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Mayor

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COPY

January 5, 2021

Mr. Sam AL-Basha
State Hazard Mitigation Officer
Illinois Emergency Management Agency
1035 Outer Park Drive
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Mr. Sam AL-Basha

Please find the attached signed resolution approved by the City of Sycamore City Council on January 4, 2021. This resolution formally adopts the 2019 DeKalb County All Hazards Mitigation Plan.

Please contact Mark Bushnell, City Engineer with any questions. He can be reached at 815-895-4557 or via email mbushnell@cityofsycamore.com.

Thank you,

Mary Kalk,
City Clerk

RESOLUTION NO. 850

A RESOLUTION ADOPTING THE 2020 UPDATED DEKALB COUNTY ALL HAZARDS MITIGATION PLAN.

WHEREAS, the City of Sycamore recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the City of Sycamore participated jointly in the planning process with DeKalb County and other local units of government within DeKalb County to prepare the 2013 DeKalb County All Hazards Mitigation Plan; and

WHEREAS, in 2019, DeKalb County coordinated a multi-agency mitigation plan that aimed at updating the 2013 DeKalb County All Hazards Mitigation Plan to address natural and man-made hazards. The updated version was recently approved by both the Illinois and Federal Emergency Management Agencies. Public safety representatives from the City of Sycamore were involved in the crafting of the amended plan.

NOW THEREFORE, consistent with the general goals and objectives of the City and the general wellness of citizens be it resolved by the City of Sycamore that:

1. That the City hereby adopts the 2019 Updated DeKalb County All Hazards Mitigation Plan as an official plan.
2. The City of Sycamore's Clerk will submit a copy of this Resolution to the Illinois Emergency Management Agency.

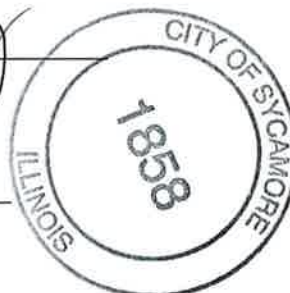
DATED: January 4, 2021

APPROVED: _____

MAYOR – Curt Lang

ATTEST: _____

CITY CLERK – Mary Kalk





DeKalb County All Hazards Mitigation Plan

**Update of the January 2008 DeKalb County
All Natural Hazards Mitigation Plan**

**DeKalb County Hazard Mitigation
Planning Committee**

October 2019



DeKalb County, Illinois

All Hazards Mitigation Plan

Update of the January 2008 DeKalb County
All Natural Hazards Mitigation Plan

DeKalb County
Hazard Mitigation Planning Committee

September 2019



This *All Hazards Mitigation Plan* was prepared with the technical support of UrbanHydro Engineering, Inc., 121 W Hillgrove Ave, Unit 376; La Grange, IL 60525, shauna@urbanhydroeng.com.

DeKalb County All Hazards Mitigation Plan

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Executive Summary

DeKalb County is subject to natural and manmade hazards. Severe storms and flooding impacted the County in 1973, 1974, 1996, 2007 2008, and 2013, which caused substantial property damage. A blizzard struck in 1979 and a severe snow storm in 2011. A microburst in 1998 seriously injured 20 people. A tornado killed 2 and injured 11 people in 2015. The *DeKalb County All Hazards Mitigation 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 and manmade hazards. The *Plan* focuses on the six major natural hazards facing DeKalb County:

- Severe summer storms
- Floods
- Severe winter storms
- Tornadoes
- Extreme cold events
- Extreme heat events

And six manmade hazards:

- Armed Attack (Active Shooter)
- Transportation related incidents
- Cyberterrorism
- Utility interruption
- Radiological release incidents
- Hazardous material incidents (HazMat)

This *Plan* fulfills the federal mitigation planning requirements, and provides the County and its municipalities and institutions with a blueprint for reducing the impacts of these natural and manmade hazards on people and property. This *Plan* meets the requirements for federal mitigation funds, according to Section 104 of the Disaster Mitigation Act of 2000 (42 USC 5165) and 44 CFR (Code of Federal Regulations) Part 201 for funding under the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation Program and the Hazard Mitigation Grant Program. This *Plan* also meets the requirements of Stafford Act (42 USC 5165) and 44 CFR Part 78.5 for FEMA's Flood Mitigation Assistance Program.

This *Plan* was prepared by the DeKalb County Hazards Mitigation Planning Committee, created by a resolution of the DeKalb County Board on September 20, 2006 and established by County resolution as a permanent committee in 2008. The Mitigation Committee's members include representatives of County offices, interested municipalities, educational institutions, and public and private stakeholder organizations.

The Mitigation Committee met annually after the development of the 2008 *Plan* and met three times in 2018, including a public meeting, to update the *Plan*. FEMA requires that hazard mitigation plans be updated every five years.

DeKalb County and the natural and manmade hazards that can impact the County have been assessed in Chapters 1 through 3. Goals and guidelines established by the Mitigation Committee are the focus of Chapter 4. Six mitigation strategies are the subjects of Chapters 5 through 10 in this *Plan*:

- Preventive
- Property protection
- Resource protection
- Emergency services
- Structural projects
- Public information

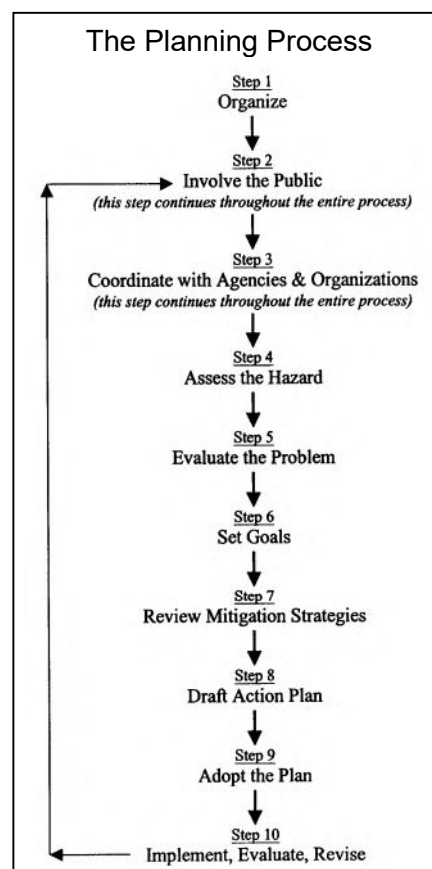
Chapter 11 presents the Action Plan for implementation of this *Plan*. The Action Plan was updated from the 2008 *Plan* and also includes items for plan maintenance.

1. Introduction

DeKalb County is located in northern Illinois. The County Seat is Sycamore, Illinois, which is located approximately 50 miles west of Chicago. DeKalb County is 18 miles wide (east to west) and 36 miles long (north to south), and covers approximately 634 square miles. DeKalb County is comprised of 14 municipalities and 19 townships.

In 2000, DeKalb County had a population of 88,969, which was a decrease of 14 percent from the 1990 census. The 2005 population estimate was 97,635, which represents a growth of 9.7 percent. The 2000 census estimates that there are approximately 33,000 housing units in DeKalb County. The labor force is about 54,000 people and the college and university enrollment is over 36,000.

The Hazard Mitigation Planning Committee followed a standard 10-step process, based on guidance and requirements of the Federal Emergency Management Agency (FEMA). The Mitigation Committee met eight times from November 2006 through October 2007. It reviewed the hazards and their effects on people and property, considered a variety of ways to reduce and prevent damage, and recommended the most appropriate and feasible measures for implementation. Existing plans and programs were reviewed during the planning process. This *Plan* does not replace other planning efforts within the County or communities; this *Plan* complements those efforts.



The public was invited to participate through several concurrent means, including contact with Mitigation Committee members and their organizations, press releases provided to local newspapers, advertisement of Mitigation Committee meetings and posting of meeting minutes on DeKalb County's website. A public meeting was held on December 27, 2018 at the DeKalb County Gathertorium.

DeKalb County critical facilities have been identified in this *Plan* and categorized as hazardous materials sites, health facilities (hospitals and nursing homes), emergency response facilities (police and fire stations, public works sites), utilities, schools, places of assembly, and bridges. Table 1-4 in Chapter 1 summarizes the County's critical facilities.

2. Hazard Analysis

The Mitigation Committee reviewed a wide range of natural and manmade hazards, and evaluated them based on what causes them, their likelihood of occurring, and their impact on people, animals, property, critical facilities, and the local economy. The information was based on available technical studies, reports by the participating agencies and communities on their past experiences.

Natural hazards were prioritized as severe winter storms, severe summer storms, extreme cold events, extreme heat events, tornadoes, and floods. Manmade hazards were prioritized as armed attack (active shooter), transportation incidents, cyberterrorism, utility interruptions, HazMat incidents, and radiological release incidents. The following table is from Chapter 2 and summarizes the natural and manmade hazards that are the focus of this *Plan*:

DeKalb County Summary of Hazard Probability

	Annual Chance	Impact Location	Square miles Affected	Safety Assessment
Natural Hazards:				
Severe Summer Storms	100%	Countywide	10	High
Floods	1%	Floodplains	(Floodplain)	Medium
Severe Winter Storms	100%	Countywide	636	Medium
Tornadoes	40%	Countywide	636	High
	0.001%	Single Location	1	High
Extreme Cold	20%	Countywide	636	High
Extreme Heat	10%	Countywide	636	High
Drought	--	Countywide	636	Medium
Manmade Hazards:				
Armed Attack	--	Site-Community	1	High
Transportation Incident – Rail	---	Single Location	1	Medium
Transportation Incident – Truck	---	Single Location	1	Low
Cyberterrorism	--	Community	200	Medium
Transportation Incident – Air	---	Single Location	1	Medium
Utility Interruption - Electrical	---	Region of County	200	Low
Hazardous Material Incident	---	Single Location	1	High
Radiological Incident	---	Region of County	50	High
Utility Interruption - Communications	---	Region of County	200	Low
Utility Interruption – Natural Gas	---	Region of County	200	Medium

3. Hazard Vulnerability Assessment

The vulnerability assessment estimates the past and future hazard impacts, in terms of people and costs in DeKalb County. Impacts are summarized as damage to buildings,

damage to critical facilities, health and safety, and economic impact (damage to businesses and infrastructure).

4. Goals

The Mitigation Committee established the following hazard mitigation goals and guidelines for the planning process:

The overall direction of this *Plan* can be summarized under the six goals established in Chapter 4:

- Goal 1. Protect the lives, health, and safety of the people and animals of DeKalb County from the impact and effects of natural and manmade hazards.
- Goal 2. Protect public services and critical facilities from loss of use during, and potential damage from, natural and manmade hazard events.
- Goal 3. Mitigate to protect against economic and transportation losses due to natural and manmade hazards.
- Goal 4. Ensure that new developments do not create new exposures to damage from natural and manmade hazards.
- Goal 5. Identify specific projects to protect lives and mitigate damage where cost-effective and affordable.
- Goal 6. Protect historic, cultural, and natural resources from the effects of natural and manmade hazards.

The seven guidelines from Chapter 4 set the direction or the strategy for the mitigation activities developed or recommended in Chapters 5 through 10. The guidelines also set the direction for the action items in this Chapter.

- Guideline 1. Focus natural hazards mitigation efforts on severe winter storms, severe summer storms, extreme cold and heat events, tornadoes, and floods.
- Guideline 2. Focus manmade hazard mitigation efforts on armed attacks (active shooters), transportation related incidents, cyberterrorism, utility interruption, hazardous material incidents, and radiological release incidents.
- Guideline 3. Make people aware of the hazards they face and focus mitigation efforts on measures that allow property owners, service providers, and pet owners to help themselves.
- Guideline 4. Create and foster public-private partnerships to accomplish mitigation activities.
- Guideline 5. Seek state, and federal support for mitigation efforts.
- Guideline 6. Use available local funds, when necessary, to protect the public services, critical facilities, lives, health, and safety from natural and manmade hazards.
- Guideline 7. Strive to improve and expand business, infrastructure, education and housing opportunities in DeKalb County in conjunction with planned mitigation efforts.

5. Preventive Measures

The Mitigation 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 concluded that all communities should, if not already, adopt the International Building Codes. Land use plans, zoning ordinances and subdivision standards could better address natural hazards.

6. Property Protection

Property protection measures are used to modify buildings or property subject to damage. Most measures are implemented by the property owners, so appropriate government activities include public information, technical assistance and financial support. Special attention should be given to repetitively flooded areas and safe rooms for tornadoes.

7. Structural Projects

The Mitigation Committee recommended that the County continue its efforts in the development of the countywide stormwater management program. The Mitigation Committee recommended setting criteria to ensure structural flood control projects do not adversely affect other properties or natural functions. It also recommended each community establish a formal and regular of drainage system maintenance program, and that the siltation of the South Branch and East Branch of the Kishwaukee River be addressed.

8. 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. Urban forestry programs are encouraged to protect utility lines during wind and ice storms.

9. Emergency Services

Emergency services include threat recognition, warning, response, and recovery. The Mitigation Committee recommended making effective use of the County's GIS capabilities to better prepare for natural and manmade incidents. Outdoor warning systems are limited in the County and should be improved. The Mitigation Committee also recommended additional training for NIMS and emergency response.

10. Public Information

Public information is important for mitigation of all natural and manmade hazards. The Mitigation Committee identified numerous subject areas that would benefit from a public information program. The Mitigation Committee reviewed outreach projects, providing background information to libraries and on websites, and providing technical assistance. Top messages to convey were identified along with the types of media that should be used to convey those messages.

11. Action Plan

After a review of the recommendations from Chapters 5 through 10, the Mitigation Committee created 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 11 of this *All Hazards Mitigation Plan*. A table summarizing the action items and the responsible agencies is presented on page ES-7.

There are 23 action items. The first three action items are administrative in nature, but very important for the continued success of hazard mitigation in DeKalb County. These items call for the formal adoption of this *Plan* by the County and all municipalities and institutions, the continuation of the Hazards Mitigation Planning Committee, and plan maintenance procedures. Formal adoption 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. The Mitigation Committee will provide the mechanism and a vehicle for the *Plan* to be implemented, monitored, evaluated and updated. The Mitigation Committee will provide a means for continued public involvement. The Mitigation Committee will report to the County Board annually, and a five year update to the *Plan* is required for FEMA's mitigation funding programs.

Twenty of the action items are mitigation program items. Most require staff time of the County and municipal staff. About eight of the action items identify funding needed from state and federal mitigation agencies. Several action items are public information activities. These items are aimed directly at the Mitigation Committee established planning guideline to make people aware of the hazards that they face.

Plan Adoption

This *Plan* serves to recommend mitigation measures. Implementation of these recommendations depends on adoption of this *Plan* by the DeKalb County Board and the city council or board of trustees of each participating municipality and institution. It also depends on the cooperation and support of the offices designated as responsible for each action item.

Formal adoption of the *Plan* ensures that County, municipal and institution staffs are authorized and instructed to implement the action items, as resources become available. Adoption is also a requirement for recognition of the *Plan* by mitigation funding programs.

The County and participating communities and schools should adopt this update of the *DeKalb County All Hazards Mitigation Plan* by passing a resolution.

Table 11-1 Action Items, Responsible Agencies and Deadlines

Responsible Agency	Administrative			Mitigation Program															Public Information				
	1. Plan Adoption	2. Hazard Mitigation Committee	3. Plan Maintenance and Monitoring	4. Building Code Improvements / Higher Regulatory Standards	5. Participation in StormReady	6. Critical Facility Design with All Hazards Protection	7. Mitigation of Floodplain Properties	8. Include the All Hazards Plan into Other Plans	9. NFIP Compliance	10. Grant Funding for Safe Rooms	11. Watershed Studies	12. Mapping of Hazards	13. Structural Flood Control Projects	14. Drainage System Maintenance	15. NOAA Weather Radios	16. Improved Threat Recognition	17. Improved Emergency Response	18. Property Protection Checklist	19. Information for Floodplain Property Owners	20. Educate Property Owners on Safe Rooms	21. Public Information - Hazard Mitigation Materials	22. Public Information - Outreach Projects	23. Property Protection References
Hazard Mitigation Committee			X															X	X	X	X	X	X
DeKalb County																							
County Board	X							X		X													
Administrator		X	X					X													X	X	X
ESDA		X	X		X	X	X	X							X	X		X		X	X	X	X
Planning & Zoning		X	X	X		X	X	X	X		X	X	X	X				X	X	X	X	X	X
Transportation						X		X															
GIS								X				X											
Health								X													X	X	X
Community Services								X													X	X	X
Municipalities																							
City Council/Village Board	X	X																					
Emergency Management		X	X		X	X	X	X		X					X	X		X		X	X	X	X
Designated department(s)		X	X	X	X	X	X	X	X	X	X		X	X				X	X	X	X	X	X
Institutions																							
Northern Illinois University	X	X		(x)	X	X		X		X					X	X	X	X			X	X	X
Kishwaukee College	X	X		(x)	X	X		X		X					X	X	X	X			X	X	X
Regional Office of Education	X	X	X	(x)		X		X		X						X				X	X	X	X
Townships		X	X											X							X	X	X
Other Agencies																							
Illinois Agencies						X							X										
American Red Cross																			X	X	X	X	X
Deadline for first product (months)	6	--	--	18	24	--	--	--	--	36	36	12	--	24	24	18	18	18	18	24	12	12	12

(x) Can be recommended

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Chapter 1. Introduction

1.1 Overview

DeKalb County, located in northern Illinois, is subject to natural and manmade hazards that have threatened life and health, as well as caused extensive property damage. Hazards in DeKalb County include severe storms and flooding, blizzards, severe winter storms, microbursts, and tornadoes. Severe storms and flooding impacted the County in 1973, 1974, 1996, 2007, 2008, and 2013, which caused substantial property damage. A blizzard struck in 1979 and a severe winter storm in 2011. A microburst in 1998 seriously injured 20 people, and a tornado in 2015 killed 2 people and injured 22. To better understand natural and manmade hazards and their potential impact on people and property of DeKalb County, this countywide *All Hazards Mitigation Plan* has been developed. This *Plan* was first adopted in 2008, updated in 2012, adopted in 2013, and updated in 2018 and adopted in 2019.

This *Plan* identifies hazard mitigation actions that can reduce the impacts of natural and manmade hazards in DeKalb County. Hazard mitigation means a long-term approach to reduce hazard vulnerability. It does not mean that hazards are stopped or prevented, and it does not suggest that damage or disruption caused by natural or manmade incidents are eliminated. Natural forces are powerful and beyond our ability to control. Natural hazards can be compounded manmade hazards and vice versa. Hazard mitigation means a comprehensive approach to minimizing the impact of hazards.

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

Source: Federal Emergency Management Agency

Purpose of planning: Different parts of the country face different hazards and communities have varying resources to address problems. Planning provides a way to assess hazards and resources in order to outline a program of activities that will best mitigate the impact of hazards and, often times, meet other needs. A well-prepared plan will ensure that all relevant activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It is intended to provide the framework for hazard mitigation not only during the recovery and reconstruction process, but on a year-round basis to identify current and proposed mitigation projects that will reduce the potential for future losses and decrease the costs to taxpayers. 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.

An adopted community mitigation plan is a requirement for federal mitigation funds under Section 104 of the Disaster Mitigation Act of 2000 (42 USC 5165) and 44 CFR (Code of Federal Regulations) Part 201. Hazard mitigation plans must be approved by the Federal Emergency Management Agency (FEMA). They must also be adopted by the local government and updated every five years.

FEMA also recognizes Hazard Mitigation Plans through its Community Rating System (CRS) Program. The CRS Program recognizes communities that are doing more than meeting the minimum NFIP requirements to help their citizens prevent or reduce flood losses through

reduced flood insurance premiums in participating communities. Within DeKalb County, the City of DeKalb and the City of Sycamore participate in CRS.

Purpose of this *Plan*: This *Plan* is an update to the 2013 Plan (originally prepared in 2008), which identifies potential natural and manmade hazards and presents activities that can be undertaken by both the public and the private sectors to reduce safety hazards, health hazards, and property damage due to those hazards. The *Plan* focuses on six priority natural hazards:

1. severe summer storms,
2. floods,
3. severe winter storms,
4. tornadoes,
5. extreme cold, and
6. extreme heat.

In addition to the above six natural hazards, this plan also focuses on the following six manmade hazard categories:

1. armed attacks (active shooter)
2. transportation incidents,
3. cyberterrorism
4. utility disruption,
5. hazardous materials, and
6. radiological incidents.

This *Plan* fulfills the federal mitigation planning requirements for mitigation funding, and provides the County, the participating municipalities, colleges and universities, and organizations with an action plan for reducing future impacts of natural and manmade hazards on people and property.

1.2 Planning Approach

This *Plan* reviews mitigation alternatives that will work best for hazard situations. This process is an attempt to avoid the need to make quick decisions based on inadequate information. It provides carefully considered direction to the County government and to the participating municipalities by studying the overall damage potential and ensuring that public funds are well spent.

Mitigation Committee: This *All Hazards Mitigation Plan* was developed under the guidance of the Hazard Mitigation Planning Committee (Mitigation Committee), created by a resolution of the DeKalb County Board on September 20, 2006. The Mitigation Committee was made a permanent advisory body to DeKalb County on January 16, 2008. DeKalb County municipalities, townships colleges, universities, and organizations participate on the Mitigation Committee. Interested municipalities passed a resolution stating their commitment to the plan development. The Mitigation Committee's members also include public and private stakeholder organizations. The Mitigation Committee representatives for this Plan update are shown in Table 1-1. All Mitigation Committee participants are listed in Appendix A.

The Mitigation Committee met three times in 2018 to prepare this *Plan* update. For the update, the Mitigation Committee reviewed the hazard identification and prioritization from the 2008 plan and 2013 plan update, reaffirmed the Plan's goals, and re-evaluated ways to protect life, health, safety, and property.

The efforts of the Mitigation Committee were coordinated through DeKalb County of Planning, Zoning and Building Department. GIS mapping and analysis was provided by the DeKalb County Information Management Office. Technical support for the planning effort was provided by UrbanHydro Engineering, Inc., a hazard mitigation planning consulting firm.

Planning process: The Mitigation Committee followed a 10-step process, based on FEMA guidance and requirements for the development of the 2008 *Plan*, the 2013 plan update, and this plan update.

Table 1-1
DeKalb County Hazard Mitigation Planning Committee

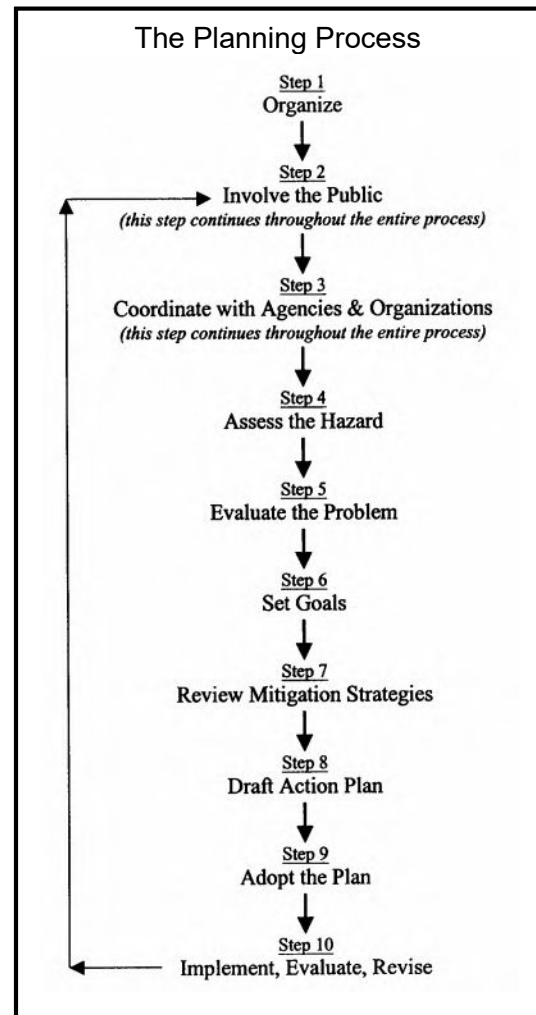
County Departments:		
Planning, Zoning and Building	Derek Hiland, Director	
GIS	Bruce Hamilton, GIS Manager	Chad Bergeson, GIS Analyst
Highways	Nathan Schwartz, County Engineer Brad Hunold	Wayne Davey
Health	Melissa Edwards, Health Promotion & Emergency Preparedness Coordinator	
ESDA	Dennis Miller, ESDA Coordinator	
Municipalities:		
Town of Cortland	Lin Dargis, Police Chief	
City of DeKalb	Dan Olson, Principal Planner Jo Ellen Zac Gill, City Engineer Bryan Faivre, City Manager	Thaddeus Mack, Chief Building Official Jason Leverton, Police Commander Tim Holdeman, Director of Public Works
City of Genoa	Brent O'Daniel	
Village of Hinckley	Nancy Nelson	
Village of Kingston	Angie Lauderdale	
Village of Kirkland	Ryan Block, Village President	
Village of Lee	Josh Carlson	
Village of Malta	Debbie Lang	
City of Sandwich	James Bianchi, Police Chief	
Village of Shabbona	Janet Clark	
Village of Somonauk	Rebecca Morphey	
City of Sycamore	Mark D. Bushnell, City Engineer	
Village of Waterman	Abigail Pool	
Institutions:		
Northern Illinois University	Lucas Ortelgel, Emergency Management & Planning Coordinator	
Townships:		
Sycamore	Amy Mathey, Township Supervisor	
Agencies:		
DeKalb Co. Soil & Water Conservation Dist.	Dean Johnson, Resource Conservationist	
Allison House LLC	Gilbert Sebenste, Meteorologist	
Stakeholders:		
Illinois State Water Survey	Sally McConkey; Coordinated Hazard Assessment & Mapping Program	
Sycamore Schools	Kim Milhouse	
Genoa - Kingston CUSD #424	Brent O'Daniell, Superintendent	

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 Mitigation Committee members and their organizations
- A standing invitation to attend Mitigation Committee meetings
- Press releases provided on the DeKalb County website for meetings
- Advertisement of Mitigation Committee meetings on DeKalb County website
- A public meeting was held on December 27, 2018 at the DeKalb County Gatherorium to receive comments on the draft plan

Examples of public involvement efforts are provided in Appendix B.

Coordination: Existing plans and programs were reviewed during the planning process. This *Plan* does not replace other planning efforts; it is intended to complement them.



During the planning process, contacts were made with regional, state, and federal agencies and organizations. In November 2018, emails were sent to a variety of stakeholder organizations as well as the following agencies to invite them to participate on the Mitigation Committee and to determine how their programs affect or could support the County's mitigation efforts.

- U.S. State Geological Survey
- U.S. Army Corps of Engineers
- National Weather Service
- Federal Emergency Management Agency
- Illinois Emergency Management Agency
- Illinois Department of Natural Resources
- Illinois State Water Survey

Meetings, phone conversations and e-mail exchanges were made with these agencies. Sally McConkey from Illinois State Water Survey attended the first two planning meetings and provided comments on the draft plan via email. Paul Osman from the Illinois Department of Natural Resources provided comments on the draft plan via email. During the planning process, the interested agencies were sent mailings that included the upcoming meeting agendas and PowerPoint presentations from the meetings. In November 2018, letters were sent to adjoining counties to inform them of DeKalb County's mitigation planning effort.

At the end of the planning process, these federal, state and local agencies were sent a notice requesting their review of the draft *Plan*. They were asked to provide any comments prior to adoption of the *Plan*.

Hazard assessment and problem evaluation: The Mitigation Committee undertook steps 4 and 5 of the planning process from November 2018 through December 2018. The potential hazards reviewed were based on the natural and manmade hazard identified by the Mitigation Committee. During a Mitigation Committee exercise, hazards were scored for their likelihood of occurrence or frequency, for potential impact or consequences, and for the vulnerability of the County to them. It found six natural hazards had an overall score of “high” or “medium,” and six categories of manmade hazards were determined to be of concern. At the December 13, 2018 meeting, the Mitigation Committee participated in a similar hazard prioritization exercise.

The hazard data and the Mitigation Committee’s findings and conclusions are covered in Chapter 2 of this *Plan*. Chapter 2 examines the hazards, including a hazard assessment – what causes the hazard and the likelihood of occurrence. Chapter 3 provides a vulnerability assessment, which estimates the impact of the hazard on life, health, and property.

Goals: Mitigation planning goals were developed by the Mitigation Committee. A goal setting exercise was conducted at the February 2007 meeting, then the goals were reviewed and revised at the March 2007 meeting. At the December 13, 2018 meeting, the Mitigation Committee conducted a similar goal setting exercise to validate the 2007 goals. The goals are presented and discussed in Chapter 4 of this *Plan*. Guidelines, or objectives, to go with the goals were also developed by the Mitigation Committee during the goal setting exercise, and are presented in Chapter 4.

Mitigation strategies: The Mitigation Committee considered a range of hazard mitigation alternatives. A capabilities assessment was also conducted during the consideration of the mitigation strategies. The Mitigation Committee examined current mitigation efforts and then considered a variety of measures that could affect the impact of the hazards. The mitigation strategies have been divided into six general categories and all measures were reviewed in relationship to the developed mitigation goals. The mitigation strategies and community capabilities are the subject of Chapters 5 through 10 of this *Plan*.

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

Action Plan: After the many alternatives were reviewed, the Mitigation 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 11 of this *All Hazards Mitigation Plan*.

It should be noted that this *Plan* serves only to recommend mitigation measures. Implementation of these recommendations depends on adoption of this *Plan* by the DeKalb County Board and the city council or board of trustees of each participating municipality and institution. It also depends on the cooperation and support of the offices designated as responsible for each action item.

1.3 DeKalb County

DeKalb County is located in northern Illinois. The County Seat is Sycamore, Illinois, which is located approximately 50 miles west of Chicago. DeKalb County is 18 miles wide (east to west) and 36 miles long (north to south), and covers approximately 634 square miles. DeKalb County is comprised of 19 townships. DeKalb County is bordered by Boone and McHenry Counties to the north, Kane and Kendall Counties to the east, LaSalle County to the south, and Lee and Ogle Counties to the west.

Figure 1-1 provides a base map of DeKalb. DeKalb County is predominately agricultural with a relatively flat terrain, with some gently rolling areas. Transportation facilities in the county include seven primary State highways and two major railroads.



DeKalb County land is considered to be of “low relief” with elevations generally ranging from 700 to 950 feet above sea level. The lowest area is southwest of Sandwich (650 feet) and the highest area is north of Lee (990 feet). The northern two-thirds of the County drain to the South Branch of the Kishwaukee River and its tributary streams. The southern third of the County is drained by Somonauk Creek, Indian Creek, and Little Rock Creek that generally flow south towards the Fox River.

Average temperatures in DeKalb County range from about 23 degrees Fahrenheit in winter to about 71 degrees Fahrenheit in summer. Average annual precipitation is 37.6 inches and 56 percent of the precipitation occurs between May and September.

1.4 DeKalb County Community Profile

In 2010, DeKalb County had a population of 105,160, which was an increase of 18 percent from the 1990 Census. Political jurisdictions in DeKalb County include:

- 19 townships
- 14 municipalities
- 18 school districts
- 17 drainage districts

DeKalb County Climate

In winter, the average temperature is 23.4 degrees F and the average daily minimum temperature is 15.6 degrees. The lowest temperature on record, which occurred at De Kalb on January 20, 1985, is -27 degrees. In summer, the average temperature is 71.5 degrees and the average daily maximum temperature is 82.4 degrees. The highest recorded temperature, which occurred at De Kalb on August 17, 1988, is 103 degrees.

The total annual precipitation is 37.59 inches. Of this total, about 21 inches, or 56 percent, usually falls in May through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 8.1 inches on July 18, 1996. Thunderstorms occur on about 43 days each year, and most occur between April and September.

The average seasonal snowfall is 34.8 inches. The greatest snow depth at any one time during the period of record was 29 inches recorded on January 24, 1979. On the average, 55 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year. The heaviest 1-day snowfall during the period of record was 15.6 inches on January 13, 1979.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 84 percent. The sun shines 67 percent of the time possible in summer and 47 percent in winter. The prevailing wind is from the west in most months, but it is from the south from June through October. Average windspeed is highest, about 12 miles per hour, in March and April. Tornadoes and severe thunderstorms strike occasionally. They are of local extent and of short duration and cause only sparse damage in narrow areas. Hailstorms sometimes occur during the warmer periods.

Source: USDA-NRCS Soil Survey of DeKalb County, Illinois, 2003 (excerpts)

Maps of the DeKalb County school districts and drainage districts are provided in Figures 1-2 and 1-3 on the following pages.

The incorporated municipalities are located throughout the County and represent about 5 percent of the County's land area. Approximately 87 percent of the County's population resides within the 14 municipalities. The City of DeKalb is classified as an urban area by the U.S. Census Bureau. The area of the Villages of Sandwich and Somonauk is considered an urban cluster by the U.S. Census Bureau.

The 2010 census estimates there are approximately 33,000 housing units in DeKalb County. The labor force is about 54,000 people and the college and university enrollment is around 36,000. According to the 2000 census, about 35 percent of DeKalb residents commute outside DeKalb County to work. Around 25 percent of the workforce in DeKalb County commutes into the County.

Major employers in DeKalb County include Northern Illinois University, KishHealth System, DeKalb School District, Target Distribution Center, Wal-Mart Super Center, Kishwaukee College, DeKalb County Government, Sycamore School District, Ideal Industries, and SCA Consumer Packaging.

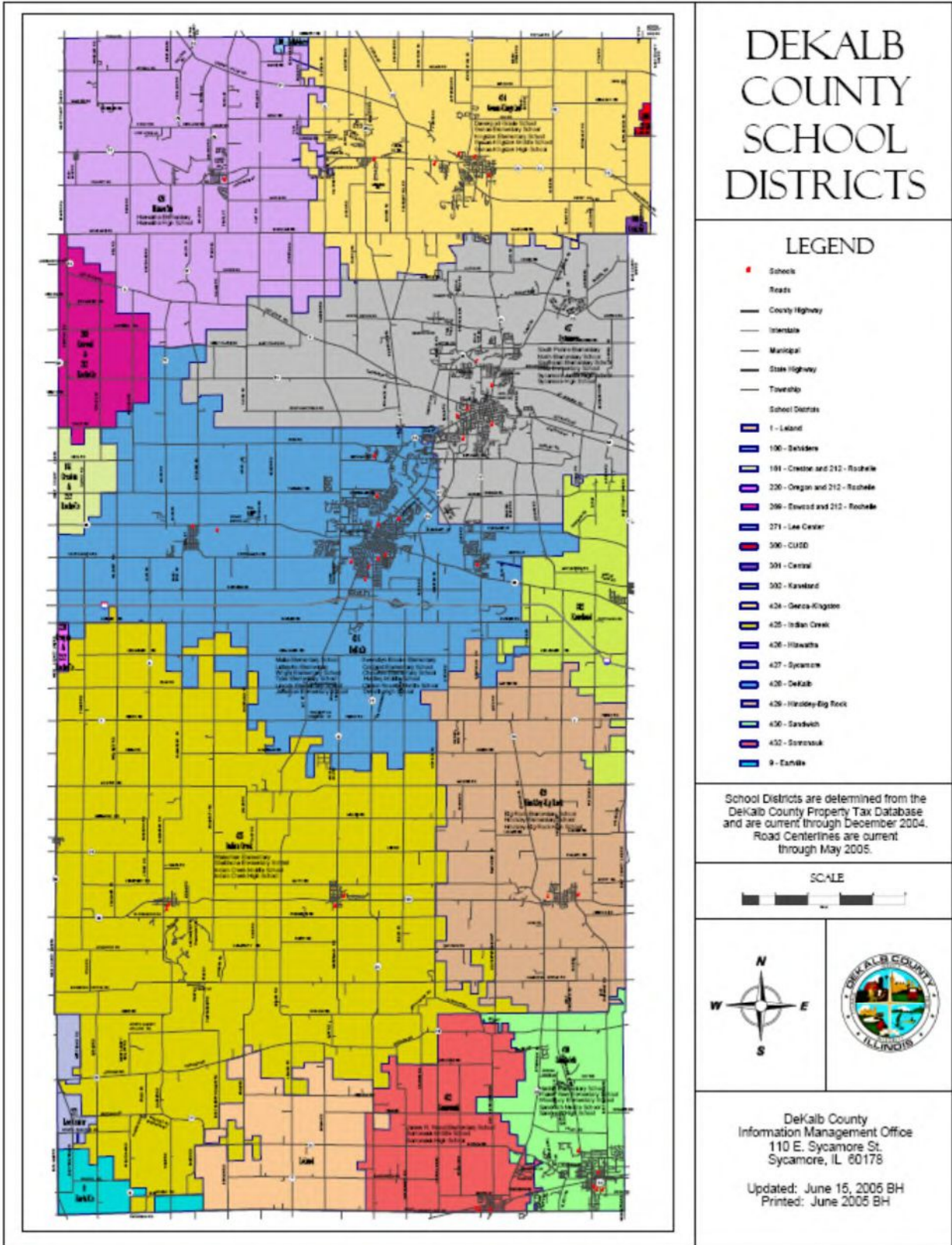


Figure 1-2 School Districts

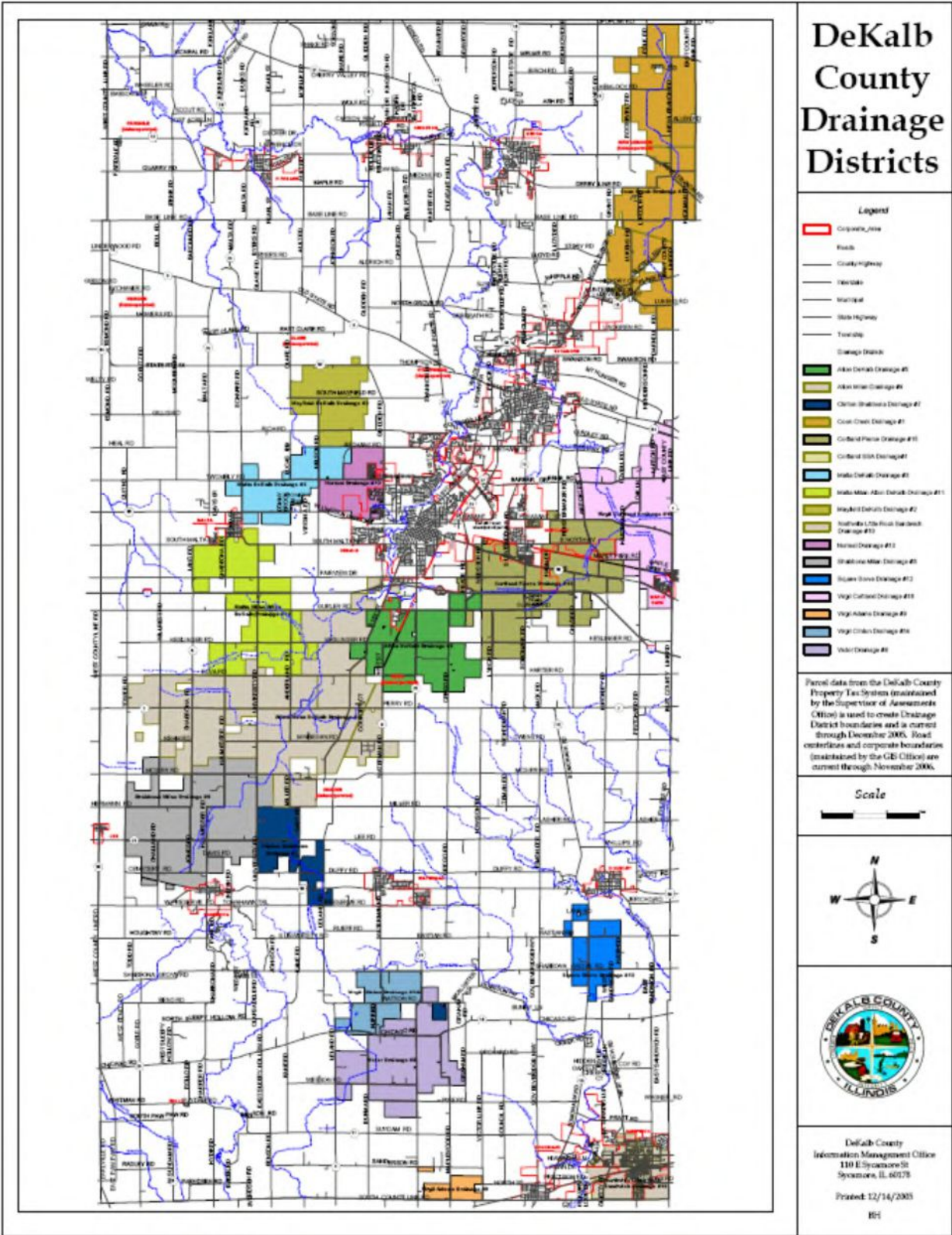


Figure 1-3 Drainage Districts

Table 1-2 presents population estimated for the DeKalb County municipalities, the estimated number of housing units, and the land area. Table 1-3 presents population estimates and housing data for DeKalb County townships.

Table 1-2 DeKalb County Municipal Data

	Home Rule	NFIP Number	2010 Population	2000 Population	2010 Housing Units	Area in square miles	CRS Class
Cortland	No	170181	4,270	2,066	1,530	1.76	
DeKalb	Yes	170182	43,862	39,018	16,436	12.62	6
Genoa	No	170183	5,193	4,169	1,959	1.91	
Hinckley	No	170184	2,070	1,994	829	0.96	
Kingston	No	170185	1,164	980	402	1.00	
Kirkland	No	170186	1,744	1,166	642	1.13	
Lee *	No	171035	337	313	139	0.22	
Malta *	No	170187	1,164	969	455	0.38	
Maple Park	No	170018	1,310	765	509	0.59	
Sandwich	No	170188	7,421	6,509	2,876	3.01	
Shabbona	No	170189	925	929	396	0.74	
Somonauk	No	170190	1,892	1,295	778	0.61	
Sycamore	Yes	170191	17,519	12,020	7,394	5.50	8
Waterman *	No	170864	1,506	1,224	599	1.00	
DeKalb County (Uninc.)		170808	14,783	15,552	6,135	603.18	
Total:			105,160	88,969	41,079	634.61	
Kishwaukee College		n/a	11,000				
Northern Illinois University		n/a	25,000				
* No SFHA							

Table 1-3 DeKalb County Township Data

Township	2010 Population	2000 Population	2010 Housing units
Afton	861	640	372
Clinton	1,868	1,663	758
Cortland	10,968	6,986	4,267
DeKalb	46,781	42,189	18,006
Franklin	2,502	2,026	950
Genoa	5,704	5,342	2,187
Kingston	3,519	2,577	1,275
Malta	1,608	1,402	640
Mayfield	929	810	414
Milan	331	364	130
Paw Paw	334	306	137
Peirce	454	473	187
Sandwich	7,709	6,920	3,005
Shabbona	1,453	1,454	603
Somonauk	2,101	1,805	831
South Grove	512	535	209
Squaw Grove	2,802	2,712	1,123
Sycamore	14,425	10,401	5,855
Victor	299	364	130
Total:	105,160	88,969	41,079

1.5 Land Use and Development

DeKalb County's predominate land use is agricultural. Hazard mitigation is primarily concerned with developed areas of communities - where the people are located, where the buildings that they live and work in are located. Also of concern, is the infrastructure that serves the community.

"Developed" land use includes residential and commercial development, such as homes, businesses, and factories. It is the 6.4 percent of the County, shown in Table 1-4, which is the developed area in incorporated and unincorporated area.

DeKalb County promotes further residential development in areas contiguous and annexable by municipalities. Therefore, large portions of the continued expected growth in the County will be in incorporated areas.

Table 1-4 DeKalb County Land Uses (2018)	
Land Use	Percent of County
Incorporated	6.4%
Agricultural	88.3%
Forest Preserve/Conservation	0.8%
Unincorporated-Developed	1.3%
Road & RR Right of Way	3.3%
<i>Source: DeKalb County Comprehensive Plan</i>	

1.6 Critical Facilities

Critical facilities are buildings and infrastructure whose exposure or damage can affect the well being of a large group. For example, the impact of a flood or tornado on a hospital is greater than on a home or most businesses.

Critical facilities are generally placed 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. Municipal facilities, including emergency facilities (police and fire stations, public works sites, etc.).
2. County government facilities.
3. Educational/school facilities.
4. Places of assembly, such as theaters and places of worship.
5. Bridges that would be inundated during the base or 100-year flood. These are discussed more in Chapter 2.
6. Health facilities: hospitals and nursing homes.
7. Airports.

Critical facilities were identified by each community participating in this *Plan*. These facilities are categorized and tallied, by municipality, on the Table 1-5, but the DeKalb County Information Management Office (GIS Department).

Table 1-5 (Revised 12/08/18)
DeKalb County Critical Facilities

Type of Critical Facility:	Municipal/ Emergency	County Government	Educational/ Schools	Assembly/ Religious	Bridges	Hospital	Airport	Total
Municipalities:								
City of DeKalb	7	3	10	27		1	1	49
City of Genoa	3		3	5				11
City of Sandwich	4		6		2	1	1	14
City of Sycamore	6	4	9	11	1	1		32
Town of Cortland	3		1	1	1			6
Village of Hinckley	4		2	2	2			10
Village of Kingston	3		1	1	1			6
Village of Kirkland	3		2	2	2			9
Village of Lee	3							3
Village of Malta	2			1				3
Village of Maple Park	1							1
Village of Shabbona	3		2	1				6
Village of Somonauk	3		3		1			7
Village of Waterman	4	1	1	1				7
Townships:								
Afton	1				14			15
Clinton					15		1	16
Cortland				1	8			9
DeKalb				1	2			3
Franklin				1	16			17
Genoa				2	15		1	18
Kingston					8			8
Malta			1	1	7			9
Mayfield				1	10			11
Milan	1			1	9			11
Paw Paw				1	20			21
Pierce	1			1	13			15
Sandwich				4	0			4
Shabbona	1				11		1	13
Somonauk				1	5			6
South Grove				1	12			13
Squaw Grove					24			24
Sycamore					8			8
Victor				1	8			9
Colleges:								
NIU			104					104
Kishwaukee CC			1					1
Total:	53	8	146	69	215	3	5	499

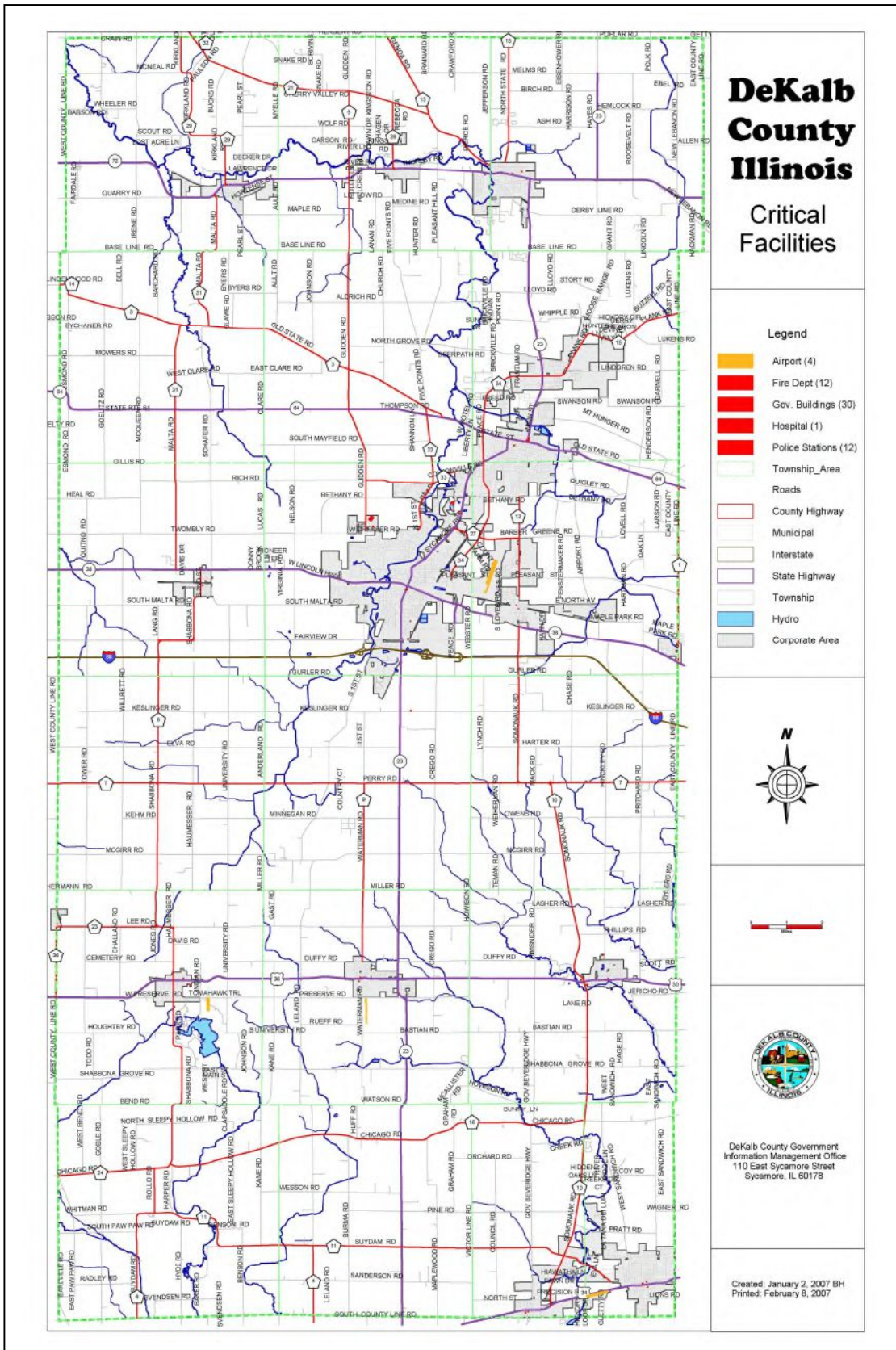


Figure 1-4 DeKalb County Critical Facilities

Figure 1-4 provides the locations of identified critical facilities in DeKalb County. The map was prepared by the County's GIS department and any area of the map can be enlarged to obtain better information regarding the type and location of each critical facilities.

Chapter 3 discuss critical facilities that are impacted by each natural hazard. Hazard mitigation measures for critical facilities are identified in Chapters 5 through 10.

1.7 References

1. Example Plans, FEMA/Community Rating System, 2002.
2. Getting Started – Building Support for Mitigation Planning, FEMA, FEMA-386-1, 2002.
3. State and Local *Plan* Interim Criteria Under the Disaster Mitigation Act of 2000, FEMA, 2002.
4. Survey of County offices and municipalities, January 2007.
5. Critical facilities data supplied by municipalities and County offices.
6. Illinois Emergency Management Agency.
7. DeKalb County Comprehensive *Plan*, 2011.
8. Soil Survey of DeKalb County, Illinois, 2003, USDA, Natural Resources Conservation Service.
9. U.S. Census Bureau website.
10. *DeKalb County Economic Profile*, DeKalb County Economic Development Corporation, 2006.

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Chapter 2. Hazard Identification & Profile

This chapter defines and assesses the natural and manmade hazards that could impact DeKalb County. Historical events are discussed, based on available information. The impact of the hazard on buildings and critical facilities are discussed, along with the potential impact on the health and safety of people and animals.

2.1 Hazard Identification

In January 2007, the National Weather Service, Chicago Office identified the following weather hazards in DeKalb County:

Tornadoes

Illinois averages 32 tornadoes per year. In northern Illinois, including DeKalb County, almost all tornadoes occur between March and November, with the majority occurring in the spring from mid-March through early-June. Most tornadoes in DeKalb County occur from mid-afternoon through early evening. In the last 10 years, there have been 4 tornadoes documented in DeKalb County. Of the four tornadoes in the last ten years, one was an F4 that caused \$8 Million in damages in Fairdale. The other three tornadoes were F0 or F1. Since 1950, when National Weather Service began detailed tornado records, there have been 14 tornadoes. Two were strong (F2 & F3) and 12 were weak (FO-F1).

Severe Thunderstorms

Damaging hail, from a half inch to golf ball size, is reported in DeKalb County 2 to 3 times per year. On rare occasions, hail up to 4 inches in diameter can occur in the area. Thunderstorm wind gusts of 58 mph or greater are reported about 6 times per year in DeKalb County. On rare occasions winds can gust to 90-120 mph. Thunderstorm winds are capable of flattening crops, snapping tree limbs or uprooting trees, and damaging structures such as farm outbuildings.

Winter Storms

De Kalb County averages about 35 inches of snow per year. Large snowstorms which deposit 10 inches of snow or more are rare, occurring about once every 3 to 5 years. Severe ice storms are very rare but can cause significant damage to trees and power lines.

High Winds

High winds (sustained winds of 45 mph or gusts to 58 mph or greater) that are not associated with thunderstorms occur about once or twice per year, typically in late fall or early spring. They are capable of doing similar damage as severe thunderstorm winds.

Temperature Extremes

In nearby Rockford, temperatures have ranged from -27 to 113.

Floods

The South Branch of the Kishwaukee River flows through DeKalb. Flood stage is 10.0 feet. The record flood of 15.8 feet occurred July 2, 1983. Flood stage has been exceeded only 9 times going back to 1926. Flash flooding and area flooding of low-lying areas can occur anywhere in

DeKalb County. Flash flooding is most likely in mid to late summer. The State of Illinois' 24-hour record rainfall of 16.91 inches fell in nearby Kane County in July, 1996.

Droughts

DeKalb County and northern Illinois periodically experience severe droughts. Average annual rainfall in DeKalb is 37.40 inches per year. On average 26.83 inches of that rainfall falls in the spring and summer months of March through September, which is critical to the agricultural community. Recent droughts include 2005 with spring/summer rainfall of 14.79 inches, 1991 with 14.62 inches, 1988 with 15.48 inches, and 1971 with 15.21 inches.

Table 2-1 lists the presidential, or federal, disaster declaration for the County since 1969. The table shows that disasters have most frequently occurred in the summer and winter.

Table 2-1 State and Federal Disaster Declarations for DeKalb County

	Fall	Winter	Spring	Summer	Declaration Date	FEMA Disaster Number	Location	Public Assistance
Flood				X	7/20/1973	DR 373		Not yet provided by IEMA
Flood				X	6/18/1974	DR 438		Not yet provided by IEMA
Blizzard & Snow		X			1/16/1979	EM 3068	Countywide	Not yet provided by IEMA
Flood				X	7/25/1996	DR 1129	Kishwaukee	Not yet provided by IEMA
Severe Storms				X	9/25/2007	DR 1729	Kishwaukee	Not yet provided by IEMA
Flood				X	10/03/2008	DR 1800	Countywide	Not yet provided by IEMA
Snow		X			03/17/2011	DR 1960	Countywide	Not yet provided by IEMA
Flood			X		05/10/2013	DR 4116	Countywide	Not yet provided by IEMA
Severe Storms & Tornado			X		04/15/2015	-	Countywide	Not yet provided by IEMA

Several disasters have been declared in the counties surrounding DeKalb County, but not including DeKalb County. The 1967 tornadoes occurred in Boone, Kane, LaSalle, McHenry, Winnebago, and DeKalb County. DeKalb County experienced a 2 mile long and 40 yard wide tornado, but most likely due to lower damages, DeKalb County was not included in the declaration (DR 684). The State declared DeKalb an Ogle Counties state disaster areas following the tornado that occurred on April 15, 2015; however, a federal disaster was not declared for this event.

Using available data, Table 2-2 shows the past frequency of the natural and manmade hazards that DeKalb County could potentially experience. DeKalb County has a history with some of the listed hazards, such as floods, winter storms and tornadoes. Other hazards have not yet impacted the County or been experienced in recent years, such as earthquakes or radiological incidents.

Table 2-2 DeKalb County Identified and Potential Hazards

Hazard	Area affected or potentially affected (Location)	Past Frequency		
		Occurrences in the last number of years		
		Last 5 years	Last 10 years	Last 20 years
Civil Disorder		--	--	--
Dam Failure	Shabbona Lake State Park	--	--	--
Drought	Countywide	0	0	2
Earthquake	Countywide	--	--	--
Extreme heat	Countywide	0	1	1
Flood	Floodplain areas	2	4	14
Hail	Countywide	15	26	50
HAZMAT	Ethanol Plant	--	--	--
Lightning	Countywide	1	2	4
Military Accident	Army National Guard and/or Munitions	--	--	--
Radiological release – transportation	Railroads	--	--	--
Thunderstorm	Countywide	22	63	143
Tornado	Countywide	2	4	7
Transportation incident				
Air	Airfields	--	--	--
Rail	Countywide	--	--	--
Local road	Countywide	--	--	--
Utility interruption				
Communication	Cellular towers	--	--	--
Electricity	Countywide	--	--	--
Natural gas	Countywide	--	--	--
Other fuel	Pipelines	--	--	--
Wildland fire	Countywide	0	0	0
Winter Storm	Countywide	2	7	20
-- No data available.				

Mitigation Committee undertook an exercise to evaluate the listed hazards in order to determine the level of attention that the hazard warranted in this *Plan*. In the evaluation, the Mitigation Committee looked at the expected frequency, impact or consequences of the event and the area of the County that is vulnerable to the hazard. The Mitigation Committee works in small groups to assign points to each hazard for each of the evaluation categories. The Mitigation Committee reevaluated the natural hazards that could impact DeKalb County during the update process for this *Plan*.

The results from the small groups were totaled and examined in two ways:

Method 1: (Frequency + Impact) x Area = Ranking
and

Method 2: (Impact + Area) x Frequency = Ranking

The two equations above provided similar results and rankings. Therefore, the points given to each hazard were evaluated based on the sum:

Method 3: Frequency + Impact + Area = Ranking

This approach gave almost the same ranking as Method 1. The manmade hazards could not be prioritized as clearly as the natural hazards, but the most significant manmade hazards are in the categories of armed attack, transportation incidents, cyberterrorism, utility disruption, HazMat, and radiological release. Table 2-3 shows the results of the ranking of the hazards based on the Mitigation Committee's hazard assessment exercise:

Table 2-3 DeKalb County Ranking of Natural and Manmade Hazards

Natural Hazards:	Manmade Hazards:
1. Thunderstorm	1. Armed Attack
2. High wind	2. Transportation incident-Rail
3. Lightning	3. Transportation incident-Local road
4. 100-year flood	4. Cyberterrorism
5. 10-year flood	5. Transportation incident-Air
6. Snow storm	6. Utility interruption-Electricity
7. Ice storm	7. HAZMAT
8. Hail	8. Radiological release-Power Plant
9. Tornado	9. Utility interruption-Communication
10. Extreme cold	10. Radiological release – transportation
11. Extreme heat	11. Utility interruption-Natural gas
12. Drought	12. Civil Disorder
13. Earthquake	13. Water Supply
14. Dam Failure	14. Terrorism
	15. Power plant
	16. School Violence
	17. Critical Facility Violence
	18. Oil Pipeline
	19. Military Accident
	20. Cable TV
	21. Bomb Threat

For natural hazards shown in Table 2-3, events that occur most frequently in DeKalb County have rank the highest. The area of the County impacted was less important for the ranking than impact or consequences. For the manmade hazards, impact and consequences (life, health, and safety) seemed to provide the most weight for the ranking. From a review of the ranking results, the Mitigation Committee prioritized the natural and manmade hazards as shown in Table 2-4.

The natural hazards were reprioritized from the 2008 Plan due to the impact of recent severe summer storms and flood events.

Table 2-4 DeKalb County Mitigation Committee Summary of Identified and Potential Hazards

Natural Hazards:		Future Frequency:	Impact:	Area Affected:
Priority	Severe Summer Storms	Likely/Frequent	Severe	Large
	Floods	Likely	Moderate	Community
	Severe Winter Storms	Likely	Severe	Large
	Tornado	Occasional	Severe/Catastrophic	Community
	Extreme Cold	Likely	Moderate	Large
	Extreme Heat	Likely	Moderate	Large
	Drought	Seldom	Low-Moderate	Community-Large
Other	Earthquake	Seldom	Low	Large
	Dam Failure	Seldom	Low	Site-Community

Manmade Hazards:		Future Frequency:	Impact:	Area Affected:
Priority	Armed Attack	Seldom	Moderate	Site-Community
	Transportation Incidents	Likely	Moderate	Community
	Cyberterrorism	Likely	Moderate	Community-Large
	Utility Disruption	Likely	Moderate-Severe	Community-Large
	HAZMAT	Seldom	Moderate	Community
	Radiological Release	Seldom-Occasional	Severe-Catastrophic	Large
Other	Civil Disorder	Occasional	Moderate	Site-Community
	Military	Seldom	Low	Community
	Political Hazards	Seldom	Moderate	Site-Community

The natural hazards listed in Table 2-4 are discussed in detail in this chapter, and mitigation activities for each hazard are identified in Chapters 5 through 10. Other natural hazards have been recognized, but a vulnerability assessment (in Chapter 3) has not been conducted at this time. In Table 2-4, the manmade hazards are grouped by the nature of the hazard. This *Plan* will focus on the manmade hazards that are the result of accidents or those that could stem from a natural disaster. Also, the identified manmade hazards will be further examined as the Mitigation Committee work continues in upcoming years.

2.2 Natural Hazard Profile

Severe summer storms, floods, severe winter storms, tornadoes, and extreme heat and cold events will be discussed in detail in this chapter as priority hazards. Information and data were collected from the municipalities, regional, state and federal agencies for much of the chapter to describe the hazards and to analyze previous occurrences. A primary source of information on recorded events was the National Climate Data Center (NCDC) at the U.S. National Oceanic and Atmospheric Administration. Probability of future occurrence of these hazards are based on collected data, and compared to plans, studies and reports prepared by the State of Illinois.

Other natural hazards are discussed, including earthquakes, and dam failure. While historical events and probability of these hazards are briefly discussed, they are not included in the vulnerability assessment in Chapter 3 since they were not determined to be priority hazards selected by the Mitigation Committee.

Climate Change will have a significant impact on weather extremes and average climate patterns in the future. Though climate change was not considered a hazard in and of itself, changes in climate will create future conditions that differ from the historical weather and climate data. As a result, the characteristics of the natural hazards that currently affect DeKalb County may change over time and the County's prioritization of those hazards may also change. Each of the priority hazards identified by the Mitigation Planning Committee are discussed in the following paragraphs, along with potential climate adaptation strategies.

2.2.1 Severe Summer Storms

For purposes of this *Plan*, severe summer storms are considered to be thunderstorms, lightning events, microbursts or high wind events, and hail storms.

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 Section 2.2.6.

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 inches 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 thunderstorm systems can travel intact for distances in excess of 600 miles.

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. Downdraft winds occur during the dissipating stage of all thunderstorms. Downburst winds are strong, concentrated, straight-line winds created by falling rain and sinking air that can reach speeds of 125 mph and are often associated with intense thunderstorms. Downbursts may produce damaging winds at the surface.

Microbursts can form from intense thunderstorms. A microburst is a convective downdraft with an affected outflow area of less than 2½ miles wide and peak winds lasting less than 5 minutes. Microbursts may induce dangerous horizontal or vertical wind shears, which can cause property damage (and adversely affect aircraft performance).

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.

National Weather Service

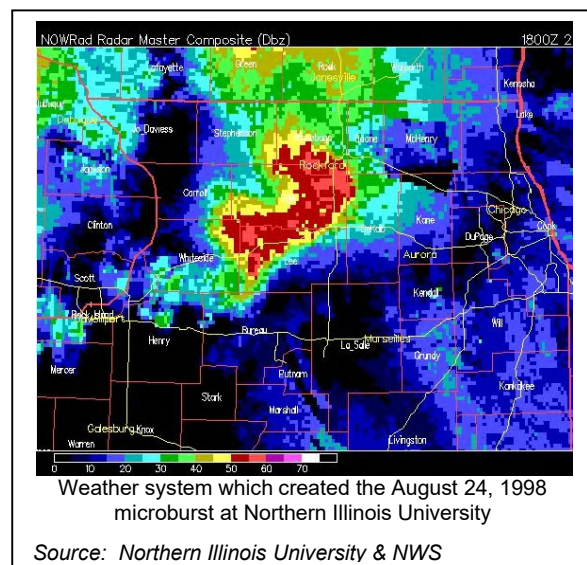
Description	Diameter (inches)
Pea	0.25
Marble or Mothball	0.50
Penny or Dime	0.75
Nickel	0.88
Quarter	1.00
Half Dollar	1.25
Walnut or Ping Pong Ball	1.50
Golf Ball	1.75
Hen's Egg	2.00
Tennis Ball	2.50
Baseball	2.75
Tea Cup	3.00
Grapefruit	4.00
Softball	4.50

Health and safety: 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, death, or at a minimum, serious burns 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. Seventy percent of the survivors suffer serious, long-term effects, such as memory loss, sleep disorders, depression, and fatigue.

The threat to life and the cause of death vary by the type of storm. Between 1995 and 2000, the National Weather Service reported 20 people in Illinois were killed by flash floods, wind, and lightning brought by thunderstorms (see table). Hail rarely causes loss of life. Most deaths can be prevented through safe practices. Much information has come out over the last 20 years about lightning safety, for example, which has reduced the loss of life. Before 1990, an average of 89 people are killed by lightning each year.

Historic events: DeKalb County has experienced significant severe summer storms. The NCDC shows limited information on lightning, thunder and wind events for DeKalb County, however community records show otherwise. Flooding associated with severe summer storms is discussed in Section 2.2.6.



On August 24, 1998 a **microburst** struck an outdoor event at Northern Illinois University (NIU) in the City of DeKalb. The microburst injured at least 10 people at NIU. The high winds caused damage around the County, bringing total injuries to 22 people.

Description of the August 1998 DeKalb County Microburst

A cold front on August 24, 1998 approached DeKalb County and generated a line of severe thunderstorms that formed into the shape of a "bow" ahead of the front. The strongest winds of storms taking a "bow" shape are found at the crux or the tip of the bow. The thunderstorms formed in the very warm and humid air mass ahead of the front, with high humidity and temperatures well into the 80s. Wind shear from the jet stream aloft made the storms more intense, and they produced a swath of 80-100 MPH winds across northern Illinois. The storm generated winds between 80 and 90 MPH at NIU. The microburst occurred at approximately 1:00 p.m. The high winds lasted approximately a half hour.

The forecast that day was for the possibility of severe thunderstorms. The area was under a severe thunderstorm watch a few hours before the microburst. The severe weather was warned a half hour before the microburst struck. However, dissemination of that warning came across civil defense radios at nearly the same time the high winds began. At the time, civil defense radios were in less than a third of the areas that now have SAME-equipped radios. The warning sent many, but not all, people indoors at Northern Illinois University (NIU).

At NIU, tent poles and equipment flew causing serious injuries. A lamp post was knocked down and pinned one person. Power lines were knocked down around the County by falling trees. People were struck by debris. DeKalb County closed roads due to downed trees. In Kirkland, a driver of a semi-truck was pinned when a tree crashed onto his cab. No fatalities resulted. Twenty-two people were treated for injuries.

In September 2004, **high winds** (and a possible microburst) damaged 30 properties in the City of DeKalb. The most recent events were during May 2019. Severe thunderstorms moved across northern Illinois during the afternoon of May 27, 2019 producing large hail, wind damage and four tornadoes.

Table 2-5 and Figure 2-1 show that there have been numerous recorded hail events by the NWS, and often hail events are directly associated with lightning and thunderstorms.

**Table 2-5: DeKalb County Recorded Hail Events
(1995-2020)**

No.	Location	Date	Size	No.	Location	Date	Size
1	Somonauk	5/9/1995	0.75	31	SYCAMORE	4/25/2009	0.75
2	Somonauk	5/9/1995	1.50	32	DE KALB	6/19/2009	0.88
3	DEKALB	4/14/1996	1.00	33	DE KALB	4/5/2010	0.88
4	MALTA	4/18/1996	1.75	34	WATERMAN	11/22/2010	1.50
5	CORTLAND	5/12/1998	1.00	35	SYCAMORE	4/3/2011	0.75
6	DE KALB	5/19/1998	1.00	36	SYCAMORE	3/17/2012	0.88
7	DE KALB	5/18/2000	1.75	37	DE KALB	4/17/2013	0.88
8	SYCAMORE	5/18/2000	0.75	38	CORTLAND	4/17/2013	0.88
9	KIRKLAND	5/18/2000	1.75	39	SHABBONA	6/12/2013	1.75
10	FAIRDALE	5/18/2000	0.75	40	ROLLO	6/12/2013	1.75
11	DE KALB	9/11/2000	0.75	41	SANDWICH	8/31/2013	1.50
12	DE KALB	10/24/2001	1.00	42	MALTA	5/20/2014	1.75
13	DE KALB	5/9/2003	1.00	43	DE KALB	5/20/2014	1.75
14	CORTLAND	5/10/2003	0.75	44	DE KALB	6/18/2014	0.75
15	MALTA	5/20/2004	1.00	45	WATERMAN	8/1/2014	1.75
16	SYCAMORE	5/21/2004	0.75	46	WATERMAN	6/20/2015	0.75
17	DE KALB	6/11/2004	0.75	47	DE KALB	8/2/2015	1.75
18	SYCAMORE	3/30/2005	0.75	48	HART	8/2/2015	1.25
19	SHABBONA	3/30/2005	1.00	49	WATERMAN	7/6/2016	0.88
20	DE KALB	3/30/2005	0.75	50	SYCAMORE	2/28/2017	0.88
21	DE KALB	3/30/2005	0.75	51	DE KALB	2/28/2017	0.88
22	DE KALB	6/27/2005	0.75	52	SYCAMORE	3/7/2017	1.00
23	ROLLO	5/27/2006	0.75	53	DE KALB	3/7/2017	0.88
24	DE KALB	9/22/2006	0.88	54	MALTA	1/22/2018	0.75
25	DE KALB	10/2/2006	0.88	55	SHABBONA	5/2/2018	1.75
26	DE KALB	10/2/2006	1.00	56	DE KALB	5/2/2018	1.00
27	SYCAMORE	3/21/2007	1.00	57	DE KALB	4/11/2019	0.88
28	DE KALB	6/3/2007	0.75	58	WATERMAN	5/16/2019	1.75
29	DE KALB	7/9/2007	0.75	59	SANDWICH ARPT	5/27/2019	1.00
30	DE KALB	6/28/2008	0.75				
Source: NCDC							

Probability of future occurrence: From available data and local accounts, it can be concluded that the probability of severe summer storms that can cause flooding, wind or hail damage in DeKalb County are 100 percent. The County will continue to monitor changes in probability due to climate change.

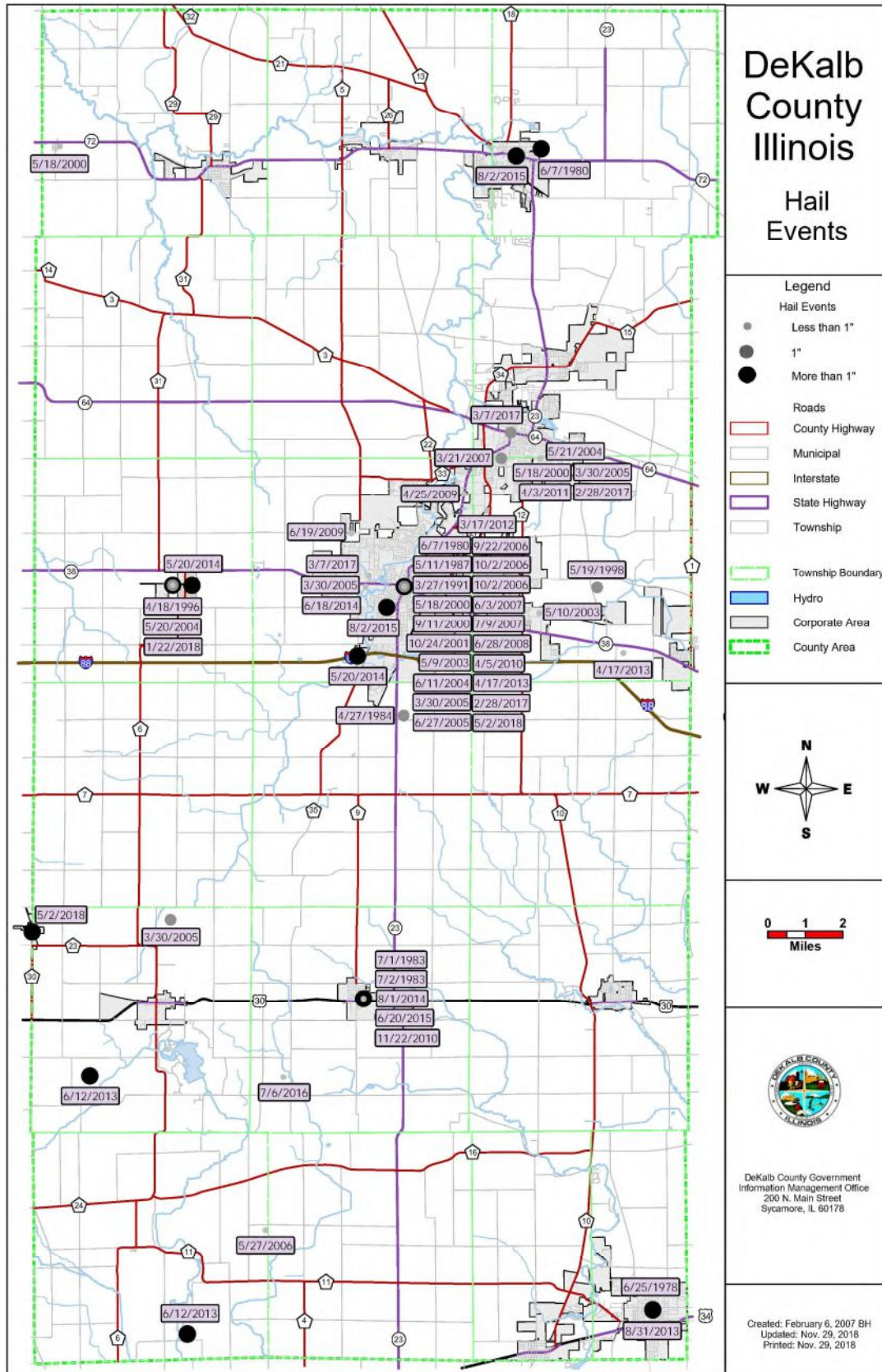


Figure 2-1 DeKalb County Recorded Hail Events (1950-2018)

2.2.2 Flood

There are two major watersheds in DeKalb County - the South Branch Kishwaukee River watershed, and the Fox River Tributary watershed. Watersheds are formed by nature. A watershed is the land area to which all rain or snow melt will drain or “runoff.” Within each watershed there are smaller rivers and creeks that are divided into subwatersheds. All watersheds in the County eventually drain into the Mississippi River. Table 2-7 shows the County’s watersheds and subwatersheds. Figure 2-2 shows the County’s major watersheds and the rivers and streams.

Table 2-6 shows the 100-year flood elevations for the major rivers in DeKalb County, which is included in the FEMA Flood Insurance Studies (January 2009).

Table 2-6 DeKalb County 100-year Flood Elevations

River	Location	Approximate 100-year Flood Elevation
South Branch Kishwaukee River	Kirkland at Kirkland Road	759.2 feet
South Branch Kishwaukee River	Genoa at Route 72	796.6 feet
South Branch Kishwaukee River	DeKalb at Route 38	847.5 feet
East Branch Kishwaukee River	Sycamore at Route 64	836.6 feet

Source: FEMA Flood Insurance Study 2009

Riverine flooding: The most common and most damaging floods occur along rivers and streams and this is called overbank flooding. The major sources of riverine or overbank flooding in DeKalb County are the East Branch Kishwaukee River, South Branch Kishwaukee River, and Somonauk Creek.

Overbank flooding of rivers and streams 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.

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.

Table 2-7 DeKalb County Watersheds

Watershed Stream Name	Tributary to	Approximate Area Square miles
Rock River	Mississippi River	
Kishwaukee River	Rock River	
Killbuck Creek	Kishwaukee River	
South Branch Kishwaukee River	Kishwaukee River	
South Branch Kiskwaukee River	Kishwaukee River	
Owens Creek	South Branch Kiskwaukee River	
Kinsbury Creek	South Branch Kiskwaukee River	
Bull Run	South Branch Kiskwaukee River	
Leeslough Creek	South Branch Kiskwaukee River	
Deer Creek	South Branch Kiskwaukee River	2.9
East Branch Kishwaukee River	South Branch Kiskwaukee River	122.0
Union Ditch 1	East Branch Kishwaukee River	12.0
Union Ditch 2	East Branch Kishwaukee River	21.6
Union Ditch 3	East Branch Kishwaukee River	85.1
North Branch Kishwaukee River	South Branch Kiskwaukee River	
Middle Branch Kishwaukee River	South Branch Kiskwaukee River	5.16
Lower Rock River Watershed		
Rickelson Creek	Lower Rock River	
Green River Watershed		
Lower Fox River Watershed	Illinois River	
Somonauk Creek	Fox River	60
Buck Branch	Somonauk Creek	
Little Rock Creek	Big Rock Creek	
West Branch Big Rock Creek	Big Rock Creek	26
Battle Creek	West Branch Big Rock Creek	
East Branch Big Rock Creek	Big Rock Creek	
Indian Creek	Fox River	
Little Indian Creek	Indian Creek	
Paw Paw Run	Indian Creek	
Spring Brook	Fox River	

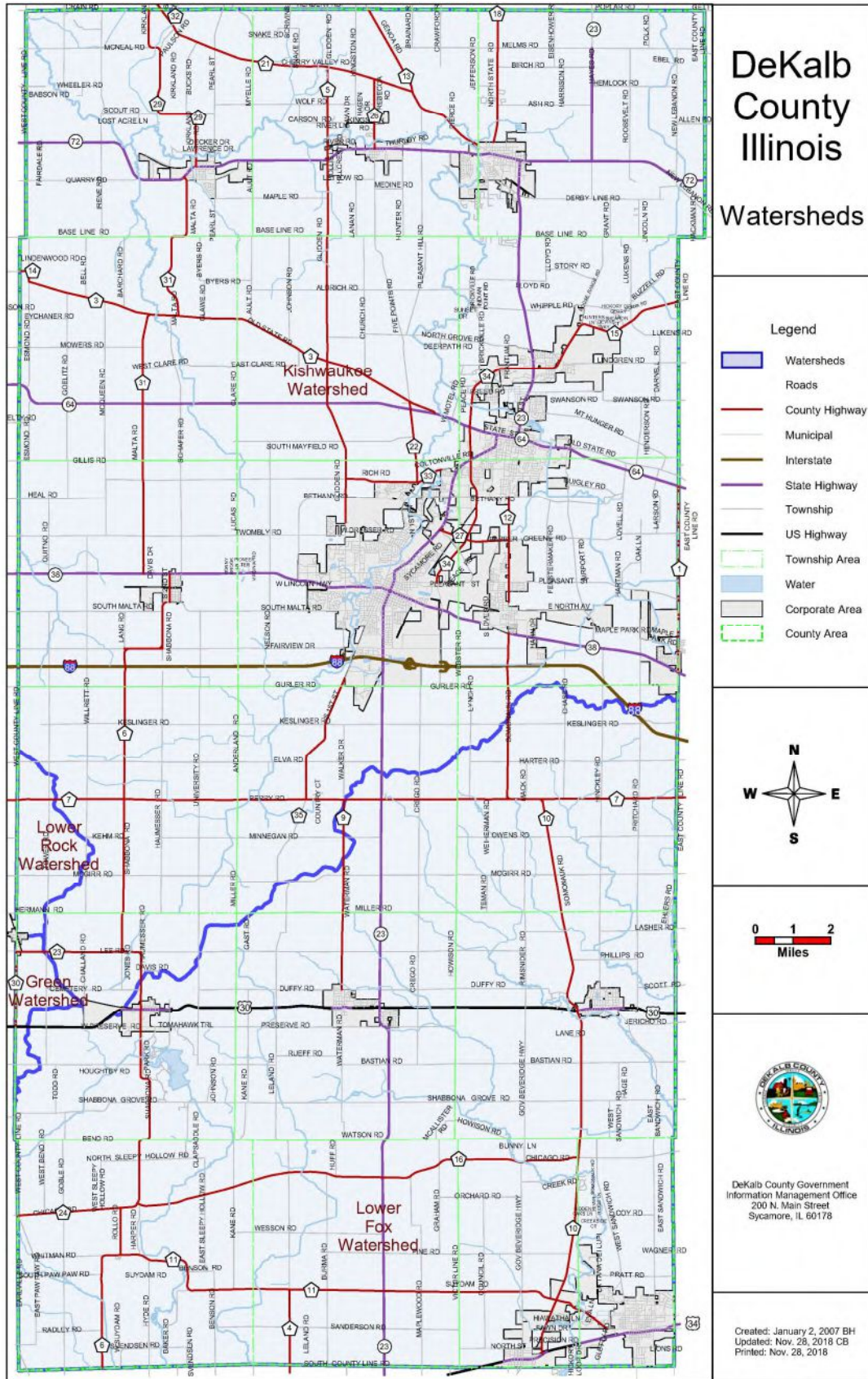


Figure 2-2 DeKalb County Major Watersheds

Most floods are caused by 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: DeKalb County receives an average of 37.6 inches of total precipitation each year. From April to September, rainfall averages 21 inches. Average annual snowfall is 34.8 inches (generally, 7 inches of snow has the equivalent water content of one inch of rain).

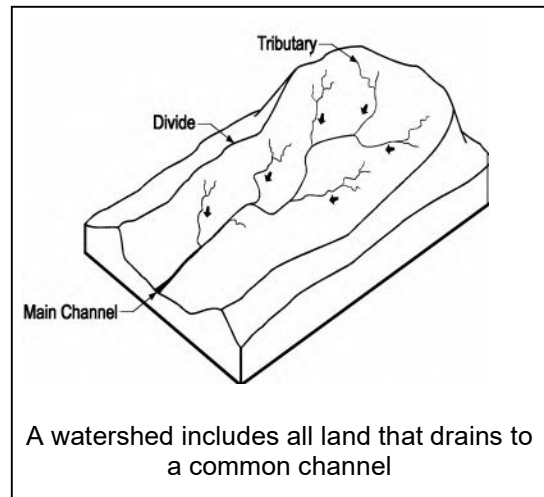
IDNR's "Flood Surveillance Bookmarks" Website:

<https://www.dnr.illinois.gov/WaterResources/Pages/Surveillance.aspx>

Gives stage and precipitation records and forecasts.

Watersheds: In a watershed, 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.

Watershed topography and 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.



Flash floods: Flash floods are generated by severe storms that drop much rainfall in a short time. All flash floods strike quickly and end swiftly. 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. 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.

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.

What are the odds of a flood?

The term “100-year flood” has caused much confusion for people not familiar with statistics. Another way of looking at it is to think of the odds that a base flood will happen sometime during the life of a 30-year mortgage (26% chance).

Chance of Flooding over a Period of Years

Period	Flood Size			
	10-year	25-year	50-year	100-year
1 year	10%	4%	2%	1%
10 years	65%	34%	18%	10%
20 years	88%	56%	33%	18%
30 years	96%	71%	45%	26%
50 years	99%	87%	64%	39%

Even these numbers do not convey the true flood risk because they focus on the larger, less frequent, floods. If a house is low enough, it may be subject to the 10- or 25-year flood. During the proverbial 30-year mortgage, it may have a 26% chance of being hit by the 100-year flood, but the odds are 96% (nearly guaranteed) that a 10-year flood will occur during the 30 year period. Compare those odds to the only 5% chance that the house will catch fire during the same 30-year mortgage.

Flood risk: Past floods are indications of what can happen in the future, but flood studies and mitigation plans are based on the *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 percent) 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 not to have a 50-year flood over the course of 100 years.

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 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 percent 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 base floodplain: The area inundated by the base flood is the “base floodplain.” FEMA maps (called Flood Insurance Rate Maps, or FIRMs) also call this the Special Flood Hazard Area or A Zone. An example of a FIRM is shown on the next page.

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.

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 (FIS) typically 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.

Depth: The Table 2-7 below shows average difference between a base elevation, the 10-year and the 100-year flood. The base elevation may represent the normal stage at a gage (i.e., Fairdale) or the stream bed elevation given in the FIS. There is an average of 2 feet difference between the 10-year and 100-year levels. This is an indicator of generally shallow flood depths, but given the relatively flat topography of the county, the area of inundation can still be very large.

Table 2-8 DeKalb County Comparison of Flood Elevations

Stream	Base Elevation	10-Year	Difference 10-yr to Base Elevation	50-year	Difference 10-yr to 50-yr	100-Year	Difference 50-yr to 100-yr
South Branch Kishwaukee River at Irene Road/Fairdale Gage (DS)	736.6 Normal Stage	743.7	7.1	744.9	1.2	745.3	0.4
South Branch Kishwaukee River at State Route 72 in Genoa	(785.0) Stream Bed-	794.6	(9.6)	795.8	1.2	796.5	0.7
South Branch Kishwaukee River at State Route 64 in Sycamore (US)	(822.5)	834.6		835.7	1.1	836.6	0.9

According to the 2009 FIS for DeKalb County, the average floodway velocities are approximated 2.8 feet per second. Some velocities on the South Branch of the Kishwaukee River reach 5 feet per second.

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. Electrocuting 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 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.

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.

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. This was the case with the Chester Bridge during the 1993 flood. 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.

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.

Flood waters saturate the ground which leads to infiltration into sanitary sewer lines. When wastewater treatment facilities 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, tetanus shots are given to people affected by a flood.

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.

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.

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.

Damage: Deep or fast moving waters will push a building off its foundation. Structural damage can also be caused by the weight of standing water, known as “hydrostatic pressure.”

Basement walls and floors are particularly susceptible to damage by hydrostatic pressure. Not only is the water acting on basement walls deeper, a basement is subjected 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.

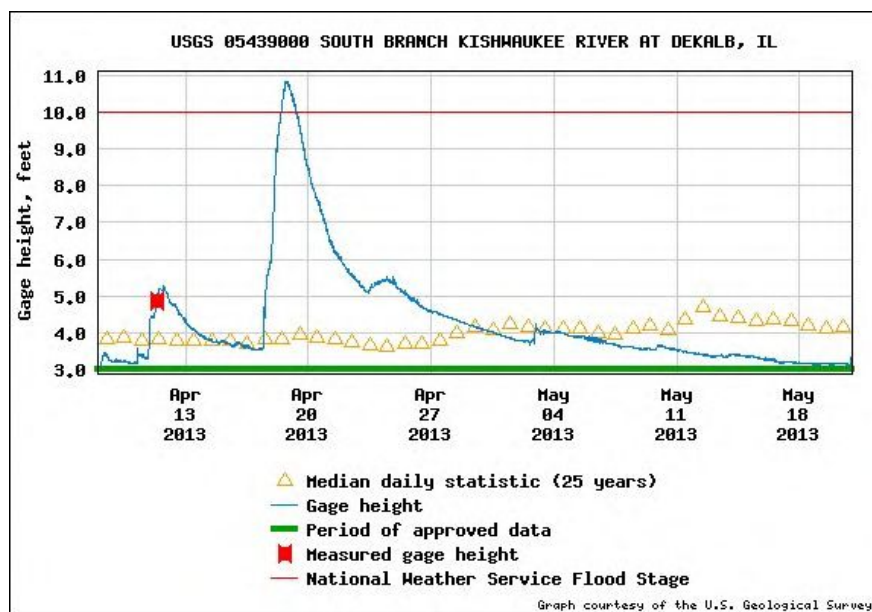
Another common type of damage inflicted by a flood is caused by soaking. When soaked, many materials change their composition or shape. Wet wood will swell and, if dried too quickly, will crack, split or warp. Plywood can come apart. Gypsum wallboard will fall apart if it is bumped before it dries out. 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. 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.

August 2013 flood event:

The most recent flood event and federal disaster declaration beginning on August 16, 2013 and ending on May 5, 2013. The USGS figure to the below shows the river gauge height on the South Branch of the Kishwaukee River.



The USGS figure above shows the South Branch of the Kishwaukee River at DeKalb reaching its peak flood stage on April 19, 2013.

On May 8, 2013, Governor Pat Quinn requested a major disaster declaration due to severe storms, straight-line winds, and flooding during the period of April 16 to May 5, 2013. On May 10, 2013, President Obama declared that a major disaster exists in the State of Illinois. This declaration made Individual Assistance requested by the Governor available to affected

individuals and households in Cook, DeKalb, DuPage, Fulton, Grundy, Kane, Kendall, Lake, LaSalle, McHenry, and Will Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide. There were 3,517 residences impacted statewide from this storm, with total costs estimated at \$23,756,760.

Historical events: Recent flood events are described in Table 2-9. The information included in Table 2-9 was collected from the NCDC, the NWS, and information provided by DeKalb County municipalities and townships.

Table 2-9
DeKalb County Recent Flood Events and Damage Estimates

Date:	Type of Flooding	Rainfall Estimate	Areas Impacted	Number of Properties Damaged	Number of Vehicles Damaged	Other Damage or Incidents	Estimate of Damages
September 12-18, 1978	Floodplain and stormwater	5 inches	City of DeKalb and Kingston Township	100	Over 20	Roadways	\$250,000
July 22, 1982	Floodplain and stormwater	7 inches	City of DeKalb	30-50			
July 2-4, 1983	Floodplain and stormwater		City of DeKalb	Over 150			\$3,000,000
March 3-5, 1985	Ice jam		City of DeKalb	5-10			\$1,000
August 27, 1987	Floodplain and stormwater	5 inches	City of DeKalb	40-70			\$100,000
July 18, 1996*	Floodplain and stormwater	7 inches	DeKalb, Sycamore, Kirkland, Unincorporated	400	Yes	Roadways	(City of DeKalb 450,000)
February 20-21, 1997	Floodplain		City of DeKalb, Unincorporated	40-60**		1 death	\$75,000
May 19, 1998	Flash flood		Eastern part of County			Roadways	
October 17, 1998	Minor						
June 13, 1999	Floodplain		Kishwaukee River				
July 10, 2000	Flash flood		Southern part of County				
June 3-4, 2002	Minor	4.7 inches	Northern part of County				
August 22, 2002	Flash flooding		Kirkland			Roadways	
May 30-31, 2004	Stormwater	(1.9 inches in 1 hour)	City of DeKalb, Malta, NIU	40		Roadways	\$70,000
August 23-28, 2007*	Severe storms	4.1	City of DeKalb, Kirkland, Unincorporated	140			Unknown
September 13, 2008*	Hurricane Ike						
April 16, 2013 – May 5, 2013*	Severe Storms, and Flooding		Entire County	3,517			\$23,756,760 (Illinois)

* Federal disaster declared

** Not including evacuation and flooding in Evergreen Park near Sycamore.

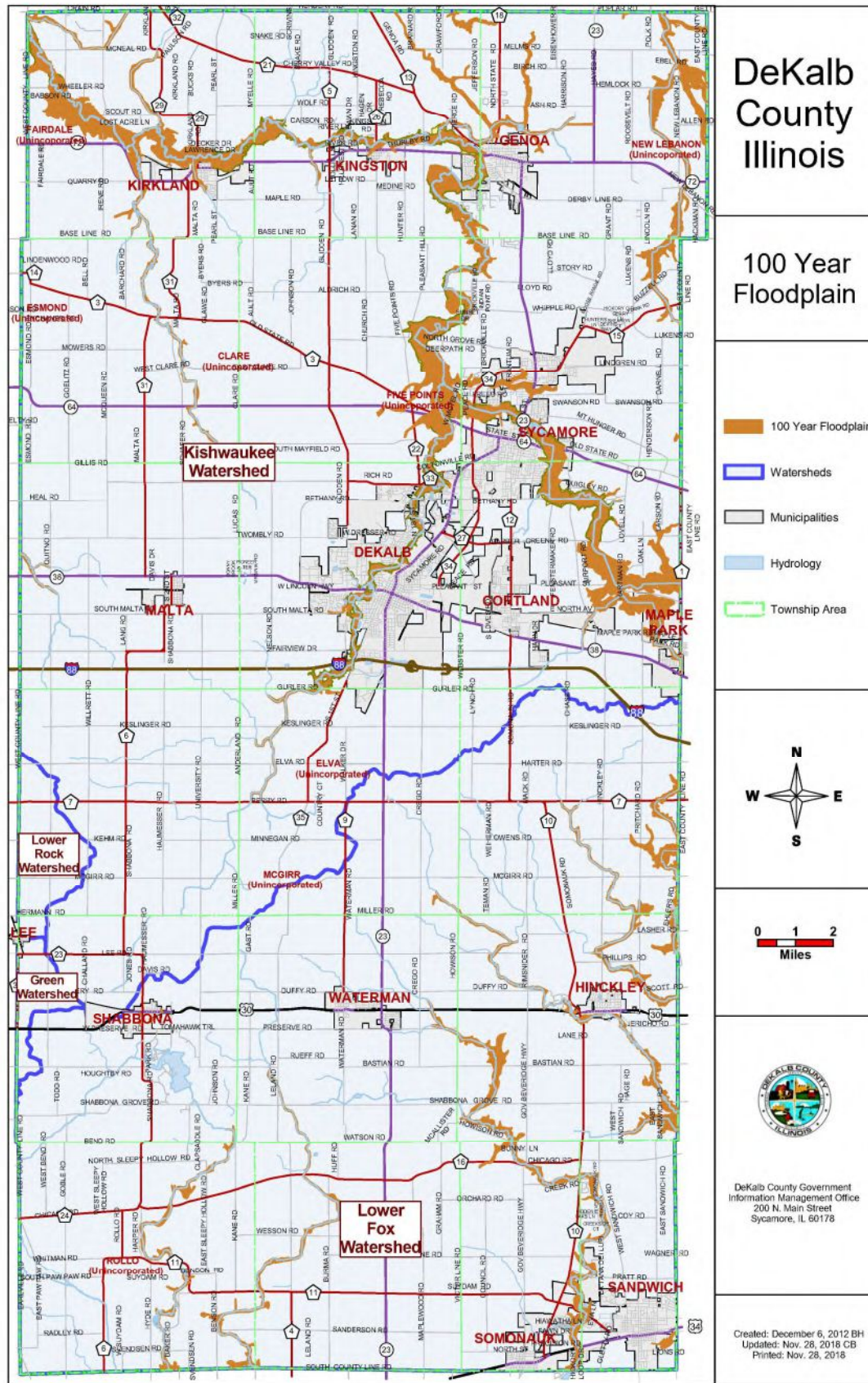


Figure 2-3 DeKalb County 100-year Floodplains

Probability of future occurrences: By definitions used in the NFIP, the probability of a 10-year flood is 10 percent in any given year, and 1 percent for a 100-year flood in any given year. Future floods are a certainty in DeKalb County, however the County and municipalities are working to reduce the potential for future flood damage, as described in Chapters 5-10.

2.2.3 Severe Winter Storms

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 percent 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 classifications are shown on the next page.

Table 2-10. Snow Classifications	
Blizzard	Winds of 35 miles per hour or more with snow and blowing snow reducing visibility to less than 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 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.



Health and Safety: Death and injuries involving motor vehicles are common with severe winter storms. Life, health and safety are also a concern with shoveling and other snow removal efforts. Safety and health concerns associated with extreme cold are discussed in Chapter 3. 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, and nose) with more circulation difficulties are most frequently affected.

Damage: Damage that occurs with snow storm is predominately related to vehicle accidents. Other damage can occur to roofs, due to the weight of snow. Damage to roofs and interior walls of buildings can occur when ice dams form at the base of a roof and cause capillary action of melting snow up between roof shingles. Water between roof shingles can potentially enter into building wall systems or to window frames. Damage to trees and power lines is common due to ice storms.

Historical events: The average annual snowfall for DeKalb County is 34.8 inches. The largest snowfall over a period of days was recorded on January 24, 1979, with a total of 29 inches. The heaviest 1-day snowfall on record was 15.6 inches, recorded on January 13, 1979.

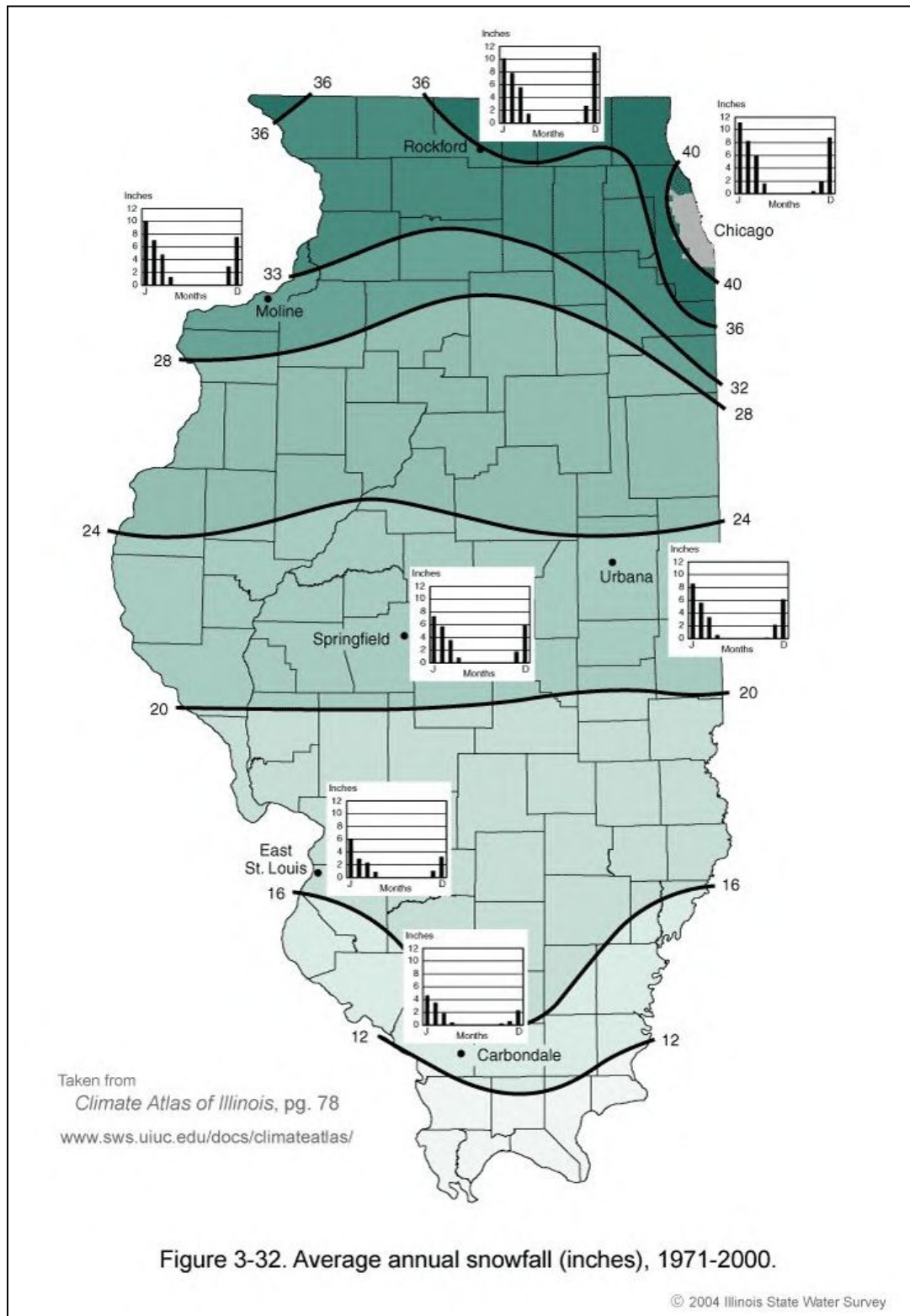
The NCDC does not report any snow or ice events for DeKalb County, but known significant winter storm events for DeKalb County are shown in Table 2-11.

Table 2-11. Severe Winter Storms in DeKalb County (1994-2020) (NCDC)

BEGIN DATE	EVENT TYPE	BEGIN DATE	EVENT TYPE
1/15/1997	Winter Storm	1/31/2008	Winter Storm
1/8/1998	Heavy Snow	2/1/2008	Winter Storm
1/1/1999	Heavy Snow	2/5/2008	Winter Storm
3/5/1999	Heavy Snow	2/25/2008	Winter Storm
3/8/1999	Heavy Snow	12/18/2008	Winter Storm
1/19/2000	Heavy Snow	12/21/2008	Blizzard
2/18/2000	Heavy Snow	12/8/2009	Winter Storm
12/11/2000	Blizzard	12/26/2009	Winter Storm
1/31/2002	Winter Storm	12/11/2010	Winter Storm
3/2/2002	Winter Storm	2/1/2011	Blizzard
3/4/2003	Winter Storm	1/20/2012	Winter Storm
1/4/2005	Heavy Snow	3/5/2013	Winter Storm
1/20/2006	Winter Storm	1/26/2014	Winter Storm
11/30/2006	Winter Storm	2/1/2015	Blizzard
12/1/2006	Winter Storm	11/20/2015	Heavy Snow
2/6/2007	Winter Storm	12/4/2016	Heavy Snow
2/13/2007	Blizzard	2/8/2018	Winter Storm
2/25/2007	Winter Storm	11/25/2018	Winter Storm
3/2/2007	Blizzard	1/18/2019	Winter Storm
12/15/2007	Heavy Snow	4/14/2019	Winter Storm

According to the National Climatic Data Center, there have been 40 winter events in DeKalb County since 1994.

Probability of future occurrence: The probability of a winter storm is 100 percent for any given year. According to the NWS, the frequency of severe winter storm is every three to five years in DeKalb County.



2.2.4 Tornado

Tornadoes are one of nature's most violent storms. A tornado is a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of one mile wide and 50 miles long. A majority of tornadoes, however, have wind speeds of 112 mph or less. The Fujita Tornado Scale is used to categorize tornado events. Often, a tornado isn't classified until the damaged area is inspected to determine the level of damage.

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.

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

Tornadoes come in all shapes and sizes and can occur anywhere in the U.S. at any time of the year. In the southern states, peak tornado season is March through May, while peak months in the northern states are during the summer months.

In an average year, about 1,000 tornadoes are reported across the United States. Since 1995, deaths due to tornadoes are about 55 per year. Illinois is tied for 7th in the United States with an average of 26 tornadoes per year. A tornado can occur any time of year and at any time of day, though statistics show that over half strike between 3:00 p.m. and 7:00 p.m.

Health and safety: Although no deaths have been attributed to tornadoes in DeKalb County, the risk of loss of life is still great. The August 1990 twister in Plainfield, Illinois caused 28 deaths. The Utica, Illinois tornado of 2004 killed eight people in one location.

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 in Plainfield, Illinois 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.

Description of the April 9, 2015 Rochelle/Fairdale EF-4 Tornado

Seven tornadoes were confirmed in north central Illinois in the NWS Chicago CWA. Six of the tornadoes formed from a single supercell. The atmosphere was ripe for severe weather due to highly anomalous moisture and instability for early April across the region. A strong low-pressure system advanced into this favorable air mass. Combined with robust wind shear, this helped to trigger these potent storms. A long tracked violent tornado destroyed numerous homes and farmsteads along its path across north central Lee, eastern Ogle, northwest Dekalb, and southern Boone counties. This path included the far northwest side of Rochelle, Interstate-39, and a direct hit in the community of Fairdale where two fatalities occurred. This was the strongest tornado in the NWS Chicago CWA since the F5 tornado that struck Plainfield, IL on August 28th, 1990.

The tornado that hit Fairdale on April 9, 2015 was the third segment of the Rochelle-Fairdale EF-4 tornado. At its strongest, peak winds were estimated to be 200 mph. The tornado entered the county just southwest of Fairdale before directly hitting the small community. Peak winds were estimated at 165 mph in Dekalb County, rating this section of the tornado a high-end EF-3.

Approximately 71 homes in the community had been damaged, 17 of which had been completely destroyed with all walls collapsed or removed from the buildings. Some homes that were only nailed to the foundation were swept clean. Two fatalities and 11 injuries occurred in Fairdale. A 67-year-old woman and her neighbor, a 69-year-old woman, were both killed in their homes. The tornado began to shift north (left) at this point during its lifecycle as it left Fairdale. Several homes were heavily damaged with large sections of the roofs removed along Wheeler Road and dozens of trees were snapped and uprooted. A few trees were debarked. The second story was ripped off of a home near the intersection of McNeal Road and Irene Road. A two-story rebar reinforced cinder block silo was destroyed. The tornado continued into Boone County just east of Irene Road. (Tornado 2c of 7).

Source: NOAA Storm Events Database
(<https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=17%2CILLINOIS>)

Damage: Property damage due to tornadoes can be significant. The damage to buildings can range from missing roof shingles or pieces of siding, to buildings being lifted off of their foundation, or destroyed completely.

Historical events: Table 2-11 shows the recorded tornado events for DeKalb County from 1950 to 2020, as recorded by NCDC. These events are also plotted in Figure 2-4. Details on the injury in the 1975 tornado are not available. Section 2.2.2 discusses the August 24, 1998 microburst at Northern Illinois University that injured over twenty people. The Village of Waterman reports tornado warnings being issued with the severe summer storms in September 2006.

Table 2-11 DeKalb County Tornadoes (1960-2020)

	Date	Time	Magnitude	Length (miles)	Width (yards)	Deaths	Injuries	Property Damage
1. DeKalb County	4/21/1967	1640	F1	2	40	0	0	25K
2. DeKalb County	5/14/1972	1140	F0	0	10	0	0	0K
3. DeKalb County	6/18/1975	1200	F2	5	27	0	1	250K
4. DeKalb County	6/30/1977	845	F	2	90	0	0	25K
5. DeKalb County	5/18/1982	1727	F0			0	0	0K
6. Malta	6/6/1996	1515	F0	2	20	0	0	0
7. Kirkland	5/10/2001	2110	F0	0	20	0	0	0
8. Shabbona Grove	6/10/2003	1730	F0	1	50	0	0	0
9. Waterman	5/10/2004	1630	F0	0	10	0	0	0
10. MC GIRR	5/13/2011	1230	EF0	0	50	0	0	0
11. SHABBONA	6/12/2013	1532	EF1	2	100	0	0	20K
12. Fairdale	4/9/2015	1812	EF3	5	700	2	11	8 Mil
13. Fairdale	4/9/2015	1815	EF1	2	100	0	0	5K
14. New Lebanon	5/23/2020	1706	EF0	2	50	0	0	0
Totals:						2	12	

Probability of future occurrences: From Table 2-11 above, fourteen tornadoes have been recorded in the last 60 years for DeKalb County. This can be translated to one tornado in every 4.3 years, or a probability of 23 percent chance in any given year.

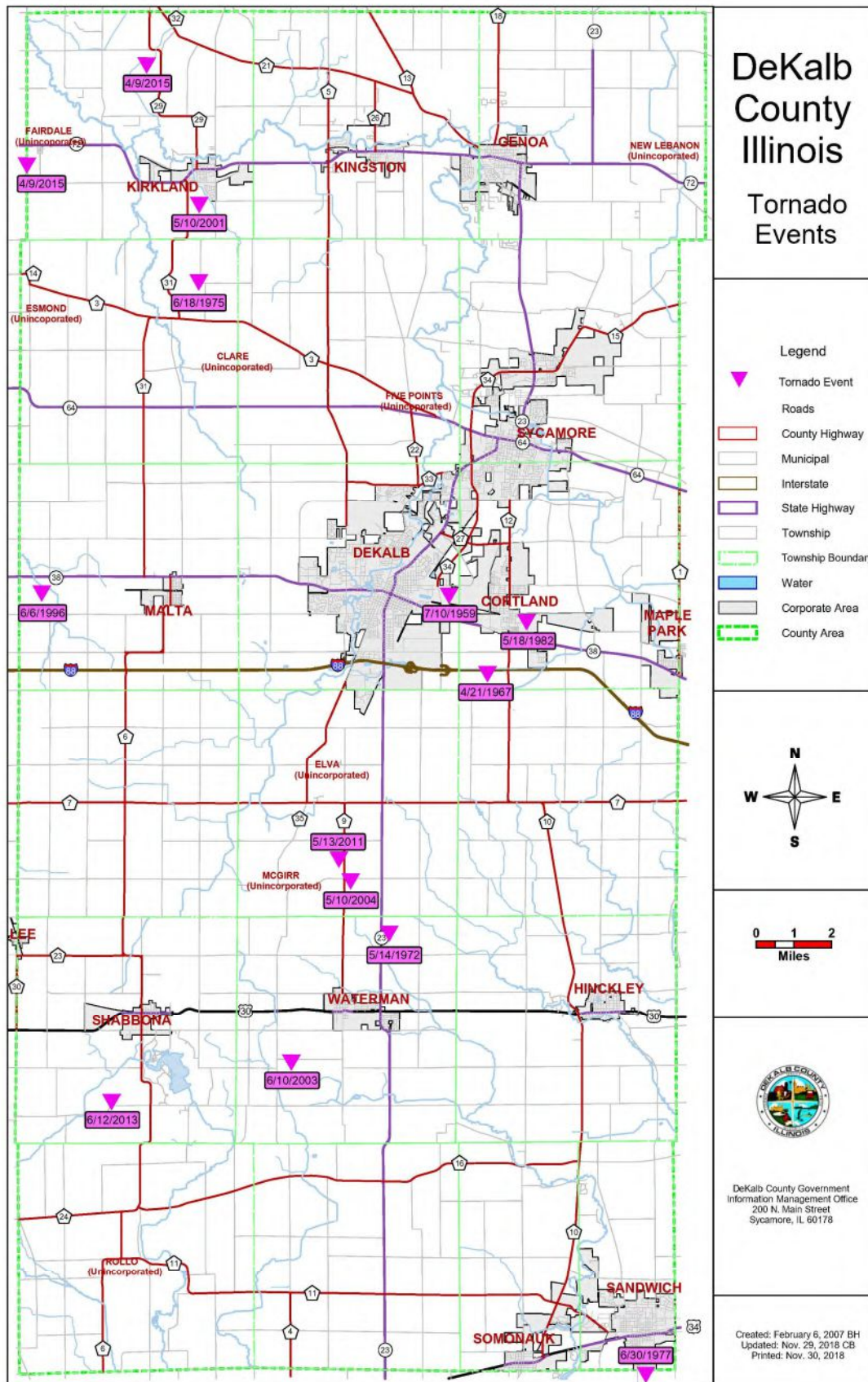
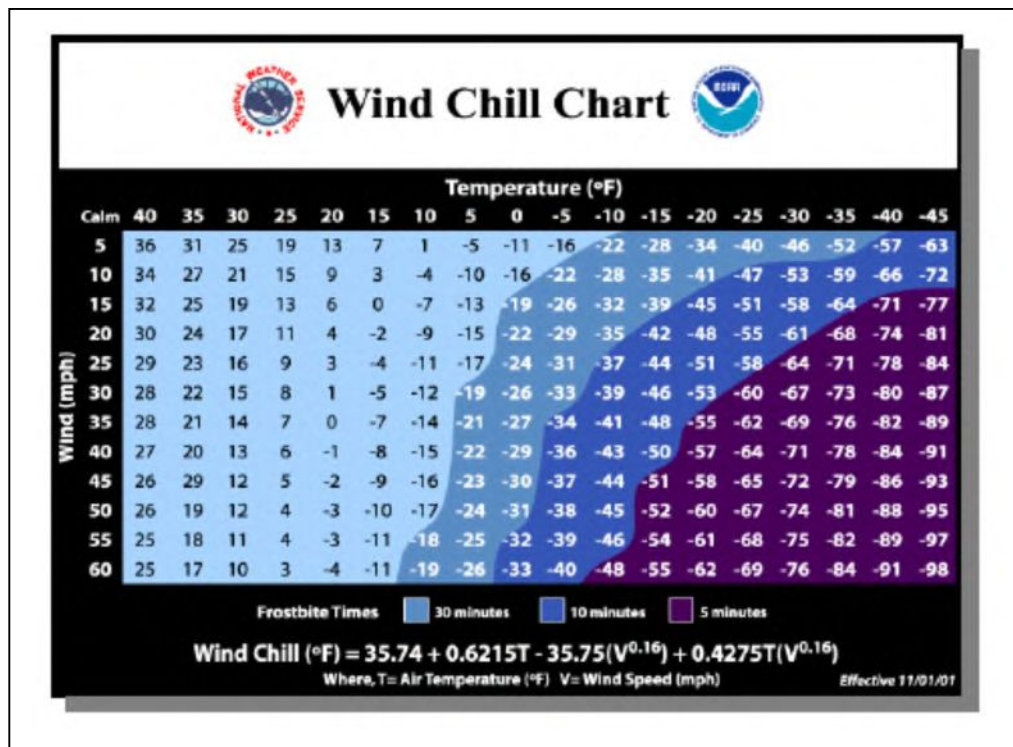


Figure 2-4 DeKalb County Recorded Tornado Events (1950-2018)

2.2.5 Extreme Cold

Extreme cold: The term “extreme cold” can have varying definitions in hazard identification. Generally, extreme cold events refer to a prolonged period of time (days) with extremely cold temperatures. An extreme cold event to the National Weather Service can refer to a single day of extreme or record-breaking day of sub-zero temperatures. Extended or single day extreme cold events can be hazardous to people and animals, and cause problems with buildings and transportation.

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. The chart on page 2-8 shows the conversion of outside air temperatures to wind chill temperatures.



Winter chill advisories are issued by the NWS when wind chill temperatures are between -20 and -29 degrees Fahrenheit and winds are greater than 10 miles per hour. When wind chill temperatures are -30 degrees and lower, with winds greater than 10 miles per hour, a wind chill warning is issued.

Health and safety: 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, and nose) with more circulation difficulties are most frequently affected.

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 re-warm a person, even mild cases.

Injuries Related to Cold

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

Damage: Damage to structures due to extreme cold events is relatively low. Freezing pipes can be the largest problem. Broken water mains can put significant demands on municipal public works departments.

Historical events: Eleven extreme cold temperature events have been recorded for Illinois in the past 13 years. There have been no deaths in DeKalb County attributed to extreme cold.

In addition to the winter storms, heavy snow, and blizzards, there have been 11 extreme cold events since 1994 as shown in Table 2-12.

Table 2-12. Extreme Cold in DeKalb County (1994-2020) (NCDC)

Date	Event Type
2/3/2007	Extreme Cold/Wind Chill
2/10/2008	Extreme Cold/Wind Chill
12/21/2008	Extreme Cold/Wind Chill
1/15/2009	Extreme Cold/Wind Chill
1/6/2014	Extreme Cold/Wind Chill
1/27/2014	Extreme Cold/Wind Chill
1/7/2015	Extreme Cold/Wind Chill
2/19/2015	Extreme Cold/Wind Chill
1/1/2018	Extreme Cold/Wind Chill
1/2/2018	Extreme Cold/Wind Chill
1/29/2019	Extreme Cold/Wind Chill

Probability of future occurrences: From the recent recorded occurrences, with consideration of their severity, the probability of occurrence is estimated to be once every 1.2 years, or a 85 percent chance in any given year.

2.2.6 Extreme Heat

Extreme heat is when temperatures are 10 degrees, or more, above the average high temperature for the region, and last for several weeks. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility.

Heat kills by pushing the human body beyond its limits. Under normal conditions, the body's internal thermostat produces perspiration that evaporates and cools the body. However, in extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature.

Heat Advisory

Issued within 12 hours of the onset of the following conditions: heat index of at least 105°F but less than 115°F for less than 3 hours per day, or nighttime lows above 80°F for 2 consecutive days.

Heat Cramps

Muscular pains and spasms due to heavy exertion. Although heat cramps are the least severe, they are often the first signal that the body is having trouble with the heat.

Heat Exhaustion

A mild form of heat stroke, characterized by faintness, dizziness, and heavy sweating.

Heat Index

The Heat Index (HI) or the "Apparent Temperature" is an accurate measure of how hot it really feels when the Relative Humidity (RH) is added to the actual air temperature.

Heat Lightning

Lightning that occurs at a distance such that thunder is no longer audible.

Heat Stroke

A condition resulting from excessive exposure to intense heat, characterized by high fever, collapse, and sometimes convulsions or coma. Also called sun stroke.

Heat Wave

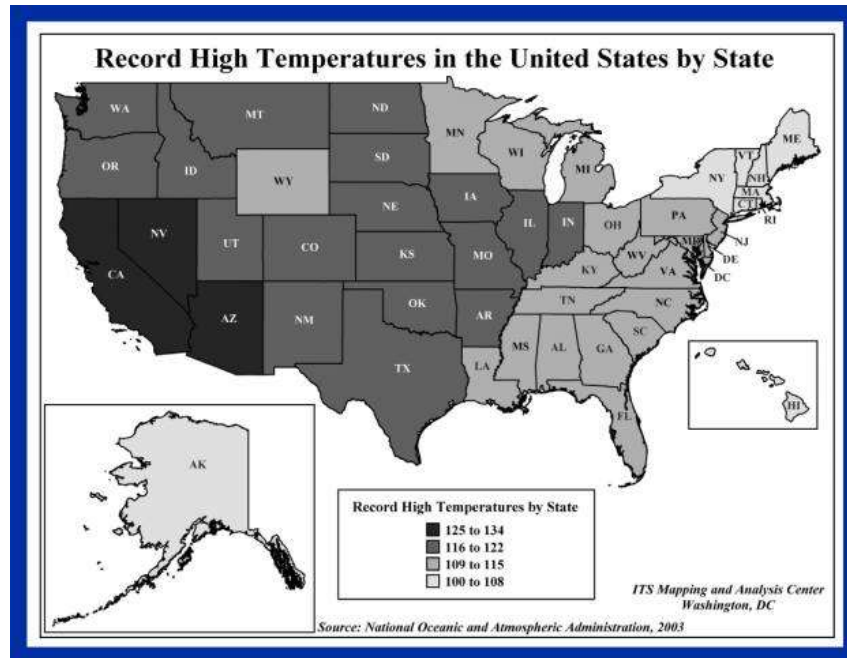
A period of abnormally and uncomfortably hot and unusually humid weather. Typically a heat wave lasts two or more days.

Source: National Weather Service

Most heat disorders occur because the victim has been overexposed to heat or has over exercised for his or her age and physical condition. Other conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality.

Extreme heat events can be just as deadly as other natural hazards due to the nature of the event. Extreme heat doesn't immediately impact people when it sets in, instead it is when the periods of extreme heat last for days and weeks that it takes its toll on people. The elderly are at particular risk. Livestock can be affected, as well.

Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought creates a very dangerous environment. Also, a prolonged drought, such as the drought that remained in the Midwest from 1987 to 1991, can have a serious economic impact on a community. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock.



Historical events: The only recorded extreme heat event for DeKalb County recorded at the NCDC was for July 4-6, 2012. High temperatures at Chicago O'Hare Airport reached 102 on the 4th, 103 on the 5th and 6th and 98 on the 7th. Low temperatures remained in the upper 70s to lower 80s during much of the heat wave with a low temperature of just 82 degrees on the morning of the 6th. Maximum heat index values were mostly in the range of 105 to 115 each day across northeast Illinois. A cold front moved across the area during the late morning and early afternoon of July 7th, bringing several days of near normal temperatures for mid-July. Between July 4th and July 11th, the intense heat was a direct or contributing factor to at least 23 deaths in Cook County.

Probability of future occurrences: There has been an extreme heat or excessive heat event recorded in Illinois every year for the past 12 years. DeKalb was included in only the 2012 event by NOAA, but examining the data for surrounding counties, it is estimated that an extreme heat event has a likelihood of impacting DeKalb County every 10 years for a probability of 10 percent.

2.2.7 Drought

Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought creates a very dangerous environment. Also, a prolonged drought, such as the drought that remained in the Midwest from 1987 to 1991, can have a serious economic impact on a community. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock.

While there is no universally accepted definition of drought, it can generally be defined as a period of unusually persistent dry weather that continues long enough to cause serious problems such as crop damage and/or water supply shortages. A drought may also be defined as the cumulative deficit of precipitation relative to what is normal for a region over an extended period of time, usually a season or more. There are effectively four types of drought, differentiated based on the use and need for water.

Meteorological Drought: Meteorological drought is a period of well-below-average precipitation that spans a few months to a few years.

Agricultural Drought: An agricultural drought is a period when soil moisture no longer meets the needs of a particular crop to germinate and grow.

Hydrological Drought: Hydrological drought is a period when surface and subsurface water supplies (i.e., streams, lakes, aquifers, etc.) drop below normal levels.

Socioeconomic Drought: Socioeconomic drought is a period when water shortages begin to affect people when there is not enough water to meet human and environmental needs. The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. It is generally difficult to pinpoint the beginning and the end of a drought. Because the impacts of a drought accumulate slowly at first, a drought may not be recognized until it has become well established. Even during a drought there may be one or two months with above average precipitation totals. These wet months do not necessarily signal the end of a drought and generally do not have a major impact on moisture deficits. Droughts can be short, lasting just a few months, or they can persist for several years before regional climate conditions return to normal. While drought conditions can occur at any time throughout the year, the most apparent time is during the summer months. Nationally, drought impacts often exceed \$1 billion due in part to the sheer size of the areas affected.

Measuring Droughts: There are several quantitative measures (indices) that have been developed to measure drought in the United States. How these indices measure drought depends on the discipline affected (i.e., agriculture, hydrology, meteorology, etc.) and the region being considered. The Palmer Drought Severity Index (PDSI) and the U.S. Drought Monitor will be highlighted in the Plan. The PDSI was the first comprehensive drought index developed in the United States. The U.S. Drought Monitor is a relatively new index that combines quantitative measures with input from experts in the field. NOAA has begun including the U.S. Drought Monitor's drought intensity ratings along with the weather information provided for drought events recorded with the National Climate Data Center.

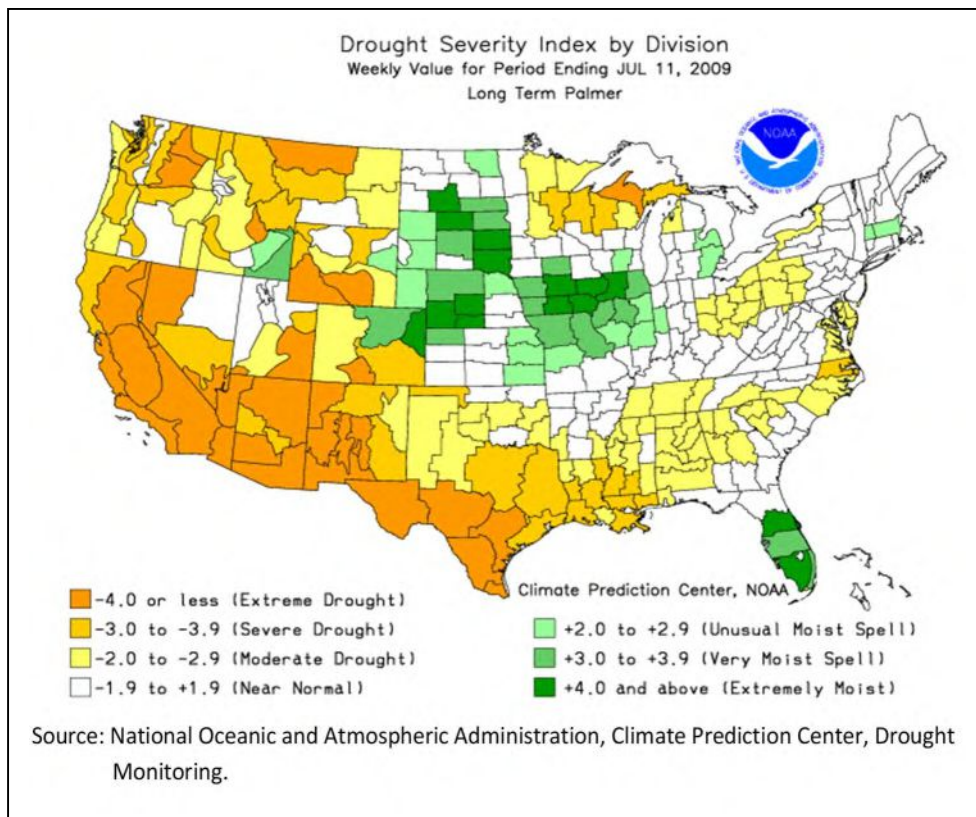
Palmer Drought Severity Index (PDSI): The PDSI, or Palmer Index, was developed in 1965 and is a long-term meteorological index that indicates when weather conditions have been abnormally dry or abnormally wet. It is most effective at measuring impacts that are sensitive to soil moisture conditions, such as agriculture. Many federal and state agencies rely on PDSI to trigger drought relief programs. It provides a standardized method to measure moisture conditions so that comparisons can be made between various locations and times. The PDSI is most useful when working with large areas of uniform topography.

The PDSI is calculated based on precipitation and temperature data, as well as the local available water content of the soil and the cumulative patterns of previous months. The index ranges from +4 (extremely moist) to -4 (extreme drought). NOAA's Climate Prediction Center produces a weekly map that shows the climate divisions and their PDSI value by color. The map to the right shows an example.

U.S. Drought Monitor: A relatively new tool used for assessing drought conditions is the U.S. Drought Monitor. It is designed to provide the general public, media, government officials and others with an easily understandable "big picture" overview of drought conditions across the United States.

Palmer Classification System	
Index Value	Description
4.0 or more	extremely wet
3.0 to 3.99	very wet
2.0 to 2.99	moderately wet
1.0 to 1.99	slightly wet
0.5 to 0.99	incipient wet spell
0.49 to -0.49	near normal
-0.5 to -0.99	incipient dry spell
-1.0 to -1.99	mild drought
-2.0 to -2.99	moderate drought
-3.0 to -3.99	severe drought
-4.0 or less	extreme drought

Source: National Drought Mitigation Center, University of Nebraska – Lincoln



The U.S. Drought Monitor is unique in that it blends multiple numeric measures of drought, including the PDSI and three other indices, and the best judgments of experts to create a weekly map that depicts drought conditions across the United States. There are five drought intensity categories, D0 through D4, to identify areas of drought.

U.S. Drought Monitor – Drought Severity Classifications

Category	Possible Impacts
D0 (Abnormally Dry)	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.
D1 (Moderate Drought)	Some damage to crops, pastures; streams, reservoirs, or wells low; some water shortages developing or imminent; voluntary water-use restrictions requested.
D2 (Severe Drought)	Crop or pasture losses likely; water shortages common; water restrictions imposed.
D3 (Extreme Drought)	Major crop/pasture losses; widespread water shortages or restrictions.
D4 (Exceptional Drought)	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies.

Source: National Integrated Drought Information System, U.S. Drought Portal, "Drought Monitor: State-of-the-Art Blend of Science and Subjectivity", U.S. Drought Monitor, January 2008.

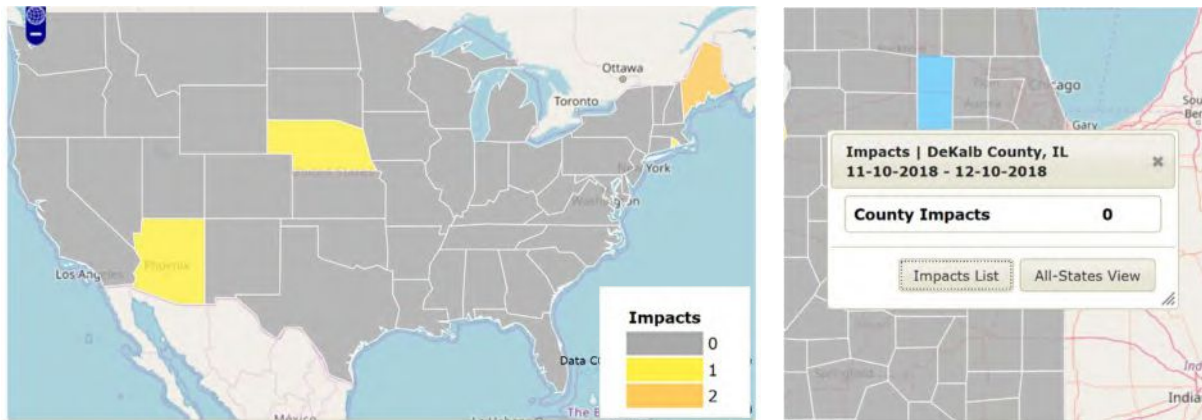
The U.S. Drought Monitor is designed to provide a general and up-to-date overview of current drought conditions across the county. It is not designed, however to depict local conditions. As a result, there could be water shortages or crop failures within areas not designated as drought, just as there could locations with adequate water supplies in an area designated as D3 or D4. Figure 2-12 shows an example of the U.S. Drought Monitor weekly map.

Historical events: The following summarizes the previous occurrences as well as the extent or severity of the drought events in northeastern Illinois. Information obtained from the NOAA Database show two drought events in DeKalb County in 2005, which continued into early 2006. Dry conditions developed during April and May 2005 across northern Illinois. By June, the dry conditions had developed into a severe drought with many locations seeing one of the driest Junes on record. Chicago O'Hare Airport measured just 0.76 inches of rainfall during June 2005, which made it the third driest June on record in Chicago. After above normal precipitation during January 2006, extreme drought conditions were lowered to severe across all of northern Illinois on February 9th. Also, no drought-related injuries or deaths were reported.

- In 1983, all 102 Illinois counties were proclaimed state disaster areas because of high temperatures and insufficient precipitation beginning in mid-June.
- In 1988, approximately half of the counties in Illinois (including DeKalb County) were impacted by drought conditions, although none of the counties were proclaimed state disaster areas. Disaster relief payments exceeding \$382 million were paid to landowners and farmers as a result of this drought.
- In 2005, drought conditions impacted much of the state, including DeKalb County. Dry conditions reached a historic level of severity in some parts of Illinois and ranked as one of the three most severe droughts in Illinois based on 112 years of data.

Though much of Illinois was in drought conditions during the summer of 2012, DeKalb County is not shown in the Events Database.

Drought conditions are tracked at the state and county level. This information can be found at National Integrated Drought Information System. Using their U.S. Drought Portal, DeKalb County is not experiencing drought conditions in December 2018.



Source: National Integrated Drought Information System, U.S. Drought Portal, U.S. Drought Monitor.

Probability of future occurrence: Drought events affect the entire County in any one of the four drought categories discussed above. The County and municipalities rely on groundwater for their source of drinking water. With the anticipated growth in the total County population, this will be a growing concern. The agricultural community will continue to be affected by droughts. All communities in DeKalb County are subject to drought-related impacts. The odds of a drought in any year are most likely less than 10 percent, but it is recognized that droughts can extend over multiple years.

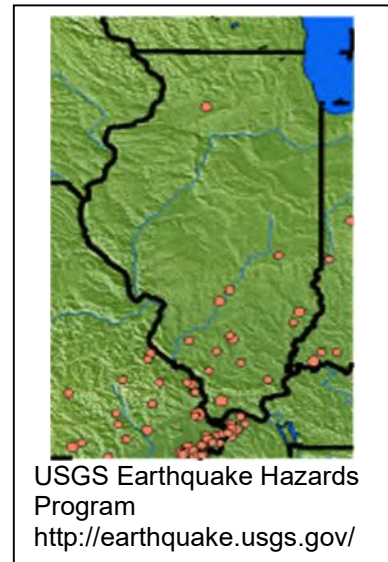
2.2.8 Other Natural Hazards

Other natural hazards that exist in DeKalb County are shown in Table 2-4, including drought, earthquakes and dam failure. These hazards have a low frequency and a small area of impact. They are, however, hazards that can impact the region. Drought, earthquakes, and dam failure will not be included in the vulnerability assessment (Chapter 3). Available data and resources regarding permitted droughts and earthquakes are discussed in this section for informational purposes. A hazard analysis of these hazards may be performed in future revisions or updates to this *Plan*.

2.2.8.1 Earthquakes

Earthquakes are one of nature's most damaging hazards. Earthquakes, and the potential damage from earthquakes, are more widespread than 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.

Illinois has the potential for severe earthquake damage due to the New Madrid Fault located near St. Louis, Missouri. The figure to the right shows recent recorded seismic activity in Illinois.



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.

Measuring Earthquakes:

For many years, the Richter Scale was the most common and familiar earthquake magnitude scale. As recording instruments have become increasingly sophisticated, more accurate calculations have evolved to determine magnitude. Today, the Richter Scale is seldom used, and scientists prefer to designate any given earthquake with just the word "magnitude," which can represent a number of different scales used in the calculation process.

There are two important things to remember about earthquake magnitude:

- The size of an earthquake increases by a factor of 10 as magnitude increases by one whole number. So, a magnitude 6.0 earthquake is 10 times larger than a 5.0; a magnitude 7.0 is 100 times larger, and a magnitude 8.0 is 1,000 times larger than a 5.0.
- The amount of energy released, however, increases by a factor of about 32. Looking at the same magnitudes, a magnitude 6.0 earthquake releases 32 times more energy than a magnitude 5.0; a 7.0 releases about 1,000 times more energy, and a magnitude 8.0 releases about 32,000 times more energy than a 5.0. It is easy to see why magnitude 7.0 and 8.0 earthquakes cause such widespread damage and destruction.

From these numbers it can also be observed that even when a fault produces many small earthquakes, there is simply not enough energy released to prevent a large one. A fault would have to have 1,000 4.0 earthquakes to prevent the occurrence of one 6.0 earthquake, or a million 4.0 events to prevent a single 8.0 earthquake.

Source: Illinois Emergency Management Agency

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 affects of the earthquake more localized.

The Modified Mercalli and Richter Scales are compared in the table below, 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 DeKalb County the intensity may be observed as a "VI."

Health and safety: The main health concerns from earthquakes would arise from sheltering people and caring for injuries. These would be the same as other quick and destructive hazards, such as tornadoes. 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.*) The greatest potential for loss of life is to people within a collapsing building.

Due to the distance of DeKalb County from the New Madrid Fault (described on the following page), the threat to DeKalb County residents is relatively low.

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, and
- Multi-story structures with open or "soft" first floors.

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.

The threat to buildings in DeKalb County is low, though older, unreinforced masonry structures, including residences and downtown buildings could suffer damage. Should a major earthquake occur in southern Illinois, utilities throughout Illinois could be severely impacted. As an

example, if natural gas pipelines were to rupture as a result of an earthquake during the winter, DeKalb County building that use natural gas for a heating source could be impacted for days or weeks.

Historical events: In the United States, the most frequent reports of earthquakes come from the West Coast, but the largest earthquakes felt in the U.S. 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.

Earthquake Frequencies in the Central United States

Earthquake Magnitude	Expected Rate (Years)
5	10-12
6	70-90
7	250-500
8	550-1200

Five of these quakes were larger than a magnitude of 8.0 on the Richter Scale, which 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.

Magnitude	Mercalli Intensity	Abbreviated Modified Mercalli Intensity Scale
1.0 to 2.9	I	Not felt except by a very few under especially favorable conditions.
3.0 to 3.9	II	Felt only by a few persons at rest, especially on upper floors of buildings.
	III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
4.0 to 4.9	IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
	V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
5.0 to 5.9	VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
	VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
6.0 to 6.9	VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
	IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
7.0 and higher	X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
	XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
	XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.
*Typical Maximum Modified Mercalli Intensity – at epicenter		

The New Madrid Fault

The New Madrid seismic zone (NMSZ) extends more than 120 miles southward from Cairo, Illinois, at the junction of the Mississippi and Ohio rivers, into Arkansas and parts of Kentucky and Tennessee. It roughly follows Interstate 55 through Blytheville down to Marked Tree, Arkansas, crossing four state lines and the Mississippi River in three places as it progresses through some of the richest farmland in the country.

The greatest earthquake risk east of the Rocky Mountains is along the NMSZ. Damaging earthquakes are not as frequent as in California, but when they do occur, the destruction covers more than 15 times the area because of the underlying geology and soil conditions prevalent in the region. The zone is active, averaging about 200 earthquakes per year, though most of them are too small to be felt. With modern seismic networks, the capability to detect earthquakes has greatly increased, and many more very small earthquakes are being detected now than in the past. There is a common misconception that the number of earthquakes has increased over the years, but the increase is due to more sophisticated recording methods that can detect earthquakes that were previously unrecorded. The history of the region tells us, however, that the earthquake risk is the most serious potential disaster we could face.

In the winter of 1811-1812, a series of very large earthquakes occurred along the fault system buried deep within the NMSZ. Using felt information reported in newspapers and from eyewitness accounts of effects, magnitudes have been estimated to be 7.8, 8.0, and 8.1. In addition to the main shocks in December, January, and February, there were more than a thousand aftershocks, some of which were almost as large as the main shocks. The earthquakes were felt throughout the eastern United States and into Canada, ringing church bells as far away as Richmond, Virginia, and Charleston, South Carolina. Closer to home, much of the area was flooded, making it unfit for farming for many years, and most of the building infrastructure in the epicentral region was destroyed. In some areas, land rose or subsided as much as 20 feet, and small waterfalls or rapids were observed on the Mississippi River, causing part of the river to flow backwards for a short time. Seismologists now believe the New Madrid earthquakes represent the greatest known release of seismic energy in the world. As a result of the earthquakes, Congress passed the nation's first disaster assistance bill, offering arable land to farmers in exchange for ruined cropland, the initiation of a federal disaster policy that continues today.

Since 1811 and 1812, two more large earthquakes have occurred in the NMSZ – an estimated magnitude 6.4 near Marked Tree, Arkansas, in 1843, and an estimated magnitude 6.8 near Charleston, Missouri, in 1895. While scientists believe magnitude 8.0 earthquakes are very rare in this area, they are concerned about smaller but potentially damaging earthquakes similar in size to those in 1843 and 1895, which occur more frequently. With the older infrastructure in our region and the relatively unprepared population, even a magnitude 6.0 event could be devastating to people and communities in the epicentral region.

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.

Table 2-12 shows more recent earthquake activity in Illinois. The June 28, 2004 was estimated to be a 4.2 magnitude earthquake with an epicenter northwest of Ottawa. The estimated intensity in DeKalb County, according to the USGS was II to III.

Table 2-13. Magnitude 2 and greater earthquakes by county from 1795 through 2017 excluding aftershocks and swarms.

COUNTY	FELT		SOME POSSIBLE DAMAGE		COUNTY	FELT		SOME POSSIBLE DAMAGE	
	Magnitudes		Magnitudes			Magnitudes		Magnitudes	
	2 to 2.9	3 to 3.9	4 to 4.9	5 to 5.4		2 to 2.9	3 to 3.9	4 to 4.9	5 to 5.4
Adams	1				Marion	1	5	1	1
Alexander	30	21	5		Mason			1	
Bond	2	6	1		Massac	1	2		
Carroll		1			McHenry	2			
Christian	1	1			McLean	1		1	
Clay	1	1			Menard		1		
Clinton	2	1	2		Monroe	11	6	2	
Coles		1			Montgomery	2	2		
Cook	1	3	1		Peoria	1			
Crawford	3				Perry	2	2		
Douglas	1				Piatt	1			
Du Page	2	1			Pike	1			
Edwards	2	1	1		Pope		1	1	
Effingham	2				Pulaski	35	5		
Fayette		3			Randolph	10	5	1	
Franklin	7	3			Richland	19	5	2	
Fulton		1			Rock Island		1	1	
Gallatin	1	3			Saline	6	5	2	
Hamilton	6	5		2	St. Clair	18	7	2	
Henderson	1				Stark		1		
Jackson	2	3	2		Stephenson		1		
Jasper	2				Union	4		4	
Jefferson	5	1			Wabash	16	6	4	1
Johnson	1	1			Warren	1			
Kane	1	2			Washington	6	1		
Kendall			1		Wayne	7	5		
LaSalle			2		White	2			
Lawrence		1			Whiteside		2		
Lee		1	1		Will				1
Macoupin		1			Williamson	7	1		
Madison	5	4			Winnebago		1		

Source: 2018 Illinois Natural Hazard Mitigation Plan

Probability of future occurrence: 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 Table 2-12. None of these caused much damage in the affected areas of the state.

Although it is estimated that the earthquakes of 1811 and 1812 (8.0 on the Richter Scale) will occur 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. Table 2-13 shows the estimated probability of damaging earthquakes in Illinois.

Table 2-13
Probability of Earthquake Events 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%

2.2.8.2 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.

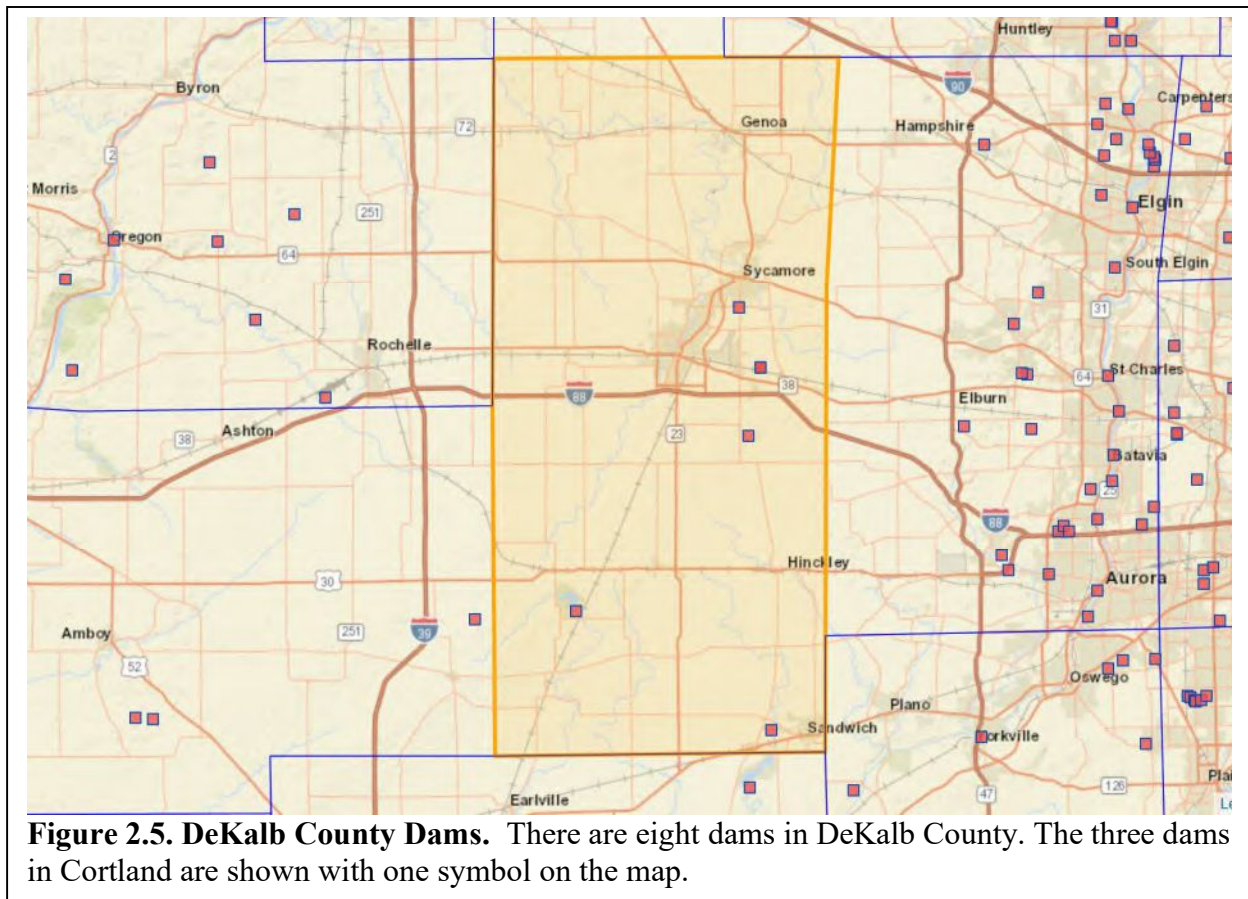
Class III – Dams located where failure has low probability for causing loss of life or minimal economic loss in excess of that which would naturally occur downstream of the dam if the dam had not failed or where there are no permanent structures for human habitation.

The dams in DeKalb County are listed in the table below.

Table 2-14
Dams in DeKalb County

Dam Name	Hazard potential	Owner Type	Primary Purpose	River
BUCK LAKE DAM	Low	Private	Recreation	BUCK BRANCH
SHABBONA LAKE DAM	Low	State	Other	INDIAN CREEK
FAIVRE POND DAM 4	Undetermined	Private	Recreation	BATTLE CREEK NW BRANCH
BETHANY ROAD DETENTION POND DAM	High	Local Government	Flood Control	TRIB E.BR. S.BR. KISHWAUKEE R
CORTLAND WATER RECLAMATION FACILITY CELL 1 DAM	Low	Local Government	Irrigation	NONE
CORTLAND WATER RECLAMATION FACILITY CELL 2 DAM	Low	Local Government	Irrigation	NONE
CORTLAND WATER RECLAMATION FACILITY CELL 3 DAM	High	Local Government	Irrigation	NONE
CORTLAND WATER RECLAMATION FACILITY CELL 4 DAM	High	Local Government	Irrigation	NONE

The location of all dams in DeKalb County are also mapped in Figure 2-5.



The Illinois Department of Natural Resources (IDNR) Dam Safety Section maintains an inventory of dams. Some DeKalb County dams may not be included in the inventory primarily because their height was less than 25 feet and less than a 50-acre-foot impounding area.

Safety and Health: The Shabbona Lake Dam is the largest dam in the County. DeKalb County has a number of manmade containment ponds for animal waste. Some of these ponds have dam structures that may not fall under IDNR regulations. There have been failures in the past that have caused significant environmental problems in waterways.

Probability of occurrence: A vulnerability analysis for dam failure has not been conducted for the dams in DeKalb County due to insufficient data. Dam-breach analyses and mapping of inundation areas that would result is the most appropriate means for examining the impact to people and property. As individual dam failure analyses and inundation mapping become available, DeKalb County intends to add this information and include a vulnerability analysis in future updates of this Plan.

As a dam ages, the likelihood for failure increases. Since dam failures are often exacerbated by flooding, the probability of dam failures can be associated with projected flood frequencies. The probability of dam failure for regulated dams can be reduced with preventative action in compliance with IDNR-OWR's dam safety program. Illinois' dam safety program provides for safety recommendations for short- and long-term structural modifications, including dam removal. There has not been failure of a dam in DeKalb County that fell under IDNR regulations.

2.3 Manmade Hazard Profile

As discussed in Section 2.1, the Committee identified and prioritized manmade hazards that could impact DeKalb County. The prioritized manmade hazards shown in Table 2-4 are discussed in this section. It is the intention of the Mitigation Committee to profile the manmade hazards based on available information. Insufficient data, however is available to develop a probability of occurrence. Additional information on manmade hazards is also provided in Chapter 7.

The priority manmade hazards for DeKalb County have been categorized as follows:

- Armed Attack
- Transportation incidents
- Cyber Attack
- Utility Disruption
- Hazardous material (HazMat)
- Radiological release

Each of the above manmade hazards are discussed in the following paragraphs.

2.3.1 Armed Attack (Active Shooter)

In recent years, armed attacks have manifested in active shooter incidents. An active shooter is an individual actively engaged in killing or attempting to kill people in a confined and populated area with firearms. There is no pattern or method to the selection of their victims, although the crime may begin with a specific target. Active shooter events are unpredictable and evolve quickly. The situations are often over within 10 to 15 minutes of the initial shooting. The extent of the effects varies based upon the perpetrators' intent and capabilities.

Safety and health: By definition, armed attacks threaten the life and health of the public.

Damages: Damage to buildings and infrastructure is dependent on the nature of the armed attack.

Historical events: None reported.

Probability of occurrence: Not determined.

2.3.2 Transportation Incident

Transportation incidents are manmade hazards that are difficult to predict. Awareness and preparedness are important for addressing transportation incidents. The Mitigation Committee separated transportation incidents into the following categories:

- Rail
- Truck
- Air

There is a significant amount of rail traffic through DeKalb County. The busiest in DeKalb County, and one of the most dangerous rail crossing in Illinois, is located at Illinois State Route 38, Illinois State Route 23 and the Union Pacific railway.

Concern for radiological incidents stem from the transportation of radiological material by rail through DeKalb County. Quantities of material and frequency of material being moved through DeKalb County is unknown, however the County is aware of the hazards to people and property. (See box on page 2-38 for description of hazardous materials.)

Commercial trucks travel through DeKalb County considerable. Interstate 88 provides accessibility for commercial traffic in an out of DeKalb County. While many State highways and county roads are being improved to four and five lanes, truck traffic in DeKalb County is still heavy.

Air transportation incidents are of concern due to the potential for aircraft accidents at DeKalb Taylor Municipal Airport (DTMA). Also, aircraft incidents at DTMA could occur in the event that air traffic is diverted to DTMA from the Chicago airfields or other surrounding airports.

Safety and health: Air incidents, railway accidents, and highway accidents create serious problems in the City of DeKalb, and impacts travel around the County.

Damages: There is a range of damages that could be incurred: either not injuries result, or significant loss of life can occur.

Historical events: Since 1966, 28 recorded aircraft crash incidents have occurred at DTMA. A crash in 1979 included six fatalities, and a crash in 1990 included one fatality. Figure 2-5 shows fatalities for vehicle crashes in DeKalb County from 2000 to 2005.

Probability of occurrence: Plans are underway to expand DTMA which will increase the potential for aircraft incidents as air traffic increases. As the County continues to grow, rail and vehicle accidents are also expected to increase.

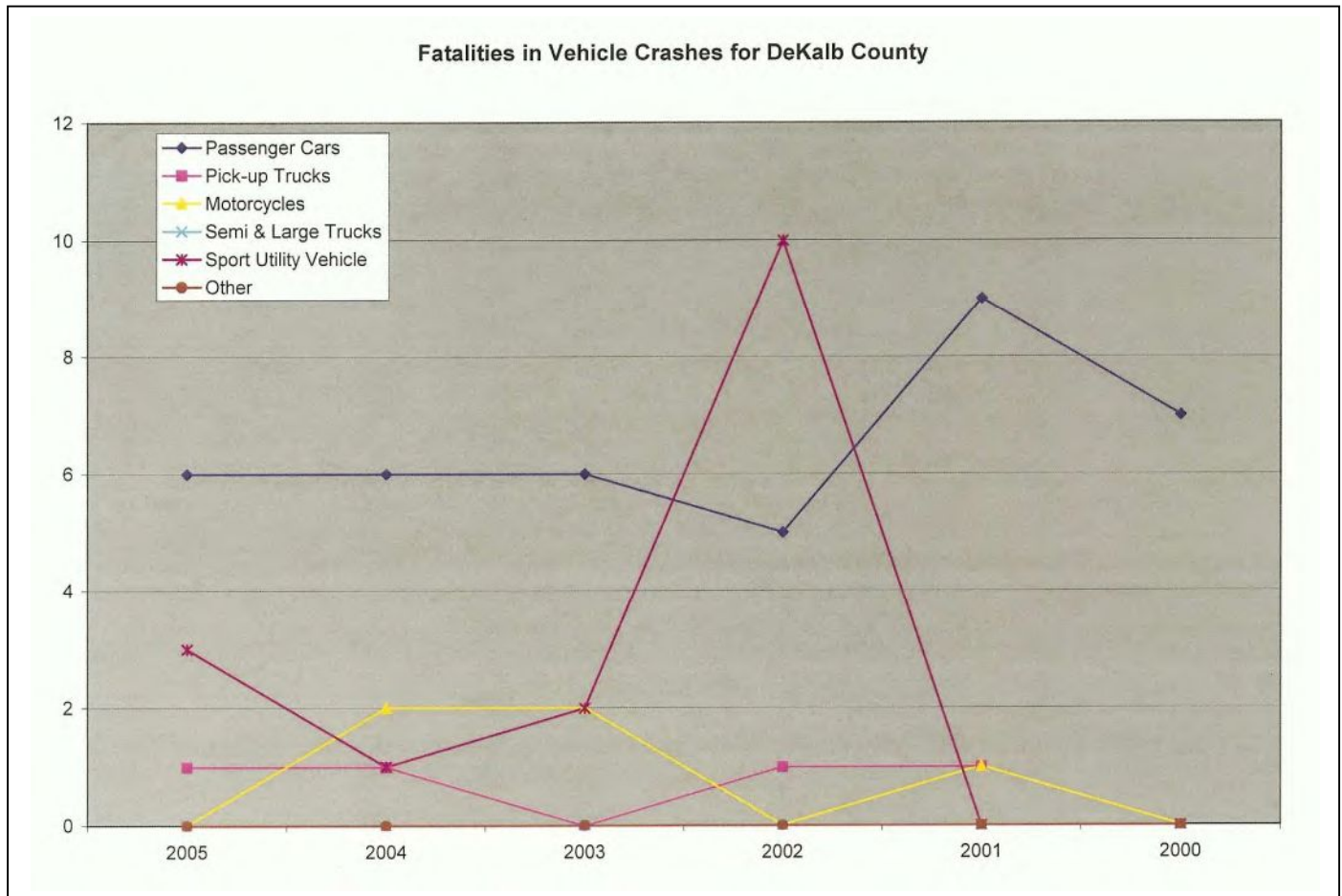


Figure 2-5

2.3.3 Cyberterrorism

Cyberterrorism is an electronic attack using one computer system against another, particularly over the internet, to cause physical or financial harm or a severe disruption of infrastructure service. Transportation, public safety, and utility services are highly dependent on information technology. The motive behind such disruptions can be driven by religious, political, or other objectives.

Safety and health: No direct loss of life is expected from an attack. Indirect injuries or deaths may result from secondary effects to critical life-sustaining resources such as energy and water.

Damages: The magnitude of extent of an incident will vary greatly based on the extent and duration of the impact. Additionally, the extent will vary based upon which specific system is affected by an attack, the warning time, and ability to preempt an attack.

Historical events: While no major direct cyber-attacks have affected DeKalb County, as mentioned, cyberterrorism is an emerging hazard that can impact the County's computer infrastructure and the systems and services that are provided to the public. Across the United States, concerns over cyberterrorism are growing.

Probability of occurrence: Security experts describe the threat of cyber terrorism as eminent and highly likely to occur in any given year. The level of success of an attack and the subsequent damage it can create will vary greatly.

2.3.4 Utility Interruption

DeKalb County and its municipalities rely on the delivery of utilities to residents and businesses. Utility interruption (or disruption) can occur as a result of a natural hazard, but it can also occur from manmade causes, such as, fires or transportation incidents. The Mitigation Committee identified utility disruption as a priority manmade hazard with attention given to the following utility sources:

- Electric
- Communications
- Natural Gas

The impacts of electric utility disruptions are most significantly felt by the general population during the winter and the summer for heating and cooling purposes. However, any electric disruption creates business losses as computers, lighting, refrigeration, gas pumps and other equipment is without power. Severe summer and winter storms, and tornados and floods can bring trees and tree limbs down on power lines. These events also cause serious safety hazards. Manmade causes can be due to construction accidents or over-use of particular power grids.

Communication disruptions are nothing new, but our society has become more dependent on our growing means of communication. Loss of telephone service is typically limited to small areas, and is often the result of construction accidents. When telephone lines are out of service, credit card and many internet transactions cannot be made. Loss of cellular phone communication is potential and has not yet been regionally experienced. Certain storm or atmospheric activity could impact radio communications. In today's society, it is hoped that if one form of communication is disrupted, other means would still be viable.

The majority of homes in DeKalb County are heated with natural gas. A natural gas pipeline travels through DeKalb County. The pipeline originates in Texas and continues on to Chicago. The distribution of natural gas could be disrupted by an earthquake in southern Illinois.

Safety and health: Utility disruption can impact people and pets when heating and cooling sources are lost. With extreme cold and heat events, the elderly are generally the first population group to be adversely affected.

Damages: Damage to buildings and infrastructure are relatively low for utility disruption. However, the potential for fire always exists when people find alternate sources for heat or light when electricity or natural gas are not available.

Historical events: Utility interruptions in the absence of a weather event have been infrequent in DeKalb County.

Probability of occurrence: Not determined.

2.3.5 Hazardous Material (HazMat) Incident

Hazardous materials are biological, chemical or physical items or agents that can cause potential harm to humans, animals or the environment by itself or through interaction with other items or agents. The box on the following page describes HazMat in more detail.

HazMat incidents could occur as a result of any of the manmade hazards discussed in this chapter along with incidents at large facilities, such as the Illinois River Energy, LLC in Rochelle (Ogle County), smaller facilities such as Farm Service plants, or any material storage facility.

The Illinois River Energy, LLC, is an ethanol plant that produces 50 million gallons per year of denatured fuel grade ethanol. The plant processes 18 million bushels of corn per year. The plant is located on an 81-acre site within the corporate limits of the City of Rochelle, which is less than ten miles from DeKalb County and approximately 15 miles from the City of DeKalb. The potential exists for a HazMat release from the ethanol plant that would impact DeKalb County with a general eastward wind.

Incidents with air, rail and trucks are also of great HazMat concern to DeKalb County.

What Is Hazardous Material?

A **hazardous material** is any item or agent (biological, chemical, physical) which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. **Hazardous materials professionals** are responsible for and properly qualified to manage such materials. This includes managing and/or advising other managers on such items at any point in their life-cycle, from process planning and development of new products; through manufacture, distribution and use; to disposal, cleanup and remediation.

Hazardous materials are defined and regulated in the United States primarily by laws and regulations administered by the U.S. Environmental Protection Agency (EPA), the U.S. Occupational Safety and Health Administration (OSHA), the U.S. Department of Transportation (DOT), and the U.S. Nuclear Regulatory Commission (NRC). Each has its own definition of a "hazardous material."

OSHA's definition includes any substance or chemical which is a "health hazard" or "physical hazard," including: chemicals which are carcinogens, toxic agents, irritants, corrosives, sensitizers; agents which act on the hematopoietic system; agents which damage the lungs, skin, eyes, or mucous membranes; chemicals which are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive or water-reactive; and chemicals which in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists or smoke which may have any of the previously mentioned characteristics. (Full definitions can be found at 29 Code of Federal Regulations (CFR) 1910.1200.)

EPA incorporates the OSHA definition, and adds any item or chemical which can cause harm to people, plants, or animals when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment. (40 CFR 355 contains a list of over 350 hazardous and extremely hazardous substances.)

DOT defines a hazardous material as any item or chemical which, when being transported or moved, is a risk to public safety or the environment, and is regulated as such under the: Hazardous Materials Regulations (49 CFR 100-180); International Maritime Dangerous Goods Code; Dangerous Goods Regulations of the International Air Transport Association; Technical Instructions of the International Civil Aviation Organization; U.S. Air Force Joint Manual, Preparing Hazardous Materials for Military Air Shipments.

The NRC regulates items or chemicals which are "special nuclear source" or by-product materials or radioactive substances. (See 10 CFR 20).

Source: Institute of Hazardous Materials Management IHMM.org © 2003

Safety and health: By definition, HazMat is harmful to people, animals and the environment. The threat to life and health is enormous.

Damages: Damage to buildings and infrastructure is dependent on the nature of the HazMat incident. The release of gas may not impact any buildings, but an associated explosion could occur.

Historical events: Waterman reported an ammonia leak that occurred on June 18, 2006 from the Northern FS Plant, southwest of the Village. A tank with a leaking valve was repaired to halt the incident. Winds that day moved the ammonia cloud away from the Village population.

Probability of occurrence: Not determined.

2.3.6 Radiological Release

The Byron Nuclear Generating Station is located near Byron, Illinois, in Ogle County. The Byron Generating Station is northeast of DeKalb County, about 20 miles from Kirkland and Kishwaukee College and about 30 miles from the City of DeKalb. The Byron Energy Complex is owned by the Exelon Corporation. The Byron Generating Station has two nuclear power units that can produce 2,353 megawatts of electricity per day. The first unit was put into service in 1985 and the second unit in 1987.

Information on the Byron Nuclear Power Plant, including Emergency Planning for the Byron area can be found at:

http://www.exeloncorp.com/ourcompanies/powergen/nuclear/byron_generating_station.htm

Nuclear power plants cannot produce a nuclear explosion but they can release radiation through a cloud or a plume that would be emitted as a result of a serious incident. According to the “Emergency Planning for the Byron Areas” publication:

“The degree of risk to the public [for a radiological release] would depend on the size of the plume, the direction and speed of the wind and other factors.”

The degree of risk dictates whether a shelter-in-place or evacuation response is warranted.

Nuclear regulatory agencies require testing of groundwater along with emissions from nuclear generation facilities. Tritium is a radioactive isotope of hydrogen and it is a byproduct of nuclear generation. Amounts of tritium were detected at the Byron Station in certain pipes during a hydrogeologic investigation done for the Exelon Corporation in May 2006. The testing, however, indicated that the tritium has not left the Byron complex, nor had it entered the groundwater system.

Radiological material is transported through DeKalb County by rail. This will be discussed in Section 2.3.3.

Safety and health: Radiation is measured in millirems. People living in Illinois receive about 300 millirems of radiation a year from natural sources, such as light, heat or radio waves. Federal regulations allow workers to receive up to 5,000 millirems a year. Dangerous levels that

produce identifiable effects to humans begin at 20,000 millirems in a day. Exposure to dangerous levels of radiation can have varying health effects on people and animals. Impacts range from minor health issues to fatal illnesses.

Damages: Damage to property is low. Contamination of property is difficult to estimate.

Historical events: None reported.

Probability of occurrence: Not determined.

2.4 Summary – Hazard Identification & Profile

Table 2-14 provides a summary of natural and manmade hazards for DeKalb County that the Mitigation Committee identified as priority hazards. The table shows the probability of future occurrence, an estimate of the area of the County affected, and a “safety assessment,” which summarizes the hazards impact to life, health and safety of people in DeKalb County.

Table 2-14 DeKalb County Summary of Hazard Probability

	Annual Chance	Impact Location	Square miles Affected	Safety Assessment
Natural Hazards:				
Severe Summer Storms	100%	Countywide	10	High
Floods	1%	Floodplains	(Floodplain)	Medium
Severe Winter Storms	100%	Countywide	636	Medium
Tornadoes	40%	Countywide	636	High
	0.001%	Single Location	1	High
Extreme Cold	20%	Countywide	636	High
Extreme Heat	10%	Countywide	636	High
Drought	--	Countywide	636	Medium
Manmade Hazards:				
Armed Attack (active shooter)	--	Single Location	1	Low
Transportation Incident – Rail	---	Single Location	1	Low
Transportation Incident – Truck	---	Single Location	1	Low
Cyberterrorism	--	Region of County	1	Low
Transportation Incident – Air	---	Single Location	1	Medium
Utility Interruption - Electrical	---	Region of County	200	Low
Hazardous Material Incident	---	Single Location	1	High
Radiological Incident	---	Region of County	50	High

As a comparison, the State of Illinois Natural Hazards Mitigation Plan, October 2018, summarized DeKalb County’s hazard risk, as follows:

Illinois Hazard Rating By County

Based on Criteria and Methodology Established at the Illinois Natural Hazard Mitigation Planning

Population	Severe Storms	Floods	Severe Winter Storms	Drought	Extreme Heat	Earthquake	Tornado
104,528	Severe	Medium	High	Low	Medium	Low	Medium

Key

Very Low=0-12

Low=13-24

Medium=25-36

High=37-48

Severe=49-60

2018 Illinois Natural Hazards Mitigation Plan, October 2018, page III-12.

A further review of Table 2-14 shows the summary of hazards identified in the *Plan* to be consistent with the assessment shown in the State Plan, except that floods were given a higher priority in the County Plan than Severe Winter Storms. Table 2-15 and Table 2-16 show the natural and manmade hazard identification, respectively, by community and township.

Table 2-15
DeKalb County Hazard Identification by Community and Township for Natural Hazards

Communities & Institutions:	Severe Winter Storms	Severe Summer Storms	Extreme Cold	Extreme Heat	Tornado	Flood
Cortland	X	X	X	X	X	X
DeKalb	X	X	X	X	X	X
Genoa	X	X	X	X	X	X
Hinckley	X	X	X	X	X	X
Kingston	X	X	X	X	X	X
Kirkland	X	X	X	X	X	X
Lee	X	X	X	X	X	
Malta	X	X	X	X	X	
Sandwich	X	X	X	X	X	X
Shabbona	X	X	X	X	X	X
Somonauk	X	X	X	X	X	X
Sycamore	X	X	X	X	X	X
Waterman	X	X	X	X	X	
DeKalb County (Uninc.)	X	X	X	X	X	X
Kishwaukee College	X	X	X	X	X	X
Northern Illinois University	X	X	X	X	X	X
Townships:						
Afton	X	X	X	X	X	X
Clinton	X	X	X	X	X	X
Cortland	X	X	X	X	X	X
DeKalb	X	X	X	X	X	X
Franklin	X	X	X	X	X	X
Genoa	X	X	X	X	X	X
Kingston	X	X	X	X	X	X
Malta	X	X	X	X	X	X
Mayfield	X	X	X	X	X	X
Milan	X	X	X	X	X	X
Paw Paw	X	X	X	X	X	X
Pierce	X	X	X	X	X	X
Sandwich	X	X	X	X	X	X
Shabbona	X	X	X	X	X	X
Somonauk	X	X	X	X	X	X
South Grove	X	X	X	X	X	X
Squaw Grove	X	X	X	X	X	X
Sycamore	X	X	X	X	X	X
Victor	X	X	X	X	X	X

Table 2-16
DeKalb County Hazard Identification
by Community and Township for Manmade Hazards

Communities & Institutions:	Armed Attack (Active Shooter)	Transportation Incident-Rail	Transportation Incident-Road	Cyber Terrorism	Transportation Incident -Air	Utility Disruption	HazMat	Radiological Release
Cortland	X	X	X	X	X	X	X	X
DeKalb	X	X	X	X	X	X	X	X
Genoa	X	X	X	X	X	X	X	X
Hinckley	X	X	X	X	X	X	X	X
Kingston	X	X	X	X	X	X	X	X
Kirkland	X	X	X	X	X	X	X	X
Lee	X	X	X	X	X	X	X	X
Malta	X	X	X	X	X	X	X	X
Sandwich	X	X	X	X	X	X	X	X
Shabbona	X	X	X	X	X	X	X	X
Somonauk	X	X	X	X	X	X	X	X
Sycamore	X		X	X	X	X	X	X
Waterman	X	X	X	X	X	X	X	X
DeKalb County (Uninc.)	X	X	X	X	X	X	X	X
Kishwaukee College	X	X	X	X	X	X	X	X
Northern Illinois University	X	X	X	X	X	X	X	X
Townships:								
Afton	X	X	X	X	X	X	X	X
Clinton	X	X	X	X	X	X	X	X
Cortland	X	X	X	X	X	X	X	X
DeKalb	X	X	X	X	X	X	X	X
Franklin	X	X	X	X	X	X	X	X
Genoa	X	X	X	X	X	X	X	X
Kingston	X	X	X	X	X	X	X	X
Malta	X	X	X	X	X	X	X	X
Mayfield	X		X	X	X	X	X	X
Milan	X	X	X	X	X	X	X	X
Paw Paw	X	X	X	X	X	X	X	X
Pierce	X		X	X	X	X	X	X
Sandwich	X	X	X	X	X	X	X	X
Shabbona	X	X	X	X	X	X	X	X
Somonauk	X	X	X	X	X	X	X	X
South Grove	X		X	X	X	X	X	X
Squaw Grove	X	X	X	X	X	X	X	X
Sycamore	X	X	X	X	X	X	X	X
Victor	X		X	X	X	X	X	X

X = Impacted by potential incident at DeKalb Taylor Municipal Airport

2.5 References

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Chapter 3. Hazard Vulnerability Assessment

This Chapter presents a vulnerability analysis, which examines the possible impact of hazards on DeKalb County assets. Impact on health, safety and property damage from natural hazards is estimated based on available information.

The hazard analysis in Chapter 2 for priority natural and manmade hazards includes a description of the nature of the hazard, past occurrences and damages, and likelihood or probability of the hazard occurring in the future. The vulnerability assessment in this Chapter examines potential impact of natural hazards to buildings, critical facilities, people and animals, and the potential economic impact. Data available through DeKalb County, the County's GIS, and U.S. Census were used to examine DeKalb County's exposure to hazards.

3.1 Assets and Property Value

3.1.1 Assets

DeKalb County's assets include people, animals, buildings, infrastructure, businesses and institutions, the land and natural resources. These assets are summarized in Table 3-1 for purposes of evaluating potential hazards against the potential damage or loss of assets.

People and Animals: There are several population groups in DeKalb County: Residents, residents who work in DeKalb County, residents who commute to DeKalb County to work, and the college student population who reside or commute to DeKalb County schools. While these groups are described below, for purposes of this *Plan's* vulnerability analysis, calculations will focus on DeKalb County residents.

Residents: According to the 2010 U.S. Census, the total DeKalb population is 105,160. A list of populations by municipality is provided in Table 1-3 in Chapter 1. The average density of people in the State of Illinois is 222 persons per square mile. The average density in DeKalb County is about 165 persons per square mile. As a note, the density of incorporated areas is 2,875 persons per square mile.

**Table 3-1
DeKalb County Estimate of Assets**

People:		
	Residents (2010 Census)	105,160
	Workforce	56,000
	Students (Elem., High School, Unit)	21,040
	College & University	36,000
Buildings:		
	Housing Units (2010 Census)	41,079
	Businesses (non-farm)	2,096
	Religious/Assembly	62
	Hospitals	1
	Schools	43
	Colleges & Universities	54
	Government-owned	50
Transportation:		
	Bridges	189
	Airports	1
Resources:		
	Agricultural	359,000 acres
	Forest Preserves & Parks	1,150 acres
	Museums, Historic & Nature Centers	25

Source: U.S. Census Bureau (2010)

Animals: While it is difficult to estimate the animal, particularly the pet, population in DeKalb County, they are recognized as a population in need of consideration during hazard mitigation planning.

Work force: Many residents commute to work locations outside of DeKalb County, while at the same time, numerous people commute into DeKalb County. The daytime workforce has areas of concentration in the DeKalb-Sycamore area.

Students: The daytime student population is at the elementary, middle and high schools in the County around 21,000, and the Kishwaukee College and Northern Illinois University (NIU) population is around 36,000. The majority of these students are full time students, but it is recognized that there is a student population group who are part of the work force in the daytime and take classes in the evening.

Buildings: Buildings shown in Table 3-1 provide a representation of the residential, commercial, industrial and institutional structures in DeKalb County estimated by the 2000 U.S. Census and from the DeKalb County GIS. Not all structures in the County are captured by these numbers. Government buildings include village halls, police and fire stations, public works buildings, libraries, and park district buildings.

Table 3-2
Estimate of Housing Units per Community

	Land Area (sq mi)	2017 Population	2010 Population	2000 Population	2010 Housing Units	2017 Housing Units	Density: Population per square mile of land area	Density: Housing units per square mile of land area
Cortland	3.6	4,105	4,270	2,066	1,530	1,378	1,125	383
DeKalb	16.1	43,141	43,862	39,018	16,436	17,070	2,659	1,060
Genoa	2.4	4,808	5,193	4,169	1,959	1,944	1,966	810
Hinckley	0.8	2,153	2,070	1,994	829	877	2,542	1,096
Kingston	1.0	1,296	1,164	980	402	433	1,317	433
Kirkland	1.2	1,764	1,744	1,166	642	676	1,436	563
Lee	0.2	361	337	313	139	142	1,802	710
Malta	0.6	1,099	1,164	969	455	465	1,797	775
Maple Park	2.1	1,338	1,310	765	509	503	646	240
Sandwich	4.7	7,633	7,421	6,509	2,876	2,772	1,611	590
Shabbona	1.3	1,009	925	929	396	467	794	359
Somonauk	2.5	2,133	1,892	1,295	778	804	859	322
Sycamore	9.8	17,712	17,519	12,020	7,394	6,846	1,800	699
Waterman	1.5	1,415	1,506	1,224	599	575	1,415	383
DeKalb County (Uninc.)	583.6	14,766	14,783	15,552	6,135	6,253	25	11
Total:	631.4	104,733	105,160	88,969	41,079	41,205	166	65

Source: 2017 ACS Census; 2010 US Census; 2000 US Census

Residential, or housing, units: Table 3-2 shows the estimated number of housing units in each municipality. Housing units in each community are shown, along with the number of housing units in unincorporated DeKalb County in 2000, 2010, and 2017. The total housing units represents a municipality's residential exposure to hazards. Housing units in DeKalb County will be used for calculating overall vulnerability of the County. There are an estimated 41,205 housing units within DeKalb County from the 2017 ACS Census. This represents a 0.3 percent increase from 2010 to 2017 Census. There was a significant decrease in population from 2000 to 2010, but the population has remained stable from 2010 to 2017. There has been no material change in population since the last plan was adopted and there has been no change in vulnerability due to development.

Manufactured housing (mobile homes): There are a number of manufactured home communities in DeKalb County. The 2017 Census estimates a total of 615 mobile homes. These homes are particularly vulnerable to damage from wind-related hazards, and have a history of flood-related damage in DeKalb County. The replacement value of these structures is estimated to be \$38,000 (2010 U.S. Census default data).

Housing Density: The average density of housing in DeKalb County was 6 housing units per square mile in 2000 and 65 housing units per square mile in 2010. The number of housing units per square mile has not changed since 2010. The average housing unit density for the State of Illinois is 96 housing units per square mile. The density of housing units in incorporated areas of the County is 176 housing units per square mile.

Non-residential, or non-housing, buildings: As shown in Table 3-1, the non-residential buildings in DeKalb County (businesses, hospitals, churches, schools, government facilities, etc.) are estimated to be around 2,300. This is a very low estimate, and does not include farm structures. As resources allow, the County's GIS could provide an evaluation of non-residential buildings.

Resources: The resources category in Table 3-1 provides a snapshot of the open space, recreational and cultural assets in DeKalb County.

Infrastructure: Infrastructure, beyond transportation-related infrastructure, includes water mains, sewers, treatment plants, and utilities (such as electrical distribution, natural gas lines, and communication networks). Estimates of these infrastructure areas have not been made for purposes of this *Plan*.

3.1.2 Property Value

Assessed property values in DeKalb County are maintained by the township assessor offices. Residential property market value can be estimated by multiplying the assessed valuation of the home and property by three. Non-residential properties generally need to be appraised to determine their property value.

Residential assessed values: The DeKalb County Supervisor of Assessment's figure for total residential assessed valuation in 2004 was 1,051,510,041. That figure multiplied by three (for market value) and divided by an estimate 2004 housing stock of 34,000 yields an

average home value of about \$93,000. The total residential assessed valuation in 2018 was \$1,492,326,940. Considering that the 2018 housing stock has increased to 41,250, the average home value has increased to \$108,500.

Replacement cost: For cost-benefit analyses, FEMA requires the use of replacement values, which is an examination of each structure's feature and the determination of a per-square-foot replacement cost. A calculation of replacement cost does not, however, include the value of the land. Residential replacement values in DeKalb County are around \$170 to \$180 per square foot. For comparison, the replacement value of a 1,200 square foot home at \$170 per square foot, places market value of the home (not including the value of the land) at \$204,000.

Real estate listing value: Current average real estate listings for single-family homes for DeKalb County range from \$160,00 to \$180,000.

Median home price: The median single-family home value in 2018 was \$166,800, which is a 3.79% increase from 2017.

Property Value Summary: The number of housing units in Dekalb County has remained constant since 2010. Considering this, a more detailed determination and comparison of total assessed valuation, market value, or replacement costs was not conducted. For purposes of this *Plan's* vulnerability analysis, median home value for DeKalb County is used. This figure was selected since it is between the assessed value estimates and real estate listing figures.

Using the 2018 estimate of 41,250 housing units in DeKalb County, and median value of \$166,800, the total residential value in DeKalb County is estimated to be \$6.9 billion. Commercial building sales have not been examined.

The following figures were used throughout this Chapter for the vulnerability analysis:

DeKalb County:	631 square miles
Population Density:	166 persons per square mile
Density of housing units:	65 homes per square mile
Residential property value:	\$ 166,800/house
Non-residential property value:	\$1,000,000/building
Value of all residential property (2018):	\$4.48 billion
Value of all non-residential property (2018):	\$2.48 billion
Value of all developed property in (2018):	\$6.96 billion
Value of all agricultural property (2018):	\$1.27 million

3.2 Natural Hazard Vulnerability Assessment

3.2.1 Severe Summer Storms Assessment

Damage to Buildings: As with tornadoes, mobile homes are at a high risk for 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.

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 percent of the dollar damage was to roofing, 12 percent to awnings, 6 percent to exterior paint, 4 percent to glass and 3 percent to siding (*Hail Loss Potential in the US*, page 2).

If a severe summer storm impacts a 100 square mile area of the County, then approximately a sixth of the of the County would be affected (DeKalb County area equals 631 square miles). If 1 percent of the homes in that area were subject to damage, the vulnerability of DeKalb County buildings would be:

$$(100 \text{ square miles} \times 65 \text{ housing units per square mile} \times \$166,800 \text{ per home}) \times 1\% = \\ = \$10.8 \text{ million in property value exposed}$$

Impact to buildings is considered **moderate**.

Damage to 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. To date, there is no record of critical facilities having incurred any damages due to severe storms. Damage to critical facilities is considered **moderate**.

Health and Safety: Severe summer storms pose a real danger to people's lives. With thunderstorms, high winds, lightning and hail, there is a large risk of injury and death. Impact to health and safety is considered **moderate**.

Economic Impact: 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. Cost of clean-up by towns can become considerable. Economic impact is considered **moderate**.

3.2.2 Flood Vulnerability Assessment

Past and future flood impacts, in terms of people and costs, will be discussed in this section. Impacts being considered are summarized under four categories: damage to buildings, damage to critical facilities, health and safety, and economic impact (damage to businesses and infrastructure).

All DeKalb County communities are vulnerable to flooding due to the relatively flat topography of the County, and due to the amount of urbanization and developed land. Flooding is not limited to floodplain areas. Most all of the flooding that DeKalb County has experienced has been a combination of stormwater and floodplain flooding.

While areas following the 1996 flood were mitigated, the August 2007 flood highlighted that many areas of the County are still very vulnerable to flooding.

Damage to Buildings: Damage to buildings can be extensive, even with relatively low depths of flooding. Walls, utilities, furnishing and other property can be damaged by both the floodwaters and by subsequent mold. Foundations can be damaged, which results in costly repairs.

Limited data is available in DeKalb County for the estimation of structures within the 100-year floodplain. Digital flood data is now available for DeKalb County for incorporation into the County's GIS.

Examination of flood insurance claims: A source of damage data is past claims paid by the National Flood Insurance Program. Table 3-3 summarizes flood insurance policy coverage and claims in DeKalb County (based on data provided by FEMA). There are currently 202 active flood insurance policies in DeKalb County. It is not known how many of those policies are within mapped floodplains or outside the mapped floodplain, since flood insurance is available for any property in a community participating in the NFIP. Nearly 400 flood insurance claims have been made since 1978; over \$4.6 million has been paid to policy holders in claims. When the 2008 Plan was developed, \$2.2 million in claims had been paid. The increase in \$2.4 million in claims can be attributed to the flooding that DeKalb County experienced in the large floods of August 2007 and September 2008, and smaller localized flooding.

Flood insurance claims figures do not include items not covered by a flood insurance policy, such as landscaping, automobiles, and the value of lost family heirlooms. They also do not include damage to uninsured or underinsured properties.

Table 3-3
DeKalb County FEMA Flood Insurance Policies

Community	As of 9/5/2019			From 1978 to 9/5/2019	
	Premiums	Policy Count	Coverage	No. of Claims Paid	Payments
Cortland				1	\$78,505
DeKalb County	\$49,004	48	\$11,744,000	90	\$1,338,887
DeKalb	\$122,560	86	\$18,985,000	177	\$2,080,115
Genoa	\$2,615	7	\$1,835,000		
Hinckley	\$1,492	3	\$745,000	5	\$77,784
Kingston	\$1,072	3	\$310,000		
Kirkland	\$18,073	13	\$2,143,000	24	\$330,961
Sandwich	\$551	2	\$175,000	3	\$26,770
Shabbona	\$2,529	4	\$812,000	2	\$7,032
Sycamore	\$70,109	36	\$6,142,000	95	\$686,468
Total:	\$268,005	202	\$42,891,000	397	\$4,626,522

Repetitive Loss Properties: There are several different definitions of a “repetitive loss property.” The current FEMA definition of a repetitive loss property is a flood-insured structure that has received two or more flood insurance claim payments of more than 25% of the market value within any 10-year period. Formerly, the definition was any property which has received two flood insurance claim payments in any ten year period. The identification and mitigation of repetitive loss properties are important to the National Flood Insurance Program because even though they comprise 2 percent of the policy base, they account for 33 percent of the country’s flood insurance claim payments.

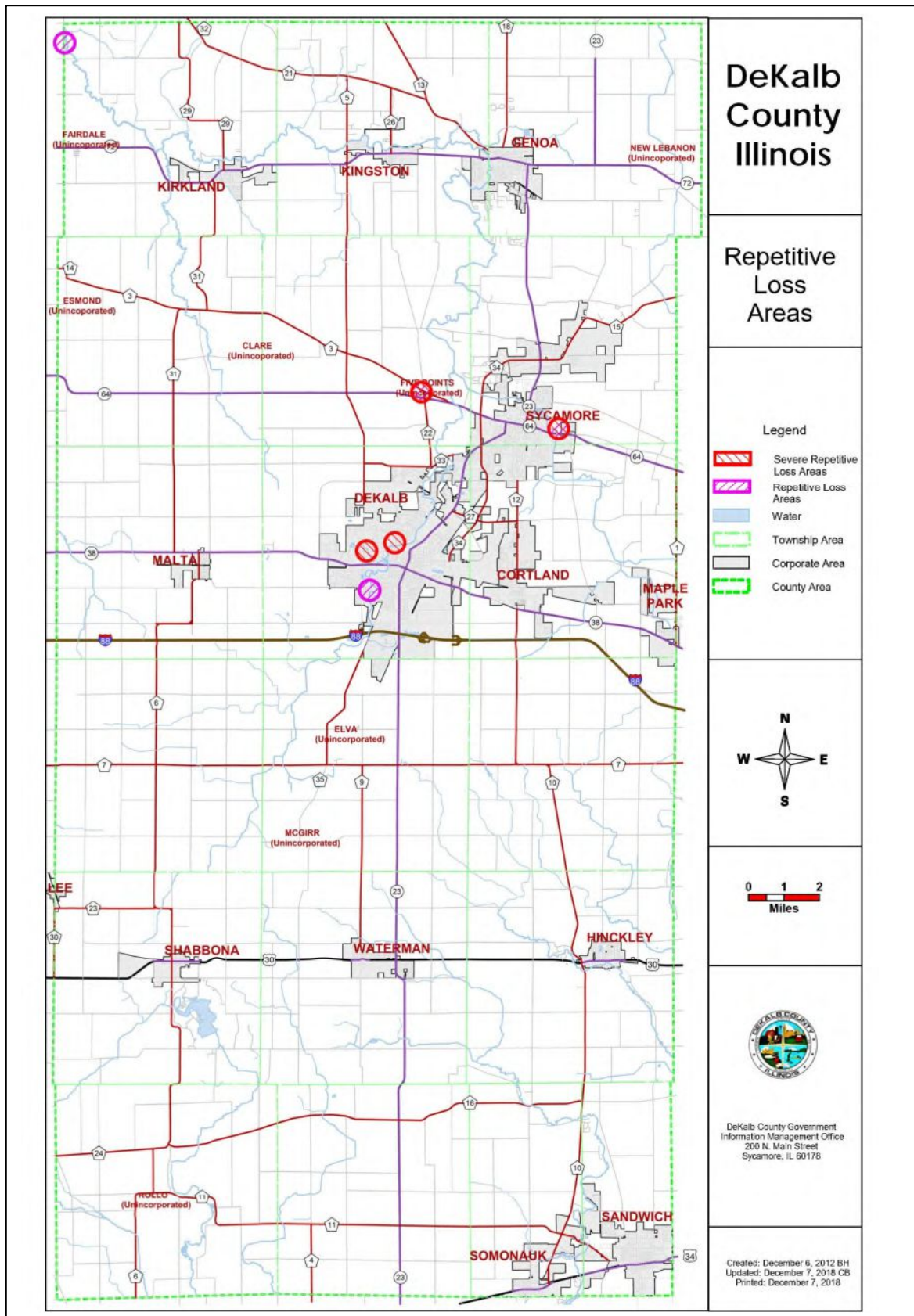
There are 8 repetitive loss properties included on the FEMA list for DeKalb County, which are shown within the repetitive loss areas mapped in Figure 3-1.

Table 3-4
DeKalb County FEMA Repetitive Flood Loss Properties

Community	No. of Repetitive Loss (RL) Properties	Property Type	Insured RL Properties	RL Properties that have been Mitigated	RL Properties with Mitigation Projects Underway	Remaining RL Properties
Kirkland	1	Residential	0	0	0	1
DeKalb	2	Residential	2	0	0	2
Sycamore	5	Residential	0	0	0	5
Total:	8	Residential	2	0	0	8

Note: All Repetitive Loss properties in DeKalb County are residential.

Overall impact of floods to buildings is **high**.



**Figure 3-1
DeKalb County Repetitive Flood Loss Properties Areas**

Critical Facilities: Critical facilities that could be impacted by flooding are primarily located in the floodplain. Data on critical facilities located in the floodplain is not currently available, but will be evaluated as FEMA Map Modernization is completed for DeKalb County. Potential impact to critical facilities is **high**.

Health and safety: The flooding experienced in DeKalb County over the last 11 years shows that the safety and lives of people and animals is of concern during flood events. Past flood events show that warning, evacuation, and rescue is important. The impact to health and safety is **moderate** during flood events.

Economic Impact: Flood damage to businesses is difficult to estimate. 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. Business can be disrupted regardless of the business being located in the floodplain when customers and clients cannot reach their location.

Historic data tells us that many businesses around the County are impacted when there is flooding, but there is insufficient data to determine a dollar impact. Disruption at NIU has been significant in the past. Overall economic impact to businesses is **moderate**.

3.2.3 Severe Winter Storms Vulnerability Assessment

Damage to Buildings: Historically, roofs would collapse due to heavy snow loads, but most buildings 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. Impact on buildings is **low**.

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. Impact on critical facilities is **low**.

Health and 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, which will be discussed in Section 3.5.

Winter Storm Deaths Illinois and United States						
	Winter Weather		Cold Related		Total	
	IL	US	IL	US	IL	US
1995		11		22	0	33
1996	1	86	5	62	6	148
1997	10	90	8	51	18	141
1998	2	68		11	2	79
1999	2	41	1	7	3	48
2000	1	33		15	1	48
2001		18		4	0	22
Total	16	347	14	172	30	519

Source: National Weather Service.

In the United States, the number of deaths peaks in midwinter and reaches a low point in late summer, but most deaths are not directly related to the weather. The table to the right shows that winter storms have led to more deaths in Illinois than any other natural hazard. Certain populations are especially vulnerable to the cold, including the elderly, the homeless, and lower income families with heating problems.

About 70 percent of the injuries caused by snow and ice storms result from vehicle accidents and 25 percent occur to people caught out in the storm. Health and safety impact is **moderate**.

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. There are also impacts when people cannot get to work, to school, or to the store. Economic impact is **moderate**.

3.2.4 Tornado Vulnerability Assessment

Damage to Buildings: 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 tornado's 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 structure's 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 wasn't secured to the foundation, or when nails were used as the primary connectors between the roof structure and the walls. A home in Kansas, for example, was lifted from its foundation. The addition of nuts to the foundation anchor bolts (connected to the wood framing) may have been all that was needed to prevent this.
- 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 foundation walls.

For DeKalb County for an estimated that 5 square mile area of tornado damage could impact 290 homes (58 housing units per square mile x 5 square miles). For an EF4 tornado and damage would average 50 percent of the value. Note, for manufactured homes, damage would be 100 percent of the structure damaged.

$$290 \times \$166,800 \times 50\% = \$24.2 \text{ million}$$

For a 10 square mile area the County's exposure to tornado damage would be \$48.4 billion

Tornado impact to buildings is **high**.

Damage to Critical Facilities: Because a tornado can hit anywhere in the County, all categories of critical facilities are susceptible to being hit. Schools are a particular concern 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, it is unknown which critical facilities in DeKalb County may have large span structures. Impact to critical facilities for tornadoes is **moderate**.

Health and safety: DeKalb County has lost a life to a tornado and had injuries. Residents living in mobile homes are more vulnerable than people in permanent homes. People can inadvertently put their lives in danger during a tornado, or have little or no warning. Impact to people is **high**.

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. Damage to roads and railroads is also localized. If it can't be repaired promptly, alternate transportation routes are usually available. Public expenditures include search and rescue, shelters, and emergency protection measures. The large expenses are for repairs to public facilities and clean-up and disposal of debris. Most public facilities are insured, so the economic impact on the local treasury may be small.

Clean-up and disposal can be a larger problem, especially with limited landfill capacity near the damage site. Economic impact of tornadoes is **moderate**.

3.2.5 Extreme Cold Vulnerability Assessment

Damage to Buildings: Extreme cold can have an impact on structures when water pipes freeze. Also the demand for natural gas and electricity is elevated, and heat can be lost during utility interruptions. Impact on buildings is **low**.

Damage to Critical Facilities: The impact of extreme cold on critical facilities is similar to residential and non-residential buildings. The impact to critical facilities is **low**.

Impact on People: 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, and nose) with more circulation difficulties are most frequently affected.

Injuries Related to Cold

- 50 percent happen to people over 60 years old
- More than 75 percent happen to males
- About 20 percent 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 re-warm a person, even mild cases. DeKalb County is very vulnerable to extreme cold events. Impact on people and animals is **high**.

Economic Impact: People generally stay home more during extreme cold events and areas can see a drop of the retail sales and the demand for services. However, the demand for heating repair services usually increased. People also struggle with automotive troubles. Economic impact of extreme heat and drought is **low**.

3.2.6 Extreme Heat and Drought Vulnerability Assessment

Damage to Buildings: Heat and drought have little or no impact on structures. Impact on buildings is **low**. Since impact is low, the vulnerability of extreme heat and drought has not been calculated.

Damage to Critical Facilities: Extreme heat and drought can have an impact on water supply. The demand on electric utilities is elevated. The impact of extreme heat and drought to critical facilities is **low**.

Impact on People: DeKalb County, like most areas of the Midwest, is very vulnerable to extreme heat. Urban areas are exposed more acutely to the dangers of extreme heat due to heat being retained in asphalt and concrete and being released at night. This effect brings little relief to the area even in the nighttime. People are at risk for heat stroke or sun stroke, heat exhaustion, and dehydration. Children and the elderly are most at risk. Loss of life is common with extreme heat events. Impact on people is **high**.

Economic Impact: Generally, extreme heat, and especially drought impact agricultural areas in the State. Less than 5.8 percent of the County is still in agricultural use. Economic impact of extreme heat and drought is **low**.

3.3 Summary

Table 3-5 show a summary of the impact of natural hazards in DeKalb County based on currently available information.

**Table 3-5
DeKalb County Summary of Hazard Vulnerability**

Natural Hazards:	Impact:			
	Buildings	Critical Facilities	Health & Safety	Economic
Severe Summer Storms	Moderate	Moderate	Moderate	Moderate
Floods	High	High	Moderate	Moderate
Severe Winter Storms	Low	Low	Moderate	Moderate
Tornadoes	High	Moderate	High	Moderate
Extreme Cold	Low	Low	High	Low
Extreme Heat	Low	Low	High	Low
Drought				

The findings of the hazard analysis and profile of Chapter 2 and the vulnerability assessment will be used as the foundation of goals and guidelines and mitigation activities developed in Chapter 4 through 10.

Comparison to State of Illinois 2018 Natural Hazard Mitigation Plan

The 2018 Illinois Natural Hazard Mitigation Plan prepared by the Illinois Emergency Management Agency (IEMA) hazard rating system has five levels: low, guarded, elevated, high and severe. DeKalb County's hazard ratings for identified natural hazards are in the 2018 Plan are shown in Table 3-41.

Table 3-6 IEMA Hazard Ratings for DeKalb County

Hazard	IEMA Rating
Floods	Medium
Tornado	Medium
Severe Summer Storms	Severe
Severe Winter Storms	High
Drought	Low
Earthquake	Low
Extreme Heat	Medium

3.4 References

1. U.S. Census 2010.
2. 2002 Census of Agriculture, U.S. Department of Agriculture.
3. Flood Insurance Claims Data for DeKalb County, FEMA, September 2019.
4. DeKalb County Economic Development Corporation web site, www.dcedc.org/.
5. *Illinois Hazard Mitigation Plan*, Illinois Emergency Management Agency, 2018.
6. *Taking Shelter from the Storm: Building a Safe Room Inside Your House*, FEMA, March 2004.
7. *Hail Loss Potential in the US*, Insurance Institute for Property Loss Reduction, 1995.
8. *Illinois Emergency Operations Plan Hazard Analysis*, Draft, Illinois Emergency Management Agency, 1995.
9. *Multi-Hazard Identification and Risk Assessment*, Federal Emergency Management Agency, 1997.
10. National Lightning Safety Institute website, www.lightningsafety.com.
11. *The Public Health Consequences of Disasters*, U.S. Department of Health and Human Services, Public Health Service, 1989.
12. Tornado Project Online, at web address: www.tornadoproject.com.
13. *Understanding Your Risks – Identifying Hazards and Estimating Losses*, FEMA 386-2, 2001.
14. University of Nebraska website, http://www.hprcc.unl.edu/nebraska/U_S_SEVERE.html.
15. <http://www.treasurer.il.gov/programs/our-own-home/pdf/MedianValues2007.pdf>

Chapter 4. Goals

The goals for this *All Hazards Mitigation Plan* were developed to reflect current community priorities, to be appropriate with the natural hazards that impact DeKalb County, and to be consistent with other planning efforts. At the March 2007 meeting, the Mitigation Committee, working in small groups, conducted three exercises to outline the goals for this *Plan*. At the December 13, 2018 meeting, the Planning Committee reviewed and updated the goals and guidelines for their implementation. The goals and guidelines were reviewed and reaffirmed at the December 27, 2018 Mitigation Committee meeting. The goals and guidelines presented in this chapter are the foundation of the Action Plan, presented in Chapter 11.

4.1 Community Priorities

Planning Committee members were given a handout listing various community priorities listed in alphabetical order. The handout asked: “What are the top five priorities for your community and DeKalb County? What do your community leaders hold as most important?” Planning Committee members were asked not to answer these questions from their personal views, but to reflect the position of their city council, village board, or County Board.

The purpose of this exercise was to have the Planning Committee consider the direction or future of the County and municipalities before focusing on hazard mitigation goals and objectives. The small groups discussed the possible priorities and narrowed the list to the top five choices of their group. Each small group reported to the whole group, and top responses were tallied as follows:

- Provide a safe place to live and work.
- Improve employment opportunities.
- Improve schools and education programs.
- Control (plan for) the rate of growth.
- Improve roads and highways.
- Improve/increase businesses and manufacturing.

Priorities given attention by at least one group:

- Preserve farmland.
- Improve/increase public transportation opportunities
- Improve water quality
- Preserve historic and cultural resources

From the exercise, it can be concluded that the Planning Committee sees community priorities as those activities that improve the quality of life of the people who live and work in DeKalb County. The priorities are focused on serving and protecting people. Committee discussion also highlighted the continued creation of opportunities for college students stay in DeKalb County following graduation, and opportunities for other new residents to both live and work in DeKalb County.

4.2 Plan Direction

The Planning Committee conducted two more exercises to examine what the *Plan* should focus on, and how mitigation projects should be funded and implemented. Planning Committee members were given a list of possible responses to each of these questions. After a process of discussing individual responses in the small groups and writing out each small group's top five responses, an overall vote was conducted to assess the mitigation priorities.

For the questions of "*What to focus on?*" the priorities were:

- Protecting people's and animals' lives.
- Protecting critical facilities.
- Protecting public health.
- Protecting public services.
- Give special attention to elderly/disabled.

Additionally, the Planning Committee gave importance to:

- Protect streets and utilities
- Protecting existing buildings
- Protecting wetland/natural areas

For the question of "*How should mitigation projects be funded and implemented?*" the responses were as follows:

- Develop public-private partnerships.
- Make people aware of how they can protect themselves.
- Make people aware of the hazards they face.
- Use county/municipal agencies to implement mitigation activities.
- Only fund projects where it's prove that the benefits exceed the costs.
- Help people protect themselves.

Also:

- Seek user fees to fund measures.
- Protect critical facilities regardless of the cost.
- Let state/federal agencies take the lead.

Interest in developing public-private partnerships was selected by more that half the Planning Committee. The need for partnerships is important in addressing natural hazards, but more important for addressing the manmade hazards discussed in Chapter 2, since manmade hazards can be the results of accidents and so forth.

The Planning Committee felt that the County and municipalities should implement mitigation projects, however state and federal agency support is important and should be sought. The Planning Committee felt that people should be aware of how to help themselves, and the County and municipalities should take an active role in this effort.

4.3 Goals and Guidelines

At the September 2011 meeting the Planning Committee established the goals, which were reviewed and updated in December 2018. The updated goals for this *DeKalb County All Hazards Mitigation Plan* are:

- Goal 1. Protect the lives, health, and safety of the people and animals of DeKalb County from the impact and effects of natural and manmade hazards.
- Goal 2. Protect public services and critical facilities from loss of use during, and potential damage from, natural and manmade hazard events.
- Goal 3. Mitigate to protect against economic and transportation losses due to natural and manmade hazards.
- Goal 4. Ensure that new developments do not create new exposures to damage from natural and manmade hazards.
- Goal 5. Identify specific projects to protect lives and mitigate damage where cost-effective and affordable.
- Goal 6. Protect historic, cultural, and natural resources from the effects of natural and manmade hazards.

The guidelines were developed by the Planning Committee, which were updated in December 2018 for the purpose of achieving the goals and facilitating the development of hazard mitigation action items in Chapter 11. The guidelines are:

- Guideline 1. Focus natural hazards mitigation efforts on severe winter storms, severe summer storms, extreme cold and heat events, tornadoes, and floods.
- Guideline 2. Focus manmade hazard mitigation efforts on armed attacks (active shooters), transportation related incidents, cyberterrorism, utility interruption, hazardous material incidents, and radiological release incidents.
- Guideline 3. Make people aware of the hazards they face and focus mitigation efforts on measures that allow property owners, service providers, and pet owners to help themselves.
- Guideline 4. Create and foster public-private partnerships to accomplish mitigation activities.
- Guideline 5. Seek state and federal support for mitigation efforts.
- Guideline 6. Use available local funds, when necessary, to protect the public services, critical facilities, lives, health, and safety from natural and manmade hazards.
- Guideline 7. Strive to improve and expand business, infrastructure, education and housing opportunities in DeKalb County in conjunction with planned mitigation efforts.

In summary, the goals and guidelines of this *Plan* focus on the life, health, and safety issues associated with natural hazards, and on the importance of people being able to protect themselves and their property from damage.

4.4 County and Municipal Planning Goals

A review of the goals and guidelines of this *Plan* were compared to the goals of other County and municipal plans. That review showed that this *Plan*'s focus is consistent and complementary to current County and municipal initiatives included in their comprehensive and other plans. Shown below are goals from the *DeKalb County Unified Comprehensive Plan*, 2011, and the *DeKalb County Stormwater Management Plan*, 2006. The DeKalb County stormwater management plan is a countywide plan. The goals of these plans are consistent with this *Plan*.

Goals of the DeKalb County Unified Comprehensive Plan of May 2011

- Preserve prime agricultural land while allowing for development and growth around municipalities.
- Preserve wetlands and floodplains, and reduce and eliminate erosion.
- Promote policies and development which protect and preserve natural resources.
- Develop policies which protect standard farm operations from encroaching development or unwarranted complaints made by adjacent residential areas against normal farming practices.
- Require proper processing and disposal of solid waste and sanitary waste.
- Discourage scattered nonagricultural development in rural areas of the County.
- Promote appropriately located economic development throughout DeKalb County.
- Foster intergovernmental cooperation and efficient use of resources.
- Reduce the potential for flood damage to homes, businesses, and farms.
- Develop and maintain transportation systems which serve existing and future residents, farms and businesses.
- Use and improve the County Geographical Information System to assess existing physical geography conditions and analyze possible developments and changes.

Goals of the DeKalb County County Stormwater Management Plan, 2010

- Preserve floodplain and wetland areas
- Promote policies and development that protect and preserve natural resources
- Reduce the potential for flood damage to homes, businesses, and farms

An Action Item 9 of this *Plan* (Chapter 11) states that “the goals and guideline of this *Plan* should be incorporated into [other planning] efforts.” An example of the implementation of this action item is the 2010 DeKalb County Unified Future Land Use Plan where the SFHAs throughout the County are identified as conservation areas. Conservation areas are defined as “land used or suited for the protraction of natural resources, floodplains or woodlands.” A copy of the 2010 DeKalb County Unified Future Land Use Plan is included in Chapter 8 of this *Plan* (Figure 8-1).

Chapter 5. Preventive Measures

The objective of preventive mitigation measures is to protect new construction from hazards and see that future development does not increase potential losses for communities. 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
- Hazard Mapping

5.1 Building Codes / Higher Regulatory Standards

Building codes provide one of the best methods of addressing natural hazard mitigation. They are an important measure to protecting 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 an earthquake,

Hazards Addressed	
Y	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
Y	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

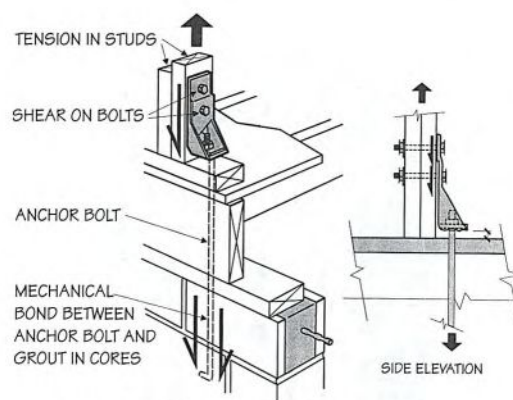


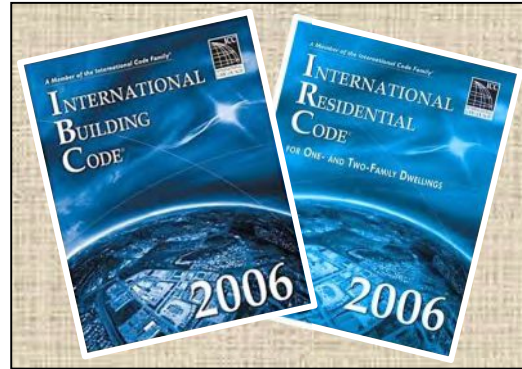
Fig. 14 - TYPICAL TIE-DOWN DETAIL TO FOUNDATION

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: Communities in Illinois are adopting the International Building Codes (I-Codes) to replace 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). The I-Codes include provisions for natural hazards including buildings constructed in floodplains.



New construction should also include the construction of an underground shelter or “safe room” at the first-floor level to protect the lives of the occupants. A building code could require them in new construction. Tornado safe rooms are discussed further in Section 6.2.3.

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

IBHS has researched the cost for implementing the Fortified program. For less than 10 percent above the cost of the average home, a builder can incorporate all of the recommended criteria for a safer building. More information can be found at <http://disastersafety.org/fortified>.

Code Administration: Just as important as the code standards is the enforcement of the code. There were many reports of buildings that lost their roofs during Hurricane Andrew because sloppy construction practices did not put enough nails in. 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.

There is a national program that measures local building code natural hazard protection standards and code administration. The Building Code Effectiveness Grading Schedule (BCEGS) is used by the insurance industry to determine how well new construction is protected from wind, earthquake and other non-flood hazards. It is similar to the 10-year old Community Rating System and the century-old fire insurance rating scheme:

building permit programs are reviewed and scored, a class 1 community is the best, and a class 10 community has little or no program.

Code Official Training: A very important part of code enforcement is having code officials who are trained and understand the code requirements. Training of code officials and inspectors is a large part of the BCEGS rating for a community. Courses are offered through the building code associations to help local officials understand standards that apply to seismic, wind and flood hazards.

Local implementation: The table below lists the building codes in use in DeKalb County for the communities that have them.

Table 5-1 Building Codes Used in DeKalb County

Municipality	Building Code Residential	BCEGS Residential	Building Code Commercial	BCEGS Commercial
Cortland	IRC 2006	4	IBC 2006	4
DeKalb	IRC 2015	4	IBC 2015	4
Genoa	BOCA 2003		BOCA 2003	
Hinckley	IRC 2000	4	IBC 2000	4
Kingston	IRC 2000	4	IBC 2000	4
Kirkland	IRC 2006	4	IBC 2006	4
Lee	IRC 2000	4	IBC 2000	4
Malta				
Sandwich	Yes		IBC 2006	
Shabbona	IRC 2000	4	IBC 2000	4
Somonauk	IRC 2003		IBC 2003	
Sycamore	IRC 2006	5	IBC 2006	5
Waterman		5		5
DeKalb County (Uninc.)	IRC 2006	5	IBC 2006	5
Kishwaukee College	---		---	
Northern Illinois University				

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.

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. The International Code should be applied to the World Shooting Complex planned for DeKalb County and being funded by the State.

Higher Regulatory Standards: These standards exceed minimum standards in order to protect existing and future development and natural areas. Some examples of Higher Regulatory Standards include:

- Protecting critical facilities to higher levels
- Requiring compensatory storage
- Requiring full compliance with floodplain management regulations when proposed improvements or repairs are less than 50% of a building's value
- Requiring the lowest floors of residences to be higher than the base flood elevation

5.2 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 (HUD). All mobile type homes constructed after June 15, 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards. These standards apply uniformly across the country and it is illegal for a local unit of government to require additional construction requirements. Local jurisdictions may regulate the location to these structures and their on-site installation.

Hazards Addressed	
Y	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
Y	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident



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

Following tornadoes in Oklahoma and Kansas, FEMA's Building Performance Assistance Team found that newer manufactured housing that had been anchored to permanent foundations performed better. They also found that newer homes are designed to better transmit wind uplift 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 (IDPH). 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.

Because the state regulates installation of mobile homes and mobile home parks, many local officials believe that they cannot enforce other ordinances. The floodplain ordinances in DeKalb County certainly apply to mobile home parks. Also, communities with zoning ordinances in DeKalb County have mobile home standards incorporated into them.

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 are also regulated by the IDPH, but the school must provide the 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.

DeKalb County has a number of manufactured home communities, including Evergreen Park near Sycamore, Southmoor Estates, Edgebrook and others in Sandwich, Cortland, and Genoa. Evergreen Park is a repetitive loss flood area.

5.3 Planning and Zoning

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.

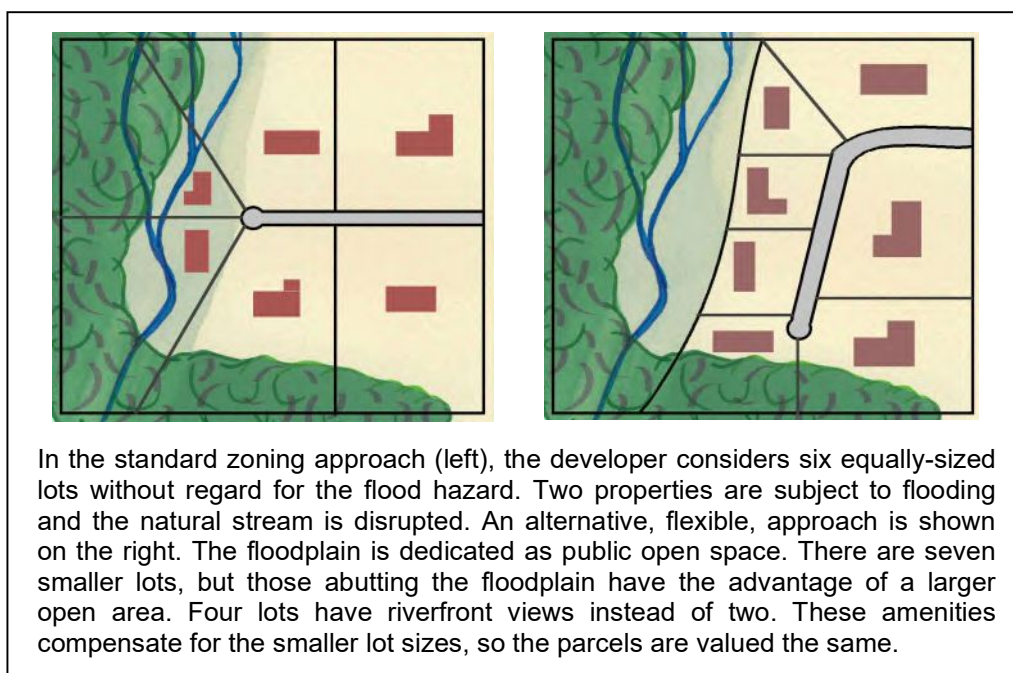
Hazards Addressed	
Y	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
Y	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
Y	HazMat
	Radiological Incident

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.

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 and 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: Table 5-2 summarizes the findings of a review of comprehensive and land use plans adopted by the County and municipalities.

Also, the 2010 DeKalb County Unified Future Land Use Plan identifies the Special Flood Hazard Areas (SFHAs) throughout the County as conservation areas. Conservation areas are defined as "land used or suited for the protraction of natural resources, floodplains or woodlands." A copy of the 2010 DeKalb County Unified Future Land Use Plan is included in Chapter 8 of this *Plan* (Figure 8-1).

Table 5-2 DeKalb County Planning and Land Use Ordinances

Community	Comprehensive* Plan	Flooding or other hazards included in Comprehensive Plan	Zoning Ordinance	Flood hazards or drainage provisions in Subdivision Ordinance	Requirement to bury utilities in Subdivision Ordinance
Cortland	Yes		Yes		
DeKalb	Yes		Yes	Yes	Yes
Genoa	Yes		Yes		
Hinckley	Yes		Yes	Yes	Whenever possible
Kingston	Yes		Yes		
Kirkland	Yes	Yes	Yes		
Lee			Yes		
Malta	Yes		Yes		
Sandwich	Yes	Yes	Yes	Yes	
Shabbona	Yes		Yes	Yes	Yes
Somonauk	Yes		Yes		
Sycamore	Yes		Yes	Yes	
Waterman	Yes		Yes		
DeKalb County (Uninc.)	Yes	Yes	Yes		
Kishwaukee College	---	---	---	---	---
Northern Illinois University	---	---	---	---	---

5.4 Subdivision Regulations

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

Hazards Addressed	
Y	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
Y	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

Local implementation: The table on the previous page shows the communities in DeKalb County that have adopted subdivision regulations.

5.5 Open Space Preservation

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

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

- Acquisition,
- Dedication by developers,
- Dedicating or purchasing an easement to keep the land open,
- Specifying setbacks or buffer zones where development is not allowed, and
- Subdivision regulations need to ensure that streets and other public facilities can handle emergency vehicles during an emergency.

Local implementation: There are two kinds of open space land in DeKalb County: lands that are currently open, such as vacant parcels and farmland; and lands that are preserved as open space, such as parks and forest preserves. As further discussed in Chapter 8, the Mitigation Committee expressed the County and municipal desire to preserve open space – farmland, forest land, wetlands and floodplains.

Hazards Addressed	
	Winter storms
	Summer Storms
	Extreme Cold
	Extreme Heat
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

5.6 Floodplain and Stormwater Management

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

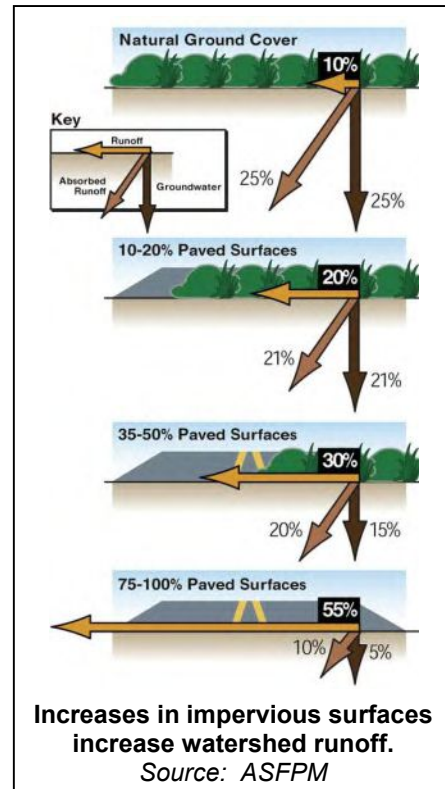
Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

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

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

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

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. These calculations are based on historical rainfall data. As new rainfall data becomes available, the updated information is incorporated into the stormwater and floodplain regulations, which could also incorporate potential changes in rainfall due to climate change.



Local implementation: The DeKalb County and community NFIP ordinances meet or exceed all of the state and NFIP floodplain regulatory requirements. DeKalb County's floodplain ordinance does not allow development in the floodplain, except for open space or recreation purposes, and infrastructure purposes. This standard exceeds the State and NFIP requirements.

FEMA and the Illinois Department of Natural Resources (IDNR) periodically visit or contact communities to verify that staff understand and are enforcing the floodplain regulations. According to IDNR, communities were found to be generally good during recent contacts and visits for administration or enforcement of the floodplain ordinances.

A number of communities currently implement stormwater drainage regulations. In 2005, DeKalb County was granted countywide stormwater management authority through the enactment of Public Act 094-0675. This is a very important authority in consideration of the continuing growth of the County. DeKalb County has developed and adopted the "DeKalb County Stormwater Management Plan" in September 2006. Implementation steps include the development of a countywide stormwater management ordinance, and examination of the County's watersheds as funding becomes available.

The DeKalb County Stormwater Management Planning Committee together with the Community Foundation are seeking Section 319 funds from the Illinois Environmental Protection Agency (IEPA) to conduct a detailed study of the Union Ditch/Virgil Ditch watershed. The watershed includes the City of Sycamore and an area extending east into Kane County and south to Maple Park and the north side of Cortland. This watershed has experienced significant damaging flooding in the past. The goal is to create a watershed

plan that will identify the important conditions within the watershed and recommend projects and solutions that can lessen the damage from flooding in the future and protect water quality.

5.7 Hazard Mapping

Mapping of hazards, both the areas impacted and the severity of the hazard, is an important tool and resource for preventing damages from natural and manmade hazards. Communities in the NFIP have the riverine flood hazard mapped on their Flood Insurance Rate Map (FIRM). However, additional maps of other areas that experience or can potentially flood are very useful.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

With the availability of the internet and mapping software tools, both hazards and their potential impact to buildings and infrastructure can be mapped. As communities build GIS mapping capabilities, layers for hazard data can be added as information becomes available.

Local implementation: As part of FEMA’s map modernization DeKalb County FIRMs were revised in 2009. The modernized FIRM provides a GIS-based map with the existing floodplains delineated on available aerial photo mapping. The ISWS started a study of the Kishwaukee Watershed in 2018 to update the floodplain maps.

As the need arises, and data becomes available, other hazards can be mapped through DeKalb County’s GIS program.

5.8 Conclusions

1. Building codes are the prime preventive measure for tornadoes, high winds, snow storms, and earthquakes. DeKalb County, DeKalb County municipalities, Kishwaukee College and Northern Illinois University have building codes that will provide adequate protection of future buildings from these hazards.
2. Comprehensive and land use plans need to address floodplains and the need to preserve these hazardous areas from intensive development. Zoning ordinances should designate flood-prone areas as a special type of land use.
3. Standards in subdivision regulations for public facilities should account for the natural and manmade hazards present at, or near, the site. New building sites, streets, and water systems should facilitate access and use by fire and emergency equipment.
4. The County and most communities have adopted the International Code series (I-Codes), which provides better protection from natural hazards. It is recognized (according to the Institute for Building and Home Safety) the I-Codes may adequately protect new construction from damage by tornadoes with wind speeds over 90 miles per hour and large hail events.

5. Based on the national Building Code Effectiveness Grading Schedule (BCEGS), administration of building codes is generally good.
6. Mobile home or manufactured home communities are extremely vulnerable to natural hazards. 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. DeKalb County have manufactured homes that are vulnerable to flood and wind events.
7. Local permit officials need to be aware of their authorities and current regulatory standards for developments such as the installation of mobile homes.
8. Much of the floodplain areas in the unincorporated areas of the County are undeveloped (open space). Preventive measures can have a great impact on the future flood damages. The County floodplain ordinance provisions exceed minimum national and State standards and will be helpful in preventing flood problems from increasing.
9. The entire county, including the colleges and universities, can benefit from the countywide stormwater management authority provided to DeKalb County.

5.9 Recommendations

1. All communities should adopt the latest I-Codes, the new national standard that is being adopted throughout the country, for residential, commercial, and institutional properties.
2. As resources allow, supplemental building code language should be developed to strengthen new buildings against damage by high winds, tornadoes, hail, and applicable manmade hazards.
3. All communities should work to improve code administration and enforcement, and to improve their BCEGS rating.
4. County, municipal staff, and consultants should be trained in building code administration and enforcement, and they should be trained on implementing the codes that are applicable to natural and manmade hazard mitigation.
5. Municipal and County code enforcement staff should work to ensure mobile home installation is adequately regulated (so that newly installed mobile homes get the same level of attention as other types of new single-family homes).
6. On a regional basis, municipal and county staff should develop example subdivision ordinance language that requires new infrastructure to have hazard mitigation provisions, such as:
 - Streets and water systems that facilitate access and use by fire and emergency equipment
 - Buried utility lines
 - Storm shelters in new mobile home parks

7. Offices responsible for design, construction or permitting critical facilities should ensure that the design accounts for natural and manmade hazards and adjacent land uses.
8. 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.
9. 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.
10. As part of the County's GIS mapping effort, hazard mapping should be developed on a countywide basis.

5.10 References

1. *Design and Construction Guidance for Community Shelters*, FEMA, 2000.
2. *Guidelines for Installing Manufactured Homes in Illinois*, Illinois Department of Public Health, 2000.
3. *Midwest Tornadoes of 1999, Observations, Recommendations and Technical Guidance*, FEMA, Building Performance Assessment Report, Preliminary Report, July 13, 1999
4. *Multi-Hazard Identification and Risk Assessment*, Federal Emergency Management Agency, 1997.
5. Survey of municipalities and review of ordinances, 2007.
6. Contact with the Illinois Department of Natural Resources, Office of Water Resources in Springfield, Illinois, January through April 2005.
7. *Regulation of Factory Built Structures in Illinois*, Illinois Department of Public Health, 2000.
8. *Subdivision Design in Flood Hazard Areas*, American Planning Association and FEMA, PAS Report 473, 1997.
9. Websites of the Institute for Business and Home Safety (www.ibhs.org) and the Illinois Department of Public Health (www.idph.state.il.us).
10. *Windstorm Mitigation Manual for Light Frame Construction*, Illinois Emergency Management Agency, 1997.

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Chapter 6. Property Protection

Property protection mitigation measures are used to modify a building or a property that is subject a hazard to reduce potential 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.

The word “building” can refer to residential, commercial or industrial structures, or it can mean infrastructure facilities (treatment plants, electrical substations, roads) or other public structures.

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

6.1 Keeping the Hazard Away

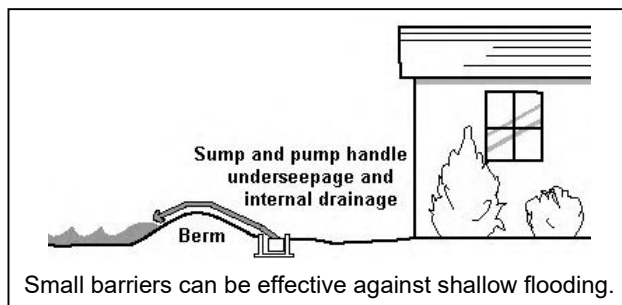
For the hazards considered in this plan, flooding is the one hazard that can be kept away from a building. There are four common methods to do this:

- 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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Heat
	Extreme Cold
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

The advantages and disadvantage to these four methods will be discussed below. Generally, floods do not damage vacant areas. 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.

Barriers: A flood protection barrier can be built of dirt or soil (“berm”) or concrete or steel (“floodwall”). Berms take up more space than floodwalls, but floodwalls are more expensive than berms.



Careful design is needed so as not to create flooding or drainage problems on neighboring properties. If the ground is porous and 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.

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 to provide sufficient flood protection, including considerations for increases in water levels due to climate change, consideration for impacts to surrounding properties and maintenance (and insurance on the building, in case of failure).

Relocation: Moving a building to higher ground is the surest and safest way to protect it from flooding. Relocation of a building can be to a new property outside of the floodplain, or, for large lots, to a higher location (outside of the floodplain) on the existing property. 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.



In areas subject to flash flooding, deep waters, or other high hazard, relocation is often the only safe approach.

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.



Home elevated one foot 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 on the previous page). 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. Although, many owners have successfully and attractively elevated their homes more than eight feet.

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. Careful design and construction, however, 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. If a home has been heavily damaged and susceptible to future damage, it is safest for owners to relocate. 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.



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

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, are reluctant to leave. Creating such an acquisition pattern in a community adds to the maintenance costs that taxpayers must support.

Local implementation: The following acquisition and demolition projects have been implemented in DeKalb County:

Village of Kirkland: In the 1996 flood on the Kishwaukee River and Bull Run Creek, 66 mobile homes were substantially damaged or destroyed in Kirkland. Following the flood, the Village of Kirkland acquired the property of the mobile home park with assistance from FEMA Hazard Mitigation Grant Program (HMGP). FEMA also assisted the mobile home owners and relocation assistance was provided accordingly. The cost of

the entire project, including demolition and site restoration was about \$1.5 million. This area was a repetitive flood loss area.

City of DeKalb: Between 2001 and 2002, the City of DeKalb acquired six structures in the Kishwaukee River floodplain on David Avenue and Dawn Court.

Following the September 2008 flood, DeKalb County and the City of DeKalb pursued the acquisition of floodplain and floodway properties. The City of DeKalb received a grant from IEMA/FEMA for the acquisition of 10 additional floodplain properties, including two repetitive flood loss properties. Five structures were removed in 2009 and five structures in 2010.

DeKalb County: IEMA/FEMA Hazard Mitigation Grant Program (HMGP) funding has been awarded for the acquisition of the Evergreen Village Mobile Home Park in unincorporated DeKalb County near Sycamore. The County is also pursuing the acquisition of a severe repetitive flood loss property in an unincorporated area County (Mayfield Township) with IEMA/FEMA Predisaster Mitigation Program (PDM) funds.

6.2 Retrofitting – Modify the Building

Section 6.1 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, summer and winter storms.

Hazards Addressed	
Y	Winter storms
Y	Summer Storms
	Extreme Heat
	Extreme Cold
Y	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

6.2.1 Winter Storm Retrofitting

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.

6.2.2 Summer Storm Retrofitting

Retrofitting approaches to protect private or public buildings from the effects of **thunderstorms** include:

- storm shutters
- lightning rods (illustrated to the right)
- strengthening connections and tie-downs (similar to tornado retrofitting)



- impact-resistant glass in window panes
- surge protectors at electrical outlets

Roofs could be replaced with materials less susceptible to damage by **hail**, such as modified asphalt or formed steel shingles.

6.2.3 Tornado Retrofitting

Tornado retrofitting measures include constructing an underground shelter or “safe room” at the first-floor level to protect the lives of the occupants. Their worth has been proven by recent tornadoes in Oklahoma, as shown in the photo to the right. They can be installed for approximately \$3,000.



Interior rooms can be reinforced and retrofitted to be tornado “safe rooms”

Safe rooms are built by connecting all parts of the shelter together (walls, roof and foundation) using adequate fasteners or tie downs. These help hold the safe room together when the combination of high wind and pressure differences work to pull the walls and ceiling apart. The walls of the safe room are constructed out of plywood and metal sheeting to protect people from windborne missiles (flying debris) with the strong winds of a tornado. More information on safe rooms can be found in FEMA Publication 320.



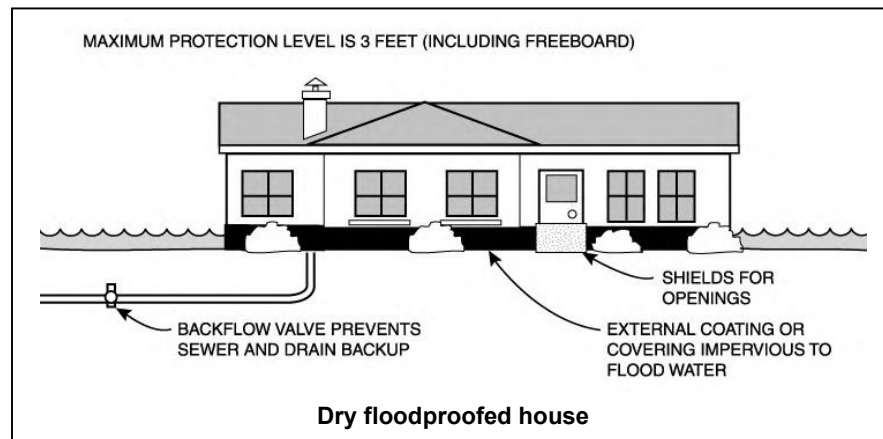
Dynergy Power Plant (Southern Illinois)

Another retrofitting approach for tornadoes and **high winds** is to secure around 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. This measure also applies to manufactured homes.

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. Impact-resistant glass is also recommended for high wind or tornado protection.

6.2.4 Flood Retrofitting - Buildings

Flood retrofitting measures include **dry floodproofing** where all areas below the flood protection level are made watertight. Walls are coated with waterproofing compounds or



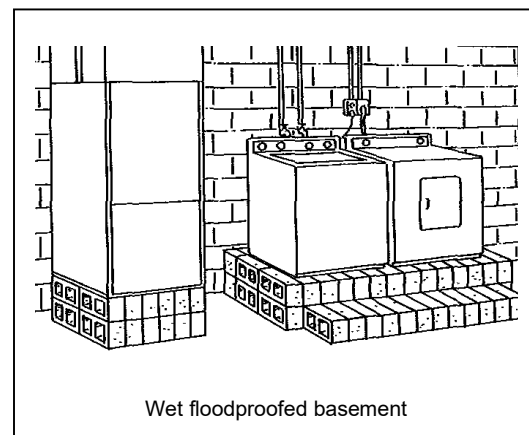
plastic sheeting. Openings (doors, windows, and vents) are closed, either permanently, with removable shields, or with sandbags.

Dry 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.

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. 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.

For dry floodproofing, wet floodproofing, and sewer backup prevention, it is important to consider what contents of a building are suitable for keeping in basements or crawl spaces. Valuable and invaluable items, such as, photographs, should be kept elsewhere in the event that the seepage or flooding occurs even with the retrofitting measures in place.

Local implementation: Homeowners on Hickory Street in the City of DeKalb elevated their home such that the first floor was above the 100-year floodplain elevation.

6.2.5 Flood Retrofitting – Other Assets

Hazardous and Buoyant Materials: Hazardous Materials, such as, petroleum or chemicals, should not be located in the floodplain. If they are in areas where they can't be relocated, then the containers should be properly anchored. This includes homeowner propane tanks. Tanks should be relocated, or elevated, or property anchored (tied down). Precautions should be taken so that floodwaters will not be contaminated, or so that the contents do not present a fire or explosion hazard.

Local implementation: No retrofitting projects for hazardous materials were reported to the Planning Committee.

6.2.6 Utility Interruption Retrofitting

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 Chapter 6. Tree pruning near power lines can also protect against broken or downed power lines.

6.3 Insurance

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

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

Hazards Addressed	
Y	Winter storms
Y	Summer Storms
	Extreme Heat
Y	Extreme Cold
Y	Tornado
Y	Flood
	Armed Attack
Y	Transportation Incident
	Cyberterrorism
	Utility Interruption
Y	HazMat
Y	Radiological Incident

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 (NFIP). **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 bi-levels and tri-levels.

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

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.

Earthquake Insurance: Earthquakes are not covered under standard homeowners or business insurance policies, but coverage is usually available for earthquake damage in the form of an endorsement to a home or business insurance policy. Cars and other vehicles are covered for earthquake damage under the comprehensive part of the auto insurance policy. In DeKalb County, earthquake insurance is very inexpensive.

Earthquake insurance provides coverage for your dwelling, your personal property, and any additional living expense (ALE). ALE coverage can include costs for the following:

- Temporary rental home, apartment, or hotel room;
- Restaurant meals;
- Telephone or utility installation in a temporary residence;
- Relocation and storage;
- Furniture rental; and
- Laundry

Local implementation: Flood insurance has been available in DeKalb County communities since 1978 in communities that participate in the NFIP. Limited data on private insurance policies was available during the development of this *Plan*. Summary flood insurance policy and claims data is presented in Tables 3-3 and 3-4 (Chapter 3). There are 202 flood insurance policies throughout DeKalb County. The 2007 *Plan* showed that there were 238 policies and there were 280 policies in 2012.

DeKalb County has an insurance policy through the ICI. Most communities in DeKalb County are enrolled in the Illinois Municipal League Risk Management Association (IML). IML provides risk management advice and coverage for all of the hazards covered in this plan, including floods and earthquakes.

6.4 The Government's Role

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

Government facilities: One of the first duties of a local government is to protect its own facilities. Fire stations, water treatment plants and other critical facilities should be a high priority for retrofitting projects and insurance coverage.

Hazards Addressed	
Y	Flood
Y	Earthquake
Y	Winter storms
Y	Summer Storms
Y	Tornado
Y	Extreme Heat
Y	Armed Attack
Y	Transportation Incident
Y	Cyberterrorism
Y	Utility Interruption
Y	HazMat
Y	Radiological Incident

Often public agencies discover after the disaster that their “all-hazard” insurance policies do not cover the property for the type of damage incurred. Flood insurance is even more important as a mitigation measure because of the Stafford Act provisions discussed above.

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

Financial Assistance: Communities can help owners by helping to pay for a retrofitting project. Financial assistance can range from full funding of a project to helping residents find money from other programs. Some communities assume responsibility for sewer backups, street flooding, and other problems that arise from an inadequate public sewer or public drainage system.

Less expensive community programs include low interest loans, forgivable low interest loans and rebates. A forgivable loan is one that does not need to be repaid if the owner does not sell the house for a specified period, such as five years. These approaches don’t fully fund the project, but they cost the community treasury less and they increase the owner’s commitment to the flood protection project. Often, small amounts of money act as a catalyst to pique the owner’s interest to get a self-protection project moving.

The more common outside funding sources are listed below. Unfortunately, the last three are only available after a disaster, not before, when damage could be prevented. Following past disaster declarations, FEMA, the Illinois Emergency Management Agency (IEMA) and the Illinois Department of Natural Resources have provided advice on how to qualify and apply for these funds.

Pre-disaster funding sources

- FEMA’s Pre-Disaster Mitigation (PDM) grants (administered by IEMA)
- FEMA’s Flood Mitigation Assistance (FMA) grants (administered by IEMA)
- Community Development Block Grant (administered by the Department of Commerce and Economic Opportunity)
- Illinois Department of Natural Resources
- Conservation organizations for the purchase of vacant land in natural areas.

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.

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 399 identified critical facilities. Most of have no special measures to protect them from flooding, tornadoes, and other natural hazards.

6.5 Repetitive Flood Loss Areas

As discussed in Section 3.2.2, the current FEMA definition of a repetitive loss property is a flood-insured structure that has received two or more flood insurance claim payments of more than 25% of the market value within any 10-year period. According to FEMA there are 27 repetitive loss properties in DeKalb County and five of those have been mitigated or have mitigation projects planned. The remaining 25 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

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Heat
	Extreme Cold
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

priority with FEMA and IEMA mitigation funding programs.

Repetitive loss properties in DeKalb County and municipalities, as identified by FEMA, have not been reviewed in detail for potential mitigation. Repetitive loss data provided by FEMA for this planning effort was limited due to varying factors. The August 2007 flooding has most likely added repetitive lost properties to FEMA's list.

Repetitive loss areas have been identified and are shown in Figure 3-1 in Chapter 3 of this *Plan*. Key factors listed below will be used to determine appropriate property protection measures. The criteria used are based on several studies that have identified appropriate measures based on flood and building conditions. While a cost/benefit study was not conducted on each property, these guidelines show which measures are cost-effective.

- “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.

The mobile home park in Kirkland, that was acquired following the 1996 flood was a repetitive loss area, and has been converted to public park. The area flooded in August 2007 and only minor damage occurred in the park.

As discussed in Section 6.2, DeKalb County has been awarded a \$6.2 million grant from IEMA/FEMA for the acquisition of the Evergreen Village Mobile Home Park. Evergreen Village and a number of mobile homes within the park are included on the County's repetitive loss list and will be fully mitigated. Evergreen Village floods frequently and must be evacuated. The mitigation of this property will benefit to the residents and the County. The County is awaiting the approval for funds to acquire a severe repetitive flood loss property in an unincorporated area County.

6.6 Conclusions

1. Property protection measures for natural hazards and manmade hazards are important for DeKalb County. In particular:
 - a. Flood protection from rivers and streams and from sewer back-ups.
 - b. Protection of structures, people, and animals from wind and severe storm hazards.
 - c. Protection of structures, people, animals, and infrastructure from manmade hazards.
2. 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.
3. 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, summer, and winter storms). For other measures, such as relocation, elevation and safe rooms, the owners may need financial assistance.
4. Local government agencies can promote and support property protection measures through several activities, ranging from public information to financial incentives to full funding.
5. The vulnerability of critical facilities and infrastructure to natural and manmade hazards in DeKalb County is unknown.

6.7 Recommendations

1. DeKalb County should continue to pursue grant funds for the acquisition of repetitive loss properties where owners have voluntary interest.
2. All repetitive flood loss areas should be investigated and mitigated.
3. Other than state and federally-mandated regulations, local incentives for doing property protection should be positive.
4. Most property protection projects should be voluntary, but in some circumstances, projects should be required.
5. Public education materials should be developed to explain property protection measures that can help owners reduce their exposure to damage by hazards and the various types of insurance coverage that are available.
6. 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 other high hazard areas.
7. DeKalb County and participating municipalities and institutions should seek property protection financial assistance for flood protection projects, the construction of safe rooms, and other mitigation projects that can cost-effectively protect people, animals and property.
8. All property owners should be encouraged to determine if they are adequately insured for natural hazards.

6.8 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. Mitigation Ideas: Possible Mitigation Measures by Hazard Type, FEMA Region 5, 2002.
6. *Floodproofed Sites in Illinois*, French & Associates, 1992.
7. *Guide to Flood Protection in Northeastern Illinois*, Illinois Association for Floodplain and Stormwater Management, 1997.
8. *The Homeowners Guide to Earthquake Safety*, California Seismic Safety Commission, 2000
9. *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding*. Federal Emergency Management Agency, FEMA-312, 1998.
10. *Ice Storm Mitigation*, FEMA –860-DR-Illinois, Illinois Emergency Management Agency, 1990.
11. *Local Flood Proofing Programs*, U.S. Army Corps of Engineers, 1994.
12. Materials supplied by County offices and municipalities, 2004 and 2005.
13. State Farm Insurance website, www.statefarm.com/consumer/lightng.htm
14. *Taking Shelter from the Storm: Building a Safe Room Inside Your House*, Federal Emergency Management Agency, FEMA-320, 1998.
15. Windshield surveys of repetitive loss areas conducted by French & Associates, Ltd., 2003.
16. *Windstorm Mitigation Manual for Light Frame Construction*, Illinois Emergency Management Agency, 1997.
17. Insurance Information Institute website: www.iii.org.

Chapter 7. Structural Projects

Structural projects are projects that are constructed to protect people and infrastructure from damage due to natural hazards. Often, they are referred to as regional projects or alternative, because they typically protect a number of buildings or properties. Structural projects are usually funded by public agencies. Preventing damage due to flooding is the primary focus of structural projects, but structural projects can also address manmade hazards, such as, hazardous material containment or the protection of infrastructure.

Structural projects have traditionally been used by communities to control or manage floodwaters. Structural projects keep flood waters away from an area by constructing barriers, by storing floodwater elsewhere, or by redirecting flood flows. 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 Illinois Department of Natural Resources, Office of Water Resources, the U.S. Army Corps of Engineers, and the USDA Natural Resources Conservation Service.

Six structural project approaches are reviewed in this Chapter:

- Reservoirs and detention
- Channel improvements
- Levees and barriers
- Crossings and roadways
- Drainage and storm sewer improvements
- Drainage system maintenance

Structural projects offer advantages not provided by other measures but they also have shortcomings. The appropriateness of using structural flood control depends on individual project area circumstances.

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.

The following flood control studies or reports on flooding have been published for DeKalb County communities:

Planning Design Analysis, DeKalb County, Section 208 Clearing and Snagging of the South Branch Kishwaukee River, September 1998, U.S. Army Corps of Engineers, Rock Island District.

Reconnaissance Report for Section 205 Flood Control Project, South Branch Kishwaukee River, DeKalb, Illinois, July 1986, U.S. Army Corps of Engineers, Rock Island District.

Inventory and Analysis of Urban Water Damage Problems, City of DeKalb, DeKalb County, Illinois, December 1983, U.S. Army Corps of Engineers, Rock Island District.

South Branch Kishwaukee River near Sycamore, Illinois, DeKalb County, Illinois, October 1981, U.S. Army Corps of Engineers, Rock Island District.

Along with the survey of DeKalb County communities, these reports form the basis of this chapter.

Problem areas in the County and municipalities include:

- Watson Creek upstream of NIU
- Kishwaukee River at Bethany Road
- Kishwaukee River at North First Street
- Evergreen Village Mobile Home Park

7.1 Reservoirs and Detention

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 flooding 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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Heat
	Extreme Cold
	Tornado
Y	Flood
	Armed Attack
Y	Transportation Incident
	Cyberterrorism
	Utility Interruption
Y	HazMat
	Radiological Incident

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).

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). Reservoirs are also constructed to contain and filter pollutants.

Regardless of size, reservoirs protect the development that is downstream from the reservoir site. Unlike levees and channel modifications, they do not have to 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.

There are several considerations when evaluating use of reservoirs and detention:

- There is a 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: Detention basins at Rotary Park in the City of DeKalb, though overall floodwater storage is limited. City of Sycamore constructed a regional detention facility within the East Branch of the South Branch Kishwaukee River in 2000, which provides protection to the 100-year storm. The County is developing a countywide stormwater management ordinance and program.

7.2 Channel Improvements

By improving 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 for the purpose of floodwater management is often viewed as a form of conveyance improvement. However, it has the following problems:

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Heat
	Extreme Cold
	Tornado
Y	Flood
	Armed Attack
Y	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

- 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.

Channelization refers to straightening, deepening and/or widening a stream or river channel. Channelization has traditionally been the remedy for local drainage or flooding problems. Here are the concerns with this approach that need to be kept in mind:

- Channelized streams can create or worsen flooding 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 reduces water quality 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. See also the example on page 7-8.

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.

Local implementation: There is a need for the removal of siltation from the Kishwaukee River, and the South Branch and the East Branch.

7.3 Levees and Barriers

7.3.1 Levees and Floodwalls for Flood Control

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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Heat
	Extreme Cold
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

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-sided structures that require less surface 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: The DeKalb County flood protection levee has performed well. The City of DeKalb's monitors and maintains the Joanna Lane levee along the Kishwaukee River.

7.3.2 Berms and Barriers for Potential Manmade Hazards

Earthen berms, concrete walls, and other barriers have been effectively used for the containment of hazardous materials, and for the protection of critical facilities.

Bridge piers can be protected with bulkheads being placed in front of the piers.

7.4 Crossings and Roadways

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. 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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Heat
	Extreme Cold
	Tornado
Y	Flood
	Armed Attack
Y	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

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.

Local implementation: The FEMA Flood Insurance Study (FIS) for DeKalb County shows 16 roadways or bridges would be overtopped during the 100-year flood event.

This information is summaries in the table below. The table also includes bridges or culverts that participating communities identified as areas of concern and structures that should be evaluated for improvements:

Table 7-1 DeKalb County (FIS) 100-year Flood Event Bridge Overtopping

Bridge or Culvert:	Stream Name:	Comments:
McNeal Road	South Branch Kishwaukee River	
Baseline Road	South Branch Kishwaukee River	
Aldrich Road	South Branch Kishwaukee River	
North Grove Road	South Branch Kishwaukee River	
Hillcrest Drive	South Branch Kishwaukee River	
Lucinda Avenue	South Branch Kishwaukee River	
College Avenue	South Branch Kishwaukee River	
Fairview Drive	South Branch Kishwaukee River	
Bethany Road	East Brach of the South Branch Kishwaukee River	Structure improved by City of DeKalb in 2011-2012
Brickville Road	Blue Heron Creek	
State Route 23	Blue Heron Creek	
Castle Drive	Watson Creek	
Normal Road to Carroll Ave.	Watson Creek	Culvert
Lucinda Avenue	Watson Creek	Culvert
Annie Glidden Road	Watson Creek	Culvert
Grant Drive East	Watson Creek	Culvert
IC&E Railroad	Kishwaukee River	Damaged in 1996 (repaired)
Pearl Street	Kishwaukee River	
Kirkland Road	Kishwaukee River	

In the City of DeKalb, the Annie Glidden bridge over the South Branch of the Kishwaukee River were replaced and raised in 2007. Also, Fairview Drive is was replaced in 2008. First Street and Lucinda Avenue bridges will be replaced by 2021. Other problem areas include Coltonville Road and Rich Road.

Table 7-2 DeKalb County Highway Department Bridge/Culvert Drainage Improvements

Township	Road Name	Location	Waterway	Year
Pierce	Perry	1/2 mi E of Pritchard Road	Young's Creek	2008
DeKalb	Gurler	1/2 mile west of South 1st Street	South Branch of the Kishwaukee	2011
Paw Paw	Shabbona	1/2 mile north of Chicago Road	Branch of Indian Creek	2009
South Grove	Old State	1/4 mile east of Malta Road	Owens Creek	2011
Franklin	Cherry Valley	At Stone Quarry Road	Kingsbury Creek	2007
Mayfield	Mayfield	1/4 mile east of Five Points Road	South Branch of the Kishwaukee	2008

The County has replaced several structures in recent years that improved drainage conditions, including those shown in Table 7-2. When structures are replaced, the County follows stringent guidelines regulating the created head and backwater. DeKalb County has thirteen bridges scheduled to be rehabilitated or replaced between 2019 – 2023.

7.5 Drainage and Storm Sewer Improvements

Manmade 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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Heat
	Extreme Cold
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

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.

Local implementation: The Village of Kingston is currently working with the Illinois Department of Natural Resources' Office of Water Resources on small flood control project. DeKalb County drainage systems perform relatively well. In the City of DeKalb, the Lion's Park neighborhood has an old system with a 2-year flow capacity.

7.6 Drainage System Maintenance

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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Heat
	Extreme Cold
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

“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.

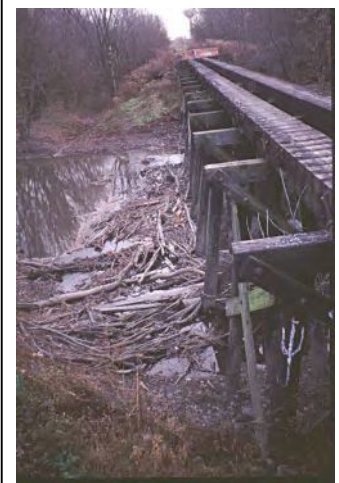


A regular inspection and maintenance program can remove debris before it becomes an obstruction to stream flows.

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 drainageway 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.

Local implementation: As discussed in Section 7.2, there is a need for the removal of siltation on Watson Creek at Lucinda Avenue and the Kishwaukee River, and the South Branch and the East Branch. The City of DeKalb and the City of Sycamore provides regular drainage system maintenance. The Town of Cortland, City of Genoa, Sandwich, DeKalb, and other municipalities inspect and cleans storm drains as needed.



Periodic inspections and debris removal are needed to prevent dams in streams

7.7 Conclusions

1. Structural projects, especially detention and the DeKalb flood protection levee, have been used effectively to reduce flooding in DeKalb County. However, it should be understood that structural projects can have adverse impacts on downstream properties and on the environment. They can also be very expensive.
2. Comprehensive watershed studies have not been completed for DeKalb County watersheds to determine the need and feasibility of additional flood protection structural projects.
3. Structural measures should be used further to address additional floodwater management areas of concern, and protection from manmade hazards, where feasible and cost effective.

4. Most municipal drainage system improvements have performed well, however older areas of a number of communities have 2-year capacity drainage systems.
5. The DeKalb County Stormwater Management Program is not a funding source for structural projects. Other funding sources must be sought.
6. Structural projects can be effective in protecting critical facilities from natural hazards.
7. There are a number of locations where bridge or culvert replacement or enlarging should be considered. However, as with structural projects, such work can potentially increase flood problems elsewhere.
8. Siltation of the South Branch and East Branch of the Kishwaukee River is a problem.

7.8 Recommendations

1. Structural flood control projects, including drainage and bridge and culvert improvements, should be pursued, provided they meet the following criteria:
 - Each project's study looks beyond the immediate project site to ensure that no other properties will be adversely impacted.
 - Each project should be based on a watershed master plan or, at a minimum, coordinated with other projects in the same watershed.
 - Each project's study considers protecting the natural functions of the stream and floodplain, in addition to flood protection.
 - Each project's study considers alternative non-structural approaches to protect the affected properties from flood damage.
 - The design and construction is certified by a licensed professional engineer.
 - Opportunities for stream and natural areas restoration are incorporated wherever feasible.
 - Communities and property owners that may be affected by the project are notified.
 - All relevant federal, state and local permits are obtained, including Corps of Engineer's 404 permits and IDNR floodway permits.
2. The DeKalb County stormwater management program should be funded through an appropriate funding mechanism. The DeKalb County Stormwater Management program should study the possibility of implementing structural flood control projects.
3. Each municipality and the County should implement a formal and regular drainage system maintenance program.
4. Removal of siltation in the Kishwaukee River, and the South Branch and East Branch, should be fully investigated.

5. Structural project should be investigated for the containment of spills, including those from farmland, to protect the people and resources of DeKalb County.

7.9 References

1. Studies listed on page 7-2 of this chapter.
2. *CRS Credit for Drainage System Maintenance*, FEMA, 2002
3. *Flood Insurance Study, DeKalb County, Illinois*, FEMA, 2000.
4. Survey of municipalities and County offices, 2007.

Chapter 8. Resource Protection

Resource protection activities are generally aimed at preserving, or in some cases restoring, natural areas. For this *Plan*, resource protection also means protecting historical assets and natural areas of DeKalb County.

Resource protection 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 through regulatory steps for protecting natural areas or natural functions. The regulatory programs are discussed in Chapter 5. 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 and quality of the County. Areas reviewed:

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

Note that the 2010 DeKalb County Unified Future Land Use Plan identifies the SFHAs throughout the County as conservation areas. Conservation areas are defined as “land used or suited for the protraction of natural resources, floodplains or woodlands.” A copy of the 2010 DeKalb County Unified Future Land Use Plan is shown in Figure 8-1.

8.1 Wetland Protection

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. 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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

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 (USEPA) 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 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.

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



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.

An example of one public information effort is on the previous page, showing one of the benefits of protecting and restoring wetlands – protecting against another natural hazard, West Nile Virus.

Local implementation: Wetlands in DeKalb County are subject to the Section 404 regulations, which are implemented by the Corps of Engineers, where applicable. Wetlands within agricultural land that have farm subsidies are under the responsibility of the Natural Resources Conservation Service. Also Goal 2 of the DeKalb County Unified Comprehensive Plan, 2011, states “preserve wetlands and floodplains, and reduce and eliminate erosion.” Again, the 2010 DeKalb County Unified Future Land Use Plan identifies the SFHAs throughout the County as conservation areas (see Figure 8-1).

8.2 Erosion and Sediment Control

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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

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.

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, 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.

8.3 River Restoration

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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
Y	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

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.

It is worth noting that rivers will take the most efficient or shortest path as the waters flows downstream. Because of debris, scour and other factors, a stream might meander through an area. During a flood, though, the stream will attempt to straighten itself or adjust its course. This is a natural occurrence, but manmade influences on this cycle should be minimized.

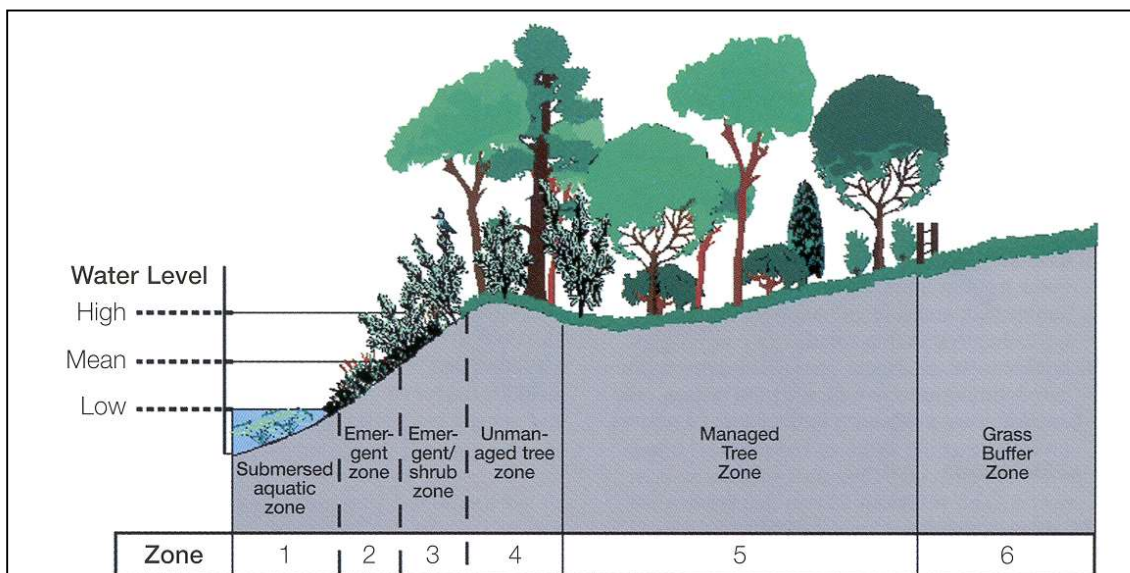
8.4 Best Management Practices

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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident



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*

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: The City of DeKalb allows the use of native vegetation where appropriate. Best management practices are encouraged throughout the County to meet the requirements of the Clean Water Act and the NPDES Phase II (National Pollutant Discharge Elimination System) requirements. Communities submit annual water quality reports to the Illinois EPA by July of each year.

8.5 Dumping Regulations

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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

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.

Local implementation: Some communities, including the Cortland, DeKalb, Genoa, Malta, Sycamore, and Sandwich have ordinances that prohibit the dumping of debris in or obstructing waterways.

8.6 Forestry

The majority 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. A forestry program (urban or rural) can reduce the damage potential of trees. The cities in central Illinois are most prone to ice storms and have initiated programs that select species that are resistant to ice and storm damage.

Hazards Addressed	
Y	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
Y	Tornado
	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
Y	Utility Interruption
Y	HazMat
	Radiological Incident

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.

Local Implementation: DeKalb has an arborist on staff and has participated in Tree City USA for more than 20 years, and Genoa has participated in Tree City USA for 18 years and Sycamore also participates in Tree City USA.

8.7 Farmland Protection

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

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.

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

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.

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: The Planning Committee agreed that the protection of farmland is important. As shown in Table 8-1, the number of farms and the number of acres in farmland was steadily decreasing in DeKalb County, but increased from 2002 to 2007.

**Table 8-1
DeKalb County Farmland**

Year	Number of Farms	Number of Acres	Average Size of Farms
1969	1,438	383,103	270
1974	1,248	378,114	303
1982	1,150	395,767	344
1987	1,063	384,277	362
1992	942	377,512	401
1997	880	375,332	427
2002	816	359,352	440
2007	930	370,772	399

* Source: USDA, and DeKalb Co. Comprehensive Plan

8.8 Historic and Natural Area Protection

DeKalb County is rich in historic resources and natural resources. Table 8-2 provides a list of most of DeKalb County's historic and natural sites. The Committee agreed that it is important for the sites to be identified and considered as valuable assets of the County.

The historic sites are vulnerable to hazards. It is difficult to protect the structures from hazards due to their historic nature. Therefore, they should be considered should any mitigation opportunities be presented.

The web sites shown below can more information on the historic sites shown in Table 8-1:

- www.nationalregisterofhistoricplaces.com/IL/DeKalb/state.html
- www3.niu.edu/historicalbuildings/prehistory_dekalb.html

Hazards Addressed	
	Winter storms
Y	Summer Storms
	Extreme Cold
	Extreme Heat
	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
	HazMat
	Radiological Incident

Table 8-2
DeKalb County Historic and Natural Sites

Elmwood House
Glidden Homestead
Egyptian Theater
NIU Sites
National Register – 9 homes, 4 businesses, 4 public, and Sycamore historic district

(Continued on the next page)

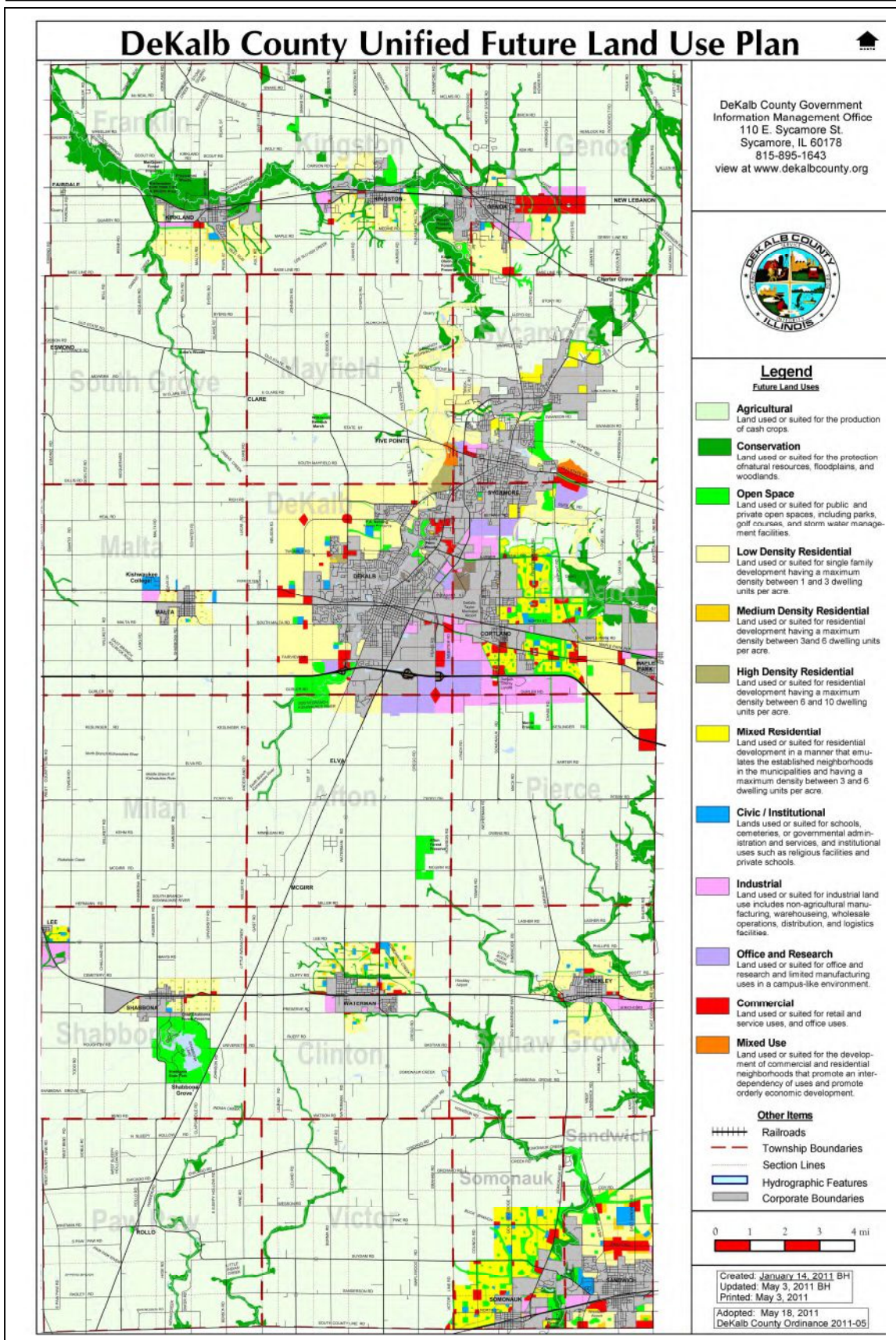


Figure 8-1 2011 DeKalb County Unified Future Land Use Plan

8.9 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. Preserving farmland in the floodplain and other hazardous areas will prevent damage to homes, businesses and other development.
3. Preventive measures can have a great impact on the future flood damages, especially if the county's floodplains remain undeveloped and preserved as open space.
4. DeKalb County is rich in historic and natural areas, which should be protected from natural and manmade hazards.
5. A number of communities have an ordinance that prohibits dumping in wetlands or other parts of the drainage system. The degree of enforcement of these ordinances is unknown.
6. The number of communities have regulations on wetland protection, erosion and sediment control, and best management practices, have effective standards. The degree of enforcement of these ordinances is unknown.
7. Community forestry programs can be effective against damage and power losses from wind and ice storms. Communities should have urban forestry programs in place that can be effective against damage and power losses from wind and ice storms.

8.10 Recommendations

1. Communities who do not already have ordinances for wetland protection, erosion and sediment control, best management practices, comprehensive stormwater management should adopt these ordinances.
2. Each community should ensure that it has enforceable stream and wetland dumping regulations.
3. The public and decision makers should be informed about the hazard mitigation benefits of restoring rivers, wetlands, and other natural areas.
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. Myths about mosquitoes should be dispelled and restoration and protection techniques should be explained.
6. Communities should implement forestry programs.
7. DeKalb County should continue to preserve farmland, historic areas, and natural areas of the County and protect them from natural and manmade hazards.
8. Every community should implement an urban forestry program that qualifies them to become a Tree City, USA.

8.11 References

1. *Best Management Practices Guidebook for Urban Development*, Northeastern Illinois Planning Commission, 1992.
2. *Environmental Consideration in Comprehensive Planning*, Northeastern Illinois Planning Commission, 1994.
3. *Illinois Hazard Mitigation Plan*, Illinois Emergency Management Agency, 2000.
4. *Banks and Buffers – A Guide to Selecting Native Plants for Streambanks and Shorelines*, Tennessee Valley Authority, 1997
5. *Living With Wetlands, A Handbook for Homeowners in Northeastern Illinois*, The Wetlands Initiative, 1998
6. *Making our Urban Forests Safer*, Alabama Cooperative Extension Service, 2001.
7. *Protecting Nature in Your Community*, Chicago Wilderness and Northeastern Illinois Planning Commission, 2000.
8. *Reducing the Impacts of Urban Runoff – The Advantages of Alternative Site Design Approaches*, Northeastern Illinois Planning Commission, 1997.
9. *Stormwater management – The Benefits of Alternative Approaches*, South Suburban Mayors and Managers Association, 2000.
10. *Stream and Wetland Protection: A Natural Resource Management Priority in Northeastern Illinois*, Northeastern Illinois Planning Commission, 1991.
11. *Stream Corridor Restoration Principles, Processes and Practices*, Federal Interagency Stream Restoration Working Group, 1998. Copies available through the USDA Natural Resource Conservation Service.
12. Survey of County and municipalities, 2007.

Chapter 9. Emergency Services

Emergency services measures protect people and animal populations before, during, and after a disaster. Emergency services measures protect life and property in four phases: mitigation, preparedness, response and recovery. 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). DeKalb County emergency services are coordinated through the DeKalb County Office of Emergency Services and Disaster Assistance (ESDA) in Sycamore. DeKalb County municipalities that have emergency management programs coordinate them through their fire or police department or a separate emergency manager or Emergency Services and Disaster Agency coordinator. There currently is no full-time emergency manager at the county or municipal level in DeKalb County. Currently, emergency management responsibilities are shared with other job tasking responsibilities for those responsible for emergency management.

Hazards Addressed	
Y	Winter storms
Y	Summer Storms
Y	Extreme Heat
Y	Extreme Cold
Y	Tornado
Y	Flood
	Armed Attack
	Transportation Incident
	Cyberterrorism
	Utility Interruption
Y	HazMat
Y	Radiological Incident

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

9.1 Threat Recognition

Threat recognition is the key. This is easier with natural hazards than with manmade hazards. 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. Man-made hazards, as they exist in our county, need to be pre-determined so that timely threat recognition may occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

9.1.1 Natural Hazards

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



Stream Gauges**USGS Site:**<http://waterdata.usgs.gov/nwis/uv?05439000>**FEMA:**<https://msc.fema.gov/portal/search>**National Weather Service:**<https://www.ncdc.noaa.gov>

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 to be the official source for weather information.

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

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

Real-time stream gage readings for sites on the Kishwaukee River can be accessed on the internet at the USGS website for current stream conditions. The DeKalb Field Office of the USGS monitors the gauge site on the Kishwaukee River at DeKalb. The National Weather Service is able to issue a specific *prediction* of when and how high the Kishwaukee River will crest. The prediction can be accessed at <https://water.weather.gov/ahps2/hydrograph.php?wfo=lot&gage=pryi2>. National Weather Service can also issue more general flood statements on smaller streams throughout the County.

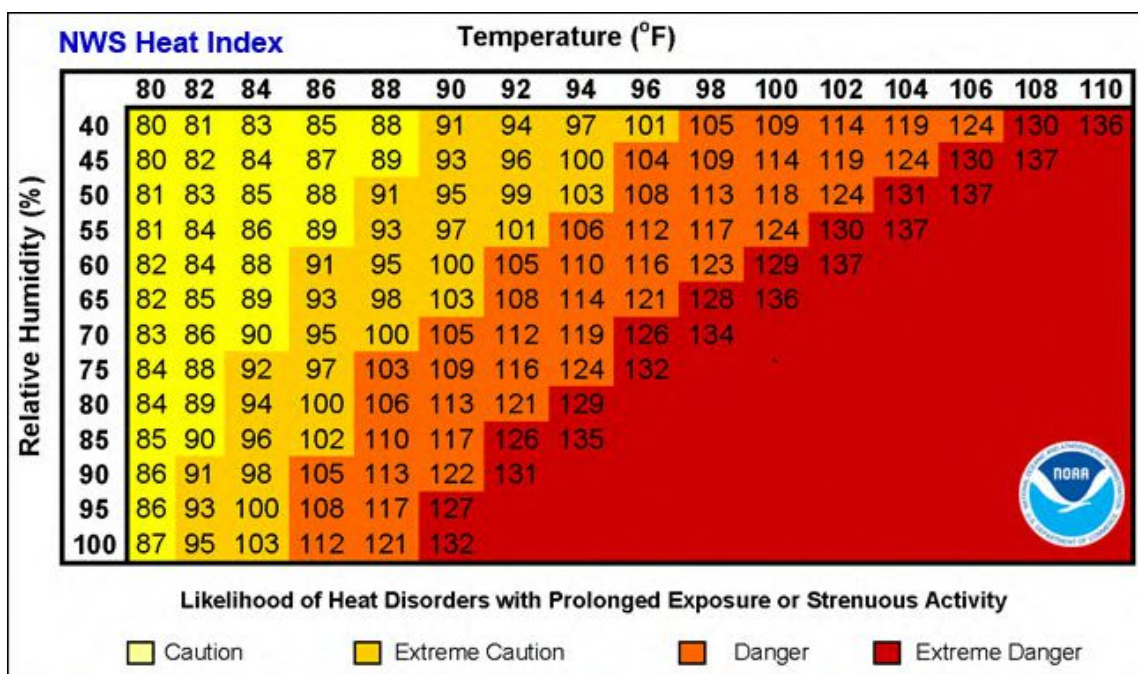
Flood maps can be viewed on line or purchased through FEMA. The website is <http://msc.fema.gov>

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

Extreme Cold/Extreme Heat: The National Weather Service is again the prime agency for predicting extreme cold and extreme heat events. These events can often be forecasted days in advance of the expected event, which allows time for warning and preparation.



Source: National Weather Service <https://www.weather.gov/safety/heat-index>

Other Weather Hazards: DeKalb County dispatch centers receive other severe weather alerts from the LEADS system. These alerts are issued by the Illinois State Police who monitor the NOAA Weather Wire, or through their monitoring of NOAA weather radios. Police and fire stations, schools, county and municipal buildings, and some private facilities have been issued Weather Radios, or they are notified over the EAS.

Hazardous weather and damage are reported to 911 Dispatch.

9.1.2 Manmade Hazards

Armed Attack (Active Shooter)

In recent years, armed attacks have manifested in active shooter incidents. Active shooter events are unpredictable and evolve quickly. Inadequate security can allow easy access to target, easy concealment of weapons, and undetected initiation of an attack. Targets of an armed attack vary; however, in recent history, schools, concert venues, office buildings, federal, state and county-owned buildings, religious institutions, military installations, and large public areas have all been subject to armed attacks.

DeKalb County dispatch centers would receive notification of an armed attack through 911 calls from citizens. The local Police and Fire Departments would respond to the 911 call and request assistance from other jurisdictions as needed.

Transportation Incident – Rail: Rail accidents typically involve rail cars carrying people, cargo, or both that leave the track. A derailment of a passenger train can have a high number of casualties and require a large response from local emergency services. A rail accident can occur due to a number of reasons including faulty equipment, operator error, or a collision with another train or vehicle crossing the track.



The State of Illinois is #2 nationally in highway-rail grade crossing collisions. Illinois is #1 in crossing fatalities.

DeKalb County has 164 railroad crossings. According to Federal Railroad Administration, 60% of all rail incidents are caused between rail and highway users at crossing sites. Twenty percent (20%) of rail incidents are to rail trespassers. In addition to collisions and trespasser incidents, 10% of all rail transportation involves the movement of hazardous materials. Hazardous materials are addressed under their own heading.

Top 5 Public Highway-Rail Crossings
Ranked by Predicted Accidents for DeKalb County
Provided by Federal Railroad Administration

<u>Collision Prediction</u>	<u>Location</u>	<u>City/Village</u>
34.8282%	Rt. 23 & Rt. 38	DeKalb
11.6836%	1 st Street	DeKalb
6.8347%	Leland Road	Waterman
6.6886%	Airport Road	Cortland
6.3830%	Illini Street	Shabbona

The map to the right shows all major railroad lines in DeKalb County.

- BNSF is Burlington Northern Santa Fe
- UP is Union Pacific
- CPRS is CP Rail System
- CN is Canadian National.



Transportation Incident – Roadway:

Roadway accidents typically involve cars, trucks, motorcycles, and/or pedestrians. DeKalb County is becoming a distribution hub for the mid-west due to its proximity to I-88, I-39, rail, and air services. As traffic increases in DeKalb County, so do roadway transportation incidents. In calendar year 2006, the City of DeKalb saw 48 motor vehicle accidents involving semi-tractor trailers.



In calendar year 2006, the City of DeKalb Emergency Medical Services responded to 172 motor vehicle accidents. There were 15 motor vehicle fatalities in 2005 in the County. It should be noted that these fatalities do not include victims that were transported to facilities in other counties and then perished.

Transportation Incident – Air: Flying remains one of the safest modes of transportation, statistically speaking, in the United States. Commercial aircraft accidents, while relatively rare, receive intense media attention. Seventy-five percent of all air accidents involve general aviation (private aircraft), and 25% involve commuter, charter, and scheduled airlines. The majority of accidents occur immediately after take-off and before landing. The Federal Aviation Administration acknowledges this danger and requires airports to create detailed emergency plans that outline how they would respond to a crash within five miles of their boundaries.



DeKalb County has seen twelve air crashes in the past twenty years. DeKalb Taylor Municipal Airport, in 2005, reported 62 based aircrafts and 37,000 total operations.

Cyberterrorism

Cyberterrorism can cause physical or financial harm or a severe disruption of transportation, public safety, and utility services. Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.

DeKalb County dispatch centers would receive notification of an armed attack through 911 calls from citizens. The local Police and Fire Departments would respond to the 911 call and request assistance from other jurisdictions as needed.

Utility Interruption: Utility disruptions and failures may involve electrical power, natural gas, public water, and public wastewater. All of these systems exist throughout DeKalb County. Utility systems exist everywhere and are subject to damage from digging, fire, traffic accidents, and severe weather. Utility disruptions can be especially taxing in extreme heat/cold if prolonged in nature.

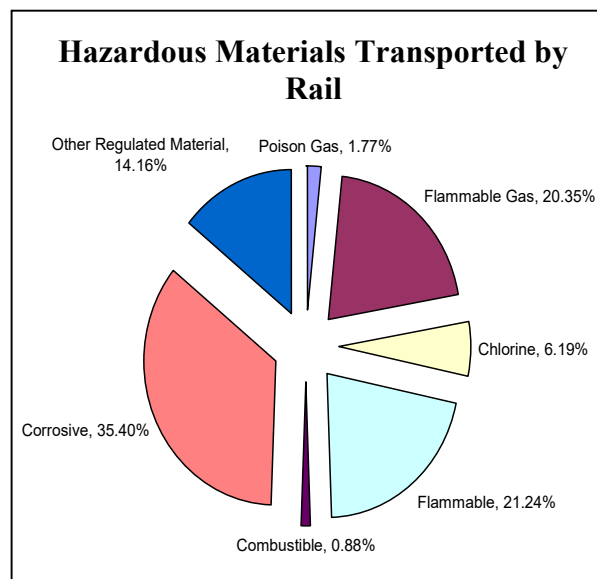
ComEd reported in their 2000 reliability report that 42% of their utility disruptions were weather and tree related.

DeKalb County dispatch centers would receive notification of these interruptions through 911 calls from citizens. The local Fire departments would work with the utility companies and local or MABAS hazmat and TRT teams, if necessary, until the interruption has been resolved.

Hazardous Materials: A hazardous material is any substance or material in a quantity or form that may pose a reasonable risk to health, the environment, or property. This can include substances such as toxic chemicals, fuels, nuclear waste and/or products, and other radiological and biological or chemical agents. Generally, with a fixed facility, the hazards are pre-identified and the facility is required by law to provide information about their activities with hazardous and toxic chemicals and provide a copy of this plan to the local emergency planning commission (LEPC) and local fire departments.

The close proximity of railroads, highways, and industrial facilities to populated areas, schools, and businesses could put a large number of individuals in danger at any time. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants are released from fixed containers. Weather conditions directly affect how a hazard develops. The micro-meteorological effects of buildings and terrain can alter travel and duration of agents. Shielding in the form of sheltering-in-place can protect people and property from harmful effects. Non-compliance with fire and building codes as well as failure to maintain existing fire and containment features can substantially increase the damage from a hazardous materials release.

Illinois rail transportation of hazardous materials in 2005 was 47 million tons. In the first five months of 2007, DeKalb County has already had a rail hazardous materials incident. Rail transportation in DeKalb County can be broken down into three categories: intermodal, grain, and coal. The Illinois Railroad Hazardous Materials Administration System conducted a study in City of DeKalb, Illinois on January 23, 2007 to determine the flow of Hazardous Materials through the city. The study is comparative to all rail traffic in the county and the results are depicted on the chart.



DeKalb County dispatch centers would receive the first notification of a hazardous materials incident. The local fire department would respond to the incident. DeKalb County has a statewide hazardous materials response team in MABAS Division 6 at their disposal for additional assistance with hazardous materials incidents.

Radiological Incident – Power Plant: Exelon Nuclear has a nuclear power plant in Byron, Illinois. They have developed plans to protect the public in the event of a nuclear incident. First, control room operators at the power plant would immediately notify local authorities. At the same time, special teams would begin testing radiation levels outside the plant and throughout the surrounding areas. If necessary, area officials would declare an emergency and take the following measures to ensure public safety: Activate community warning sirens, broadcast emergency information and instruction to the public over local radio and TV stations, including information regarding evacuation or shelter-in-place. Evacuation routes have been developed and coordinated with reception communities of Dixon, Rockford, and Freeport. DeKalb is not a reception community because prevailing winds could make evacuation toward our area dangerous.

9.2 Warning

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

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.

Red Flag Warning: critical fire weather conditions are either occurring now, or will shortly. The low relative humidity and high dispersion indices will enhance fire growth potential.

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

- Outdoor warning sirens
- Sirens on public safety vehicles
- Commercial or public radio or TV stations
- The Weather Channel

NOAA Weather Radios All Hazards (NWR)

NWR is a nationwide network of radio stations that broadcasts warnings, watches, forecasts and other hazard information 24 hours a day. For DeKalb 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 National Weather Service.

- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Door-to-door contact
- Mobile public address systems
- E-mail notifications

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

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

StormReady: 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).



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 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. The City of DeKalb is a StormReady community. Northern Illinois University is the only StormReady university in the State of Illinois.

Local Implementation: The DeKalb County ESDA and municipal emergency services are responsible for disseminating warning information to the public and notifying response personnel during an emergency. Once a threat is perceived, the County's 911 dispatch center then transmits the warnings to these offices and all first responders, as well as to schools, hospitals, government offices, businesses, 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, television stations, and local cable television systems. The Emergency Alert System Emergency Management Network (EMnet). This is a satellite based digital state-wide messaging system that allows users to send secure messages to all municipal Public Safety Answering Points, hospitals, and the County Health Department. In DeKalb County, EMnet is available at the DeKalb County Sheriff PSAP and at the DeKalb City PSAP.

Incorporated Areas: Municipalities are responsible for installation, operation, notification to their citizens, and activation of their warning systems. Fire chiefs, police chiefs, and mayors may be authorized to activate these warning systems according to their emergency plans.

Rural areas: In the rural area, the population is urged to have weather alert radios and a battery-operated AM/FM radio. DeKalb County ESDA does not own or maintain any type of outdoor warning system. Therefore, most unincorporated areas do not have warning sirens. For rural and unincorporated areas, DeKalb County ESDA holds that the most effective means of warning are radio, television, and cable systems (EAS); the EARS tone alert radios and NOAA Weather Radios.

Special Needs Populations: The hospitals, nursing homes, special needs homes, and animal care facilities in the county should have weather radios to monitor weather conditions.

9.3 Response

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

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

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 county agencies, offices and municipal first responders and have Standard Operating Guidelines for response.

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. 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.

(Continued on the next page)

Table 9-1 DeKalb County Emergency Management Plans and Emergency Operations Centers

Community	Emergency Operations Plan	Emergency Manager	Emergency Operations Center
Cortland	Yes	No	
DeKalb	Yes	Fire Chief and Police Chief	Yes
Genoa	Yes	Police Chief	Yes
Hinckley	No	Village Board President	Yes
Kingston	No	No	
Kirkland	Yes	Village Board President	Yes
Lee	No	No	
Malta	No	No	
Sandwich	Yes	Yes	
Shabbona	No	No	
Somonauk	Public Works	No	No
Sycamore	Yes	City Manager	Yes
Waterman	Yes		
DeKalb County (unincorporated)	Yes	ESDA Director	Yes
Kishwaukee College	Yes	Vice President	Yes
Northern Illinois University	Yes	Deputy Police Chief	Yes
ESDA = separate Emergency Services and Disaster Agency			

Local Implementation: DeKalb County:

The DeKalb County ESDA is responsible for the Emergency Operations Plan for the County. The chief elected official, County office holders, first responders in DeKalb County (law enforcement, fire departments, EMS), county highway department, county health department, American Red Cross, County Mental Health Department, and County animal control are included in the emergency planning process. DeKalb County ESDA is also responsible for the development of mutual aid agreements that can be executed during a natural or manmade hazard event. Mutual aid agreements have been developed between the County and municipalities for all municipal services.

Municipalities: Municipalities are responsible for their incorporated areas until all of their resources are exhausted. If the severity or extent of an emergency were to exceed any municipality's capability, in addition to County ESDA, MABAS and ILEAS will be able to provide additional resources and assistance. Six DeKalb County municipalities and villages have or will have emergency operation plans. State law requires an update and revision every two years.



Emergency response planning will make flood response activities more efficient.

Therefore, many municipalities are currently in the process of plan development or revision.

9.4 Critical Facilities Protection

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: This Plan identifies all county-owned, municipal-owned buildings, schools, hospitals, nursing homes, and other public and private health facilities. 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.

9.5 Post-Disaster Recovery and Mitigation

After a disaster, communities should undertake activities to protect public health and safety, facilitate recovery and help prepare people and property for the next disaster. Throughout the recovery phase, everyone wants to get "back to normal." The problem is, "normal" means the way they were before the disaster, exposed to repeated damage from future disasters.

Appropriate measures include the following:

Recovery actions

- Patrolling evacuated areas to prevent looting
- Providing safe drinking water
- Monitoring for diseases
- Vaccinating residents for tetanus
- Clearing streets
- Cleaning up debris and garbage
- Regulating reconstruction to ensure that it meets all code requirements

Mitigation actions

- Conducting a public information effort to advise residents about mitigation measures they can incorporate into their reconstruction work

- Evaluating damaged public facilities to identify mitigation measures that can be included during repairs
- Acquiring substantially or repeatedly damaged properties from willing sellers
- Planning for long term mitigation activities
- Applying for post-disaster mitigation funds

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 City of DeKalb Building Department staff, including Chief Building Officer, Building Inspector and Fire Prevention Officer will conduct site inspections/evaluations of structures to determine extent of damage and if condemnation is warranted to prevent reoccupation prior to repairs being completed.

The DeKalb County Planning and Zoning Department and each community that participates in the NFIP are responsible for the enforcement of floodplain regulations. All parcels in the floodplain should be identified on the GIS mapping for future use.

9.6 Conclusions

1. The flood threat recognition system is best on the Kishwaukee River. For other streams, local officials have to augment the National Weather Service's (NWS) general statements of possible flooding and utilize the rain gage network.
2. The rain gauge network in the County is very limited. Rainfall reports are available from the NWS's Romeoville office.
3. The threat recognition system for severe weather hazards (tornadoes, thunderstorms, and winter storms) for the County is inadequate, but as effective as the County can have for the cost.

4. Northern Illinois University has staff and resources for severe weather threat recognition for the University population, and the information is utilized by all DeKalb County.
5. The warning system for the County is inadequate. Warning systems do not exist for parts of the County, particularly in rural areas. Mobile home parks are without warning systems. Kishwaukee College is without a warning siren or weather-related alarm system.
6. Schools, Kishwaukee College, NIU, hospitals, nursing homes, government buildings and some factories have NOAA Weather Radios All Hazards. There may be some critical facilities that do not have them.
7. The extent that animal care facilities are informed of severe weather or manmade hazards is unknown.
8. DeKalb County is without pet shelters.
9. The procedures and media that the County and municipalities use to disseminate warnings are lacking. Warnings from radio sources can be unreliable. Most citizens of DeKalb County rely on reports from the NWS in Romeoville and Chicago television station reports for good information.
10. The County has a network of storm watchers.
11. The *DeKalb County Emergency Operations Plan* and its municipal counterparts have overall guidance on responding to many different kinds of hazards. There are only a few additional documents that provide specific guidance for responding to individual natural hazards.
12. Some emergency response plans do not cover critical facilities that will be affected by various types of hazards.
13. The County has developed evacuation plans.
14. There are no specific plans or guidance documents on post-disaster inspections and capitalizing on post-disaster mitigation opportunities.

9.7 Recommendations

1. Consideration should be given to hiring a full-time emergency manager at either the local or the county level.
2. Update Emergency Operations Plans for the County and municipalities
3. Work toward NIMS compliance for the County and all municipalities.
4. Conduct annual emergency response training exercises.
5. Provide training on NIMS and ICS for all first responders and other identified personnel for compliance.
6. Research possibility and feasibility of a comprehensive countywide EAS.

7. Provide, and research funding for, emergency warning and response equipment, including outdoor weather warning sirens, warning media, and warning systems for all areas and populations of the County.
8. The public should be educated on what the sirens and warnings mean and what steps they should take to protect themselves.
9. Warning and response needs of animal care facilities should be assessed.
10. All identified critical facilities in the County should continue to be mapped using the County's GIS mapping for planning, warning, and response purposes.
11. Critical facilities infrastructure inventory needs to be established, and an evaluation of critical facility vulnerability and preparedness for natural and management hazards.
12. Provide, and research funding for, generators for critical facilities.
13. Research funding for additional river gauges.
14. The County should install additional rain gages in the northern and southern townships and utilized the data to improve the warning capabilities for flash flooding. The data collected should be used to evaluate and design storm drainage works.
15. All parcels in the floodplain should be identified using the County's GIS mapping for planning, warning, and response purposes.
16. Flood inundation maps, or flood stage maps, should be developed through GIS and used in conjunction with flood warning for evacuation and property protection.
17. Each community should appoint an emergency management coordinator or liaison to ensure smooth communications before, during, and after warnings and emergencies.
18. The County and the individual municipalities should consider whether the exposure to flooding on their smaller streams warrants a local rain and stream gauging and flood threat recognition system.
19. 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. Review evacuation plans.
 - e. Conduct a tabletop exercise at least once a year (as required by State law).
20. A countywide sheltering strategy, including policies and management concepts should be developed for addressing large-scale or regional hazard events.
21. Funding mechanisms should be developed to support hazardous material response needs. Also, a countywide "spiller pay" ordinance should be considered.

9.8 References

1. *CRS Coordinator's Manual*, Community Rating System, FEMA, 2017
2. *CRS Credit for Flood Warning Programs*, FEMA, 1999
3. *Flood Fighting*, Illinois Department of Transportation, Division of Water Resources, 1985.
4. *Guidelines on Community Local Flood Warning and Response Systems*, Federal Interagency Advisory Committee on Water Data, 1985
5. Information on StormReady communities can be found on the National Weather Service website, www.nws.noaa.gov/stormready/
6. *Post-Flood Mitigation Procedures*, Village of South Holland, Illinois, 1997.
7. *Accident Prediction Report for Public at-Grade Highway-Rail Crossings*, Federal Railroad Administration, Office of Safety Analysis, Highway-Rail Crossing Safety & Trespass Prevention, December 11, 2006.
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9. *Assessment of Commonwealth Edison Company, 2000 Reliability Report*, Illinois Commerce Commission, March 12, 2002.
10. *Emergency Planning for the Byron Area: Important Safety Information for Your Community*, Exelon Nuclear, 2006.
11. *2005 Annual Report on Accidents/Incidents Involving Hazardous Materials on Railroads in Illinois*, Illinois Commerce Commission May 2006.
12. *Airport Inventory Report*, Illinois Department of Transportation, 2006.
13. *Hazardous Materials Flow Study*, Illinois Railroad Hazardous Materials Administration System, 2007.

Chapter 10. Public Information

Public information activities are an integral part of hazard mitigation. Public information activities advise property owners, renters, businesses, and local officials about hazards that they face, and provide advice and tools that allow people to protect themselves and their property from natural and manmade hazards. A successful hazard mitigation program involves a public information strategy and involves both the public and private sectors. This chapter discusses public information outreach activities, ways to deliver public information, and elements of a comprehensive public information strategy for hazard mitigation.

10.1 Outreach Projects

Numerous government agencies and non-profit organizations publish public information and guidance regarding hazards and hazard mitigation. Other means of public information assistance include technical assistance from communities and library resources. None of these efforts are effective, however, if the information or the message does not reach people.

An outreach project is an effort to ensure that information and resources reach the appropriate person or groups. 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. Sending notices to property owners can help introduce the idea of property protection and identify sources of assistance.

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.

Community newsletters/direct mailings: The most efficient and effective type of outreach projects are those where information is mailed or distributed to everyone in the community or, in the case of floods, to floodplain property owners.

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.

Other approaches: Examples of other outreach project approaches include:

School programs,

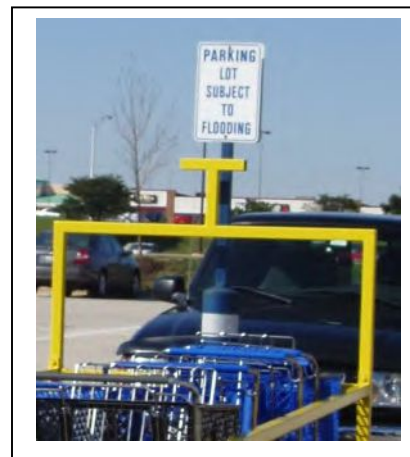
Presentations at meetings of neighborhood, civic or business groups,

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: Table 10-1 shows which DeKalb County communities provide residents with a newsletter, offer a website, and/or provide technical assistance for floodplain management issues or addressing wind or snow hazards.

Table 10-1 DeKalb County Public Information Activities

Community	Regular newsletter?	Hazards information in newsletter?	Hazard information in public library?	Website hazard links?	Read NFIP for property owners?	Property visits for hazard protection advice?
Cortland	Yes	Yes			Yes	
DeKalb	Yes				Yes	Yes
Genoa	Yes	Yes		Yes	Yes	Yes
Hinckley	Yes		Yes	Yes	Yes	
Kingston						
Kirkland	Yes	Yes				
Lee						
Malta	Yes					
Sandwich					Yes	
Shabbona						
Somonauk					Yes	Yes
Sycamore	Yes		Yes			Yes
Waterman						
DeKalb County (Uninc.)				Yes	Yes	
Kishwaukee College	Yes		Yes			Yes
Northern Illinois University						

The American Red Cross has a variety of brochures and publications on safety measures to take for fires, floods, winter storms, heat, and other disasters. Their publications are tailored for different age groups.

American Red Cross brochures can be ordered through the:

American Red Cross - DeKalb County Chapter
 2727 Sycamore Road
 DeKalb, Illinois 60115
 Phone: 815/756-7399
 Fax: 815/756-6627

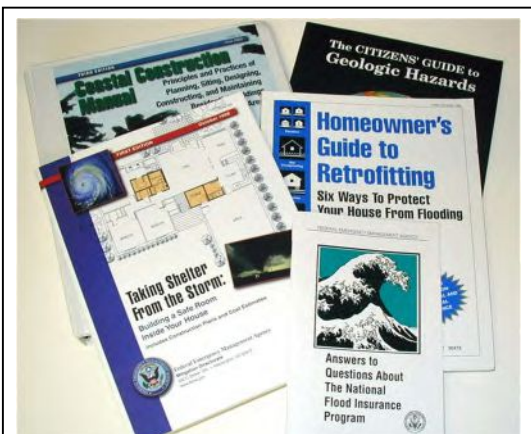
The DuPage County Health Department provides presentations on an ongoing basis to community members about emergency preparedness including the flood, tornado, winter storm or other hazards information and also the importance of emergency preparedness kits. September is Emergency Preparedness month and this is the month we usually have multiple presentations scheduled at various locations throughout the county focusing on emergency preparedness topics. In 2017 and 2018, the Health Department has received a grant to be able to distribute over 800 emergency preparedness starter kits to community members throughout DeKalb County.

10.2 Library and Web Sites

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: The DeKalb County Health Department has provided presentations at Genoa Library, Sandwich Library, and Sycamore Library. Communities as well as food pantries, libraries, the jail, YMCA's, HeadStart, and other agencies. Community websites are listed in Table 10-2. DeKalb County libraries are listed in

Table 10-3. Potentially, the community libraries have a variety of references on natural hazards.

Table 10-2 DeKalb County Community Web Sites

Community	Web Site
Cortland	www.cortlandil.org
DeKalb	www.cityofdekalb.com
Genoa	www.genoa-il.com
Hinckley	www.hinckleyil.com
Kingston	www.villageofkingston.org
Kirkland	www.villageofkirkland.com
Lee	---
Malta	villageofmalta.net
Sandwich	www.sandwich.il.us
Shabbona	www.shabbona-il.com
Somonauk	www.vil.somonauk.il.us/
Sycamore	www.cityofsycamore.com
Waterman	www.villageofwaterman.com
DeKalb County (Uninc.)	www.dekalbcounty.org
Kishwaukee College	www.kish.edu
Northern Illinois University	www.niu.edu

Table 10-3 DeKalb County Libraries

Clinton Twp Public Library	Sandwich D.L.
Cortland Library	Shabbona Library
DeKalb Public Library	Somonauk Public Library
Genoa Public Library	Squaw Grove Public Library
Kirkland Public Library	Kishwaukee College LRC Library
Malta Twp Public Library	Northern Illinois University Library

10.3 Technical Assistance

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: The DeKalb County Zoning office provides advice and technical assistance to property owners and local government units for floodplain management. The DeKalb County Health Department provides technical guidance related to septic system failure and well contamination.

Cortland, DeKalb, Genoa, Hinckley, Sandwich, Somonauk, and the County provide technical assistance for floodplain management issues. DeKalb, Genoa, Somonauk, Sycamore, and Kishwaukee College officials will visit properties to provide advice when requested. The City of DeKalb provides city alerts and safety tips regarding extreme heat, flood cleanup, flood safety, cold weather safety, home escape plan, carbon monoxide on the City website.

10.4 Real Estate Disclosure

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 the property's vulnerability 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 seepage

If the property is located in a floodplain or if the seller has flood insurance

If the seller is aware of a radon problem

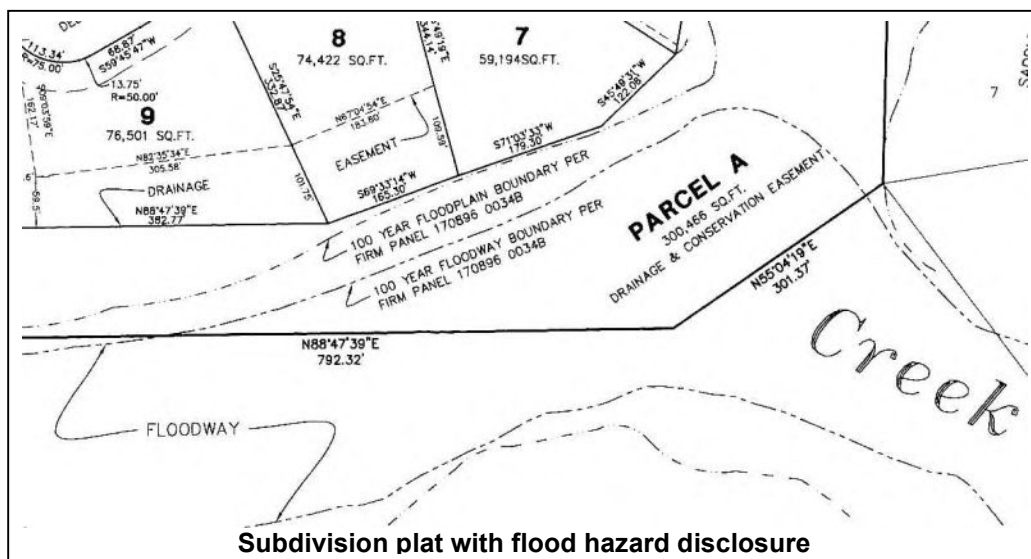
If the seller is aware of any mine subsidence or earth stability defects on the premises

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.

The shortcoming of this approach is that it is dependent on the seller, not on an independent check of the flood map. Multiple Listing Service (MLS) entries read "Flood insurance may be required." This does not provide any help in disclosing the flood hazard.

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).



10.5 Public Information Program Strategy

The development of a public information program strategy a way to be sure that a community's public information efforts are effective. A public information program strategy involves the review of local conditions, local public information needs, and a recommended action plan of activities. A strategy should consist of the following parts, which are incorporated into this plan.

- The local hazards – discussed in Chapter 2 and Chapter 3 of the *Plan*.
- The property protection measures appropriate for a specific hazard – discussed in Chapter 6.
- Hazard safety measures appropriate for the local situation. Example for earthquake safety measures is shown on page 10-9 and 10-10.
- Flood safety measures appropriate for the local situation – discussed in the box on page 10-11.
- The public information activities currently being implemented within the communities, including those by non-government agencies – discussed in sections 10.1 through 10-3.
- Goals for the community public information programs are covered in Chapter 4.
- The outreach projects that will be done each year to reach the goals are section 10-7's recommendations and Chapter 10's Action Plan.
- The process that will be followed to monitor and evaluate the projects is in Chapter 10's Action Plan

Much of the above items are taken from FEMA's Community Rating System for the National Flood Insurance Program, but the strategy is useful and applicable for any hazard or mitigation outreach effort.

Public information topics: The Planning Committee worked through a list of potential public information topics and selected ten topics to focus initial efforts on. These selected topics are shown in the recommendations section of this chapter (Section 10.7). Of note is the recommendation for more information on mosquito protection and eradication. This is due to the concern for the West Nile Virus. Safety is another important topic selected by the Committee, along with more information on earthquakes. The Committee agreed that while the area is aware of the earthquake hazard, little information has been provided to residents on earthquake safety or preparedness. As examples, the following three pages depict some of the available public information on earthquake preparedness and flood safety.

Ways to disseminate public information: The Committee also evaluated ways or methods of distributing the public information messages and materials. The top ten approaches are also presented in the recommendations section of this chapter (Section 10.7).

10.6 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.
2. Public information efforts have been implemented by the County, municipalities, colleges and the American Red Cross, but primarily during and after disasters.
3. A community's staff can implement some of the public information activities.
4. Outreach projects, libraries and websites can reach a lot of people, but most communities are not including much hazard or mitigation information in any current activities.

10.7 Recommendations

1. The County and municipalities should develop a public information strategy with focus on wind-related and severe summer and winter storms.
2. The following topics should be covered in public information activities.
 - a. Warning signals and emergency protection measures
 - b. Safety during floods, tornados, severe summer ad severe winter storms
 - c. Health hazards related to natural and manmade hazards
 - d. Protecting water quality
 - e. Benefits of open space and wetland protection
3. 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.
4. The following media should be used to convey these messages:
 - a. Newspaper articles
 - b. Web sites and links to other sources of information
 - c. Mass mailings to property owners
 - d. Cable TV access channels
 - e. Community newsletters
5. Each County office and municipality should review their current public information activities and incorporate the messages in them, where appropriate, or develop public information activities.
6. Local libraries should be provided with an order form to order free state and federal hazard mitigation publications.
7. Community websites should include information and links to other sites to cover as many mitigation topics as possible.
8. Communities in the National Flood Insurance Program should provide floodplain information for property owners.
9. Public information should also be provided to DeKalb County residents on railroad safety.

Duck, Cover and Hold

Whether you are in your home, a school classroom, a high-rise or other type of building, it is important to know how to protect yourself during an earthquake. Practice what to do during an earthquake with your family members so you can react automatically when the shaking starts. If you are outdoors when the shaking starts, get into an open area away from trees, buildings, walls and power lines. If you are indoors follow these steps.

Duck

Duck or drop down to the floor.

Cover

Take cover under a sturdy desk, table or other furniture. If that is not possible, seek cover against an interior wall and protect your head and neck with your arms. Avoid danger spots near windows, hanging objects, mirrors or tall furniture.

Hold

If you take cover under a sturdy piece of furniture, hold on to it and be prepared to move with it. HOLD the position until the ground stops shaking and it is safe to move.



Earthquake Preparedness Before, During and After

There are many things you can do to help yourself in the event of an earthquake. Generally, an earthquake is divided into three stages: before, during and after. Know what to do in each stage.

Before

- Develop a family earthquake plan. Prepare yourself and your home by completing the activities on this checklist.
- Decide how and where your family will reunite if separated.
- Choose an out-of-area friend or relative who separated family members can call after the quake to report their whereabouts and condition.
- Know the safe spots in each room: under sturdy tables, desks, or against inside walls.
- Know the danger spots: windows, mirrors, hanging objects, fireplaces and tall, unsecured furniture.
- Conduct practice drills. Physically place yourself in safe locations.
- Learn first aid and CPR (cardiopulmonary resuscitation) from your local American Red Cross chapter or other community organization.
- Keep a list of emergency phone numbers.
- Learn how to shut off gas, water and electricity in case the lines are damaged. (Safety note: Do not attempt to relight a gas pilot).
- Secure water heaters and appliances that could move enough to rupture lines.
- Secure heavy furniture, hanging plants, heavy pictures or mirrors.
- Keep flammable or hazardous liquids in cabinets or on lower shelves.
- Maintain emergency food, water and other supplies, including a flashlight, a portable battery-operated radio, extra batteries, medicines, first aid kit and clothing.

Earthquake Preparedness Before, During and After - continued

During

- If indoors, stay there and take cover under a table, desk, or other sturdy furniture.
- Face away from windows and glass doors.
- A doorway without a door is an acceptable location in which to stand.
- Lie, kneel or sit near a structurally sound interior wall or corner away from windows, brick fireplaces, glass walls, etc.
- Protect your head and body from falling or flying objects.
- Remain where you are until shaking stops. Think out your plan of action first, then move.
- Know exit routes if in a commercial building. Take cover and don't move until the shaking stops.
- If outside, get into an open area away from trees, buildings, walls and power lines.
- Lie down or crouch low to maintain balance.
- Get to the best available shelter if there is no open area available.
- If driving, stop safely as soon as possible. Stay inside your vehicle until the shaking stops.
- Do not stop your vehicle under overpasses or bridges.
- Stay below window level in your vehicle.
- Turn off the engine and turn on the radio. Follow emergency instructions.
- Stay in the vehicle if downed power lines have fallen across it. Do not touch metal. Wait for help. You might be able to back away from lines.
- If you have to leave your vehicle, move to an open area quickly.

After

- Check for injuries. Render first aid. Do not move seriously injured victims unless they are in immediate danger. Do not use the telephone immediately unless there is a serious injury, fire or other emergency. Hunt for hazards.
- Check for other hazards and control them (fire, chemical spills, toxic fumes and possible collapse).
- Check utilities (water, gas, electric). If there is damage, turn the utility off at the source.
- Check for other hazards and control them (fire, chemical spills, toxic fumes and possible collapse).
- Check building for cracks and damage, including roof, chimneys, and foundation.
- Check food and water supplies.
- Emergency water can be obtained from water heaters, melted ice cubes, canned vegetables, and toilet tanks.
- Never use matches, lighters or candles inside.
- Turn on the radio and listen for emergency broadcasts/announcements, news reports, and instructions. Cooperate with public safety officials.
- Do not use your vehicle unless there is an emergency. Keep the streets clear for emergency vehicles.
- If buildings are suspect, set up your shelter area away from damage.
- Work with your neighbors for a quicker recovery. Stay calm and lend a hand to others.
- Be prepared for aftershocks.
- Plan for evacuation in case events make this necessary. Leave written messages for other family members or searchers.
- Use gloves, wear heavy shoes, and have adequate and appropriate clothing available.

Source: Illinois Emergency Management Agency
www.state.il.us/Prep/earthquake.htm

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.

10.8 References

1. Community surveys, January 2007.
2. *Are You Ready? A guide to Citizen Preparedness*, FEMA, 2002.
3. *Floodproof Retrofitting: Homeowner Self-Protective Behavior*, Shirley Bradway Laska, University of Colorado, 1991.
4. *Protecting Nature in Your Community*, Chicago Wilderness and Northeastern Illinois Planning Commission, 2000.
5. *Stormwater Management Public Information Resource Guide*, South Suburban Mayors and Managers Association, 1999.

Chapter 11. Action Plan

11.1 Action Plan Overview

The findings, conclusions and recommendations of Chapters 1 through 10 of the *DeKalb County All Hazards Mitigation Plan* have been aggregated into this Action Plan. The Action Plan consists of action items that are to be implemented as part of the DeKalb County mitigation program. The action items have been placed into three groups: (1) administrative action items (2) specific mitigation activities to be implemented as resources become available, and (3) public information action items. The administrative action items include action for plan maintenance, and other details of plan maintenance are discussed in Section 11.4.

Recommendations for this *DeKalb County All Hazard Mitigation Plan (Plan)* appear at the end of Chapters 5 through 10 for mitigation strategies analyzed (preventive, property protections, structural measures, resource protection, emergency services, and public information). This chapter converts those recommendations to specific action items. The action items presented in this Chapter are both priority items and feasible in the next few years. Feasibility has to do with current County, municipal and institutional (school, college and university) resources, and the likelihood of grant funding from state and federal agencies. *Recommendations in this Plan that are not included in the Action Plan are no less important and should be funded and/or implemented as resources become available.* Some recommendations, for example, may become priority actions following a natural or manmade hazard event, or following a federal disaster declaration.

All of the action items are related to the goals and guidelines developed in Chapter 4, and shown below.

The overall direction of this *Plan* can be summarized under the six goals established in Chapter 4:

- Goal 1. Protect the lives, health, and safety of the people and animals of DeKalb County from the impact and effects of natural and manmade hazards.
- Goal 2. Protect public services and critical facilities from loss of use during, and potential damage from, natural and manmade hazard events.
- Goal 3. Mitigate to protect against economic and transportation losses due to natural and manmade hazards.
- Goal 4. Ensure that new developments do not create new exposures to damage from natural and manmade hazards.
- Goal 5. Identify specific projects to protect lives and mitigate damage where cost-effective and affordable.
- Goal 6. Protect historic, cultural, and natural resources from the effects of natural and manmade hazards.

The seven guidelines from Chapter 4 set the direction or the strategy for the mitigation activities developed or recommended in Chapters 5 through 10. The guidelines also set the direction for the action items in this Chapter.

- Guideline 1. Focus natural hazards mitigation efforts on severe winter storms, severe summer storms, extreme cold and heat events, tornadoes, and floods.
- Guideline 2. Focus manmade hazard mitigation efforts on armed attacks, transportation related incidents, cyberterrorism, utility disruption, HazMat, and radiological release incidents.
- Guideline 3. Make people aware of the hazards they face and focus mitigation efforts on measures that allow property owners, service providers, and pet owners to help themselves.
- Guideline 4. Create and foster public-private partnerships to accomplish mitigation activities.
- Guideline 5. Seek state, and federal support for mitigation efforts.
- Guideline 6. Use available local funds, when necessary, to protect the public services, critical facilities, lives, health, and safety from natural and manmade hazards.
- Guideline 7. Strive to improve and expand business, infrastructure, education and housing opportunities in DeKalb County in conjunction with planned mitigation efforts.

11.2 Mitigation Action Items

Action items are prioritized within this Chapter in the order that they are presented under the headings of “Administrative Action Items,” “Mitigation Program Action Items” and “Public Information Action Items.” The prioritization was established based on input from the communities and an examination of current mitigation activities and community capabilities, and reprioritized for this update. The action items have been formulated around the priority hazards discussed in Chapters 2 and 3, and the goals and guidelines presented in the Chapter 4.

The action items listed below assign recommended projects and deadlines to the appropriate agencies. Institutions include DeKalb County public schools, colleges and universities. 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.

Administrative Action Items

Action Item 1 - *Plan Adoption*

Adopt this *DeKalb County All Hazards Mitigation Plan* by resolution. The municipal and institutional resolutions should adopt action items that are pertinent to the community and assign a representative to the DeKalb County Hazard Mitigation Planning Committee.

Responsible agency: County Board, Village Boards, City Councils, Boards of Trustees.

Problem/Opportunity: This was fully implemented in 2008, updated in 2013, and will be implemented again in 2019.

Deadline: December 31, 2019.

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 2 - Mitigation Planning Committee

The DeKalb County Hazard Mitigation Planning Committee will continue as a permanent advisory body in the County's and:

- Act as a forum for hazard mitigation issues,
- Disseminate hazard mitigation ideas and activities to all participants,
- Allow for continued public participation in the implementation and future revisions,
- Ensure incorporation of this *Plan's* goals and guidelines into other planning documents,
- Monitor implementation of this Action Plan, and
- Report on progress and recommended changes to the County Board and each municipality.

Responsible agency: The DeKalb County Planning, Zoning and Building Department.

Problem/Opportunity: The Planning Committee was made a permanent advisory body to the County in 2008 and has continued to meet annually since that time.

Deadline: Ongoing.

Cost: Staff time.

Benefits: The benefit is better implementation of this *Plan*, plus a more comprehensive mitigation program in DeKalb County. This approach also provides a mechanism for continued public involvement (e.g., Committee activities posted on County website).

Action Item 3 - Plan Monitoring and Maintenance

A Hazard Mitigation Planning Committee meeting will be held *at least* once a year to evaluate and monitor progress on implementation. This meeting will be publicized in local newspapers and on the County and community websites (the public will be welcome to attend and/or comment). An annual evaluation report will be submitted to the County Board by the DeKalb County Administrator's Office or the current chair of the Hazard Mitigation Planning Committee.

At the annual meeting, along with an assessment of the implementation efforts, the Committee will determine if other mitigation issues or efforts, based on any natural or manmade hazard occurrences or input from communities or the public, should be added

to the *Plan*. Any substantive revisions to the *Plan*, in particular, to the Action Plan, must be adopted by the County Board and the participating communities and institutions.

The Mitigation Planning Committee will update the *Plan* every five years.

Responsible agency: The Hazard Mitigation Planning Committee and the DeKalb County Planning, Zoning and Building Department.

Problem/Opportunity: The Planning Committee will continue to meet annually at the County Offices. The DeKalb County Director of Planning and Zoning is serving as the Chair of the Planning Committee.

Deadline: Evaluation reports are due on the anniversary of the date the *Plan* is adopted by the County Board. A five year update is required for FEMA's mitigation funding programs.

Cost: Staff time.

Benefits: A monitoring system helps ensure that responsible agencies 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.

Mitigation Program Action Items

Action 4 - Building Code Improvements / Higher Regulatory Standards

Adopt the latest series International Codes. Residential and commercial code revisions should be pursued to strengthen new buildings against damage by high winds, tornadoes, hail, and earthquakes. Requiring tornado safe rooms in certain structures should be considered. In addition to adopting the latest International Codes, the County and local communities should consider higher regulatory standards to further protect residents from natural and man-made hazards. Any code revisions should be consistent with the efforts undertaken by any multi-community organizations of building department staff.

Develop and conduct training for building department staff on building code administration, enforcement, and the natural hazards aspects of the International Codes, regulation of mobile home installation, floodplain ordinances, and provision applicable to hazard mitigation

Responsible agency: DeKalb County and building departments for those municipalities that have not adopted the I-Codes.

Problem/Opportunity: As presented in Chapter 5, DeKalb County communities have taken action in achieving this action item since 2008 by either updating their building codes or considering future updates. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item to assist with the reduction of risk within DeKalb County.

Deadline: Ongoing.

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. Countywide adoption of the IRC and IBC will protect against damages that are likely to occur during natural hazards.

Building codes cannot be effective unless they are administered and enforced properly. Training will ensure that county and municipal staff understand the codes and procedures. This is a benefit that property owners will also benefit from and they understand the importance of the building standards for new construction, and allow them to protect their investment in the property.

Action Item 5 - Participation in StormReady:

DeKalb County, municipalities, other agencies, universities and colleges should join, or maintain their status in, the National Weather Service's StormReady program. The StormReady program has been developed to provide communities guidelines to improve the timeliness and effectiveness of hazardous weather-related warning for the public.

Responsible agency: County, municipalities, other agencies, and institutional emergency managers.

Problem/Opportunity: The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item to assist with the reduction of risk within DeKalb County. The City of DeKalb and NIU are StormReady and a number of other communities will continue to take steps to apply to the program. Staff was identified as the main obstacle in achieving this mitigation action item. This mitigation action item was originally identified in the 2008 Plan.

Deadline: 24 months from Plan adoption with consideration of municipal and institutional budget cycles.

Cost: \$2 per capita, staff time.

Benefits: By meeting StormReady requirements, the County, communities and institutions will be better able to detect impending weather hazards and disseminate warnings as quickly as possible. Given the County's population, all efforts to prevent injury, save lives, and protect property are of high value.

Action 6 – Critical Facilities Design with All Hazards Protection

Offices responsible for design, construction or permitting critical facilities, including federal, state, county and municipal agencies, and institutions should ensure that the design or modification of critical facilities accounts for natural and manmade hazards and adjacent land uses. Mitigation grant funding should be pursued, when appropriate.

Responsible agency: County, municipal, institutions, and federal and state agencies responsible for critical facilities.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. The City of DeKalb took this action item into consideration with the construction of a new police station in 2013. The mitigation action remains an appropriate action item to assist with the reduction of risk within DeKalb County.

Deadline: Ongoing.

Cost: Staff time.

Benefits: This *Plan* expanded the list of critical facilities to include school, places of assembly, and other assets that are significant in the county during times of natural or manmade disasters. These may be shelters, or places of concentrated populations. If these facilities are better protected, then the risk for life, health and safety is reduced.

Action Item 7 - Mitigation of Floodplain Properties

Properties that are exposed to flood damage throughout DeKalb County should be protected through property protection measures where regional structural projects are not feasible. Property protection measures should include, but not be limited to, acquisition, elevation, or floodproofing. Priority should be given to repetitive loss properties, but all floodplain properties including critical facilities should be included.

Also, the number of structures within the 100-year floodplains should be determined in detail, and mitigation opportunities for those structures should be identified. As repetitive flood loss areas identified in this Plan are investigated (or as additional flood prone areas are identified), cost-effective mitigation alternatives should be developed (acquisition, elevation or floodproofing) and funding assistance from FEMA or IEMA should be pursued.

Responsible Agency: DeKalb County, municipal stormwater administrators and NFIP coordinators.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan and has been implemented where funding has become available. Since that time the City of DeKalb and DeKalb County have obtained grants from IEMA for floodplain property acquisitions (see Chapter 6). Additional opportunities will be identified in the future.

Deadline: Ongoing.

Cost: Identified per project.

Benefits: Properties will be protected from future flooding. Also the exposure of the National Flood Insurance Fund will be reduced. There will also be a reduction in emergency response as structures are protected or removed from flood prone areas.

Action 8 – Include the *All Hazards Mitigation Plan* into Other Plans

As the county and municipalities develop or revise comprehensive or land use plans, emergency operations plans, and ordinances, the goals and guidelines of this *Plan* should be incorporated into those efforts.

Responsible agency: DeKalb County and municipalities.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. Participating communities are aware of this action time and this remains a needed action item for DeKalb County communities.

Deadline: Ongoing.

Cost: Staff time.

Benefits: This will ensure that DeKalb County takes a consistent approach to natural and manmade hazard mitigation, and develops other plans with the protection of life, health, safety, business and property protection in mind.

Action Item 9 - Continued NFIP Compliance

Floodplain management is the cornerstone of participation in the National Flood Insurance Program (NFIP). Communities which participate in the NFIP are expected to adopt and enforce floodplain management regulations. These regulations apply to all types of floodplain development activities. The regulations ensure that any proposed floodplain development activities will not cause an increase in future flood damages. New and replacement structures are required to be elevated at or above the base flood elevation. In Illinois, most communities require structures to be protected one foot above the base flood elevation. DeKalb County and participating municipalities have adopted the State of Illinois Model Floodplain Ordinance. That ordinance goes above-and-beyond NFIP minimum standards. In addition, the State of Illinois' floodway regulations are much more restrictive than NFIP minimums. By adopting the State of Illinois Model Floodplain Ordinance, the county not only complies with all NFIP regulations but exceeds them.

Responsible Agency: DeKalb County Planning, Zoning and Building Department and municipal NFIP Administrators.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan and remains an important action time for all NFIP communities.

Deadline: Ongoing.

Cost: Staff time.

Benefits: Community compliance with the NFIP is essential

Action 10 – Grant Funding for Safe Rooms

Pursue grant funding for the construction of safe rooms, in homes, businesses, at critical facilities, health care facilities, and schools. The first priority for any available funding should be schools.

Responsible agency: DeKalb County, municipalities, and institutions.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item to assist with the reduction of risk within DeKalb County. DeKalb County has taken initial action in achieving this action item by identifying and prioritizing specific locations within the county where shelters should be placed. In addition, initial cost estimates have been obtained to construct shelters in the following locations. Staffing and funding levels were identified as the main obstacles in further progress on this mitigation action item.

Deadline: 36 months.

Cost: Staff time (plus grant cost share).

Benefits: DeKalb County is vulnerable to tornado events. With the construction of safe rooms, life and safety can be protected.

Action 11 - Watershed Studies

Illinois State Water Survey (ISWS) is preparing studies of the County's watersheds for purposes of stormwater management, flood control, and water quality concerns. One watershed study is complete and another is underway. This effort will foster the understanding of impact of development on existing flood problems and identify ways to reduce future flood problems.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan, and as discussed in Chapter 5, this action item is underway. These plans should be completed in 2019. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item for the protection of DeKalb County from future flood damage.

Responsible agency: DeKalb County.

Deadline: 36 months.

Cost: Staff time (plus grant cost share).

Benefits: All residents will benefit from the understanding of the County's watersheds, and a cost-effective approach to addressing existing and future flood problems. Efforts will provide for the protection of property, reduced transportation disruption, and improved health and safety during minor and major flood events.

Action 12 - Mapping of Hazards

Natural and manmade hazard mapping should be developed on a countywide basis, as part of the County's GIS mapping effort.

Responsible agency: DeKalb County GIS.

Problem/Opportunity: DeKalb County has taken initial action in achieving this action item through activities of the GIS Department. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item for the protection of DeKalb County.

Deadline: 12 months.

Cost: Staff time.

Benefits: Hazard mapping will benefit several groups, including, the Mitigation Committee as they implement this Action Plan, emergency officials as that prepare or respond to disasters or incidents, permit and building officials as property develops, and property owners interested in pursuing mitigation alternatives.

Action 13 - Structural Flood Control Projects

DeKalb County and/or municipalities should support and cost-share on feasible structural flood control projects as they are identified in watershed plans.

Responsible agency: DeKalb County and municipalities.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. Staffing and funding levels were identified as the main obstacles in achieving this mitigation action item. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item to assist with the reduction of risk within DeKalb County.

Deadline: Unknown.

Cost: Project specific.

Benefits: Structural project benefits are determined during project development.

Action 14 - Drainage System Maintenance

The South Branch and the East Branch of the South Branch of the Kishwaukee River, and their tributaries, are in need of stream maintenance in both rural and urban areas. Efforts should be made to identify areas of restricted flow, due to erosion and sedimentation, and funds should be pursued to restore the flow capacity of the streams. Also, bridges and culverts (active or abandoned) that restrict flood flows should be evaluated. The removal or enlargement of stream crossings, in cases where a modification will not cause an increase in downstream flooding, should be considered and funded.

Responsible agency: DeKalb County and municipalities.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. Progress is discussed in Chapter 7. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item to assist with the reduction of risk within DeKalb County. Staffing and funding levels were identified as the main obstacles in comprehensively implementing this mitigation action item.

Deadline: 36 months.

Cost: Project specific.

Benefits: DeKalb County is experiencing significant growth, though it is still a highly agricultural county. Development and agriculture have lead to a reduction of stream

capacity, and upstream flooding as a result may be increasing. A restoration of stream capacity may mitigate upstream damage, and enhance stream and water quality.

Action 15 – NOAA Weather Radios All Hazards for Critical Facilities, Homes, and Businesses

Ensure that all critical facilities (as defined by this *Plan*) in the County, municipalities, institutions, and animal care facilities, have enhanced NOAA Weather Radios All Hazards that include additional media alerts, and encourage homes and businesses to allow have weather radios.

Responsible agency: County, municipalities and institutions.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. DeKalb County has taken initial action in achieving this action item. As discussed in Chapter 9, many critical facilities have been provided with weather radios. The mitigation action was reviewed by the Planning Committee and communication remains an appropriate action item to assist with the reduction of risk within DeKalb County.

Deadline: 24 months.

Cost: Unknown.

Benefits: At the current time, NOAA weather radios are the primary warning mechanism for DeKalb County. Most critical facilities already have weather radios, but by ensuring that all facilities have current weather radios, then life, health and safety can be protected. Encouraging private property owner to also maintain radios can also help to protect life, health and safety.

Action 16 - Improved Threat Recognition

DeKalb County, municipalities, and Kishwaukee College should seek funding for improved outdoor warning sirens.

Responsible agency: DeKalb County ESDA.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. Funding levels were identified as the main obstacle in achieving this mitigation action item. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item to assist with the reduction of risk within DeKalb County.

Deadline: 18 months.

Cost: Unknown.

Benefits: With the exception of radios and other police and fire communication networks, DeKalb County has limited warning systems. Outdoor warning systems are inadequate for the County. The lives, health and safety of people would be better protected with effective outdoor warning systems.

Action 17 - Improved Emergency Response

Working through the Local Emergency Planning Committee (LEPC), DeKalb County and the municipalities should update all state and federal required emergency response plans for natural and manmade hazards.

Responsible agency: DeKalb County ESDA and municipal ESDAs.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. DeKalb County communities continue to update their plans. Funding is the main obstacle in achieving further coordination between the communities in this mitigation action item. The mitigation action was reviewed by the Planning Committee and if funding is restored, the LEPC will be reassembled.

Deadline: 18 months.

Cost: Staff time.

Benefits: Updating and enhancing the County and municipal emergency response plans will enhance the effectiveness of the County's mitigation program. Improved emergency response will also protect the lives, health and safety of the people in DeKalb County. Relatively new response issues, such as sheltering policies and strategies, or funding mechanisms for countywide HazMat response, could be investigated.

Action 18 - Property Protection Checklist

A checklist should be prepared for use by all agencies throughout the County for evaluating properties that are exposed to flood damage, and to examine property protection alternatives.

Responsible agency: The Hazard Mitigation Planning Committee, DeKalb County, and municipalities.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. Staffing levels were identified as the main obstacle in achieving this mitigation action item. The Planning Committee determined that this is still a useful action item.

Deadline: 18 months.

Cost: Staff time.

Benefits: Allows for the efficient collection of property information and a useful evaluation of alternatives.

Public Information Action Items

Action 19 - Information for Floodplain Property Owners

Due to their particular vulnerability to damage, properties in floodplains should be provided with information and advice on property protection measures. Special attention should be given to repetitive loss and high hazard areas.

Responsible agency: DeKalb County and municipalities in the NFIP.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. DeKalb County communities have taken initial action in achieving this action item by identifying resources on websites, newsletter and community mailings. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item to assist with the reduction of flood damage in DeKalb County.

Deadline: 18 months.

Cost: Staff time.

Benefits: It is beneficial for people to be aware of hazards that may impact them.

Action 20 – Educate Property Owners on Safe Rooms

Use available brochures and other information to educate residents, businesses, school communities and other property owners about safe rooms for tornados. Encourage retrofitting of existing buildings to include safe rooms, and the construction of safe rooms in new building designs.

Responsible agency: The Hazard Mitigation Planning Committee, DeKalb County, municipalities, and institutions.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. Staffing levels were identified as the main obstacles in achieving this mitigation action item. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item to assist with the reduction of risk and protection of life safety within DeKalb County.

Deadline: 24 months.

Cost: Staff time.

Benefits: DeKalb County is vulnerable to tornado events and safe rooms used in other parts of the country have proven effective. Encouraging property owners, including the owners of manufactured home communities, private schools, businesses, and medical facilities, to include safe rooms in their buildings will protect lives.

Action 21 - Public Information Hazard Mitigation Materials

Prepare background information, articles, and other explanations of hazard mitigation topics, including:

- Warning signals and emergency protection measures
- Safety during, tornados, severe summer ad severe winter storms
- Health hazards related to natural and manmade hazards
- Protecting water quality
- What the County and municipalities are doing for hazard mitigation

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.

Responsible agency: DeKalb County and the DeKalb County Hazard Mitigation Planning Committee. The American Red Cross could provide technical advice.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. Staffing and funding levels were identified as the main obstacles in achieving this mitigation action item. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item to assist with the reduction of risk within DeKalb County.

Deadline: 12 months.

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 22 - Public Information 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. Different media should be used for the following audiences:

- The general public
- Floodplain residents
- Developers and builders
- Decision makers
- Schools and teachers

Responsible agency: The Hazard Mitigation Planning Committee, and DeKalb County. The American Red Cross should also participate.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. Staffing and funding levels were identified as the main obstacles in achieving this mitigation action item. The mitigation action was reviewed by the Planning Committee and remains a viable and appropriate action item to assist with the reduction of risk within DeKalb County.

Deadline: 12 months.

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.

Action 23 - 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. Include a request that they make the references available for public use. A special effort should be made to identify references on insurance, emergency preparedness and property protection.

Also, identify websites that provide property protection information and provide their addresses to the County and municipal webmasters.

Responsible agency: DeKalb County to collect publications, then municipal offices the place in libraries and offices. The American Red Cross should provide technical advice.

Problem/Opportunity: This mitigation action item was originally identified in the 2008 Plan. DeKalb County has taken initial action in achieving this action item by the City of DeKalb and Sycamore through their participation in CRS.

Deadline: 12 months.

Cost: Staff time.

Benefits: As with the other public information activities, this action item helps inform the public. It provides the greatest assistance to those people who want to learn more about property protection and take the right steps to reduce their exposure to damage by natural hazards.

11.3 Action Items Presented as “Community Specific Action Items”

The action items presented in Section 11.2 of this Chapter are the action items that the Mitigation Committee agreed to pursue individually and as a countywide effort (including the universities). This Section presents those action items, plus any additional action items, that the participating municipalities selected as action items to focus on in the next five years. Again, recommendations for this *Plan* that are presented at the end of Chapters 5 through 10 may be implemented at anytime by the County, municipalities, institution or stakeholders to this *Plan*.

DeKalb County: All action items presented in Section 11.2 of this Chapter of this *Plan*. Also, the County may implement action items or recommendations in this Plan with or on behalf of DeKalb County municipalities, townships, school district, institutions or stakeholders.

DeKalb County will also carry out the mitigation projects in Evergreen Village and Mayfield Township.

Town of Cortland:

- Action Item 1. Plan Adoption
- Action Item 5. Participation in StormReady
- Action Item 9. Continued NFIP Compliance
- Action Item 14. Drainage System Maintenance
- Action Item 22. Public Information - Outreach Projects

City of DeKalb

- Action Item 1. Plan Adoption
- Action Item 2. Hazard Mitigation Committee
- Action Item 9. NFIP Compliance
- Action Item 14. Drainage System Maintenance
- Action Item 19. Information for Floodplain Property Owners
- Also: Encourage underground utilities for new construction
 - Continue Participation in the CRS
 - Improve the capacity of drainage systems

City of Genoa

- Action Item 1. Plan Adoption
- Action Item 2. Hazard Mitigation Committee
- Action Item 4. Building Code Improvements / Higher Regulatory Standards
- Action Item 8. Include the All Hazards Plan into Other Plans
- Action Item 9. NFIP Compliance

Action Item 11. Watershed Studies
Action Item 13. Structural Flood Control Projects
Action Item 14. Drainage System Maintenance
Action Item 15. NOAA Weather Radios
Action Item 16. Improved Threat Recognition
Action Item 17. Improved Emergency Response
Action Item 18. Property Protection Checklist
Action Item 21. Public Information - Hazard Mitigation Materials
Action Item 22. Public Information - Outreach Projects
Action Item 23. Property Protection References
Also: Encourage underground utilities for new construction

- Continue or Consider Participation in the CRS
- Review of Critical Facilities
- Provide alternative power sources at critical structures and shelters
- Development of Flood Stage Maps
- Urban Forestry - Tree City USA
- NIMS Compliance
- Establish an emergency response assessment team
- Establish system of cooling/warming centers
- Improve the capacity of drainage systems

Village of Hinckley

Action Item 1. Plan Adoption
Action Item 2. Hazard Mitigation Committee
Action Item 9. NFIP Compliance
Action Item 14. Drainage System Maintenance
Also: Encourage underground utilities for new construction
Urban Forestry – Tree City USA

Village of Kingston

Action Item 1. Plan Adoption
Action Item 2. Hazard Mitigation Committee
Action Item 4. Building Code Improvements / Higher Regulatory Standards
Action Item 5. Participation in StormReady
Action Item 8. Include the All Hazards Plan into Other Plans
Action Item 9. NFIP Compliance
Action Item 10. Grant Funding for Safe Rooms
Action Item 15. NOAA Weather Radios
Action Item 16. Improved Threat Recognition
Action Item 18. Property Protection Checklist

Action Item 19. Information for Floodplain Property Owners

Action Item 20. Educate Property Owners on Safe Rooms

Action Item 21. Public Information - Hazard Mitigation Materials

Action Item 22. Public Information - Outreach Projects

Action Item 23. Property Protection References

Also: Consider Participation in the CRS

 Seek Mitigation Grant Funding

 Provide alternative Power Sources at Critical Structures and Shelters

 NIMS Compliance

 Improve Capacity of Drainage System

Village of Kirkland

Action Item 1. Plan Adoption

Action Item 2. Hazard Mitigation Committee

Action Item 4. Building Code Improvements / Higher Regulatory Standards

Action Item 5. Participation in StormReady

Action Item 6. Critical Facility Design with All Hazards Protection

Action Item 7. Mitigation of Floodplain Properties

Action Item 8. Include the All Hazards Plan into Other Plans

Action Item 9. NFIP Compliance

Action Item 13. Structural Flood Control Projects

Action Item 14. Drainage System Maintenance

Action Item 16. Improved Threat Recognition

Action Item 17. Improved Emergency Response

Action Item 19. Information for Floodplain Property Owners

Action Item 20. Educate Property Owners on Safe Rooms

Action Item 21. Public Information - Hazard Mitigation Materials

Action Item 22. Public Information - Outreach Projects

Also: Establish system of cooling/warming centers

 Improve the capacity of drainage systems

Village of Lee

Action Item 1. Plan Adoption

Action Item 2. Hazard Mitigation Committee

Action Item 5. Participation in StormReady

Action Item 9. NFIP Compliance

Action Item 14. Drainage System Maintenance

Action Item 22. Public Information - Outreach Projects

Village of Malta

- Action Item 1. Plan Adoption
- Action Item 2. Hazard Mitigation Committee
- Action Item 4. Building Code Improvements / Higher Regulatory Standards
- Action Item 5. Participation in StormReady
- Action Item 6. Critical Facility Design with All Hazards Protection
- Action Item 7. Mitigation of Floodplain Properties
- Action Item 8. Include the All Hazards Plan into Other Plans
- Action Item 9. NFIP Compliance
- Action Item 14. Drainage System Maintenance
- Action Item 16. Improved Threat Recognition
- Action Item 17. Improved Emergency Response
- Action Item 18. Property Protection Checklist
- Action Item 20. Educate Property Owners on Safe Rooms
- Action Item 21. Public Information - Hazard Mitigation Materials
- Action Item 22. Public Information - Outreach Projects
- Also: Encourage Underground Utilities for New Construction
 - Safety Requirements for Manufactured Homes
 - Consider Participation in the CRS
 - Review Critical Facilities
 - Urban Forestry – Tree City USA
 - Provide alternative Power Sources at Critical Structures and Shelters
 - NIMS Compliance
 - Establish an Emergency Response Assessment Team
 - Establish System of Cooling/Warming Centers
 - Improve Capacity of Drainage System

City of Sandwich

- Action Item 1. Plan Adoption
- Action Item 2. Hazard Mitigation Committee
- Action Item 6. Critical Facility Design with All Hazards Protection
- Action Item 8. Include the All Hazards Plan into Other Plans
- Action Item 9. NFIP Compliance
- Action Item 10. Grant Funding for Safe Rooms
- Action Item 14. Drainage System Maintenance
- Action Item 16. Improved Threat Recognition
- Action Item 17. Improved Emergency Response
- Action Item 18. Property Protection Checklist

Action Item 20. Educate Property Owners on Safe Rooms
Action Item 21. Public Information - Hazard Mitigation Materials
Action Item 22. Public Information - Outreach Projects
Action Item 23. Property Protection References
Also: Safety Requirements for Manufactured Homes
 Review Critical Facilities
 NIMS Compliance
 Establish an Emergency Response Assessment Team

Village of Shabbona

Action Item 1. Plan Adoption
Action Item 2. Hazard Mitigation Committee
Action Item 4. Building Code Improvements / Higher Regulatory Standards
Action Item 5. Participation in StormReady
Action Item 6. Critical Facility Design with All Hazards Protection
Action Item 8. Include the All Hazards Plan into Other Plans
Action Item 9. NFIP Compliance
Action Item 14. Drainage System Maintenance
Action Item 19. Information for Floodplain Property Owners
Action Item 21. Public Information - Hazard Mitigation Materials
Also: Encourage Underground Utilities for New Construction
 Review Critical Facilities
 Provide Alternative Power Sources at Critical Structures
 NIMS Compliance
 Establish an Emergency Response Assessment Team

Village of Somonauk

Action Item 1. Plan Adoption
Action Item 2. Hazard Mitigation Committee
Action Item 4. Building Code Improvements / Higher Regulatory Standards
Action Item 5. Participation in StormReady
Action Item 9. Continued NFIP Compliance
Action Item 16. Improved Threat Recognition
Action Item 17. Improved Emergency Response
Also: NIMS Compliance,

City of Sycamore

- Action Item 1. Plan Adoption
- Action Item 2. Hazard Mitigation Committee
- Action Item 9. NFIP Compliance
- Action Item 11. Watershed Studies
- Action Item 19. Information for Floodplain Property Owners
- Action Item 22. Public Information - Outreach Projects
- Also: NIMS Compliance
 - Establish an emergency response assessment team
 - Establish system of cooling/warming centers
 - Improve the capacity of drainage systems

Village of Waterman

- Action Item 1. Plan Adoption
- Action Item 2. Hazard Mitigation Committee
- Action Item 4. Building Code Improvements / Higher Regulatory Standards
- Action Item 5. Participation in StormReady
- Action Item 9. NFIP Compliance
- Action Item 14. Drainage System Maintenance
- Action Item 22. Public Information - Outreach Projects

Northern Illinois University

- Action Item 1. Plan Adoption
- Action Item 2. Hazard Mitigation Committee
- Action Item 5. Participation in StormReady
- Action Item 6. Critical Facility Design with All Hazards Protection
- Action Item 8. Include the All Hazards Plan into Other Plans
- Action Item 9. NFIP Compliance
- Action Item 10. Grant Funding for Safe Rooms
- Action Item 15. NOAA Weather Radios
- Action Item 16. Improved Threat Recognition
- Action Item 17. Improved Emergency Response
- Action Item 21. Public Information - Hazard Mitigation Materials
- Action Item 22. Public Information - Outreach Projects
- Also: Seek Mitigation Grant Funding
 - Review Critical Facilities
 - Provide alternative Power Sources at Critical Structures and Shelters

Development of Flood Stage Maps
NIMS Compliance
Establish an Emergency Response Assessment Team
Establish County Natural Hazard Mitigation Emergency Response Team

11.4 Summary of Action Plan Items

Table 11-1 summarizes the 23 action items, the responsible agencies and the deadlines for implementing them. The action items are categorized as *Plan* administrative items, mitigation program items, and public information items. Mitigation Committee items include additional tasks needed to administer and support plan implementation.

The relationship between the goals and guidelines (from Chapter 4) are shown in Table 11-2, and Table 11-3 show the relationship of *Plan* recommendations (Chapter 5 through 10) to the action items.

11.5 Plan Implementation and Maintenance

The continuation of the Hazard Mitigation Planning Committee is necessary to ensure that the Action Plan is carried out. Accordingly, the creation of a permanent Mitigation Committee is 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 Items 2 and 3.

Maintenance and monitoring of the *DeKalb County All Hazards Mitigation Plan* are addressed in the Action Item 3. This action item explains how and when this *Plan* will be reviewed, revised, and updated. While Action Item 3 calls for the Mitigation Committee to meet at least once a year, it is anticipated that they will meet more frequently as mitigation and stormwater activities are pursued.

Table 11-1 Action Items, Responsible Agencies and Deadlines

Responsible Agency	Administrative			Mitigation Program															Public Information				
	1. Plan Adoption	2. Hazard Mitigation Committee	3. Plan Maintenance and Monitoring	4. Building Code Improvements / Higher Regulatory Standards	5. Participation in StormReady	6. Critical Facility Design with All Hazards Protection	7. Mitigation of Floodplain Properties	8. Include the All Hazards Plan into Other Plans	9. NFIP Compliance	10. Grant Funding for Safe Rooms	11. Watershed Studies	12. Mapping of Hazards	13. Structural Flood Control Projects	14. Drainage System Maintenance	15. NOAA Weather Radios	16. Improved Threat Recognition	17. Improved Emergency Response	18. Property Protection Checklist	19. Information for Floodplain Property Owners	20. Educate Property Owners on Safe Rooms	21. Public Information - Hazard Mitigation Materials	22. Public Information - Outreach Projects	23. Property Protection References
Hazard Mitigation Committee			X															X	X	X	X	X	X
DeKalb County																							
County Board	X							X		X													
Administrator		X	X					X													X	X	X
ESDA		X	X		X	X	X	X							X	X		X		X	X	X	X
Planning & Zoning		X	X	X		X	X	X	X		X	X	X	X				X	X	X	X	X	X
Transportation						X		X															
GIS								X				X											
Health								X													X	X	X
Community Services								X													X	X	X
Municipalities																							
City Council/Village Board	X	X																					
Emergency Management		X	X		X	X	X	X		X					X	X		X		X	X	X	X
Designated department(s)		X	X	X	X	X	X	X	X	X	X		X	X				X	X	X	X	X	X
Institutions																							
Northern Illinois University	X	X		(x)	X	X		X		X					X	X	X	X			X	X	X
Kishwaukee College	X	X		(x)	X	X		X		X					X	X	X	X			X	X	X
Regional Office of Education	X	X	X	(x)		X		X		X						X				X	X	X	X
Townships		X	X											X							X	X	X
Other Agencies																							
Illinois Agencies						X							X										
American Red Cross																			X	X	X	X	X
Deadline for first product (months)	6	--	--	18	24	--	--	--	--	36	36	12	--	24	24	18	18	18	18	24	12	12	12

(x) Can be recommended

Table 11-2 Action Items, Goals and Guidelines

Responsible Agency	Administrative			Mitigation Program															Public Information				
	1. Plan Adoption	2. Hazard Mitigation Committee	3. Plan Maintenance & Monitoring	4. Building Code Improvements / Higher Regulatory Standards	5. Participation in StormReady	6. Critical Facility Design with All Hazards Protection	7. Mitigation of Floodplain Properties	8. Include the All Hazards Plan into Other Plans	9. NFIP Compliance	10. Grant Funding for Safe Rooms	11. Watershed Studies	12. Mapping of Hazards	13. Structural Flood Control Projects	14. Drainage System Maintenance	15. NOAA Weather Radios	16. Improved Threat Recognition	17. Improved Emergency Response	18. Property Protection Checklist	19. Information for Floodplain Property Owners	20. Educate Property Owners on Safe Rooms	21. Public Information - Hazard Mitigation Materials	22. Public Information - Outreach Projects	23. Property Protection References
Goals																							
1. Protect the lives, health, and safety of the people and animals.				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Protect public services and critical facilities.				X	X	X	X	X	X	X	X	X	X	X	X	X	X						
3. Mitigate to protect against economic and transportation losses.				X	X	X	X	X	X			X	X	X	X	X	X						
4. Ensure that new developments do not create new exposures to hazards.				X		X		X	X		X	X		X									
5. Identify specific projects to protect lives and mitigate damage.						X	X			X		X	X	X	X	X		X	X	X	X	X	X
6. Protect historic, cultural, and natural resources.					X	X	X	X	X		X			X						X	X	X	X
Guidelines																							
1. Focus on severe summer storms, floods, severe winter storms, tornadoes, extreme cold and heat events, and drought.				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Focus on armed attack, transportation incidents, cyberterrorism, utility interruption, HazMat incidents, and radiological release incidents.					X	X						X			X	X	X			X	X	X	X
3. Make people aware of the hazards they face.					X			X	X									X	X	X	X	X	X
4. Create and foster public-private partnerships.						X		X										X	X	X	X	X	X
5. Seek state, and federal support for mitigation efforts.						X	X	X		X		X	X	X	X	X							
6. Use available local funds, when necessary.				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7. Strive to improve and expand business, infrastructure, education & housing opportunities.				X	X	X	X		X		X	X	X	X									

Table 11-3 Action Items and Recommendations

	Administrative			Mitigation Program															Public Information				
Responsible Agency	1. Plan Adoption	2. Hazard Mitigation Committee	3. Plan Maintenance and Monitoring	4. Building Code Improvements / Higher Regulatory Standards	5. Participation in StormReady	6. Critical Facility Design with All Hazards Protection	7. Mitigation of Floodplain Properties	8. Include the All Hazards Plan into Other Plans	9. NFIP Compliance	10. Grant Funding for Safe Rooms	11. Watershed Studies	12. Mapping of Hazards	13. Structural Flood Control Projects	14. Drainage System Maintenance	15. NOAA Weather Radios	16. Improved Threat Recognition	17. Improved Emergency Response	18. Property Protection Checklist	19. Information for Floodplain Property Owners	20. Educate Property Owners on Safe Rooms	21. Public Information - Hazard Mitigation Materials	22. Public Information - Outreach Projects	23. Property Protection References
Recommendations																							
Ch. 4. Preventive Measures				X		X		X	X			X							X	X	X	X	X
Ch. 5. Property Protection						X	X			X									X	X	X	X	X
Ch. 7. Structural Projects											X		X	X									
Ch. 8. Resource Protection						X					X	X							X	X	X	X	X
Ch. 9. Emergency Services					X							X			X	X	X	X		X	X	X	X
Ch. 10. Public Information												X							X	X	X	X	X

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Appendix A

Workgroup Participants

The following people participated in the development of the DeKalb County All Hazards Mitigation Plan and the Plan update:

Name	Representing	Title	Address
Lin Dargis	Town of Cortland	Police Chief	P.O. Box 519 Cortland
Bryan Faivre	City of DeKalb	City Manager	700 Pine St. DeKalb
Kim Milhouse	Sycamore School Dist. 427		245 W Exchange St # 1, Sycamore
James Bianchi	City of Sandwich	Police Chief	44 E. Railroad St, Sandwich
Wayne Davey	DeKalb County Highway		1826 Barber Greene Rd. DeKalb
Nathan Schwartz	DeKalb County Highway	County Highway Engineer	1826 Barber Greene Rd. DeKalb
Ryan Block	Village of Kirkland	Mayor	511 W. Main St., Kirkland
Lucas Ortegel	NIU Police Dept.	Emergency Management & Planning Coordinator	275 Wirtz Dr. DeKalb
Dean Johnson	DeKalb Co. Soil & Water	Resource Conservationist	1350 W. Prairie Dr. Sycamore
Brad Hunold	DeKalb County Highway		1826 Barber Greene Rd. DeKalb
Dennis Miller	DeKalb County ESDA	Coordinator	150 N. Main St., Sycamore
Jason Leverton	City of DeKalb	Police Commander	700 Pine St. DeKalb
Bruce Hamilton	DeKalb County GIS	GIS Manager	110 E. Sycamore St. Sycamore
Chad Bergeson	DeKalb County GIS	GIS Analyst	110 E. Sycamore St. Sycamore
Brent O'Daniell	Genoa - Kingston CUSD #424	Superintendent	980 Park Ave, Genoa
Zac Gill	City of DeKalb	City Engineer	700 Pine St. DeKalb
Jo Ellen	City of DeKalb		700 Pine St. DeKalb
Tim Holdeman	City of DeKalb	Director of Public Works	700 Pine St. DeKalb
Thaddeus Mack	City of DeKalb	Chief Building Official	700 Pine St. DeKalb
Gilbert Sebenste	Northern Illinois University	Staff Meteorologist	Dorland Building, NIU, DeKalb
Amy Mathey	Sycamore Township	Township Supervisor	545 Brickville Road, Sycamore
Sally McConkey	Illinois State Water Survey	Section Head, Coordinated Hazard Assessment & Mapping Program	2204 Griffith Dr, Champaign
Mark D. Bushnell	City of Sycamore	City Engineer	535 DeKalb Ave. Sycamore
Derek Hiland	DeKalb County Community Development	Director	110 E. Sycamore St. Sycamore

Name	Representing	Title	Address
Shauna Urlacher	UrbanHydro Engineering, Inc.	President	121 Hillgrove Ave # 376; La Grange
Melissa Edwards	DeKalb County Health Dept.	Health Promotion & Emergency Preparedness Coordinator	
Nancy Nelson	Village of Hinckley	Village President	720 James St., Hinckley
Angie Lauderdale	Village of Kingston	Village Clerk	101 E. Railroad St., Kingston
Debbie Lang	Village of Malta	Comptroller/Administrator	302 S. 2nd Street, Malta
Janet Clark	Village of Shabbona	Village Clerk	206 S Blackhawk St., Shabbona
Abigail Pool	Village of Waterman	Village Clerk	215 W. Adams, Waterman
Josh Carlson	Village of Lee	Village President	PO Box 65, Lee

Appendix B

Public Involvement Activities

Below are samples of public information and public involvement activities that were used during the development of the *DeKalb County All Hazards Mitigation Plan* and for the 2019 Plan update, including:

- Press releases
- Local newspaper articles
- Public meeting and public comment announcements
- Public meeting held on December 27, 2018
- Frequently asked questions

1. Press Releases:

For Immediate Release

DeKalb County is subject to natural hazards that threaten life and health and can cause extensive property damage in the past. Floods struck the County in 1973, 1974 and 1996, and severe winter storms in 1979. While these hazards are acts of nature, the impacts on residents, public facilities, businesses, and private property can be diminished through hazard mitigation.

The DeKalb County is undertaking a Natural Hazards Mitigation Plan for the County. This Plan will identify activities that can be undertaken by both the government and the private sector to reduce the safety hazards, health hazards, and property damage caused by floods, tornados, earthquakes, severe summer storms, and snow and ice storms. The plan will also examine manmade hazards that can impact the County.

The work is being coordinated by the DeKalb County Hazard Mitigation Committee, which was created by the County Board on September 20, 2006. The Committee's members include representatives of County offices, interested municipalities, and stakeholder organizations.

"Hazard mitigation" means doing everything that can be done to reduce the impact of the natural hazards on people and property. It does not necessarily mean controlling floodwaters or stopping tornadoes. These hazards are natural phenomena and, in many cases, mitigation means adjusting what people do in the face of this natural activity.

There are a variety of mitigation measures. They are organized under six general strategies:

Structural flood control projects, which include levees, reservoirs, channel improvements.

Property protection measures, such as relocation out of harm's way, retrofitting buildings, insurance.

Preventive measures, such as zoning ordinances, building codes, and other development regulations.

Emergency services including warning, sandbagging, evacuation.

Natural resource protection that can include wetlands protection, urban forestry programs.

Public information efforts, such as outreach projects, and technical assistance to property owners.

The meetings are open to the public. The public is invited to comment on the plan and the planning effort. Beginning on November 14th, the Mitigation Planning Committee will generally meet on the second Tuesday of each month at the Gathertorium in the DeKalb County Legislative Building at 200 N. Main Street in Sycamore. Information about the hazard mitigation planning effort will be posted on the DeKalb County website at dekalbcounty.org.

2. Local Newspaper Articles:

Daily Chronicle ONLINE

Your Towns | Your Neighbors | Your Newspaper

Updated: Aug 31, 2007 - 11:17:57 am CDT

Officials work to prevent future flood damage

By Kate Schott - City Editor

While officials are optimistic that DeKalb County could get federal disaster funding to help with post-flood cleanup, they also are creating a plan that will hopefully provide money to take steps to prevent future damage.

Area municipalities, led by county efforts, are wrapping up work on a hazard mitigation plan. The plan will detail steps the county and municipalities can take prior to a hazard, such as a flood, to prevent or reduce risks and damages.

It's different from being declared a federal disaster area, a declaration the county hopes to get from President Bush. Those dollars help with repairs and cleanup after a disaster - in this case, last week's flooding, said Molly O'Toole, president of Molly O'Toole Associates Ltd. in Lombard. She is the consultant hired by the county to help shape the mitigation plan.

The plan will help the county take steps to prevent damage from happening in the first place, she said. "This is the money to do mitigation," O'Toole said. "The other money is for recovery and for assistance for those needing a place to live. This is to do things to protect the residents and the county and the community from future flooding."

But in order to even apply for those funds, communities are required by the federal Disaster Mitigation Act of 2000 to have an approved plan in place, O'Toole said.

"If you don't, you can't even talk about it," said Dennis Miller, coordinator for the DeKalb County Emergency Services and Disaster Agency. "They won't even look at you."

The county found out about the requirement out of curiosity more than a year ago, County Administrator Ray Bockman said.

Officials knew there were areas that could be subject to flooding - like Evergreen Village Mobile Home Park just outside of Sycamore - and decided to take a proactive approach to finding ways of avoiding damage if a flood occurred.

The county applied for a grant in February 2006, received one in July 2006 for \$65,000 to help with the plan and formed the Hazard Mitigation Committee in November 2006. The entire planning effort will cost \$86,000.

Representatives of nearly every county municipality have taken part in the committee meetings, as have Northern Illinois University, Kishwaukee College, the DeKalb County Chapter of the American Red Cross, school districts, TAILS Humane Society and police and rescue departments.

Once approved, the plan will assist the county or municipalities with mitigation efforts. Other entities, such as NIU, also will be eligible to apply for funds. The plan, and the funds it could bring, could save money in the long run, Miller said. Instead of needing massive amounts of money to clean up from events like the recent flooding, the county and municipalities can spend less money upfront and prevent situations like the flooding in Evergreen Village, he said.

The final meeting of the Hazard Mitigation Committee is scheduled for Sept. 11, at which time it should complete a draft mitigation plan to send to the Illinois Emergency Management Agency and Federal Emergency Management Agency for review, Bockman said. A public meeting will be held, and the municipalities that have taken part will need to adopt the plan.

Miller is optimistic about the county's chances of being declared a federal disaster area due to the recent flooding because of the amount of damage and because nearby counties also have significant damage.

County officials are still working on a damage estimate, Miller said. Officials from IEMA were in the county Sunday, and are waiting for representatives from FEMA to arrive.

Kate Schott can be reached at kschott@daily-chronicle.com.

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3. Public Meeting Announcement:

December 18, 2018 – Press Release

“Public Meeting to Be Held on the DeKalb County All Hazards Mitigation Plan”

The DeKalb County Hazard Mitigation Planning Committee is in the process of updating the DeKalb County All Hazards Mitigation Plan. An update to the Plan is required every five years by the Federal Emergency Management Agency. A public meeting will be held on December 27th at 4:00 p.m. in Sycamore, IL to review the proposed changes to the Plan.

The public is invited to attend this meeting and to provide comments on the Plan. The Plan will identify activities that can be undertaken by both the government and the private sector to reduce the safety hazards, health hazards, and property damage caused by floods, severe summer and winter storms, tornadoes, and other natural hazards.

The draft Plan will be available for viewing at DeKalb County website, www.dekalbcounty.org or a copy of the draft Plan can be requested at the DeKalb County Planning, Zoning and Building Department, 110 E. Sycamore St., Sycamore, IL (815) 895-7188.

The public meeting will be held on Thursday, December 27, 2018 from 4:00 p.m. to 6:00 p.m. at the DeKalb County Legislative Center, “Gathertorium”, 200 N. Main Street, Sycamore, IL. Comments on the draft plan will be accepted until January 24, 2019.

"Hazard mitigation" means doing everything that can be done to reduce the impact of the natural hazards on people and property. It does not necessarily mean controlling floodwaters or stopping tornadoes. These hazards are natural phenomena and, in many cases, mitigation means adjusting what people do in the face of this natural activity.

DeKalb County is subject to natural hazards that threaten life and health and have caused extensive property damage in the past. Again, while these hazards are acts of nature, the impacts on residents, public facilities, businesses, and private property can be reduced through hazard mitigation.

The update to the DeKalb County All Hazards Mitigation Plan will be considered by the DeKalb County Board for adoption, and also for adoption by the DeKalb County municipalities that participated on the planning process. After the Plan is adopted, DeKalb County and the participating municipalities will continue to be eligible for hazard mitigation grant funding through the Illinois Emergency Management Agency and the Federal Emergency Management Agency.

For more information, contact Derek Hiland, DeKalb County Community Development Director (815) 895-7188.

4. Public Meeting – Sign In Sheets:

**DeKalb County
Draft Hazard Mitigation Plan 2019 Update**

Public Meeting Sign-in Sheet

Date: December 27, 2018

Print Name	Signature	email
Bruce Hamilton		
Sheila Santos		
Marcelle Anderson		
GARY HANSON		
Tasha Sims		
Peggy Carey		
Angie Arnold		
TERRY HANNA		
Lisa K. Sunderson		

5. Frequently Asked Questions:

DeKalb County All Hazards Mitigation Plan

**Mitigation Plan Frequently Asked Questions
(Mitigation Plan FAQs)**

December 2018

1. What is the DeKalb County All Hazards Mitigation Plan?

The DeKalb County All Hazards Mitigation Plan is a multi-hazard mitigation plan that addresses natural and manmade hazards that may impact DeKalb County. The Plan was first developed and adopted by DeKalb County and all participating communities in 2007/2008 and has been updated by the DeKalb County Mitigation Planning Committee in 2018. While the Plan was developed as a countywide effort, it is considered to be a multi-jurisdictional plan.

2. What is hazard mitigation?

Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. Examples of hazard mitigation include flood control projects, storm warning systems, and building codes.

3. Why was the Plan developed?

The Plan was developed to fulfill the federal mitigation planning requirements of Section 104 of the Disaster Mitigation Act of 2000 and the Stafford Act. Communities and universities must develop and adopt a hazard mitigation plan in order to be eligible for hazard mitigation grant funding under the following Federal Emergency Management Agency (FEMA) mitigation programs:

- Pre-Disaster Mitigation Program (PDM)
- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance Program (FMA)

This Plan is also eligible for credit under the FEMA National Flood Insurance Program's Community Rating System.

4. What does the Plan address?

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 and manmade hazards. The Plan focuses on the identified major hazards facing DeKalb County: severe summer storms, floods, severe winter storms, tornadoes, extreme heat and cold events, drought, radiological incidents, utility interruptions, transportation incidents and hazardous materials incidents.

5. The Plan is considered is multi-jurisdictional. Is this the same as "countywide"?

No, the Plan is not a countywide plan like the DeKalb County Stormwater Management Plan. FEMA allows for the multi-jurisdictional development of hazard mitigation plans. Each government agency must adopt and implement the Plan for its own purposes. The County Board adoption of the Plan will be for the unincorporated areas of the County. Each municipality and institution (university) must adopt and implement the Plan for their own purposes.

6. Have we met the FEMA mitigation planning requirements?

Yes. Most communities in DeKalb County and DeKalb County adopted the 2008 Plan. FEMA requires that all adopted hazard mitigation plans be updated and re-adopted every five years. DeKalb County is currently in the

update process, and all communities and institutions are able to adopt the updated plan and qualify for mitigation grants.

7. What is the update “process”?

Our update process included meetings of the Mitigation Planning Committee to review the goals and action items of the current Plan, and the draft the update of the Plan. The updated draft DeKalb County All Hazards Mitigation Plan will be sent to the Illinois Emergency Management Agency (IEMA) and FEMA for review and approval. Following their approval, the Plan will be finalized and sent to the participating communities, agencies, and institutions for adoption.

8. When should we adopt the updated Plan?

In 2013, when the plan has been approved by IEMA and FEMA. A sample adoption resolution will be provided to communities and institutions, along with instructions to send a copy of the adoption resolution to the DeKalb County Planning, Zoning and Building Department and IEMA.

9. Who will implement the Plan?

Each municipality, agency and institution that adopts the Plan will implement the Plan, as resources (staff and funding) allow. The DeKalb County Mitigation Planning Committee will continue to meet annually to assess progress in action item implementation and to note obstacles to implementation. This effort will be coordinated by the DeKalb County Planning, Zoning and Building Department.

10. What if we don’t adopt the Plan?

Then your community or institution will not be eligible for hazard mitigation grant funds from FEMA programs.

11. If we don’t adopt the Plan will our community be eligible for IEMA/FEMA disaster assistance following a disaster declaration for DeKalb County?

Yes. This Plan is for the mitigation grant purposes. It is not tied to disaster assistance. Recognize that often mitigation projects come to light following a disaster. It is prudent to have an adopted mitigation plan.

12. What are the types of mitigation grants available?

Planning grants and project grants. An example of mitigation planning grant would be for the evaluation of critical facilities to determine if they are disaster resistant. Examples of mitigation project grants would be for floodplain property acquisitions, or the construction of a tornado shelter. All plans and projects are funded 75 percent by FEMA and 25 percent by the community or institution.

13. How do we apply for a mitigation grant?

Mitigation grants are applied for through the IEMA. An online “eGrant” application is used. Communities can contact Sam Al-Basha, the State Hazard Mitigation Officer at IEMA, at 217/785-9942 for more information.

14. What is the FEMA web site for hazard mitigation grants?

Links to more information about FEMA mitigation grant programs can be found at:
<http://www.fema.gov/hazard-mitigation-grant-program>

Also, visit IEMA’s web site at:
<http://www.state.il.us/iema/planning/planning.htm>

15. Who should I contact at if I have questions?

Contact Mr. Derek M. Hiland at the DeKalb County Community Development Department at dhiland@dekalbcounty.org or (815) 895-7188.

Appendix C

Community Resolutions (Examples)

- For creation of Mitigation Planning Committee
- For communities to join the Mitigation Planning Committee
- For DeKalb County to adopt this Plan
- For communities and institutions to adopt this Plan

RESOLUTION

Whereas the DeKalb County is subject to natural hazards, such as, floods, tornadoes, earthquake, and severe winter and summer storms; and

Whereas Federal programs, including *44 CFR Part 201 – Mitigation Planning, Interim Final Rule, in accordance with the Stafford Act (42 U.S.C. 5165)*, and *44 CFR Part 78.5 – Flood Mitigation Plan Development, in accordance with the National Flood Insurance Act of 1968 (42 U.S.C. 4104c et seq)* require that DeKalb County have an adopted natural hazard mitigation plan to qualify for their benefits;

Whereas DeKalb County has received a grant from the Illinois Emergency Management Agency for the development of a hazard mitigation plan;

Now, therefore, ***be it resolved*** that:

1. A DeKalb County Hazard Mitigation Committee, which will serve as the County's hazard mitigation planning committee, is hereby established for the purpose of developing a natural hazard mitigation plan;
2. All municipalities within DeKalb County shall be invited to participate in and benefit from County's hazard mitigation planning effort.
3. The Hazard Mitigation Committee will be comprised of representatives from the County, municipalities and appointed representatives. Representatives of other interested agencies, organizations and associations shall be appointed by the Chair of the County Board to represent the stakeholders in hazard mitigation and the general public.
4. The Committee shall meet as often as necessary to prepare the hazard mitigation plan. The schedule of Committee meetings shall be posted in appropriate places. All meetings of the Committee shall be open to the public
5. Haley Murray is hereby appointed as the lead County representative on the Mitigation Committee. She is charged with:
 - a. Working with and coordinating the efforts of the Chair and the Mitigation Committee;
 - b. Keeping the County Board informed of the Committee's activities and recommendations;
 - c. Coordinating the County's efforts to collect information about the hazards facing the DeKalb County and our current policies and programs that can mitigate the impacts of those hazards; and

- d. Obtaining input from County staff on mitigation issues relevant to their work.
- e. Working with the County's planning consultant for the development of the hazard mitigation plan.

6. When the County's Mitigation Committee has completed its work and presents its recommended plan, this Board will review it with the intention of adopting all or parts of it. It is understood that this resolution of commitment to participate in the planning process does not constitute a commitment to enact the recommended plan.

PASSED AT SYCAMORE, ILLINOIS THIS 20TH DAY OF SEPTEMBER 2006 A.D.

ATTEST:

SIGNED:

Sharon B. Holmes
County Clerk

Ruth Anne Tobias
County Board Chair

Resolution No. _____

Whereas the City/Village of _____ is subject to natural hazards, such as, floods, tornadoes, earthquakes, severe winter and summer storms that can damage property, close businesses, disrupt traffic, and present a public health and safety hazard; and

Whereas DeKalb County is undertaking a natural hazards mitigation plan for the County; and

Whereas the County has invited the City/Village of _____ to participate in and benefit from this planning effort; and

Whereas several Federal programs require that the City/Village of _____ have an adopted hazard mitigation plan to qualify for their benefits;

Now, therefore, be it resolved that:

1. The City/Village of _____ hereby states its interest in participating in the County's mitigation planning process.
2. _____ is hereby appointed as our representative on the County's Mitigation Committee. He/she is charged with:
 - a. Attending the regular meetings of the County's Mitigation Committee;
 - b. Keeping City/Village staff and this Council/Board of Trustees informed of the Committee's activities and recommendations;
 - c. Assisting the County's efforts to collect information about the hazards facing the City/Village of _____ and our current policies and programs that can mitigate the impacts of those hazards; and
 - d. Obtaining input from City/Village staff on mitigation issues relevant to their work.
3. When the County's Mitigation Committee has completed its work and presents its recommended plan, this Council/Board of Trustees will review it with the intention of adopting all or parts of it. It is understood that this resolution of commitment to participate in the planning process does not constitute a commitment to enact the recommended plan.

ADOPTED this the _____ day of _____, 2006

Clerk of the City/Village of _____, Illinois

APPROVED this the _____ day of _____, 2006

Mayor/President of the City/Village of _____, Illinois

RESOLUTION

Adoption of the
DeKalb County All Hazards Mitigation Plan
and
Continuation of the
Hazard Mitigation Planning Committee

Whereas the County of DeKalb is subject to natural hazards, such as, severe winter and storms summer, extreme cold and heat events, tornadoes and floods; and manmade hazards, such as radiological release, utility interruption, transportation incidents, and hazardous material incidents.

Whereas natural and manmade hazards can damage property, close businesses, disrupt traffic, can threaten lives, and present public health and safety hazards; and

Whereas the preparation and adoption community mitigation plan is a requirement of the Federal Emergency Management Agency (FEMA) for federal mitigation funds under Section 104 of the Disaster Mitigation Act of 2000 (42 USC 5165), and under 44 CFR (Code of Federal Regulations) Part 201.

Whereas the DeKalb County Hazard Mitigation Committee, created by resolution of the DeKalb County Board, has prepared the *DeKalb County All Hazards Mitigation Plan* that reviews the County's options to protect people and reduce damage from the hazards; and

Whereas the County has participated in the development of the *DeKalb County All Hazards Mitigation Plan*; and

Whereas the recommended *DeKalb County All Hazards Mitigation Plan* has been presented for review by residents, federal, state and regional agencies;
Now therefore, be it resolved that:

A. The *DeKalb County All Hazards Mitigation Plan* is hereby adopted as an official plan of DeKalb County.

B. The *DeKalb County All Hazards Mitigation Plan* identifies a series of action items. The following action items are hereby assigned to the noted department, division or office of the County. The designated department, division or office shall be responsible for the implementation of the action item, provided that resources are available, by the deadline listed in the *Plan*.

1. Plan Adoption (*County Board*)
2. Hazard Mitigation Planning Committee (*DeKalb County*)
3. Plan Maintenance and Monitoring (*Hazard Mitigation Planning Committee*)
4. Building Code Improvements (*Planning and Zoning Department*)
5. Critical Facility Design with All Hazards Protection (*all departments*)
6. Mapping of Hazards (*DeKalb County GIS*)
7. Mitigation for Floodplain Properties and Critical Facilities (*Planning and Zoning Department*)
8. Property Protection Checklist (*Hazard Mitigation Planning Committee*)
9. Include the All Hazards Plan into Other Plans (*all departments*)

10. Grant Funding for Safe Rooms (*all departments*)
11. Watershed Studies (*Planning and Zoning Department*)
12. Structural Flood Control Projects (*Planning and Zoning Department*)
13. Drainage System Maintenance (*Planning and Zoning Department*)
14. Participation in StormReady (*ESDA*)
15. NOAA Weather Radios (*ESDA*)
16. Improved Threat Recognition (*ESDA*)
17. Improved Emergency Response (*ESDA*)
18. Information for Floodplain Property Owners (*NFIP Coordinator*)
19. Educate Property Owners on Safe Rooms (*ESDA and Planning and Zoning Department*)
20. Public Information - Hazard Mitigation Materials (*ESDA and Planning and Zoning Department*)
21. Public Information - Outreach Projects (*Hazard Mitigation Planning Committee*)
22. Property Protection References (*ESDA and Planning and Zoning Department*)

C. The DeKalb County Hazard Mitigation Committee is hereby established as a permanent advisory body. It shall be comprised of representatives from:

1. The County's emergency management, stormwater management, GIS and any other office that might be directly involved in the implementation of the Plan's action items.
2. Those municipalities that pass a resolution to adopt the DeKalb County All Hazards Mitigation Plan and send a representative to attend the meetings of the Committee.
3. Representatives of other interested agencies and organizations and associations appointed by the Chair of the County Board of Commissioners to represent stakeholders in hazard mitigation and the general public.

D. The Committee shall meet as often as necessary to prepare or review mitigation activities and progress toward implementing the *DeKalb County All Hazards Mitigation Plan*. It shall meet at least once each year to review the status of ongoing projects.

E. The schedule of Committee meetings shall be posted in appropriate places. All meetings of the Committee shall be open to the public.

F. The Committee shall prepare an annual report of the *DeKalb County All Hazards Mitigation Plan* for the County Board and the municipalities. The report will cover the following points:

1. A review of the original plan.
2. A review of the natural or manmade disasters that occurred during the previous calendar year.
3. A review of the action items in the original plan, including how much was accomplished during the previous year.

4. A discussion of why action items were not completed or why implementation is behind schedule.

5. Recommendations for new projects or revised action items. Such recommendations shall be subject to the approval of the County Board and the affected municipality's governing bodies as amendments to the Plan.

G. The Committee shall update the *DeKalb County All Hazards Mitigation Plan* every five years, according to requirements provided by the Federal Emergency Management Agency, for the consideration of the County Board and the participating municipalities.

BE IT FURTHER RESOLVED that the County Clerk be directed to transmit certified copies of this Resolution to the Illinois Emergency Management Agency in Springfield, Illinois, and the Federal Emergency Management Agency in Chicago, Illinois.

Enacted and approved this ____ day of _____ 2007 at Sycamore, Illinois.

Ruth Anne Tobias, Chairman
DeKalb County Board

ATTEST: _____

County Clerk

Resolution No. _____

Whereas the City/Village of _____ is subject to natural hazards, such as, severe winter and summer storms, extreme cold and heat events, tornadoes, and floods, that can damage property, close businesses, disrupt traffic, can threaten lives, and present public health and safety hazards; and

Whereas the preparation and adoption community mitigation plan is a requirement of the Federal Emergency Management Agency (FEMA) for federal mitigation funds under Section 104 of the Disaster Mitigation Act of 2000 (42 USC 5165), and under 44 CFR (Code of Federal Regulations) Part 201.

Whereas the DeKalb County Hazard Mitigation Committee has prepared a recommended *DeKalb County All Hazards Mitigation Plan* that reviews the City/Village's options to protect people and reduce damage from the hazards; and

Whereas the City/Village has participated in the development of the *DeKalb County All Hazards Mitigation Plan*; and

Whereas the recommended *DeKalb County All Hazards Mitigation Plan* has been presented for review by residents, federal, state and regional agencies;

Now therefore, be it resolved that:

A. The *DeKalb County All Hazards Mitigation Plan*, [month] 2007, is hereby adopted as an official plan of the City/Village.

B. The *DeKalb County All Hazards Mitigation Plan* identifies a series of action items. The following action items are hereby assigned to the noted person or department of the City/Village. The designated person or department shall be responsible for the implementation of the action item, provided that resources are available, by the deadline listed in the Plan.

1. Plan Adoption (*City/Village* _____)
2. Hazard Mitigation Planning Committee (*DeKalb County*)
3. Plan Maintenance and Monitoring (*Hazard Mitigation Planning Committee*)
4. Building Code Improvements (_____)
5. Critical Facility Design with All Hazards Protection (_____)
6. Mapping of Hazards (*DeKalb County*)
7. Mitigation for Floodplain Properties and Critical Facilities (_____)
8. Property Protection Checklist (_____)
9. Include the All Hazards Plan into Other Plans (_____)
10. Grant Funding for Safe Rooms (_____)

11. Watershed Studies (*DeKalb County*)
12. Structural Flood Control Projects (_____)
13. Drainage System Maintenance (_____)
14. Participation in StormReady (_____)
15. NOAA Weather Radios (_____)
16. Improved Threat Recognition (_____)
17. Improved Emergency Response (_____)
18. Information for Floodplain Property Owners (*NFIP Coordinator*)
19. Educate Property Owners on Safe Rooms (_____)
20. Public Information - Hazard Mitigation Materials (_____)
21. Public Information - Outreach Projects (_____)
22. Property Protection References (_____)

C. [_____ name] is hereby appointed as the City/Village's representative on the DeKalb County Hazards Mitigation Committee. The offices charged with implementation of action items in Section 2 shall keep the representative advised of their progress and recommendations.

ADOPTED this the _____ day of _____, 2007.

Clerk

APPROVED this the _____ day of _____, 2007

Mayor/Village President

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