small rainstorm. By inspecting and maintaining the drainage system, potential flood problems can be identified and corrected before the next big rain. A proactive preventive activity like this can prevent $1,000's in flood damage, closed streets and threat to people.

6.1 - Algonquin, Village of

Dixie Creek Streambank Stabilization & Lake Braewood Naturalization. The existing channel of this creek is subject to high velocities and severe erosion has occurred in the open stream. This has caused Lake Braewood to silt in considerably and it no longer maintains its original stormwater storage capacity. This causes Gaslight Drive, the adjacent park and an adjacent homeowner to flood.

Year included in the plan: 2015

Responsible Agency: Public Works Department

Deadline: Currently funding for this project is not available. When funding becomes available the project should be completed in 3 years

Estimated Cost: $700,000

Benefits: The proposed improvements will stabilize Dixie Creek, open up Lake Braewood for additional stormwater capacity and ultimately protect Gaslight Drive and both Village and private property.

6.2 – Carpentersville, Village of

Lake Marian Watershed - Alt. B1 Keith Andres Park Stream Maintenance Debris Removal and Vegetation Management

Year included in plan: 2009

Responsible Agencies: Village Public Works Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. This will be ongoing annual program, starting within months of funding being made available. Debris and brush removal has taken place on an annual basis.

Cost: $200,000

Benefits: Reduce debris clogging of downstream drainage structures, maintain optimal hydraulic capacity of the creek channel, and improve water quality.

2015 Status Update: Due to funding restrictions no action has been taken on this project.

6.3 – North Aurora, Village of

The village of North Aurora has identified a need to install Cured-in-place Piping (C.I.P.P.). C.I.P.P. is formed by the insertion of a resin-impregnated flexible tube into the existing pipe. The tube is expanded to fit against the original conduit, and then heated to cure the resin. The finish product is a joint (less structural) pipe that is formed to the existing pipe. The cured-in-place pipe shall be chemically resistant to domestic sewage. Over the next (3) years the Village will also be entering into a manhole sealing program to help eliminate additional Inflow and Infiltration into the system.

Year included in plan: 2015

Responsible agency: Public Works

Deadline: 3 years to finish the entire community.

Cost: The cost per budget year is roughly $200,000 to $250,000

Benefits: Eliminate Inflow and Infiltration into the Sanitary Sewer System. This in return will eliminate backups into the homes.

Action Item 7. Urban Forestry

Implement an urban forestry program that qualifies the municipality to become a Tree City, USA. To qualify for Tree City USA, a city or village must meet four standards, which are explained in more detail on page 6-10:

- A tree board or department
- A tree care ordinance
- A community forestry program with an annual budget of at least $2 per capita
- An Arbor Day observance and proclamation

Year included in plan: 2003

Responsible agency: To be designated by the municipality's adopting resolution.

Deadline: Each jurisdiction is encouraged to implement an urban forestry program and work towards Tree City USA designation as funding allows.

Cost: $2 per capita, staff time

Benefits: In addition to improving a community's appearance, an active urban forestry program will address the major problems caused by winter storms and high winds – loss of power, telephone and cable services and damage to vehicles and buildings due to falling trees or limbs.

7.1 – Burlington, Village of

The Village of Burlington would like to establish a tree program (urban forestry) for the Village for maintenance and tree planting/conservation.

Year included in plan: 2009

Responsible agency: Village of Burlington

Deadline: Some work has been completed on this project but currently the village has no funding to finish or expand this project.

Cost: Approximately $10,000 annually

Benefits: To mitigate potential damage during winter and spring summer storms due to high winds and or ice.

2015 Status Update: Installation of several trees around the main detention pond has been completed. As additional funds or grant funding becomes available this project will be expanded further.

7.2 – Lily Lake, Village of

The Village of Lily Lake has identified a need for a program to identify and estimate the age of prominent trees along Village roads and right-of-ways and investigate forestry maintenance programs suited to the needs of the Village. The program should also draft guidelines to the maintenance of trees within the Village and draft a tree maintenance

booklet addressing the care and maintenance of trees within the community. Review existing Village tree ordinances and offer amended ordinances, where required, for review by Village Board members. Establish an action plan to maintain trees and forested areas of Village property. Arbor Day will be observed through the planting of a tree species native to northern Illinois at a designated location within the Village Park.

Year included in plan: 2009

Responsible agency: The Lily Lake Plan Commission will appoint members to be part of the Village Tree Board. The Village Tree Board will review programs suited to urban forestry and recommend actions to the Plan Commission and the Village Board.

Deadline: Once funding is established implementation will be about one year.

Cost: A small budget, meeting the Tree City, USA requirements will be established for the distribution of information associated with the care of trees within the Village and community. A portion of the budget will be allocated to amending present tree ordinances. Estimated cost about $2 per capita and staff time.

Benefits: Improvement of Village appearance as well as identifying trees that are possible hazards and could create additional problems during emergencies and disasters.

2015 Status Update: The Village currently does not have funding for this project but will continue to look for funding in order to become a Tree City USA recipient.

7.3 – West Dundee, Village of

The neighborhood tree trimming project has been ongoing under the supervision of the Public Works Department. This project, on a seven to eight year cycle, allows for every parkway tree within West Dundee to be examined, preventatively maintained (i.e. removal of dead or broken branches, obstructions removed and structural integrity analyzed) and hazardous trees to be identified and removed as needed. The program enhances the vitality of the urban tree canopy and limits the amount of roadway obstructions, debris and potential to damage property through branches being damaged in storm/ice events. The previous budgeted amount to conduct this program was $50,000 a year. However, under the fiscally constrained budget, this program is no longer being funded. A limited amount is available to remove hazardous trees by a contractor in the event that staff cannot safely remove the tree. In the event that funding becomes available, this program will resume its scheduled activities.

Year included in plan: 2009

Responsible agency: Village of West Dundee Public Works Department

Deadline: Currently the village has no funding for this project. Once funding is identified the project will be incorporated into the Public Works department.

Cost: $50,000 annually

Benefits: It maintains a healthy, green canopy of municipal, parkway trees. The Preventative Maintenance removes dead/broken/weak branches under controlled circumstances. Limits storm/severe weather breakage and roadway debris.

2015 Status Update: Program is ongoing. $55,000 was approved for forestry related expenditures for the new/current fiscal year. Tree trimming by contract and by staff is a part of that in addition to tree removals, tree planting and stump grinding by contract and by staff.

7.4 – Pingree Grove, Village of

The Village is adding a tree/forestry program and in 2015 will be working towards a "Tree City USA" designation.

Year included in plan: 2015

Responsible Agency: Village of Pingree Grove

Deadline: The Village plans to have the Village designated as a "Tree City USA" community by the end of the year.

Cost: $12,000

Benefits: To mitigate some of the potential problems during high wind incidents and ice storms.

Action Item 8. Flood Threat Recognition

Continue current funding of rain and stream gages throughout county. Review the gauging network, especially the western rural areas, to determine if additional rain and stream gages are necessary. This work would identify any potential new sites where gages would be most productive and estimate the cost of installing and maintaining them. Participate in the annual Stream Gage Cooperators' meeting through the USGS, Fox River Coordinating Group with IDNR, and develop gaging capabilities as funding permits and projects call for additional capabilities.

Year included in plan: 2003

Responsible agency: Kane County Departments.

Deadline: Continue to monitor gage needs in Kane County, Participate in annual Stream Gage Cooperators' Meetings, and evaluate gaging needs upon onset of all new hydrologic and hydraulic modeling projects.

Cost: Staff time

Benefits: Early recognition of an impending flood can save lives and prevent property damage. For example, 10 minutes of lead time could allow evacuation of a parking lot or installation of emergency protection measures. The data collected would also help in evaluating watershed plans and models and designing storm drainage works.

8.1 – Elburn, Village of

The Blackberry Creek Subdivision, located south of Keslinger Road and east of Rout 47, contains wetlands of considerable size. These wetlands are part of the natural drainage for the water from rain events for an area roughly bounded by Route 47 on the west, Pouley Road on the east, and Route 38 on the north. During very heavy rain events, this area can be taxed to the point of overflowing, and threaten flooding of homes at the far south end of Blackberry Creek Subdivision. To help mitigate the flooding threat, a dam was built during the initial construction phase of the subdivision. A spillway runs under Patriot Parkway. The water height at the dam is monitored by an electronic flood gage. The flood gage has been damaged by ice, and is no longer functioning, and needs to be replaced.

Year Included in plan: 2009

Responsible Agency: The Village of Elburn Public Works Department.

Deadline: Currently, the Village has no funding available for this project. Once funding is secured, the project should be completed within one year.

Cost: Unknown at this time. No quotes for replacement have been received.

Benefits: Monitoring of water levels at the dam in the wetlands area, would allow those residents living in the southern flood zone to receive adequate warning of potential flooding during heavy rain events.

2015 Status Update: This project is still viable, however, due to budgetary constraints, there is no funding available for FY 2015-2016. The project will be re-evaluated during the budgeting process for FY 2016-2017.

8.2 – Montgomery, Village of

There is a recurrent flooding problem in the Parkview Estates neighborhood in Montgomery from Waubonsie Creek. The Village would like to install a flood warning station to warn the Village of rising flood water and allow the Village to evacuate residents when necessary. The warning station would include a monitoring station and a SCADA (radio control) system to transmit data to the Village emergency responders.

Responsible Agencies: Village of Montgomery, Village of Montgomery Police Department, Illinois Department of Natural Resources, and U.S. Geologic Survey.

Deadline: Once the Village secures funding for this project the warning station could be set up within a year. Village staff will continue to look for funding sources and include this item in our annual budget proposal process.

Cost: $25,000 to purchase and install the warning station and then yearly maintenance and operation costs of $13,000.

Benefits: Establishing the Parkview Estates Warning Station would allow the Village to warn residents in advance of flooding events. This will allow evacuation of people and property in a timely manner to prevent harm to people and reduce damage to property.

2015 Status Update: The village does not currently have funding for this project but will actively look for available funding options.

Action Item 9. Improved Emergency Response

Conduct a review of emergency response plans and programs to:

- Ensure that each municipality has an emergency management coordinator or liaison.
- Identify where additional activities are needed to respond to natural hazards, especially activities that can be undertaken after a flood warning and before the flood arrives.
- Ensure there is adequate and current information on critical facilities.
- Incorporate post-disaster procedures for public information, reconstruction regulation and mitigation project identification.
- Conduct a table top exercise at least once a year
- Identify what rural areas could use additional warning capabilities.

Year included in plan: 2003

Responsible agency: Kane County Office of Emergency Management. Municipal leads to be designated by the municipality's adopting resolution.

Deadline: This action item will be continuous and should be reviewed annually by each jurisdiction. Jurisdictions should strive to improve overall emergency response to natural hazards.

Cost: Depends on project and Staff time

Benefits: Some communities have no plan and others are revising theirs. Very few have special procedures for natural hazards. An emergency response plan that has been

carefully prepared, that utilizes all available data on the hazards and their potential impact, and that is regularly exercised will greatly improve local disaster response capabilities.

9.1 – Batavia, City of

The City of Batavia has identified the need to replace the Wastewater utility SCADA system. The system provides day-to-day operating information. The system also provides emergency and system alarms. The system was partially installed in 2014 and will be completed with ongoing treatment plant improvements in 2017. The system is vital to ensure the safe and efficient operation of the City's wastewater utility.

Year included in plan: 2009

Responsible Agency: City of Batavia

Deadline: Fiscal year 2017

Cost: $200,000

Benefits: Ensure safe and efficient operation of the City's wastewater utility.

2015 status: This action item originally included also replacing the electric and water utility systems. The electric system was completed in 2013 and the water system was completed in 2014. The Wastewater system is to be completed in combination with ongoing treatment plant improvements in 2017

9.2 – Big Rock, Village of

The Village will draft an Emergency Operations Plan

Year included in plan: 2009

Responsible Agency: The Village Board of Trustees will appoint a public safety committee. The committee will research, draft, and recommend a plan to the Board.

Deadline: December 31, 2012 depending on availability of staff and funding.

Cost: Estimated $5 – 10,000 in legal and consultant review fees and staff time.

Benefits: Since the Village has discovered through the recent responses during flood conditions that the responses have been disorganized, the residents would be better served during emergencies if the Village adopted and followed an Emergency Operations Plan. The Village would

- Appoint an emergency management coordinator or liaison.

- Identify where additional activities are needed to respond to natural hazards, especially activities that can be undertaken after a flood warning and before the flood arrives.
- Ensure there is adequate and current information on critical facilities.
- Incorporate post-disaster procedures for public information, reconstruction regulation and mitigation project identification.
- Conduct a table top exercise at least once a year

2015 Status Update: Currently the Village does not have any funding for this project. The Village is looking for grants so that we can move forward on our project's

9.3 Campton Hills, Village of

There currently is no tornado warning siren system in the Village of Campton Hills. The village would like to install a warning system for the purpose of alerting the residents of approaching tornados. Several sirens will need to be installed to cover the Villages 17 square miles.

During the spring of 2015, the Village will complete the installation of the first early warning siren at Wasco Elementary School. The project will be completed with the assistance of School District 303, the Fox River and Countryside Fire/Rescue District, and the Cities of Service Grant provided to the Village through Bloomberg Philanthropies. The siren, valued at $10,000, will be donated by Fulton Technologies and the installation, estimated at $12,000-$15,000, will be funded through the Cities of Service Grant. The siren is expected to serve well over 1,000 residents, two elementary schools, one Fire Station, the combined Village Hall/Police Station, and downtown Campton Hills businesses.

Fulton Technologies has agreed to donate the remaining sirens necessary to cover the entire 17 square miles of the Village. Due to funding constraints, the Village will not be able to complete the installation of these sirens in the immediate future but will continue its pursuit of grant funds to do so.

Year included in plan: 2015

Responsible Agency: Village of Campton Hills

Deadline: The first siren should be installed in the spring of 2015 with other sirens added to the system as funding becomes available.

Cost: $15,000 for installation of each siren

Benefits: The warning system benefits the residents of Campton Hills by alerting them in advance of a tornado allowing them to seek shelter.

9.4 – Elgin, City of

Due to new annexations, identify and install all areas without storm siren coverage.

- Ensure that all areas are included when storm sirens are activated.
- Identify what areas are without coverage.
- Upgrade/retrofit older technology 7,000' diameter siren buffer sirens with new 11,000' diameter buffer technology sirens providing better coverage while reducing the overall number of sirens to maintain.
- Add solar and battery backup to all existing warning sirens and include same for new sirens.
- Purchase and install sirens in needed areas.

Year included in plan: 2009

Responsible agency: Elgin Fire Department has identified the locations and how many storm sirens are needed.

Deadline: 2015, pending budget allocations

Cost: Estimated to be over $250,000.

Benefits: Currently, new annexations are not within coverage of storm sirens. By identifying the locations and installing storm sirens, citizens in those areas will be included in storm siren activation. By replacing some existing warning siren heads, pockets of housing previously not covered in the older parts of town will now receive sufficient warning coverage and overlap without cost of tower infrastructure.

2015 status update: This project was updated to include upgrading older technology and adding solar and battery backups. Cost estimates have also been updated.

9.5 – Elgin, City of

The City of Elgin EOC is located in the basement of city hall. Currently there is no radio signal in the EOC, there is no Wi-Fi access, and there is no technology for displaying critical display information in the room. The room is small and congested and is furnished with some folding tables and chairs. The EOC will be remodeled to include all new furnishings with computer classroom style tables and electric and Cat. 5 capabilities at every seat. A wall will be removed to enlarge the EOC by 260 square feet and 12 computers will be installed so the room can be utilized for training purposes. Four 42" monitors will be mounted to display weather status, police CAD, fire CAD, and other display information. A state of the art Smartboard will be installed at the front of the room and there will be 4 "consolettes" installed to provide direct communications with emergency dispatch center and the Incident Command Post. An additional 500 square foot room adjacent to the EOC will be set up as conference/breakout room.

Year included in plan: 2015

Responsible Agency: Fire Department will oversee the renovation through the Office of Emergency Management.

Deadline: Early 2015

Cost: Estimated to be approximately $30,000

Benefits: the City of Elgin has been fortunate that it has not had to stand up an EOC yet. Part of the reason for this is that it lacked an adequately equipped facility. By enhancing the room with technology and communications capabilities the room will be activated when appropriate. The new design will allow the room to be utilized by all of City Hall as a functional classroom and Emergency Management training will be scheduled on a quarterly basis. These improvements will result in a safer and more efficient response to all hazards disaster responses.

9.6 – Gilberts, Village of

The McCornack Bridge allows light traffic over the Tyler Creek. It is not rated for heavy truck traffic including fire department apparatus. At this time, there are six occupied homes on this road. There is proposed a 600 unit residential and commercial development around this bridge, however the fire protection district is not in favor without an upgrade for the bridge. The village planes to upgrade the bridge to allow for heaver truck traffic including the fire departments vehicles.

Year included in plan: 2009

Responsible agency: Public Works Department

Deadline: The Village currently has no funding for this project. Once funding is established the project should take about two years.

Cost: $600,000

Benefits: With an improved bridge, responding emergency vehicles could use McCornack Road without having additional response times to locations south of the bridge on Big Timber Road corridor.

2015 Status Update: The Village has not been able to fund this project but would still like to complete the work once funding is available.

9.7 – Hampshire, Village of

Establish a Citizens Emergency Response Team (CERT) to assist first responders with lower priority tasks such as staffing telephone banks, messaging, traffic control,

transportation (snowmobiles, small boats, canoes and pickup trucks) etc. as required by the first responders.

Year included in plan: 2009

Responsible agency: Village of Hampshire's Public Safety Committee, Hampshire Police Department, and the Hampshire Fire Protection District.

Deadline: Start the project in 2010 and have an on-going program

Cost: The start-up cost would be approximately $ 5,000 to $ 10,000 with an annual expense of between $ 5,000 and $ 10,000. Currently, due to economic constraints, there is no local funding available.

Benefits: The benefits of establishing a CERT program will provide citizens the training and knowledge to assist in a coordinated effort following large emergencies and disasters thereby reducing the overall effect of the incident.

2015 Status Update: The Village board is currently working with the Village Police Department and the Hampshire Fire Protection District to create the CERT program. the Village hopes to have a formal program established by the end of 2015.

9.8 – Hampshire, Village of

Install a solar and battery powered early warning siren for the purpose of alerting the Hampshire residents in the Northeast corner of the Village of tornado, severe storms and other potential weather related conditions.

Year included in plan: 2009

Responsible agency: The Village of Hampshire and to be radio signal activated by the Hampshire police department.

Deadline: The Village currently has no funding for this project. Once funding is established the project should take about a year.

Cost: $17,211.00

Benefits: This will allow both the new Hampshire High School and the Gary D. Wright Elementary School at the intersection of Big Timber and Ketchum Roads as well as the residents of the Lakewood subdivision maximum audio volume from this warning device. There currently is a warning siren on the North/East side of the toll way but depending on prevailing wind conditions the toll way's height blocks the full effect of that siren.

2015 Status Update: Due to funding restrictions no action has been taken on this project.

9.9 – Montgomery, Village of

The village of Montgomery has identified the need for a third outdoor weather/emergency warning siren to cover newer residential areas on the west side of the community. There are currently two village-owned sirens in operation that work in conjunction with the City of Aurora emergency warning system to cover most of the village. With the expansion of residential areas to the west and south over the past decade, it was determined that our current mapped coverage area did not include all Montgomery properties. The new siren will be placed at 2525 Dickson Road at the Dickson-Murst Farm property, and will cover an area bordered generally by Lakewood Creek Drive, U.S. Route 30, IL Route 47, and the BNSF railroad in Bristol, IL.

Year included in plan: 2014

Responsible agency: Village of Montgomery

Deadline: The village has identified funding for the installation of the siren, and is working with vendors and contractors to initiate construction in 2014. The Village anticipates having the siren operational in 2015.

Cost: $45,000

Benefits: The additional siren will provide coverage to all Montgomery properties and will work in conjunction with the existing sirens and City of Aurora system to provide early weather and emergency warnings to Montgomery residents.

9.10 – St. Charles, City of

The current Emergency Operations Center for the City of St. Charles is located in the basement of City Hall. It is cramped and floods during heavy rain events. Adequate space is not available for all radios, computers and other technology required to operate a functional center. The City is currently constructing a new Central Administrative Headquarters Fire Station and room was made available for an EOC. Money was allocated for basic construction costs to finish the space, however additional funding will be needed for outfitting the center.

Year included in Plan: 2009

Responsible Agency: Fire Department

Deadline: Upon completion of the building, approximately two budget years will be needed to acquire the radio equipment and antennas.

Cost: Total cost for construction and equipment is approximately $325,000

Benefits: A new EOC will function as the command center during any emergency impacting the community. It will have dispatching capabilities and will be able to act as a back-up to Tri Com when called to do so. This will have the effect of providing seamless response during large scale events.

2015 Status Update: The building has been completed and some of the necessary communication and technology equipment has been purchased. Due to budget constraints there remains another year to complete the purchases of the necessary communication and technology equipment to realize the EOC's full potential.

9.11 – St. Charles, City of

The City of St. Charles plays host to a number of festivals, concerts, and other large gatherings in the downtown area. The largest of these can bring tens of thousands of people into the downtown during any particular day. Currently, there is no rapid method of disseminating information concerning impending severe weather or other threats to public health. The city would like to install an AM Radio Station in the EOC and the EOC can be staffed during these events and information can be passed rapidly to the vendors and attendees.

Year included in plan: 2009

Responsible agency: Fire Department

Deadline: about one year once funding is available.

Cost: $35,000

Benefits: The Emergency Management Agency would be able to provide rapid information to those in attendance for festivals, concerts, and other gatherings on impending severe weather, sheltering locations, lost children and need for evacuation when called for. Other uses could be for the dissemination of general information in the broadcast area.

2015 Status Update: This project is still viable, however, due to budget constraints there is no funding available for Fiscal 2015/2016. The project will be re-evaluated during the budgeting process for Fiscal 2016/2017.

9.12 – Sugar Grove, Village of

The Village purchased a Federal Government FEMA Surplus Trailer that can be converted to a moveable temporary EOC Center. The Village intends to equip the trailer with communications equipment, emergency supplies, and other equipment.

Year included in plan: 2009

Responsible agency: Police Department

Deadline: About one year once funding is available.

Cost: $25,000

Benefits: This trailer, once fully equipped will give the village flexibility in coordinating the village's response to natural hazards.

2015 Status Update: The Village has not been able to fund the communication equipment part of this project. Once funding is available it should take about a year to outfit the trailer.

9.13 – Virgil, Village of

There currently is no tornado warning siren in the Village of Virgil. The village would like to install a warning siren for the purpose of alerting the residents of approaching tornados. The siren would be radio signal activated by a member of the Virgil Village Board or by a Committee member.

Year included in plan: 2009

Responsible agency: The Village of Virgil

Deadline: Currently the village has no funding for this project. Installation should take about one year once funding is available.

Cost: $25,000

Benefits: This will allow the residents of the Village of Virgil to be alerted in the event there is a tornado approaching the village area.

2015 Status Update: The village would still like to have a tornado siren but currently no funding is available for this project.

9.14 – Wayne, Village of

Currently, the Village Hall, Police Department, and Emergency Operations Center (EOC) are housed in one building. The structure is in the area of 100 years old and the largest room can hold no more than 15 people. There is no Village public building that can hold more than 15 people safely during a natural hazard incident, or the village's ability to address such an incident at the EOC. The village has identified the need for a new Police Station and EOC building.

Year included in plan: 2009

Responsible agency: Village of Wayne, Wayne Police Department

Deadline: Currently the village has no funding for the construction or outfitting of either facility. Once funding is acquired the project should be completed in two years

Cost: $750,000

Benefits: By the Village building a new EOC and increasing the size of the facility the village will be more capable of providing command and control functions during incidents.

2015 Status Update: The Village reviewed this project and would still like to have a new facility for the Police Department and EOC. However funding has not been available for such a project.

Action Item 10. Flood Control Projects

Implement flood control projects, including farm drainage improvements and projects to improve bridges and culverts, where they prove to be the most appropriate approach to reduce flood damage. Such projects need to meet the criteria listed in Section 8.8, especially the first two – ensuring no adverse impacts on other properties and coordinating projects on a watershed basis.

Responsible agency: Kane County Departments, municipal public works departments, State, County and township transportation departments.

Year included in plan: 2003

Deadline: Each jurisdiction is encouraged to continue to implement and improve flood control projects.

Cost: The cost of each project will vary. This action item calls for ensuring the projects meet the criteria set in Section 8.8.

Benefits: The benefits of each project will vary. This action item calls for ensuring the projects meet the criteria set in Section 8.8. Several of those criteria assure that adverse impacts will not be transferred on to neighboring or downstream properties.

10.1 Aurora, City of

Woodlawn Avenue, Prairie Street, and Highland Avenue Storm Sewer Improvement Project – 5000 lineal feet of storm sewers ranging in size from 12” to 36” in diameter.

Year included in plan: 2014

Responsible Agencies: Public Works Department

Deadline: Work should be completed in 2015

Benefits: Completed project should reduce frequency of sewage backup into homes and businesses along with overflows into the Fox River and Indian Creek.

Cost: As bid cost: $2,212,956.00

10.2 Aurora, City of

Charles – Harrison Sewer Separation Project - 2900 lineal feet of storm sewers ranging in size from 12” to 30” in diameter.

Year included in plan: 2014

Responsible Agencies: Public Works Department

Deadline: Work should be completed in 2015

Benefits: Completed project should reduce frequency of sewage backup into homes and businesses along with overflows into the Fox River and Indian Creek.

Cost: As bid cost: $998,198.00

10.5 – Big Rock, Village of and Kane County

The Village is collaborating with Kane County’s Water Resource Department to conceptually study the drainage/flooding issues plaguing the Tenerelli Subdivision. The Village will determine a course of action upon reviewing the results of that study.

Year included in plan: 2009

Responsible Agency: The Village is the lead agency for the study/project. Kane County’s Water Resources is the coordinating agency. The Village’s Waste/Stormwater Committee is the contact and administrative agency.

Deadline: An RFP for the conceptual study will be submitted to consulting firms by September of 2009. The deadlines for actions resulting from the study are not known at this time.

Cost: The conceptual study is expected to cost $5,000. The costs for actions identified by the study are not known but expected to be beyond the Village’s funding means.

Benefits: The Tenerelli Subdivision was developed prior to the adoption of the Kane County Stormwater Ordinance. The residents suffer with habitual ponding of water that jeopardizes the proper function of septic leach fields. During storm events, some residents cannot access their homes until the rising water recedes. The subdivision is bordered by undeveloped land with channel drainage that is choked with vegetation. This drainage channel empties into a deteriorating and undersized agricultural drain tile which carries the water from a 2,000 acres watershed to Welch Creek. On another side, the subdivision’s drainage system must accommodate the run-off from a major pass through highway with inadequate right of way drainage provisions.

The conceptual study will be performed by a licensed engineer approved by the Village and County. Any action taken as a result of the study will meet the criteria set in Section 8.8 designed to assure that adverse impacts will not be transferred to neighboring or downstream properties.

2015 Status Update: Currently the Village does not have any funding for this project. The Village is looking for grants so that we can move forward on our project's

10.6 – Big Rock, Village of

After the installation of the Water Reclamation Facility, the Village is researching the feasibility of assuming responsibility for and improving the existing tile line on the south side of the town center to mitigate drainage/flooding conditions in that section of town versus developing a separate nuisance flow system and improved roadway drainage.

Year included in plan: 2009

Responsible Agency: The Village Board of Trustees with the advice and administrative assistance from the Drainage Committee.

Deadline: The Water Reclamation Facility will not be operational until 2011. A study will be performed shortly thereafter to determine the feasibility of each action.

Cost: Unknown

Benefits: The South Side of Big Rock is currently underserved by the Rhodes Ave. trunk sewer line which has the capacity to accommodate additional lateral lines for road right of way run-off. The area is also served by an inadequate and deteriorating nuisance flow drainage system. But the system may be able to be replaced on a sectional basis over a period of years to drain flooded and ponding areas on the South Side.

2015 Status Update: Currently the Village does not have any funding for this project. The Village is looking for grants so that we can move forward on our project's

10.7 – Big Rock, Village of

Two subdivisions, Bergman Estates and Raymond Woods, have been newly annexed to the Village (April 2009). The road ways and yards of these residential areas suffer from severe ponding during heavy rains or storm events. The culverts and drainage ways are deteriorating and undersized. Since an adjacent area has been subdivided in preparation for residential development, the Village would like to extend the drainage measures that will be installed for the developing area to serve the adjacent areas.

Year included in plan: 2009

Responsible Agency: The Village Board of Trustees with the advice and administrative assistance from the Drainage Committee.

Deadline: At this time the village does not have funding for this project and a deadline can not be specified until funding is established.

Cost: Preliminary estimate, $250,000 – $500,000 for the initial phase.

Benefits: The roadways and driveways in these residential areas are often impassable during and after storm events. Further, ponding on residential property negatively impacts septic field function. A properly sized and functioning system would eliminate these ponding issues and the associated health risks. By coordinating the drainage measures with the adjacent developing property, a more comprehensive solution will be implemented that considers the needs for all of the residents in that area.

2015 Status Update: Currently the Village does not have any funding for this project. The Village is looking for grants so that we can move forward on our project's

10.8 – Big Rock, Village of

The residences and school on the North Side of Big Rock drain to an inadequate and deteriorating agricultural drain tile system. Because the cost to separate these "urbanized" drainage requirements from the agricultural drain tiles is currently prohibitive, an effort has been made to re-organize the drainage district that once regulated the tile system. However, Big Rock will eventually need to create a separate drainage plan for the residential, commercial, and institutional uses for the Route 30 corridor.

Year included in plan: 2009

Responsible Agency: The Village Board of Trustees with the advice and administrative assistance from the Drainage Committee.

Deadline: At this time the village does not have funding for this project and a deadline can not be specified until funding is established.

Cost: A preliminary engineering estimate placed the projects costs in excess of $1.5 million dollars.

Benefits: The school property as the land locked depressional area holds water during any wet season and floods excessively in heavy rains and storm events. The residential properties and roadways flood in moderate to severe events. A properly sized and functioning system would eliminate these ponding issues and the associated health risks.

Additional Item: An alley behind homes on Main Street would flood when there were heavy rains. After televising the drain tile it was determined that the installation of a new manhole 25 to 30 years ago, damaged the drain tile and was not connected to the current drainage system. Removal of the damaged drain tile and installation of proper drainage lines have alleviated standing water and flooding issues previously experienced by the residents in this block of Main Street.

2015 Status Update: Currently the Village does not have any funding for this project. The Village is looking for grants so that we can move forward on our project's

10.9 – Carpentersville, Village of and East Dundee, Village of

L W Besinger Drive Stormwater Detention Facility. The current Meadowdale Mall was constructed in the late 1950's, prior to any stormwater detention requirements. The tributary area is about 90% impervious surface with fairly steep slopes, leading to intense stormwater runoff with no attenuation. This runoff has severely eroded the downstream drainage channel, in areas downcutting exists up to 10 feet deep and beginning to encroach near existing residential properties.

Year included in plan: 2009

Responsible Agencies: Village of Carpentersville and Village of East Dundee

Deadline: Currently, neither village has funding for this project and a deadline will depend on when funding becomes available. Estimated at 2 years after funding approval, for design, environmental permitting, land acquisition, and construction

Cost: $2,000,000 estimated, including 4 acre land acquisition of vacant land, design, permitting, and construction costs

Benefits: The construction of a proposed 25-30 acre-feet stormwater detention basin will bring this site into compliance with current stormwater regulations, to significantly reduce or eliminate downstream channel erosion.

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.10 – Carpentersville, Village of

Sioux Avenue to IL RT 62 and along RT 62 Stormwater Detention and Storm Sewer Project The current drainage system is severely undersized, resulting in roadway overtopping of Sioux Avenue in a 2 to 5 year interval, and severe stormwater ponding on residential property in both the Village of Carpentersville and the Village of Barrington Hills. The existing storm sewer system is in an advance state of deterioration, resulting in a court ordered twice-annually cleaning and jetting program.

Year included in plan: 2009

Responsible Agencies: Village of Carpentersville Engineering and Public Works Departments

Department *Deadline:* Currently the village has no funding for this project and a deadline will depend on when funding becomes available. Estimated at 4 years after funding approval, for design, environmental permitting, land acquisition and construction.

Cost: $1,670,000

Benefits: Benefits will include improved drainage, construction of stormwater detention facilities to reduce downstream discharge rates, and restoration of eroded areas.

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.11 – Carpentersville, Village of

Lake Marian Watershed - Alt. C1 Alameda Avenue Culvert Replacement and channel improvement (Alameda and Kings culvert replacements and channel improvements are part of same drainage issue, can be combined if funding available for both) The existing cast in place triple box cell culvert is in an advance state of deterioration. Severe erosion has occurred in the open stream, resulting in nearly vertical banks and near-undermining of an existing Village watermain. With the existing culvert, Alameda Avenue currently overtops at between the 25 and 50 year interval.

Year included in plan: 2009

Responsible Agencies: Village Engineering Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. Estimated at 2 years after funding approval, for design, environmental permitting, land acquisition and construction

Cost: $251,000

Benefits: The acquisition of one home (included in cost estimate), the replacement of this culvert, and channel improvement upstream to the RT 25 storm sewer outfall will address condition, roadway overtopping, and streambank stabilization and naturalization issues

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.12 – Carpentersville, Village of

Lake Marian Watershed - Alt. C1 Kings Avenue Culvert Replacement (Alameda and Kings culvert replacements and channel improvements are part of same drainage issue, can be combined if funding available for both) Severe erosion has occurred in the open stream, resulting in nearly vertical banks, encroaching near residential properties. With the existing culvert, Kings Road currently overtops at between the 50 and 100 year interval.

Year included in plan: 2009

Responsible Agencies: Village Engineering Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. *Estimated at 2 years after funding approval, for design, environmental permitting, and construction*

Cost: $183,000

Benefits: The replacement of this culvert, and channel improvement upstream to Alameda Avenue culvert outfall will address condition, roadway overtopping, and streambank stabilization and naturalization issues

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.13 – Carpentersville, Village of

Lake Marian Watershed - Alt. C1 Algonquin Avenue Culvert Replacement Severe erosion has occurred in the open stream, resulting in downcutting and nearly vertical banks. Debris clogging of the existing undersized culvert resulted in roadway overtopping, roadway closure, and partial roadway washout in August 2007 storm event. With the existing culvert, Algonquin Road currently overtops at between the 25 and 50 year interval.

Year included in plan: 2009

Responsible Agencies: Village Engineering Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. Estimated at 2 years after funding approval, for design, environmental permitting, and construction

Cost: $342,000

Benefits: Severe erosion has occurred in the open stream, resulting in downcutting and nearly vertical banks. Debris clogging of the existing undersized culvert resulted in roadway overtopping, roadway closure, and partial roadway washout in August 2007 storm event. With the existing culvert, Algonquin Road currently overtops at between the 25 and 50 year interval. The replacement of this culvert will provide adequate drainage capacity to prevent overtopping and closure of the roadway

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.14 – Carpentersville, Village of

Lake Marian Watershed - Alt. S2 Keith Andres Park Check Dams Create 5 check dams and over 23 ac-ft of storage to reduce downstream runoff impacts, create stream crossing locations that would allow a more extensive network of trails within this 25 acre park

Year included in plan: 2009

Responsible Agencies: Village Engineering Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. Estimated at 2 years after funding approval, for design, environmental permitting, and construction

Cost: $570,000

Benefits: Create 5 check dams and over 23 ac-ft of storage to reduce downstream runoff impacts, create stream crossing locations that would allow a more extensive network of trails within this 25 acre park

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.15 – Carpentersville, Village of

Lake Marian Watershed - Alt. B2 Keith Andres Park Riffle Pool Restoration / Enhancement

Year included in plan: 2009

Responsible Agencies: Village Engineering Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. Estimated at 2 years after funding approval, for design, environmental permitting, and construction

Cost: $130,000

Benefits: Allow stream to reach dynamic stability by dissipating and distributing energy throughout the channel, reduce continued erosion of existing stream system.

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.16 – Carpentersville, Village of

Lake Marian Watershed - Alt. B3 or Z1 Keith Andres Park J-Hook Vanes (or) In-stream Grade Control Structures

Year included in plan: 2009

Responsible Agencies: Village Engineering Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. Estimated at 2 years after funding approval, for design, environmental permitting, and construction

Cost: $295,000

Benefits: Improve creek sinuosity at desired locations by utilizing erosive velocities and reduce continued erosion of existing stream system.

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.17 – Carpentersville, Village of

Lake Marian Watershed - Alt. Z2 Skyline Avenue Gabion Embankment Stabilization

Year included in plan: 2009

Responsible Agencies: Village Engineering Department and Dundee Township Highway Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. Estimated at 2 years after funding approval, for design, environmental permitting, and construction

Cost: $253,000

Benefits: Protect Skyline Avenue embankment and structural stability of roadway from erosion and damage due to poor orientation of creek related to the outlet structure

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.18 – Carpentersville, Village of

Lake Marian Watershed - Alt. Z3 Skyline Avenue Debris Control Structure to improve protection of existing creek outlet structure under Skyline Avenue

Year included in plan: 2009

Responsible Agencies: Village Engineering Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. Estimated at 1 year after funding approval, for design, environmental permitting, and construction

Cost: $50,000

Benefits: Prevent debris clogging and roadway overtopping problems

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.19 – Carpentersville, Village of

Four Winds Way Creek - FEMA restudy to determine new accurate flood elevations

Year included in plan: 2009

Responsible Agencies: Village Engineering Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. Study could begin within months after funding becomes available, with approximate study duration of 18 months, including FEMA concurrence

Cost: $40,000

Benefits: This project is necessary due to massive erosion from 2007 storm event which significantly widened drainage channel, very likely resulting in lowered flood elevations and possibly remapping to remove some or all of the existing 22 homes from the floodplain.

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.20 – Carpentersville, Village of

Four Winds Way Creek - Riversview Drive culvert replacement

Year included in plan: 2009

Responsible Agencies: Village Engineering Department

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. Estimated at 2 years after funding approval, for design, environmental permitting, and construction

Cost: $100,000

Benefits: Culvert was massively overtopped in 2007 storm event, resulting in some roadway damage and road closure for over a week. Culvert replacement to pass 100 year storm under roadway will addressing overtopping and closure issues

2015 Status Update: Due to funding restrictions no action has been taken on this project.

10.21 - Carpentersville, Village of

Carpenter Creek Reach #2 – Stabilization and Runoff Storage Project

Year included in plan: 2014

Responsible Agencies: Village of Carpentersville

Deadline: The Village recently received funding through the IEPA Section 319 grant program for bank stabilization and water quality improvements to a 1,500 linear foot stretch directly north of Maple Avenue of Carpenter Creek. The project is currently scheduled to commence in the spring of 2015 pending the design, environmental permitting, and land acquisition.

Cost: $1,111,500

Benefits: This project will improve and stabilize the stream banks along Carpenter Creek as well as to enhance water quality in the area. In addition, the Village also desires to improve the channel conveyance and floodplain storage along a portion of this reach to potentially remove approximately 40 structures from the regulatory floodplain. The project was listed as the highest BOD reduction project within the Jelkes Creek-Fox River Watershed Action Plan.

10.22 - Carpentersville, Village of

Washington Street Bridge Culvert Replacement Project

Year included in plan: 2014

Responsible Agencies: Village of Carpentersville

Deadline: Currently the village has no funding for this project and a deadline will depend on when funding becomes available. However, a floodplain study has been completed and will need to be updated.

Cost: $1,200,000

Benefits: This project is necessary to improve the conveyance of Carpenter Creek through the culvert as well as to reduce the regulatory floodplain adjacent to the project. Approximately 6 structures would be removed from the regulatory floodplain.

10.23 – East Dundee, Village of

The Village of East Dundee has experienced significant flooding adjacent to the McIntosh Creek watershed. All of the major crossings upstream from Van Buren Street experience frequent overtopping of the roadway causing a significant erosion control problems. The village has identified two areas where storm water detention facilities would greatly improve the quality of life for downstream residents and reduce the likelihood of property damage during exceptional rain events.

Year included in plan: 2009

Responsible Agencies: East Dundee Public Works

Deadline: Presently there is insufficient funding in the village budget to complete this project.

Cost: The estimated cost of construction including engineering is $750,000. The estimate does not include land acquisition, which would be necessary. The village would need significant funding assistance to move forward on this project. It is recommended that the downstream detention area be constructed first as funding becomes available.

Benefits: The completion of this project will prevent or reduce flooding for the residents downstream.

2015 Status update: This Project has not moved forward do to the lack of funding resources. This is still a viable project for the Village of East Dundee.

10.24 – East Dundee, Village of

The Village of East Dundee has experienced significant flooding in the Terrace and Fox River Bluff Subdivisions. This area of the village has been developed in a bowl with no gravity storm sewer release. The storm water is infiltrated by drywell throughout the subdivisions. Since the drywells have limited infiltration rate the higher intensity storms result in much of the water bypassing the drywells and ending up in the lowest part of the bowl. This area is the rear yard of several homes and a park. The proposed project is to build a detention/infiltration pond to efficiently collect the excess storm water and hold it until the infiltration rate can exceed the inflow rates.

Year included in plan: 2009

Responsible Agencies: East Dundee Public Works

Deadline: Presently there is insufficient funding in the village budget to complete this project.

Cost: The estimated cost of construction including engineering is $200,000. The estimate does not include land acquisition but the Dundee Park District has been contacted and they seem agreeable in concept and would likely grant an easement to the village. The village would need significant funding assistance to move forward on this project.

Benefits: The completion of this project will prevent or reduce flooding Terrace and Fox River Bluff Subdivisions.

2015 Status update: Currently the Village of East Dundee is working on Phase II design engineering with FEMA grant process. Final funding has not been awarded to the Village. The Village should receive notification on FEMA funding during the winter of 2015.

10.25 – Elburn, Village of

The northwest quadrant of Elburn (north of the Union Pacific Railroad Tracks and west of Route 47) is one of the oldest sections of the Village. The existing storm water drainage system is old. It was not built to handle storm water runoff from the number of residences and businesses that are tied into it. This means that the system is easily overwhelmed during, even moderately heavy, rain events. Adding to this problem are the existing drainage channels that run under the Union Pacific Railroad tracks. These channels are not large enough to completely accommodate the storm water runoff in the quadrant. The Elburn Public Works Department keeps the channels open as much as possible by regularly removing debris and blockages.

Responsible Agency: The Village of Elburn Public Works Department.

Deadline: When the property immediately south of the Union Pacific Railroad tracks is developed, the Village will require an improved storm water drainage and retention system.

Cost: Unknown at this time. The cost will ultimately have to be part of any future development of the area immediately adjacent to the south side of the Union Pacific Railroad tracks.

Benefits: Flooding of streets and basements in the northwest quadrant of the Village will be reduced significantly. The existing storm water drainage system will not be overwhelmed by moderately heavy rain events.

2015 Status update: This project is still viable, however, due to budgetary constraints for, and lack of commercial development in area, it is doubtful that any action can be taken on this project for FY 2015-2016. This project will be re-evaluated during the budgeting process for FY 2015-2016.

10.26 – Gilberts, Village of

The Village of Gilberts annexed land in 2005 on the north side of Binnie Road extending east from Galligan Road for approximately 2000'. This annexation included the previous township road known as Binnie Road. At the extreme east end of the annex roadway is a dip (depression in the roadway that will hide a vehicle for a few seconds) in Binnie Road that is bordered by a restrictive wetlands area prone to flooding in spring with snow melt and during significant rain events. The village continually asphalt patches the lowest point to keep a reasonable roadway surface. There exist field tile on the south side near the wetlands that is compromised at times and requires excavation and mechanical pumping to help alleviate the standing water.

The village would like to remove the existing roadway surface, install a series of engineered culverts, place road rock to an engineered height and then pave the new roadway raising the roadway out of the dip and out of the flood way.

Year included in plan: 2009

Responsible Agencies: Public Works Department

Deadline: The Village currently has no funding for this project. Once funding is established the project should take about a year.

Cost: $450,000

Benefits: This would eliminate the roadway surface being submerged under flood water for any period of time. Emergency vehicles and normal traffic will be able to use the roadway at all times and travel much safer without the blind dip in the road.

2015 Status Update: The Village has not been able to fund this project but would still like to complete the work once funding is available.

10.27 – Maple Park, Village of

The Village of Maple Park is working on flooding issues, on the North side of Maple Park, near the water tower and the Heritage Hills Subdivision. Village engineers have begun mapping these areas where flooding occurs. The Village proposes to install new storm water sewer lines and catch basins in these areas; the water on the north side of town will then flow to a detention pond to the west or to the drainage ditch to the south, to allow the water to flow away from these areas. In the Heritage Hills subdivision, increase the size of the existing storm sewers to the north, add a new storm sewer line and catch basin to the south, this water will then flow out to Union drainage ditch #2

Year included in plan: 2009

Responsible Agencies: Village of Maple Park

Deadline: Presently there is no funding in the village budget to complete this project.

Cost: The estimated cost of this project is over $500,000. At this time the Village does not have the resources to fund this project. Once funding is secured, the Village Engineer's will develop a specific plan for the project to go forward.

Benefits: This project will be beneficial to the surrounding homeowners that suffer basement flooding when heavy rainfall occurs. It will also benefit and alleviate flooding at the Well Pumping Station and Sanitary Sewer Lift Station.

2015 Status Update: In 2012, the village installed a storm drain at the NE corner of Elm & Broadway and also increased the size of the existing storm sewers in the Heritage Hills

subdivision. In 2013, the village installed a new storm drain at the NW corner of Broadway and Willow. In 2014, the village installed a new storm sewer line on Willow Street from Liberty to Green. Although this is a large amount of improvements for the area this will not completely solve the flooding issue. Currently the village does not have any funds allocated in the current budget for any additional improvements. As funding becomes available the village will continue to implement improvements in this area.

10.28 - Montgomery, Village of

The Montgomery Overflow of Blackberry Creek conveys flood water from Blackberry Creek to the Fox River in large flooding events. In normal conditions the area is drained by a 12 inch agricultural drain tile which is currently in disrepair and there is standing water through much of the overflow route. The Village proposes to replace the drain tile and restore drainage to the area allowing the soils to drain and restoring their water holding and infiltration capacity allowing the Overflow to function better in flooding events.

Responsible Parties: Village of Montgomery and Kane County

Deadline: Currently the Village has no funding for this project and a deadline will depend on when funding becomes available. The project can be constructed in phases with the first phase starting after funding is secured and the whole project completed within two years of funding.

Cost: $100,000 for replacement of approximately 4500 feet of 12 inch drain tile

Benefits: By replacing the drain tile normal drainage can be restored to the Montgomery Overflow area. This will restore the capacity of the soils for infiltration allowing the Overflow to function better in flooding events. Restoring normal drainage to the area will also allow the agricultural lands to be farmed and reduce the impacts that high water tables have had on surrounding residential areas.

2015 Status Update: The Village has looked at this project during the 2015 update and decided that the project is still a good project but currently no funding is available for the project.

10.29 – Montgomery, Village of

In the spring of 2013, residents of the Lakewood Creek West subdivision whose homes back up to a large parcel of ComEd right-of-way experienced basement flooding after a 5.5” rain event within 24 hours. During heavy rains the low-lying ComEd depressional filled with storm water runoff which rose to within 6” – 12” of ground level door thresholds. Although water did not flow directly into the homes, the high water levels and increased burden placed on sump pumps caused basement flooding in adjacent homes. The Village Engineer and Public Works staff developed a 3 phase plan for reducing the elevation of stored storm water. Phase I will include the upsizing of detention basin restrictor plates at downstream detention basins to allow improved

passage of storm water. Phase II will be the installation of a 24 inch storm sewer to by-pass the ComEd depressional storage area and transmit the storm water to the existing Lakewood West detention basin system. Phase III will be the construction of a secondary storm sewer outfall through the adjoining Lakewood Creek storm sewer/detention system.

Year included in plan: 2014

Responsible agency: Village of Montgomery

Deadline: The village Public Works staff completed the Phase I improvements in the Fall of 2013 for $15,000. The Village will monitor the area to determine the level of improvement achieved by the Phase I changes, and will look to secure funding for Phase II and Phase III improvements, with installation to take place in the appropriate budget year following fund appropriation.

Cost: Phase I: $15,000, Phase II: $115,000, Phase III: $22,000, Total $152,000

Benefits: Phase I improvements increased detention release rates without causing downstream high water issues, which allowed for a larger volume of available detention within the Lakewood West basin system. Phase II and III improvements will allow positive drainage paths that will greatly reduce or eliminate the storage of storm water runoff in the ComEd right-of-way.

10.30 – Sleepy Hollow, Village of

The village has experienced flooding in the area along Sleepy Creek between Winmoor Drive on the west and Locust on the east and Sycamore on the north and Willow on the south. Correcting this situation will require re-grading of existing swale and storm drainage as well as possible repair, replacement or removal of existing dams.

Year included in plan: 2009

Responsible Agencies: Board of Trustees/Village Engineers and Public Works

Deadline: The Village does not currently have funding for this project.

Cost: $750,000

Benefits: resolve repeated flooding of property within the described boundaries.

2015 Status Update: The Village does not have the funding, but still desires to complete this project.

10.31 – Sleepy Hollow, Village of

The village has experienced flooding in the area along Jelkes Creek between Sleepy Hollow Road on the west and Bullfrog Lane on the east and Route 72 on the north and Boncosky Road on the south. Critical facilities in this area, which experience flooding, include the Village Hall, Village Police Department, Village Public Works and the Rutland-Dundee Fire Protection District fire station. This will require possible remeandering of the creek along with increasing the height of the bank downstream as well as establishing additional detention/retention along with swale and drainage re-engineering.

Year included in plan: 2009

Responsible Agencies: Board of Trustees/Village Engineers and Public Works

Deadline: The Village does not currently have funding for this project.

Cost: $1,250,000

Benefits: resolve repeated flooding of property within the described boundaries including the critical facilities listed above.

2015 Status Update: The Village does not have the funding for this project but still desires to complete this project.

10.2. Public Information Strategy

Action Item 11. Hazard Mitigation Materials

Prepare background information, articles, and other explanations of hazard mitigation topics, including:

- The natural hazards that threaten Kane County
- What the sirens and warnings mean
- Safety and health precautions
- What government agencies are doing and how they can help
- The hazard mitigation benefits of preventive measures
- The procedures that should be followed to ensure that new developments do not create new problems.
- The need to protect streams and wetlands from dumping and inappropriate development.
- The hazard mitigation benefits of restoring agricultural drainage and rivers, wetlands and other natural areas.

These materials are to be provided to County, municipal, school, and private offices for use in presentations, newsletter articles, webpages, brochures and other outreach projects.

Year included in plan: 2003

Responsible agency: Kane County Office of Emergency Management, Water Resources Department, and municipalities. The Red Cross should provide technical advice.

Deadline: Each jurisdiction is encouraged to continue to develop materials for the public on natural hazard mitigation strategies and then use the materials for action item 12. Outreach Projects, listed below.

Cost: Staff time

Benefits: By preparing a master set of locally pertinent articles and materials, each interested office only has to select the most appropriate media and distribute the messages. By simply inserting an article in a newsletter or putting it on the website, the local level of effort is greatly reduced, which increases that likelihood that the messages will get out. The messages will also be technically correct and consistent throughout the County.

Action Item 12. Outreach Projects

Prepare and disseminate mitigation information based on the materials provided under action item 11. Such projects should include articles in newsletters, news releases, directed mailings, handouts, websites, and displays. Different media should be used for the following audiences:

- The general public
- Floodplain residents
- Developers and builders
- Farm owners and operators
- Decision makers
- Schools and teachers

Provide building departments, libraries and other interested offices with a list of references on property protection. Include a request that they make the references available for public use. A special effort should be made to identify references on insurance, flood proofing and other methods of flood protection.

Year included in plan: 2003

Responsible agency: Kane County Office of Emergency Management. Municipal leads to be designated by the municipality's adopting resolution. The Red Cross should also participate.

Deadline: Each jurisdiction is encouraged to continue implementing outreach projects and provide mitigation information to the public

Cost: Most projects will only cost staff time, such as newsletter articles and websites. Others, such as directed mailings and brochures, will have printing and/or postage expenses.

Benefits: There are many benefits to having a well-informed public. For example, deaths from lightning have steadily decreased over the years because people are more aware of what they should and should not do. More self-help and self-protection measures will be implemented if people know about them and are motivated to pursue them.

10.3. Administrative Action Items

This section reviews the additional action items that are needed to administer and support the recommendations of the two previous sections.

Action Item 13. Plan Adoption

Adopt this *Natural Hazards Mitigation Plan* by passing a resolution. The County's resolution creates the Mitigation Coordinating Committee which is described in the next action item. The municipal resolutions adopt each action item that is pertinent to the community and assigns a person responsible for it.

Year included in plan: 2003

Responsible agency: County Board, Village Boards and City Councils

Deadline: With each update of the plan the county and participating jurisdictions will need to adopt or re-adopt the updated plan within one year of tentative plan approval from FEMA.

Cost: Staff time

Benefits: Formal adoption of the plan ensures that County and municipal staffs are authorized and instructed to implement the action items. Adoption is also a requirement for recognition of the plan by mitigation funding programs and the Community Rating System.

Action Item 14. Mitigation Coordinating Committee

The Natural Hazards Mitigation Planning Committee has been converted to a permanent advisory body in the County's original resolution to adopt this *Plan*. The Committee:

- Act as a forum for hazard mitigation issues,
- Disseminate hazard mitigation ideas and activities to all participants,
- Monitor implementation of this Action Plan, and

– Report on progress and recommended changes to the County Board and each municipality.

The Committee does not have any powers over staff or the municipalities. It is purely an advisory body. Its primary duty is to collect information and report to the County Board, the municipalities, and the public on how well this *Plan* is being implemented. Other duties include reviewing mitigation proposals, hearing resident concerns about flood protection and related matters, and passing the concerns on to the appropriate entity.

The Mitigation Committee is, in effect, Kane County's hazard mitigation conscience, reminding the member agencies and municipalities that they are all stakeholders in the plan's success. The resolution charges it with seeing the *Plan* carried out and recommending changes that may be needed. While it has no formal powers, its work should act as a strong incentive for the offices responsible for the action items to meet their deadlines.

Year included in plan: 2003

Responsible agency: The Kane County Development and Community Services Department, Division of Transportation, Environmental and Water Resources Division, GIS Technology Department, and the Office of Emergency Management as well as a representative from each participating jurisdiction.

Deadline: The yearly report is due to the County Board in December of each year. The reports should also be made available to all participating jurisdictions. An annual evaluation of the plan's implementation is required for credit under the Community Rating System. A five year update is required for continuing credit of this *Plan* under the Community Rating System and FEMA's mitigation funding programs.

Cost: Staff time.

Benefits: Those responsible for implementing the various recommendations have many other jobs to do. A monitoring system helps ensure that they don't forget their assignments or fall behind in working on them. The *Plan* should be evaluated in light of progress, changed conditions, and new opportunities.

Action Item 15. Community Rating System

Host a workshop to review floodplain management activities currently undertaken and those recommended by this *Plan (*see the paragraphs on CRS credit at the end of the discussion of each mitigation measure in chapters 4 – 9). Participants will determine whether to apply for a Community Rating System flood insurance premium rate discount. If so, they would submit an application.

Year included in plan: 2003

Responsible agency: Kane County Departments. Municipal leads to be designated by the municipality's adopting resolution. Technical support and a workshop can be provided by the Insurance Services Office.

New Deadline: This action item will be continuous.

Cost: Staff time.

Benefits: There are many benefits to CRS participation, as explained in the document, *CRS Application*. In addition to saving residents money, it has been shown to provide an effective incentive to implement and maintain floodplain management activities, even during times of drought.

10.4 Action Items Completed Since the 2009 Update

Mitigation projects completed from Action Item 1. Building Code Improvements

1. **Geneva, City of**

The City of Geneva will review the 2009 I-codes for amendments and adoption.

Benefits: Benefits will include improved construction of facilities, consistent application of the codes.

The City of Geneva adopted the 2009 International Building Code in June of 2011.

Mitigation projects completed from Action Item 9. Improved Emergency Response

1. **Batavia, City of**

The City of Batavia has identified the Public Works facility as being vital to emergency operations. The existing emergency backup generator within the facility is insufficient to support all tasks necessary for emergency operations. The existing generator will be replaced with a larger natural gas powered unit.

Benefits: Provide backup power source for Public Works facility in support of emergency operations.

The City completed this work in 2011

2. **Carpentersville, Village of**

Currently the village Emergency Operations Center (EOC) is located in the Police Department and doubles as the Departments Roll Call room. Anytime the room is activated, phones, computers, tables, chairs, and other supplies are assembled. The Village has plans for a new Public Works facility where an EOC will be added to the basement area. Currently the Village collects approximately $5,000/year for the ESDA operating budget. Any grant money would be used to supplement this amount.

Benefits: Reduce the impact of natural and man-made disasters and emergencies to the community due to increased response capability. The EOC can be a vital resource in coordinating the Village's response to provide the highest level of service to the community. The EOC will then be fully outfitted with radios, computers, phones, and other supplies in a "ready" state.

The Village constructed the public works facility and established an EOC within the facility in 2013.

3. Geneva, City of and all municipal jurisdictions in the county.

The county had a committee of building department officials from each municipality. For the most part this committee has ceased to exist. The committee worked on common building department issues including mutual aid of building officials for emergencies and disasters. The lead agency for this committee has been the city of Geneva Building Department. It has been determined that this committee should be resurrected.

Benefits: Benefits will be unified structure for requesting and receiving help from other communities in the event of natural hazards.

The local municipalities started to meet again monthly back in 2012. Starting in February of 2015 all local municipalities are reviewing the 2015 I codes as a group for possible adoption.

4. Pingree Grove, Village of

The village of Pingree grove has identified a need for outdoor warning sirens within the village. In 2008 the village installed its first warning siren on Reinking Rd to serve the residents of the Heritage District and Cambridge Lakes South area of the village. A second siren is needed for the Cambridge Lakes North area. This area is bordered by Rt. 47, Rt. 72, and Big Timber Rd. The planned siren would be consistent with the specifications of the current siren and would be installed based on the Village Engineer's recommendations for maximum coverage.

Benefits: This type of warning system greatly benefits the residents of Pingree Grove by alerting them in advance of severe weather allowing them to seek shelter and a place of safety

The Village of Pingree Grove installed the storm sirens in 2013

5. South Elgin, Village of

The Village of South Elgin has had several major flooding events affect its residents in the past several years. The village would like to improve the response time for sandbagging operations and increases the overall sandbagging effort for the residents. The village has identified a need to purchase a four-chute sandbagging machine to address this issue.

Benefits: The purchase of this sandbagging machine should expedite the filling of sandbags for residents and it is expected the response time of filled sandbags to the affected area will improve.

The Village of South Elgin purchased the four-chute sandbagging equipment in 2010.

6. West Dundee, Village of

Historically, the Village of West Dundee has provided itself with a part-time Emergency Management Agency (EMA) Coordinator. This position was incorporated into the job description of the Deputy Fire Chief, which also was a part-time position. Due to fiscal restraints and the current state of economic affairs with the Village, the position of Deputy Chief has been eliminated and not replaced. However the village would like to establish an EMA coordinator as soon as the financial situation allows.

Benefits: The position would be responsible for the coordination of the Village's Emergency Operations Plan with the departments of Administration, Community Development & Building, Fire, Police and Public Works. The Part-Time EMA Coordinator would be tasked with the revision and development of a Village of West Dundee Emergency Operations Plan, incorporating the guidelines and practices of the National Incident Management System. The function of the EMA Coordinator would be the preparation of all Village Departments in the event of a natural and/or man-made disaster; and to coordinate the efforts with the surrounding municipalities of Carpentersville, East Dundee, Elgin, Gilberts, Sleepy Hollow as well as the Kane County Office of Emergency Management.

The Village has secured a part-time EMA Coordinator; however not at the proposed compensation rate.

7. West Dundee, Village of and Carpentersville, Village of

Administrative staff has met with our equivalents from Carpentersville to discuss the possibility of a water system interconnect. Carpentersville's west water tower is in need of routine maintenance, including cleaning and painting. However, without that tower, their water distribution system would have a difficult time maintaining adequate water

pressure through the western half of their Village. West Dundee will face similar obstacles when the Randall Road Water Tower is serviced in the future. A resolution for both communities needs would be to interconnect each Village's water systems. This would allow for one community's tower to be taken out of service and then utilize the other community's tower to maintain their system's pressures. The interconnect would be utilized only during times of tower maintenance, high fire volume flows or in response to a catastrophic event. Pending approval by the two communities, construction would be in 2010 with the interconnect available for use by spring, 2011. The estimated cost for this project would be split between the two communities.

Benefits: This project will provide emergency access to adjacent community's water supply in the event of extended high fire flows, catastrophic event of reservoir supply (tower failure) or extended disruption of water production capability. Also, this project will enhanced the ability to perform preventative maintenance on existing water distribution/production system with little to no impact on maintaining current and required water system pressures.

This project has been completed.

Mitigation projects completed from Action Item 10. Flood Control Projects

1. **Algonquin, Village of**

Ratt Creek Tributary adjacent to Edgewood Drive. The existing channel is subject to high velocities and severe erosion has occurred in the open stream resulting in severely sloped banks and potential undermining of Edgewood Drive and Harper Drive. The Village has developed Streambank Stabilization plans for the above reach of Ratt Creek Tributary to stabilize the channel and protect adjacent roadways.

Benefits: The proposed improvements will stabilize the Ratt Creek Tributary streambank and ultimately protect Edgewood Drive and Harper Drive.

The Village of Algonquin has completed this project.

2. **Aurora, City of**

The City of Aurora has experienced flooding upstream of Illinois Avenue in a drainage from Greenfield Lake to Orchard Lake. The city has identified the cause of this flooding to be undersized culverts under Illinois Avenue. The undersized culverts need to be replaced.

Benefits: Replacement of the undersized culvert should alleviate the flooding.

Completed on 08-27-11 with a final cost of $228,972.00

3. Aurora, City of

The City of Aurora is proposing to construct storm sewers within sewer basins 5, 6, and 13. The improvements are as follows:

2.1 Basin 6 Fulton, Smith, and Fenton St. Storm and Sanitary Sewer Improvements – which consists of approximately 6,800 lineal feet of storm sewers ranging in size from 12" to 42" in diameter.

Completed on 4-21-11 with a final cost of $1,452,066.81

2.2 Basin13 River St Sub Basin Storm Sewer Improvements Phase 2 - which consists of approximately 3,900 lineal feet of storm sewer ranging in size from 6" to 27" in diameter.

Completed on 10-5-10 with a final cost of $307,436.86

2.3 Basin13 River St Sub Basin Storm Sewer Improvements Phase 3 - which consists of approximately 7,800 lineal feet of storm sewer ranging in size from 12" to 26" in diameter.

Completed on 12-10-10 with a final cost of $2,046,580.07

4. Aurora, City of

The City is in the process of preparing a CSO LTCP that will be used as a planning tool to decrease the frequency of combined sewage overflows into the Fox River and Indian Creek. The plan is a requirement listed in the City's CSO NPDES permit.

Benefits: Completed project should reduce frequency of sewage overflows into the Fox River and Indian Creek.

The preparation and review of the LTCP was completed in July of 2010.

5. Batavia, City of, Geneva, City of & Kane County

Kane County and the cities of Batavia and Geneva have identified that flooding occurs near and along the Braeburn Marsh during heavy rain events. The City has contracted with a consultant to model the watershed and identify flood mitigation projects for the area. Once the mitigation projects have been identified the city will prioritize the projects and start construction; assuming funding will be available from the city or grants are obtained.

Benefits: To prevent or reduce future flooding in the Braeburn and Crestview Subdivisions.

The study for this item was completed in 2010/2011 and the construction was completed in 2012/2013

6. Batavia, City of

The City of Batavia has identified the need to reconstruct the Carriage Crest sanitary lift station. The station serves approximately three hundred acres with a flow of 2,100+/- P.E. The station was constructed in 1968 and is nearing the end of its useful life. Failure of the lift station would result in sanitary sewer overflows. The Carriage Crest Lift Station is located within the Crestview subdivision. Depending on the results of the ongoing Braeburn March drainage study, the lift station may be reconstructed to include a separate storm water lift station.

Benefits: To prevent sanitary sewer overflows. To reduce groundwater levels.

The construction for this action item was completed in 2010/2011

7. Burlington, Village of

To alleviate flooding on the east side of the Village of Burlington wants to improve the drainage from the south side of the railroad tracks to the north side of the railroad tracks. This work would involve replacing drainage tile that has been in place under the railroad since the late 1890's and replace the section of tile on the north side of the tracks, going under the abandoned grain mill and continuing to the north east that is collapsing.

During 2008 the Village undertook steps to assess the condition of the drainage tile after experiencing backup flooding in the eastern area of the Village. Portions of this tile were televised and the collapsing state of the tile was seen. Further improvements would include a grate over the opening of the tile on the south side of the tracks and drainage improvements/replacement of drainage tile.

Benefits: to alleviate damages to businesses, homes, well and property in the Village of Burlington.

In 2013, the Village of Burlington completed this project using grant money.

8. Campton Hills, Village of

During extended wet weather or major storms extensive flooding occurs along Denker Road in the area of the Vestuto property. This flooding creates a wash –out of Denker Road closing the road to traffic affecting 750 vehicles per day. The adjacent property is also being flooded. To elevate these problem 2-24 inch culverts will need to be placed to increase conveyance of 345 cfs of flow. Additional re-grading of Denker Road and the driveway approach to the private residence and ditch grading will also need to be completed.

Benefits: This project would eliminate additional ongoing costs needed to keep the road open, allow access to emergency vehicles and the citizens of the village, and prevent or reduce flooding to the adjacent property.

This project was completed and the Village has not had any more issues up to the present, within this area causing road closures or flooding of nearby residences.

9. Sleepy Hollow, Village of

The village has identified Saddle Club subdivision and Deer Creek subdivision water shed area as having flooding problems. The village would like to Re-engineer and re-grad swales and storm drainage along with resizing and replacement of culverts.

Benefits: Resolve repeated flooding of streets and property within the described boundaries.

This project was completed in 2012.

10. South Elgin, Village of

Within the Village of South Elgin the area in and near the Renee Detention Pond floods during large rain events. During the September 13, 2008 rain event, the village received 9.38 inches of rain and as a result of this event the village initiated an immediate storm water study in the area resulting of a regional solution to the problem. The village will install a 36 inch storm sewer on Kane Street to carry the storm water from the Kane Street Detention Pond straight to the Fox River thereby avoiding the nearby neighborhood. Rear yard storm sewers will be constructed on Martin Drive between Spring Street and Kane Street. Residents will be allowed to hook up to the new storm sewers once constructed. Other area improvements such as more inlets on the area streets for drainage will be constructed as well as improvements on the Renee Detention Pond.

Benefits: By installing the 36 inch storm sewer and other improvements in the area the amount of storm water moved out of the area directly to the Fox River will be increased, thereby preventing or reducing future flooding in the area.

The Village of South Elgin completed the 36" storm sewer in 2011. This sewer has greatly improved the capacity of the storm sewer system as well as making several neighborhoods safer during storm events due to the elimination of street flooding.

10.5 Action Items Removed at the Jurisdictions Request since the 2009 Update

Action Items removed from Action Item 11. Flood Control Projects

1. Carpentersville, Village of

Lake Marian Watershed - Alt. S1 Keith Andres Park Class II Dam Installation

Action Items, Goals, Guidelines and Recommendations	1. Building Code Improvements	2. Improved Code Enforcement	3. Plans & Development Regs	4. Retrofitting Incentives	5. Repetitive Loss Projects	6. Drainage Maintenance	7. Urban Forestry	8. Flood Threat Recognition	9. Improved Emergency Response	10. Flood Control Projects	11. Hazard Mitigation Materials	12. Outreach Projects
Goals												
1. Protect lives and health	X	X	X	X	X	X	X	X	X	X	X	X
2. Encourage self-help				X	X		X	X	X		X	X
3. Protect critical facilities			X			X	X	X	X	X		
4. Identify special projects				X	X					X		
5. Reduce repetitive losses	X	X	X	X	X	X		X	X	X	X	X
Guidelines												
1. Focus on most common hazards	X	X	X	X	X	X	X	X	X	X	X	X
2. Encourage responsibility				X	X	X	X				X	X
3. New developments	X	X	X								X	X
4. Protect citizens and public property				X		X	X	X	X	X	X	X
5. Seek support					X							
6. Preserve open space		X	X							X	X	X
7. Be consistent with existing plans	X	X	X						X			
Recommendations												
Ch. 4. Preventive Measures	1, 2, 3	3, 6	4, 5								7	7
Ch. 5. Property Protection				3, 7	3, 8						1	1, 2
Ch. 6. Resource Protection		1	6			3	5				2, 4	2,4
Ch. 7. Emergency Services								2, 3	1, 4, 6		5	
Ch. 8. Structural Projects						2				1		
Ch. 9. Public Information											1, 2	1,2, 3,4

This table relates the Program and Public Information action items to the 5 goals and 7 guidelines of this *Plan*. The goals and guidelines are stated in full on pages 3-7 and 10-1. The table also shows the relation between the action items and the recommendations at the end of chapters 4 – 9. For example action item 1, Building Code Improvements, supports goals 1 & 5, guidelines 1, 3 & 7, and recommendations 1, 2 & 3 at the end of chapter 4.

Action Items: Community Participation															
	1. Building Code Improvements	2. Improved Code Enforcement	3. Plans & Development Regs.	4. Retrofitting Incentives	5. Repetitive Loss Projects	6. Drainage Maintenance	7. Urban Forestry	8. Flood Threat Recognition	9. Improved Emergency Response	10. Flood Control Projects	11. Hazard Mitigation Materials	12. Outreach Projects	13. Plan Adoption (as of 2009)	14. Mitigation Committee	15. Community Rating System
Kane County (Unincorporated)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Algonquin						X							X	X	
Aurora										X			X	X	
Batavia									X				X	X	
Big Rock			X	X					X	X			X	X	
Burlington							X						X	X	
Campton Hills									X				X	X	
Carpentersville						X				X			X	X	6
East Dundee										X			X	X	
Elburn								X		X			X	X	
Elgin									X				X	X	
Geneva										X			X	X	
Gilberts									X	X			X	X	
Hampshire									X				X	X	7
Lily Lake							X						X	X	
Maple Park										X			X	X	
Montgomery								X	X	X			X	X	
North Aurora				X		X							X	X	
Pingree Grove							X							X	
Sleepy Hollow										X			X	X	
South Elgin			X										X	X	5
St. Charles									X				X	X	5
Sugar Grove									X				X	X	6
Virgil									X				X	X	
Wayne									X				X	X	
West Dundee							X						X	X	

This table indicates which communities have specific projects related to each action item.
CRS Participation and Class as of 5-1-2014

Chapter 11. Plan update

11.1 2015 Plan Update

Since the original Plan's adoption by Kane County and local communities in 2003/2004 and the updated version in 2009, the Natural Hazards Mitigation Planning Committee has met twice a year to track implementation of the action items contained in the Plan. As was recommended from the 2009 update an agenda item was added to every meeting asking committee members if they had any suggestions for improving or changing the plan. This way as items came up they would be recorded so the committee could look at adding the change during the next update.

It was determined that the Kane County Stormwater Management department and the Kane County Office of Emergency Management would be the lead departments to update the plan.

With the spring meeting in 2014 the pending update was discussed and committee members were encouraged to review the plan and make recommendation for improvement. Each committee member was instructed to review the jurisdiction specific action item(s) listed in chapter 10 for their jurisdiction. Each member was also instructed to provide information about the action item including if the item had been completed and the year complete. If the item was not complete, was it still a viable project for the City/Village and if so provide a status update with new information. Committee members were also reminded that FEMA required at least one jurisdiction specific action item in the plan for all participating jurisdictions.

At the fall committee meeting the update was again on the agenda and a large part of the meeting. A status on the update was provided to committee members and discussion was held about the update.

The committee did not hold any special meetings for the update but Stormwater Management and Emergency Management staff communicated with committee members throughout the process by email.

In addition the committee specifically reviewed the goals and guidelines discussed in chapter 3 and found them to still be valid and determined they did not need to be changed.

Public involvement: County resolution 03-308 officially adopted this plan and specifically stated that all meetings of the mitigation coordinating committee will be open to the public. With this in mind the public has been encouraged to attend and participate in the bi-annual meetings. An open invitation is listed on the county website along with the meeting schedule as well as a copy of the plan and the yearly reports.

In addition, a special public meeting was held on September 25, 2014. This meeting was used to explain the plan and update information to the public and to record any public comments. In order to advertise the meeting as widely as possible a press release was sent

out by the Stormwater Management Department. Kane County Connects which is a Kane County run electronic newsletter also ran an article about the public meeting. The Meeting was listed on the Counties website and was also posted on the emergency Management Facebook site.

September 19, 2014
Contact: Scott Hajek (630) 232-3496

KANE COUNTY NATURAL HAZARDS MITIGATION PLAN 2014 UPDATE
PUBLIC MEETING

For Immediate Release

The Kane County Natural Hazards Mitigation Planning Committee announces the completion of the 2014 update to the *Natural Hazards Mitigation Plan*.

This is the second 5-year update to the original Natural Hazards Mitigation Plan adopted in 2003. The original plan was developed after a nine month effort that reviewed the major hazards to which the County is exposed: floods, tornadoes, earthquakes, thunderstorms and winter/ice storms. The 2003 plan was one of the first of its kind in the State of Illinois.

This year, the Committee evaluated and updated the report which includes a variety of measures that can reduce exposure to the dangers and damage posed by the hazards, and selected action items to be implemented by the County and municipal governments. The current *Plan* (including an executive summary) is available for review on the County's website at http://dewprojects.countyofkane.org/naturalHazards/index.asp

A public meeting will be held at 6 p.m., Thursday, September 25, 2014, in the First Floor Auditorium at the Kane County Government Center, Geneva, Building A.

Comments may be submitted at the public meeting or to:

Scott Hajek
Department of Environmental & Water Resources
719 Batavia Avenue, Building A
Geneva, IL, 60134
630/232-3496
HajekScott@co.kane.il.us

The Mitigation Planning Committee will meet after the public meeting, review any desired changes, and finalize the update to the mitigation plan for adoption by the County Board and the individual city councils and village boards.

###

KANE COUNTY CONNECTS

Engaged Citizens. Involved Communities. Open Government

KCC Search

Search site ...

SUBSCRIBE TO BLOG VIA EMAIL

Enter your email address to subscribe to this blog and receive notifications of new posts by email.

Email Address

Subscribe

META

- Log In
- Entries RSS
- Comments RSS
- WordPress.org

Browse: Home / 2014 / September / Floods, Tornadoes, Earth Quakes, Ice Storms: Thursday Hearing Looks at Updated Natural Hazards Plan

FLOODS, TORNADOES, EARTH QUAKES, ICE STORMS: THURSDAY HEARING LOOKS AT UPDATED NATURAL HAZARDS PLAN

September 23, 2014 · by kanecountyconnects · in Government, Office of Emergency Management, Public Safety

SOURCE: Kane County Mitigation Plan.

CALENDAR

September 2014

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

« Aug

KCC FACEBOOK

Kane County Connected

You like this.

You and 1,691 others like Kane County Connected.

Facebook social plugin

http://kanecountyconnects.com/2014/09/floods-tornadoes-earth-quakes-ice-storms-natural-hazards-plan-hearing-is-thursday/?utm_source=Kane+Cou... 1/3

Kane County Connects Website (page 1)

July 19, 1996, Blackberry Creek Flood
Source: Chris Degiardo,
Kane County Development Department

Thunderstorm Damage, July 7, 1994, Aurora
Source: Aurora Emergency Management

A Chicago Tribune infographic from Aug. 28, 1990, is included in Kane County's Natural Hazards Mitigation Plan, and the headline says it all: "A Trail of Death and Destruction."

That's what it was, when tornadoes ripped through Will County. In Plainfield, 56 homes destroyed. In Peerless Estates, 75 home destroyed. In Lily Cache, 55 homes destroyed. Crystal Lake, 69 homes destroyed. Plainfield High School, Grand Prairie Elementary School, St. Mary Immaculate grade school, church, rectory and convent destroyed. The final death toll was 27. Damages totaled $155 million.

Thirteen years later, Kane County adopted a plan to deal with high-magnitude emergencies — the mitigation plans that was hailed as one of the first of its kind in the state of Illinois.

Now, the Kane County Natural Hazards Mitigation Planning Committee has completed the 2014 update to its plan and will unveil it Thursday at a public meeting.

This is the second five-year update to the original plan, which was developed after a nine-month effort that reviewed the major hazards to which Kane County is exposed: floods, tornadoes, earthquakes, thunderstorms and winter/ice storms.

The updated report includes a variety of measures that can reduce exposure to the dangers and damage posed by the hazards and names selected action items to be implemented by the county and municipal governments.

The plan, including an executive summary, is available for review on the county's website.

A public meeting will be held at 6 p.m., Thursday, Sept. 25, 2014, in the First Floor Auditorium at the Kane County Government Center, Geneva, Building A.

Comments may be submitted at the public meeting or to Scott Hajek, Department of Environmental & Water Resources, 719 Batavia Avenue, Building A, Geneva, IL, 60134. Hajek also can be reached at 630/232-3496 and HajekScott@co.kane.il.us

The Mitigation Planning Committee will meet after the public meeting, review any desired changes, and finalize the update to the mitigation plan for adoption by the County Board and the individual city councils and village boards.

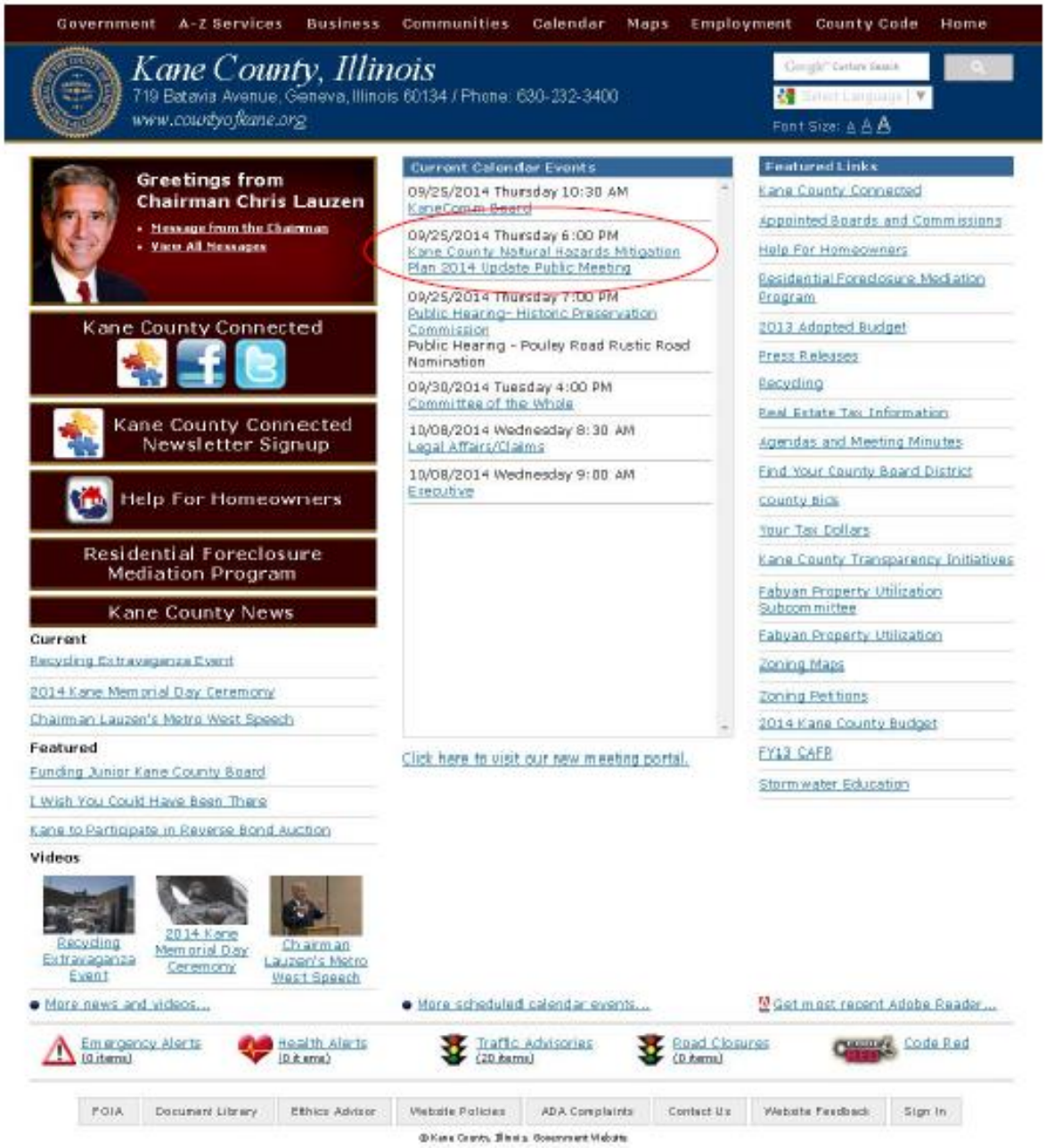
Share this:

Email | Facebook 2 | Print | Twitter 3 | Google

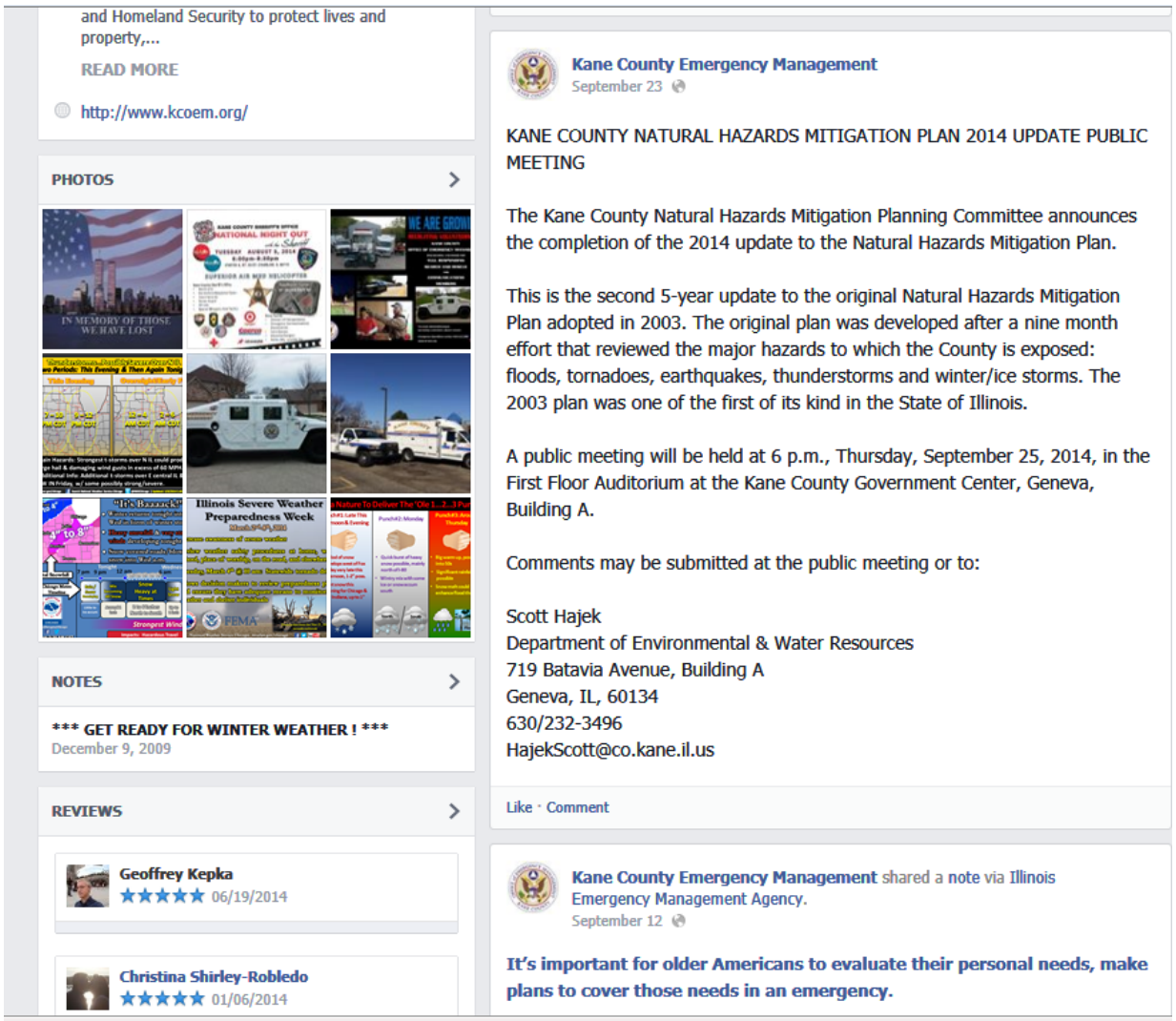
Tags: 1990, Hearing, Kane County, Natural Hazards Mitigation Plan, Plainfield Tornado

Leave a Reply

Kane County Connects Website (page 2)



County of Kane Website Calendar



Kane County Office of Emergency Management Facebook Page

Surrounding county involvement: As was done during the 2009 update, the committee felt it was important to continue to involve the surrounding counties in the 2015 update process. Therefore a draft copy of the updated plan was provided to the seven counties (McHenry, Lake, Cook, DuPage, Will, Kendall, and DeKalb) that surround Kane County. Each of the counties had the opportunity to provide input on the updates to the committee.

11.2 Guidelines for the 2020 plan update

County Resolution 03-308 specifies that the Environmental Management Department, now the Environmental and Water Resources Division, and the Office of Emergency Management will serve on the committee and shall provide staff support for the committee's work. It can be concluded that both of the county departments will be

similarly listed in the new County resolution adopting the 2015 plan. Therefore both the Environmental and Building Management Department, and the Office of Emergency Management will continue to provide staff to support the committee. This will include facilitating committee meetings, compiling the annual reports, and updating the plan. County Resolution 03-308 also specifies that the County Development and Transportation Departments and the municipalities that pass a resolution to adopt the Natural Hazards Mitigation Plan will serve on the committee. Environmental and Building Management Department and the Office of Emergency Management will draw on these other departments and municipalities for assistance in monitoring the plans implementation and for updating the plan.

The 2015 plan will be required to be updated in five years or in 2020. At this point the plan will be 17 years old. The committee should determine early in the update phase if the committee will update the plan or if they should attempt to secure a grant to hire a contractor.

As stated earlier, the committee will meet twice per year to monitor the plans implementation. As was started in 2009 a section will continue to be included in each meeting's agenda for plan update information and ideas. This will allow and encourage county departments and committee members to suggest items for plan improvement throughout the years leading up to the actual plan update.

FEMA publishes a Local Mitigation Plan Review Crosswalk, which lists all of the required items that must be in the mitigation plan in order for the plan to be approved. The crosswalk was used in the 2009 and 2015 updates. The committee should acquire the Crosswalk from FEMA and use it to insure all required information is included in the 2020 plan update.

For the 2015 plan update the Illinois Emergency Management Agency requested the final draft of the updated plan be submitted to them three months prior to the plans expiration date. IEMA then sent the plan to FEMA for review and approval. With this in mind the committee should start the update process 12 months before the plan is to be submitted to IEMA.

Once the plan is submitted to IEMA/FEMA for approval, FEMA may require additional information be added to the plan before they grant approval. As was the case with the 2015 update, FEMA required additional updates be made to the plan. Due to unforeseen incidents occurring in Kane County during this time it took several month to add the additional information to the plan and then resubmit the plan to FEMA. Therefore the committee, working with the Office of Emergency Management and Environmental and Building Management should consider sending the plan to IEMA/FEMA four or five months prior to the plans expiration.

Public Involvement: All of the mitigation committee meetings shall be open to the public. The public will continue to be invited to each of the regularly held committee meetings during the year and any additional meetings that are added to facilitate plan updates.

At the regular scheduled meeting before the update year the committee should discuss ways to increase public involvement in the upcoming meetings, as these meetings will be geared towards updating the plan. It is understood that funding will be a major concern for the two county departments charged with providing staff for the committee's work. Neither department has any funding specifically allocated for the mitigation committees work. If funding is available additional actions should be taken to notify the public and to encourage participation in the plan update meetings.

An action that can be implemented with no cost would be to place information about the update meetings on the main County website as well as the websites of the Office of Emergency Management and Environmental and Building Management. Along this same line, each jurisdiction will be encouraged to post information about the update meetings on the jurisdictions website. If a newsletter is published by the jurisdiction they will also be encouraged to publish meeting information in the newsletter.

As was done for the 2015 update the committee should hold a public meeting to explain what the plan is and what update have been made to the plan.

Surrounding county involvement: The surrounding counties should continue to be included in the plan update process. Once a draft copy of the plan has been prepared each of the seven surrounding counties should be sent a copy and allowed to make comments about the plan.

Schedule for the 2020 plan update:

2015 Adopt the 2015 Plan Update
2016 Evaluate Action Items via committee meetings
2017 Evaluate Action Items via committee meetings
2018 Evaluate Action Items via committee meetings
Determine if a contractor will be used to update the plan or if the committee will update the plan.
Possibly Prepare grant application to hire outside contractor
2019 Work with all involved parties more closely and more frequently to update all aspects of the plan
2020 Prepare and finalize 2020 Plan Update

Appendix A. County and Municipal Resolutions

1. Kane County resolution for September 2003 Plan

STATE OF ILLINOIS

COUNTY OF KANE

RESOLUTION NO. 03 - 308

ADOPTION OF THE KANE COUNTY NATURAL HAZARDS MITIGATION PLAN AND ESTABLISHMENT OF A KANE COUNTY HAZARD MITIGATION COMMITTEE

WHEREAS, on October 13, 1998, the Kane County Board passed Resolution No. 98-251 adopting the KANE COUNTY STORMWATER MANAGEMENT PLAN (the "Plan") pursuant to 55ILCS 5/5-1062 which established goals to minimize and reduce stormwater damages to existing structures and land use in order to maximize the protection of public health, safety, and welfare, and identify and develop revenue sources to complete the goals and objectives; and

WHEREAS, the mission of the Kane County Office of Emergency Management includes the charge to "identify hazards and vulnerabilities, whether natural or man made, within the corporate limits of Kane County, and provide programs to eliminate or reduce the effects of such threats …"; and

WHEREAS, on September 10, 2002, the Kane County Board passed Resolution No. 02-281 approving the development of an Natural Hazard Mitigation Plan; and

WHEREAS, a Natural Hazard Mitigation Plan for Kane County will be required beginning in November 2003 to receive any state or federal mitigation funding such as flood prone property improvement or buyout funds; and

WHEREAS, the County of Kane is subject to flooding, tornadoes, winter storms, and other natural hazards that can damage property, close businesses, disrupt traffic, and present a public health and safety hazard; and

WHEREAS the Natural Hazards Mitigation Planning Committee, comprised of representatives from the County, municipalities and stakeholder organizations, has prepared a recommended Natural Hazards Mitigation Plan that reviews the options to protect people and reduce damage from these natural hazards; and

WHEREAS, the recommended Natural Hazards Mitigation Plan has been widely circulated for review by the County's residents and federal, state and regional agencies and has been supported by those reviewers.

NOW, THEREFORE BE IT RESOLVED by the Kane County Board that:

1. The *Natural Hazards Mitigation Plan* is hereby adopted as an official plan of Kane County.
2. The Mitigation Coordinating Committee is hereby established as a permanent advisory body. It shall be composed of representatives from the following groups, as appointed by the County Board Chairman and approved by the County Board:
    a. The following County offices and departments:
        1) Environmental Management
        2) Emergency Management
        3) Development
        4) Water Resources
        5) Transportation
    b. Those municipalities that pass a resolution to adopt the *Natural Hazards Mitigation Plan* and that send a representative to attend the meetings of the Committee.

c. Representatives of other interested agencies, organizations and associations appointed by the Chair of the County Board to represent the stakeholders in hazard mitigation and the general public.

3. The Committee shall meet as often as necessary to prepare or review mitigation activities and progress toward implementing the *Natural Hazards Mitigation Plan*. It shall meet at least once each year to review the status of ongoing projects.
4. The schedule of Committee meetings shall be posted in appropriate places. All meetings of the Committee shall be open to the public.
5. By November 30 each year, the Committee shall prepare an annual evaluation report on the *Mitigation Plan* for the County Board and the municipalities. The report will cover the following points:
   a. A review of the original plan.
   b. A review of any natural disasters that occurred during the previous calendar year.
   c. A review of the action items in the original plan, including how much was accomplished during the previous year.
   d. A discussion of why any action items were not completed or why implementation is behind schedule.
   e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval by the County Board and the affected municipality's governing boards as amendments to the adopted plan.
6. The director of each County office identified as "responsible agency" for the *Mitigation Plan's* action items shall ensure that the action item is implemented by the listed deadline subject to fiscal and staff time constraints.
7. The Environmental Management Department and the Office of Emergency Management shall provide staff support for the Committee's work.

Passed by the Kane County Board on October 14, 2003.

Clerk, County Board
Kane County, Illinois

Chairman, County Board
Kane County, Illinois

Vote:
Yes 24
No 0

10MitigationPlan

2. Municipal resolutions for September 2003

The Kane County Office of Emergency Management has a copy of the resolution from each municipality that adopted the September 2003 plan. The OEM will also maintain a copy of all resolutions from future plan updates. The following is a list of the municipalities that passed a resolution adopting the September 2003 plan.

Municipality	Date Passed
Algonquin, Village of	11/04/03
Aurora, City of	01/13/04
Batavia, City of	10/20/03
Big Rock, Village of	11/03/03
Burlington, Village of	10/20/03
Campton Hills, Village of	01/20/09
Carpentersville, Village of	10/07/03
East Dundee, Village of	11/17/03
Elburn, Village of	10/20/03
Elgin, City of	04/14/04
Geneva, City of	01/05/04
Gilberts, village of	11/04/03
Hampshire, Village of	10/02/03
Huntley, Village of	10/23/03
Lily Lake, Village of	10/20/03
Maple Park, Village of	11/04/03
Montgomery, Village of	11/10/03
North Aurora, Village of	12/08/03
Sleepy Hollow, Village of	01/05/04
South Elgin, Village of	10/20/03
St. Charles, City of	11/17/03
Sugar Grove, Village of	11/18/03
Virgil, Village of	11/13/03
Wayne, Village of	02/03/04
West Dundee, Village of	11/03/03

3. Kane County resolution for May 2015 Plan

Will be added upon resolution passing.

4. Municipal resolutions for May 2015 Plan

Will be added upon resolution passing.

Appendix B. Kane County Natural Hazards Mitigation Committee Annual Reports

This appendix contains all of the annual reports starting with 2009. Each jurisdiction is requested to submit a jurisdiction report to the Kane County Office of emergency Management by the end of October of each year listening what activity they had for each of the action items listed in chapter 10 of the plan. The Office of Emergency Management then compiled this information into the annual report and the report is submitted to the Kane County Board and is posted to the mitigation page of the Kane County website. Older reports are available from the Kane County Office of Emergency Management.

Kane County Natural Hazards Mitigation Committee

Annual Report For 2009

TO: Members of the Kane County Board
FROM: Kane County Natural Hazards Mitigation Committee
SUBJECT: Annual Report for 2009
DATE: November 25, 2009

Kane County is subject to natural hazards that threaten life and health and have a history of causing extensive property damage. To better understand these hazards and their impacts on our communities, the County's Department of Environmental Management and Office of Emergency Management jointly undertook the creation of the Kane County *Natural Hazards Mitigation Plan.*

The *Plan* identifies activities that can be undertaken to reduce safety and health hazards along with property damage caused by natural hazards. It focuses on the five major natural hazards that threaten Kane County: floods, tornadoes, earthquakes, thunderstorms and winter/ice storms. ***The full Natural Hazards Mitigation Plan can be reviewed or downloaded at www.co.kane.il.us/hazards/.***

On October 14, 2003 the Kane County Board passed resolution 03-308 adopting the Natural Hazards Mitigation Plan. A provision in this resolution requires the committee to submit an annual written report to the County Board, summarizing the *Plan's* implementation status for the preceding year.

The following is our report for 2009:

A. A review of the original Plan.

Kane County has been subject to a variety of natural hazards over the years including tornadoes, floods, ice storms, blizzards, severe thunderstorms and high wind events. The County's Emergency Response Plan takes these types of events into account and identifies appropriate response activities.

The Disaster Mitigation Act of 2000 states that after November 1, 2003, local governments applying for pre-disaster mitigation funds must have an approved local mitigation plan. After November 1, 2004, a mitigation plan will also be needed before applying for post-disaster mitigation funds under the Hazard Mitigation Grant Program.

In 2002 the County Board approved the creation of a Natural Hazards Mitigation Plan planning committee. The Committee met monthly from October 2002 through September 2003 to develop the plan that was presented to and approved by the Board in October 2003. The Committee identified 17 key action items for implementation.

The ongoing portions of the action items have been started and will continue through the life of the Plan.

B. A review of natural disasters during 2009.

No natural disasters occurred in Kane County during 2009.

C. A review of the action items.

During the 2008/2009 update process one of the FEMA requirements specified that all of the participating jurisdictions have at least one identifiable action item in the plan. All of the jurisdictions complied with this requirement and each new action item has been placed under one of the original 17 action items. The next annual report will be compiled at the end of 2010.

Many jurisdictions have put a hold on projects due to the current economic situation and many of the new action items have no funding unless a grant for the project can be obtained.

1. Building Code Improvements

Adopt the latest International series of codes, the new national standard that is being adopted throughout the country.

Status:

- Aurora plans to adopted the 2009 ICC Codes in April of 2010
- Batavia has begun to enforce, 2009 commercial energy code upgrades. The City also initiated a program to insure the long-term viability of significant historic buildings through a combination of inspection, code compliance and grant assistance efforts.
- Elburn will continue to adhere to the 2000 International Residential Code (IRC) and the 2003 International Building Code (IBC). However, due entirely to the current economic climate, the Building and Zoning Department was disbanded, with the employees being reassigned to the Public Works Department. Any inspections that need to be conducted are still being done by the certified inspectors as additional duties. The inspectors are supervised by the Director of Public Works.
- Huntley continues to update its building codes, adding and adapting codes as required for new developments

2. Improved Code Enforcement

Develop and conduct training for building department staff on the natural hazards aspects of the International Codes, regulation of mobile home installation, and the new County stormwater management ordinance and its flood protection, wetland protection,

erosion and sediment control and best management practices provisions.

Status:

- Aurora's Building and Permits Department personnel (Inspectors & Staff) continue to be cross-trained and participate in ongoing training on ICC Codes, code enforcement, and building permits. Engineering looks at all flood, IEPA, storm water, etc. issues during code review.
- Batavia continues to use the new process for administrative adjudication of municipal and building code violations, and the joint hearing officer process with the City of Geneva and the Village of North Aurora.
- Carpentersville's Engineering Department is responsible for enforcement of the County's stormwater ordinance, and utilizes an ongoing contract with an outside consulting engineering firm with employees who are Kane County Qualified Engineer Review Specialists and Qualified Wetland Review Specialists to meet the requirements of this ordinance.
- Elburn; As reported in last year's report, the Village approved an ordinance that adopted and amended the 2003 International Property Maintenance Code (IPMC). With the 2009 Mayoral election, the person originally hired as a community development officer to oversee the code enforcement effort and the preliminary planning with developers, was appointed as the new Village Administrator. The position of Community Development Coordinator will not be re-staffed until development resumes in a significant way. This will also hold true for the Building and Zoning Department.
- Hampshire has contracted B&F Building inspections as our Building Department and Code Enforcement Unit.
- Huntley continues to upgrade the training of the inspectors and employees involved either directly or indirectly in code enforcement.
- North Aurora has hired a second code enforcer.

3. Review of Plans and Development Regulations

When they are up for revision; comprehensive plans, land use plans, and zoning and subdivision ordinances should incorporate mitigation provisions.

Status:

- Aurora's Building and Permits staff continues to review architectural/engineering plans for code compliance. Engineering reviews civil. Development Services Team

continues to review incoming developments and staff follows the developments as they progress through the planning process
- Batavia has released a draft of its new Zoning Code for public comment, and will be holding hearings prior to adoption of the new code in March 2010.
- Burlington continues its efforts to look at detention areas & site plans to reduce risk of potential flooding in the future.
- Lily Lake is continuing with the revision of the Comprehensive Land Use Plan. Conservation design for new subdivision is being included in the new plan.
- North Aurora has updated the Zoning Map & Subdivision Control Ordinance in August of 2009.

3.1 Big Rock (jurisdiction specific action item 3.1 in plan)

The Village will adopt a *Subdivision Control Ordinance* and accompanying *Standard Specifications*.

Status:
- The Subdivision Control Ordinance is adopted with the first two measures implemented. The Standard Specifications to accompany that ordinance is still under review but will also address the second two measures.
- The Zoning Ordinance is under review with a revision expected to mandate storm shelters in new mobile home parks.

4. Facility Audits

Develop a checklist to evaluate a property's exposure to damage from the hazards of flooding, high winds, lightning, hail and power losses from downed lines. Evaluate all critical facilities using the checklist.

Status:
- This action item has been completed. Kane County Office of Emergency Management secured a grant for a contractor to conduct the facility audits for the entire county. The facility audits began in 2005 and continued until late 2006. The Office of Emergency Management holds the data from this audit.
- As this action item is being removed from the plan this will be the last yearly report that this action item appears in.

5. Retrofitting Incentives

Establish a program of technical assistance and financial incentives to encourage property protection measures on private property, such as:

- Surface and subsurface drainage improvements,
- Berms and regrading for shallow surface flooding,
- Sewer backup protection
- Relocating furnaces and water heaters out of basements

- Tornado safe rooms
- Installing lightning rods

Status:

- Neighborhood Redevelopment has a downsizing incentive program that assists property owners in converting multi-dwelling unit homes back to single family homes.

6. Repetitive Loss Projects

Protect the buildings in repetitive loss areas 7, 8, 9, 12 and 14. These are the top priority areas based on the flood hazard and type of construction, as explained in the criteria on page 5-12. Acquisition is the recommended property protection approach for areas 7, 8, 9, and 12 and elevation is recommended for areas 9, 12 and 14. Properties in the other repetitive loss areas could be protected by retrofitting measures that could be funded for much less under the cost share program proposed in action item 5.

Status:

- In 2009, the Environmental Management Department was awarded a FEMA PreDisaster Mitigation Grant to mitigate three floodprone structures identified in the Repetitive Loss Areas Plan. The three structures will be acquired and demolished, leaving permanent open space. The Department closed on two properties in 2009, and expects all three to be acquired and demolished by early 2010.

7. Drainage Maintenance

Implement a formal and regular drainage system maintenance program.

Status:

- Aurora's Street Department and the Water and Sewer Maintenance Department regularly sweeps streets and clean catch basins to facilitate drainage.
- Batavia:
  - Inspection and repair of storm drainage structures associated with the 2009 roadway program
  - Installation of new sump pump collection system (Wintergreen Terrace)
- Big Rock signed an IGA with the Road District for street maintenance services. The Road District has already cleaned and repaired several culverts and consults with the Village on tile replacement and necessary culvert maintenance.
- Carpentersville Public works has initiated a catch basin cleaning program which consists of cleaning approximately 20% of the storm water catch basins annually. In addition all streets are

swept a minimum of 4 times annually. These efforts prevent debris from entering the storm water catch basins. All new developments, and Village capital improvement programs, submit digital record drawings of completed improvements, to aid in mapping efforts.

- Elburn; The Village maintains a storm drainage maintenance program that inspects and cleans all storm sewers every five years. Regular monthly inspections of all storm water detention/retention facilities are performed to ensure proper operation and that they are free of debris. During 2009, inspection of approximately 2,000 feet of storm sewers was completed using remote cameras. The televised inspections were recorded and analyzed. The same 2,000 feet of storm sewers were "jet-rodded" to clean out any debris build-up. Inspection of field tiles outside of the Village corporate limits that may impact existing neighborhoods are inspected on a regular basis throughout the year.
- Lily Lake completed the Indian Creek Subdivision drainage project. The project included improved ditches and a new under drain system. Many existing, damaged, field tiles were discovered and connected to the new under drain system, which has improved the localized flooding during heavy rainstorms.
- North Aurora has set up a river bank cleanup for the 4th year.
- South Elgin
  - The Village paved Gilbert Street, East Middle Street, Aaron Avenue, Adam Drive and Barbara Avenue. All damaged curbs, inlets, sidewalks and some driveway approaches were completed as well. Drainage was addressed on all these streets.
  - All 4,800 inlets have been inspected in 2009 as mosquito larvacide briquettes are dropped into each one.
  - Routine ditching is completed throughout the year.
- West Dundee
  - The Village assumed control of the Carrington Reserve Subdivision's Natural Areas and Wetlands.
  - Street sweeping continues on a monthly basis as long as weather allows.
  - Weekly inspections conducted on detention facility outfalls to ensure that they are clear of debris.

8. Urban Forestry

Implement an urban forestry program that qualifies the municipality to become a Tree City, USA.

Status:

- Aurora has formed a municipal arbor committee to address urban forestry issues and the city is pursuing “Tree City USA” designation.
- Batavia
  - In 2009, the City has celebrated 12 years as Tree City/ Tree Line USA.
  - Continuation of parkway tree program (replacement of or planting new trees)
- Burlington is working toward developing a tree program. Trees were purchased and planted in the detention area.
- Elburn was recognized as a Tree City USA for the 10th straight year in 2009. The Village continues to maintain a successful brush collection program that encourages residents to maintain trees on private property, while the Village prunes and maintains trees on the public right-of-way. The Village has also enacted a tree preservation ordinance and reviews construction plans relative to tree preservation/protection during construction and development projects. Also, with the invasion of the emerald ash borer, the Village removes the effected trees on Village parkways, and replaces those trees.
- Lily Lake’s Plan Commission will be discussing urban forestry and “tree City USA” in 2010.
- North Aurora
  - Last year the Village became a “Tree City” and qualified again this year.
  - The Village has a Beatification Committee and a Tree Ordinance and will be doing an Arbor Day Observance/Proclamation.
  - Last year the Village replaced 58 parkway trees, but due to budget issues the Village will be replacing 50 parkway trees this year.
  - The Village is also doing Parkway Tree Trimming
- West Dundee
  - Limited parkway tree trimming conducted by field employees.
  - In August, the Emerald Ash Leaf Borer was identified on within the Village. The Village response plan was put into effect with increase emphasis on parkway tree survey and specie identification.

9. Flood Warnings

Review the gauging system in the County, especially the western rural areas, to determine where additional rain and stream gages would be worthwhile.

Status:

- Aurora made internal improvements for information sharing, coordination, and notification.
- Elburn; During 2009 the Village Public Works Department continued with its on-going efforts to identify locations where storm sewers have been connected to abandoned sanitary sewer lines. After these improper connections are pinpointed, the Public Works Department repairs them to bring them in line with established codes.

10. Improved Emergency Response

Conduct a review of emergency response plans and programs to:

- Ensure that each municipality has an emergency management coordinator or liaison.
- Identify where additional activities are needed to respond to natural hazards, especially activities that can be undertaken after a flood warning and before the flood arrives.
- Ensure there is adequate and current information on critical facilities.
- Incorporate post-disaster procedures for public information, reconstruction regulation and mitigation project identification.
- Conduct a table top exercise at least once a year
- Identify what rural areas could use additional warning capabilities.

Status:

- Kane County Office of Emergency Management created a Disaster Intelligence Officer position within the EOC structure to aid in the collection of critical information during a disaster.
- Aurora:
  - The Police, Fire, and EMA team continue annual site visits to every public/private school in Aurora to standardize crisis response plans and review procedures. Our goal is to extend this process to local business, congregate care facilities, and hospitals.
  - Aurora is compliant with all 2009 NIMS requirements. Aurora EMA provided NIMS training as required for all Aurora Police Department and other municipal personnel, as well as for personnel from Aurora School Districts 129 and 131. Aurora Fire provided NIMS training for its own personnel.
  - Conducted numerous E-Team training sessions for municipal EOC staffers. E-Team is the incident management software used by Aurora.
  - Added Government Emergency Telecommunications Service (GETS) and Wireless Priority Service (WPS) to improve emergency communications capabilities for key

municipal employees identified by Aurora's Emergency Operations Plan as having a critical command/control/support role during emergencies and disasters.
    - Contracted with outside vendor to assist in development of a municipal Continuity of Operations plan and the conduct of a continuity of business exercise. This project will be completed by the end of 2009.
    - 11 of Aurora's 18 AC powered Municipal Outdoor Warning Sirens have been replaced with AC/DC sirens as part of a multi-year project to provide battery backup for all municipal outdoor warning sirens. Approximately 90% of Aurora's land area is covered by AC/DC sirens.
    - Aurora has purchased a new interoperable public safety radio system. The system is currently undergoing signal testing. The system is expected to be operational by the spring of 2010.
    - Construction is almost complete on Aurora's new Police Headquarters and Branch Court building. The new APD Headquarters building will include a new municipal EOC and Emergency Management space.
    - Aurora City Council approved Aurora's participation in the Illinois Public Works Mutual Aid Network (IPWMAN).
- Batavia:
    - IS Dept has setup an emergency Data Center. Data pushed to a secondary location so it is redundant in case of emergency. In the event of an emergency, quick transfer of servers to the remote location would keep the City operational if the Data Center is inoperable.
    - City became a member of the Illinois Public Works Mutual Aid Network (IPWMAN)
- Burlington
    - Work has been completed on the Evacuation Plan for the Village of Burlington as well as reverse 911 calling system implementation. Work to finalize the plan was coordinated with the Burlington Fire Chief.
    - Battery backup was purchased and installed for the KLERN radio system.
- Campton Hills joined the Illinois Public Works Mutual Aid Network (IPWMAN) in order to work with other communities in emergencies needing large equipment or manpower.
- Carpentersville
    - A table top exercise was conducted on February 24, 2009 simulating a response to an ice storm throughout the area. This table top included department heads forming the crisis management team.

    - A Village wide review of NIMS compliance was begun during the end of 2008. All departments of the Village were compiling the lists of those employees and their required training levels. Dates were set to assist getting everyone trained to the required levels.
    - Training has begun on the ICS 300 & ICS 400 courses for all required personnel. The Fire Department has also sent a member to the Train-the-Trainer program so that all the ICS courses (100, 200, 300, & 400) can be offered.
- Elburn; The Village continues to work in conjunction with the Elburn and Countryside Fire Protection District to develop an Emergency Response strategy for the Village and surrounding area. A major step forward in this area, for Elburn, was the formation of the Elburn Citizen Emergency Response Team in January of 2009. The program is under the auspices of the Elburn Police Department. There are currently ten team members who assist with traffic and crowd control whenever necessary.
- Hampshire
    - Purchased and put into service a fully equipped International MAX FORCE DT dump body truck, with additional snow and ice equipment, the snow and ice removal equipment being a Liquid Calcium Spreader and New Snow Plow.
    - The Hampshire Fire Protection District (being part of the Village's plan) has added a new squad and ambulance to its fleet.
    - The Village, Fire Protection District, Hampshire Township and the Village Police will update the emergency evacuation plan as necessary.

- Huntley
    - The Village's emergency outdoor warning sirens have been increased to seven (7) to better serve the residential population of the Village.
    - The Police Departments radios have been upgraded to P25 / narrowband compliant radios in an effort to minimize any delays in the future narrow band transition.
    - The Village's website has been upgraded to provide information on severe weather and other emergency conditions such as the pandemic influenza.
    - The Village has completed its Emergency Operation Plan and Continuity of Operations Plan during a pandemic event.
- North Aurora

- The Village is working on updating their emergency response plan.
- The Village has been doing NIMS training and has regular scheduled monthly meetings and will be doing a table top exercise in November.
- The Village Passed an ordinance to join the Illinois Public Works Mutual Aid Network (IPWMAN).

➢ South Elgin
- village has trained with the South Elgin Fire Protection District to use the NIMS (National Incident Management Systems) command structure. We successfully did this with our Fourth of July Parade and the annual RiverFest Carnival/Food Court, etc.
- A new sand bagger machine was purchased during the past year to help fill sand bags faster.

10.1 Big Rock (jurisdiction specific action item 10.3 in plan)
The Village will draft an Emergency Operations Plan

Status:

➢ The Village Board adopted a new Business Registration Program designed to catalog emergency contact information in a database and report hazardous materials on commercial sites in preparation of an EOP.

➢ The webmaster is directing Village staff in uploading necessary emergency information including the contact databases to the website for back-up storage. This action will allow Village officials to access the information from any computer location during an emergency.

10.2 Hampshire (jurisdiction specific action item 10.8 in plan)

Install a solar and battery powered early warning siren for the purpose of alerting the Hampshire residents in the Northeast corner of the Village of tornado, severe storms and other potential weather related conditions.

Status:

➢ The early warning siren has been installed and is functional for the area of Big Timber and Route 20.

11. Flood Control Projects
Implement structural flood control projects, including farm drainage improvements and projects to improve bridges and culverts, where they prove to be the most appropriate approach to reduce flood

damage. Such projects need to meet the criteria listed in Section 8.8.

Status:

- Aurora has completed the following sewer separation projects:
  - Area 3A Illinois Lake to Iowa & Wilder/Oak/Palace/Grand/ Pennsylvania/Iowa/Orchard - Contract Amt. $ 1,682,982.20 (completed)
  - Area 2 Ph 1Fifth St/Talma/Simms/Watson/Seventh/Sixth/Hinman/ Bangs/Fifth Av/South Av - Contract Amt. $ 1,871,706.85 (completed)
  - Area 3B West Park River to View & Wilder/Oak/Palace/Grand/ Pennsylvania/Iowa/Blackhawk/View/Plum/Cedar - Contract Amt. $3,740,043.50 (completed)
  - Area 2 Ph 2 Hazel/Evans/Linden/Seventh/Talma/Jackson/ Simms/5th St. - Contract Amt. $ 4,827,737.00 (completed)
  - Area 2 Ph 3 North Ave/4th ave/2nd Ave/Union/State/East/Smith Eng. Est. $ 6,221,478.00 (completed)
  - Downtown, Near East, and Near West Sewer Separation Projects (3-years) - Eng. Est. $ 30,400,000.00 (70% completed)
- In Batavia the Breaburn Marsh has had on going flooding issues due to conveyance issues along the Mckee Road tributary. The City is in the design and permitting phase to remove sediment and vegetation which will alleviate the conveyance issues along the creek.
- Burlington has installed a grate over the tile opening on the south side of the railroad tracks by the detention pond.
- Carpentersville; A longstanding drainage problem in the area of Randall Road and Binnie Road, in which subdivision drainage relies upon a poorly mapped and unmaintained drain tile system, is being updated in conjunction with an ongoing commercial development to address these longstanding drainage concerns. Village staff worked with developer and Kane County representatives to make these improvements not only within Village boundaries, but also extending outside of the Village into an unincorporated area, to provide for comprehensive improvements which are in accordance with a Kane County master drainage plan for the area.
- Hampshire; After the dredging of part of Coon Creek and widening the channel at its intersection with State St. we have graded and filled the new area of controlled overflow with a

special clay mixture and planted water tolerant plantings for erosion and bank control.

- Huntley; A drainage concern is being investigated in conjunction with the Army Corps of Engineers concerning the area of Dean and Mill and the proper drainingе strategies.
- North Aurora
  - The Village is in the 8th year of its infiltration & inflow of sanitary sewers.
  - The Village added approximately 6,549 lineal feet of C.I.P.P. Lining to back yard sanitary sewer lines.
  - Passed overhead sanitary sewers grant to help President with Sanitary Backups in heavy rain events.
  - Road Improvements to 4265 lineal feet of roadway which included adding additional storm sewer.
- South Elgin
  - Renee Drive Detention Pond breached in September 2008. The Village has responded to this with a $3.5 million Regional Storm Water Improvements Project scheduled to start in Fall 2009 and will continue for two years.
  - A new 30" storm pipe was installed on River Road to alleviate residential flooding.

11.1 Big Rock (jurisdiction specific action item 11.8 in plan)

After the installation of the Water Reclamation Facility, the Village is researching the feasibility of assuming responsibility for and improving the existing tile line on the south side of the town center to mitigate drainage/flooding conditions in that section of town versus developing a separate nuisance flow system and improved roadway drainage.

Status:

- Drainage Committee is working toward the design and construction phases of the Water Reclamation Facility at this time (CMAP and FPA applications expected to be submitted in early December).

12. Hazard Mitigation Materials

Prepare background information, articles, and other explanations of hazard mitigation topics.

Status:

- Aurora continues to expand the amount and variety of information available to the public on the municipal website.
- Huntley has Hazard Mitigation information available at the Village Hall, through the Village newsletter, by public information seminars, by various handouts and on the Villages web site.

13. Outreach Projects

Prepare and disseminate outreach projects based on the materials provided under action item 12.

Status:

- Kane County Office of Emergency Management distributed public education materials about natural hazards at numerous community events throughout 2009.
- Aurora:
    - Conducted numerous presentations on preparedness to a variety of audiences.
    - Conducted Community Emergency Response Training (CERT) programs designed to improve the emergency preparedness of individuals, families, and neighborhoods. This included CERT training at West Aurora High School for the second year in a row.
    - Conducted numerous Severe Weather Information Safety Seminars (SWISS) programs for schools, businesses, and other organizations/facilities.
    - Heavily promoted citywide participation in 2009 Annual Statewide Tornado Drill. Participation surveys returned to EMA Office following 2009 drill indicated over 41,000 people in Aurora took part in the drill.
    - Distributed more than 40 additional NOAA Weather Radios free to schools, government offices, nursing homes, hospitals, etc. during 2009.
    - Expanded the amount and variety of information available on Municipal website.
    - Continued promote “CodeRed” and to add citizen contact information to Aurora’s CodeRed emergency telephone notification system. We have added more than 12,100 phone numbers to the database in the last two years. After Kane County signed on with CodeRed, Aurora and Kane County began to “share” registration information so that each jurisdiction’s database is as up-to-date as possible.
- Batavia Installed storm drain stenciling to raise public awareness about dumping of pollutants into storm drainage system
- Big Rock is updating the village’s web site for screen readers and other accessibility upgrades to improve public access to emergency and other information.
- Carpentersville
    - Disaster/emergency information is provided in the Village’s newsletter to all residences along with information being available through the various departments’ public education departments.

- The Village participates in the FEMA Community Rating System (CRS) program, and publicizes information on this program annually in the Village newsletter.

- Huntley provides limited references at the Village Hall, Public Works, Building and Police Departments. Other references are posted on the Villages website
- Lily Lake has a newsletter that is being emailed to interested residents. Copies are also available at the Village Community Center.

14. Property Protection References

Provide building departments, libraries and other interested offices with a list of references on property protection that can be ordered for free from state and federal offices. A special effort should be made to identify references on insurance, flood proofing and other methods of flood protection.

Status:

- This action item is being removed from the plan and will no longer be in effect. The Office of Emergency Management has posted mitigation references on the agency website and directs building departments, libraries and other interested offices to the website for mitigation information.
- This action item is also being removed as it is very close in nature to the above action item, (Action Item 13 Outreach projects). The efforts of this action item will be incorporated into action item 13.
- As this action item is being removed from the plan this will be the last yearly report that this action item appears in.

15. *Plan* Adoption

Adopt this *Natural Hazards Mitigation Plan* by passing the resolution in Section 10.4 or 10.5, as appropriate.

Status:

- All participation jurisdictions will need to adopt the new updated 2009 plan. Two jurisdictions have adopted the new plan and the rest will be adopting the plan over the next several months.

16. Mitigation Coordinating Committee

The Natural Hazards Mitigation Planning Committee would be converted to a permanent advisory body in the County's resolution to adopt this *Plan*. It would:

- Act as a sounding board for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all participants.

- Monitor implementation of this Action Plan and
- Report on progress and recommended changes to the County Board and each municipality.

Status:

- The Standing Committee has been created. It met twice during 2009 to review mitigation activities on the now standard semi-annual meeting dates, which are the 2nd Wednesday of April and October.

17. Community Rating System

Host a workshop to review floodplain management activities currently undertaken and those recommended by this *Plan.* Compare these activities to those credited under the Community Rating System.

Status:

- Kane County completed a revision of its stormwater ordinance to comply more closely with the requirements of the Illinois Department of Natural Resources' recommendations. Kane County passed a Community Audit in order to complete its CRS application in 2007, but the audit has since expired before the stormwater ordinance changes could be made effective. Kane County's first application to join the CRS was submitted in 2006, but has not yet gained CRS credit due to the expired audit. Kane also posted past Hazard Mitigation Committee reports to its website, http://www.co.kane.il.us/HAZARDS, so other communities may access the reports for their CRS annual reporting requirements.

D. Plan Update Activity

The Federal Emergency Management Agency requires that the mitigation plan be updated every five years. During 2008 and 2009 the mitigation committee updated the plan and FEMA conditional approved the updated plan in September 2009. The plan is conditional approved by FEMA until the plan is adopted by the county and municipal jurisdictions represented in the plan. A resolution to adopt the updated plan should be before the Board in December 2009.

Kane County Natural Hazards Mitigation Committee

Annual Report For 2010

TO: Members of the Kane County Board
FROM: Kane County Natural Hazards Mitigation Committee
SUBJECT: Annual Report for 2010
DATE: December 22, 2010

Kane County is subject to natural hazards that threaten life and health and have a history of causing extensive property damage. To better understand these hazards and their impacts on our communities, the County's Department of Environmental Management and Office of Emergency Management jointly undertook the creation of the Kane County *Natural Hazards Mitigation Plan.*

The *Plan* identifies activities that can be undertaken to reduce safety and health hazards along with property damage caused by natural hazards. It focuses on the five major natural hazards that threaten Kane County: floods, tornadoes, earthquakes, thunderstorms and winter/ice storms. ***The full Natural Hazards Mitigation Plan can be reviewed or downloaded at www.co.kane.il.us/hazards/.***

On October 14, 2003 the Kane County Board passed resolution 03-308 adopting the Natural Hazards Mitigation Plan. A provision in this resolution requires the committee to submit an annual written report to the County Board, summarizing the *Plan's* implementation status for the preceding year.

The following is our report for 2010:

A. A review of the original Plan.

Kane County has been subject to a variety of natural hazards over the years including tornadoes, floods, ice storms, blizzards, severe thunderstorms and high wind events. The County's Emergency Operations Plan takes these types of events into account and identifies appropriate response activities.

The Disaster Mitigation Act of 2000 states that after November 1, 2003, local governments applying for pre-disaster mitigation funds must have an approved local mitigation plan. After November 1, 2004, a mitigation plan will also be needed before applying for post-disaster mitigation funds under the Hazard Mitigation Grant Program.

In 2002 the County Board approved the creation of a Natural Hazards Mitigation Plan planning committee. The Committee met monthly from October 2002 through September 2003 to develop the plan that was presented to and approved by the Board in October 2003. The Committee identified 17 key action items for implementation.

The ongoing portions of the action items have been started and will continue through the life of the Plan.

B. A review of natural disasters during 2010.

No natural disasters occurred in Kane County during 2010.

C. A review of the action items.

FEMA requires that every five years the Natural Hazards Mitigation Plan must undergo a comprehensive updated. In 2009 the Mitigation Committee updated the plan and submitted the plan to FEMA for approval. On February 3, 2010 FEMA approved the plan for Kane County and the City of Aurora. On November 19, 2010 FEMA approved the plan for the City of Batavia, and the villages of Big Rock, Burlington, Campton Hills, Carpentersville, Hampshire, Kaneville, Lily Lake, Maple Park, Montgomery, North Aurora, Pingree Grove, South Elgin, Sugar Grove, and West Dundee.

During the 2009 update process one of the FEMA requirements specified that all of the participating jurisdictions have at least one identifiable action item in the plan. All of the jurisdictions complied with this requirement and each new action item has been placed under one of the original 17 action items. The next annual report will be compiled at the end of 2011.

In 2009 many jurisdictions put a hold on projects due to the economic situation and many of the new action items added per FEMA's requirement have no funding unless a grant for the project can be obtained. This trend continued in 2010 and in some cases even more restrictions on projects occurred. This accounts for the low activity level on mitigation projects in 2010.

1. Building Code Improvements

Adopt the latest International series of codes, the new national standard that is being adopted throughout the country.

Status:

- Kane County has adopted all or parts of the IBC/IRC
- Aurora adopted the 2009 ICC code series effective July 01st 2010.
- Batavia enforces the 2009 commercial and residential energy code upgrades. The City also is actively pursuing a program to insure the long-term viability of significant historic buildings through a combination of inspection, code compliance, along with loan and grant assistance efforts.

- Huntley has upgraded from the 2003 I codes to the 2006 versions and have additionally adopted the 2009 International Energy Conservation Code as required by the State of Illinois.

2. Improved Code Enforcement

Develop and conduct training for building department staff on the natural hazards aspects of the International Codes, regulation of mobile home installation, and the new County stormwater management ordinance and its flood protection, wetland protection, erosion and sediment control and best management practices provisions.

Status:

- The Kane County Building Officer, Building Plan Examiners and Building Inspectors continue to receive training on new codes at both a local training academy and at off-site sessions by the International Code Council. Division staff meets on a regular basis to discuss review and inspection issues. The County Board adopted Ordinance 05-310 establishing a program for the administrative adjudication of ordinance violations. This program started in January of 2006 and provides an expedited process to obtain compliance for violations that are time critical or have a direct negative impact on the occupants and/or adjacent property owners.
- Aurora's Building and Permits Department personnel (Inspectors & Staff) continue to be cross-trained and participate in ongoing training on ICC Codes, code enforcement, and building permits. Engineering looks at all flood, IEPA, storm water, etc. issues during code review.
- Batavia continues to use the new process for administrative adjudication of municipal and building code violations, and the joint hearing officer process with the City of Geneva and the Village of North Aurora.
- Huntley's building inspectors have attended several meetings in Kane County regarding disaster preparedness. The building department continues to upgrade training it receives in order to properly assess damage after a disaster incident.

3. Review of Plans and Development Regulations

When they are up for revision; comprehensive plans, land use plans, and zoning and subdivision ordinances should incorporate mitigation provisions.

Status:

- Kane County: As an ongoing issue, plans will be reviewed for inclusion of appropriate mitigation items. Examples: The County

Development and Resource Management Department published the Kane County 2030 Land Resources Management Plan. The Plan includes language encouraging efforts to protect new development from flooding, preserve wetlands, enhance groundwater infiltration and preserve farmland.

- Aurora's Building and Permits staff continues to review architectural/engineering plans for code compliance. Engineering reviews civil. Development Services Team continues to review incoming developments and staff follows the developments as they progress through the planning process.
- Batavia adopted a new Zoning Code on May 10, 2010, containing requirements for landscaping and open space.
- Big Rock
  - With the amendments to the Zoning Ordinance, the Village incorporated new provisions for drainage district reviews in addition to Water Resources review in the site plan and planned development review sections.
  - The Village adopted a culvert/access ordinance with strong regulations governing the preservation and improvement of drainage on all culvert and/or access projects.

4. Facility Audits

Develop a checklist to evaluate a property's exposure to damage from the hazards of flooding, high winds, lightning, hail and power losses from downed lines. Evaluate all critical facilities using the checklist.

Status: *COMPLETE*

5. Retrofitting Incentives

Establish a program of technical assistance and financial incentives to encourage property protection measures on private property, such as:

- Surface and subsurface drainage improvements,
- Berms and regrading for shallow surface flooding,
- Sewer backup protection
- Relocating furnaces and water heaters out of basements
- Tornado safe rooms
- Installing lightning rods

Status:

- Kane County finalized the buyout and demolition of three flood prone properties. Two of the three properties are now held by the Village of South Elgin, and one was turned over to Dundee Township.

- Aurora's Neighborhood Redevelopment has a downsizing incentive program that assists property owners in converting multi-dwelling unit homes back to single family homes
- Big Rock (Jurisdiction specific action item)
    - Project Description: The Village is planning to work with homeowners on a property protection program for surface and subsurface drainage improvements.
    - The Village identified several causes possibly contributing to a localized flooding condition along Route 30 west of Davis Road.
        - 1. A driveway installed directly east of the subject properties may be partially obstructing surface drainage. The Village is coordinating with the property owner to complete the grading recommended by Kane County Water Resources.
        - 2. The Route 30 roadway drainage and BNSF railroad drainage directly south and adjacent to the problem area was in poor repair. The Village coordinated with BNSF and IDOT to unblock culverts and clear the drainage path in the immediate vicinity. The Village is waiting for a rainy period to assess if the completed maintenance to the drainage ways will be sufficient to re-establish an outfall for the excess water during storm events.
        - 3. The Drainage Committee also believes that subsurface tile lines installed on the residents' private property may be blocked or damaged because they do not appear to be functioning properly. The Drainage Committee has investigated the probable location of the tile lines, assessed their condition, and recommended that the individual property owners acting separately or jointly hire a drainage tile professional to obtain detailed information and/or effective repairs and improvements.

6. Repetitive Loss Projects

Protect the buildings in repetitive loss areas 7, 8, 9, 12 and 14. These are the top priority areas based on the flood hazard and type of construction, as explained in the criteria on page 5-12. Acquisition is the recommended property protection approach for areas 7, 8, 9, and 12 and elevation is recommended for areas 9, 12 and 14. Properties in the other repetitive loss areas could be protected by retrofitting measures that could be funded for much less under the cost share program proposed in action item 5.

Status:

- Kane County finalized the buyout and demolition of three floodprone properties. Two of the three properties are now held by the Village of South Elgin, and one was turned over to Dundee Township.

7. Drainage Maintenance

Implement a formal and regular drainage system maintenance program.

Status:

- Kane County Division of Transportation:
  - Swept approximately 75 miles of curbing and 35 bridge decks
  - Brush and tree trimming/removal along County ROW is completed on a regular maintenance schedule, mostly during the winter months
  - Brushed and trimmed the northeast section of the county.
  - Replaced 48 cross culverts and did many ditching enhancements/cleaning along the county ROW
- Aurora's drainage issues are looked at under code enforcement upon complaints. The Street Department and the Water and Sewer Maintenance Department regularly sweeps streets and clean catch basins to facilitate drainage.
- Batavia installed a new sump pump collection system (Mayflower Drive)
- Big Rock: Three culverts are slated for replacement in the spring: Timberview Drive, Katie Lane, Dolly Drive
- Carpentersville Public works has initiated a catch basin cleaning program which consists of cleaning approximately 20% of the storm water catch basins annually. In addition all streets are swept a minimum of 4 times annually. These efforts prevent debris from entering the storm water catch basins.
- Hampshire started a structured program for storm water and sanitation sewer line maintenance. The Village purchased a Water Jetter and Video unit for this purpose. We are now able to empty catch basin material, flush out the sewer line and then inspect and repair any failure encountered.
- North Aurora:
  - Conducted a river bank cleanup for the 5th year
  - The Village added approximately 4,323 lineal feet of C.I.P.P. Lining to back yard sanitary sewer lines.
  - The Village reconstructed 4270 lineal feet or .81 miles of roadway and added additional storm sewer.
  - Substantially completed the Riverfront Stabilization Project.
- South Elgin:

- The Village paved Kane Street, Martin Drive, Barbara (east of Renee Drive), Wedgewood Drive, Danbury Court, Yorkshire Court, Brandywine Court, Kossuth Street, Mill Street and Spruce Street. All damaged curbs, inlets, sidewalks and some driveway approaches were completed as well. Drainage was addressed on all these streets.
- All 4,800 inlets have been inspected in 2010 as mosquito larvacide briquettes are dropped into each one.

- Sugar Grove:
  - Removed overgrowth and sedimentation and re-graded the drainage swale located at the dead end of Neil Road.
  - Replaced 80' of drainage pipe and installed new flared end sections at the Waubonsee Drive retention pond.
  - Removed and replaced extensive curb and gutter sections along Neil Road and Stanley Road to improve drainage flow.
  - Cleared flared end sections and overflow basins at the Mallard Point retention pond.
  - Completed 8 cycles of street sweeping
  - Staff inspected 1,150 catch basins while completing the Mosquito Abatement Program

8. Urban Forestry

Implement an urban forestry program that qualifies the municipality to become a Tree City, USA.

Status:

- Aurora has established a municipal arbor committee to address urban forestry issues and is continuing its pursuit of "Tree City USA" designation.
- Batavia:
  - In 2010, celebrated 13 years as Tree City/ Tree Line USA
  - Continuation of parkway tree program (replacement of or planting new trees)
- Carpentersville held an Arbor Day Celebration was held in April 2010 which included the planting of trees within Carpentersville and Triangle Parks
- North Aurora:
  - The Village did an Arbor Day Observance/Proclamation.
  - The Village did not plant trees this year due to the budget.
  - Removed 18 Ash Trees due to the Emerald Ash Borer beetle.
  - The Village is doing Parkway Tree Trimming

- Sugar Grove:
  - Achieved its 14th year as a designated Tree City USA Community.
  - Continued the Parkway Tree Program which includes planting, hazardous removals and tree trimming activities.
  - Developed an Emerald Ash Borer response plan

9. Flood Warnings

Review the gauging system in the County, especially the western rural areas, to determine where additional rain and stream gages would be worthwhile.

Status:

- Kane County
  - Environmental Management Department re-appropriated funds in 2010 and have an ongoing Joint Funding Agreement with USGS for the operation and maintenance of the Kane County stream and rain gage network. The County participates each year in the Illinois Streamgage Cooperators' Meeting to discuss issues related to funding and operating stream and rain gages in Illinois.
  - The Environmental Management Department completed remodels of three of Kane County's western watersheds including the Eakin Creek, South Branch Kishwaukee, and the Big Rock/ Welch watersheds. Part of the remodeling projects included the installation of stream and rain gages in the Eakin, Coon, Union and Big Rock-Welch watersheds to assist with future modeling and flood hazard refinement.

10. Improved Emergency Response

Conduct a review of emergency response plans and programs to:

- Ensure that each municipality has an emergency management coordinator or liaison.
- Identify where additional activities are needed to respond to natural hazards, especially activities that can be undertaken after a flood warning and before the flood arrives.
- Ensure there is adequate and current information on critical facilities.
- Incorporate post-disaster procedures for public information, reconstruction regulation and mitigation project identification.
- Conduct a table top exercise at least once a year
- Identify what rural areas could use additional warning capabilities.

Status:

- Kane County Office of Emergency Management:
  - Working with the Red Cross the OEM started a major update to the County shelter management plan
  - Established a County-wide Citizen Corps group, bringing all of the Citizen Corps Councils in the County together to discuss shared planning, training, and mutual aid for incidents
  - Developed, tested, and implemented a County-wide Tactical Interoperable Communications Plan
  - A Geospatial Information System was added to the capability of the County Emergency Operations Center to improve disaster intelligence gathering.
  - Implemented a recruitment drive for the Medical Reserve Corps. To date the OEM has added over 200 RN's and LPN's to the MRC
- Aurora:
  - Police, Fire, and EMA team continue annual site visits to every public/private school in Aurora to standardize crisis response plans and review procedures. Our goal is to extend this process to local business, congregate care facilities, and hospitals.
  - Aurora is compliant with all 2010 NIMS requirements. Aurora EMA provided NIMS training as required for all Aurora Police Department and other municipal personnel, as well as for personnel from Aurora School Districts 129 and 131. Aurora Fire provided NIMS training for its own personnel.
  - Aurora continued its participation in the Government Emergency Telecommunications Service (GETS) and Wireless Priority Service (WPS) to improve emergency communications capabilities for key municipal employees identified by Aurora's Emergency Operations Plan as having a critical command/control/support role during emergencies and disasters.
  - Aurora conducted its first disaster exercise in its new EOC during the month of August. 34 municipal staff members participated in a tabletop exercise designed to evaluate the new EOC and our EOC operating procedures. The after-action report identified a number of strategies to improve EOC operations and capabilities, as well as to improve the effectiveness of our overall disaster response.
  - We will conduct a COOP exercise in November or December.

    - Aurora's new interoperable public safety radio system is expected to be operational in December 2010.
- Batavia's IS Dept has setup an emergency Data Center. Data pushed to a secondary location so it is redundant in case of emergency. In the event of an emergency, quick transfer of servers to the remote location would keep the City operational if the Data Center is inoperable.
- Carpentersville began Construction on the new Public Works Facility which will include an Emergency Operations Center. Occupancy is expected to be in November 2011
- Huntley:
    - The Police Department has activated a Nixle account in which critical updates are disseminated to the subscribing public in a timely manner via text messaging and e-mail.
    - The Village participated in a functional drill to test the capabilities of incident management and radio communications in the event of a natural disaster.
    - The Village of Huntley has established a Geographic Information System (GIS) and continues to upgrade data information to help establish critical infrastructure and land use development.
- North Aurora had two employees pass the NIMS ICS 300 level class

11. Flood Control Projects

Implement structural flood control projects, including farm drainage improvements and projects to improve bridges and culverts, where they prove to be the most appropriate approach to reduce flood damage. Such projects need to meet the criteria listed in Section 8.8.

Status:

- Aurora has completed the following sewer separation projects:
    - Area 3A Illinois Lake to Iowa & Wilder/Oak/Palace/Grand/ Pennsylvania/Iowa/Orchard - Contract Amt. $ 1,682,982.20 (completed)
    - Area 2 Ph 1Fifth St/Talma/Simms/Watson/Seventh/Sixth/Hinman/ Bangs/Fifth Av/South Av - Contract Amt. $ 1,871,706.85 (completed)
    - Area 3B West Park River to View & Wilder/Oak/Palace/Grand/ Pennsylvania/Iowa/Blackhawk/View/Plum/Cedar - Contract Amt. $3,740,043.50 (completed)

- Area 2 Ph 2 Hazel/Evans/Linden/Seventh/Talma/Jackson/ Simms/5th St. - Contract Amt. $ 4,827,737.00 (completed)

- Batavia:
  - The Breaburn Marsh has had on going flooding issues due to conveyance issues along the McKee Road tributary. The City is in the construction phase to remove sediment and vegetation which will alleviate the conveyance issues along the creek.
  - The City is investigating grant opportunities for stabilization of the banks of the Fox River in the downtown area. Severe erosion displaces the natural design of the river, undermines trees which further damages the river when they fall, becoming hazards for recreational users of the river.
- Big Rock (Jurisdiction specific action item)
  - Project Description: The Village is collaborating with Kane County's Water Resource Department to conceptually study the drainage/flooding issues plaguing the Tinerelli Subdivision. The Village will determine a course of action upon reviewing the results of that study.
    - With the assistance of Kane County Water Resources, the Village issued an RFP for the conceptual study. The study budget was increased to $10,000 shared equally by the Village and County because the scope of work was increased to study drainage problems in areas adjacent to the subdivision as well as exploring alternative options and phasing.
    - At this juncture, a consultant is preliminarily selected and a contract is being negotiated to begin the study.
  - Project Description: After the installation of the Water Reclamation Facility, the Village is researching the feasibility of assuming responsibility for and improving the existing tile line on the south side of the town center to mitigate drainage/flooding conditions in that section of town versus developing a separate nuisance flow system and improved roadway drainage.
    - The Wastewater Reclamation Facility earned a vote of recommendation by CMAP in April of 2010 and the Facilities Plan is under review by the IEPA for FY 2011 funding.
    - Until the wastewater is eliminated from the nuisance flow system, repairs and improvements to the nuisance flow system cannot be contemplated. But the Committee is planning for the most efficient way to rehabilitate the nuisance flow system once the Wastewater Reclamation

Facility is operational. The Committee has discovered through the survey of the tile lines in conjunction with the Design of the Facility and confirmed using prior on-site investigation during the construction of the Rhodes Ave. Trunk sewer that the elevation of the tile lines compared to the trunk sewer at points of intersection or adjacency is such that the trunk sewer may be able to be utilized to establish a new outflow for the nuisance flow system without the necessity of rehabilitating much of the tiles located on private property. Hence, the consultant engineer has been asked to consider the future expansion of the trunk sewer to connect at these points of intersection or adjacency in designing the collection system for the Wastewater Reclamation Facility.

    - Additionally, an ongoing localized flooding concern in the south central portion of town exacerbated by the blockage of the outfall for the area when a driveway's grade was elevated, may be relieved by constructing a catch basin structure on the nuisance flow system once the tile line is connected to the trunk sewer.

- Project Description: These two subdivisions have been newly annexed to the Village (April 2009). The road ways and yards of these residential areas suffer from severe ponding during heavy rains or storm events. The culverts and drainage ways are deteriorating and undersized. Since an adjacent area has been subdivided in preparation for residential development, the Village would like to extend the drainage measures that will be installed for the developing area to serve the adjacent areas.
    - After the Drainage Committee identified the suspected cause of localized flooding in the Raymond Woods subdivision to be improperly functioning tiles in the adjacent farm field by inspecting the culverts for blockages, the Village sent a letter to the property owner requesting information on any planned drain tile investigation or improvements.
    - The Committee is in the process of responding to a localized flooding concern in the Bergman Estates subdivision by lowering the outfall of an isolated drainage pond to lower the surrounding groundwater level.

        - The Committee hosted a meeting of property owners within the vicinity of another problem area in the Bergman Estates subdivision and is now coordinating with County Water Resources to obtain preliminary estimates for a feasible solution for establishing an outfall to drain that area after storm events.
    - Project Description: The residences and school on the North Side of Big Rock drain to an inadequate and deteriorating agricultural drain tile system. Because the cost to separate these "urbanized" drainage requirements from the agricultural drain tiles is currently prohibitive, an effort has been made to re-organize the drainage district that once regulated the tile system. However, Big Rock will eventually need to create a separate drainage plan for the residential, commercial, and institutional uses for the Route 30 corridor.
        - The Village facilitated the formation and initial planning meetings for Big Rock Drainage District No. 1.
- Carpentersville:
    - The Village has completed preparation of an overall watershed study of the Lake Marian Watershed, which encompasses approximately 840 acres (1.31 square miles). This study was commissioned after the Fall 2007 storm events due to damage which ensued from that event. The analysis has been completed, and the results of this study have been used to document necessary improvements and to provide supporting documentation for grant funding applications through the Kane County Hazard Mitigation Program. While no grant funding has been received to date, the Village is continuing to research additional funding opportunities to allow implementation of these projects.
    - The Village has commissioned an overall watershed study of the Carpenter Creek watershed, from the confluence with the Fox River, upstream to RT 25, a distance of 2.6 miles. This is being done to address errors in FIRM maps, determine base flood elevations for the upstream portion of this watershed, and evaluate potential improvements to remove certain adjacent properties from the floodplain through channel improvements, culvert replacements, etc. Also to provide a comprehensive model to be used for future development purposes of vacant properties adjacent to Carpenter Creek.
- Hampshire

- Mitigated basement flooding in our downtown area. We abandoned a broken storm sewer line on the west side of State Street and worked with the business owners to disconnect any floor sewer drains in those businesses. We contracted a sewer lining company to re-line the on the east side of State Street to protect the integrity for years to come. This line was clay but in better shape than the abandoned line on the west side. Cost for this project was $65,000.00.
- Mill Street, Keyes Ave and Industrial drive. Hampshire applied for a federal infrastructure grant in 2003, which was accepted but the money was not available until 2009. The Grant was for just under 4 million dollars with a Village participation of 40%. Over and above the street being re-aligned for ease of truck shipping and receiving we will be able to end a re-occurring flooding condition not only on a residential property but other water gathering areas as well. We purchased 1.6 acres of adjacent land for water detention, relocated roof drainage lines, installed a drainage line on the residential property and replaced the under the road culverts as well as clearing the natural overland drainage to the creek. This will now give that area 2 storm water paths to the creek. This project will continue into 2011 due to seasonal conditions.

- South Elgin:
  - A new 30” storm pipe was installed on Robertson Road to alleviate residential flooding.
  - The Village continues to televise and slip-line sewers and has rehabbed manholes in the past.
  - The Regional Stormwater Project is almost complete. A new 36” stormwater pipe has been installed on Kane Street from the Kane Street Detention Basin to the Fox River. This already has eased the amount of water that use to flood the area. The Project cost approximately $3,000,000.
  - The new spillway at the Renee Detention Pond is delayed until next year due to difficulty in getting permitted.
- Sugar Grove:
  - The Mallard Point subdivision has had a history of flooding problems mainly due to a high groundwater table and conveyance issues along the western edge of the subdivision.
  - The Village, in conjunction with Kane County and the Rob Roy Drainage District, embarked on an extensive study of the drainage system in this area. The study

included a review of improvements made during construction of the subdivision, a field tile inventory and inspection, a field verification of as-built engineering plans and a full engineering review of the entire system.
    - In addition, Village staff cleaned out all flared end sections and overflow basins around the retention pond and cleared numerous obstructions along the overland flow route. This project is now in the planning and design stages.

12. Hazard Mitigation Materials

Prepare background information, articles, and other explanations of hazard mitigation topics.

Status:

- Aurora continues to expand the amount and variety of information available to the public on the municipal website

13. Outreach Projects

Prepare and disseminate outreach projects based on the materials provided under action item 12.

Status:

- Kane County
    - Office of Emergency Management distributed public education materials about natural hazards at numerous community events throughout 2010.
    - The Office of Emergency Management has several documents and guides on preparedness available on its website at http://www.kcoem.org/Library/Library.htm
    - Department of Environmental Management developed, as part of the Repetitive Loss Areas Plan, a document titled "Guide to Flood Protection." The guide is available on the Kane County website at http://www.co.kane.il.us/hazards/floodguide.pdf.
- Aurora:
    - EMA conducted numerous presentations on preparedness to a variety of audiences.
    - EMA conducted Community Emergency Response Training (CERT) programs designed to improve the emergency preparedness of individuals, families, and neighborhoods.
    - EMA conducted numerous Severe Weather Information Safety Seminars (SWISS) programs for schools, businesses, and other organizations/facilities.
    - EMA heavily promoted citywide participation in 2010 Annual Statewide Tornado Drill. Participation surveys

returned to the EMA Office following 2010 drill indicated over 35,000 people in Aurora took part in the drill.
    - Aurora will receive 120 NOAA Weather Radios as part of a grant from ITTF. The radios will be distributed to educational institutions, medical and assisted living facilities, as well as places of public assembly.
    - Aurora continues to expand the amount and variety of information available on Municipal website.
    - Aurora continued promote "CodeRed" and to add citizen contact information to Aurora's CodeRed emergency telephone notification system.
- Batavia installed storm drain stenciling to raise public awareness about dumping of pollutants into storm drainage system
- Carpentersville participated in the review process for the FIRM map updates, including participation on the public meetings held by IDNR.
- Huntley disseminates an E-Newsletter, to the subscribing public to better keep citizens informed of general and critical updates of Village matters.
- South Elgin distributed public education materials at the Annual National Night Out Against Crime in August 2010.

14. Property Protection References

D. Action item was removed from plan during last year's update.

15. *Plan* Adoption

Adopt this *Natural Hazards Mitigation Plan* by passing the resolution as listed in Section 10.4 or 10.5 of the plan, as appropriate.

Status:

- Kane County and 20 municipalities have adopted the 2009 update to the Natural Hazards Mitigation Plan and all other municipalities are actively working on adopting the plan by FEMA's deadline of February 3, 2011.

16. Mitigation Coordinating Committee

The Natural Hazards Mitigation Planning Committee would be converted to a permanent advisory body in the County's resolution to adopt this *Plan*. It would:

- Act as a sounding board for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all participants.
- Monitor implementation of this Action Plan and

- Report on progress and recommended changes to the County Board and each municipality.

Status:

- The Standing Committee met twice during 2010 to review mitigation activities on the now standard semi-annual meeting dates, which are the 2nd Wednesday of April and October.

17. Community Rating System

Host a workshop to review floodplain management activities currently undertaken and those recommended by this *Plan.* Compare these activities to those credited under the Community Rating System.

Status:

- While Kane County passed a Community Audit in 2008 to complete its CRS application, the audit expired while the County was in the process of making changes to its Stormwater Ordinance, as requested by IDNR. Kane County does not have funds or staff time available to precede with another audit and application, so the CRS application for Kane County is on indefinite hold.
- South Elgin's ISO rating went from 5 to 3.

Kane County Natural Hazards Mitigation Committee

Annual Report For 2011

TO: Members of the Kane County Board
FROM: Kane County Natural Hazards Mitigation Committee
SUBJECT: Annual Report for 2011
DATE: December 5, 2011

Kane County is subject to natural hazards that threaten life and health and have a history of causing extensive property damage. To better understand these hazards and their impacts on our communities, the County's Department of Environmental Management and Office of Emergency Management jointly undertook the creation of the Kane County *Natural Hazards Mitigation Plan.*

The *Plan* identifies activities that can be undertaken to reduce safety and health hazards along with property damage caused by natural hazards. It focuses on the five major natural hazards that threaten Kane County: floods, tornadoes, earthquakes, thunderstorms and winter/ice storms. ***The full Natural Hazards Mitigation Plan can be reviewed or downloaded at www.co.kane.il.us/hazards/.***

On October 14, 2003 the Kane County Board passed resolution 03-308 adopting the Natural Hazards Mitigation Plan. A provision in this resolution requires the committee to submit an annual written report to the County Board, summarizing the *Plan's* implementation status for the preceding year.

The following is our report for 2011:

A. A review of the original Plan.

Kane County has been subject to a variety of natural hazards over the years including tornadoes, floods, ice storms, blizzards, severe thunderstorms and high wind events. The County's Emergency Operations Plan takes these types of events into account and identifies appropriate response activities.

The Disaster Mitigation Act of 2000 states that after November 1, 2003, local governments applying for pre-disaster mitigation funds must have an approved local mitigation plan. After November 1, 2004, a mitigation plan will also be needed before applying for post-disaster mitigation funds under the Hazard Mitigation Grant Program.

In 2002 the County Board approved the creation of a Natural Hazards Mitigation Plan planning committee. The Committee met monthly from October 2002 through September 2003 to develop the plan that was presented to and approved by the Board in October 2003. The Committee identified 17 key action items for implementation.

The ongoing portions of the action items have been started and will continue through the life of the Plan.

B. A review of natural disasters during 2011 - Blizzard of 2011.

Kane County was the recipient of one of the most powerful winter storms in history on February 1st and 2nd, 2011. Snowfall totaled 20.2 inches officially at Chicago's O'Hare Airport, making it the third largest snowstorm on record. The blizzard was accompanied by fierce winds, gusting from 50 to 60 mph. The intense winds and heavy snow reduced visibility to near zero at times and produced widespread snow drifts of 2 to 5 feet, and a few drifts of 10 feet or more.

The County's Emergency Operations Center was activated at noon on Tuesday, February 1st and remained operational until 3:30 pm Wednesdays, February 2rd to coordinate the County's response to this disaster. At the start of the blizzard on Tuesday, Chairman McConnaughay issued a disaster declaration activating the County's Emergency Operations Plan.

As the blizzard developed into the evening the Sheriff's Department instituted their emergency snow plan as the EOC received numerous reports of stranded motorists on major highways throughout the county. The blizzard was so intense that Sheriff's patrol cars became inoperable in the deep snow and a number of snow plows were buried in deep snow drifts.

The EOC requested assistance from local snowmobile clubs to help rescue stranded motorists and take them to a place of safety. The OEM also sent out "rescue convoys" made up of OEM volunteers with three to four, four wheel drive vehicles per convoy to transport physicians and KaneComm telecommunicators to their respective facilities along with assisting in the rescue efforts.

Rescued motorists were taken to one of six shelters that were established in the municipalities of Gilberts, Pingree Grove, Hampshire, St. Charles, Elburn, and Sugar Grove. At one point 66 people gathered at the BP gas station at the intersection of routes 72 & 47 as they either found safe haven there or were taken there by rescue teams.

During the height of the storm an ambulance was attempting to transport a person to St. Joseph Hospital. During the transport the ambulance went off the road into a ditch. After numerous failed tempts to free the ambulance the EOC was able to send snow sleds from the Illinois Department of Natural Resources to transport the patient to a neighboring fire station. From there the patient was transferred to an available ambulance and with assistance from a Gilberts snow plow was able to take the person to the hospital.

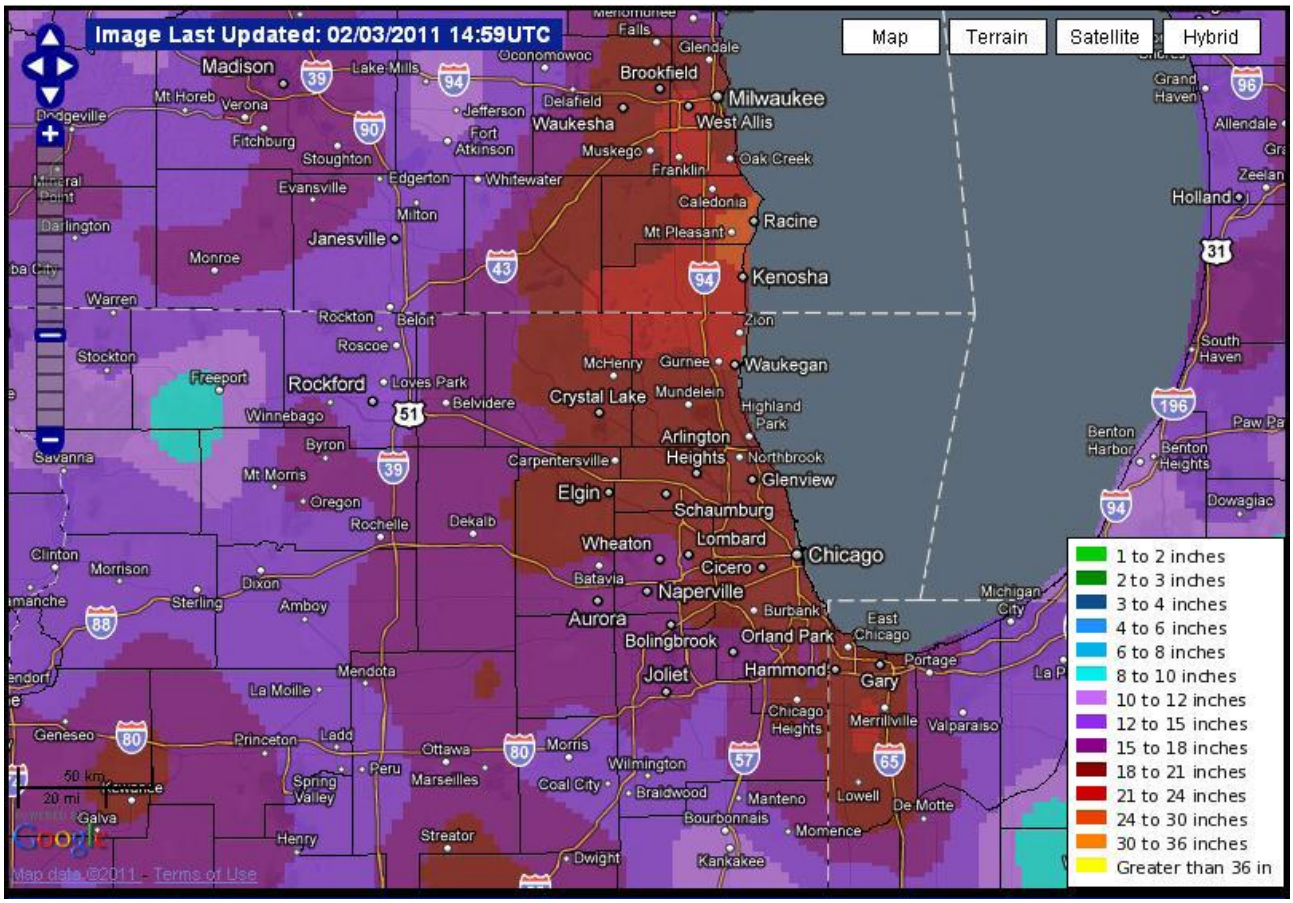
Also during this time period members from the snowmobile club were attempting to search vehicles that were stranded west of Hampshire. Unfortunately, the snow was so deep in this area the snowmobiles were unable to navigate the terrain.
It wasn't until mid morning on Wednesday the OEM rescue convoys, with the assistance of local farmers using their tractors to move the deep snow, were able to reach the far northwestern portion of the county to complete searching for stranded motorists.

Wednesday afternoon, after the snow had ended, tow trucks began to assist snow plows in reopening the roadways by moving abandon vehicles so the plows could remove the deep snow. This process continued well into Friday in the extreme western portions of the County as continued high winds complicated the snow removal efforts.

This incident did result in a federal disaster declaration.

Local Snowfall Totals

Batavia	15.4
Elburn	18.5
Geneva	15.6
North Aurora	19.0
St. Charles	20.0



Source: NWS Chicago

C. A review of the action items.

FEMA requires that every five years the Natural Hazards Mitigation Plan must undergo a comprehensive updated. In 2009 the Mitigation Committee updated the plan and submitted the plan to FEMA for approval. On February 3, 2010 FEMA approved the plan for Kane County.

During the 2009 update process one of the FEMA requirements specified that all of the participating jurisdictions have at least one identifiable action item in the plan. All of the jurisdictions complied with this requirement and each new action item has been placed under one of the original 17 action items.

In 2009 many jurisdictions put a hold on projects due to the economic situation and many of the new action items added per FEMA's requirement have no funding unless a grant for the project can be obtained. This trend continued in 2010 and 2011 and in some cases even more restrictions on projects occurred. This accounts for the low activity level on mitigation projects since 2009.

1. Building Code Improvements

Adopt the latest International series of codes, the new national standard that is being adopted throughout the country.

Status:

- Batavia is actively pursuing a program to insure the long-term viability of significant historic buildings through a combination of inspection, code compliance, along with loan and grant assistance efforts.

2. Improved Code Enforcement

Develop and conduct training for building department staff on the natural hazards aspects of the International Codes, regulation of mobile home installation, and the new County storm water management ordinance and its flood protection, wetland protection, erosion and sediment control and best management practices provisions.

Status:

- Aurora
  - All Building and Permit Department personnel (Inspectors & Staff) continue to be cross-trained and participate in ongoing training on ICC Codes, code enforcement, and building permits.
  - Engineering looks at all flood, IEPA, storm water, etc. issues during code review.
- Batavia continues to use the process of administrative adjudication of municipal and building code violations, and the joint hearing officer process with the City of Geneva and the Village of North Aurora. The City has seen a greatly improved compliance rate as a result of this process.
- The Carpentersville Community Development Department Engineering Division is responsible for enforcement of the County's storm water ordinance, and utilizes an ongoing contract with an outside consulting engineering firm with employees who are Kane County Qualified Engineer Review Specialists and Qualified Wetland Review Specialists to meet the requirements of this ordinance.

3. Review of Plans and Development Regulations

When they are up for revision; comprehensive plans, land use plans, and zoning and subdivision ordinances should incorporate mitigation provisions.

Status:

- Aurora

    - Building and Permits staff continues to review architectural/engineering plans for code compliance.
    - Development Services Team continues to review incoming developments and staff follows the developments as they progress through the planning process.
- Big Rock continues to work on the *Subdivision Control Ordinance* and accompanying *Standard Specifications*. This past year they held Public Hearings and Planning & Zoning Commission recommendation of the comprehensive revision of the Zoning Ordinance is complete including the mandated storm shelter in mobile home parks.
- South Elgin
    - All new projects in the Village are reviewed with the appropriate departments and the Village Engineers.
    - All Federal, State, County and Municipal Ordinances are followed.
    - Kane County Storm Water Ordinance is strictly followed.

4. Facility Audits

Develop a checklist to evaluate a property's exposure to damage from the hazards of flooding, high winds, lightning, hail and power losses from downed lines. Evaluate all critical facilities using the checklist.

Status: *COMPLETE*

5. Retrofitting Incentives

Establish a program of technical assistance and financial incentives to encourage property protection measures on private property, such as:

- Surface and subsurface drainage improvements,
- Berms and regrading for shallow surface flooding,
- Sewer backup protection
- Relocating furnaces and water heaters out of basements
- Tornado safe rooms
- Installing lightning rods

Status:

- Aurora's Neighborhood Redevelopment continues a downsizing incentive program to assist property owners in converting multi-dwelling unit homes to single family homes.
- Batavia established a program to provide financial incentives for the retrofitting of overhead sewers and offers a rebate for the installation of water conserving toilets

6. Repetitive Loss Projects

Protect the buildings in repetitive loss areas 7, 8, 9, 12 and 14. These are the top priority areas based on the flood hazard and type of construction, as explained in the criteria on page 5-12. Acquisition is the recommended property protection approach for areas 7, 8, 9, and 12 and elevation is recommended for areas 9, 12 and 14. Properties in the other repetitive loss areas could be protected by retrofitting measures that could be funded for much less under the cost share program proposed in action item 5.

Status:

- No activity for 2011

7. Drainage Maintenance

Implement a formal and regular drainage system maintenance program.

Status:

- Kane County Division of Transportation
  - Swept approximately 81 miles of curbing and 38 bridge decks on a regular interval.
  - Brush and tree trimming/removal along the County ROW on a regular maintenance schedule, mostly during the winter months. This year we have brushed and trimmed the northeast section of the county.
  - Replaced 37 cross culverts and did many ditching enhancements/cleaning along our County R.O.W.
- Aurora
  - Drainage issues are looked at under code enforcement upon complaints.
  - The Street Department and the Water and Sewer Maintenance Department regularly sweeps streets and clean catch basins to facilitate drainage.
- Batavia
  - Inspected storm drainage structures associated with the annual roadway program
  - Compliance effort for sump pump discharges to the sanitary sewer system
  - Repair of one of the gabion baskets along Mahoney Creek
  - Annual cleaning of approximately 30% of the city curb inlets and catch basins
  - Video inspection of entire downtown storm sewer system
- Carpentersville Public works has initiated a catch basin cleaning program which consists of cleaning approximately 20% of the storm water catch basins annually. In addition all streets are

swept a minimum of 4 times annually. These efforts minimize the amount of debris that enters the storm water system.

- The Village of Elburn maintains a storm drainage maintenance program that inspects and cleans all storm sewers every five years. Regular monthly inspections of all storm water detention/retention facilities are performed to ensure proper operation and that they are free of debris. During 2011, inspection of approximately 300 feet of storm sewers was completed using remote cameras. The televised inspections were recorded and analyzed. The same 300 feet of storm sewers were "jet-rodded" to clean out any debris build-up. Inspection of field tiles outside of the Village corporate limits that may impact existing neighborhoods were inspected periodically throughout the year.
- Huntley
    - The Village is continuing its sewer lining and rehabilitation program.
    - The Village annually inspects sanitary and storm sewer collection systems to identify existing pipe conditions and develop a strategic plan for spot repairs and pipe lining programs.
- Kaneville has completed a two year project to clean up the storm water drainage ditch that runs through the subdivision on the south side of Kaneville.
- South Elgin
    - All 4,800 inlets have been inspected in 2011 as mosquito larvacide briquettes are dropped into each one.
    - Routine ditching is completed throughout the year.
    - The Village paved Kane Street, Walnut Avenue (from Spring Street to Kane Street), Dean Street, Division Street (from Michigan Avenue to Renee Drive), Churchill Court, La Fayette Drive, Marbury Street, Kane Street (from McLean Boulevard east to Manchester Court) and Gilbert Street (from Spruce Street to Oak Street). All damaged curbs, inlets, sidewalks and some driveway approaches were completed as well. Drainage was addressed on all these streets.
- Sugar Grove
    - Removed overgrowth and sedimentation and re-graded the overland drainage located at the dead end of Maple Street.
    - Shouldered approximately 7 miles of Village roadway to restore drainage and eliminate ponding water on rural cross section roads.
    - Removed and replaced extensive curb and gutter sections along Terry Drive and Annette's Circle to improve drainage flow.

- Village staff continued to monitor and clean all flared end sections and overflow basins around the retention pond and along the overland flow route in the Mallard Point subdivision
- Cleared flared end sections and overflow basins at the Galena Boulevard detention pond.
- Completed 8 cycles of street sweeping
- Staff continues to regularly clean catch basins in problematic areas in advance of rain.
- Staff inspected 1,150 catch basins while completing the Mosquito Abatement Program

8. Urban Forestry

Implement an urban forestry program that qualifies the municipality to become a Tree City, USA.

Status:

- Aurora
  - A municipal arbor committee has been formed to address urban forestry issues.
  - Aurora is continuing its pursuit of "Tree City USA" designation.
- Batavia
  - In 2011, the City has celebrated 14 years as Tree City/ Tree Line USA.
  - Continuation of parkway tree program (replacement of or planting new trees)
  - Continued Removal of EAB infested trees on public lands.
- Elburn continues to maintain a successful brush collection program that encourages residents to maintain trees on private property, while the Village prunes and maintains trees on the public right-of-way. Still addressing the invasion of the emerald ash borer, the Village continues to remove the affected trees on Village parkways, and replacing those trees. The Village will once again apply to be a 2011 Tree City USA for the 12th straight year.
- Huntley is continuing its 50/50 Residential Parkway Tree Program.
- Lily Lake continues to discuss becoming a Tree City.
- South Elgin
  - One fifth of the Village's parkway trees are trimmed each year.
  - Approximately 50 new trees are planted on the parkways or parks of the Village each year.
  - Public Works Staff takes down dead or damaged trees or branches.

- Public Works offers free branch pick up to residents on the first and third full week of each month, year round.

- Sugar Grove
  - Achieved its 15th year as a designated Tree City USA Community.
  - Continued the Parkway Tree Program which includes planting, hazardous removals and tree trimming activities.
  - Continued operations in accordance with the Village's Emerald Ash Borer response plan

9. Flood Warnings

Review the gauging system in the County, especially the western rural areas, to determine where additional rain and stream gages would be worthwhile.

Status:

- Aurora continues to improve its flood threat recognition capabilities through information sharing, coordination, and notification.

10. Improved Emergency Response

Conduct a review of emergency response plans and programs to:

- Ensure that each municipality has an emergency management coordinator or liaison.
- Identify where additional activities are needed to respond to natural hazards, especially activities that can be undertaken after a flood warning and before the flood arrives.
- Ensure there is adequate and current information on critical facilities.
- Incorporate post-disaster procedures for public information, reconstruction regulation and mitigation project identification.
- Conduct a table top exercise at least once a year
- Identify what rural areas could use additional warning capabilities.

Status:

- Kane County Office of Emergency Management:
  - Developed and conducted a Multi-Jurisdictional exercise titled "Dundee Township Tornado 2011". This exercise was developed to test the participating organization's capabilities to establish and effectively manage an emergency operations center (EOC), share and disseminate disaster intelligence and information and develop an effective ICS structure to provide critical

resource logistics and distribution capabilities. Participants included Kane County, the Village of Carpentersville, the Village of West Dundee, Sherman Hospital, and Spring Hill Mall.
    - Based on the After Action Report from the blizzard in February the EOC guidelines for severe winter storms has been updated including:
        - Expanding the Disaster Intelligence function
        - Improved coordination with KaneComm
        - Expanded personnel in the EOC to include a PIO, KDOT representative, and Red Cross representative.
    - Added a Zumro Shelter System that can be deployed to expand the size of a field command center, stand alone clinic, first responder rehab center, post disaster field medical center, etc.
    - Established a Homeland Security Information Network Multimedia account in order to conduct briefings between jurisdictions
- Aurora
    - The Police, Fire, and EMA team continue annual site visits to every public/private school in Aurora to standardize crisis response plans and review procedures. Our goal is to extend this process to local business, congregate care facilities, and hospitals.
    - The Illinois Emergency Management Agency approved Aurora's 2011 EOP.
    - Aurora is compliant with all 2011 NIMS requirements.
    - Aurora continued its participation in the Government Emergency Telecommunications Service (GETS) and Wireless Priority Service (WPS).
    - Aurora activated its EOC for the February 2011 Blizzard. Aurora received Full Scale Exercise credit for this actual event. The after-action report identified a number of strategies to improve EOC operations and capabilities, as well as to improve the effectiveness of our overall disaster response.
    - Aurora continues to replace AC only outdoor warning sirens with AC/DC sirens. Aurora replaced 5 sirens in 2011.
- Batavia
    - IS Department has setup an emergency Data Center, with data pushed to a secondary location so it is redundant in case of emergency. In the event of an emergency, quick transfer of servers to the remote location would keep the City operational if the Data Center is inoperable.

- New protocols have been established for the dissemination of information related to power outages.
- The City continued its involvement with the Illinois Municipal Utility Association which provides mutual aid assistance for the Electric Utility.
- The City continued its status as a member of the Illinois Public Works Mutual Aid Network
- The City became a member of the Illinois Water/Wastewater Agency Response Network

- Carpentersville
  - In April and May of 2011, two EOC functional exercises were conducted; one with Kane County OEM, the Village of West Dundee and Sherman Hospital, the second was in conjunction with Commonwealth Edison. These two exercises allowed the Crisis Management Team to practice their skills working in the EOC to manage the response to tornado simulations.
  - The Village is currently working on an agreement with the Village of Algonquin which will allow for the use of each other's Village Halls in the event that one is damaged during a disaster or emergency.
- Elburn
  - The Village continues to work in conjunction with the Elburn and Countryside Fire Protection District to develop an Emergency Response strategy for the Village and surrounding area. Elburn continues to develop the Elburn Citizen Emergency Response Team (CERT) that was formed in 2009. Currently there are seventeen team alum and trainees involved in traffic and crowd control whenever necessary.
  - Currently the Village of Elburn has begun sending employees to training in order to satisfy their required NIMS training. Further training for employees on the Village and Public Works will be addressed this coming year.
- Hampshire
  - The Hampshire Emergency Evacuation plan has been updated and accepted by the Village Board with a unanimous positive vote. The updated plan now has accompanying aerial mapping to compliment the area sectioned orienteering maps. This will allow for a more detailed view of the 21 segregated areas. Additional water/pond information was added as well as water tower locations and a correction to the wastewater treatment plant.

- The Depiction program with the Kane County OEM overlay is in place and being used by our Police Dept., Public Works Dept. and building code dept.
- Our Police Dept. has purchased a new Ford Expedition 4X4 for the use of the shift Sergeants; hopefully we will not have to use it for a repeat February 2011 blizzard.
- Hampshire has started on putting the COOP plan into a working program thru the Public Safety Committee. We have had meetings on various aspects of the plan with representatives from Burlington and Pingree Grove for alternative locations as well as mutual aide. Meetings have also happened with NICOR and ComED. Partial document recovery, storage plans and implementation are now an on-going process.
- The establishment of a CERT team is still on the table but will have to be held off again due to funding shortfalls in the budget.

- Huntley
  - The Village Police Department radio system is being upgraded to comply with the 2013 FCC narrow band update. As part of the project, older components of the system are being updated and a new P25 channel is being implemented.
  - The radio project includes the re-programming of radios to include VHF interoperable channels.
- South Elgin Village has trained with the South Elgin Fire Protection District to use the NIMS (National Incident Management Systems) command structure. We successfully did this with our Fourth of July Parade and the annual RiverFest Carnival/Food Court, etc. Employees continue to take NIMS classes.
- Lily Lake is working on becoming NIMS compliant.

11. Flood Control Projects

Implement structural flood control projects, including farm drainage improvements and projects to improve bridges and culverts, where they prove to be the most appropriate approach to reduce flood damage. Such projects need to meet the criteria listed in Section 8.8.

Status:

- Aurora's Illinois Avenue Culvert Project from Greenfield Lake to Orchard Lake is 95% completed – Contract Amount: $215,552.00
- Batavia
  - The City has completed construction of the Braeburn Marsh improvements which removed sediment and

vegetation in the marsh. This improved conveyance issues along the creek.

- The City is investigating grant opportunities for stabilization of the banks of the Fox River in the downtown area. Severe erosion displaces the natural design of the river, undermines trees which further damages the river when they fall, becoming hazards for recreational users of the river.

- Big Rock
  - Localized flooding condition along Route 30 west of Davis Road.
    - The grading recommended by Kane County Water Resources in 2010 has been completed by installing a driveway culvert and grading the area.
    - In 2010 the village coordinated with BNSF and IDOT to unblock culverts and clear the drainage path in the immediate vicinity. This past year it has been determined that Clearing the culverts of debris was not sufficient to re-establish the flow and poor drainage conditions still plague the area. Ditching along the IDOT or BNSF railroads is not feasible due to the flat topography and distance to the creeks. The Village is contemplating extending the Rhodes Rd Trunk Sewer into the area utilizing the IDOT ROW. Coordination with IDOT and analysis of the Rhodes Rd Trunk Sewer capacity will be the initial factors to consider.
  - The Village continues work on the *Tinerelli Subdivision* flooding action item. The concept study was completed in early spring of this year. The Village was awarded a grant for drainage improvements in the area in the summer. The Village has selected a consultant for the design, permitting, and bidding and is awaiting the execution of funding agreements to embark on the project.
  - The Village continues work on the *South Side Drainage* action item. The Village was awarded a grant for the extension and improvement of the Rhodes Ave. Trunk Sewer. The Village has selected a consultant, and work has begun in surveying and information gathering (as referenced above under localized flooding conditions) to inform the design of the project. The project will be designed and permitted this year and is expected to be bid in early spring of 2012 for completed construction by the end of 2012.
  - The Village continues to work on the *Bergman Estates and Raymond Woods* action item. The Village jetted a

blocked section of the tile line utilized as the outfall for the pond and is coordinating with Kane County to identify the design level for the pond and possible remedies for the adjacent property owners to alleviate drainage issues from elevated ground water in the area. The Village was awarded a grant for the re-establishment of the drainage outfall for the John St./Raymond Rd. intersection. The Village has selected a consultant, and work has begun in surveying and information gathering (including obtaining easements from property owners and selecting a route for the outfall and obtaining a maintenance agreement from the Forest Preserve to maintain the tiles along the route) to inform the design of the project. The project will be designed and permitted this year and is expected to be bid in early spring of 2012 for completed construction by the end of 2012.

- The Village also continues to work on the *North Side Drainage* action item. Big Rock Drainage District No. 1 now maintains the tile lines serving the residents in the northern sections of the Village. However, several of the Village projects will reduce the impacts of the drainage from those developed areas:
    - Sewer system will serve Oaken an area that drains into the tile lines. The septic systems in the area will no longer be used so no discharge will enter into the Drainage District tile lines. Also, the fear of ground water contamination due to the severe ponding in the areas adjacent to the tile lines will be reduced by eliminating the septic treatment in areas of elevated ground water.
    - With the completion of the Tenerelli Drainage Improvement Project, the Subdivision's drainage will be removed from tile lines since a new ditch will be constructed to convey the water directly to the floodplain of the creek.
    - Extending the Rhodes Rd. Trunk Sewer to serve the area west along Route 30 (including the gas station) is under consideration as the most feasible option to resolve the flooding concerns in that area currently being underserved by the Drainage District tile lines.

- Huntley is nearing completion of the Route 47 expansion project which will help too better control water runoff and eliminate previous flood areas along the roadway.
- South Elgin
    - The Regional Storm Water Project is complete. A new 36" storm water pipe has been installed on Kane Street

from Kane Street Detention Basin to the Fox River. This improvement has already eased the amount of water that use to flood the area. The project cost approximately $3,000,000.

  - Renee Drive Detention Pond breached in September 2008. The Village has responded to this with a $3.5 million Regional Storm Water Improvements Project scheduled to start in Fall 2009 and will continue for two years. This work was delayed until 2011when the Department of Natural Resources approved the Village's Permit. The work was completed during the summer of 2011.
  - SCADA (Supervised Control Alarming and Data Acquisition fully implemented. This provides 24 hour accessibility with three laptop computers to monitor the Village's water system.

- In the Village of Sugar Grove, the Mallard Point subdivision has had a history of flooding problems mainly due to a high groundwater table and conveyance issues along the western edge of the subdivision. The Village, in conjunction with Kane County and the Rob Roy Drainage District, embarked on an extensive study of the drainage system in this area in 2010. This project is now in the planning and design stages. Intergovernmental agreements have been executed with Kane County and the Rob Roy Drainage District. Construction engineering plans for mitigation are in process and storm water permitting is on-going. Funding sources are also being identified.

12. Hazard Mitigation Materials

Prepare background information, articles, and other explanations of hazard mitigation topics.

Status:

- Aurora continues to expand the amount and variety of information available to the public on the municipal website
- The Huntley website, newsletters, e-letters, and pamphlets are utilized to reach the public on mitigation issues and pending conditions.
- South Elgin provides public education materials on the village website and distributed materials at the Annual National Night Out Against Crime in August 2011.
- The Village of Sugar Grove offers a variety of materials for resident use on the Village website, in the Village Newsletter, at the annual Village Open House and at Village Hall.

13. Outreach Projects

Prepare and disseminate outreach projects based on the materials provided under action item 12.

Status:

- Kane County Office of Emergency Management
  - Continues to provide mitigation information on the agency website
  - Provided preparedness information to the public at various community events throughout the County
- Aurora
  - Aurora EMA conducted numerous presentations on preparedness to a variety of audiences in 2011.
  - Aurora EMA has completed two of four Community Emergency Response Training (CERT) programs scheduled for 2011.
  - Aurora EMA continues to conduct numerous Severe Weather Information Safety Seminars (SWISS) programs for schools, businesses, and other organizations/facilities.
  - Aurora EMA heavily promoted citywide participation in the 2011 Annual Statewide Tornado Drill. Participation surveys returned to the EMA Office following the 2011 drill indicated over 39,895 people in Aurora took part in the drill.
  - Aurora continues to distribute NOAA Weather Radios to educational institutions, medical and assisted living facilities, as well as places of public assembly.
  - Aurora continues to expand the amount and variety of information available on Municipal website.
  - Aurora continues to promote “CodeRed” and to add citizen contact information to Aurora’s CodeRed emergency telephone notification system.
- Batavia made public announcements on BATV (Public Access Channel) about the annual Fox River Clean-Up event
- Lily Lake has a newsletter that is being emailed to interested residents. Copies are also available at the Village Community Center.
- South Elgin - Through continuing education, staff shares information with the community at the front counter, telephone and at community events.
- Sugar Grove
  - Continues to promote the “CodeRed” program to residents and businesses.
  - Continued participation in the FEMA Community Rating System (CRS) and re-applied for certification in 2011.

The information on this program is published in the Village Newsletter.

- Continues to updates information available on the Village website and publishes at least one annual article on pollution prevention and storm water resources.

14. Property Protection References

D. Action item was removed from plan during the 2009 update.

15. *Plan* Adoption

Adopt this *Natural Hazards Mitigation Plan* by passing the resolution as listed in Section 10.4 or 10.5 of the plan, as appropriate.

Status:

- Kane County and 20 municipalities have adopted the 2009 update to the Natural Hazards Mitigation Plan.

16. Mitigation Coordinating Committee

The Natural Hazards Mitigation Planning Committee would be converted to a permanent advisory body in the County's resolution to adopt this *Plan*. It would:

- Act as a sounding board for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all participants.
- Monitor implementation of this Action Plan and
- Report on progress and recommended changes to the County Board and each municipality.

Status:

- The Standing Committee met twice during 2011 to review mitigation activities on the now standard semi-annual meeting dates, which are the 2nd Wednesday of April and October.

17. Community Rating System

Host a workshop to review floodplain management activities currently undertaken and those recommended by this *Plan.* Compare these activities to those credited under the Community Rating System.

Status:

- Batavia Completed and submitted review under ISO BCEGS rating system. Have not received final number rating as of yet.

Kane County Natural Hazards Mitigation Committee

Annual Report For 2012

TO: Members of the Kane County Board
FROM: Kane County Natural Hazards Mitigation Committee

Co-Chair	Co-Chair
Deputy Director Sean Madison	Karen Kosky
Office of Emergency Management	Environmental Management

SUBJECT: Annual Report for 2012
DATE: December 26, 2012

Kane County is subject to natural hazards that threaten life and health and have a history of causing extensive property damage. To better understand these hazards and their impacts on our communities, the County's Department of Environmental Management and Office of Emergency Management jointly undertook the creation of the Kane County *Natural Hazards Mitigation Plan.*

The *Plan* identifies activities that can be undertaken to reduce safety and health hazards along with property damage caused by natural hazards. It focuses on the five major natural hazards that threaten Kane County: floods, tornadoes, earthquakes, thunderstorms and winter/ice storms. ***The full Natural Hazards Mitigation Plan can be reviewed or downloaded at www.co.kane.il.us/hazards/.***

On October 14, 2003 the Kane County Board passed resolution 03-308 adopting the Natural Hazards Mitigation Plan. A provision in this resolution requires the committee to submit an annual written report to the County Board, summarizing the *Plan's* implementation status for the preceding year.

The following is our report for 2012:

A. A review of the original Plan.

Kane County has been subject to a variety of natural hazards over the years including tornadoes, floods, ice storms, blizzards, severe thunderstorms and high wind events. The County's Emergency Operations Plan takes these types of events into account and identifies appropriate response activities.

The Disaster Mitigation Act of 2000 states that after November 1, 2003, local governments applying for pre-disaster mitigation funds must have an approved local mitigation plan. After November 1, 2004, a mitigation plan will also be needed before applying for post-disaster mitigation funds under the Hazard Mitigation Grant Program.

In 2002 the County Board approved the creation of a Natural Hazards Mitigation Plan planning committee. The Committee met monthly from October 2002 through September 2003 to develop the plan that was

presented to and approved by the Board in October 2003. The Committee identified 17 key action items for implementation.

The ongoing portions of the action items have been started and will continue through the life of the Plan.

B. A review of natural disasters during 2012.

No natural disasters occurred in Kane County during 2012.

C. A review of the action items.

FEMA requires that every five years the Natural Hazards Mitigation Plan must undergo a comprehensive updated. In 2009 the Mitigation Committee updated the plan and submitted the plan to FEMA for approval. On February 3, 2010 FEMA approved the plan for Kane County.

During the 2009 update process one of the FEMA requirements specified that all of the participating jurisdictions have at least one identifiable action item in the plan. All of the jurisdictions complied with this requirement and each new action item has been placed under one of the original 17 action items.

In 2009 many jurisdictions put a hold on projects due to the economic situation and many of the new action items added per FEMA's requirement have no funding unless a grant for the project can be obtained. This trend continued in 2012 and in some cases even more restrictions on projects occurred. This accounts for the low activity level on mitigation projects since 2009.

1. Building Code Improvements

Adopt the latest International series of codes, the new national standard that is being adopted throughout the country.

Status:

- Kane County will be adopting the 2012 editions of the ICC Codes effective in 2013.

2. Improved Code Enforcement

Develop and conduct training for building department staff on the natural hazards aspects of the International Codes, regulation of mobile home installation, and the new County storm water management ordinance and its flood protection, wetland protection, erosion and sediment control and best management practices provisions.

Status:

- The Kane County Building Officer, Building Plan Examiners and Building Inspectors continue to receive training on new codes at both a local training academy and at off-site sessions by the International Code Council. Division staff meets on a regular basis to discuss review and inspection issues. The County Board adopted Ordinance 05-310 establishing a program for the administrative adjudication of ordinance violations. This program started in January of 2006 and provides an expedited process to obtain compliance for violations that are time critical or have a direct negative impact on the occupants and/or adjacent property owners. Water Resources has been working directly with the Building Department to ensure that new construction in or near flood prone property is in compliance with the NFIP regulations.
- All Aurora Building and Permits Department personnel (Inspectors & Staff) continue to be cross-trained and participate in ongoing training on ICC Codes, code enforcement, and building permits. Engineering looks at all flood, IEPA, storm water, etc. issues during code review.

3. Review of Plans and Development Regulations

When they are up for revision; comprehensive plans, land use plans, and zoning and subdivision ordinances should incorporate mitigation provisions.

Status:

- Kane County: As an ongoing issue, plans will be reviewed for inclusion of appropriate mitigation items. Examples: The County Development and Resource Management Department published the Kane County 2040 Land Resources Management Plan. The Plan includes language encouraging efforts to protect new development from flooding, preserve wetlands, enhance groundwater infiltration and preserve farmland.
- Aurora Building and Permits staff continues to review architectural/engineering plans for code compliance. Engineering reviews civil. Development Services Team continues to review incoming developments and staff follows the developments as they progress through the planning process.
- The Village of Big Rock's Planning & Zoning Commission has initiated a comprehensive review of the Comprehensive Land Use Plan to include infrastructure planning funded by an Ike PLP grant. The Village is expected to create a storm water management plan as part of the update process.

4. Facility Audits

Develop a checklist to evaluate a property's exposure to damage from the hazards of flooding, high winds, lightning, hail and power losses from downed lines. Evaluate all critical facilities using the checklist.

Status: *COMPLETE*

5. Retrofitting Incentives

Establish a program of technical assistance and financial incentives to encourage property protection measures on private property, such as:

- Surface and subsurface drainage improvements,
- Berms and regrading for shallow surface flooding,
- Sewer backup protection
- Relocating furnaces and water heaters out of basements
- Tornado safe rooms
- Installing lightning rods

Status:

- Since 2005, the Kane County Water Resources Division has approved and completed over 40 cost-share projects, County Board Committee approval of these projects is required and is based on the Policy and Guidelines for the Allocation and Disbursement of Assistance Funds for Stormwater and Subsurface Drainage Improvements. This program may provide up to 50% of the construction cost if residents or other parties agree to voluntarily contribute the remaining expense.

6. Repetitive Loss Projects

Protect the buildings in repetitive loss areas 7, 8, 9, 12 and 14. These are the top priority areas based on the flood hazard and type of construction, as explained in the criteria on page 5-12. Acquisition is the recommended property protection approach for areas 7, 8, 9, and 12 and elevation is recommended for areas 9, 12 and 14. Properties in the other repetitive loss areas could be protected by retrofitting measures that could be funded for much less under the cost share program proposed in action item 5.

Status:

- Kane County continues to monitor the need for additional floodprone property protection, especially with regards to repetitively flooded properties. Occasional buyout inquiries are fielded, however, Kane County will entertain buyout requests only for those properties which:
  - Are part of a group of homes, all of which are interested in potential buyout;
  - Include one or more repetitively flooded homes
  - Have conducted a preliminary benefit/cost analysis, which yields a positive result; and
  - Have identified a probable and eligible taker for the properties.

7. Drainage Maintenance

Implement a formal and regular drainage system maintenance program.

Status:

- Kane County Division of Transportation swept approximately 81 miles of curbing and 38 bridge decks on a regular interval listed on the schedule.
- The Kane County Water Resources Division meets with citizens, townships and the rural villages to provide technical assistance with drainage problems.
- Aurora drainage issues are looked at under code enforcement upon complaints. The Street Department and the Water and Sewer Maintenance Department regularly sweeps streets and clean catch basins to facilitate drainage.
- Blocked culverts in the Village of Big Rock's Bergman Estates Subdivision were replaced.
- Campton Hills:
    - All grates and storm drains were cleaned of debris throughout Campton Township and Village of Campton Hills
    - Weeds and brush were cleared from Campton Township and the Village of Campton Hills ditches
    - Swept intersections in Campton Township and the Village of Campton Hills on weekly basis
    - Picked up garbage and debris along Campton Township and the Village of Campton Hills ditches on a bi-weekly basis
    - Completion of brush pick-up/chipping for the months of May and October on the north and south sides of Rt.64 in Campton Township, Village of Campton Hills and the residents in Campton Hills in Plato Township.
    - Removed cornstalks from Harley Rd ditches due to heavy rainstorms
- South Elgin
    - Replaced an old 4" to 6" rear yard drainage sewer on the south side of Independence Avenue
    - The Village utilizes its Vactor/Jetter to clean manholes and storm sewers throughout the year.

8. Urban Forestry

Implement an urban forestry program that qualifies the municipality to become a Tree City, USA.

Status:

- An Aurora arbor committee has been formed to address urban forestry issues. Aurora is continuing its pursuit of "Tree City USA" designation

9. Flood Warnings

Review the gauging system in the County, especially the western rural areas, to determine where additional rain and stream gages would be worthwhile.

Status:

- Kane County Environmental Management Department
  - Reappropriated funds in 2012 and have an ongoing Joint Funding Agreement with USGS for the operation and maintenance of the Kane County stream and rain gage network. The County participates each year in the Illinois Streamgage Cooperators' Meeting to discuss issues related to funding and operating stream and rain gages in Illinois.
  - Assisted with activities related to the final remapping of Kane County's Big Rock/ Welch Creek and Coon Creek watersheds.
- Aurora continues to improve its flood threat recognition capabilities through information sharing, coordination, and notification.

10. Improved Emergency Response

Conduct a review of emergency response plans and programs to:

- Ensure that each municipality has an emergency management coordinator or liaison.
- Identify where additional activities are needed to respond to natural hazards, especially activities that can be undertaken after a flood warning and before the flood arrives.
- Ensure there is adequate and current information on critical facilities.
- Incorporate post-disaster procedures for public information, reconstruction regulation and mitigation project identification.
- Conduct a table top exercise at least once a year
- Identify what rural areas could use additional warning capabilities.

Status:

- Kane County Office of Emergency Management (OEM)
  - Upgraded a communications repeater on the OEM main radio channel.
  - Continues to provide Incident Command System (ICS) training. Conducted two ICS 300 and two ICS 400 classes in 2012.
  - Formalized a plan to utilize Kane County GIS staff in the Emergency Operations Center during emergencies and disasters to function as a disaster intelligence group.
  - Deputy Director Madison has completed Community Emergency Response Team (CERT) instructor training and will assist Kane County Communities with CERT training starting in 2013
  - Conducted a tornado table top exercise for the Village of Montgomery

- Aurora:
    - The Aurora Police, Fire, and EMA team continue annual site visits to every public/private school in Aurora to standardize crisis response plans and review procedures. Our goal is to extend this process to local business, congregate care facilities, and hospitals.
    - The Illinois Emergency Management Agency approved Aurora's EOP on July 13, 2011. The EOP is due for update in June of 2013.
    - Aurora recently completed a draft of a new "Functional Needs" Annex for the EOP. This draft will be reviewed and modified for inclusion in our 2013 EOP update.
    - Aurora is compliant with all 2012 NIMS requirements.
    - Aurora continued its participation in the Government Emergency Telecommunications Service (GETS) and Wireless Priority Service (WPS).
    - Aurora has applied for access to the Integrated Public Alert and Warning System (IPAWS)
- The Village of Big Rock contributed to the outdoor weather siren that was installed at the Fire Station.
- Hampshire:
    - The updated Evacuation Plan was hand delivered to all of the Hampshire Schools and personally reviewed with each of the respective principals, copy was also delivered to the D300 Security Department Chief.
    - The Depiction GIS program that was purchased is in the process of having the potable water infrastructure included in the program by our water facility manager. Since the area was shaken by a earthquake in the near past, the Fire Protection District has asked that we establish a potable water preservation program in the event of earthquake damage to the infrastructure or high wind/lightning damage to the water towers. The reason being that in this type event fire suppression issues will also arise and would be difficult to deal with using just water supplied by tanker, not to say the residents requirements. We have reviewed the SCADA plan and operation of the components as well as upgrading the various operators skill level and are now in the process of physically re-indentifying all shut off and reroute locations for manual operation in the event of a major power interruption. Once completed training exercises will be held with all Public Works personnel and 1st responders.
    - Progress on the COOP plan is on hold due to replacement of a number of computers in all of the Village's departments. The Village Administrator is in the process of compiling the information for each computer as well as documenting active programs and what version as well as creating disc images for each computer. The Village Administrator is also working with our IT person, who in-turn will be working with the County's IT dept to set up a

network connection to avail us information in a more direct fashion.

- The Village has concluded a street and road survey to assure that the 911 GIS program as well as the general GIS program has accurate information. We found that the GIS program and the actual on the ground information had a number of discrepancies. These items and corrections have been made and put into Ordinance form which was passed by the Village Board and will be forwarded to proper County Authorities for changes to be made.
- The establishment of a CERT program has been on hold due to finances not available. Since being made aware of the $35,000.00 grant available thru the 2012 Community Resilience Innovation Challenge, we will apply and if awarded will immediately start the program and procure the necessary supplies, hard service computers, communication devices and other equipment to complete and maintain the program.

- The Village of Pingree Grove plans on installing an outdoor storm warning siren in the Carillon Development. This area is bordered by Rt. 47, Rt. 72 and Big Timber Rd. The area is currently being developed and homes are being built. In 2008, Pingree Grove installed our first storm warning siren on Reinking Road to serve the residents of the Heritage District and Cambridge Lakes South. The planned siren would be consistent with the specifications of our current siren and would be installed based on the Village Engineer's recommendations for maximum coverage. The estimated location of installation would be Reinking Rd. and Rt. 47. The cost of the earlier installed siren was $14,900 and cost estimates are similar for the installation of this siren. This type of warning system greatly benefits the residents of Pingree Grove by alerting them in advance of severe weather allowing them to seek shelter and a place of safety. Currently the Village has no funding for this siren but will be seeking grant funding to finance the installation. The Village hopes to have the siren installed by 2014.

11. Flood Control Projects

Implement structural flood control projects, including farm drainage improvements and projects to improve bridges and culverts, where they prove to be the most appropriate approach to reduce flood damage. Such projects need to meet the criteria listed in Section 8.8.

Status:

- Kane County Division of Transportation replaced 18 cross culverts and did many ditching enhancements/cleaning along our county R.O.W.
- Aurora:

- Orchard Lake Restoration and Stabilization Project is 90% completed as of 11/20/2012 with a contract amount of $682,000
- Farnsworth Avenue Drainage Improvement Project is under design and is to be constructed in 2013

- Big Rock:
  - *Tinerelli Subdivision Project:* The design of the Tenerelli Drainage Improvement Project was delayed due in part by the delay of the funding agreement from the state (the project is funded by an Ike PI grant). Further delays were caused by protracted negotiations of a maintenance agreement with the downstream property owner in lieu of recording an easement for maintenance of the downstream tile. Both issues have now been resolved and the design and permitting phases have resumed.
  - *South Side Drainage Project:* The contract for the Combined Sewer Separation – Stormwater Project was awarded on September 25th. The IEPA NOI permit is secured and construction is underway. The project is funded by an Ike PI grant.
  - *Bergman Estates and Raymond Woods Project:* Maintenance agreements with the Forest Preserve and local property owners are finalized. Army Corp, Kane/Dupage Soil and Water Conservation, and IEPA NOI permits are secured. The project was awarded in early October. Construction start-up is anticipated shortly. The project is funded by an Ike PI grant.
  - *North Side Drainage Project:* As part of the Combined Sewer Separation – Stormwater Project, the engineer reviewed the feasibility of extending the stormwater line west along Route 30. Although the grant award is insufficient to fund this extension of the project, the Village anticipates working with IDOT and the BNSF on this portion in the future.
- Campton Hills
  - Drainage projects that consist of digging out culvert ends, culvert opening, catch basins, installing new culverts, dirt, and gravel and shaping ditches for installing matting, rip/rap, 3”drain tiles and landscaping with dirt and seed. This was done on: Faireno Dr., * Venetian Way * Old Burlington Rd * Brookside West Dr.,* Old La Fox Rd., * Wooley Rd., * Jens Jensen Ln. * Far View Ct., * Cloverfield Cir., * Deer Run Dr., * Phar Lap Dr.* East Woodland Dr., * Hidden Springs Dr., * Long Shadow Ln. * Retreat Ct., * Baert Ln. * Colt Dr * Balkin Dr. * Campton Hills Rd * Kildeer Ln * Pouley Rd * Harvest Ln * Quail Ct * Poplar Ln * East Mary Ln * Walt Whitman Rd * Sylvan Dr. * Westwood Dr * Crawford Rd., * Campton Ridge Rd. * Balkan Rd * Fox Ben Dr * Ravine Dr * Highpoint Ct * Farmview Rd * Red Barn Ln * Bridle Creek Dr * Stirrup Av * Long Acre Rd * Harley Rd * Campton Woods Dr * in Campton Township, The Village of Campton Hills and the VCH in Plato Twp.

- Intersection/shoulder restoration consisting of replacing shoulder gravel, dirt and seed throughout Campton Township and the Village of Campton Hills in Plato Township.
-

- South Elgin:
  - The reconstruction of Stone Street, Prairie Street and North Collins Street has concluded the Village's response to the area's flooding. Curb/gutter pavement and storm sewers will collect rain waters into the new Kane Street 36" storm sewer pipe.
  - New storm sewer was installed to Ann Street and Mill Street to collect storm water to prevent flooding

12. Hazard Mitigation Materials

Prepare background information, articles, and other explanations of hazard mitigation topics.

Status:

- Aurora continues to expand the amount and variety of information available to the public on the municipal website

13. Outreach Projects

Prepare and disseminate outreach projects based on the materials provided under action item 12.

Status:

- Aurora:
  - Aurora EMA conducted numerous presentations on preparedness to a variety of audiences.
  - Aurora EMA conducted Community Emergency Response Training (CERT) programs designed to improve the emergency preparedness of individuals, families, and neighborhoods.
  - Aurora EMA heavily promoted citywide participation in the 2012 Annual Statewide Tornado Drill. Participation surveys returned to the EMA Office following the 2012 drill indicated 40,223 people in Aurora took part in the drill.
  - Aurora continues to distribute NOAA Weather Radios to educational institutions, medical and assisted living facilities, as well as places of public assembly.
  - Aurora continues to expand the variety of preparedness information available on Municipal website.
  - Aurora continues to promote "CodeRed" and to add citizen contact information to Aurora's CodeRed emergency telephone notification system.

14. Property Protection References

D. Action item was removed from plan during the 2009 update.

15. *Plan* Adoption

Adopt this *Natural Hazards Mitigation Plan* by passing the resolution as listed in Section 10.4 or 10.5 of the plan, as appropriate.

Status:

- Kane County and 20 municipalities have adopted the 2009 update to the Natural Hazards Mitigation Plan.

16. Mitigation Coordinating Committee

The Natural Hazards Mitigation Planning Committee would be converted to a permanent advisory body in the County's resolution to adopt this *Plan*. It would:

- Act as a sounding board for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all participants.
- Monitor implementation of this Action Plan and
- Report on progress and recommended changes to the County Board and each municipality.

Status:

- The Standing Committee met twice during 2012 to review mitigation activities on the standard semi-annual meeting dates, which are the 2nd Wednesday of April and October.

17. Community Rating System

Host a workshop to review floodplain management activities currently undertaken and those recommended by this *Plan.* Compare these activities to those credited under the Community Rating System.

Status:

- Kane County Water Resources has been authorized by the County Board Development Committee to prepare a new CRS application following the next Community Assistance Visit by IDNR. Based on information provided by IDNR/OWR, it is anticipated that Kane County is on the schedule for a CAV during early 2013.

Kane County Natural Hazards Mitigation Committee

Annual Report For 2013

TO: Members of the Kane County Board
FROM: Kane County Natural Hazards Mitigation Committee

Co-Chair	Co-Chair
Deputy Director Sean Madison	Karen Kosky
Office of Emergency Management	Environmental Management

SUBJECT: Annual Report for 2013
DATE: December 20, 2013

Kane County is subject to natural hazards that threaten life and health and have a history of causing extensive property damage. To better understand these hazards and their impacts on our communities, the County's Department of Environmental Management and Office of Emergency Management jointly undertook the creation of the Kane County *Natural Hazards Mitigation Plan.*

The *Plan* identifies activities that can be undertaken to reduce safety and health hazards along with property damage caused by natural hazards. It focuses on the five major natural hazards that threaten Kane County: floods, tornadoes, earthquakes, thunderstorms and winter/ice storms. ***The full Natural Hazards Mitigation Plan can be reviewed or downloaded at www.co.kane.il.us/hazards/.***

On October 14, 2003 the Kane County Board passed resolution 03-308 adopting the Natural Hazards Mitigation Plan. A provision in this resolution requires the committee to submit an annual written report to the County Board, summarizing the *Plan's* implementation status for the preceding year.

The following is our report for 2013:

A. A review of the original Plan.

Kane County has been subject to a variety of natural hazards over the years including tornadoes, floods, ice storms, blizzards, severe thunderstorms and high wind events. The County's Emergency Operations Plan takes these types of events into account and identifies appropriate response activities.

The Disaster Mitigation Act of 2000 states that after November 1, 2003, local governments applying for pre-disaster mitigation funds must have an approved local mitigation plan. After November 1, 2004, a mitigation plan will also be needed before applying for post-disaster mitigation funds under the Hazard Mitigation Grant Program.

In 2002 the County Board approved the creation of a Natural Hazards Mitigation Plan planning committee. The Committee met monthly from October 2002 through September 2003 to develop the plan that was

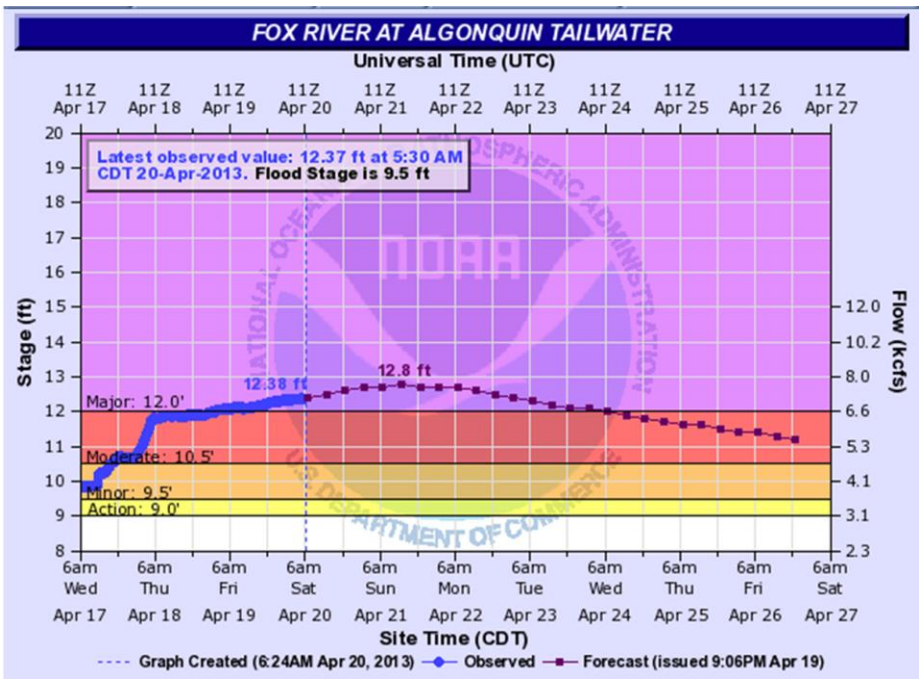
presented to and approved by the Board in October 2003. The Committee identified 17 key action items for implementation.

The ongoing portions of the action items have been started and will continue through the life of the Plan.

B. A review of natural disasters during 2013.

2013 Fox River and Flash Flooding

Going into the week of April 15th, the National Weather Service predicted minor flooding along the Fox River south of the Wisconsin state line due to the spring thaw. Late Wednesday night, April 17th, the National Weather Service added the prediction of significant rain fall beginning the next day that would cause the Fox River to enter a major flood stage status which would continue for several more days.



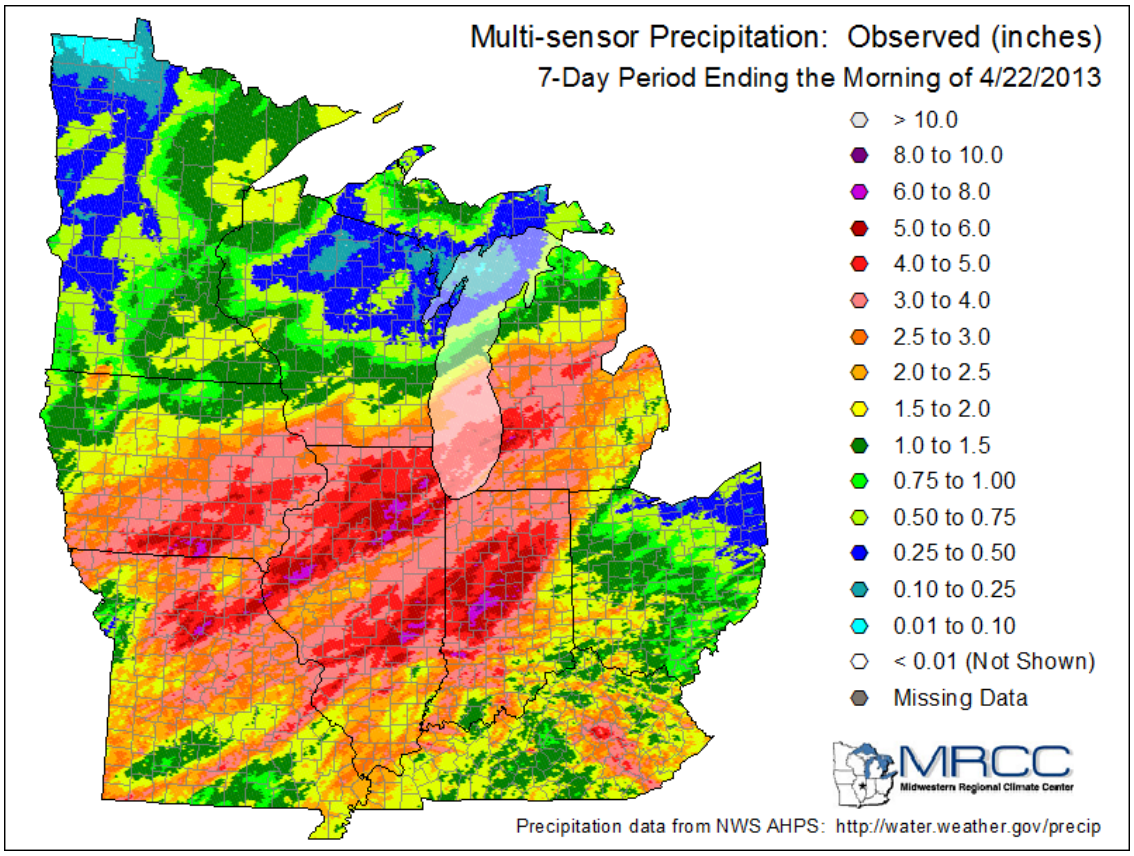
With this Wednesday night forecast the Kane County EOC was activated to a level 2 status bringing the communications center online overnight. It wasn't until Thursday morning that reports of significant flooding had begun along the Fox River along with flash flooding away from the river beginning around South Elgin extending south into Aurora Township.

The County's Emergency Operations Plan was activated implementing a successful flood fighting strategy used during prior flood events. OEM volunteers and K.D.O.T. were activated to establish community sandbag piles within the stricken communities. The Village of South Elgin and City

of Geneva also distributed sandbags to local residents from a supply that had been pre-staged within their community.

As Thursday progressed a subdivision within South Elgin required evacuation as did several areas along the Fox River. The Red Cross opened a shelter in St. Charles in the event it was needed.

By 1900 Hrs. that evening approximately 4-5 additional inches of rain had fallen over the central and southern portions of the County and the various streams and creeks that feed the Fox River had overrun their banks causing widespread residential and roadway flooding.



As the incident progressed into Friday, operations slowly transitioned to recovery as damage assessment had begun along with identifying those with unmet needs, critical health issues, and those who lost their furnaces as overnight temperatures continued to drop in the 30's and 40's.

Throughout the next two weeks the County continued to identify those with unmet needs by going door-to-door in the stricken areas and helped arrange assistance through the Salvation Army and numerous Community Organizations Active in Disasters (COAD).

OEM staff worked with the FEMA/IEMA Individual Assistance team on May 7-9 to identify families in the stricken areas who were severely affected by the flooding to qualify for a Federal Disaster Declaration.

OEM staff joined the FEMA Public Assistance survey team on May 9 in travelling throughout the County collecting information on the protective actions taken by local governments during the flooding event along with assessing the damage that was done to public property.

On May 10, 2013 a Federal Disaster Declaration was issued for Individual Assistance (FEMA-4116-DR, Illinois)

Supplies Distributed for this Incident include 30,000+ sandbags distributed in a 24 hour period, 108 tons of sand, and 100+ ARC cleanup kits.

879 single and multi-family homes reported damage resulting from this storm. As of July 30, 2013, 603 Kane County households were approved to participate in FEMA's individual assistance program totaling $1,572,640.

C. A review of the action items.

FEMA requires that every five years the Natural Hazards Mitigation Plan must undergo a comprehensive updated. In 2009 the Mitigation Committee updated the plan and submitted the plan to FEMA for approval. On February 3, 2010 FEMA approved the plan for Kane County.

During the 2009 update process one of the FEMA requirements specified that all of the participating jurisdictions have at least one identifiable action item in the plan. All of the jurisdictions complied with this requirement and each new action item has been placed under one of the original 17 action items.

In 2009 many jurisdictions put a hold on projects due to the economic situation and many of the new action items added per FEMA's requirement have no funding unless a grant for the project can be obtained. This trend continued in 2013 and in some cases even more restrictions on projects occurred. This accounts for the low activity level on mitigation projects since 2009.

1. Building Code Improvements

Adopt the latest International series of codes, the new national standard that is being adopted throughout the country.

Status:

- The Village of Carpentersville is reviewing the 2012 ICC Codes for possible implementation

- The Village of Montgomery has adopted the 2009 International Building Codes

2. Improved Code Enforcement

Develop and conduct training for building department staff on the natural hazards aspects of the International Codes, regulation of mobile home installation, and the new County storm water management ordinance and its flood protection, wetland protection, erosion and sediment control and best management practices provisions.

Status:

- The Village of Montgomery has adopted the Kane County Storm Water Ordinance, and Building & Community Development Department Staff work with developers, builders and residents to properly apply the standards set out in the document

3. Review of Plans and Development Regulations

When they are up for revision; comprehensive plans, land use plans, and zoning and subdivision ordinances should incorporate mitigation provisions.

Status:

- Carpentersville
  - The Village Board approved the Carpenter Park Master Plan which, once constructed, would preserve open space within the Village's floodplain in areas of the park. Additional improvements to the park include stabilization of the existing banks of Carpenter Creek as well as infiltration basins to allow water to infiltrate rather than running off down-stream
  - The Old Town Comprehensive Plan recommends acquiring certain properties along the Fox River to establish additional recreational open space areas as well as reducing the Village's risk to flooding
- The Village of Montgomery is currently updating their Comprehensive Plan, which will include natural resources and mitigation activities. The proposed adoption of the revised plan is scheduled for 2014.

4. Facility Audits

Develop a checklist to evaluate a property's exposure to damage from the hazards of flooding, high winds, lightning, hail and power losses from downed lines. Evaluate all critical facilities using the checklist.

Status: COMPLETE

5. Retrofitting Incentives

Establish a program of technical assistance and financial incentives to encourage property protection measures on private property, such as:

- Surface and subsurface drainage improvements,
- Berms and regrading for shallow surface flooding,
- Sewer backup protection
- Relocating furnaces and water heaters out of basements
- Tornado safe rooms
- Installing lightning rods

Status:

- No activity to report for 2013

6. Repetitive Loss Projects

Protect the buildings in repetitive loss areas 7, 8, 9, 12 and 14. These are the top priority areas based on the flood hazard and type of construction, as explained in the criteria on page 5-12. Acquisition is the recommended property protection approach for areas 7, 8, 9, and 12 and elevation is recommended for areas 9, 12 and 14. Properties in the other repetitive loss areas could be protected by retrofitting measures that could be funded for much less under the cost share program proposed in action item 5.

Status:

- The Village of Montgomery continues to pursue funding support when opportunities and programs are made available and will continue seeking funding

7. Drainage Maintenance

Implement a formal and regular drainage system maintenance program.

Status:

- Campton Hills (Campton Township Highway District)
  - Completed road and drainage projects that consisted of digging out culvert ends, culvert openings, replacing culverts, catch basins, soil, gravel and shaping ditches for installation of matting, rip/rap, 3” to 4” drain tiles, shoulder gravel and landscaping with soil and seed. This was completed on many roads in the District.
  - All grates and storm drains were cleaned of debris throughout Campton Township and the Village of Campton Hills.
  - Swept intersections in Campton Township and the Village of Campton Hills on weekly basis

    - Picked up trash along Campton Township and the Village of Campton Hills ditches on a bi-weekly basis
- Carpentersville
    - Public works has initiated a catch basin cleaning program which consists of cleaning approximately 20% of the storm water catch basins annually. In addition, all streets on the west side of the Village are swept a minimum of 4 times annually, while on the east side of the Village the streets are swept a minimum of 5 times annually. These efforts minimize the amount of debris that enters the storm water system
    - Public Works removed two large diameter culvert pipes that were plugged within a major drainage ditch in Keith Andres Park
- The Village of Hampshire regularly jets the sewers within the Village
- Kane County Division of Transportation
    - Swept approximately 85 miles of curbing and 40 bridge decks on a regular interval listed on the schedule
    - Brush and tree trimming/removal along our ROW on a regular maintenance schedule, mostly during the winter months. We also do this detail for storm damage. This year we have brushed and trimmed the south portion of the county
    - Replaced 24 cross culverts and did many ditching enhancements/cleaning along our county R.O.W.
- The Village of Montgomery has an ongoing street cleaning and catch basin cleaning program through their NDPES MS4 Permit Program

8. Urban Forestry

Implement an urban forestry program that qualifies the municipality to become a Tree City, USA.

Status:

- Carpentersville
    - In 2013, the Village officially became a Tree City USA community
    - Funds in the amount of $75,000 were allocated within the 12/13 fiscal year for a tree removal project for the removal of large diameter ash trees
    - A total of 126 large diameter ash trees were removed as part of the 2013 MFT Tree Removal Project
    - The Village also contracted out for the removal of 19 large diameter ash trees within Carpenter Park

- Utilizing in-house staff, the Village removed approximately 295 small to medium diameter ash trees
- Funds in the amount of $75,000 were allocated within the 12/13 fiscal year for a tree replacement program
- The Village also established an Emerald Ash Borer (EAB) cost-sharing program in which a resident that lost an ash tree can purchase and plant another tree and be reimbursed by the Village. This will be an on-going budget item until all trees that have been lost due to the EAB have been replaced
- A total of 410 trees were replaced as part of the Village's EAB cost sharing program
- A total of 75 trees were planted along Grandview Drive and Miller Roads
- A total of 140 trees were replaced by taking advantage of grant funding
- The Village replaced 3 trees within Carpenter Park as part of the Carpenter Park Parking Lot Improvement Project

➢ The Village of Montgomery has hired a full time Arborist and continues to improve our urban forestry program

9. Flood Warnings

Review the gauging system in the County, especially the western rural areas, to determine where additional rain and stream gages would be worthwhile.

Status:

➢ The Village of Montgomery has selected two locations, one on Waubonsia Creek and one on Blackberry Creek, to site future rain and stream gage stations, and staff has prepared budget estimates for board review

10. Improved Emergency Response

Conduct a review of emergency response plans and programs to:

- Ensure that each municipality has an emergency management coordinator or liaison.
- Identify where additional activities are needed to respond to natural hazards, especially activities that can be undertaken after a flood warning and before the flood arrives.
- Ensure there is adequate and current information on critical facilities.
- Incorporate post-disaster procedures for public information, reconstruction regulation and mitigation project identification.
- Conduct a table top exercise at least once a year

- Identify what rural areas could use additional warning capabilities.

Status:

- Carpentersville (Action Item 10.4 in Plan)
  - The new Emergency Operations Center (EOC) at the Village of Carpentersville Public Works Department was put in to service in 2012. The IT department purchased the following equipment to bring it on line in May 2013
    - 1 Cisco Catalyst 2960 24 – port POE switch
    - 12 Cisco 6921 VoIP Phones
    - 1 cabinet on wheels
    - 1 battery backup
    - 13 25 foot network patch cables
  - The Village of Carpentersville has an agreement to use the Village of West Dundee's Fire Station # 2 EOC in case of a disaster that affects the Village of Carpentersville EOC
  - The Village has secured an agreement with the Village of Algonquin which will allow for the use of each other's Village Halls in the event that one is damaged during a disaster or emergency
- The Village of Hampshire is investigating if Nixel can improve communications with residents during emergencies
- Kane County Office of Emergency Management (OEM)
  - Continues to provide Incident Command System (ICS) training. Conducted one ICS 300 and one ICS 400 class in 2013.
  - Conducted a tornado table top exercise for the Village of North Aurora
  - Conducted a tornado table top exercise for the City of St. Charles
  - Conducted a snowstorm table top exercise for the Village of Carpentersville
  - Participated with the Kane County Health Department in a FEMA/CDC snowstorm virtual table top exercise

11. Flood Control Projects

Implement structural flood control projects, including farm drainage improvements and projects to improve bridges and culverts, where they prove to be the most appropriate approach to reduce flood damage. Such projects need to meet the criteria listed in Section 8.8.

Status:

- Carpentersville

- The Village commissioned for an overall watershed study of Carpenter Creek from Spring Street to Illinois Route 25, for a total distance of 2.6 miles. The study is being completed in order to map the existing Zone-A floodplain with new base flood elevations, address errors in the Flood Insurance Rate Maps (FIRM's), and identify potential flood control projects which would remove existing structures from the floodplain. Results from the study determined that improvements to the existing creek and Maple Avenue bridge structure would be required to remove homes from the floodplain as well as to reduce localized flooding adjacent to the creek. The Village commissioned for Phase II engineering for reach 2 of Carpenter Creek as documented in the Jelkes Creek-Fox River Watershed Study. Currently, the Village did not allocate funding to complete the project; however, the Village did apply for an IEPA Section 319 grant in order to complete the project. The Village should find out if funding was received sometime in early 2014.
- As part of the Maple Avenue Improvement Project, the existing bridge on Carpenter Creek was removed and replaced with a three-sided concrete structure in order to provide improved storm water conveyances along the creek. This improvement is an integral part to the aforementioned improvements to Carpenter Creek.
- The Public Works department installed 70 feet of 12" storm sewer in order to relieve street flooding and provide an outfall for the existing storm sewer system along N. Lincoln Avenue
- The Village still considers the following Carpentersville specific action items a priority but are unable to complete them at this time due to funding limitations: 11.15, 11.16, 11.17, 11.18, 11.19, 11.20, 11.22, 11.23, and 11.25

➢ The Village of Montgomery has an ongoing drainage improvement program. 2013 improvements included the 3rd Avenue Drainage Improvements and the Lakewood Creek West Drainage Study and Phase I improvements

12. Hazard Mitigation Materials

Prepare background information, articles, and other explanations of hazard mitigation topics.

Status:

➢ No activity to report for 2013

13. Outreach Projects

Prepare and disseminate outreach projects based on the materials provided under action item 12.

Status:

- Carpentersville
  - Letters publicizing assistance available to residents and businesses goes out annually to insurance companies and realtors in the local area
- Hampshire
  - Started a social media page to communicate with the public
  - Currently in the process of redesigning the Village website
- Kane County Office of Emergency Management (OEM) Provided preparedness information to the public at various community events throughout the County

14. Property Protection References

D. Action item was removed from plan during the 2009 update.

15. Plan Adoption

Adopt this Natural Hazards Mitigation Plan by passing the resolution as listed in Section 10.4 or 10.5 of the plan, as appropriate.

Status:

- Kane County and 20 municipalities have adopted the 2009 update to the Natural Hazards Mitigation Plan.

16. Mitigation Coordinating Committee

The Natural Hazards Mitigation Planning Committee would be converted to a permanent advisory body in the County's resolution to adopt this Plan. It would:

- Act as a sounding board for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all participants.
- Monitor implementation of this Action Plan and
- Report on progress and recommended changes to the County Board and each municipality.

Status:

- The Standing Committee met twice during 2013 to review mitigation activities on the standard semi-annual meeting dates, which are the 2nd Wednesday of April and October.

- Co-Chair Karen Kosky left the County at the end of 2013. Scott Hajek from Kane County Water Recourses will start serving as Co-Chair in 2014.

17. Community Rating System

Host a workshop to review floodplain management activities currently undertaken and those recommended by this Plan. Compare these activities to those credited under the Community Rating System.

Status:

- The Village of Montgomery is working with the ISO-CRS office to pursue CRS certification for the Village. CRS staff have met with Village staff and is currently reviewing our certification request

Kane County Natural Hazards Mitigation Committee

Annual Report For 2014

TO: Members of the Kane County Board
FROM: Kane County Natural Hazards Mitigation Committee

Co-Chair	Co-Chair
Deputy Director Sean Madison	Scott Hajek
Office of Emergency Management	Water Resources

SUBJECT: Annual Report for 2014
DATE: December 8, 2014

Kane County is subject to natural hazards that threaten life and health and have a history of causing extensive property damage. To better understand these hazards and their impacts on our communities, the County's Department of Environmental Management and Office of Emergency Management jointly undertook the creation of the Kane County *Natural Hazards Mitigation Plan.*

The *Plan* identifies activities that can be undertaken to reduce safety and health hazards along with property damage caused by natural hazards. It focuses on the five major natural hazards that threaten Kane County: floods, tornadoes, earthquakes, thunderstorms and winter/ice storms.

The full Natural Hazards Mitigation Plan can be reviewed or downloaded at http://www.kcoem.org/linked/haz_mit_plan_fema_approved_2010.pdf.

On October 14, 2003 the Kane County Board passed resolution 03-308 adopting the Natural Hazards Mitigation Plan. A provision in this resolution requires the committee to submit an annual written report to the County Board, summarizing the *Plan's* implementation status for the preceding year.

The following is our report for 2014:

A. A review of the original Plan.

Kane County has been subject to a variety of natural hazards over the years including tornadoes, floods, ice storms, blizzards, severe thunderstorms and high wind events. The County's Emergency Operations Plan takes these types of events into account and identifies appropriate response activities.

The Disaster Mitigation Act of 2000 states that after November 1, 2003, local governments applying for pre-disaster mitigation funds must have an approved local mitigation plan. After November 1, 2004, a mitigation plan will also be needed before applying for post-disaster mitigation funds under the Hazard Mitigation Grant Program.

In 2002 the County Board approved the creation of a Natural Hazards Mitigation Plan planning committee. The Committee met monthly from

October 2002 through September 2003 to develop the plan that was presented to and approved by the Board in October 2003. The Committee identified 17 key action items for implementation.

The ongoing portions of the action items have been started and will continue through the life of the Plan.

B. Plan update

FEMA requires that every five years the Natural Hazards Mitigation Plan must undergo a comprehensive updated. In 2009 the Mitigation Committee updated the plan and submitted the plan to FEMA for approval. On February 3, 2010 FEMA approved the plan for Kane County for another five years.

In 2014 the mitigation plan underwent another update. The plan has been submitted to FEMA and we are awaiting approval of the plan by FEMA. Once FEMA approves the 2014 update, the County Board will need to readopt the 2014 updated version of the plan. We expect to have FEMA's approval of the plan in the first few months of 2015.

C. A review of natural disasters during 2014.

No natural disasters occurred in Kane County during 2014.

D. A review of the action items.

In 2009 many jurisdictions put a hold on projects due to the economic situation and many of the new action items added per FEMA's requirement have no funding unless a grant for the project can be obtained. This trend has continued and in some cases even more restrictions on projects occurred. This accounts for the low activity level on mitigation projects since 2009.

1. Building Code Improvements

Adopt the latest International series of codes, the new national standard that is being adopted throughout the country.

Status:

- No activity in 2014

2. Improved Code Enforcement

Develop and conduct training for building department staff on the natural hazards aspects of the International Codes, regulation of mobile home installation, and the new County storm water management ordinance and its flood protection, wetland protection,

erosion and sediment control and best management practices provisions.

Status:

- The Village of South Elgin has staff annually attends the statewide flood conference as well as regional and local training

3. Review of Plans and Development Regulations

When they are up for revision; comprehensive plans, land use plans, and zoning and subdivision ordinances should incorporate mitigation provisions.

Status:

- Kane County: As an ongoing issue, plans will be reviewed for inclusion of appropriate mitigation items.
- South Elgin, Village of
  - Received free local assistance from CMAP to develop a Unified Development Ordinance. This Ordinance will include open space, floodplain, and other mitigation provisions.
  - The Village implemented a new Engineering Design and Inspection Policy Manual. This manual includes strict storm water requirements.
  - All new projects in the Village are reviewed with the appropriate departments and the Village Engineers.

4. Facility Audits

Develop a checklist to evaluate a property's exposure to damage from the hazards of flooding, high winds, lightning, hail and power losses from downed lines. Evaluate all critical facilities using the checklist.

Status: *COMPLETE*

5. Retrofitting Incentives

Establish a program of technical assistance and financial incentives to encourage property protection measures on private property, such as:

- Surface and subsurface drainage improvements,
- Berms and regrading for shallow surface flooding,
- Sewer backup protection
- Relocating furnaces and water heaters out of basements
- Tornado safe rooms
- Installing lightning rods

Status:

- No activity in 2014

6. Repetitive Loss Projects

Protect the buildings in repetitive loss areas 7, 8, 9, 12 and 14. These are the top priority areas based on the flood hazard and type of construction, as explained in the criteria on page 5-12. Acquisition is the recommended property protection approach for areas 7, 8, 9, and 12 and elevation is recommended for areas 9, 12 and 14. Properties in the other repetitive loss areas could be protected by retrofitting measures that could be funded for much less under the cost share program proposed in action item 5.

Status:

- The village of Carpentersville allocated $450,000 in the FY 2014/15 budget for land acquisition along the Fox River. However, to date (11/13/14), no properties have been acquired.
- The Village of South Elgin sends out direct mailings to all repetitive loss properties and special flood hazard areas annually.

7. Drainage Maintenance

Implement a formal and regular drainage system maintenance program.

Status:

- Kane County Division of Transportation
  - Swept approximately 85 miles of curbing and 40 bridge decks on a regular interval listed on the schedule.
  - Brush and tree trimming/removal along our ROW on a regular maintenance schedule, mostly during the winter months. We also do this detail for storm damage. This year we did very little brushing on the north section because of above average snow events.
  - Replaced 34 cross culverts and completed many ditching enhancements/cleaning along our County R.O.W.
- The Village of Burlington replaced a damaged drainage tile and re-connected the drainage lines.
- Campton Hills, Village of
  - Completed drainage projects that consisted of digging out culvert ends, culvert openings, replacing culverts, catch basins and 3” to 4” drain tiles.
  - Replaced two failed culverts on Brundige Rd.
  - Installed a second culvert on Farm Drive and Lenz Rd.
  -
- The Village of Carpentersville Public works has initiated a catch basin cleaning program which consists of cleaning approximately 20% of the storm water catch basins annually. In addition, all streets on the west side of the Village are swept a minimum of 4 times annually, while on the east side of the Village the streets are

swept a minimum of 5 times annually. These efforts minimize the amount of debris that enters the storm water system.

- The Village of Hampshire regularly Jet the sewers within the village
- South Elgin, Village of
  - A drainage system maintenance program is in place for all 4,800 inlets, open ditches, and detention ponds.
  - The Village purchased a new Vactor/Jetter truck to clean manholes and storm sewers throughout the year.
  - The Village paved Cambridge Road (from Concord Avenue to Lexington Avenue), Trenton Avenue (from north end to Cambridge Road), Lexington Avenue (from Sunbury Road to Cambridge Road), Fulton Street (from South Street to Plum Street), Fulton Street (from South Street to North Street), Hilltop Lane (from Park Avenue to Park Avenue), Park Avenue (from Fulton Street to Hilltop Lane (east) and McDonald Road intersection improvements at Thornwood Way.
  - All Village inlets have been inspected in 2014 and mosquito larvacide has been utilized.

8. Urban Forestry

Implement an urban forestry program that qualifies the municipality to become a Tree City, USA.

Status:

- The Village of Campton Hills completed tree trimming throughout the village.
- Carpentersville, Village of
  - The Village was designated as a Tree City USA community for the second year in a row.
  - Funds in the amount of $75,000 were allocated within the FY 13/14 for a tree trimming project. The Village will be entering into a contract with tree care professionals for the trimming of approximately 392 trees within the Village's Old Town Area as part of the 2013 MFT Tree Removal Project.
  - The Village contracted with tree care professionals for the removal of 13 large diameter diseased or severely damaged trees within the Village's "Old Town" area.
  - To date (November 13, 2014), utilizing in-house staff, the Village has removed approximately 1,092 small to medium diameter ash trees.
  - Funds in the amount of $75,000 were allocated within the 13/14 fiscal year for a tree replacement program.
  - The Village also established an Emerald Ash Borer (EAB) cost-sharing program in which a resident that lost an ash tree can purchase and plant another tree and be reimbursed by the Village. This will be an on-going budget item until all trees that have been lost due to the EAB have been replaced. This project continued throughout 2014

and a total of 221 trees were replaced as part of the Village's EAB cost sharing program.
    - A total of 54 trees were planted within the White Oaks Subdivision through the White Oaks Escrow fund.
- South Elgin, Village of
    - One fifth of the Village's parkway trees are trimmed each year.
    - Approximately 66 new trees are planted on the parkways or parks of the Village each year.
    - Public Works Staff takes down dead or damaged trees or branches.
    - Public Works offers free branch pick up to residents on the first and third full week of each month, year round.

9. Flood Warnings

Review the gauging system in the County, especially the western rural areas, to determine where additional rain and stream gages would be worthwhile.

Status:

- South Elgin, Village of
    - Village staff has worked with WBK, Wills Burke Kelsey Associates from Saint Charles, Illinois to evaluate areas of 100 year flooding and designed remedies.
    - Village staff has identified flooding issues caused by crop runoff. A design solution is pending.

10. Improved Emergency Response

Conduct a review of emergency response plans and programs to:

- Ensure that each municipality has an emergency management coordinator or liaison.
- Identify where additional activities are needed to respond to natural hazards, especially activities that can be undertaken after a flood warning and before the flood arrives.
- Ensure there is adequate and current information on critical facilities.
- Incorporate post-disaster procedures for public information, reconstruction regulation and mitigation project identification.
- Conduct a table top exercise at least once a year
- Identify what rural areas could use additional warning capabilities.

Status:

- Kane County Office of Emergency Management (OEM)

- OEM updated the County Emergency Operations Plan and the plan was approved by the Illinois Emergency Management Agency.
- In August OEM received re-certification as a National Weather Service StormReady County.
- Participated in FEMA's Rick Map review of the lower Fox River.
- Provided technical assistance to the villages of Campton Hills and Carpentersville, and the City of St. Charles on the development and update of emergency plans.
- Facilitated table-top exercise with the Village of Carpentersville and the City of Geneva.
- Sponsored and facilitated a FEMA tornado exercise for the County's Disaster Management Team.
- Sponsored a severe weather class open to the public.
- Conducted Community Emergency Response Team training for the Village of North Aurora
- Conducted Emergency preparedness training for the Village of Campton Hills.
- Continues to provide Incident Command System (ICS) training. Conducted two ICS 300 and two ICS 400 classes in 2014.

- The Village of Burlington Continues coordination between the Village and Emergency respondents
- The Village of Carpentersville Installed a radio repeater/control box at the Public Works building to enhance emergency communications throughout the Village of Carpentersville in case of a disaster. We will now have direct communications with Police, Fire, and Public works in case of an emergency
- The Village of Hampshire is Investigating Nixel as a method of communicating with residents in an emergency.
- The Village of South Elgin worked with the South Elgin Fire Protection District to improve the NIMS (National Incident Management Systems) command structure. We successfully did this with our Fourth of July Parade and the annual RiverFest Carnival/Food Court, etc. Employees continue to take NIMS classes to further understand emergency response.

11. Flood Control Projects

Implement structural flood control projects, including farm drainage improvements and projects to improve bridges and culverts, where they prove to be the most appropriate approach to reduce flood damage. Such projects need to meet the criteria listed in Section 8.8.

Status:

- Carpentersville, Village of
  - The Village recently received an Open Space Land and Development (OSLAD) Grant through the Illinois Department of Natural Resources for improvements to

Carpenter Park. Construction is expected to take place in the summer of 2015 and will include rain gardens south of the existing Carpenter Park Parking lot as well as two detention basin to collect and release stormwater.

- The Village commissioned for an overall watershed study of Carpenter Creek from Spring Street to Illinois Route 25, for a total distance of 2.6 miles. The Village received a IEPA section 319 grant in the amount of $625,000 for the improvements and a Spring/Summer construction project is anticipated, pending the acquisition of properties and permitting.
- The Public Works Department installed 25 feet of 12" storm sewer in order to relieve street flooding and provide an outfall at the intersection of North Grove Street and Charles Street.
- The Village has many additional flood control project listed in the Natural Hazards Mitigation Plan that are still a priority, however, no funding has been allocated at this time.
- The Village added two additional flood control project to the plan in 2014 that are listed below:
    - Action item 11.26 – Carpentersville, Village of
      Spring Street Culvert Replacement Phase I Engineering Study
      Year included in plan: 2014
      Responsible Agencies: Village Engineering Division and Public Works Department
      Deadline: This project is scheduled to be replaced in 2015 as part of the Village's 5-year Capital Improvement Plan – 2014.
      Cost: $ 60,000
      Benefits: Culvert is currently a restrictive culvert. Culvert replacement will ultimately allow a 100 year storm event to pass through the culvert which will address overtopping and closure issues.
    - Action item 11.27 – Carpentersville, Village of
      Washington Street Culvert Replacement Project, Includes Phase I, II & III Engineering
      Year included in plan: 2014
      Responsible Agencies: Village Engineering Division and Public Works Department
      Deadline: This project is scheduled to be replaced in 2015 as part of the Village's 5-year Capital Improvement Plan – 2014.
      Cost: $ 1,200,000
      Benefits: Culvert is currently a restrictive culvert. Culvert replacement will ultimately allow a 100 year storm event to pass through the culvert which will address overtopping and closure issues and reduce the existing floodplain limits

- South Elgin, Village of
  - All portions of the following streets received enhanced storm water controls: Cambridge Road (from Concord Avenue to Lexington Avenue), Trenton Avenue (from north end to Cambridge Road), Lexington Avenue (from Sunbury Road to Cambridge Road), Fulton Street (from South Street to Plum Street), Fulton Street (from South Street to North Street), Hilltop Lane (from Park Avenue to Park Avenue), Park Avenue (from Fulton Street to Hilltop Lane (east)) and McDonald Road intersection improvements at Thornwood Way.
  - Several storm sewer inlets have been added on East Middle Street to collect runoff.

12. Hazard Mitigation Materials

Prepare background information, articles, and other explanations of hazard mitigation topics.

Status:

- No activity in 2014

13. Outreach Projects

Prepare and disseminate outreach projects based on the materials provided under action item 12.

Status:

- Kane County OEM participated in 11 community events promoting community and personal preparedness.
- The Village of Hampshire redesigned the Village website and started a social media page to communicate with the public
- South Elgin, Village of
  - The Village used a water table display on loan from IAFSM to demonstrate specific flood concepts and safety concern at our flood safety week open house and the Annual National Night Out Against Crime in August.
  - South Elgin distributes flood insurance materials through newsletter articles as well as all local Realtors and direct mailings to flood hazard area residents.
  - Information was provided to local libraries regarding flooding and flood safety.

14. Property Protection References

E. Action item was removed from plan during the 2009 update.

15. *Plan* Adoption

Adopt this *Natural Hazards Mitigation Plan* by passing the resolution as listed in Section 10.4 or 10.5 of the plan, as appropriate.

Status:

- Kane County and 20 municipalities have adopted the 2009 update to the Natural Hazards Mitigation Plan.
- Once FEMA approves the 2014 update, the County and all municipalities will need to re-adopt the plan.

16. Mitigation Coordinating Committee

The Natural Hazards Mitigation Planning Committee would be converted to a permanent advisory body in the County's resolution to adopt this *Plan*. It would:

- Act as a sounding board for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all participants.
- Monitor implementation of this Action Plan and
- Report on progress and recommended changes to the County Board and each municipality.

Status:

- The Standing Committee met twice during 2014 to review mitigation activities on the standard semi-annual meeting dates, which are the 2nd Wednesday of April and October.

17. Community Rating System

Host a workshop to review floodplain management activities currently undertaken and those recommended by this *Plan.* Compare these activities to those credited under the Community Rating System.

Status:

- The Village of South Elgin joined the Community Rating System with a CRS Class 5 due in part to the preservation of open space for park land and natural open space.

Appendix C. The Community Rating System

The Federal Emergency Management Agency's National Flood Insurance Program (NFIP) administers the Community Rating System (CRS). Under the CRS, flood insurance premiums for properties in participating communities are reduced to reflect the flood protection activities that are being implemented.

A community receives a CRS classification based upon the credit points it receives for its activities. It can undertake any mix of activities that reduce flood losses through better mapping, regulations, public information, flood damage reduction and/or flood warning and preparedness programs.

There are ten CRS classes: class 1 requires the most credit points and gives the largest premium reduction; class 10 receives no premium reduction (see table). A community that does not apply for the CRS or that does not obtain the minimum number of credit points is a class 10 community.

Community Rating System Premium Reductions

Class	Points	Premium Reduction In Floodplain	Premium Reduction Outside Floodplain
1	4,500+	45%	10%
2	4,000–4,499	40%	10%
3	3,500–3,999	35%	10%
4	3,000–3,499	30%	10%
5	2,500–2,999	25%	10%
6	2,000–2,499	20%	10%
7	1,500–1,999	15%	5%
8	1,000–1,499	10%	5%
9	500– 999	5%	5%
10	0 – 499	0	0

Fifty-seven Illinois communities participate, including seven in Kane County: Bartlett (Class 7), Carpentersville (Class 6), Hampshire (Class 7) Hoffman Estates (Class 7), South Elgin (Class 5), St. Charles (Class 5) and Sugar Grove (Class 6).

Program incentive: The CRS provides an incentive not just to start new programs, but to keep them going. If Kane County or a municipality were to join the CRS, there are two requirements that would "encourage" it to implement flood mitigation activities.

First, the community would receive CRS credit for this *Plan* when it is adopted. To retain that credit, though, the County must submit an evaluation report on progress toward implementing this *Plan* to FEMA by October 1 of each year. That report must be made available to the media and the public.

Second, the community must annually recertify to FEMA that it is continuing to implement its CRS credited activities. Failure to maintain the same level of involvement in flood protection can result in a loss of CRS credit points and a resulting increase in flood insurance rates to residents.

It is expected that this undesirable impact of loss of CRS credit for failure to report on the plan's progress or for failure to implement flood loss reduction projects will be a strong

encouragement for a Kane County community to continue implementing this *Plan* in dry years when there is less interest in flooding.

Kane County CRS Credit

The table on the last page of this appendix identifies where Kane County and its municipalities can expect to receive CRS credit, based on the activities reviewed and recommended in this *Plan*. A community can improve one class for each 500 points. A range of points is shown where the score varies according to local conditions and the community's level of effort. Points are approximate.

There are additional prerequisites for CRS participation (e.g., the community must be cleared by FEMA as being in full compliance with the requirements of the National Flood Insurance Program). There are also requirements for several of the activities. For example, credit for 320, reading Flood Insurance Rate Maps for inquirers, is dependent on the community publicizing the service.

The likely scores for Kane County municipalities range from 1,300 to 2,500. With at least 1,000 points, the County and most communities can be expected to enter the CRS as a Class 8. Depending on their level of activity, some communities could be as high as a Class 5 which is among the highest classifications received to date in the Midwest.

Benefits of CRS participation

In addition to the direct financial reward for participating in the Community Rating System, there are many other reasons to participate in the CRS. As FEMA staff often say, "if you are only interested in saving premium dollars, you're in the CRS for the wrong reason."

The other benefits that are more difficult to measure in dollars:

1. The activities credited by the CRS provide direct benefits to Kane County residents, including:

   – Enhanced public safety;
   – A reduction in damage to property and public infrastructure;
   – Avoidance of economic disruption and losses;
   – Reduction of human suffering; and
   – Protection of the environment.

2. A community's flood programs will be better organized and more formal. Ad hoc activities, such as inspecting for drainage problems, will be conducted on a sounder, more equitable basis.

3. A community can evaluate the effectiveness of its flood program against a nationally recognized benchmark.

4. Technical assistance in designing and implementing a number of activities is available at no charge from the Insurance Services Office.

5. A community would have an added incentive to maintain its flood programs over the years. The fact that its CRS status could be affected by the elimination of a flood-related activity or a weakening of the regulatory requirements for new developments would be taken into account by the governing board when considering such actions.

6. The public information activities will build a knowledgeable constituency interested in supporting and improving flood protection measures.

7. Every time residents pay their insurance premiums, they are reminded that the community is working to protect them from flood losses, even during dry years.

More information on the Community Rating System can be found at:

https://www.fema.gov/national-flood-insurance-program-community-rating-system

The latest version of the NFIP CRS Coordinator's Manual can be downloaded at:

http://www.fema.gov/media-library/assets/documents/8768?id=2434

	Activity/Element	Plan Section	Maximum Possible Points
	300 Series: Public Information		
310	Maintaining FEMA Elevation Certificates on new buildings		116
320	Reading Flood Insurance Rate Maps for inquirers	9.4	90
330	Designing and distributing outreach projects	9.1	350
	Implementing the public information program strategy	9.5	
340	Real estate disclosure laws and practices	9.2	80
350	References in the public library	9.3	125
	Flood protection information in the community's website	9.3	
360	Flood protection technical assistance	9.4	110
370	Flood Insurance Promotion		110
	400 Series: Mapping and Regulations		
410	Providing additional flood data or mapping to State standards		802
420	Preserving open space in the floodplain	4.5	2020
430	Higher standards for floodplain regulations	4.6	2042
	Regulating mobile home parks	4.2	
	Higher standards for new subdivisions	4.4	
	Adoption of the International series of building codes	4.1	
	Building Code Effectiveness Grading Schedule (BCEGS) class	4.1	
	Planning and zoning to preserve floodplain open space	4.3	
440	Maintaining flood maps on a geographic information system (GIS)		222
	Maintaining elevation reference marks and old flood maps		
450	Retention and detention requirements for new developments	4.6	755
	Erosion and sediment control requirements for new developments	4.6	
	Best management practices and water quality regulations	4.6	
	500 Series: Flood Damage Reduction		
510	Floodplain management or natural hazards mitigation plan	1.1	622
520	Acquisition and Relocation	5.1	2250
530	Flood Protection	5.2, 8	1600
540	Formal drainage system maintenance program	8.6	570
	600 Series: Flood Preparedness		
610	Flood warning and response program, Fox River	7.1 – 7.4	395
	Flood warning and response program, other streams	7.1 – 7.4	
630	Levee safety program		235
630	State dam safety program		160
	Dam failure emergency response plan		