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# LEE COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN



## PARTICIPANTS

AMBOY, CITY OF  
ASHTON, VILLAGE OF  
DIXON, CITY OF  
FRANKLIN GROVE, VILLAGE OF

HARMON, VILLAGE OF  
LEE COUNTY  
STEWART, VILLAGE OF  
SUBLETTE, VILLAGE OF

## MARCH 2011

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## **ACKNOWLEDGEMENTS**

Developing this first of its kind all-hazard mitigation plan for Lee County resulted in a high quality document that should serve current residents and be useful in providing protection for future generations. Business and government participants on the Planning Committee provided exceptional cooperation and information not readily available to produce this Plan.

The photographs showcased on the cover and within this Plan depicting natural hazards and the damages that can result from such events were provided courtesy of several Planning Committee members and the Sauk Valley Newspapers. These photographs enhance the Plan and help illustrate the true scope of the damages caused by natural hazard events that words alone cannot fully convey.

Regional weather information and additional guidance used to supplement data obtained from the National Weather Service was provided by Larry Acker, an official weather observer for northwestern Illinois. The Acker family has kept the only source of continuous weather records in Polo, Illinois since 1883.

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**FEMA**

May 27, 2011

Mr. Ron Davis  
State Hazard Mitigation Officer  
Illinois Emergency Management Agency  
1035 Outer Park Drive  
Springfield, IL 62704

Dear Mr. Davis:

Thank you for submitting the Lee County Hazard Mitigation Plan for our review. The plan was reviewed based on the local plan criteria contained in 44 CFR Part 201, as authorized by the Disaster Mitigation Act of 2000, as well as the Flood Mitigation Assistance Program (FMA). Lee County met the required criteria for a multi-jurisdictional hazard mitigation plan. Formal approval of this plan is contingent upon the adoption by the participating jurisdictions of this plan. Once FEMA Region V receives documentation of adoption from the participating jurisdictions, we will send a letter of official approval to your office.

We look forward to receiving the adoption documentation and completing the approval process for Lee County.

If you or the community has any questions, please contact me at (312) 408-5227.

Sincerely,

A handwritten signature in black ink, appearing to read "Lee Zachos".

Lee Zachos, Mitigation Planner  
Risk Analysis Branch  
Mitigation Division

Attachment: Local Mitigation Plan Review Crosswalk



# LEE COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

## LEE COUNTY, ILLINOIS

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*Researched and written for the Lee County Multi-Jurisdictional  
All Hazards Mitigation Planning Committee  
by Greg R. Michaud and Andrea J. Bostwick  
Johnson, Depp & Quisenberry*



## **1.0 INTRODUCTION**

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## 1.0 INTRODUCTION

Each year natural hazards (i.e., severe thunderstorms, tornadoes, severe winter storms, flooding, etc.) cause damage to property and threaten the lives and health of the residents of Lee County. Since 1965, Lee County has had three federally-declared disasters. **Figure 1** identifies each declaration including the year the disaster was declared and the type of natural hazard that triggered the declaration.

<b>Figure 1 Federal Disaster Declarations for Lee County</b>		
<b>Declaration #</b>	<b>Year</b>	<b>Type of Natural Hazard(s) Event</b>
373	1973	severe storms and flooding
438	1974	severe storms and flooding
735	1985	severe storms (excessive rainfall), ice jams and flooding

In addition, in the past decade alone, there have been over 80 severe storms (thunderstorms, high winds, hail, lightning strikes, heavy rain etc.), 27 severe winter storms, 11 flood events, two tornadoes, one drought and three earthquakes felt by residents in the County.

While natural hazards cannot be avoided, their impacts can be reduced through effective hazard mitigation planning. This prevention-related concept of emergency management often receives the least amount of attention, yet it is one of the most important steps in creating a hazard-resistant community.

### **What is hazard mitigation planning?**

Hazard mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and man-made hazards. This process helps the County and participating municipalities reduce their risk from natural and man-made hazards by identifying vulnerabilities and developing mitigation actions to lessen and sometimes even eliminate the effects of a hazard. The results of this process are documented in an all hazards mitigation plan.

### **Why prepare an all hazards mitigation plan?**

By preparing and adopting an all hazards mitigation plan, participating jurisdictions become eligible to apply for and receive federal hazard mitigation funds to implement mitigation actions identified in the plan. These funds can help provide local government entities with the opportunity to complete mitigation projects that would not otherwise be financially possible.

The federal hazard mitigation funds are made available through the Disaster Mitigation Act of 2000, an amendment to the Robert T. Stafford Disaster Relief and Emergency Assistance Act, which provide federal aid for mitigation projects, but only if the local government entity has a Federal Emergency Management Agency approved hazard mitigation plan.

### **How is this plan different from other emergency plans?**

An all hazards mitigation plan is aimed at identifying projects and activities that can be conducted prior to a natural or man-made disaster, unlike other emergency plans which provide direction on how to respond to a disaster after it occurs. This is the first time that Lee County has prepared a plan that describes actions that can be taken to help reduce or eliminate damages caused by specific types of natural and man-made hazards.

### **1.1 PARTICIPATING JURISDICTIONS**

Recognizing the benefits that could be gained from preparing an all hazards mitigation plan, the Lee County Board passed a resolution on June 16, 2009 authorizing the development of the Lee County Multi-Jurisdictional All Hazards Mitigation Plan (hereto referred to as the Plan). **Appendix A** contains a copy of the resolution. The County then invited all the municipalities within Lee County to participate. **Figure 2** identifies the municipalities that are represented in the Plan. The Lee County Emergency Management Agency administered the Plan.

<b>Figure 2 Municipalities Represented in the Plan</b>	
Amboy, City of	Harmon, Village of
Ashton, Village of	Steward, Village of
Dixon, City of	Sublette, Village of
Franklin Grove, Village of	

### **1.2 DEMOGRAPHICS**

Lee County is located in northwestern Illinois and covers approximately 729 square miles. The topography is gently sloping with the Rock River flowing on a southwesterly course across the northwest corner of the County. The County seat is located in Dixon. Agriculture is a major industry in the County. According to the 2007 Census of Agriculture, there were 898 farms in Lee County occupying approximately 85% (395,624 acres) of the total acreage in the County. The major crops include corn, soybeans, alfalfa hay and wheat, while the major livestock includes hogs and cattle. Lee County ranks in the top 20 Illinois counties for crop cash receipts.

Lee County has a diversity and balance among residential employment. Manufacturing is the leading employment sector for Lee County residents. According to the 2000 U.S. Census, approximately 3,600 Lee County residents were employed in manufacturing. This is due, in part, to nearby manufacturing jobs. Manufacturing in the County is primarily located in the Dixon area where the largest employers manufacture hardware and process food. Other important industries located in the County include healthcare, education and retail trade. Approximately one-third of Lee County residents commute outside the County for employment, and most of these commuters are employed in Ogle or Whiteside Counties. Most of the remaining commuters have workplace destinations in either DeKalb or LaSalle Counties.

There is a 640 megawatt gas-fired peak generation facility outside of Dixon that produces power for the surrounding area. In addition to the peak facility, the Mendota Hills Wind Farm near the

Village of Paw Paw has 63 operating wind turbines with a capacity to generate an additional 50 megawatts of electricity.

**Figure 3** provides demographic data on each of the participating jurisdictions along with information on housing units and assessed values. The assessed values are only for residential structures (including farm homes). The assessed value of a residence in Lee County is approximately one-third of the market value.

<b>Figure 3 Demographic Data by Participating Jurisdiction</b>						
<b>Participating Jurisdiction</b>	<b>Population (2000)</b>	<b>Projected Population (2020)</b>	<b>Total Land Area (Sq. Miles)</b>	<b>Number of Housing Units (2000)</b>	<b>Housing Unit Density (Units per Sq. Mile)</b>	<b>Total Assessed Value of Housing Units</b>
Amboy	2,561	2,694	1.3	1,057	813	\$28,093,295
Ashton	1,142	1,201	0.7	471	471	\$15,521,028
Dixon	15,941	16,771	6.7	6,129	915	\$177,793,087
Franklin Grove	1,052	1,107	0.4	387	387	\$11,250,995
Harmon	149	157	0.1	65	65	\$2,104,593
Lee County (unincorporated)	14,490	15,244	719.6	5,905	8	\$316,322,279
Steward	271	285	0.1	99	99	\$3,641,768
Sublette	456	480	0.4	197	197	\$8,084,739

Sources: Ryerson, Wendy. Chief County Assessment Officer. "NHMP Mtg." Email to Greg R. Michaud. July 13, 2010.

Illinois Department of Commerce and Economic Opportunity, Census 2000 Data for Illinois, 2010.

Illinois Department of Commerce and Economic Opportunity, Population Projects, Project Summary by County, 2010.

U. S. Census Bureau, Geography, Census 2000 U.S. Gazetteer Files – Counties & Places, 2010.

### 1.3 LAND USE AND DEVELOPMENT TRENDS

Population growth and economic development are two major factors that trigger changes in land use. Lee County is largely rural with a population that experienced an increase of 4.9% between 1990 and 2000. Since 1970, the population of Lee County experienced a net loss of 1,885 persons from 37,947 to 36,062. All of the municipalities participating in the development of this Plan have experienced population growth since 1990 with two exceptions. Harmon lost nearly 20% of its population with a decrease from 186 to 149 persons, and Steward lost nearly 4% of its population with a decrease from 282 to 271 persons. The Department of Commerce and Economic Opportunity projected Lee County’s population to increase by less than 1% between 2000 and 2010, and by approximately 5% between 2000 and 2020.

Land use in Lee County is primarily agricultural. As discussed in the previous section, approximately 85% of the land area within the County is used as farmland. While manufacturing is the leading employment sector for Lee County residents, agriculture is and will continue to be an important part of the Lee County economy.

While there are no major economic development projects planned or under construction in Lee County at this time, economic development initiatives in nearby Ogle County could lead to

projects in Lee County in the future. In 2003, Union Pacific Railroad opened its Global III Intermodal Facility in nearby Rochelle. One of the larger terminals of its kind in the Midwest, this facility is located within two miles of I-88 and I-39 in Lee County. These two four-lane interstates provide access north, south, east and west from the facility. While the opening of Global III resulted in some employees seeking housing in Lee County, it has not yet attracted warehouses or distribution centers, manufacturing companies or other related businesses to Lee County. However, improvement in the economy could prompt development related to this facility within the County in the future.

With I-88 providing an easy east-west connection to the Chicago metropolitan area and the Quad Cities, economic development opportunities seem likely on the developable acres located near municipalities and interchanges associated with I-88 across the County. Should this type of economic development occur, additional residential development may result. Consequently, changes in land use (from agricultural land to residential, commercial and industrial) may become noticeable during the next decade.



## **2.0 PLANNING PROCESS**

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## 2.0 PLANNING PROCESS

The Lee County Multi-Jurisdictional All Hazards Mitigation Plan (the Plan) was developed through the Lee County Multi-Jurisdictional All Hazards Mitigation Planning Committee (Planning Committee). The Plan was prepared to comply with the Disaster Mitigation Act of 2000 and incorporates the Federal Emergency Management Agency’s (FEMA) 10 step planning process approach. **Figure 4** provides a brief description of the process utilized to prepare this Plan.

<b>Figure 4 Description of Planning Process</b>	
<b>Tasks</b>	<b>Description</b>
Task One: Organize	The Planning Committee was formed with broad representation and specific expertise to assist the County and the Consultant in preparing the Plan.
Task Two: Public Involvement	Early and ongoing public involvement activities were conducted throughout the Plan’s development to ensure the public was given every opportunity to participate and provide input.
Task Three: Coordination	Agencies and organizations were contacted to identify plans and activities currently being implemented that impact or might potentially impact hazard mitigation activities.
Task Four: Risk Assessment	The Consultant identified and profiled the natural hazards that have impacted the County and conducted a vulnerability assessment to evaluate the risk to each participating jurisdiction. (This task incorporated two of FEMA’s steps: assessing the hazard and assessing the problem.) In addition, the top four man-made hazards identified by the Committee were profiled.
Task Five: Goal Setting	After reviewing existing plans and completing the risk assessment, the Consultant assisted the Planning Committee in establishing goals and objectives for the Plan.
Task Six: Mitigation Activities	The participating jurisdictions were asked to identify mitigation actions based on the results of the risk assessment. These actions were then analyzed, categorized and prioritized.
Task Seven: Draft Plan	The draft Plan summarized the results of Tasks One through Six. In addition, a section was added that describes the responsibilities to monitor, evaluate and update the Plan. The draft Plan was reviewed by the participants and a public forum was held to give the public an additional opportunity to provide input. Any comments received were incorporated into the draft Plan submitted to the Illinois Emergency Management Agency (IEMA) and FEMA for review and approval.
Task Eight: Final Plan	Comments received from IEMA and FEMA were incorporated in to the final Plan. The final Plan was then submitted to the County and participating municipalities for adoption. The Plan will be reviewed periodically and updated every five years. (This task incorporated two of FEMA’s steps: adopt the plan and implement, evaluate and revise the plan.)

The plan development was led at the staff level by Kevin Lalley, the Lee County Emergency Management Agency Coordinator. Johnson, Depp & Quisenberry, an environmental and engineering consulting firm, with experience in hazard mitigation, risk assessment and public involvement, was employed to guide the County and participating jurisdictions through the planning process.

Participation in the planning process, especially by the County and municipal representatives, was crucial to the development of the Plan. To ensure that all participating jurisdictions took part in the planning process, participation requirements were established. Each participating jurisdiction agreed to satisfy the following requirements in order to be included in the Plan. All of the participating jurisdictions met the participation requirements.

- Attend at least two Planning Committee meetings.
- Submit a list of documents (i.e., plans, studies, reports, maps, etc.) relevant to the all hazard mitigation planning process.
- Identify and submit a list of critical infrastructure and facilities.
- Review the risk assessment and provide information on additional events and damages.
- Participate in the development of mitigation goals.
- Submit a list of mitigation actions.
- Review and comment on the draft Plan.
- Formally adopt the Plan.
- Where applicable, incorporate the Plan into existing planning efforts.
- Participate in the plan maintenance.

## 2.1 PLANNING COMMITTEE

As previously mentioned, at the start of the planning process, the Lee County Multi-Jurisdictional All Hazards Mitigation Planning Committee was formed. The Planning Committee included representatives from each participating jurisdiction, the general public as well as agriculture, business, education, emergency services (ambulance, fire and law enforcement), healthcare, GIS and insurance.



**Figure 5** details the entities represented on the Planning Committee and the individuals who attended on their behalf. The Planning Committee was chaired by the Lee County Emergency Management Agency.

Additional technical expertise was provided by Molly O’Toole of Molly O’Toole & Associates, Ltd., staff at the Illinois Emergency Management Agency Hazard Mitigation Unit, the Illinois Department of Natural Resources Office of Water Resources, the Illinois Environmental Protection Agency, the Illinois State Water Survey, the Illinois State Geological Survey, and the University of Illinois.

Two subcommittees were formed to help with the development of the risk assessment and the mitigation strategy. Members of the subcommittees were provided information in advance of the Planning Committee to obtain their input. Once their input was incorporated, the appropriate

sections of the Plan were presented to the entire Planning Committee for discussion and comment. All communication with the subcommittees was handled via email and phone conferences.

<p align="center"><b>Figure 5</b>  <b>Lee County Multi-Jurisdictional All Hazards Mitigation</b>  <b>Planning Committee Member Attendance Record</b></p>						
Representing	Name	2/18/2010	4/8/2010	7/15/2010	10/21/2010	2/17/2011
Amboy	Stenzel, Al	X	X	X	X	X
	Therriault, Mike	X	X	X	X	X
American Red Cross	Kersten, Sharon	X				X
	Pattengale, David	X				
Ashton	Hetland, James	X				X
	Martinez, John			X		
Commonwealth Edison	Fox, Jim	X	X	X	X	X
Dixon	Langloss, Danny	X	X			X
	Shipman, Tim	X		X		
	Whalen, Clay			X		
Franklin Grove	Miller, Ron	X	X			
Harmon	Morehead, Barb	X	X	X	X	
	Morehead, Jeff	X	X	X	X	X
	Sheridan, DJ			X		
Hick's Insurance	Hicks, Greg	X	X	X	X	X
Illinois Dept. of Central Management Services	Hoots, Diane	X	X			
Lee/Ogle ROE #47	McMahon, Paul	X	X			
Lee Co. - Assessor's Office	Ryerson, Wendy	X	X	X	X	X
Lee Co. - Board	Nicholson, John	X	X	X		X
Lee Co. - EMA	Lalley, Kevin	X	X	X	X	X
Lee Co. - Health Dept.	Frazier, Mike		X	X	X	X
Lee Co. - Highway Dept.	Anderson, Dave	X	X	X	X	X
Lee Co. - IT/GIS	McBride, Mike	X				
Lee Co. - Zoning	Henkel, Chris	X	X	X	X	X
Lee Co. - Sheriff's Office	Varga, John	X	X	X	X	X
Lee County Farm Bureau	Schielein, Jim		X			
	Shippert, Marilyn	X				
Public Representative	Person, Steven	X		X		X
Steward	Bratko, Jim	X	X	X	X	X
Sublette	Stenzel, John	X	X	X	X	X

***Mission Statement***

Over the course of the first two meetings, the Planning Committee developed a mission statement they felt best described their objectives for the Plan.

*“The mission of the Lee County Multi-Jurisdictional All Hazards Mitigation Planning Committee is to develop a mitigation plan that can reduce the negative impacts of natural and man-made hazards on citizens, infrastructure, private property and critical facilities.”*

### ***Planning Committee Meetings***

The Planning Committee met five times between February 2010 and February 2011. **Figure 5** identifies the representatives present at each meeting. **Appendices B** and **C** contain copies of the sign-in sheets and meeting minutes for each meeting. The purpose of each meeting, including the topics discussed, is provided below.

#### ***First Planning Committee Meeting – February 18, 2010***

The purpose of this meeting was to explain the planning process to the Planning Committee members and give them a brief overview on what an all hazard mitigation plan is and why one should be prepared. Drafts of the mission statement and mitigation goals were presented. Representatives for the County and the participating municipalities were asked to complete the forms entitled “List of Documents Relevant to the All Hazard Mitigation Plan” and “Critical Facilities” and return it at the next meeting. Copies of the citizen questionnaire were also distributed.

#### ***Second Planning Committee Meeting – April 8, 2010***

At the second Planning Committee meeting the natural hazard risk assessment section was presented for review. The Planning Committee continued their discussions on the mission statement and mitigation goals and finalized both. Ideas for potential mitigation projects were presented. Representatives for the County and the participating municipalities were asked to complete the form entitled “Natural Hazard Mitigation Plan Projects” and return it at the next meeting.

#### ***Third Planning Committee Meeting – July 15, 2010***

The purpose of the third Planning Committee meeting was to review the mitigation actions identified by the participating jurisdictions and discuss the mitigation strategy. The mitigation strategy discussion focused on the project prioritization methodology and categories of mitigation actions. Representatives for the County and the participating municipalities were asked to provide information on any critical facilities that have been damaged by a natural hazard event within their jurisdiction and then complete the form entitled “Critical Facilities Hazard Data Collection” and return it at the next meeting.



At the fourth meeting the sections of the Plan focusing on the man-made hazards risk assessment, vulnerability assessment, mitigation strategy and plan maintenance were presented for review. In addition, the mitigation action tables were completed for each participating jurisdiction and distributed for review. The tables listed all of the mitigations actions identified and prioritized them using the approved project prioritization methodology.

#### ***Fourth Planning Committee Meeting – October 21, 2010***

At the fourth meeting the sections of the Plan focusing on the man-made hazards risk assessment, vulnerability assessment, mitigation strategy and plan maintenance were presented for review. In addition, the mitigation action tables were completed for each participating jurisdiction and distributed for review. The tables listed all of the mitigations actions identified and prioritized them using the approved project prioritization methodology.

*Fifth Planning Committee Meeting – February 17, 2011*

The purpose of the fifth Planning Committee meeting was to provide the public an opportunity to provide comments on the draft Plan.

## **2.2 PUBLIC INVOLVEMENT**

To engage the public in the planning process, a comprehensive public involvement strategy was developed. The strategy was structured to engage the public in a two-way dialogue, encouraging the exchange of information throughout the planning process. A mix of public involvement techniques and practices were utilized to:

- disseminate information;
- identify additional useful information about natural hazard occurrences and impacts;
- assure that interested residents would be involved throughout the Plan’s development; and
- nurture ownership of the Plan, thus increasing the likelihood of adoption by the participating jurisdictions.

The dialogue with the public followed proven risk communication principles to help assure clarity and avoid overstating or understating the impacts posed by the natural and man-made hazards identified in the Plan. The following public involvement techniques and practices were applied to give the public an opportunity to access information and participate in the dialogue at their level of interest and availability.

### ***Citizen Questionnaire***

A citizen questionnaire was created to gather facts and gauge public perceptions about natural hazards. The questionnaire was made available at the government offices of participating jurisdictions. A copy of the questionnaire is contained in **Appendix D**.

A total of 34 questionnaires were completed and returned to the Planning Committee. The questionnaires were filled out by residents of unincorporated Lee County as well as all of the participating municipalities. While fewer questionnaires were returned than has been experienced using similar techniques with virtually the same survey in other counties, the responses should provide useful information to decision-makers as they deliberate how best to disseminate information about natural hazards and how residents can protect themselves and their property. Additionally, these results provide an indication of county-wide sentiment as to the types of projects that are more likely to receive public support. A review of the questionnaires indicated the following:

- Severe storms and severe winter storms have been the most frequently encountered natural hazard in Lee County. This response is consistent with weather records compiled for Lee County and described in this Plan.
- Electronic media (radio, television and internet) was identified as the most effective way to disseminate information about natural hazards. Of the electronic media choices, the internet was recognized as the most favored means of dissemination. Fact sheets

distributed via mail and through fire and law enforcement departments also received strong support among respondents.

- Six categories of mitigation projects and activities were felt to be most needed. The categories are identified as follows and include the percentage of support received from respondents.
  - ❖ maintaining power during storms (68%);
  - ❖ maintaining roadway passage (62%);
  - ❖ identifying residents with special needs (62%);
  - ❖ public information materials (62%);
  - ❖ retrofitting critical infrastructure (56%); and
  - ❖ sirens or other alert systems (56%).

The next closest category was culvert and drainage ditch maintenance which received 35% of the correspondence support.

### ***FAQ Fact Sheet***

A “Frequently Asked Questions” fact sheet was created to explain what an all hazard mitigation plan is and briefly explain the planning process. The fact sheet was made available at the government offices of participating jurisdictions. A copy of the fact sheet is contained in **Appendix E**.

### ***News Media***

News releases were prepared and submitted to local print media, radio stations and television stations prior to each Planning Committee meeting. The releases announced the purpose of the meetings and how the public could become involved in the Plan’s development. **Appendix F** contains a listing of the news media outlets that received the news releases and copies of the news articles that were printed. No newspaper articles were printed for the April 8, 2010 or July 15, 2010 committee meetings even though news releases were issued. A copy of the official news release is included in place of newspaper articles for these meetings.

Electronic media coverage included television and radio. WREX Channel 13, the local NBC affiliate, attended the February 18, 2010 Planning Committee meeting and interviewed Kevin Lalley, the Planning Committee Chairman and Lee County Emergency Management Agency Coordinator for their nightly news broadcast. **Appendix F** contains an abbreviated copy of the story that was aired. In addition to providing television coverage, WREX and WIFR Channel 23 posted articles about the planning process on their respective websites. **Appendix F** contains copies of these articles.

Radio coverage of the planning process was provided by WGLC 100.1 FM out of Mendota, Illinois. The station conducted an interview with Kevin Lalley following the October 21, 2010 Planning Committee meeting to talk about the planning process and discuss the mitigation projects and activities submitted by the participating jurisdictions.

Prior to the Public Forum held on February 17, 2011, a news release was issued on two separate occasions, February 4<sup>th</sup> and February 14<sup>th</sup>. The news release invited the public to attend the Forum to review the draft Plan and provide comments. It also announced that the draft Plan would be available on the County's website for review and comments would be accepted through March 4<sup>th</sup> for those who could not attend the Public Forum. While no newspaper articles were printed, three radio stations, WGLC 100.1 FM – Mendota, WIXN 1460 AM – Dixon, and WSDR 1240 AM – Sterling conducted interviews with Kevin Lalley and ran stories on the Public Forum and planning process and provided information to residents about how they could review the draft Plan and provide comments.

### ***Planning Committee Meetings***

All of the meetings conducted by the Planning Committee were open to the public and publicized in advance to encourage public participation. At the end of each meeting, time was set aside for public comment. In addition, Committee members were available throughout the planning process to talk with residents and community officials and were responsible for relaying any concerns and questions voiced by the public to the Planning Committee.

### ***Public Forum***

The final meeting of the Planning Committee, held on February 17, 2011, was conducted as an open-house public forum. The open-house format was chosen for this forum instead of a hearing to provide greater convenience for residents who wished to participate. Residents were able to come and go at any time during the forum, reducing conflicts with school activities. At the forum, residents could review the draft Plan; meet with representatives from the County, the participating municipalities and the Consultant to discuss the Plan; ask any questions; and provide comments on the Plan. Individuals attending the public forum were provided with a two-page handout summarizing the planning process and a comment sheet that could be used to provide feedback on the draft Plan. **Appendices G and H** contain copies of these materials.

### ***Public Comment Period***

After the public forum, the draft Plan was made available for public review and comment at the Lee County Emergency Management Agency's website and office through March 4, 2011. Residents were encouraged to submit their comments electronically, by mail or through representatives of the Planning Committee.

### ***Results of Public Involvement***

The public involvement strategy implemented during the planning process created a dialogue among participants and interested residents which resulted in many benefits, a few of which are highlighted below.

- *Served as a catalyst to improve flood protection.* The dialogue maintained throughout the planning process helped to address National Flood Insurance Program (NFIP) discrepancies identified for the Villages of Ashton and Sublette. While listed as a community in good standing within the NFIP, Sublette was unaware that they were required to adopt a floodplain ordinance. The Village worked to rectify this oversight and passed an ordinance in December 2010. The Village of Ashton had been suspended from the NFIP in 1991, however the planning process provided the momentum to

complete the steps required to renew its participation and become a member in good standing once again on February 22, 2011.

- *Discovered previously unidentified documentation about natural hazards.* Information gaps in the occurrence, severity and damages resulting from severe storms and severe winter storms were partially filled through the efforts of the Planning Committee members and residents. Verifiable information was obtained that helped improve the profiles of both of these hazards.
- *Obtained critical facilities damage information.* Data collection surveys soliciting information about critical facilities damaged by severe storms and other natural hazards were used to supplement information obtained from government files. This information was used in the preparation of the vulnerability assessment.
- *Enhanced understanding of the natural hazard events that impact the County, thus fostering dialogue about mitigation actions needed to reduce the risks to the participating jurisdictions.* Assembling lists of mitigation projects can be a struggle even when examples are provided. Dialogue initiated at the Planning Committee Meetings triggered meaningful discussions within the County and municipalities and between the participating jurisdictions and the Consultant. Through these various discussions, mitigation projects emerged that should receive support within their jurisdictions.
- *Encouraged cooperation among those jurisdictions involved in the planning process.* The planning process encouraged cooperation among participating jurisdictions to accomplish projects and activities that cross governmental boundaries. The realization that cooperation may be needed is best illustrated by the following three examples.
  - ❖ Most of the participating municipalities recognize the need to identify special needs persons. To better overcome hurdles in assembling this data and to make it more inclusive, a county-wide effort spearheaded through the joint efforts of the Lee County Emergency Management Agency and the Public Health Department with help from the participating municipalities may be needed.
  - ❖ When man-made hazards were discussed during the planning process, concerns were expressed regarding whether Lee County was prepared to accommodate a population surge resulting from a major incident in the Chicago Metropolitan area. As a result of this discussion, the development of workshops for Lee County participants as well as a regional workshop to include Cook and the collar counties is being considered.
  - ❖ The Village of Steward is exploring a project with a municipality in an adjacent county to protect its residents from drought. A model Memorandum of Agreement used when two municipalities faced a similar problem in western Illinois was provided to Steward to help as it proceeds with these discussions.

### **2.3 PARTICIPATION OPPORTUNITIES FOR INTERESTED PARTIES**

Neighboring communities, agencies, businesses, academia, not-for-profits and other interested parties were given several opportunities to participate in the planning process. Examples include: sending out letters to adjacent counties informing them of Lee County's intention to

prepare a natural hazard mitigation plan and extending an invitation to attend Planning Committee meetings (see **Appendix I** for a copy of the letter); directly inviting communities, agencies, businesses, and others to serve on the Planning Committee; and through the many public involvement activities listed previously.

To improve participation among the business community, a two-pronged approach was taken. First, representatives from those segments of the business community who have the most interest in natural hazard mitigation were invited to serve on the Planning Committee. With agriculture being the predominant business in Lee County as well as touching every aspect of life and defining the character and heritage of the area, it was important to include the agricultural community in the planning process. The obvious choice to represent this segment was the Lee County Farm Bureau. The Lee County Farm Bureau representative had extensive experience and connections with the various sub-segments of agriculture. Mr. Schielein was able to provide difficult to obtain information about property damages that was useful in preparing the vulnerability assessment.

Input from the insurance industry was also needed to provide balance and context for discussion regarding property damages, not only to agriculture, but also to other segments of the business community as well as residential property damages. A local insurance agent, who also served on the County Planning Commission, represented the insurance industry and provided the necessary balance needed when discussing property damages. Mr. Hicks was also able to provide storm damage photographs used in the Plan.

Individual contact with some of the largest employers in Lee County was the second method used to obtain input. Information was solicited about past and current storm damage concerns. These employers included Katherine Shaw Bethea Hospital, Dixon Correctional Center, Jack Mabley Developmental Center, and Wood Haven Lakes Realty, Incorporated.

## **2.4 INCORPORATING EXISTING PLANNING DOCUMENTS**

As part of the planning process, each participating jurisdiction was asked to identify and provide existing documents (plans, studies, reports and technical information) relevant to the Plan. **Figure 6** summarizes the availability of existing planning documents by participating jurisdiction. These documents were reviewed and incorporated into the Plan whenever applicable.

<b>Figure 6 Existing Planning Documents by Participating Jurisdiction</b>								
Existing Planning Documents	Participating Jurisdiction							
	Amboy	Ashton	Dixon	Franklin Grove	Harmon	Lee County	Steward	Sublette
<b>Plans</b>								
Comprehensive Plan	X		X			X	X	X
Emergency Management Plan	X		X			X	X	X
Land Use Plan	X	X					X	
<b>Codes &amp; Ordinances</b>								
Building Codes	X	X	X				X	
Drainage Ordinances	X	X				X	X	X
Historic Preservation Ordinance	X		X					
Subdivision Ordinance(s)	X	X	X			X	X	
Zoning Ordinances	X	X	X	X		X	X	
<b>Maps</b>								
Existing Land Use Map	X	X	X			X	X	X
Infrastructure Map	X	X	X	X	X		X	X
Zoning Map	X	X	X			X	X	
<b>Flood-Related</b>								
Flood Ordinance(s)	X	X	X			X	X	X
Flood Insurance Rate Maps	X	X	X	X	X	X	X	X
Repetitive Flood Loss List						X		
Elevation Certificates for Buildings			X			X		



## **3.0 RISK ASSESSMENT**

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### 3.0 RISK ASSESSMENT

Risk assessment is the process of evaluating the vulnerability of people, buildings and infrastructure to natural and man-made hazards in order to estimate the potential loss of life, personal injury, economic injury and property damage resulting from natural and man-made hazards. This section summarizes the results of the risk assessment conducted on the natural and man-made hazards that pose a threat to Lee County. The information contained in this section was gathered by evaluating local, state and federal records from the last 60 years.

This risk assessment identifies the natural and man-made hazards that pose a threat to the County and includes a profile of each which describes the location and severity of past occurrences, reported damages to public health and property, and the likelihood of future occurrences. It also provides a vulnerability assessment that evaluates the assets of the participating jurisdictions (i.e., residential buildings, critical facilities and infrastructure) and estimates the potential impacts each natural and man-made hazard would have on the health and safety of the residents of Lee County as well as the buildings, critical facilities and infrastructure located within the County. Where applicable, the differences in vulnerability between participating jurisdictions are described.

One of the responsibilities of the Planning Committee was to decide which natural and man-made hazards to include in the Plan. Over the course of the first three Planning Committee meetings, the Planning Committee members discussed their experiences with natural and man-made hazard events and reviewed information about various natural hazards. After much discussion, they chose to include the following natural and man-made hazards in this Plan:

- ❖ severe storms (thunderstorms, hail, lighting & heavy rain)
- ❖ severe winter storms (snow, ice & extreme cold)
- ❖ tornadoes
- ❖ flood
- ❖ drought
- ❖ extreme heat
- ❖ earthquakes
- ❖ dam failures
- ❖ man-made hazards including:
  - hazardous substances (transportation & disposal)
  - hazardous material incidents
  - nuclear accidents
  - terrorism

The subsequent sections provide detailed information on each of the selected natural and man-made hazards. The sections are color coded and ordered by the frequency with which the natural hazard has previously occurred within the County, starting with severe storms. Each natural hazard section contains three subsections: identifying the hazard, profiling the hazard and assessing vulnerability.

**3.1 SEVERE STORMS (THUNDERSTORMS, HAIL, LIGHTNING & HEAVY RAIN)**

**IDENTIFYING THE HAZARD**

**What is the definition of a severe storm?**

The National Weather Service (NWS) defines a “severe storm” as any thunderstorm that produces one or more of the following elements:

- winds with gust of 50 knots (58 mph) or greater;
- hail that is at least one inch in diameter (quarter size) or larger; and/or
- a tornado.

While severe storms are capable of producing deadly lightning and excessive rainfall that may lead to flash flooding, the NWS does not use either to define a severe storm. For the purposes of this report, tornadoes and flooding are categorized as separate hazards and are not discussed under severe storms.

Thunderstorms affect relatively small areas when compared to winter storms or hurricanes. The typical thunderstorm is approximately 15 miles in diameter and lasts an average of 30 minutes at a single location. They may occur singly, in clusters or in lines. Despite their size, all thunderstorms are dangerous and capable of threatening life and property. Thunderstorms can bring heavy rain, damaging winds, hail, lightning and tornadoes. Of the estimated 100,000 thunderstorms that occur each year in the United States, roughly 10% are classified as severe.

**What kinds of damaging winds are produced by a thunderstorm?**

Aside from tornadoes, thunderstorms can produce straight-line winds. A straight-line wind is a term used to define any wind produced by a thunderstorm that is not associated with rotation. Straight-line winds are responsible for most thunderstorm wind damage. There are several types of straight-line winds including downdrafts, downbursts and microbursts. Straight-line wind speeds can exceed 87 knots (100 mph) and can cause damage equivalent to a strong tornado. These winds can also be extremely dangerous for aircrafts.

The NWS measures a storm’s wind speed in knots or nautical miles. A wind speed of one knot is equal to approximately 1.15 miles per hour. **Figure 7** shows conversions from knots to miles per hour for various wind speeds.

<b>Figure 7 Wind Speed Conversions</b>			
<b>Knots (kts)</b>	<b>Miles Per Hour (mph)</b>	<b>Knots (kts)</b>	<b>Miles Per Hour (mph)</b>
50 kts	58 mph	60 kts	69 mph
52 kts	60 mph	65 kts	75 mph
55 kts	63 mph	70 kts	81 mph
58 kts	67 mph	80 kts	92 mph

**What is hail and how is it formed?**

Hail is precipitation in the form of spherical or irregular-shaped pellets of ice. It forms within a thunderstorm when strong rising currents of air (updrafts) carry raindrops into extremely cold areas of the atmosphere where freezing occurs. As the hail grows in size they become heavier and begin to fall. Depending on the strength of the updraft, the hail may be caught up and re-circulated through the storm clouds many times. Eventually the hail becomes too heavy to be supported by the thunderstorm’s updrafts and falls to the ground. The size of an individual hailstone depends on how many times it is drawn back up into the upper levels of the storm cloud before finally falling to the ground.

In the United States, hail annually causes more than \$1 billion in damage to property and crops. It damages buildings and homes by perforating holes in roofs and shingles, breaking windows and denting siding and damages automobiles by denting panels and breaking windows. Hail rarely causes any deaths; however, several dozen people are injured each year in the United States.

**How are hail events measured?**

The magnitude or severity of a hail event is measured in terms of the size (diameter) of the hailstones. The hail size is estimated by comparing it to known objects. **Figure 8** provides descriptions for various hail sizes.

<p style="text-align: center;"><b>Figure 8</b> <b>Hail Size Descriptions</b></p>			
Hail Diameter (inches)	Description	Hail Diameter (inches)	Description
0.25 in.	pea	1.75 in.	golf ball
0.50 in.	marble	2.50 in.	tennis ball
0.75 in.	penny	2.75 in.	baseball
0.88 in.	nickel	3.00 in.	tea cup
1.00 in.	quarter	4.00 in.	grapefruit
1.50 in.	ping pong ball	4.50 in.	softball

Source: NOAA, Storm Prediction Center, Converting Traditional Hail Size Descriptions Table.

Hail size can vary widely. Hailstones may be as small as ¼ inch in diameter (pea-sized) or, under extreme circumstances, as large as 4 ½ inches in diameter (softball-sized). Typically hail that is 1 inch in diameter (quarter size) or larger is considered severe.

Hail events can also be measured or rated using the TORRO Hailstorm Intensity Scale. This scale was developed in 1986 by the Tornado and Storm Research Organisation of the United Kingdom. It measures the intensity or damage potential of a hail event based on several factors including: maximum hailstone size, distribution, shape and texture, numbers, fall speed and strength of the accompanying winds. The Hailstorm Intensity Scale identifies ten different categories of hail intensity, H0 through H10. **Figure 9** gives a brief description of each category.

This scale is unique because it recognizes that, while the maximum hailstone size is the most important parameter relating to structural damage, size alone is insufficient to accurately categorize the intensity and damage potential of a hail event.

<b>Figure 9 TORRO Hailstorm Intensity Scale</b>					
Intensity Category		Typical Hail Diameter		Description	Typical Damage Impacts
		millimeters (approx.)*	inches (approx.)*		
H0	Hard Hail	5 mm	0.2"	pea	no damage
H1	Potentially Damaging	5-15 mm	0.2" – 0.6"	pea / marble	slight general damage to plants, crops
H2	Significant	10-20 mm	0.4" – 0.8"	dime / penny	significant damage to fruit, crops, vegetation
H3	Severe	20-30 mm	0.8" – 1.2"	nickel / quarter	severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-40 mm	1.0" – 1.6"	half dollar / ping pong ball	widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50 mm	1.2" – 2.0"	golf ball	wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60 mm	1.6" – 2.4"	golf ball / egg	bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50-75 mm	2.0" – 3.0"	egg / tennis ball	severe roof damage, risk of serious injuries
H8	Destructive	60-90 mm	2.4" – 3.5"	tennis ball / tea cup	severe damage to aircraft bodywork
H9	Super Hailstorms	75-100 mm	3.0" – 4.0"	tea cup / grapefruit	extensive structural damage, risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	> 100 mm	> 4.0"	softball	extensive structural damage, risk of severe or even fatal injuries to persons caught in the open

\* Approximate range since other factors (i.e., number and density of hailstones, hail fall speed and surface wind speed) affect severity.

Source: Tornado and Storm Research Organisation, TORRO Hailstorm Intensity Scale Table.

It should be noted that the typical damage impacts associated with each intensity category reflect the building materials predominately used in the United Kingdom. These descriptions may need to be modified for use in other countries to take into account the differences in building materials typically used (i.e., whether roofing materials are predominately shingle, slate or concrete, etc.).

### What is lightning?

Lightning, a component of all thunderstorms, is an electrical discharge that results from the buildup of charged ions. It can occur from cloud-to-ground, cloud-to-cloud, within a cloud or cloud-to-air. The air near a lightning strike is heated to 50,000°F (hotter than the surface of the sun). The rapid heating and cooling of the air near the lightning strike causes a shock wave that produces thunder.

Lightning on average causes 80 fatalities and 300 injuries annually in the United States. Most fatalities and injuries occur when people are caught outdoors in the summer months. In addition, lightning can cause structure and forest fires. Many of the wildfires in the western United States and Alaska are started by lightning. While it is difficult to quantify lightning-related losses, NOAA's National Severe Storms Laboratory estimates that lightning causes \$4 to \$5 billion in damages each year.

#### Are alerts issued for severe storms?

Yes. The National Weather Service Weather Forecast Office in Chicago, Illinois is responsible for issuing severe thunderstorm watches or warnings for Lee County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Severe Thunderstorm Watch.** A severe thunderstorm watch is issued when conditions are favorable for a severe thunderstorm to develop in the next several hours. The watch will tell individuals when and where a severe thunderstorm is likely to occur.
- **Severe Thunderstorm Warning.** A severe thunderstorm warning is issued when severe weather (hail 1 inch in diameter or greater and/or winds which equal or exceed 58 mph) has been reported by spotters or indicated by radar. Warnings indicate imminent danger to life and property for those who are in the path of the storm.

### PROFILING THE HAZARD

#### When have severe storms occurred previously? What is the extent of these previous severe storms?

Tables 1, 2, 3 and 4 summarize the previous occurrences as well as the extent or magnitude of severe storms in Lee County. The severe storm events are separated into four categories: thunderstorm and high wind events, hail events, lightning events and heavy rain events. Severe storms are the most frequently occurring natural hazard in Lee County.

#### THUNDERSTORMS AND HIGH WINDS

The National Oceanic and Atmospheric Administration's Storm Events Database records show 107 reported occurrences of thunderstorms and high winds in Lee County between 1956 and 2009. Of the 107 reported occurrences, 76 had wind speeds of 50 knots or greater. There were, however, 28 reported occurrences of thunderstorms and high winds where the wind speed was not recorded.

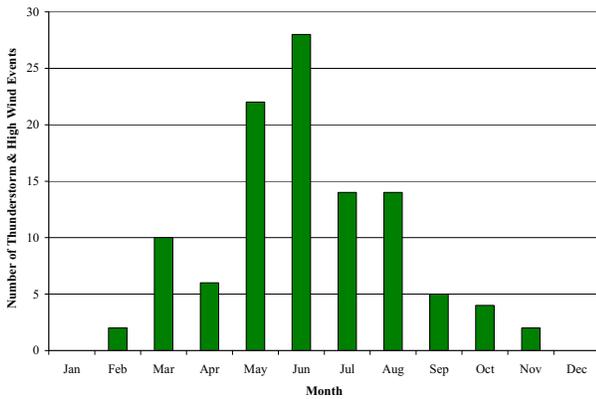
Thunderstorms with high winds have impacted every municipality within the County on multiple occasions. **Figures 10 and 11** chart the reported occurrences of thunderstorm and high wind events by month and hour. Of the 107 events, 78 took place between May and August, making this the peak period for thunderstorms and high winds in Lee County. Approximately 75% of all thunderstorm and high wind events occurred during the p.m. hours, with 64 events taking place between 2 p.m. and 9 p.m.



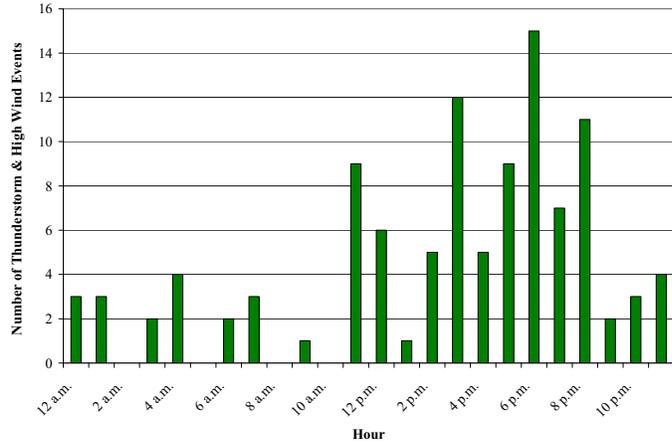
Damage sustained to a garage in Dixon during a thunderstorm event accompanied by high winds.

*Photo provided by Hicks Insurance Agency & Assoc., Inc.*

**Figure 10**  
Lee County Thunderstorm & High Wind Events by Month – 1956 through 2009



**Figure 11**  
Lee County Thunderstorm & High Wind Events by Hour – 1956 through 2009



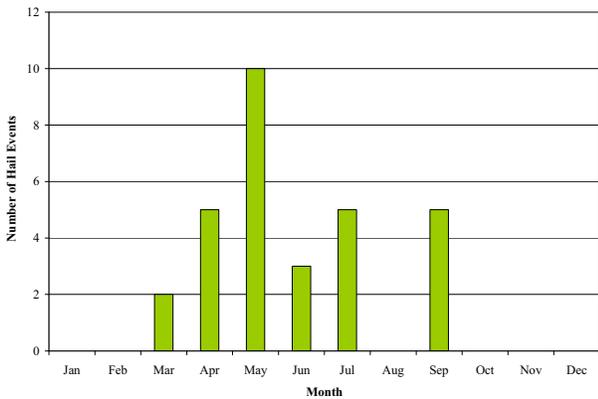
NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

**HAIL**

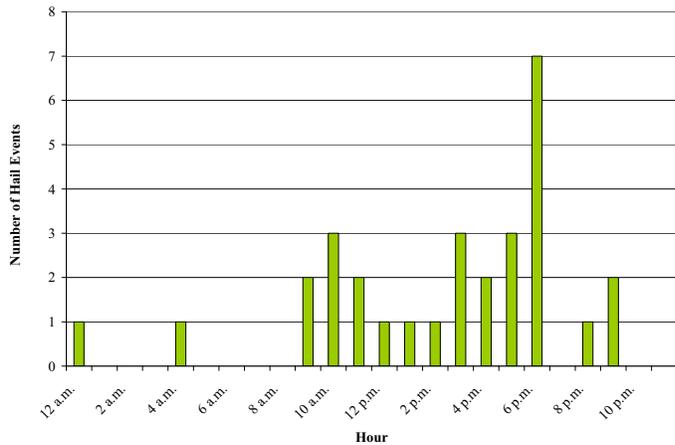
The Storm Events Database records show 30 reported occurrences of hail one inch in diameter or greater in Lee County between 1958 and 2009. Of the 30 reported occurrences, 14 produced hailstones 1.50 inches or larger in diameter. The largest hail recorded in Lee County measured 4.00 inches in diameter (grapefruit size) and fell on July 13, 2004 in Sublette.

Figures 12 and 13 chart the reported occurrences of hail by month and hour. Fifteen of the 30 events took place between April and May, making this the peak period for hail events in Lee County. Approximately 70% of all hail events occurred during the p.m. hours, with 15 events taking place between 3 p.m. and 7 p.m.

**Figure 12**  
Lee County Hail Events by Month 1958 through 2009



**Figure 13**  
Lee County Hail Events by Hour 1958 through 2009



NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

### **LIGHTNING**

The Storm Events Database and community records show eight reported occurrences of lightning strikes in Lee County between 2000 and 2009. Property damage was sustained during seven of the eight events.

### **HEAVY RAIN**

The Storm Events Database records show one reported occurrence of heavy rain in Lee County in 2009. Approximately two inches of rain fell on August 26<sup>th</sup>, 2009, however, no flooding was reported as a result of this event.

#### **What locations are affected by severe storms?**

Severe storms affect the entire County. A single severe storm event will generally extend across the entire County and affect multiple locations. The *2010 Illinois Natural Hazard Mitigation Plan* prepared by the Illinois Emergency Management Agency (IEMA) classifies Lee County's hazard rating for severe storms as "severe." (IEMA's hazard rating system has five levels: low, guarded, elevated, high and severe.)

#### **What is the probability of future severe storm events occurring?**

Lee County has had 107 verified occurrences of thunderstorms and high wind events between 1956 and 2009. With 107 occurrences over the past 54 years, Lee County should expect to experience at least two thunderstorm and high wind events each year. There were 13 years over the last 54 years where multiple (three or more) thunderstorm and high wind events occurred. This indicates that the probability that multiple thunderstorm and high wind events may occur during any given year within Lee County is 24%.

There have been 30 verified occurrences of hail between 1958 and 2009. With 30 occurrences over the past 52 years, the probability or likelihood of a hail event occurring somewhere in Lee County in any give year is 58%. There were seven years over the last 52 years where two or more hail events occurred. This indicates that the probability that more than one hail event may occur during any given year within the County is 13%.

## **ASSESSING VULNERABILITY**

#### **Are the participating jurisdictions vulnerable to severe storms?**

Yes. All of Lee County is vulnerable to the dangers presented by severe storms due to the topography of the region and its location in relation to the movement of weather fronts across northwestern Illinois. Since 2000, Lee County has experienced 56 thunderstorm and high wind events, 16 hail events, eight lightning strike events and one heavy rain event.

Of the participating municipalities, Amboy and Dixon have had substantially more recorded occurrences of thunderstorm and high wind events than any of the other municipalities while Dixon has



*Damage sustained to a tree in Dixon from a thunderstorm event accompanied by high winds.*

*Photo provided by Hicks Insurance Agency & Assoc., Inc.*

had the greatest number of recorded hail events. The difference in the number of events recorded may be due to the fact that these two municipalities are the largest in the County; thus, resulting in more storm reports. **Figure 14** details the number of thunderstorm and high wind events and hail events by participating municipality.

<b>Figure 14                      Verified Thunderstorm &amp; High Wind Events and                      Hail Events by Participating Municipality</b>		
<b>Participating Municipality</b>	<b>Number of Verified Thunderstorm &amp; High Wind Events</b>	<b>Number of Verified Hail Events</b>
Amboy	25	4
Ashton	5	1
Dixon	33	12
Franklin Grove	4	1
Harmon	7	4
Steward	10	1
Sublette	3	1

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

**What impacts resulted from the recorded severe storms?**

Severe storms as a whole have caused an estimated \$657,650 in crop damage and \$2,539,511 in property damages and resulted in one injury. The following provides a breakdown of impacts by category.

While severe summer storms frequently occur in Lee County, the number of injuries and deaths is relatively low. The hospital in Dixon, as well as the hospital in nearby Rochelle (Ogle County), is equipped to provide continuous care to those injured during a severe storm. Consequently, the risk or vulnerability to public health and safety from severe storms is low.

**THUNDERSTORMS AND HIGH WINDS**

The data provided by the Storm Events Database indicates that between 1956 and 2009, 12 thunderstorm & high wind events caused approximately \$220,000 in property damage. It should be noted, however, that the property damage total of \$75,000 for the high wind event on October 25, 2001 represents losses sustained by eight counties (including Lee County). A breakdown by county of this total was not available. Damage information was either unavailable or none was recorded for the remaining 86 reported occurrences.

In addition to the property damages reported by the Storm Events Database, local insurance experts believe that an additional \$2,219,400 in property damages can be attributed to thunderstorm, high wind and hail events in Lee County. These additional property damages represent the estimated insurance industry high wind/hail losses based on actual losses incurred by COUNTRY Financial between 2005 and 2009. It is estimated that vehicles sustained \$243,900 in damages while homes and businesses sustained \$1,975,500 in damages. These

estimates are not included in **Tables 1** and **2** because they represent a cumulative estimate that was not attributable to specific locations. This information indicates that the total property damage figure for thunderstorm and high wind events is closer to \$2,439,400.

The Storm Events Database has only one recorded report of an injury resulting from a thunderstorm and high wind event. On June 12, 2001 a construction trailer was blown over during a thunderstorm injuring a man inside.

### **HAIL**

Damage information was either unavailable or none was recorded for any of the reported hail events. Local insurance experts believe that \$657,650 in crop damages can be attributed to hail in Lee County. These crop damages represent actual losses incurred by COUNTRY Financial between 2005 and 2009. These crop damages are not included in **Table 2** because they represent a cumulative estimate that was not attributable to specific locations. This information indicates that the total crop damage figure for hail events is closer to \$657,650.

As mentioned previously, an additional \$2,219,400 in property damages can be attributed to thunderstorm, high wind and hail events in Lee County. These additional property damages represent the estimated industry high wind/hail losses based on actual losses incurred by COUNTRY Financial between 2005 and 2009. These estimates are not included in the event tables because they represent a cumulative estimate that was not attributable to specific locations.

No injuries or deaths were reported as the result of any of the hail events.

### **LIGHTNING**

The data provided by the Storm Events Database and community records indicates that between 2000 and 2009, seven lightning events caused approximately \$100,111 in property damage. The Storm Events Database indicates that \$5,000 in damages was sustained to a utility pole and power lines on August 10, 2006. Damage estimates for the other six lightning events were provided by Planning Committee members. Committee members were asked to provide property damage estimates for any critical facilities damaged by lightning within their jurisdictions. The Lee County 911 Center in Dixon sustained lightning damage on four separate occasions: September 22, 2000, May 14, 2004, February 2, 2008 and December 16, 2009. Damages for all four events totaled \$72,911. The City of Amboy sustained lightning damage to their water treatment facility on January 12, 2005 and May 13, 2009. Damages for both events totaled \$22,200.

No injuries or deaths were reported as a result of any of the lightning strike events.

### **HEAVY RAIN**

Damage information was either unavailable or none was recorded for the heavy rain event that started on August 26, 2009. In addition, no injuries or deaths were reported as a result of this event.

**What other impacts can result from severe storms?**

While only one injury was reported by the Storm Events Database for the severe storm events in Lee County, severe storms do have the ability to impact health and safety. Severe storms have caused multiple injuries and deaths elsewhere in Illinois.

In Lee County, vehicle accidents are the largest risk to health and safety from severe storms. Hazardous driving conditions resulting from severe storms (i.e., wet pavement, poor visibility, high winds, etc.) can contribute to accidents that result in injury and death. Traffic accident data assembled by the Illinois Department of Transportation between 2004 and 2008 indicates that wet road surface conditions were present for 10.3% to 13.5% of all crashes recorded annually in Lee County. While other circumstances cause wet road surface conditions (i.e., melting snow, condensation, light showers, etc.), law enforcement officials agree that hazardous driving conditions caused by severe storms add to the number of crashes. **Figure 15** provides a breakdown by year of the number of crashes and corresponding injuries and deaths that occurred when treacherous road conditions caused by wet road surface conditions were present as well as the total number of crashes that occurred in the County for comparison.

<b>Figure 15 Severe Weather Crash Data for Lee County</b>				
<b>Year</b>	<b>Total # of Crashes</b>	<b>Presence of Wet Road Surface Conditions</b>		
		<b># of Crashes</b>	<b># of Injuries</b>	<b># of Deaths</b>
2004	1,194	145	45	2
2005	1,214	125	38	1
2006	1,081	146	49	2
2007	1,161	136	41	0
2008	1,200	124	29	1

Source: Illinois Department of Transportation, Illinois Crash Data, County Crash Summaries, Lee County, 2004-2008.

Severe storms are unique in that they can pose several different health and safety hazards during a single event. Individuals who are outdoors during a severe storm are at risk of being struck by lightning, hit by flying debris and hailstones and if the conditions are just right, caught in flash flooding.

**Are existing buildings, infrastructure and critical facilities vulnerable to severe storms?**

Yes. All existing buildings, infrastructure and critical facilities located in Lee County and the participating jurisdictions are vulnerable to damage from severe storms. Structural damage to buildings is a relatively common occurrence with severe storms. Damage to roofs, siding, awnings and windows can occur from hail, flying and falling debris and high winds. Lightning strikes can damage electrical components and equipment (i.e., appliances, computers etc.) and can cause fires that consume buildings. If the roof is compromised or windows are broken, rain can cause additional damage to the structure and contents of a building.

Infrastructure and critical facilities tend to be just as vulnerable to severe storm damage as buildings. The infrastructure and critical facilities that are the most vulnerable to severe storms are related to power distribution and communications. High winds, lightning and flying and

falling debris have the potential to cause damage to communication and power lines; power substations, transformers and poles; and communication antennas and towers.

The damage inflicted by severe storms often leads to disruptions in communication and creates power outages. Depending on the damage, it can take anywhere from several hours to several days to restore service. Power outages and disruptions in communications can impair vital services, particularly when backup power generators are not available. Most of the participating jurisdictions acknowledged the need for emergency backup generators to allow continued operation of critical facilities such as emergency shelters, drinking water facilities and towers, lift stations, and communication towers.

In addition to affecting power distribution and communications, debris and flooding from severe storms can block state and local roads hampering travel. When transportation is disrupted, emergency and medical services are delayed, rescue efforts are hindered and government services can be affected.

Based on the frequency with which severe storms occur in Lee County, the amount of property damage previously reported and the potential for disruptions to power distribution and communication; the risk or vulnerability to buildings, infrastructure and critical facilities from severe storms is medium to high.

**Are future buildings, infrastructure and critical facilities vulnerable to severe storms?**

Yes. While four of the participating municipalities have building codes in place that will likely help lessen the vulnerability of new buildings and critical facilities to damage from severe storms, the County and several other municipalities do not. Infrastructure such as new communication and power lines also will continue to be vulnerable to severe storms. High winds, lightning and flying and falling debris can disrupt power and communication. Steps to bury all new lines would eliminate the vulnerability, but this action would be cost prohibitive in most areas. There is very little that can be done to totally eliminate the vulnerability of new critical facilities.

**What are the potential dollar losses to vulnerable structures from severe storms?**

Unlike other hazards, such as flooding, there are no standard loss estimation models or methodologies for severe storms. With only 19 of the 146 recorded events listing property damage numbers for severe storms, there is no way to accurately estimate future potential dollar losses. Since all structures within Lee County are vulnerable to damage it is likely that there will be future dollar losses to severe storms.

## 3.2 SEVERE WINTER STORMS (SNOW, ICE & EXTREME COLD)

### IDENTIFYING THE HAZARD

#### What is the definition of a severe winter storm?

A severe winter storm can range from moderate snow over a few hours to blizzard conditions with blinding wind-driven snow, sleet and/or ice and extreme cold that lasts several days. The amount and extent of snow or ice, air temperature, wind speed and event duration all influence the severity and type of severe winter storm that results. In general there are three types of severe winter storms. The following provides a brief description of each type.

- **Blizzards.** Blizzards are characterized by low temperatures and strong winds of at least 35 miles per hour. In addition to extreme temperatures and life-threatening wind chills, a blizzard is also characterized by falling or blowing snow that reduces visibility to ¼ mile or less for at least three hours. They are by far the most dangerous of all winter storms.
- **Heavy Snow Storms.** A heavy snow storm is any winter storm that produces six inches or more of snow within a 48 hour period or less.
- **Ice Storms.** Ice storms occur when precipitation (i.e., freezing rain, sleet, etc.) falls to the ground and freezes immediately on impact. Generally in Illinois an ice storm is considered severe if there is an accumulation of ¼ inch or more of freezing rain or ½ inch or more of sleet.

While severe winter storms are often accompanied by extreme cold (i.e., low temperatures and wind chills), the National Weather Service does not use it to implicitly define a severe winter storm. However, for the purposes of this report, extreme cold is discussed under severe winter storms since it has the ability to cause property damage, injuries and even death (whether or not it is accompanied by freezing rain, sleet or snow).

#### What is snow and how is it formed?

Snow is precipitation in the form of ice crystals. These ice crystals are formed directly from the freezing of water vapor in wintertime clouds. As the ice crystals fall toward the ground, they cling to each other creating snowflakes. Snow will only fall if the temperature remains at or below 32°F from the cloud base to the ground.

#### What is sleet and how is it formed?

Sleet is precipitation in the form of ice pellets. These ice pellets are composed of frozen or partially frozen rain drops or refrozen partially melted snowflakes. Sleet typically forms in winter storms when snowflakes partially melt while falling through a thin layer of warm air that is wedged between two masses of colder air. The partially melted snowflakes then refreeze and form ice pellets as they fall through the colder air mass closer to the ground. Sleet usually bounces after hitting the ground or other hard surfaces and does not stick to objects.

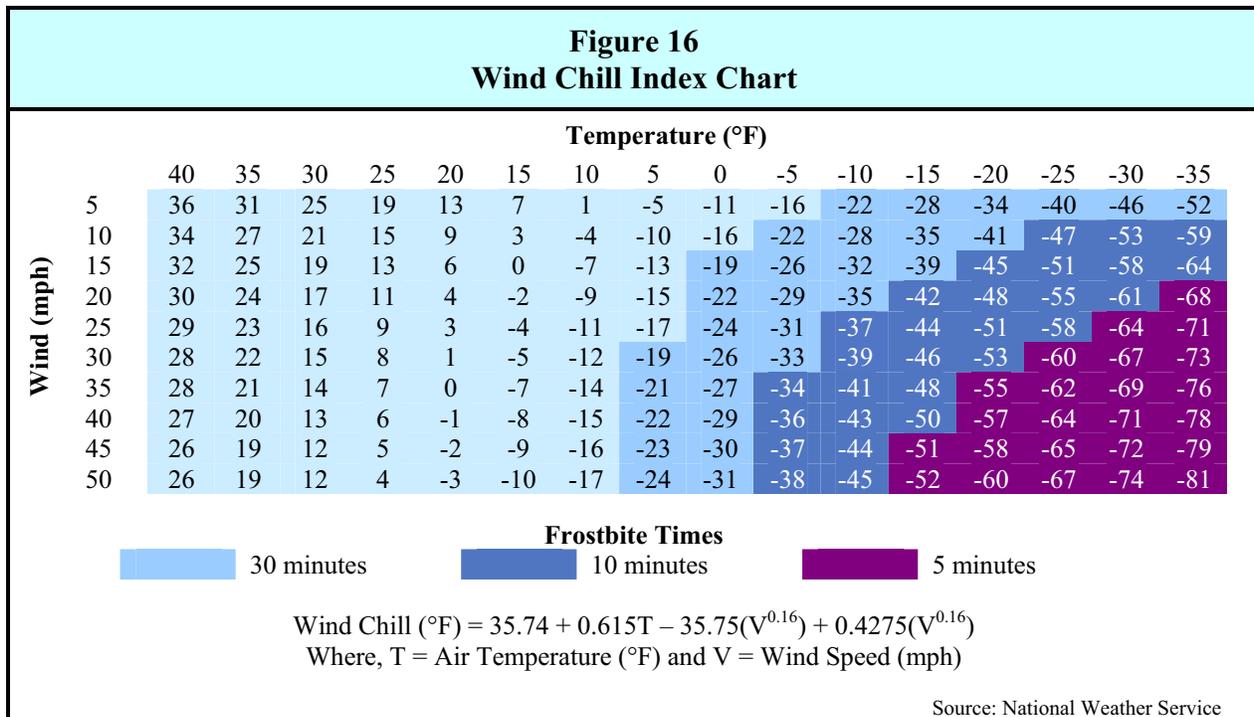
#### What is freezing rain and how is it formed?

Freezing rain is precipitation that falls in the form of rain, but freezes into a glaze upon contact with the ground or other hard surfaces. The rain is formed when snowflakes completely melt while falling through a layer of warmer air situated between two masses of colder air. The rain

drops do not have time to refreeze before they reach the ground because the layer of cold air just above the surface is thin. The rain drops do become supercooled as they pass through this layer of colder air and instantly refreeze upon contact with anything that is at or below 32°F (i.e., the ground, trees, power lines, etc.).

**What is the Wind Chill Index?**

The Wind Chill Index is a measure of the rate of heat loss from exposed skin caused by the combined effects of wind and cold. As the wind increases, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature. Exposures to extreme wind chills can be life threatening. **Figure 16** shows the Wind Chill Index as it corresponds to various temperatures and wind speeds. As an example, if the air temperature is 5°F and the wind speed is 10 miles per hour, then the wind chill would be -10°F. As wind chills edge toward -19°F and below, there is an increased likelihood that continued exposure will lead to individuals developing cold-related illnesses.



**What cold-related illnesses are associated with severe winter storms?**

Frostbite and hypothermia are both cold-related illnesses that result when individuals are exposed to extreme temperatures and wind chills, in many cases, as a result of severe winter storms. The following describes the symptoms associated with each.

- **Frostbite.** During exposure to extremely cold weather the body reduces circulation to the extremities (i.e., feet, hands, nose, cheeks, ears, etc.) in order to maintain its core temperature. If the extremities are exposed, then this reduction in circulation coupled with the cold temperatures can cause the tissue to freeze. Frostbite is characterized by a loss of feeling and a white or pale appearance. At a wind chill of -19°F, exposed skin can

freeze in as little as 30 minutes. Seek medical attention immediately if frostbite is suspected. It can permanently damage tissue and in severe cases can lead to amputation.

- **Hypothermia.** Hypothermia occurs when the body begins to lose heat faster than it can produce it. As a result, the body's temperature begins to fall. If an individual's body temperature falls below 95°F, then hypothermia has set in and immediate medical attention should be sought. Hypothermia is characterized by uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness and exhaustion. Left untreated, hypothermia will lead to death. Hypothermia occurs most commonly at very cold temperatures, but can occur at cool temperatures (above 40°F) if an individual isn't properly clothed or becomes chilled.

#### **Are alerts issued for severe winter storms?**

Yes. The National Weather Service Weather Forecast Office in Chicago, Illinois is responsible for issuing winter storm watches and warnings for Lee County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Winter Storm Watch.** A winter storm watch is issued when severe winter conditions, such as heavy snow, blizzard conditions or significant accumulations of freezing rain or sleet, may affect the area within the next 12 to 36 hours.
- **Advisories.** Winter advisories are issued for lesser winter weather events that may cause significant inconvenience, but do not pose an immediate threat to life and/or property. The following advisories will be issued when an event is occurring, is imminent or is likely to occur.
  - ❖ **Snow Advisory.** A snow advisory is issued for an average snow fall of 3 to 5 inches.
  - ❖ **Freezing Rain Advisory.** A freezing rain advisory is issued when light freezing rain or freezing drizzle will produce less than ¼ inch of ice accumulation.
  - ❖ **Sleet Advisory.** A sleet advisory is issued when sleet accumulation are expected to be less than ½ inch.
  - ❖ **Blowing Snow Advisory.** A blowing snow advisory is issued when sustained winds or frequent gust of 25 to 35 mph are accompanied by falling and blowing snow, occasionally reducing visibility to ¼ mile or less.
  - ❖ **Winter Weather Advisory.** A winter weather advisory is issued when a combination of two or more of the following events are occurring, imminent or likely: snow, freezing rain or drizzle, sleet or blowing snow.
  - ❖ **Wind Chill Advisory.** A wind chill advisory is issued when the wind chill values are expected to be between -20°F and -30°F.
- **Warnings.** Winter weather warnings are issued for events that pose a threat to life and/or property. The following warnings will be issued when an event is occurring, is imminent, or is likely to occur.
  - ❖ **Blizzard Warning.** A blizzard warning is issued when sustained winds or frequent gusts greater than or equal to 35 mph are accompanied by considerable falling and/or blowing snow that frequently reduces visibility to less than ¼ mile for three hours or more. There are no temperature criterion, however, freezing temperatures and 35 mph winds will create sub-zero wind chills.

- ❖ **Heavy Snow Warning.** A heavy snow warning is issued when six inches or more of snow is expected to fall within 12 hours or less or when eight inches or more is expected to fall within 24 hours or less.
- ❖ **Ice Storm Warning.** An ice storm warning is issued when freezing rain is expected to produce ¼ inch or more of ice accumulation.
- ❖ **Heavy Sleet Warning.** A heavy sleet warning is issued when sleet accumulations are expected to be ½ inches or more.
- ❖ **Winter Storm Warning.** A winter storm warning is issued when a combination of two or more of the following events are occurring, imminent or likely: heavy snow, freezing rain, sleet and/or strong winds.
- ❖ **Wind Chill Warning.** A wind chill warning is issued when wind chill values are expected to be -30°F or below.

If an event is expected to produce only one type of precipitation, say snow, then the warning or advisory will be specific: Heavy Snow Warning or Snow Advisory. If a mixture of precipitation types is expected, say snow and sleet, then the generic Winter Storm Warning or Winter Weather Advisory will be used.

## PROFILING THE HAZARD

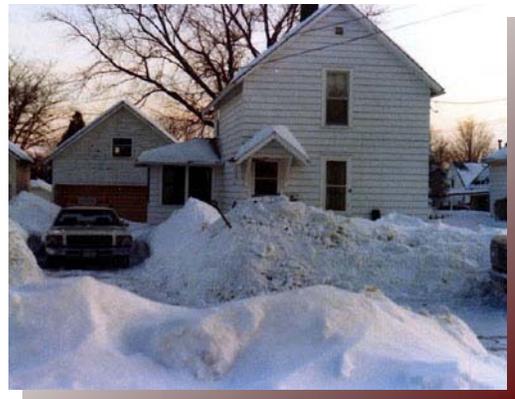
**When have severe winter storms occurred previously? What is the extent of these previous severe winter storms?**

**Tables 5 and 6** summarize the previous occurrences as well as the extent or magnitude of severe winter storm events in Lee County. The severe winter storm events are separated into two categories: snow and ice events and extreme cold events.

### SNOW AND ICE

The Storm Events Database identified 29 reported occurrences of severe snow and ice events in Lee County between 1967 and 2009, making this one of the more frequently occurring hazards. Of the 29 reported occurrences, there were 24 severe snow events, three severe ice and sleet events and two events that were a combination of severe freezing rain, ice, sleet and snow.

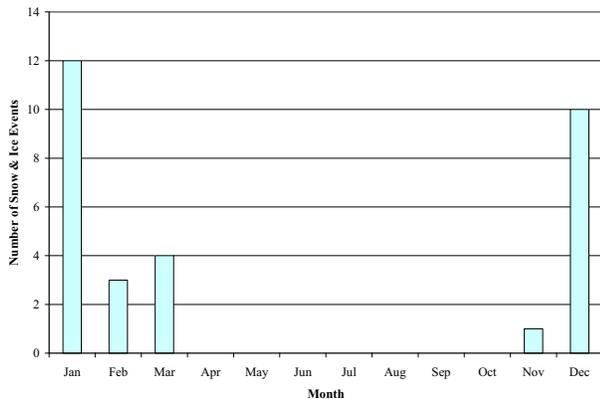
Since 1994, at least one severe snow and/or ice event has occurred each year in Lee County with the exception of two years (1996 and 2001.) Anecdotal information shared by long-time residents suggests that severe snow and ice events have occurred with similar frequency between 1950 and 1994. In comparison, Illinois has averaged at least two snow events annually between 1900 and 2000 where six inches or more of snow falls within a 48 hour period.



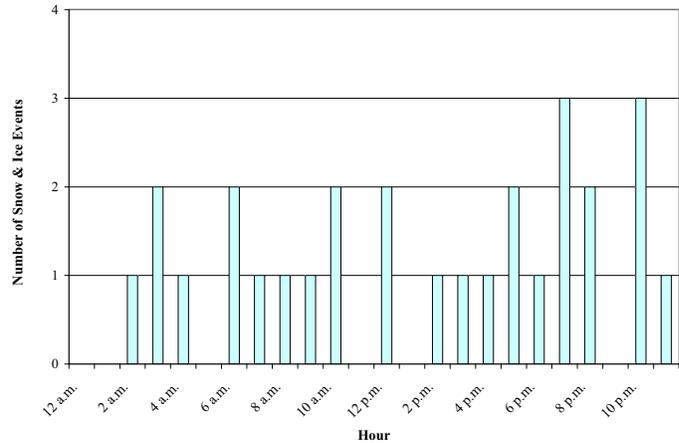
*Snow is piled alongside roads as residents of Dixon dig out from a winter storm.*

**Figures 17 and 18** chart the reported occurrences of severe snow and ice events by month and hour. Twenty-two of the 29 events took place in December and January. One of the 29 events spanned between November and December. Approximately 61% of all snow and ice events with recorded times began during the p.m. hours.

**Figure 17**  
Lee County Snow & Ice Events  
by Month – 1967 through 2009



**Figure 18**  
Lee County Snow & Ice Events  
by Hour – 1967 through 2009



NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

According to the Midwestern Regional Climate Center, over the last 110 years the maximum one-day accumulation of snow recorded in Lee County first occurred on February 7, 1933 when 14 inches of snow fell. There has been one other day (January 27, 1967) when the maximum one-day accumulation of snow also reached 14 inches.

**EXTREME COLD**

The Storm Events Database and community records identified eight reported occurrences of extreme cold (i.e., low temperatures and wind chills) in Lee County between 1996 and 2009. Of the eight reported occurrences, none corresponded with a recorded severe snow and ice event, although one did follow immediately after an event. Seven of the eight extreme cold events took place between January and February. Approximately 75% of all the events began during the a.m. hours. According to the Midwestern Regional Climate Center, the coldest temperature recorded in Lee County over the last 110 years was -33°F on February 3, 1996.

**What locations are affected by severe winter storms?**

Severe winter storms affect the entire County. All communities in Lee County have been affected by severe winter storms. The 2010 Illinois Natural Hazard Mitigation Plan prepared by the Illinois Emergency Management Agency classifies Lee County’s hazard rating for severe winter storms as “severe.”

**What is the probability of future severe winter storms occurring?**

Lee County has had 29 verified occurrences of severe snow and ice events between 1967 and 2009. With 29 occurrences over the past 43 years, the probability or likelihood that a severe snow and ice event will occur in any given year is 67%. There were eight years over the past 43

years where two or more severe snow and ice events occurred. This indicates that the probability that more than one snow and ice event may occur during any given year within the County is 19%.

There have been eight verified occurrences of extreme cold events between 1996 and 2009. With eight occurrences over the past 14 years, the probability or likelihood that an extreme cold event will occur in any given year is 57%. There was one year over the past 14 years where two or more extreme cold events occurred. This indicates that the probability that more than one extreme cold event may occur during any given year within the County is 7%.

## ASSESSING VULNERABILITY

### Are the participating jurisdictions vulnerable to severe winter storms?

Yes. All of Lee County, including the participating jurisdictions, is vulnerable to the dangers presented by severe winter storms. Severe winter storms are among the most frequently occurring natural hazards in Illinois. There are no official state-designated warming centers located in Lee County.



*A pedestrian walks along Hennepin Avenue in Dixon after a severe winter storm blanketed the Sauk Valley in several inches of snow.*

*Photo provided by Sauk Valley Newspapers*

Since 2000, Lee County has experienced 20 snow and ice events and seven extreme cold events. During eight of these years, the County experienced two or more events. Severe winter storms have immobilized portions of the County, blocking roads, downing power lines, trees and branches causing power outages and property damage and contributing to vehicle accidents. In addition, the County and municipalities must budget for snow removal and de-icing of roads and bridges as well as for roadway repairs.

### What impacts resulted from the recorded severe winter storms?

Of the 37 reported occurrences severe winter storms, damages were only recorded for one event. Beginning on November 30, 2006, a winter storm dumped 10" to 15" of snow across the County and caused \$8,500 in property damage in Amboy. In comparison, the State of Illinois has averaged an estimated \$102 million annually in property damage losses from severe winter storms since 1950, ranking severe winter storms second only to flooding in terms of economic loss. While behind floods in terms of the amount of property damage caused, severe winter storms have a greater ability to immobilize larger areas, with rural areas being particularly vulnerable.

One death was reported as a result of the January 1, 1999 heavy snow event. It should be noted, however, that this event covered 18 counties (including Lee County) and information was not available on the location of the severe winter storm-related fatality. In comparison, Illinois averages six deaths per year as a result of severe winter storms.

While severe winter storms occur regularly in Lee County, the number of injuries and deaths is relatively low. The combination of treacherous road conditions and a temporary loss of power can make individuals who are not able to reach emergency shelters more vulnerable to hypothermia and other common winter-related injuries. However, even taking into consideration the increased impacts from a power outage, the risk to public health and safety from severe winter storms is relatively low.

**What other impacts can result from severe winter storms?**

While only one death was reported by the Storm Events Database for the recorded severe winter storm events in Lee County, severe winter storms do have the ability to impact health and safety.

In Lee County, vehicle accidents are the largest risk to health and safety from severe winter storms. Hazardous driving conditions (i.e., reduced visibility, icing road conditions, strong winds, etc.) contribute to the increase in accidents that result in injury and death. A majority of all severe winter storm injuries result from vehicle accidents. Traffic accident data assembled by the Illinois Department of Transportation between 2004 and 2008 indicates that treacherous road conditions caused by snow and ice were present for 6.1% to 27.5% of all crashes recorded annually in Lee County. **Figure 19** provides a breakdown by year of the number of crashes and corresponding injuries and deaths that occurred when treacherous road conditions caused by snow and ice were present as well as the total number of crashes that occurred in the County for comparison.

<b>Figure 19 Severe Winter Weather Crash Data for Lee County</b>				
<b>Year</b>	<b>Total # of Crashes</b>	<b>Presence of Treacherous Road Conditions caused by Snow and Ice</b>		
		<b># of Crashes</b>	<b># of Injuries</b>	<b># of Deaths</b>
2004	1,194	125	28	0
2005	1,214	155	47	0
2006	1,081	66	18	0
2007	1,161	220	48	6
2008	1,200	330	55	0

Source: Illinois Department of Transportation, Illinois Crash Data, County Crash Summaries, Lee County, 2004-2008.

Persons who are outdoors during and immediately following severe winter storms can experience other health and safety problems. Frostbite to hands, feet, ears and nose and hypothermia are common injuries. Treacherous walking conditions also lead to falls which can result in serious injuries, including fractures and broken bones, especially for the elderly. Over exertion from shoveling driveways and walks can lead to life-threatening conditions such as heart attacks in middle-aged and older adults who are susceptible.

**Are existing buildings, infrastructure and critical facilities vulnerable to severe winter storms?**

Yes. All existing buildings, infrastructure and critical facilities located in Lee County and the participating jurisdictions are vulnerable to damage from severe winter storms. Structural

damage to buildings caused by severe winter storms is very rare, but can occur particularly to flat rooftops.

Information gathered from Lee County residents indicates that snow and ice accumulations on communication and power lines as well as key roads presents the greatest vulnerability to infrastructure and critical facilities within the County. Snow and ice accumulations on communication and power lines often lead to disruptions in communication and create power outages. Depending on the damage, it can take anywhere from several hours to several days to restore service.

In addition to affecting communication and power lines, snow and ice accumulations on state and local roads hampers travel and can cause dangerous driving conditions. Blowing and drifting snow can lead to road closures and increases the risk of automobile accidents. Even small accumulations of ice can be extremely dangerous to motorists since bridges and overpasses freeze before other surfaces. When transportation is disrupted, schools close, emergency and medical services are delayed, some businesses close and government services can be affected.

When a severe winter storm hits there is also an increase in cost to the County and municipalities for snow removal and de-icing. Road resurfacing and pothole repairs are additional costs incurred each year as a result of severe winter storms. According to David Anderson, Lee County Highway Engineer, severe winter storms have caused considerable damage to County roads. Based on visual inspections and information provided by the Township Road Commissioners, Mr. Anderson estimates that since 2007 winter weather conditions have caused \$7 million in damages to 78 miles of seal coat roads and \$855,000 in damages to 57 miles of aggregate roads in the County. (These figures exclude road damages experienced within municipalities and on state-owned roadways.) Spread over three years, road damage in Lee County accounts for over \$2.5 million a year. These figures illustrate that roadway damage is one of the most costly forms of property damage associated with severe winter storms and winter weather conditions.

Extreme cold events can also have a detrimental impact on buildings, infrastructure and critical facilities. Pipes and water mains are especially susceptible to freezing during extreme cold events. This freezing can lead to cracks or ruptures in the pipes in buildings as well as in buried service lines and mains. As a result, flooding can occur as well as disruptions in service. Since most buried service lines and water mains are located under local streets and roads, fixing a break requires portions of the street or road to be blocked off, excavated and eventually repaired. These activities can be costly and must be carried out under less than ideal working conditions.

Based on the frequency with which severe winter storms occur in Lee County, the amount of property damage previously reported and the potential for disruptions to power distribution and communication; the risk or vulnerability to buildings, infrastructure and critical facilities from severe winter storms is medium to high.

**Are future buildings, infrastructure and critical facilities vulnerable to severe winter storms?**

Yes. While four of the participating municipalities have building codes in place that will likely help lessen the vulnerability of new buildings and critical facilities to damage from severe winter storms, the County and several other participating municipalities do not. Infrastructure such as new communication and power lines also will continue to be vulnerable to severe winter storms. Ice accumulations on power lines can disrupt power service. Rural areas of Lee County have experienced extended periods without power due to severe winter storms. Steps to bury all new lines would eliminate the vulnerability, but this action would be cost prohibitive in most areas. There is very little that can be done to reduce or eliminate the vulnerability of new critical facilities such as roads and bridges to severe winter storms.

**What are the potential dollar losses to vulnerable structures from severe winter storms?**

Unlike other hazards, such as flooding, there are no standard loss estimation models or methodologies for severe winter storms. Since there were limited recorded events listing property damage numbers for severe winter storms, there is no way to accurately estimate future potential dollar losses. Since all structures within Lee County are vulnerable to damage it is likely that there will be future dollar losses to severe winter storms.

### 3.3 TORNADOES

#### IDENTIFYING THE HAZARD

##### What is the definition of a tornado?

A tornado is a violently rotating column of air, usually characterized by a twisting, funnel-shaped cloud, that extends from the cloud formation of a thunderstorm to the ground. The strongest tornadoes have rotating wind speeds of more than 250 miles per hour and can create damage paths in excess of one mile wide and 50 miles long.

Not all tornadoes have a visible funnel cloud. Some may appear nearly transparent until dust and debris are picked up or a cloud forms within the funnel. Generally, tornadoes move from southwest to northeast, but they have been known to travel in any direction, even backtracking. The average forward speed of a tornado is 30 mile per hour, but this may vary from nearly stationary to 70 miles per hour.

The destruction caused by a tornado may range from light to catastrophic depending on the intensity, size and duration of the storm. Tornadoes cause crop and property damage, power outages, environmental degradation, injury and death. Tornadoes are known to blow off roofs, move cars and tractor trailers and demolish homes. Typically tornadoes cause the greatest damage to structures of light construction, such as residential homes.

##### How are tornadoes rated?

Tornadoes are rated using the Fujita Scale, which measures the intensity of a tornado based on its wind speed and the damage sustained by structures and vegetation. The Fujita Scale identifies six different categories of tornadoes, F0 through F5. **Figure 20** gives a brief description of each category.

Figure 20 Fujita Tornado Measurement Scale		
Category (F-Scale #)	Intensity Phase / Wind Speed	Description
F0	Gale Tornado 40 – 72 mph	Light damage – some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; damage to sign boards
F1	Moderate Tornado 73 – 112 mph	Moderate damage – peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
F2	Significant Tornado 113 – 157 mph	Considerable damage – roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated
F3	Severe Tornado 158 – 206 mph	Severe damage – roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown
F4	Devastating Tornado 207 – 260 mph	Devastating damage – well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated
F5	Incredible Tornado 261 – 318 mph	Incredible damage – strong frame houses lifted off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 yards; trees debarked; incredible phenomena will occur

Source: FEMA “State and Local Mitigation Planning How-To Guide: Understanding Your Risks”, August 2001.

On February 1, 2007 use of the original Fujita Scale was discontinued in favor of the Enhanced Fujita Scale. The Enhanced Fujita Scale continues to use the F0 through F5 categories, but is based on additional damage indicators and revised wind speeds. **Figure 21** depicts the Enhanced Fujita Scale. While the Enhanced Fujita Scale is currently in use, the historical data presented in this report is based on the original Fujita Scale.

<b>Figure 21 Enhanced Fujita Tornado Measurement Scale</b>	
Category (EF Scale #)	Wind Speed
EF0	65 – 85 mph
EF1	86 – 110 mph
EF2	111 – 135 mph
EF3	136 – 165 mph
EF4	166 – 200 mph
EF5	Over 200 mph

Source: NOAA, Storm Prediction Center, Online Tornado FAQ: Frequently Asked Questions about Tornadoes.

**Are alerts issued for tornadoes?**

Yes. The National Weather Service Weather Forecast Office in Chicago, Illinois is responsible for issuing tornado watches or warnings for Lee County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Tornado Watch.** A tornado watch is issued when conditions are favorable for tornadoes and severe thunderstorms to develop in the next several hours. It does not mean that a tornado is imminent, just that individuals need to be alert and prepared.
- **Tornado Warning.** A tornado warning is issued when a tornado has been spotted or indicated by radar. Warnings indicate imminent danger to life and property for those who are in the path of the tornado. Individuals should see shelter immediately.

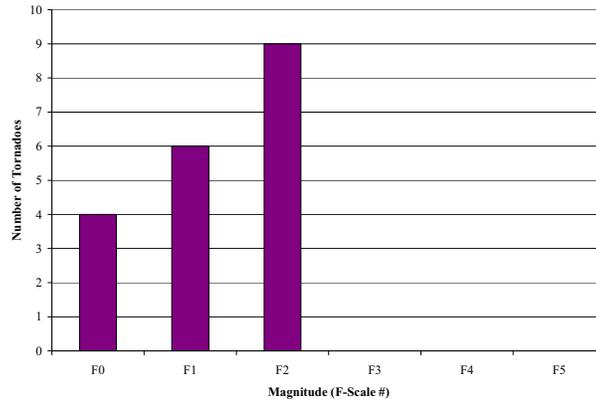
**PROFILING THE HAZARD**

**When have tornadoes occurred previously? What is the extent of these previous tornadoes?**

**Table 7** summarizes the previous occurrences as well as the extent or magnitude of tornado events recorded in Lee County. The Storm Events Database records show 20 reported occurrences of tornadoes in Lee County between 1956 and 2009. In comparison, Illinois has averaged 36 tornadoes annually since 1950. Tornadoes have occurred every decade in Lee County since 1956.

**Figure 22** charts the reported occurrences of tornadoes by magnitude. Of the 20 reported occurrences, nine were classified as F2 tornadoes, six were classified as F1 tornadoes, four were classified as F0 tornadoes and one was not classified. These 20 reported tornadoes were produced by separate weather events.

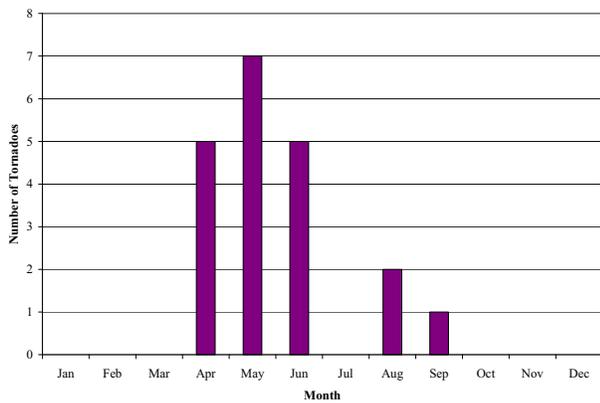
**Figure 22**  
**Lee County Tornadoes by Magnitude**  
**1956 through 2009**



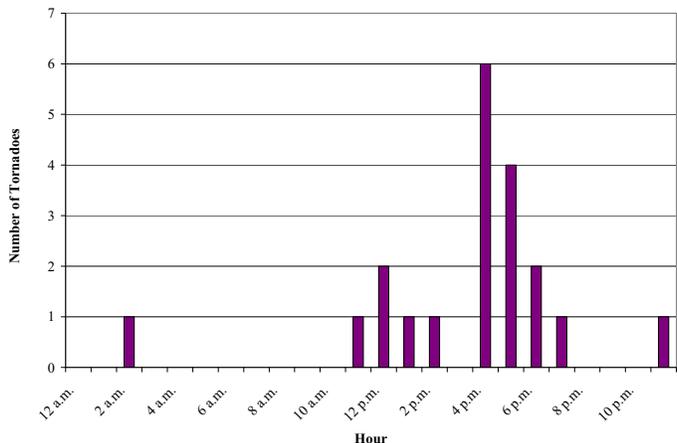
NOAA, NESDIS, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

**Figures 23 and 24** chart the reported occurrences of tornadoes by month and hour. Seventeen of the 20 events took place between April and June. This three-month period has the highest frequency of tornado occurrences not only in Lee County but statewide as well. Approximately 90% of all tornadoes occurred during the p.m. hours, with 13 of the 20 events taking place between 4 p.m. and 8 p.m.

**Figure 23**  
**Lee County Tornadoes by Month**  
**1956 through 2009**



**Figure 24**  
**Lee County Tornadoes by Hour**  
**1956 through 2009**



NOAA, NESDIS, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

The recorded tornadoes varied in length from 0.1 miles to 26.3 miles and in width from 7 yards to 100 yards. The average length of a tornado in Lee County is 4.5 miles, the average width is 46 yards and the average damage pathway is approximately 0.12 square miles. The longest and widest tornado recorded in Lee County occurred on August 15, 1958. This F2 tornado, measuring 100 yards wide, touched down approximately 5 miles south of Dixon and traveled southeast for 74.5 miles before dissipating south of Joliet in Will County. The damage pathway of this tornado covered approximately 4.2 square miles.

**What locations are affected by tornadoes?**

Tornadoes have the potential to affect the entire County. The *2010 Illinois Natural Hazard Mitigation Plan* prepared by the Illinois Emergency Management Agency classifies Lee County’s hazard rating for tornadoes as “elevated.”

All of the participating municipalities except Sublette have had reported occurrences of tornadoes in or near their locations. **Figure 25** shows the pathway each reported tornado took. Records indicate that most of these tornadoes generally moved from west to east across the County. Unlike other natural hazards (i.e., severe winter storms, drought and extreme heat), tornadoes impact a relatively small area. Typically the area impacted by a tornado is less than four square miles.

**What is the probability of future tornadoes occurring?**

Lee County has had 20 verified occurrences of tornadoes between 1956 and 2009. With 20 occurrences over the past 54 years, the probability or likelihood of a tornado hitting somewhere in Lee County in any given year is 37%. There were four years over the last 54 years where more than one tornado occurred. This indicates that the probability that more than one tornado may occur during any given year within Lee County is 7%.

**ASSESSING VULNERABILITY**

**Are the participating jurisdictions vulnerable to tornadoes?**

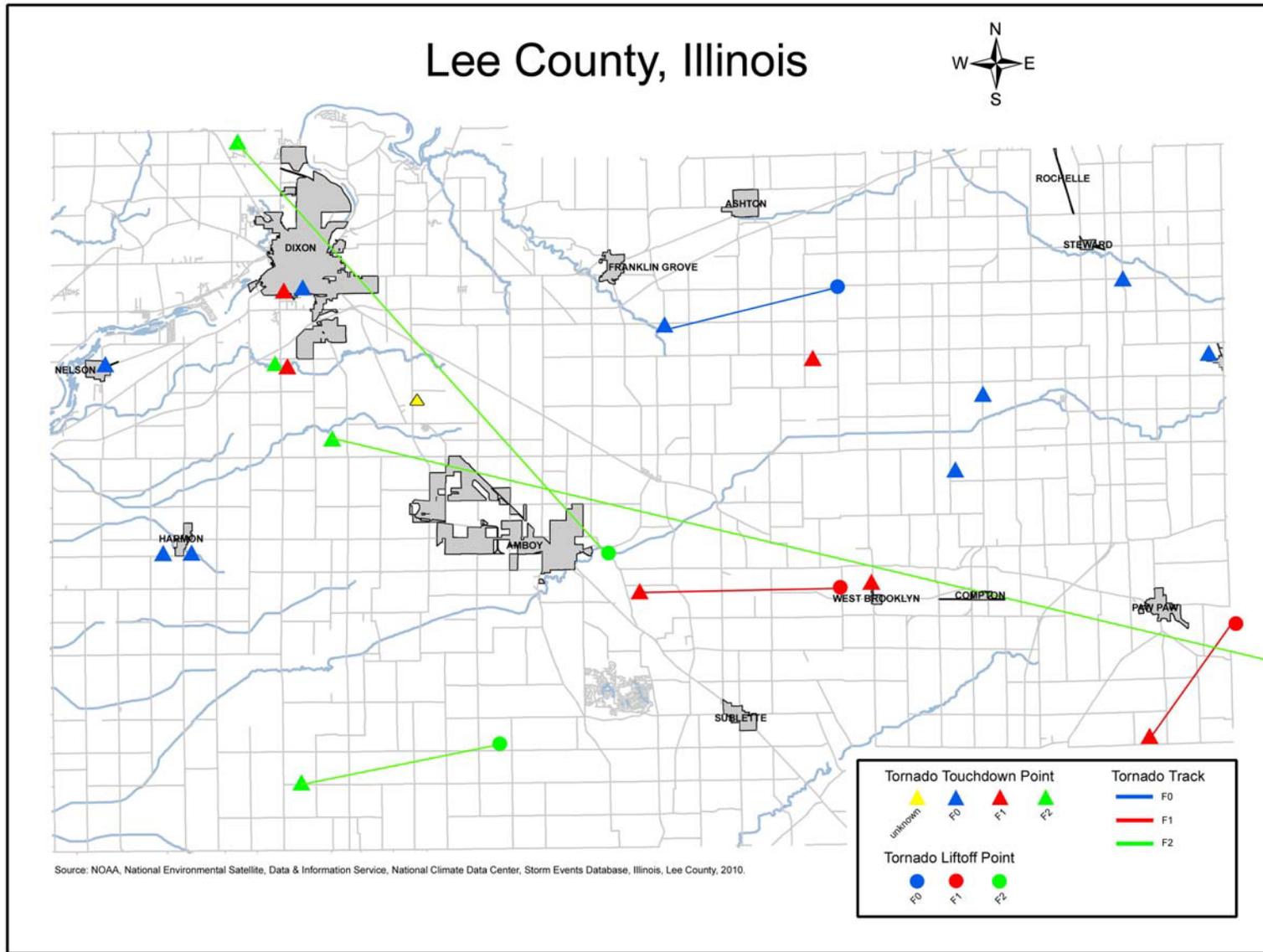
Yes. All of Lee County is vulnerable to the dangers presented by tornadoes. Municipalities located in the western portions of the County (Harmon, Dixon and Amboy) have experienced more tornadoes and appear to be more vulnerable than those located in the eastern portions of the County. **Figure 26** lists the verified tornadoes that have touched down in or near each participating municipality.

Figure 26 Verified Tornado Touchdowns by Participating Municipality		
Participating Municipality	Number of Verified Tornadoes	Year Tornado Touchdown
Amboy	3	1967 (2), 1972
Ashton	2	1975, 2003
Dixon	7	1956, 1958, 1959, 1972, 1974, 1986, 1988
Franklin Grove	1	2003
Harmon	3	1967, 1988, 1995
Steward	1	1975
Sublette	0	---

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

Seven tornadoes have occurred in the immediate vicinity of Dixon. This is more than twice the number of tornadoes that have affected any other participating municipality in the County. In addition to the higher tornado frequency, Dixon has the largest number of people, housing units

**Figure 25**  
**Tornado Touchdowns in Lee County: 1956 – 2009**



and critical facilities and infrastructure. This combination of facts makes Dixon highly vulnerable to tornado damage. More people reside in Dixon than unincorporated Lee County or any other municipality within the County. Dixon also possesses the most critical facilities and infrastructure within the County, including six state-owned correctional, law enforcement and transportation facilities.

**What impacts resulted from the recorded tornadoes?**

Storm Events Database records indicate that between 1956 and 2009, tornadoes caused approximately \$882,800 in property damage. Property damages for three of the occurrences totaled \$250,000 or more. There were, however, eight occurrences where the amount of the property damage was not reported.

Seven injuries were reported as a result of two separate incidents between 1956 and 2009. In comparison, Illinois averages approximately four tornado fatalities annually; however, this number varies widely from year to year. Detailed information was not available for any of the incidents in Lee County.

One of the worst outbreaks of tornadoes recorded in Illinois occurred on May 18, 1898 impacting multiple counties including Lee County. Widespread destruction of homes, businesses and barns were reported across the County as well as deaths and injuries to humans and livestock. If an outbreak of tornadoes similar to those that occurred in 1898 were to impact the County today, they would likely cause more property damage and destruction due to the greater development of infrastructure and a larger population within Lee County. Improvements in weather forecasting and notification, however, would probably reduce the number of deaths and injuries.

**What other impacts can result from tornadoes?**

In addition to causing damage to buildings and properties, tornadoes can damage infrastructure and critical facilities such as roads, bridges, railroad tracks, drinking water treatment plants, water towers, communication towers and antenna and power substations, transformers and poles. Depending on the damage done to the infrastructure and critical facilities, indirect impacts on individuals could range from inconvenient (i.e., adverse travel) to life-altering (i.e., loss of utilities for an extended period of time).

**Are existing buildings, infrastructure and critical facilities vulnerable to tornadoes?**

Yes. All existing buildings, infrastructure and critical facilities located in Lee County and the participating jurisdictions are vulnerable to damage from tornadoes. Buildings, infrastructure and critical facilities located aboveground in the path of a tornado are the most vulnerable and usually suffer extensive damage, if not complete destruction. While some buildings adjacent to a tornado's path may remain standing with little or no damage, all are vulnerable to damage caused by flying debris. It is common for flying debris to cause damage to roofs, siding and windows. In addition, mobile homes, homes on crawlspaces and buildings with large spans (i.e., schools, barns, airport hangers, factories, etc.) are more likely to suffer damage. Most workplaces and many residential units do not provide sufficient protection from tornadoes. Several of the participating jurisdictions have indicated a need for tornado safe shelters.

As with severe storms, infrastructure and critical facilities tend to be just as vulnerable to tornadoes as buildings. The damages sustained by infrastructure and critical facilities during a tornado are similar to those experienced during a severe storm. There is a high probability that power, communication and transportation will be disrupted in and around the affected area.

A simple way to assess the vulnerability of buildings is to determine the average housing unit density within the County. This can be done by taking the number of housing units within the County (14,310) and dividing that number by the total land area of the County (729.3 square miles). The result suggests that there is an average of 20 housing units per square mile in Lee County. While this method provides an adequate assessment of the buildings that may be potentially damaged in a densely populated county, it does not provide a realistic assessment for those counties with large, sparsely populated rural areas such as Lee County.

In Lee County, and many other northwestern counties, differences in housing density must be considered when assessing the vulnerability of buildings to tornado damage. Approximately 73% of all housing units within Lee County are located in six of the County's 22 townships (Amboy, Ashton, China, Dixon, Palmyra and Wyoming). **Figure 27** provides a breakdown of housing units by township. Consequently, tornado damage to buildings, infrastructure and critical facilities in these more densely populated townships is likely to be greater than in the rest of Lee County. In addition, over half of the mobile home units (which are more vulnerable to tornadoes) within the County are located in three of these six townships (Amboy, Dixon and Palmyra).

To more accurately assess building vulnerability in Lee County, the average housing unit density for each township was calculated. **Figure 27** illustrates the substantial differences in housing unit density between the various townships in Lee County. By comparing the average county housing unit density calculated above (20 housing units per square mile) to the township housing unit densities listed in **Figure 27**, the shortcomings of using a countywide average housing unit density for counties such as Lee become apparent. For 16 of the 22 townships, the average county housing unit density is greater (in most cases considerably) than the density numbers calculated for the townships. Furthermore, the average county housing unit density is considerably less than the housing unit densities calculated for four of the most populated townships.

Since the housing unit density has been calculated for each township, it is relatively simple to provide an estimate of the number of housing units that could potentially be damaged by a tornado in Lee County. This can be done by taking the housing unit density for each township and multiplying that by the land area impacted by a tornado. For this scenario a land area of 0.12 square miles was chosen, the average damage pathway recorded for a tornado in Lee County. **Figure 27** provides a breakdown of the number of potentially damaged housing units by township.

It is important to note that for the six townships with the greatest number of total housing units, the potential damage estimates would only be reached if a tornado's pathway included the major municipality within the township. If the tornado pathway remained in the rural portion of the township, then the number of potentially damaged housing units would be considerably lower.

**Figure 27**  
**Potential Tornado Damage to Housing Units in Lee County by Township**

Township	Land Area (Sq. Miles)	Total Number of Housing Units (2000)	Number of Mobile Homes (2000)	Housing Unit Density (Units per Sq. Mile)	Number of Potentially Damaged Housing Units (Units per 0.12 Sq. Mile Area)
Alto	34.9	214	9	7	1
Amboy	35.4	1,320	112	38	5
Ashton	17.8	542	13	31	4
Bradford	36.0	122	0	4	1
Brooklyn	36.4	375	20	11	2
China	26.9	532	5	20	3
Dixon	30.3	6,995	219	231	28
East Grove	35.6	89	2	3	1
Hamilton	35.8	100	14	3	1
Harmon	35.9	168	2	5	1
Lee Center	36.5	223	38	7	1
Marion	35.7	119	9	4	1
May	35.8	181	82	6	1
Nachusa	28.9	210	0	8	1
Nelson	23.7	415	39	18	3
Palmyra	35.5	1,034	248	30	4
Reynolds	35.5	118	7	4	1
South Dixon	29.7	322	5	11	2
Sublette	36.5	340	19	10	2
Viola	35.4	110	8	4	1
Willow Creek	35.1	251	3	8	1
Wyoming	36.0	530	7	15	2

Sources: Illinois Department of Commerce and Economic Opportunity, Census 2000 Data for Illinois.  
U. S. Census Bureau, Geography, Census 2000 U.S. Gazetteer Files – County Subdivisions, 2010.

Lee County ranks among the top 50 counties in Illinois in terms of tornado frequency. This fact suggests that the overall risk posed by tornadoes in Lee County might be relatively high. While frequency is important, other factors must be examined when assessing vulnerability. When such factors as population distribution, the absence of high risk living accommodations (such as high rise buildings, etc.), the largely rural pathway of the previously recorded tornadoes, and the presence of uniform building codes among half of the participating municipalities are taken into consideration, the overall risk posed by tornadoes becomes relatively low. While the risk to the County is relatively low, if a tornado were to touchdown in any of the municipalities, the risk or vulnerability for that location would be elevated to high.

**Are future buildings, infrastructure and critical facilities vulnerable to tornadoes?**

Yes. While four of the seven participating municipalities have building codes in place that will likely help lessen the vulnerability of new buildings and critical facilities to damage from tornadoes, the County does not. Infrastructure such as new communication and power lines also will continue to be vulnerable to tornadoes. Steps to bury all new lines would eliminate the vulnerability, but this action would be cost prohibitive in most areas. There is very little that can

be done to reduce or eliminate the vulnerability of critical facilities constructed in the future other than enacting building codes where none exist and enforcing existing building codes.

### **What are the potential dollar losses to vulnerable structures from tornadoes?**

Unlike other hazards, such as flooding, there are no standard loss estimation models or methodologies for tornadoes. However, a rough estimate of potential dollar losses to vulnerable structures located within each participating municipality can be calculated if several assumptions are made. These assumptions represent a probable scenario based on the reported historical occurrences of tornadoes in Lee County. The purpose of providing a rough estimate is to help residents and municipal officials make informed decisions to better protect themselves and their communities. These estimates are meant to provide a general idea of the magnitude of the potential damage that could occur from a tornado event in Lee County.

#### Step 1: Determining the Number of Impacted Housing Units

First, an estimate of the number of residential housing units impacted by a tornado needs to be calculated. In order to accomplish this, the size of the impacted area must be determined. While the worst tornado recorded in Lee County could be used to estimate the area impacted; it was decided that the area impacted should be based on an average of the tornadoes that have been recorded in the County. The average area impacted by a tornado in Lee County was calculated and found to cover approximately 0.12 square miles. This approach offers a reasonable alternative to using the worst tornado since the size and area impacted by the average of the recorded tornadoes is more likely to recur. In many cases damage estimates are ignored when the scenario is extreme or when the estimates appear to overstate the damages.

There are two ways in which the average area impacted by a tornado can be used to help determine the estimated number of impacted housing units. The first method involves overlaying the average tornado on a map of each municipality to determine whether the average impacted area would fall within the municipal limits. If the area impacted is less than the average because of the size and shape of the municipality, then additional calculations would be required to determine what portion of the average area would fall within the municipality. Once the portion within the municipality is calculated, then that area would be used to help estimate the number of impacted housing units. This method is more precise; however, it requires that future updates to the Plan use the exact same layouts of the average tornado for each municipality since changes may produce differences in the number of impacted housing units.

The second method assumes that the entire average impacted area would fall within the municipal limits; therefore, no additional calculations would be necessary in order to determine the number of impacted housing units. This method is quicker and easier and is more likely to produce consistent results when the Plan is updated. There is, however, a greater likelihood that the number of impacted housing units will be overestimated for those municipalities that occupy less than one square mile or have irregular shaped boundaries.

Both methods were applied to selected municipalities within Lee County and the areas compared. While the two methods did produce different results, the differences were not significant. Therefore, it was decided that the second method would be used since it is quick and much easier to duplicate.

Next, the issue of housing density must be examined. While the number of impacted housing units could be determined by overlaying the average impacted area on a municipality and then physically counting the number of housing units within the area, this approach is time consuming and will provide a different estimate depending on the layout of the average impacted area. A more practical approach is to use the average housing unit density to help calculate the number of impacted housing units. The use of this approach is appropriate, in part, because the housing unit densities within the municipalities in Lee County do not substantially change between the center of the municipality and the edges. This is not true for all municipalities in Illinois, especially those in and around Chicago.

To determine the average housing unit density for a municipality, the number of housing units within the municipality is divided by the land area occupied by the municipality. **Figure 28** provides the average housing unit density for each participating municipality. Now that both the area impacted and average housing unit densities have been determined, the number of impacted residential buildings can be calculated. This is done by taking the average housing unit density for each participating municipality and multiplying that by the land area impacted (0.12 square miles). **Figure 28** provides a breakdown of the number of impacted housing units by municipality.

<b>Figure 28</b> <b>Estimated Number of Residential Housing Units</b> <b>Impacted by a Tornado</b>				
Participating Municipality	Land Area (Sq. Miles)	Number of Housing Units (2000)	Housing Unit Density (Units per Sq. Mile)	Housing Units Impacted (Units per 0.12 Sq. Miles)
Amboy	1.3	1,057	814	98
Ashton	0.7	471	471	57
Dixon	6.7	6,129	915	110
Franklin Grove	0.4	387	387	47
Harmon	0.1	65	65	8
Steward	0.1	99	99	12
Sublette	0.4	197	197	24

Sources: Illinois Department of Commerce and Economic Opportunity, Census 2000 Data for Illinois, 2010.  
 U. S. Census Bureau, Geography, Census 2000 U.S. Gazetteer Files – Counties & Places, 2010.

*Step 2: Determining Potential Dollar Losses to Impacted Housing Units*

Once the number of impacted housing units has been determined, the potential dollar losses can be estimated. In order to determine the potential dollar losses, the average assessed value must first be determined for each municipality. The average assessed value for each municipality was calculated from the 2009 tax assessment information provided by the Lee County Supervisor of Assessments. The average assessed value is important because it establishes the average market value which will be used to estimate the potential dollar losses. To determine the average market value for each municipality, the average assessed value for that jurisdiction is multiplied by three

(the assessed value of a structure in Lee County is approximately one-third of the market value). **Figure 29** provides the average assessed value and average market value for each participating municipality.

When comparing the average assessed value of a residential property in unincorporated Lee County to the average assessed value of a residential property in any of the participating municipalities, there is a substantial difference. This difference is attributed to several factors including larger parcel sizes and the inclusion of outbuildings (i.e., sheds, barns, etc.) in the averaged assessed value. In addition, there has been a recent trend towards building new, larger residences in unincorporated areas of the County.

Next, the potential dollar loss estimates must be calculated for both the damage done to the housing unit and the contents. To determine the potential dollar losses to the housing units, start by taking the average market value and multiplying that by the percent damage. For the purposes of this scenario, it is assumed that the expected damage to the housing units is 100%; in other words, the housing units are completely destroyed. While it is unlikely that each and every housing unit would sustain the maximum percent damage, this assumption represents the worst case for each jurisdiction.

<b>Figure 29 Estimated Potential Dollar Losses to Impacted Residential Housing Units from a Tornado</b>						
Participating Jurisdiction	Housing Units Impacted	Average Assessed Value	Average Market Value	Potential Dollar Losses		Total Potential Dollar Losses
				Housing Unit	Content	
Amboy	98	\$26,578	\$79,734	\$7,813,932	\$3,906,966	\$11,720,898
Ashton	57	\$32,953	\$98,859	\$5,634,963	\$2,817,482	\$8,452,445
Dixon	110	\$29,008	\$87,024	\$9,572,640	\$4,786,320	\$14,358,960
Franklin Grove	47	\$29,072	\$87,216	\$4,099,152	\$2,049,576	\$6,148,728
Harmon	8	\$32,378	\$97,134	\$777,072	\$388,536	\$1,165,608
Steward	12	\$36,786	\$110,358	\$1,324,296	\$662,148	\$1,986,444
Sublette	24	\$41,039	\$123,117	\$2,954,808	\$1,477,404	\$4,432,212
County*	3	\$39,330	\$117,990	\$353,970	\$176,985	\$530,955
County†	1	\$39,330	\$117,990	\$117,990	\$58,995	\$176,985

\* Uses the generic average housing unit density (20 housing units per square mile)

† Uses the average housing unit density for the 16 least populated townships (7 housing units per square mile)

Source: Ryerson, Wendy. Chief County Assessment Officer. "NHMP Mtg." Email to Greg R. Michaud. July 13, 2010.

The potential dollar losses to the content of the housing units must be estimated next. Based on FEMA guidance, it is assumed that the value of a residential housing unit's content is approximately 50% of its market value. Therefore, to determine the potential dollar losses to the content, start by taking half of the average market value and multiply by the percent damage. As with the potential dollar losses to structures, it is assumed that the expected damage to the content is 100% (the content is completely destroyed). Then multiply the average market value number by the number of impacted housing units to calculate the estimated content damage.

Finally, the total potential dollar losses may be calculated by adding together the potential dollar losses to the impacted housing units and the potential dollar losses to the content of the impacted housing units. **Figure 29** lists the total potential dollar losses by municipality.

To provide an estimate of potential dollar losses from tornadoes within the County, it becomes necessary to revisit the issue of average housing unit density discussed previously. If the generic average housing unit density of 20 housing units per square mile is used for the County and it is assumed that the tornado impacts a 0.12 square mile area, then the total number of housing units impacted would be three. However, as discussed earlier, the average housing unit density for the County does not take into consideration the differences in housing density in the County. If an average housing unit density is calculated for the 16 least populated townships (3,357 housing units divided by 547.4 square miles equals approximately seven housing units per square mile) and multiplied by the area impacted by the tornado (0.12 square miles), then the total number of housing units impacted is reduced to one. This difference in housing units leads to a substantial difference in the total potential dollar losses estimated for the County.

This assessment illustrates why potential residential dollar losses should be considered when municipalities are deciding which mitigation projects to pursue. Potential dollar losses caused by an average tornado in Lee County would be expected to exceed at least \$1 million in any of the participating municipalities.

## 3.4 FLOOD

### IDENTIFYING THE HAZARD

#### **What is the definition of a flood?**

The Federal Emergency Management Agency (FEMA) defines a “flood” as a general or temporary condition where two or more acres of normally dry land or two or more properties are inundated by:

- overflow of inland or tidal waters;
- unusual and rapid accumulation or runoff of surface waters from any source;
- mudflows; or
- a sudden collapse of shoreline land.

The severity of a flooding event is determined by a combination of topography and physiography, ground cover, precipitation and weather patterns and recent soil moisture conditions.

#### **What types of floods occur in Lee County?**

Floods can be classified under two categories: flash floods and general floods. Flash floods are generally produced when heavy localized precipitation falls over an area in a short amount of time. There is no time for the excess water to soak into the ground nor are the storm sewers able to handle the sheer volume of water. There is generally very little, if any, warning associated with flash floods.

In Lee County, general flooding can fall into two subcategories: river floods and area or overland floods. River floods are generally caused by a gradual increase in the water levels of a river or creek. These floods occur when winter or spring rains, coupled with melting snow, fill river basins with too much water too quickly or when torrential rains associated with tropical storms enter the area. Low lying areas near rivers, streams, lakes and reservoirs are susceptible to this type of flooding. Area or overland floods occur outside a defined stream or river and are generally the result of previous precipitation events that have left the ground saturated. Additional rainfall leads to surface runoff which causes ponding to occur in low-lying areas such as open fields. Area floods can also occur when a levee is breached.

On average, flooding causes more than \$2 billion in property damage each year in the United States. Floods cause utility damage and outages, infrastructure damage (both to transportation and communication systems), structural damage to buildings, crop loss, decreased land values and impede travel.

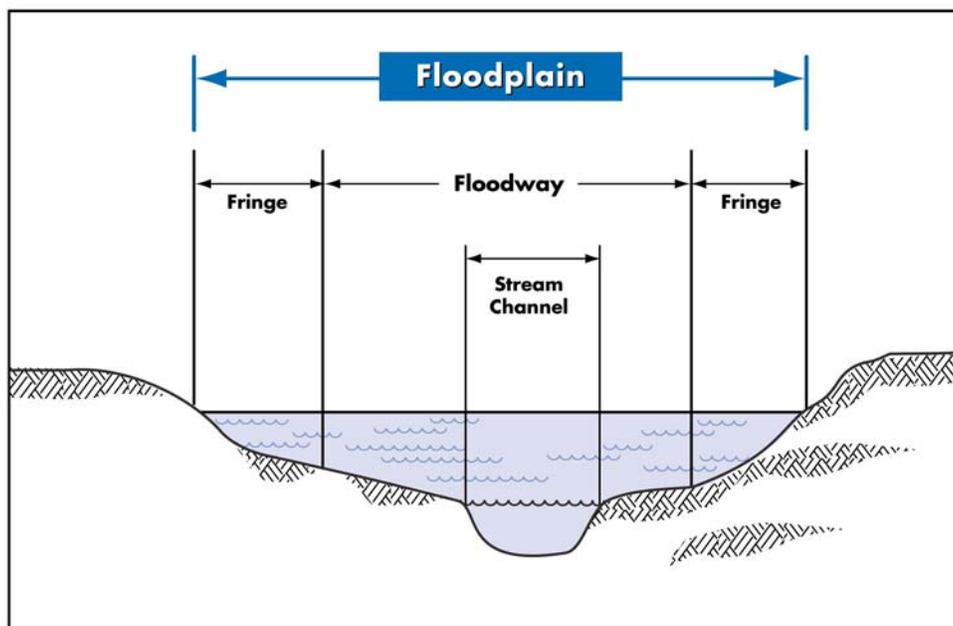
#### **What is a floodplain?**

There are several ways to define the term “floodplain”. The general definition of a floodplain is any land area susceptible to being inundated or flooded by water from any source (i.e., river, stream, lake, estuary, etc.). This general definition differs slightly from the regulatory definition of a floodplain.

A regulatory floodplain is the land area that is subject to a 1% or greater chance of flooding in any given year. It is also known as the 100-year floodplain. This definition is utilized by the FEMA to administer the National Flood Insurance Program and by the State of Illinois to regulate construction activities within a floodplain. Regulating floodplains is important because when individuals build within a floodplain, property damage and even loss of life can occur. It is this second definition that is generally most familiar to people and the one that will be used from this point forward in the Plan.

A regulatory floodplain is divided into two parts: the floodway and the flood fringe. **Figure 30** illustrates the various components of a regulatory floodplain.

**Figure 30**  
**Floodplain Illustration**



Source: Illinois Department of Natural Resources, Office of Water Resources, "Floodplain Management in Illinois: Quick Guide," 2001.

The floodway is the channel of a river or other watercourse and the adjacent land area that is required to store and convey the base flood without increasing the water surface elevation. Typically the floodway is the most hazardous portion of the floodplain because it carries the bulk of the floodwater downstream and is usually the area where water velocities and forces are the greatest. Floodplain regulations prohibit construction within the floodway that results in an increase in the floodwater's depth and velocity.

The flood fringe is the remaining area of the regulatory floodplain, outside of the floodway, that is subject to shallow inundation and low velocity flows or standing water. In general, the flood fringe plays a relatively insignificant role in storing and discharging floodwaters. The flood fringe can be quite wide on large streams and quite small or nonexistent on small streams. Development within the flood fringe is typically allowed via permit if it will not significantly increase the floodwater's depth or velocity. However, any development will require protection

from the floodwaters through the elevation of the buildings above the base flood or by flood-proofing buildings so that water can not enter the structures.

### **What is a base flood?**

A base flood refers to any flood having a 1% chance of being equaled or exceeded in any given year. It is also known as the 100-year flood or the one percent chance flood. The base flood has been adopted by the National Flood Insurance Program as the basis for mapping, insurance rating and regulating new construction.

Many individuals misinterpret the term “100-year flood”. This term is used to describe the risk of future flooding; it does not mean that it will occur once every 100 years. Statistically speaking, a 100-year flood has a 1/100 (1%) chance of occurring in any given year. In reality, a 100-year flood could occur two times in the same year or two years in a row, especially if there are other contributing factors such as unusual changes in weather conditions, stream channelizations or changes in land use (i.e., open space land developed for housing or paved parking lots). It is also possible not to have a 100-year flood event over the course of 100 years.

While the base flood is the standard most commonly used for floodplain management and regulatory purposes in the United States, the 500-year flood is the national standard for protecting critical facilities, such as hospitals and power plants. A 500-year flood has a 1/500 (0.2%) chance of occurring in any given year. It is generally deeper than a 100-year flood and covers a greater amount of area; however, it is statistically less likely to occur.

### **What is the National Flood Insurance Program?**

The National Flood Insurance Program (NFIP) is a federal program administered by FEMA enabling property owners in participating communities to purchase insurance protection against losses from flooding. It was established by the U.S. Congress on August 1, 1968 with the passage of the National Flood Insurance Act of 1968. This program has been broadened and modified several times over the years, most recently with the passage of the Flood Insurance Reform Act of 2004.

Prior to the creation of the NFIP, the national response to flood disasters was generally limited to constructing flood-control projects such as dams, levees, sea-walls, etc. and providing disaster relief to flood victims. This approach did not reduce losses, nor did it discourage unwise development practices. In the face of mounting flood losses and the escalating costs of disaster relief to taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for protection.

Participation in the NFIP is voluntary and based on an agreement between local communities and the federal government. If a community agrees to adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in a Special Flood Hazard Area (regulatory floodplain), then the government will make flood insurance available within the community as a financial protection against flood losses.



A FIRM will generally show a community's base flood elevations, flood zones and floodplain boundaries. The information presented on a FIRM is based on historic, meteorological, hydrologic and hydraulic data as well as open-space conditions, flood-control projects and development. *These maps only define flooding that occurs when a creek or river becomes overwhelmed. They do not define overland flooding that occurs when an area receives extraordinarily intense rainfall and storm sewers and roadside ditches are unable to handle surface runoff.*

### **What are flood zones?**

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's FIRM. Each zone reflects the severity or type of flooding in the area. The following provides a brief description of each of the flood zones that may appear on a community's FIRM.

- **Zone A.** Zone A, also known as a Special Flood Hazard Area (SFHA) or regulatory floodplain, is defined as the floodplain area that is subject to a 1% or greater chance of flooding in any given year. There are multiple Zone A designations, including Zones A, AO, AH, A1-30, AE, AR or A99. Land areas located within Zone A are at a high risk for flooding. A home located with Zone A has a 26% chance of suffering flood damage over the life of a 30 year mortgage. In communities that participate in the NFIP, structures located within Zone A are required to purchase flood insurance.
- **Zone X (shaded).** Zone X (shaded), formerly known as Zone B, is defined as the floodplain area between the base flood (Zone A) and the 500-year flood. Land areas located within Zone X (shaded) are affected by the 500-year flood and are considered at a moderate risk for flooding. In communities that participate in the NFIP, structures located within Zone X (shaded) are not required to purchase flood insurance, but it is made available to all property owners and renters.
- **Zone X (unshaded).** Zone X (unshaded), formerly known as Zone C, is defined as all other land areas outside of Zone A and Zone X (shaded). Land areas located in Zone X (unshaded) are considered at a low risk for flooding. In communities that participate in the NFIP, structures located with Zone X (unshaded) are not required to purchase flood insurance, but it is made available to all property owners and renters.

### **What is a Repetitive Loss Structure or Property?**

The Federal Emergency Management Agency defines a "repetitive loss structure" as an NFIP-insured structure that has received two or more flood insurance claim payments of more than \$1,000 each within any 10-year period since 1978. These structures account for approximately one-third of the nation's flood insurance claim payments. Identifying these structures and working with local jurisdictions to implement the appropriate mitigation measures to eliminate or reduce the damages caused by repeated flooding to these structures is important to FEMA and the NFIP. These structures not only increase the NFIP's annual losses, they drain funds needed to prepare for catastrophic events.

### **What is the NFIP's Community Rating System?**

The NFIP's Community Rating System (CRS) is a voluntary program developed by FEMA to provide incentives (in the form of flood insurance premium discounts) for NFIP participating

communities that have gone beyond the minimum NFIP floodplain management requirements. CRS discounts on flood insurance premiums range from 5% up to 45%. Those discounts provide an incentive for new flood mitigation, planning and preparedness activities that can help save lives and property in the event of a flood.

**Are alerts issued for flooding?**

Yes. The National Weather Service Weather Forecast Office in Chicago, Illinois is responsible for issuing flood watches or warnings for Lee County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Flash Flood / Flood Watch.** A flash flood or flood watch is issued when current or developing hydrologic conditions are favorable for flash flooding or flooding to develop in or close to the watch area. It does not mean that flooding is imminent, just that individuals need to be alert and prepared.
- **Flash Flood / Flood Warning.** A flash flood or flood warning is issued when flooding is in progress, imminent or highly likely. Warnings indicate imminent danger to life and property for those who are in the area of the flooding.

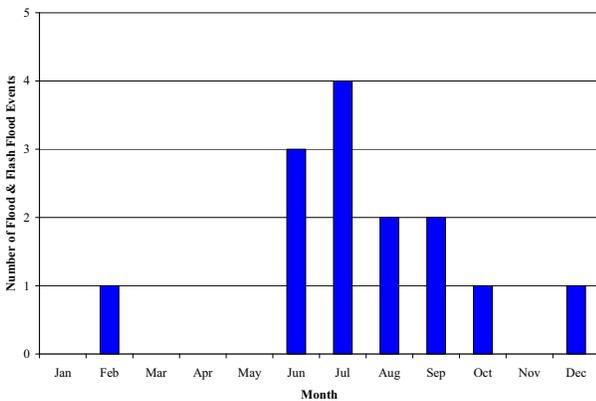
**PROFILING THE HAZARD**

**When has flooding occurred previously? What is the extent of these previous floods?**

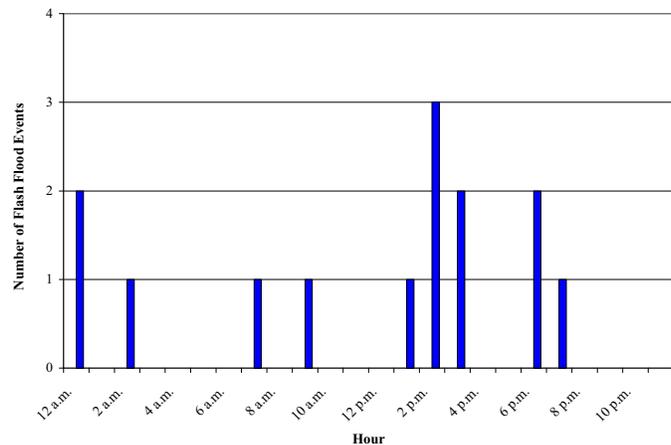
**Table 8** summarizes the previous occurrences as well as the extent or magnitude of the flood events in Lee County. The Storm Events Database identified 14 flooding and flash flooding events in Lee County between 1996 and 2009. Seven of the 14 events were caused by flash flooding.

**Figures 32 and 33** chart the reported occurrences of flooding and flash flooding by month and hour. Eleven of the 14 events took place between June and September, with four of the events occurring in July. Approximately 64% of all the Storm Events Database recorded flood and flash flood events occurred during the p.m. hours.

**Figure 32**  
Lee County Flood & Flash Flood Events  
by Month – 1996 through 2009



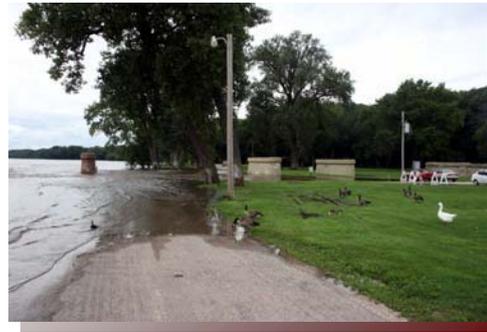
**Figure 33**  
Lee County Flood & Flash Flood Events  
by Hour – 1996 through 2009



NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

**What locations are affected by floods?**

While specific locations are affected by river flooding, many areas of the County can be affected by overland and flash flooding because of flat to gently sloping topography and seasonally high water table of the area. The areas along the ridges and bluffs are not susceptible to floods. Approximately 13.3% of the area in Lee County is designated as being within the regulatory floodplain and susceptible to river floods. The 2010 Illinois Natural Hazard Mitigation Plan prepared by the Illinois Emergency Management Agency classifies Lee County’s hazard rating for floods as “elevated.”



*Flooding on August 23, 2007 caused the Rock River to overflow its banks, flooding Page Drive near Page Park in Dixon.*

A large portion of the area prone to river flooding is in the unincorporated portion of the County, although several participating municipalities including Dixon, Ashton, Steward and Amboy are also susceptible to river flooding because of their proximity to floodplains.

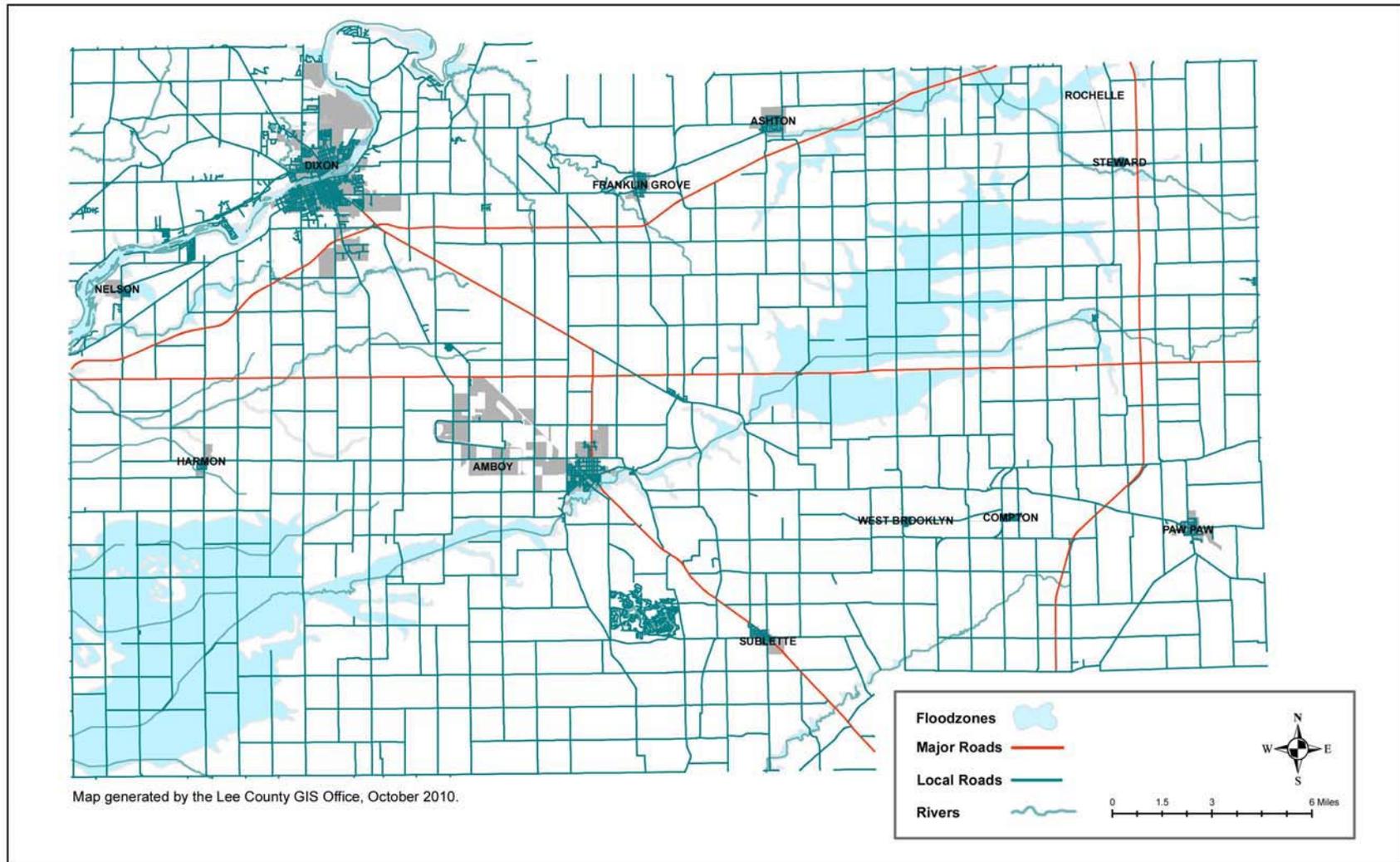
**Figure 34** shows the floodplains in Lee County. This figure is based on the Digital Flood Insurance Rate Maps (DFIRMs) for Lee County that became effective on April 5, 2010. To review the DFIRMs for the participating municipalities, see **Appendix J**. **Figure 35** identifies the bodies of water by participating municipality that have FEMA-designated Special Flood Hazard Areas and are known to cause flooding.

<b>Figure 35 Bodies of Water Subject to Flooding</b>	
Participating Jurisdiction	Water Bodies
Amboy	Green River
Ashton	Beach Creek
Dixon	Rock River, Plum Creek
Franklin Grove	Franklin Creek
Harmon	---
Steward	Steward Creek
Sublette	---
Unincorporated Lee County	Bass Lake, Beach Creek, Big Bureau Creek, Black Oak Lake, Chamberlain Creek, Coon Creek Ditch, Dry Run, Five Mile Branch, Fourmile Grave Creek, Franklin Creek, Green River, Howland Creek, Indian Creek, Leake Lake, Lyon Lakes, Main Ditch, Paw Paw Run, Plum Creek, Red Oak Ditch, Reid Creek, Rickelson Creek, Rock River, Seven Mile Branch, Sinissippi Lake, Steward Creek, Sugar Creek, Three Mile Branch, Wild Creek, Willow Creek, Winnebago Ditch, Woodhaven Lake,

**Do any of the participating jurisdictions take part in the NFIP?**

Yes. Lee County, Amboy, Ashton, Dixon, Steward and Sublette all participate in the NFIP. **Figure 36** provides additional information about each jurisdiction, including the date each participant joined the NFIP and the date of the most recently adopted floodplain zoning

**Figure 34**  
**Floodplain Areas in Lee County**



ordinance. Franklin Grove and Harmon have no identified flood hazard boundaries within their corporate limits and are not required to participate.

Figure 36 NFIP Participating Communities				
Participating Jurisdictions	Participation Date	Current Effective FIRM Date	CRS Participation	Most Recently Adopted Floodplain Zoning Ordinance
Lee County	4/15/1988	4/5/2010	No	2010
Amboy	4/15/1988	4/5/2010	No	2010
Ashton	4/30/1986*	4/5/2010	No	2010
Dixon	4/15/1988	4/5/2010	No	2010
Steward	9/1/1987	4/5/2010	No	2010
Sublette	9/1/1987	NA	No	2010

\* Ashton was reinstated to the regular phase of the NFIP on February 22, 2011.

Sources: FEMA, National Flood Program, Community Status Book Report – Illinois, November 11, 2010.

**What is the probability of future flood events occurring?**

Lee County has had 14 verified occurrences of flooding between 1996 and 2009. With 14 occurrences over the past 14 years, Lee County should expect to experience one flood event each year. There were three years over the past 14 years where two or more flood events occurred. This indicates that the probability that more than one flood event may occur during any given year within the County is 21%.

**ASSESSING VULNERABILITY**

Several factors including topography, precipitation and an abundance of rivers and streams make Illinois especially vulnerable to flooding. Since the 1940s, Illinois climate records show an increase in heavy precipitation which has led to increased flood peaks on Illinois rivers.

**Are the participating jurisdictions vulnerable to flooding?**

Yes. Lee County, including the participating jurisdictions, is vulnerable to the dangers presented by flooding. Precipitation levels, high seasonal water table, and topography that includes the Rock River and its associated watersheds are factors that cumulatively make virtually the entire County susceptible to some form of flooding. Flooding occurs along the floodplains of all the rivers and streams within the County as well as outside of the floodplains in low-lying areas where drainage problems occur due to culvert or drainage ditches that need improvement or proper maintenance.



Stalks of corn are reflected in standing water in a field outside of Dixon.

Photo provided by Sauk Valley Newspapers

Since 13.3% of the area within Lee County lies within a floodplain and the topography is relatively flat, approximately half of the flooding experienced within the County is related to

flash flooding. **Figure 37** details the number of flood and flash flood events by participating jurisdiction.

<b>Figure 37 Verified Flood &amp; Flash Flood Events by Participating Jurisdiction</b>				
<b>Participating Jurisdiction</b>	<b>Number of Verified Flood Events</b>	<b>Year of Flood Event</b>	<b>Number of Verified Flash Flood Events</b>	<b>Year of Flash Flood Event</b>
Countywide / Portion of County	4	1997, 1998, 2000, 2002	1	2002
Amboy	1	2008	3	2007 (2), 2008
Ashton	0	---	0	---
Dixon	2	2007 (2)	1	2008
Franklin Grove	0	---	0	---
Harmon	0	---	0	---
Steward	0	---	0	---
Sublette	1	2008	0	---

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

Vulnerability to flooding can change depending on several factors, including land use. As land used primarily for agricultural and open space purposes is converted for residential and commercial/industrial uses, the number of buildings and impervious surfaces (i.e., parking lots, roads, sidewalks, etc.) increases. As the number of buildings and impervious surfaces increases, so too does the potential for flash flooding. Rather than infiltrating the ground slowly, rain and snowmelt that falls on impervious surfaces runs off and fills ditches and storm drains quickly creating drainage problems and flooding. As described in Section 1.3, substantial changes in land use (from forested, open and agricultural land to residential, commercial and industrial) are not anticipated within the County in the immediate future. No substantial increases in residential or commercial/industrial developments are expected within the next five years.

**What impacts resulted from the recorded floods?**

Damage information was either unavailable or none was recorded for any of the flood events. However, the State of Illinois has averaged an estimated \$257 million annually in property damage losses from flooding since 1983, making flooding the single most financially damaging weather hazard in Illinois.

No injuries or deaths were reported as a result of any of the recorded flood events in Lee County. In comparison, Illinois averages four deaths per year from flooding.

Even though 13.3% of the area within the County lies in a floodplain, the number of injuries and deaths is very low. As a result, the risk or vulnerability to public health and safety from general flooding is seen as relatively low. However, half of the recorded flood events were a result of flash flooding. Since there is very little warning associated with flash flooding, the risk to public health and safety from flash flooding is elevated to medium.

**What other impacts can result from flooding?**

One of the primary threats from flooding is drowning. Nearly half of all flash flood deaths occur in vehicles as they are swept downstream. Most of these deaths take place when people drive into flooded roadway dips and low drainage areas. It only takes two feet of water to carry away most vehicles.

Floodwaters also pose biological and chemical risks to public health. Flooding can force untreated sewage to mix with floodwaters. The polluted floodwaters then transport the biological contaminants into buildings and basements and onto streets and public areas. If left untreated, the floodwaters can serve as breeding grounds for bacteria and other disease-causing agents. Even if floodwaters are not contaminated with biological material, basements and buildings that are not properly cleaned can grow mold and mildew which can pose a health hazard, especially for small children, the elderly and those with specific allergies.

Flooding can also cause chemical contaminants such as gasoline and oil to enter the floodwaters if underground storage tanks or pipelines crack and begin leaking during a flood event. Depending on the time of year, floodwaters also may carry away agricultural chemicals that have been applied to farm fields.

**Are there any repetitive loss structures/properties within Lee County?**

Yes. Twenty-one repetitive flood loss properties are located within Lee County. There is one single family dwelling located in Steward, one single family dwelling located in Dixon, and 19 single family dwellings located in unincorporated Lee County. As described previously, FEMA defines a “repetitive loss structure” an NFIP-insured structure that has received two or more flood insurance claim payments of more than \$1,000 each within any 10-year period since 1978.

**Figure 38** identifies the type of repetitive flood loss structure/property by location and the number of flood insurance claim payments paid for each structure/property. Information on the amounts of the flood insurance claim payments was unavailable. The exact location and/or addresses of the insured properties are not included in this Plan to protect the owners’ privacy. According to FEMA, there have been 54 flood insurance claim payments for the 21 repetitive flood loss structures/properties located in Lee County.

**Are existing buildings, infrastructure and critical facilities vulnerable to flooding?**

Yes. **Figure 39** identifies the existing residential buildings by participating jurisdictions that are located within the floodplain and vulnerable to flooding. Aside from key roads and bridges, no other critical facilities or infrastructure vulnerable to flooding are located within the floodplain.

While only 13.3% of the area in Lee County is designated as being within the regulatory floodplain and susceptible to river floods, most of the County is vulnerable to flash floods. A majority of the buildings, and virtually all infrastructure and critical facilities that may be impacted by flooding are located outside of the regulatory floodplain.

Structural damage, such as cracks forming in foundations, can result from flooding. In most cases, however, the structural damage sustained during a flood occurs to the flooring, drywall

<b>Figure 38 Repetitive Flood Loss Properties</b>			
<b>Property Location</b>	<b>Structure Type</b>	<b>Number of Properties</b>	<b>Number of Flood Insurance Claim Payments</b>
Dixon	Single Family	1	2
Steward	Single Family	1	3
Unincorp. Lee County*	Single Family	17	41
Unincorp. Lee County^	Single Family	2	8
<b>Totals:</b>		21	54

\* These properties are located in unincorporated Lee County near Dixon. FEMA records associated the location of these properties with the nearest city, which is Dixon.

^ These properties are located in unincorporated Lee County near the Lee County/Whiteside County border. FEMA records associate the location of these properties with the nearest city, which is Sterling, Illinois in Whiteside County.

Sources: Owen, Jared. Hazard Mitigation Planner. Illinois Emergency Management Agency. "RE: Flood Letters." E-mail to Greg R. Michaud. April 15, 2010.

Smith, Tom. Planning Specialist – Mitigation Division. Federal Emergency Management Agency, Region V. "Repetitive flood loss properties in Lee County." E-mail to Kevin Lalley. May 5, 2010.

and wood framing. In addition to structural damage, a flood can also cause serious damage to a building's content. Infrastructure and critical facilities are also vulnerable to flooding. Roadways, culverts and bridges can be weakened by floodwaters and have been known to collapse under the weight of a vehicle. Buried power and communication lines are also vulnerable to flooding. Water can get into the lines and cause disruptions in power and communications.

<b>Figure 39 Existing Residential Buildings Vulnerable to Flooding in Lee County</b>	
<b>Participating Jurisdiction</b>	<b>Residential Buildings</b>
Amboy	31
Ashton	3
Dixon	160
Franklin Grove	0
Harmon	0
Steward	1
Sublette	0
Unincorporated Lee County	251

Source: McBride, Mike. Lee County GIS/IT Director. "FW: Emailing: Maps of Flood Plains & Tornadoes." Email to Andrea J. Bostwick. October 19, 2010.

Based on the fact that most of the County is vulnerable to flash flooding and a majority of the buildings, infrastructure and critical facilities that may be impacted are located outside of the regulatory floodplain, the vulnerability of buildings, infrastructure and critical facilities to flooding varies from medium to high.

**Are future buildings, infrastructure and critical facilities vulnerable to flooding?**

Yes and No. All of the participating jurisdictions that are subject to flooding (Amboy, Ashton, Dixon, Steward and unincorporated Lee County) take part in the National Flood Insurance Program (NFIP) and have adopted floodplain ordinances. Enforcement of these ordinances provides protection to any new building, infrastructure or critical facility built within a flood-prone area.

While new buildings, infrastructure and critical facilities should be protected from river flooding, they will still be vulnerable to flash flooding depending on the amount of precipitation that is received, the topography and land use changes.

**What are the potential dollar losses to vulnerable structures from flooding?**

**Residential**

The first step in determining potential dollar losses to vulnerable structures is to estimate the number of vulnerable buildings. This task was undertaken by the County’s GIS Department. Using the current DFIRMs, the Department was able to estimate the number of residential buildings within the floodplain for each of the participating jurisdictions. **Figure 40** lists the estimated number of vulnerable buildings by participating jurisdiction.

<b>Figure 40 Potential Dollar Losses to Vulnerable Residential Buildings from a Single Flood Event*</b>						
<b>Participating Jurisdiction</b>	<b>Estimated Number of Vulnerable Residential Buildings</b>	<b>Average Assessed Value</b>	<b>Average Market Value</b>	<b>Potential Dollar Losses</b>		<b>Total Potential Dollar Losses</b>
				<b>Housing Unit</b>	<b>Content</b>	
Amboy	31	\$26,578	\$79,734	\$494,351	\$741,526	\$1,235,877
Ashton	3	\$32,953	\$98,859	\$59,315	\$88,973	\$148,288
Dixon	160	\$29,008	\$87,024	\$2,784,768	\$4,177,152	\$6,961,920
Franklin Grove	0	\$29,072	\$87,216	\$0	\$0	\$0
Harmon	0	\$32,378	\$97,134	\$0	\$0	\$0
Steward	1	\$36,786	\$110,358	\$22,072	\$33,107	\$55,179
Sublette	0	\$41,039	\$123,117	\$0	\$0	\$0
Unincorporated Lee County	251	\$53,569	\$160,707	\$8,067,491	\$12,101,237	\$20,168,728

\* For the purposes of this scenario, it is assumed the vulnerable residential buildings are one or two story homes with basements that are flooded with two feet of water.

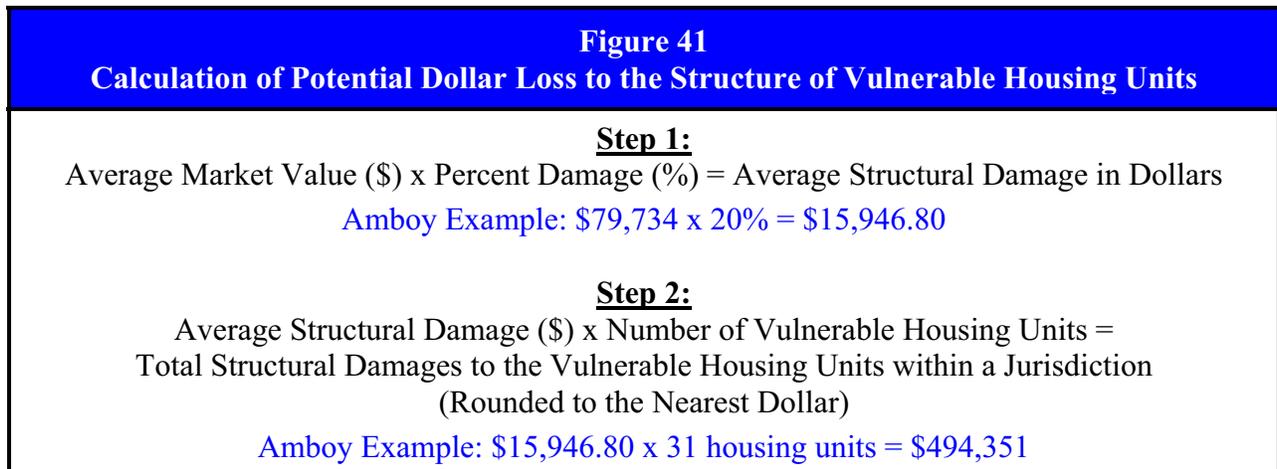
Sources: McBride, Mike. Lee County GIS/IT Director. “FW: Emailing: Maps of Flood Plains & Tornadoes.” Email to Andrea J. Bostwick. October 19, 2010.  
Ryerson, Wendy. Chief County Assessment Officer. “NHMP Mtg.” Email to Greg R. Michaud. July 13, 2010.

In order to begin calculating the total potential dollar losses to vulnerable residential buildings, the average assessed value must be determined. The average assessed value for each municipality was calculated from the 2009 tax assessment information provided by the Lee County Supervisor of Assessments. The average assessed value was then multiplied by three to determine the average market value (the assessed value of a structure in Lee County is

approximately one-third of the market value). The average market value was then used to calculate the damage or potential dollar loss to both the vulnerable housing units and their contents.

When comparing the average assessed value of a residential property in unincorporated Lee County to the average assessed value of a residential property in any of the participating municipalities, there is a moderate difference. This difference is attributed to several factors including larger parcel sizes and the inclusion of outbuildings (i.e., sheds, barns, etc.) in the averaged assessed value. In addition, there has been a recent trend towards building new, larger residences in unincorporated areas of the County.

To determine the potential dollar losses to the **structure of the vulnerable housing units**, start by taking the average market value and multiplying by the percent damage. For the purposes of this scenario, let's assume that the vulnerable residential buildings are one or two story homes with basements that are flooded with two feet of water. Based on FEMA guidance, the expected damage to the structure of the vulnerable housing units would be 20%. After calculating the adjusted average market value number, multiply it by the number of vulnerable housing units. **Figure 41** provides a sample calculation of potential dollar loss to the structure of vulnerable housing units.



Next, calculate the potential dollar losses to the **content of the vulnerable housing units**. This is determined in the same manner as the potential dollar losses to the vulnerable housing units. Take the average market value and multiply by the percent damage. Using the same assumption as above, the FEMA guidance estimates that the expected damage to the content of the vulnerable housing units would be 30%. After determining the adjusted average market value number, multiply it by the number of vulnerable housing units. **Figure 42** provides a sample calculation of potential dollar loss to the content of vulnerable housing units.

Finally, the total potential dollar losses may be calculated by adding together the potential dollar losses to the vulnerable housing units and the potential dollar losses to the content of the vulnerable housing units. **Figure 40** provides an estimate of the total potential dollar losses by participating jurisdiction.

**Figure 42**  
**Calculation of Potential Dollar Loss to the Content of Vulnerable Housing Units**

**Step 1:**

Average Market Value (\$) x Percent Damage (%) = Average Content Damage in Dollars

Amboy Example: \$79,734 x 30% = \$23,920.20

**Step 2:**

Average Content Damage (\$) x Number of Vulnerable Housing Units =  
Total Content Damages to the Vulnerable Housing Units within a Jurisdiction  
(Rounded to the Nearest Dollar)

Amboy Example: \$23,920.20 x 31 housing units = \$741,526

This assessment illustrates why potential residential dollar losses should be considered when participating jurisdictions are deciding which mitigation projects to pursue. Potential dollar losses caused by flooding to vulnerable residences within the participating municipalities would be expected to range from \$55,000 to \$7 million. There are three participating municipalities in this scenario who do not have any residences considered vulnerable to flooding.

**Infrastructure & Critical Facilities**

No other above-ground infrastructure or critical facilities within the participating jurisdictions, other than key roads and bridges, were identified as being vulnerable to flooding.

**Considerations**

The calculations presented above are meant to provide the reader with a sense of the scope or magnitude of a large flood event in dollars. These calculations do not address the physical damages sustained by businesses or other infrastructure, such as roads and bridges. These calculations also do not address the monetary impacts to businesses who can not operate or lose goods through the failure of crucial services (i.e., power, drinking water and sewer). While average dollar amounts can not be supplied for these items at this time, they should be taken into account when officials discuss the overall impacts that a large-scale flood event would have on their jurisdiction.

## 3.5 DROUGHT

### IDENTIFYING THE HAZARD

#### What is the definition of a drought?

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. This deficiency results in a water shortage for some activity, group or environmental sector.

There are four types of drought. They are differentiated based on the use and need for water. The following provides a brief description of each type.

- **Meteorological Drought.** Meteorological drought is a period of well-below-average precipitation that spans a few months to a few years. It can be identified by a shortfall in precipitation. Due to climate differences, what might be considered a drought in one location of the country may not be in another location.
- **Agricultural Drought.** An agricultural drought is a period when soil moisture no longer meets the needs of a particular crop to germinate and grow. It can be identified by a deficit in soil moisture.
- **Hydrological Drought.** Hydrological drought is a period when surface and subsurface water supplies (i.e., streams, lakes, aquifers, etc.) drop below normal levels. It can be identified by a deficit in surface and groundwater.
- **Socioeconomic Drought.** Socioeconomic drought is a period when water shortages begin to affect people. In this case, 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.

#### How are droughts measured?

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. Although none of the major indices are inherently superior to the rest, some are better suited than others for certain uses.

Two of the indices highlighted in this plan are: the Palmer Drought Severity Index (PDSI) and the U.S. Drought Monitor. The PDSI was the first comprehensive drought index developed in the United States and is still in use today. It is designed to indicate when weather conditions have been abnormally dry or wet and provides a standardized method of identifying and comparing drought conditions regardless of time or location.

The U.S. Drought Monitor is a relatively new index that combines quantitative measures with input from experts in the field. 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. In the last several years, the National Oceanic and Atmospheric Administration 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.

The following provides a more detailed discussion of these two indices to aid the plan’s developers and the general public in understanding how droughts are identified and categorized. The information used to prepare this section utilized one or both of these indices to identify previous drought events recorded in the County.

#### **Palmer Drought Severity Index (PDSI)**

The Palmer Drought Severity Index (PDSI), developed in 1965, was the first comprehensive drought index used in the United States. The PDSI 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.

The PDSI has been useful as a drought monitoring tool and many federal and state agencies rely on it 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. It is not as well suited for use in the western states, with their mountainous terrain and varying climate extremes.

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). **Figure 43** shows the classification system utilized by the Palmer Drought Severity Index.

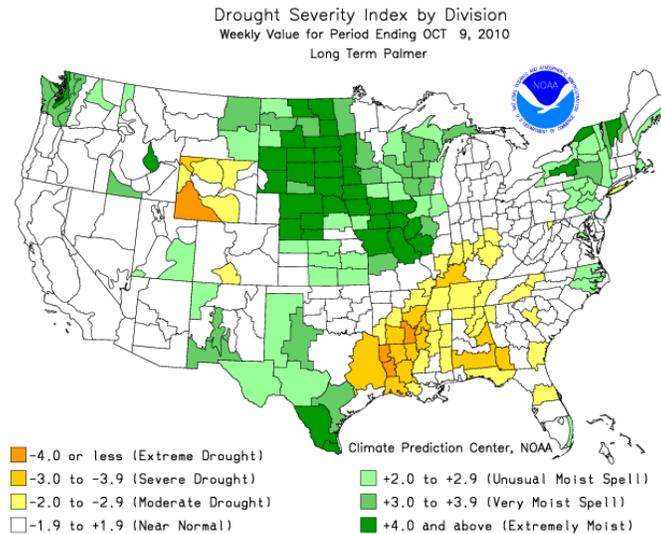
Calculations of the PDSI are made for 350 climate divisions in the United States and Puerto Rico. PDSI values have typically been calculated on a monthly basis. The National Climate Data Center has records on the monthly PDSI values for every climate division in the United States dating back to 1895.

In addition to the monthly calculations, weekly PDSI values are now being calculated for the climate divisions during every growing season. NOAA’s Climate Prediction Center produces a weekly map that shows the climate divisions and their PDSI value by color. **Figure 44** shows an example of this map.

<b>Figure 43 Palmer Classification System</b>	
<b>Index Value</b>	<b>Description</b>
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, “What is Drought? – Drought Indices”, Dr. Michael J. Hayes, Climate Impacts Specialist, 2006.

**Figure 44  
Palmer Drought Severity Index Map**



Source: National Oceanic and Atmospheric Administration, Climate Prediction Center, Drought Monitoring.

### U.S. Drought Monitor

A relatively new tool used for assessing drought conditions is the U.S. Drought Monitor. The U.S. Drought Monitor is unique in that it blends multiple numeric measures of drought with the best judgments of experts to create a weekly map that depicts drought conditions across the United States. It began in 1999 as a federal, state and academic partnership, growing out of a Western Governors’ Association initiative to provide timely and understandable scientific information on water supplies and drought for policymakers.

The Drought Monitor is produced by a rotating group of authors from the U.S. Department of Agriculture, the National Oceanic and Atmospheric Administration and the National Drought Mitigation Center located at the University of Nebraska – Lincoln. It incorporates reviews from a group of 250 climatologists, extension agents and others across the nation.

The Drought Monitor utilizes five drought intensity categories, D0 through D4, to identify areas of drought. **Figure 45** provides a brief description of each category.

<b>Figure 45</b>	
<b>U.S. Drought Monitor – Drought Severity Classifications</b>	
<b>Category</b>	<b>Possible Impacts</b>
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

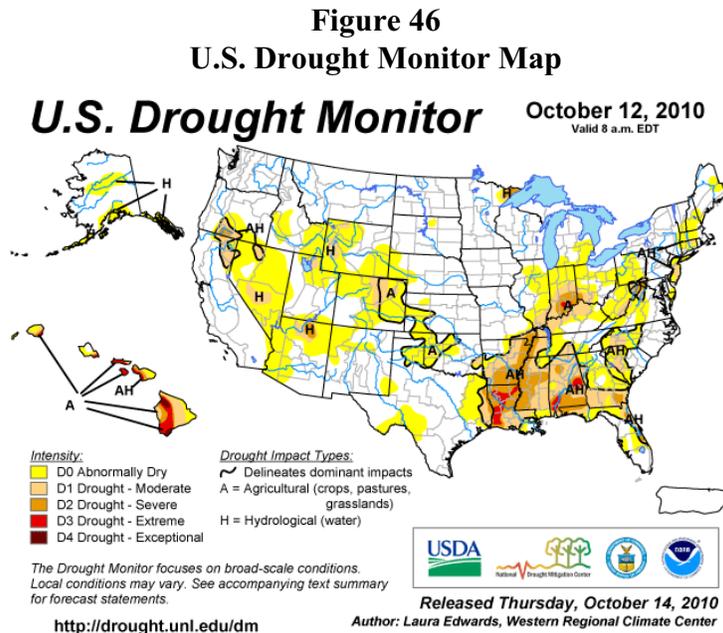
Source: National Integrated Drought Information System, U.S. Drought Portal, “Drought Monitor: State-of-the-Art Blend of Science and Subjectivity”, U.S. Drought Monitor, January 2008.

The drought intensity categories are based on five key indicators and numerous supplementary indicators. The five key indicators include the Palmer Drought Severity Index, Climate Prediction Center’s Soil Moisture Model (percentiles), United States Geological Survey Weekly Streamflow (percentiles), Standardized Precipitation Index and Objective Short and Long-term Drought Indicator Blends (percentiles).

Because the ranges of the various indicators often don’t coincide, the final drought category tends to be based on what a majority of the indicators show. The authors also weight the indices according to how well they perform in various parts of the country and at different times of the year. While the maps are based in part on the key indices and other measures of moisture, they also incorporate real-world conditions as reported by numerous experts throughout the country, providing a more comprehensive approach to identifying and monitoring drought conditions.

In addition to identifying and categorizing general areas of drought, the weekly map also identifies whether a drought’s impacts are agricultural (crops, pastures and grasslands) and/or hydrological (rivers, groundwater and reservoirs). **Figure 46** shows an example of the U.S. Drought Monitor weekly map. A summary also accompanies the map outlining the general conditions by regions.

The U.S. Drought Monitor is designed to provide a general and up-to-date overview of current drought conditions. It is not designed 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 be locations with adequate water supplies in an area designated as D3 or D4.



Source: Drought Monitor, National Drought Mitigation Center, U.S. Drought Monitor.

## PROFILING THE HAZARD

### When have droughts occurred previously? What is the extent of these previous droughts?

The following summarizes the previous occurrences as well as the extent or severity of the drought events in Lee County. Information obtained from the Storm Events Database and the Illinois Emergency Management Agency show three reported drought events in Lee County between 1983 and 2009.

- In 1983, all 102 Illinois counties were proclaimed state disaster areas because of high temperatures and insufficient precipitation beginning in mid-June.
- In 1988, all of the counties in Illinois (including Lee 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 2005-2006, drought conditions impacted much of the state, including Lee 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.

For each event lower than normal precipitation levels were recorded between April and June and unusually dry weather conditions persisted throughout the summer months. The Illinois State Water Survey records indicate that droughts also occurred in the region in 1931, 1934, 1936 and 1954; however, the extent to which Lee County was impacted was unavailable.

**What locations are affected by drought?**

Drought events affect the entire County. All communities in Lee County have been affected by drought. Droughts, like extreme heat and severe winter storms, tend to impact large areas, extending beyond county boundaries. The *2010 Illinois Natural Hazard Mitigation Plan* classifies Lee County’s hazard rating for drought as “guarded.”

**What is the probability of future drought events occurring?**

Lee County has experienced three droughts between 1983 and 2009. With three occurrences over 27 years, the probability or likelihood that Lee County may experience a drought in any given year is 11%. However, if earlier recorded droughts are factored in, then the probability that Lee County may experience a drought in any given year decreases slightly to 9%.

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**ASSESSING VULNERABILITY**

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**Are the participating jurisdictions vulnerable to drought?**

Yes. All of Lee County is vulnerable to drought. Neither the amount nor distribution of precipitation, soil types, topography, or water table conditions provides protection for any area within Lee County.

**What impacts resulted from the recorded drought events?**

Comprehensive damage information was either unavailable or none was reported for any of the three recorded events. Disaster relief payment information was only available for one of the recorded events. Landowners and farmers in Illinois were paid in excess of \$382 million in disaster relief payments for the 1988 drought.

No injuries or deaths were reported as a result of any of the recorded drought events in Lee County. Consequently, the risk or vulnerability to public health and safety from drought is low.

**What other impacts can result from drought events?**

Based on statewide drought records available from the Illinois State Water Survey, the most common impacts that result from severe drought events in Illinois include reductions in crop yields and drinking water shortages. Even though no drought-related impact information was provided for Lee County, information gathered from County residents indicates the impacts experienced during the recorded drought events were similar to those seen statewide.



*Drought in Lee County has caused significant reductions in crop yields.*

*Crop Yield Reductions*

Agriculture is a major industry in Lee County. According to the 2007 Census of Agriculture, there were 898 farms in Lee County occupying 395,624 acres. Farm land accounts for approximately 85% of all the land in Lee County. Of the 395,624 acres of farm land, approximately 95% or 377,611 acres of this land was in crop production. Less than one percent of this land is irrigated.

Crop sales accounted for \$195,871,000 in revenue while livestock sales accounted for \$18,497,000. A severe drought would have a financial impact on the large agricultural community, particularly if it occurred during the growing season. Dry weather conditions, particularly when accompanied by excessive heat, can result in diminished crop yields and place stress on livestock.

A reduction in crop yields was seen as a result of the 1983, 1988 and 2005 droughts. **Figure 47** illustrates the reduction in yields seen for corn and soybeans during the three recorded drought events. Records obtained from the United States Department of Agriculture’s National Agricultural Statistics Service show that the 1983 drought resulted in corn yield reductions of 22%, while soybeans did not experience any reductions in yields. In 1983, 103 bushels per acre were harvested for corn in contrast to 132 bushels per acres of corn the previous year.

<b>Figure 47</b>				
<b>Crop Yield Reductions Due To Drought in Lee County</b>				
<b>Year</b>	<b>Corn</b>		<b>Soybeans</b>	
	<b>Yield (bushel)</b>	<b>% Reduction from Previous Year</b>	<b>Yield (bushel)</b>	<b>% Reduction from Previous Year</b>
1982	132	---	40	---
<b>1983</b>	<b>103</b>	<b>22%</b>	<b>40.5</b>	<b>0%</b>
1987	123	---	42.5	---
<b>1988</b>	<b>67</b>	<b>46%</b>	<b>27.5</b>	<b>35%</b>
2004	185	---	49	---
<b>2005</b>	<b>142</b>	<b>23%</b>	<b>47</b>	<b>4%</b>
2006	188	---	53	---

Source: United States Department of Agriculture, National Agricultural Statistics Service, Quick Stats – Crops, Lee County, Illinois, 2010.

Corn yield reductions were 46% and soybean yield reductions were 35% as a result of the 1988 drought when only 67 bushels per acre of corn and 27.5 bushels per acre of soybeans were harvested in contrast to 123 bushels per acre of corn and 42.5 bushels per acre of soybeans harvested the previous year. The 2005-2006 drought caused a 23% yield reduction in corn and 4% yield reduction in soybeans for 2005, but did not impact yields in 2006. In 2005, 142 bushels per acre of corn and 47 bushels per acre of soybeans were harvested in contrast to 185 bushels per acre of corn and 49 bushels per acre of soybeans harvested the previous year.

*Drinking Water Shortages*

Municipalities that rely on surface water sources for their drinking water supplies are more vulnerable to shortages as a result of drought. However, in Lee County, none of the participating

municipalities rely on surface water sources for their drinking water supplies. All obtain water from deep underground wells. As a result, they are less vulnerable to drinking water shortages, although a prolonged drought or a series of droughts in close succession do have the potential to impact water levels in aquifers used for providing drinking water wells that primarily serve farms. Low water levels can also adversely affect fishing and boating activities on lakes and ponds.

**Are existing buildings, infrastructure and critical facilities vulnerable to drought?**

No. In general, existing buildings, infrastructure and critical facilities located in Lee County and the participating jurisdictions are not vulnerable to drought. As with extreme heat events, droughts typically do not cause damage to buildings, infrastructure or critical facilities. The true concern centers on the financial impacts that result from loss of crop yields.

While buildings do not typically sustain damage from drought events, in rare cases infrastructure and critical facilities may be directly or indirectly impacted. While uncommon, droughts can contribute to damage caused to roadways. Severe soil shrinkage can compromise the foundation of a roadway and lead to cracking and buckling. Prolonged heat associated with drought can also increase the demand for energy to operate air conditioners, fans and other devices. This increase in demand places stress on the electrical grid which increases the likelihood of power outages. Additionally, droughts have the potential to impact drinking water supplies. Reductions in the water levels of wells and surface water supplies can cause water shortages that require water conservation measures to be enacted in an effort to maintain a sufficient supply of water to provide drinking water and fight fires.

In general, the risk or vulnerability to buildings, infrastructure and critical facilities from drought is low, even taking into consideration the potential impact a drought may have on drinking water supplies and the stress that prolonged heat may place on the electrical grid.

**Are future buildings, infrastructure and critical facilities vulnerable to drought?**

No. Future buildings, infrastructure and critical facilities within the County are no more vulnerable to drought than the existing building, infrastructure and critical facilities. As discussed above, buildings do not typically sustain damage from drought. Infrastructure and critical facilities may, in rare cases, be damaged by drought, but very little can be done to prevent this damage.

**What are the potential dollar losses to vulnerable structures from drought?**

Unlike other natural hazards that affect the County, drought does not typically damage buildings. The primary concern associated with drought is loss of crop yield and the potential impacts to drinking water supplies. With no comprehensive damage information available for previous occurrences there is no way to accurately estimate future potential dollar losses. However, since a major portion of the County is involved in farming activities, it is likely that there will be future dollar losses to drought. In addition, reduced water levels and the water conservation measures that typically accompany a drought will most likely impact businesses and industries that are water-dependent (i.e., car washes, landscapers etc.).

## 3.6 EXTREME HEAT

### IDENTIFYING THE HAZARD

#### What is the definition of extreme heat?

Extreme heat is characterized by temperatures that hover 10 degrees or more above the average high temperature of a region for several days to several weeks. In comparison, a heat wave is generally defined as a period of at least three consecutive days above 90°F.

Extreme heat events are usually a result of both high temperatures and high relative humidity. (Relative humidity refers to the amount of moisture in the air.) The higher the relative humidity or the more moisture in the air, the less likely that evaporation will take place. This becomes significant when high relative humidity is coupled with soaring temperatures. On hot days the human body relies on the evaporation of perspiration or sweat to cool and regulate the body's internal temperature. Sweating does nothing to cool the body unless the water is removed by evaporation. When the relative humidity is high, then the evaporation process is hindered, robbing the body of its ability to cool itself.

On average, more than 1,500 people die in the United States each year from extreme heat. This number is greater than the 30-year mean annual number of deaths due to tornadoes, hurricanes, floods and lightning combined. In an effort to raise the public's awareness of the hazards of extreme heat, the National Weather Service has devised the "Heat Index".

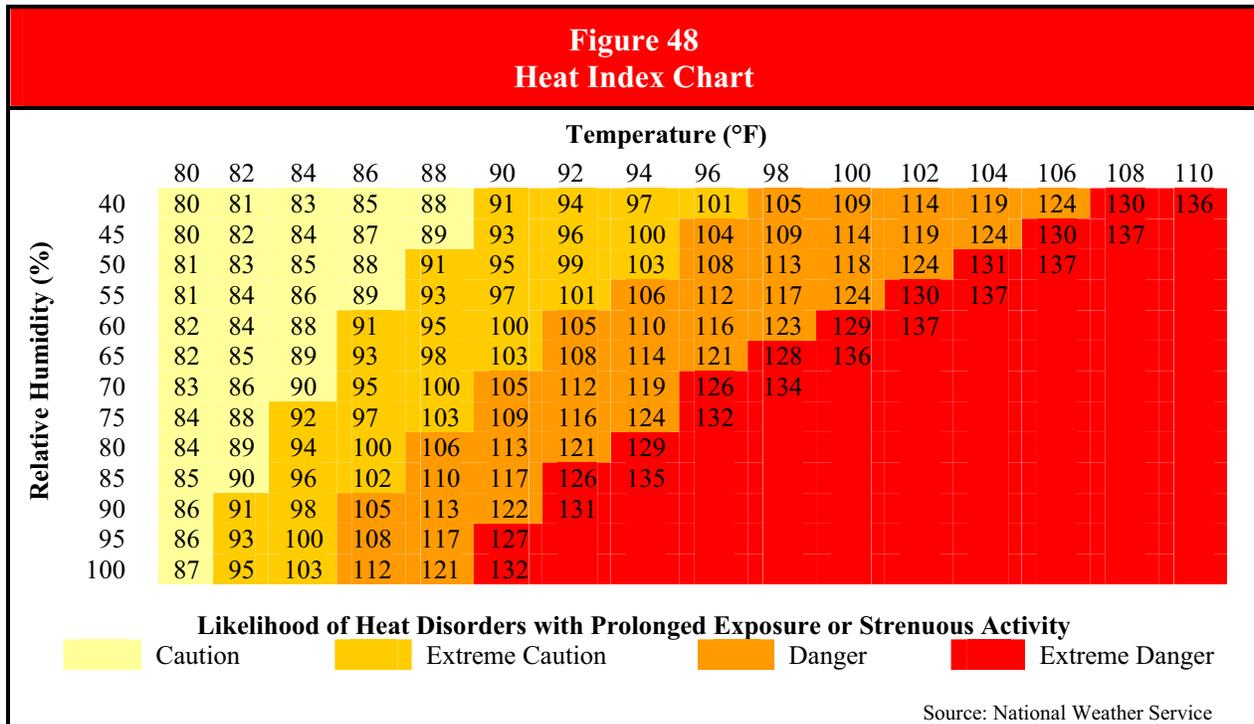
#### What is the Heat Index?

The Heat Index, sometimes referred to as the "apparent temperature", is a measure of how hot it feels when relative humidity is added to the actual air temperature. **Figure 48** shows the Heat Index as it corresponds to various air temperatures and relative humidity. As an example, if the air temperature is 96°F and the relative humidity is 65%, then the Heat Index would be 121°F. It should be noted that the Heat Index values were devised for shady, light wind conditions. Exposure to full sunshine can increase Heat Index values by up to 15°F. Also strong winds, particularly with very hot, very dry air, can be extremely hazardous. When the Heat Index reaches 105°F or greater, there is an increased likelihood that continued exposure and/or physical activity will lead to individuals developing severe heat disorders.

#### What are heat disorders?

Heat disorders are a group of illnesses caused by prolonged exposure to hot temperatures and are characterized by the body's inability to shed excess heat. These disorders develop when the heat gain exceeds the level the body can remove or if the body cannot compensate for fluids and salt lost through perspiration. In either case the body loses its ability to regulate its internal temperature. All heat disorders share one common feature: the individual has been overexposed to heat, or over exercised for their age and physical condition on a hot day. The following describes the symptoms associated with the different heat disorders.

- **Sunburn.** Sunburn is characterized by redness and pain of skin exposed too long to the sun without proper protection. In severe cases it can cause swelling, blisters, fever and headaches. It can significantly retard the skin's ability to shed excess heat.



- **Heat Cramps.** Heat cramps are characterized by heavy sweating and painful spasms, usually in the muscles of the legs and possibly the abdomen. The loss of fluid through perspiration leaves the body dehydrated resulting in muscle cramps. This is usually the first sign that the body is experiencing trouble dealing with heat.
- **Heat Exhaustion.** Heat exhaustion is characterized by heavy sweating, weakness, nausea, exhaustion, dizziness and faintness. Breathing may become rapid and shallow and the pulse thready (weak). The skin may appear cool, moist and pale. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a mild form of shock. If not treated, the victim’s condition will worsen.
- **Heat Stroke (Sunstroke).** Heat stroke is life-threatening condition characterized by a high body temperature (106°F or higher). The skin appears to be dry and flushed with very little perspiration present. The individual may become mentally confused and aggressive. The pulse is rapid and strong. There is a possibility that the individual will faint or slip into unconsciousness. If the body is not cooled quickly, then brain damage and death may result.

Studies indicate that, all things being equal, the severity of heat disorders tend to increase with age. Heat cramps in a 17-year-old may be heat exhaustion in someone 40 and heat stroke in a person over 60. Elderly persons, small children, chronic invalids, those on certain medications and persons with weight or alcohol problems are particularly susceptible to heat reactions.

**Figure 49** below indicates the heat index at which individuals, particularly those in higher risk groups, might experience heat-related disorders. Generally, when the heat index is expected to

exceed 105°F, the National Weather Service will initiate extreme or excessive heat alert procedures.

<b>Figure 49 Relationship between Heat Index and Heat Disorders</b>	
<b>Heat Index (°F)</b>	<b>Heat Disorders</b>
80°F – 90°F	Fatigue is possible with prolonged exposure and/or physical activity
90°F – 105°F	Heat cramps, heat exhaustion and heat stroke possible with prolonged exposure and/or physical activity
105°F – 130°F	Heat cramps, heat exhaustion and heat stroke likely; heat stroke possible with prolonged exposure and/or physical activity
130°F or Higher	Heat stroke highly likely with continued exposure

Source: NOAA, “Heat Wave: A Major Summer Killer” brochure.

### What is an excessive heat alert?

An excessive heat alert is an advisory or warning issued by the National Weather Service when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines the type of alert issued. There are four types of alerts that can be issued for an extreme heat event. The following provides a brief description of each type of alert based on the excessive heat advisory/warning criteria established by National Weather Service Weather Forecast Office in Chicago, Illinois. The Chicago office is responsible for issuing alerts for Lee County.

- **Excessive Heat Outlook.** An excessive heat outlook is issued when the potential exists for an excessive heat event to develop over the next three to seven days.
- **Excessive Heat Watch.** An excessive heat watch is issued when conditions are favorable for an excessive heat event to occur within the next 12 to 48 hours.
- **Excessive Heat Advisory (northern Illinois).** An excessive heat advisory is issued when the heat index is expected to be between 105°F and 110°F, with a minimum temperature of 75°F or higher for two or more consecutive days.
- **Excessive Heat Warning (northern Illinois).** An excessive heat warning is issued when the heat index is expected to equal or exceed 110°F and the minimum temperature is 75°F for two or more consecutive days.

## PROFILING THE HAZARD

### When have extreme heat events occurred previously? What is the extent of these extreme heat events?

Only one extreme heat event has been recorded by the National Oceanic and Atmospheric Administration’s Storm Events Database for Lee County. Between July 12, 1995 and July 16, 1995 an extreme heat event affected all of northern Illinois, including Lee County. The temperatures for this time period soared into the middle to upper 90s and the heat index reached a high of 125°F. According to the Midwestern Regional Climate Center, the highest temperature recorded in Lee County over the last 110 years was 110°F on July 14, 1936. More recently

recorded high temperatures include 108°F on July 21, 2001 in Ashton, 101°F on July 14, 1995 in Compton, and 101°F on June 26, 1988 in Paw Paw.

**What locations are affected by extreme heat?**

Extreme heat events affect the entire County. A single extreme heat event will generally extend across an entire region and affect multiple counties. The *2010 Illinois Natural Hazard Mitigation Plan* classifies Lee County’s hazard rating for extreme heat as “elevated.”

**What is the probability of future extreme heat events occurring?**

Lee County has experienced one verified extreme heat event between 1995 and 2009. With one occurrence over the past 15 years, the probability or likelihood that the County may experience an extreme heat event in any given year is 7%.

<b>ASSESSING VULNERABILITY</b>
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**Are the participating jurisdictions vulnerable to extreme heat?**

Yes. All of Lee County is vulnerable to extreme heat. One extreme heat event was recorded over the past 15 years. There are no official state-designated cooling centers located in Lee County.

**What impacts resulted from the recorded extreme heat events?**

There were reports of road buckling and power outages as a result of the July 12, 1995 event; however the locations and the extent of the damages were not recorded. Property and crop damage information was either unavailable or none was recorded for this event. Approximately 583 heat-related deaths were recorded as a result of this event in Illinois; however none were reported in Lee County. While no heat-related injuries were reported, the heat indices were sufficiently high to produce heat cramps or heat exhaustion with the possibility of heat stroke in cases of prolonged exposure or physical activity. In comparison, Illinois averages 74 deaths per year as a result of extreme heat. Extreme heat has triggered more deaths than any other natural hazard in Illinois. More deaths are attributed to extreme heat than the combined number of deaths attributed to floods, tornadoes, lightning and extreme cold.

While extreme heat events occur in Lee County, no specific injuries or deaths have been reported. This does not mean, however, that none have occurred; it simply means that extreme heat was not identified as the primary cause. This is especially true for deaths. Usually heat is not listed as the primary cause of death, but rather an underlying cause. However, even if injuries and death due to extreme heat are under reported in Lee County, the risk or vulnerability to public health and safety from extreme heat is relatively low for the general population. The risk or vulnerability is elevated to medium for sensitive populations such as the elderly, small children, chronic invalids, those on certain medications and persons with weight or alcohol problems who are more susceptible to heat reactions.

**What other impacts can result from extreme heat events?**

Other impacts of extreme heat include early school dismissals and school closings. In addition, extreme heat events can lead to an increase in water usage and may result in municipalities

imposing water use restrictions when water is obtained from lakes or rivers. In Lee County, extreme heat should not impact municipal water supplies since there are none that obtain their water from surface water bodies.

**Are existing buildings, infrastructure and critical facilities vulnerable to extreme heat?**

No. In general, existing buildings, infrastructure and critical facilities located in Lee County and the participating jurisdictions are not vulnerable to extreme heat events. Unlike other natural hazards such as floods, earthquakes or tornadoes, extreme heat events in Lee County typically do not cause damage to buildings, infrastructure or critical facilities. The true concern is for the health and safety of those living in the County.

While buildings do not typically sustain damage from extreme heat events, in rare cases infrastructure and critical facilities may be directly or indirectly damaged by an event. While uncommon, extreme heat events have been known to contribute to damage caused to roadways within Lee County. The combination of extreme heat and vehicle loads has caused pavement cracking and buckling. Extreme heat events have also been known to indirectly contribute to disruptions in the electrical grid. When the temperatures rise, the demand for energy also rises in order to operate air conditioners, fans and other devices. This increase in demand places stress on the electrical grid components increasing the likelihood of power outages. While not common in Lee County, there is the potential for this to occur. The potential may increase over the next two decades if new power plants are not built to replace the state's aging nuclear power facilities that are expected to be decommissioned.

In general, the risk or vulnerability to buildings, infrastructure and critical facilities from extreme heat events is low, even taking into consideration the potential for disruptions to the electrical grid.

**Are future buildings, infrastructure and critical facilities vulnerable to extreme heat?**

No. Future buildings, infrastructure and critical facilities within the County are no more vulnerable to extreme heat events than the existing building, infrastructure and critical facilities. As discussed above, buildings do not typically sustain damage from extreme heat events. Infrastructure and critical facilities may, in rare cases, be damaged by extreme heat, but very little can be done to prevent this damage.

**What are the potential dollar losses to vulnerable structures from extreme heat?**

Unlike other natural hazards that affect the County, extreme heat events do not typically damage buildings. The primary concern associated with extreme heat is the health and safety of those living in the County, especially vulnerable populations such as the elderly, infants, young children and those with medical conditions.

Unlike other counties within the region, Lee County does not have large urban areas where living conditions such as older, poorly-ventilated high rise buildings and low-income neighborhoods tend to contribute to heat-related deaths and injuries during extreme heat events because air-conditioning units, fans and cooling centers are unavailable.

### 3.7 EARTHQUAKE

#### IDENTIFYING THE HAZARD

##### What is the definition of an earthquake?

An earthquake is a sudden shaking of the ground caused when rocks forming the earth's crust slip or move past each other along a fault (a fracture in the rocks). Most earthquakes occur along the boundaries of the earth's tectonic plates. These slow-moving plates are being pulled and dragged in different directions, sliding over, under and past each other. Occasionally, as the plates move past each other, their jagged edges will catch or stick causing a gradual buildup of pressure (energy). Eventually, the force exerted by the moving plates overcomes the resistance at the edges and the plates snap into a new position. This abrupt shift releases the pent-up energy, producing vibrations or seismic waves that travel outward from the earthquake's point of origin. The location below the earth's surface where the earthquake starts is known as the hypocenter or focus. The point on the earth's surface directly above the focus is the epicenter.

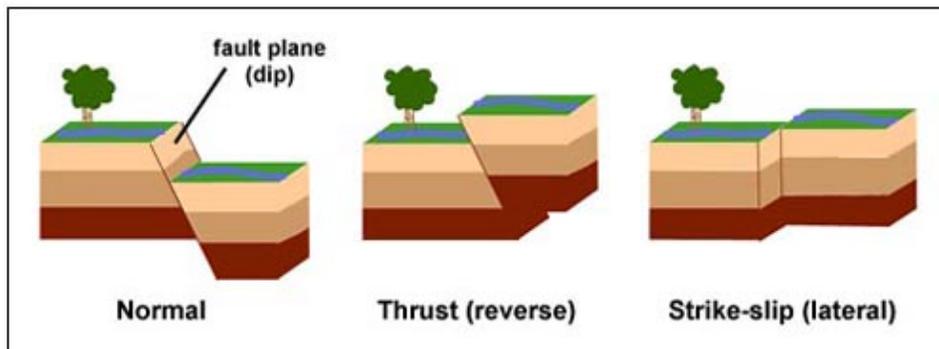
The destruction caused by an earthquake may range from light to catastrophic depending on a number of factors including the magnitude of the earthquake, the distance from the epicenter, the local geologic conditions as well as construction standards and time of day (i.e., rush hour). Earthquake damage may include power outages, general property damage, road and bridge failure, collapsed buildings and utility damage (ruptured gas lines, broken water mains, etc.). Most of the damage done by an earthquake is caused by its secondary or indirect effects. These secondary effects result from the seismic waves released by the earthquake and include ground shaking, surface faulting, liquefaction, landslides and, in rare cases, tsunamis.

##### What is a fault?

A fault is a fracture or zone of fractures in the earth's crust between two blocks of rock. They may range in length from a few millimeters to thousands of kilometers. Many faults form along tectonic plate boundaries.

Faults are classified based on the angle of the fault with respect to the surface (known as the dip) and the direction of slip or movement along the fault. There are three main groups of faults: normal, thrust (reverse) and strike-slip (lateral). **Figure 50** provides an illustration of each type of fault.

**Figure 50**  
**Fault Illustration**



Source: U. S. Geological Survey, Earthquake Hazards Program, "Visual Glossary – fault".

Normal faults occur in response to pulling or tension along the two blocks of rock causing the overlying block to move down the dip of the fault plane. Most of the faults in Illinois are normal faults. Thrust or reverse faults occur in response to squeezing or compression of the two blocks of rock causing the overlying block to move up the dip of the fault plane. Strike-slip or lateral faults can occur in response to either pulling/tension or squeezing/compression causing the blocks to move horizontally past each other.

Geologists have found that earthquakes tend to recur along faults, which reflect zones of weakness in the earth's crust. Even if a fault zone has recently experienced an earthquake, there is no guarantee that all the stress has been relieved. Another earthquake could still occur.

### **What are tectonic plates?**

Tectonic plates are large, irregularly-shaped, relatively rigid sections of the earth's crust that float on the top, fluid layer of the earth's mantle. There are about a dozen tectonic plates that make up the surface of the planet. These plates are approximately 50 to 60 miles thick and the largest are millions of square miles in size.

### **How are earthquakes measured?**

The severity of an earthquake is measured in terms of its magnitude and intensity. A brief description of both terms and the scales used to measure each are provided below.

#### Magnitude

Magnitude refers to the amount of seismic energy released at the hypocenter of an earthquake. The magnitude of an earthquake is determined from measurements of ground vibrations recorded by seismographs. As a result, magnitude is represented as a single, instrumentally determined value. A loose network of seismographs has been installed all over the world to help record and verify earthquake events.

There are several scales that measure the magnitude of an earthquake. The most well known is the Richter Scale. This logarithmic scale provides a numeric representation of the magnitude of an earthquake through the use of whole numbers and decimal fractions. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in ground vibrations measured. In addition, each whole number increase corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number. It is important to note that the Richter Scale is used only to determine the magnitude of an earthquake, it does not assess the damage that results.

Once an earthquake's magnitude has been confirmed, it can be classified. **Figure 51** categorizes earthquakes by class based on their magnitude (i.e., Richter Scale value). Any earthquake with a magnitude less than 3.0 on the Richter Scale is classified as a microquake while any earthquake with a magnitude of 8.0 or greater on the Richter Scale is considered a great earthquake. Earthquakes with a magnitude of 2.0 or less are not commonly felt by individuals. The largest earthquake to occur in the United States since 1900, took place off the coast of Alaska on March 28, 1964 and registered a 9.2 on the Richter Scale.

<b>Figure 51 Earthquake Magnitude Classes</b>	
<b>Class</b>	<b>Magnitude (Richter Scale)</b>
Micro	smaller than 3.0
Minor	3.0 – 3.9
Light	4.0 – 4.9
Moderate	5.0 – 5.9
Strong	6.0 – 6.9
Major	7.0 – 7.9
Great	8.0 or larger

Source: U.S. Geological Survey, Earthquake Hazards Program, “What are the earthquake magnitude classes?” FAQ – Measuring Earthquakes.

### Intensity

Intensity refers to the effect an earthquake has on a particular location. The intensity of an earthquake is determined from observations made of the damage inflicted on individuals, structures and the environment. As a result, intensity does not have a mathematical basis; instead it is an arbitrary ranking of observed effects. In addition, intensity generally diminishes with distance. There may be multiple intensity recordings for a region depending on a location’s distance from the epicenter.

Although numerous intensity scales have been developed over the years, the one currently used in the United States is the Modified Mercalli Intensity Scale. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. The lower numbers of the intensity scale are based on human observations (i.e., felt only by a few people at rest, felt quite noticeably by persons indoors, etc). The higher numbers of the scale are based on observed structural damage (i.e., broken windows, general damage to foundations etc.). Structural engineers usually contribute information when assigning intensity values of VIII or greater. **Figure 52** provides a description of the damages associated with each level of intensity as well as comparing Richter Scales values to Modified Mercalli Intensity Scale values.

Generally the Modified Mercalli Intensity value assigned to a specific site after an earthquake is a more meaningful measure of severity to the general public than magnitude because intensity refers to the effects actually experienced at that location.

### **When and where do earthquakes occur?**

Earthquakes can strike any location at any time. However, history has shown that most earthquakes occur in the same general areas year after year, principally in three large zones around the globe. The world’s greatest earthquake belt, the circum-Pacific seismic belt (nicknamed the “Ring of Fire”), is found along the rim of the Pacific Ocean, where about 81 percent of the world’s largest earthquakes occur. The second prominent belt is the Alpide, which extends from Java to Sumatra and through the Himalayan Mountains, the Mediterranean Sea and out into the Atlantic Ocean. It accounts for about 17 percent of the world’s largest earthquakes,

<b>Figure 52 Comparison of Richter Scale and Modified Mercalli Scale</b>		
<b>Richter Scale</b>	<b>Modified Mercalli Scale</b>	<b>Level of Damage</b>
≤ 4.3	I-IV Instrumental to Moderate	No damage.
4.4 – 4.8	V Rather Strong	Damage negligible. Small, unstable objects displaced or upset; some dishes and glassware broken.
4.9 – 5.4	VI Strong	Damage slight. Windows, dishes, glassware broken. Furniture moved or overturned. Weak plaster and masonry cracked.
5.5 – 6.1	VII Very Strong	Damage slight-moderate in well-built structures; considerable in poorly-built structures. Furniture and weak chimneys broken. Masonry damaged. Loose bricks, tiles, plaster and stones will fall.
6.2 – 6.5	VIII Destructive	Structure damage considerable, particularly to poorly built structures. Chimneys, monuments, towers, elevated tanks may fail. Frame houses moved. Trees damaged. Cracks in wet ground and steep slopes.
6.6 – 6.9	IX Ruinous	Structural damage severe; some will collapse. General damage to foundations. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground; liquefaction.
7.0 – 7.3	X Disastrous	Most masonry and frame structures/foundations destroyed. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Sand and mud shifting on beaches and flat land.
7.4 – 8.1	XI Very Disastrous	Few or no masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Rails bent. Widespread earth slumps and landslides.
> 8.1	XII Catastrophic	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted.

Source: FEMA for Kids: The Disaster Area – Intensity Scales, “Earthquakes – The Modified Mercalli Scale & The Richter Scale”.

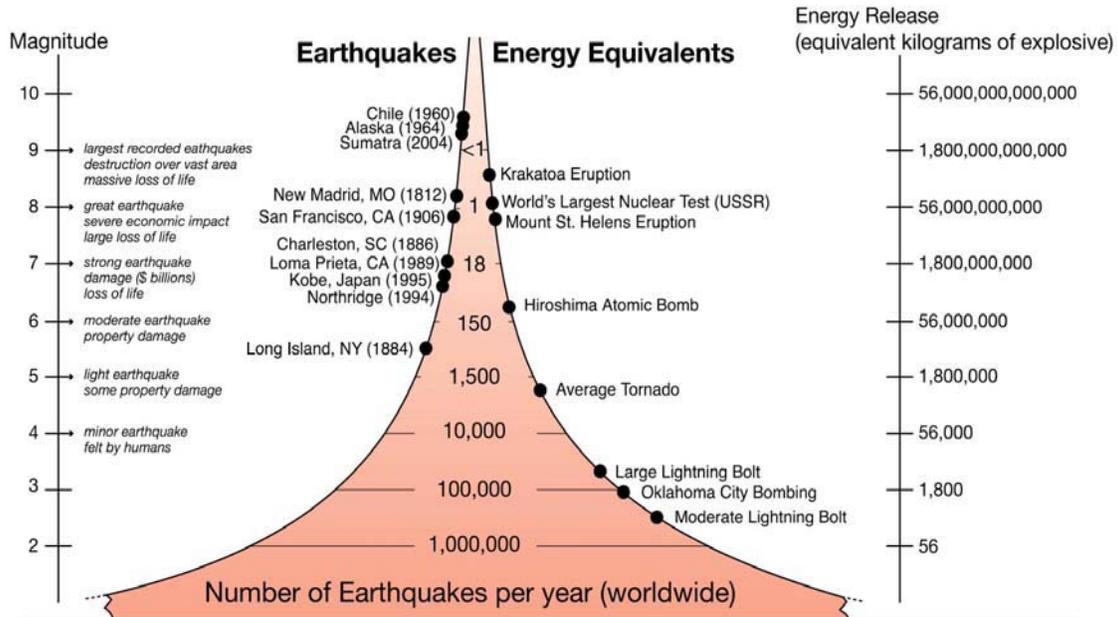
including those in Iran, Turkey and Pakistan. The third belt follows the submerged mid-Atlantic Ridge, the longest mountain range in the world, nearly splitting the entire Atlantic Ocean north to south.

While most earthquakes occur along plate boundaries some are known to occur within the interior of a plate. (As the plates continue to move and plate boundaries change over time, weakened boundary regions become part of the interiors of the plates.) Earthquakes can occur along zones of weakness within a plate in response to stresses that originate at the edges of the plate or from deep within the earth’s crust. The New Madrid earthquakes of 1811 and 1812 occurred within the North American plate.

**How often do earthquakes occur?**

Earthquakes occur everyday. Worldwide, small earthquakes, such as magnitude 2 earthquakes, occur several hundred times a day. These earthquakes are known as microquakes and are generally not felt by humans. Major earthquakes, such as magnitude 7 earthquakes, generally occur more than one a month. **Figure 53** illustrates the approximate number of earthquakes that occur worldwide per year based on magnitude. This figure also identifies manmade and natural events that release approximately the same amount of energy for comparison.

**Figure 53**  
**Approximate Number of Earthquakes Recorded Annually**



Source: "How Often Do Earthquakes Occur?", Education and Outreach Series Guide No. 3, Incorporated Research Institutions for Seismology.

## PROFILING THE HAZARD

### Are there any fault zones located within the County?

Yes. There is one known fault zone in Lee County, the Sandwich Fault Zone. The Sandwich Fault Zone is the largest fault zone in northern Illinois. It is approximately 85 miles long and runs northwest/southeast across northern Illinois, from central Ogle County to southern Will County. It varies in width from ½ mile to 2 miles. **Figure 54** illustrates the location of the Sandwich Fault Zone.

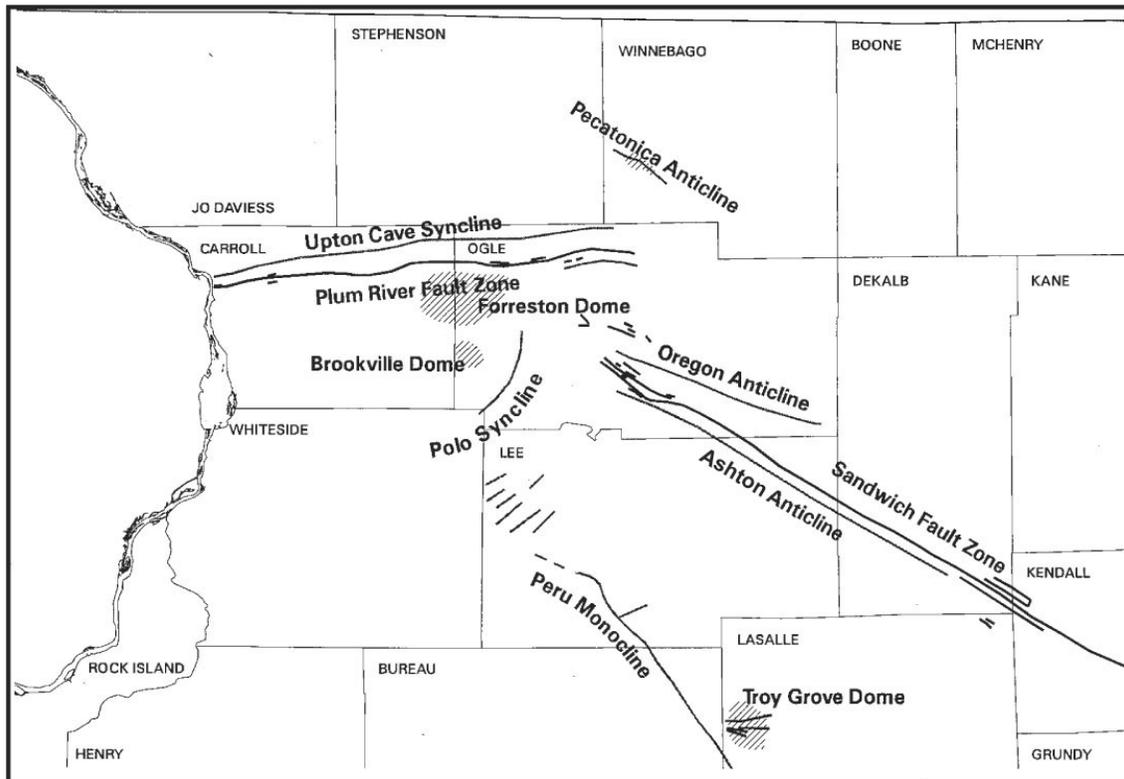
### When have earthquakes occurred previously? What is the extent of these previous earthquakes?

According to the Illinois State Geological Survey's *Northern Illinois Earthquakes* fact sheet and the *Earthquakes of Illinois: 1795 – 2010* map, one minor earthquake and one light earthquake have originated in Lee County during the last 200 years. The minor earthquake took place in 1999 and the light earthquake took place in 1972. In addition, there have been at least a dozen earthquakes that have occurred in northern Illinois in the last century, though none of them were greater than a magnitude 5.1. These earthquakes generally caused minor damage within 10 to 20 miles of the epicenter and were felt over several counties. Earthquakes greater than a magnitude 5 are generally not expected in this region.

The most recent earthquake to take place in northern Illinois occurred on February 10, 2010. This magnitude 3.8 earthquake was located approximately two miles northeast of Virgil in Kane County and was felt over much of Illinois, Indiana and central and southern Wisconsin. Some

minor structural damage was reported as a result of this earthquake. A magnitude 4.2 earthquake was reported in northern Illinois on June 28, 2004 approximately eight miles northwest of Ottawa in La Salle County. Ground shaking was felt over six states.

**Figure 54**  
**Geological Structures in Northern Illinois**



Source: "Northern Illinois Earthquakes," Earthquake Facts 1999-1, Illinois State Geological Survey.

On September 2, 1999, a magnitude 3.5 earthquake was reported in northern Illinois near Dixon in Lee County. This earthquake was not directly linked to any known fault in Northern Illinois. Ground shaking was felt over several counties. The September 2, 1999 earthquake occurred in roughly the same vicinity as the September 15, 1972 earthquake. A magnitude 4.5 earthquake was reported on September 15, 1972 near Amboy in Lee County. Minor structural damage, such as cracks in chimneys and plaster, was reported. Ground shaking was felt over most of northern Illinois.

The largest earthquake to take place in northern Illinois in the past several hundred years occurred on May 26, 1909. The exact location of this magnitude 5.1 earthquake isn't known, but the greatest damage occurred in and near Aurora where many chimneys fell and gas lines were ruptured. Minor structural damage was reported across northern and central Illinois and southern Wisconsin. Ground shaking was felt over seven states.

Lee County has also felt ground shaking caused by several earthquakes that have originated in southeastern Illinois. On April 18, 2008, a magnitude 5.2 earthquake was reported in

southeastern Illinois near Belmont in Wabash County. The earthquake was located along the Wabash Valley seismic zone. Minor structural damage was reported in several towns in Illinois and Kentucky. Ground shaking was felt over all or parts of 18 states in the central United States and southern Ontario, Canada.

On June 10, 1987 another magnitude 5.2 earthquake was reported in southeastern Illinois near Olney in Richland County. This earthquake was also located along the Wabash Valley seismic zone. Only minor structural damage was reported in several towns in Illinois and Indiana. Ground shaking was felt over all or parts of 17 states in the central and eastern United States and southern Ontario, Canada.

The strongest earthquake in the central United States during the 20<sup>th</sup> century occurred along the Wabash Valley seismic zone in southeastern Illinois near Dale in Hamilton County. This magnitude 5.3 earthquake occurred on November 9, 1968 with an intensity estimated at VII for the area surrounding the epicenter. Moderate structural damage was reported in several towns in south-central Illinois, southwest Indiana and northwest Kentucky. Ground shaking was felt over all or parts of 23 states in the central and eastern United States and southern Ontario, Canada.

One of the most seismically active areas of the United States east of the Rockies occurs along the New Madrid seismic zone which lies within the central Mississippi Valley, extending from northeast Arkansas, through southeast Missouri, western Tennessee, western Kentucky and southern Illinois. Since 1974 more than 4,000 earthquakes have been recorded within this seismic zone, most of which were too small to be felt.

Two of the three largest earthquakes ever recorded within the continental United States took place along the New Madrid seismic zone in 1811 and 1812 with magnitudes of 8.1 and 8.0 respectively. These great earthquakes, centered near the town of New Madrid, Missouri, devastated the surrounding region and rang church bells 1,000 miles away in Boston. The quakes locally changed the course of the St. Francis and Mississippi Rivers and created Reelfoot Lake, which covers an area of more than 10 square miles in northwestern Tennessee.

### **What locations are affected by earthquakes?**

Earthquake events affect the entire County. Earthquakes, like drought and extreme heat, impact large areas, extending beyond county boundaries. Lee County's proximity to two earthquake fault zones (the Plum River and the Sandwich) makes the entire area likely to be affected by an earthquake if these faults become seismically active. The *2010 Illinois Natural Hazard Mitigation Plan* classifies Lee County's hazard rating for earthquakes as "guarded."

### **What is the probability of future earthquake events occurring?**

As with flooding, calculating the probability of future earthquakes changes depending on the magnitude of the event. According to the Illinois State Geological Survey, Illinois is expected to experience a magnitude 3.0 earthquake every year, a magnitude 4.0 earthquake every four years and a magnitude 5.0 earthquake every 20 years. The likelihood of an earthquake with a magnitude of 6.3 or greater occurring somewhere in the central United States within the next 50 years is between 86% and 97%.

## ASSESSING VULNERABILITY

### **Are the participating jurisdictions vulnerable to earthquakes?**

Yes. All of Lee County is vulnerable to earthquakes. The unique geological formations topped with glacial drift soils found in the central United States conduct an earthquake's energy farther than in other parts of the Nation. Consequently, earthquakes that originate in the Midwest tend to be felt at greater distances than earthquakes with similar magnitudes that originate on the West Coast. This vulnerability, found throughout most of Illinois and all of Lee County, is compounded by relatively high water tables within the region. When earthquake shaking mixes the groundwater and soil, ground support is further weakened thus adding to the potential structural damages experienced by buildings, roads, bridges, electrical lines and natural gas pipelines.

The infrequency of major earthquakes, coupled with the relatively low magnitude/intensity of past events, has led the public to perceive that Lee County is not vulnerable to damaging earthquakes. This perception has allowed the County and participating jurisdictions to develop largely without regard to earthquake safety.

### **What impacts resulted from the recorded earthquake events?**

While residents of Lee County felt the earthquakes that occurred in northern Illinois in 2010, 2004, 1999, 1972 and 1909, damages were only reported as a result of the 1972 event. The September 15, 1972 earthquake caused minor structural damage such as cracks in chimneys and plaster. Given the magnitude of the great earthquakes of 1811 and 1812, it is almost certain that individuals in what is now Lee County felt those quakes; however historical records do not indicate the intensity or impacts that these quakes had on the County. If another earthquake the magnitude of those recorded 1811 and 1812 occurs again along the New Madrid seismic zone, the damage that will be experienced in northern Illinois is not expected to be substantial.

The risk or vulnerability to public health and safety from an earthquake is dependent on the intensity of the event. Since there is one known fault in Lee County, an earthquake may originate in the County at some point in the future, increasing the chances that damage will occur. However, since there have not been any earthquakes associated with this fault in over 200 years, there is a higher likelihood that Lee County residents will experience impacts from earthquakes that originate from outside of the County. As a result, the risk or vulnerability to public health and safety from a light earthquake such as the one that occurred on September 15, 1972 is low. However, if a great earthquake similar to those experienced in 1811 and 1812 were to originate in northern Illinois, then the risk or vulnerability to public health and safety would be elevated to high.

### **What other impacts can result from earthquakes?**

Earthquakes can impact human life, health and public safety. **Figure 55** details the potential impacts that may be experienced within the County should a magnitude 6.0 or greater earthquake ever occur in the region.

**Figure 55  
Potential Earthquake Impacts**

Direct	Indirect
<p><i>Buildings</i></p> <ul style="list-style-type: none"> <li>• Temporary displacement of businesses, households, schools and other critical services where heat, water and power are disrupted</li> <li>• Long-term displacement of businesses, households, schools and other critical services due to structural damage or fires</li> </ul> <p><i>Transportation</i></p> <ul style="list-style-type: none"> <li>• Damages to bridges (i.e., cracking of abutments, subsidence of piers/supports, etc.)</li> <li>• Cracks in the pavement of critical roadways</li> <li>• Increased traffic on I-39 and I-88 (especially if the quake originates along the Sandwich Fault) as residents move out of the region to seek shelter and medical care and as emergency response, support services and supplies move in to the region to aid in recovery.</li> <li>• Misalignment of rail lines due to landslides (most likely near stream crossings), fissures and/or heaving</li> </ul> <p><i>Utilities</i></p> <ul style="list-style-type: none"> <li>• Downed power and communication lines</li> <li>• Breaks in drinking water and sanitary sewer lines resulting in the temporary loss of service</li> <li>• Disruptions in the supply of natural gas due to cracking and breaking of pipelines</li> </ul> <p><i>Health</i></p> <ul style="list-style-type: none"> <li>• Injuries/deaths due to falling debris and fires</li> </ul> <p><i>Other</i></p> <ul style="list-style-type: none"> <li>• Cracks in the earthen dams of the lakes and reservoirs within the County which could lead to dam failures</li> </ul>	<p><i>Health</i></p> <ul style="list-style-type: none"> <li>• Use of County health facilities to treat individuals injured closer to the epicenter</li> <li>• Emergency services (ambulance, fire, law enforcement) may be needed to provide aid in areas where damage was greater</li> </ul> <p><i>Other</i></p> <ul style="list-style-type: none"> <li>• Disruptions in land line telephone service throughout an entire region (i.e., northern Illinois)</li> <li>• Depending on the seasonal conditions present, more displacements may be expected as those who may have enough water and food supplies seek alternate shelter due to temperature extremes that make their current housing uninhabitable.</li> </ul>

**Are existing buildings, infrastructure and critical facilities vulnerable to earthquakes?**

Yes. All existing buildings, infrastructure and critical facilities located in Lee County and the participating jurisdictions are vulnerable to damage from earthquakes. Unreinforced masonry buildings are most at risk during an earthquake because the walls are prone to collapse outward. Steel and wood buildings have more ability to absorb the energy from an earthquake. Wood buildings with proper foundation ties have rarely collapsed in earthquakes.

Depending on the intensity of the earthquake, building damage in Lee County could range from negligible to moderate in well-built structures and considerable in poorly-built structures. An earthquake has the ability to damage infrastructure and critical facilities such as roads and utilities. In the event of a strong earthquake, bridges are expected to experience moderate damage such as cracking in the abutments and subsidence of piers and supports. The structural integrity may be compromised to the degree where safe passage is not possible, resulting in

adverse travel times as alternate routes are taken. Some rural families may become isolated where alternate paved routes do not exist. In addition, cracks may form in the pavement of key roadways.

An earthquake may also down overhead power and communication lines causing power outages and disruptions in communications. Cracks or breaks may form in natural gas pipelines and drinking water and sewage lines resulting in temporary loss of service. In addition, an earthquake could cause cracks to form in the dams located within the County, increasing the likelihood of a dam failure.

As with public health and safety, the risk or vulnerability to buildings, infrastructure and critical facilities is dependent on the intensity of the event. The risk to buildings, infrastructure and critical facilities from a moderate earthquake is likely to be low, while the risk from a great earthquake is likely to be high.

**Are future buildings, infrastructure and critical facilities vulnerable to earthquakes?**

Yes. All future buildings, infrastructure and critical facilities located in Lee County and the participating jurisdictions are vulnerable to damage from earthquakes. While four of the participating municipalities have building codes in place, these codes do not contain seismic provisions that address structural vulnerability for earthquakes. As a result, future buildings, infrastructure and critical facilities face the same vulnerabilities as those of existing buildings, infrastructure and critical facilities described previously.

**What are the potential dollar losses to vulnerable structures from earthquakes?**

With no property damage estimates available for the recorded earthquake events, there is no way to accurately estimate future potential dollar losses to vulnerable structures in Lee County. Sufficient information was not available to make useful predictions regarding potential earthquake damage through the use of computer modeling. Since all structures within Lee County are vulnerable to damage, it is likely that there will be future dollar losses from a strong earthquake.

## 3.8 DAM FAILURE

### IDENTIFYING THE HAZARD

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#### **What is the definition of a dam?**

A dam is an artificial barrier constructed across a stream channel or a man-made basin for the purpose of storing, controlling or diverting water. Dams typically are constructed of earth, rock, concrete or mine tailings. The area directly behind the dam where water is impounded or stored is referred to as a reservoir.

According to the National Inventory of Dams (NID), there are approximately 83,983 dams in the United States and Puerto Rico, with 1,504 dams located in Illinois. (The NID is maintained by the U.S. Army Corps of Engineers and is updated approximately every two years, with the last update occurring in 2009.) Ninety-four percent of the dams in Illinois are constructed of earth.

#### **What is the definition of a dam failure?**

A dam failure is the partial or total collapse, breach or other failure of a dam that causes flooding downstream. Dam failures can result from natural events such as earthquakes or landslides, human-induced events such as improper maintenance, or a combination of both. In the event of a dam failure, the people, property and infrastructure downstream could be subject to devastating damage.

The potential severity of a full or partial dam failure is influenced by two factors:

- the capacity of the reservoir and
- the extent and type of development and infrastructure located downstream.

There are two categories of dam failures, “flood” failures and “sunny day” failures. A “flood” failure usually results when excess precipitation and runoff cause overtopping or a buildup of pressure behind a dam which leads to a breach. Even normal storm events can lead to “flood” failures if debris plugs the water outlets. Given the conditions that lead to a “flood” failure (i.e., rainfall over a period of hours or days), there is usually a sufficient amount of time to warn and evacuate residents downstream.

Unlike a “flood” failure, there is generally no warning associated with a “sunny day” failure. A “sunny day” failure is usually the result of improper or poor dam maintenance, internal erosion, vandalism or an earthquake. This unexpected failure can be catastrophic because it may not allow enough time to warn and evacuate residents downstream.

#### **What causes a dam failure?**

Dam failures can result from one or more of the following:

- ***prolonged periods of rainfall and flooding*** (the cause of most failures);
- ***inadequate spillway capacity*** resulting in excess flow overtopping the dam;
- ***internal erosion*** caused by embankment or foundation leakage ;
- ***improper maintenance*** (including failure to remove trees, repair internal seepage problems, maintain gates, valves and other operational components, etc.);

- **improper design** (including use of improper construction materials and practices);
- **negligent operation** (including failure to remove or open gates or valves during high flow periods);
- **failure of an upstream dam on the same waterway;**
- **landslides into reservoirs** which cause surges that result in overtopping of the dam;
- **high winds** which can cause significant wave action and result in substantial erosion; and
- **earthquakes** which can cause longitudinal cracks at the tops of embankments that can weaken entire structures.

**How are dams classified?**

Each dam in Illinois is assigned a hazard classification based on the potential for loss of life and damage to property in the event of a dam failure. The three classifications are Class I, Class II and Class III. **Figure 56** provides a brief description of each hazard classification. The hazard classifications used in Illinois are similar to those used by the U.S. Army Corps of Engineers to classify dams listed in the National Inventory of Dams. It is important to note that the hazard classification assigned is not an indicator of the adequacy of the dam or its physical integrity and in no way reflects the current condition of the dam.

<b>Figure 56 Dam Hazard Classification System</b>	
<b>Class</b>	<b>Description</b>
Class I	Dams located where failure has a high probability of causing loss of life or substantial economic loss downstream (i.e., a dam located where its failure may cause additional damage to such structures as a home, a hospital, a nursing home, a highly travelled roadway, a shopping center or similar type facilities where people are normally present downstream of the dam).
Class II	Dams located where failure has a moderate probability of causing loss of life or may cause substantial economic loss downstream (i.e., a dam located where its failure may cause additional damage to such structures as a water treatment facility, a sewage treatment facility, a power substation, a city park, a U.S. Route or Illinois Route highway, a railroad or similar type facilities where people are downstream of the dam for only a portion of the day or on a more sporadic basis).
Class III	Dams located where failure has a low probability of causing loss of life, where there are no permanent structures for human habitation, or minimal economic loss downstream (i.e., a dam located where its failure may cause additional damage to agricultural fields, timber areas, township roads or similar type areas where people seldom are present and where there are few structures).

Source: Illinois Administrative Code. Title 17: Conservation. Chapter I: Department of Natural Resources. Subchapter h: Water Resources. Part 3702: Construction and Maintenance of Dams. Section 3702.30 Applicability.

**Are there any classified dams owned by any of the participating jurisdictions?**

Yes, there is one publicly-owned dam within Lee County. The East Branch Fargo Creek Dam is owned by the City of Dixon. This Class I earth dam was completed in 1997 for flood control purposes.

**Are there any privately-owned classified dams within Lee County?**

Yes. There are five privately-owned classified dams located within Lee County. **Figure 57** provides a brief description of each dam. The Woodhaven Lake Dam and the Bass Lake Dam are part of the Woodhaven Lakes recreational camping resort west of Sublette. This private resort is open year-round and contains 6,140 individually-owned recreational campsites spread throughout 1,756 acres of woodlands, lakes and prairies.

<b>Figure 57 Privately-Owned Classified Dams Located in Lee County</b>					
<b>Name</b>	<b>Owner</b>	<b>Type</b>	<b>Purpose</b>	<b>Completion Date</b>	<b>Classification</b>
Dixon Dam	STS Hydropower Inc.	Gravity	Hydroelectric Power	1927	Class II
Sherman Dam	Private	Earth	Recreation	1991	Class II
Bass Lake Dam	Woodhaven Association	Earth	Recreation	1971	Class III
Woodhaven Lake Dam	Woodhaven Association	Earth	Recreation	1975	Class III
Stroyan Lake Dam	Private	Earth	Recreation	1966	Class III

Sources: Illinois Department of Natural Resources, Office of Water Resources, Telephone Interview with Greg Michaud regarding Classified Dams in Lee County, May 7, 2010.  
 U.S. Army Corps of Engineers, National Inventory of Dams Interactive Report, Illinois, Lee County, November 12, 2010.

**PROFILING THE HAZARD**

**When have dam failures occurred previously? What is the extent of these previous dam failures?**

There have been no recorded dam failures in Lee County.

**What locations are affected by dam failure?**

Dam failures have the potential to affect Dixon and unincorporated portions of Lee County. **Figure 58** shows the locations of publicly and privately-owned classified dams in Lee County.

**What is the probability of future dam failure events occurring?**

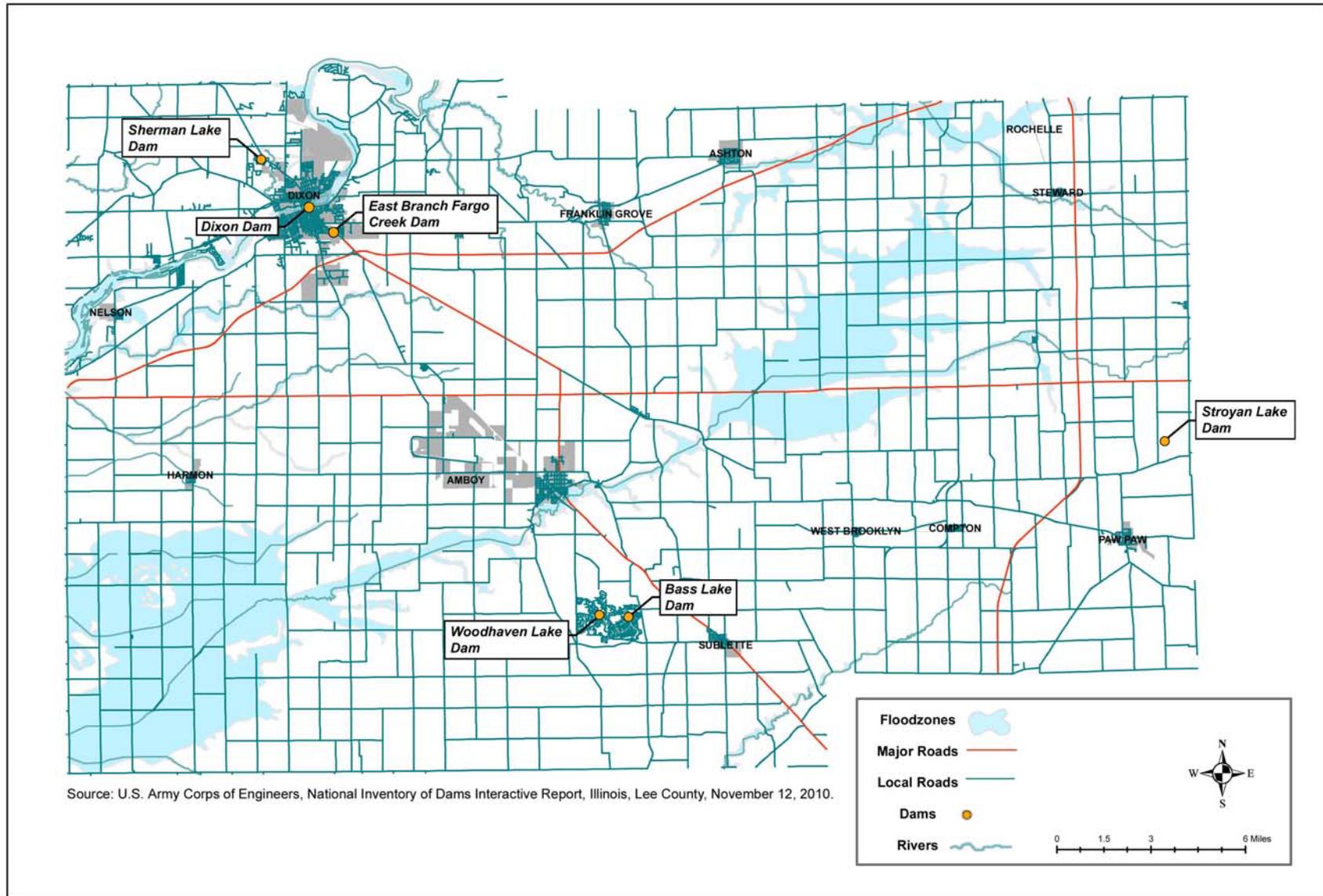
Since none of the dams have experienced a dam failure, it is difficult to specifically establish the probability of a future failure: however, it is estimated to be relatively low.

**ASSESSING VULNERABILITY**

**Are the participating jurisdictions vulnerable to dam failures?**

Yes and No. While Dixon and portions of unincorporated Lee County are vulnerable to the dangers presented by dam failures, none of the other participating municipalities are vulnerable.

**Figure 58**  
**Locations of Publicly and Privately-Owned Dams in Lee County**



**What impacts resulted from the recorded dam failures?**

Since there have been no recorded dam failures in Lee County, there are no recorded impacts.

**What other impacts can result from dam failures?**

The impacts from a dam failure are similar to those of a flood. There is the potential for injuries, loss of life and property damage. Depending on the type of dam failure, there may be little, if any warning that an event is about to occur, similar to flash flooding. As a result, one of the primary threats to individuals is from drowning. Motorists who choose to drive over flooded roadways run the risk of having their vehicles swept off the road and downstream. Flooding of roadways is also a major concern for emergency response personnel who would have to find alternative routes around any section of road that becomes flooded due to a dam failure.

In addition to concerns about injuries and death, the water released by a dam failure poses the same biological and chemical risks to public health as floodwaters. The flooding that results from a dam failure has the potential to force untreated sewage to mix with floodwaters. The polluted floodwaters then transport the biological contaminants into buildings and basements and onto streets and public areas. If left untreated, the floodwaters can serve as breeding grounds for bacteria and other disease-causing agents. Even if floodwaters are not contaminated with biological material, basements and buildings that are not properly cleaned can grow mold and mildew which can be pose a health hazard, especially for small children, the elderly and those with specific allergies.

Flooding from dam failures can also cause chemical contaminants such as gasoline and oil to enter floodwaters if underground storage tanks or pipelines crack and begin leaking during a dam failure event. Depending on the time of year, the water released by a dam failure may also carry away agricultural chemicals that have been applied to farm fields and cause damage to or loss of crops.

The risk or vulnerability to public health and safety from a dam failure is dependent on several factors including the severity of the event, the capacity of the reservoir and the extent and type of development and infrastructure located downstream. Based on the locations, size and classification of the dams located in Lee County, the risk from a dam failure is low to medium.

**Are existing buildings, infrastructure and critical facilities vulnerable to dam failures?**

Yes. While Emergency Action Plans were not available for any of the classified dams, a visual inspection of the area surrounding several of these dams indicates that there are buildings, infrastructure and critical facilities that are vulnerable to dam failures. Depending on whether there is a full or partial dam failure, all of the vulnerable buildings, infrastructure and critical facilities may be inundated by water and structural damage may result. Because none of the reservoirs are immense in size, the damage sustained from dam failure flooding may not be to the structure, but to the contents of the building or critical facility.

In addition to impacting structures, a dam failure can damage roads and utilities. Roadways, culverts and bridges can be weakened by dam failure floodwaters and may collapse under the weight of a vehicle. Power and communication lines, both above and below ground, are also vulnerable to dam failure flooding. Depending on their location and the velocity of the water as

it escapes the dam, power poles may be snapped causing disruptions to power and communication. Water may also get into any buried lines causing damage and disruptions.

As with public health and safety, the risk or vulnerability to buildings, infrastructure and critical facilities is dependent on several factors including the severity of the event, the capacity of the reservoir and the extent and type of development and infrastructure located downstream. In general, the risk to buildings, infrastructure and critical facilities from a dam failure is relatively low.

**Are future buildings, infrastructure and critical facilities vulnerable to dam failures?**

Yes. All future buildings, infrastructure and critical facilities located within the flood path of one of the classified dams are vulnerable to damage from a dam failure. As a result, future buildings, infrastructure and critical facilities face the same vulnerabilities as those of existing buildings, infrastructure and critical facilities described previously.

**What are the potential dollar losses to vulnerable structures from dam failures?**

Unlike other hazards, such as flooding, there are no standard loss estimation models or methodologies for dam failures. Given that there have been no recorded dam failures in Lee County, sufficient information was not available to prepare a reasonable estimate of future potential dollar losses to vulnerable structure from dam failures.

### 3.9 MAN-MADE HAZARDS

While the process to develop this Plan focused on natural hazards, the Planning Committee recognized that man-made hazards can also pose risks to public health and property. The extent and magnitude of the impacts that result from man-made hazard events can be influenced by natural hazard events. For example, severe winter storms can cause accidents involving trucks transporting hazardous substances. These accidents may lead to the release of these substances which can result in injury and potential contamination of the natural environment.

Consequently, the Planning Committee decided to profile the more prominent man-made hazards in Lee County. The man-made hazards assessed in this Plan include:

- ❖ Hazardous Substances
  - Transportation
  - Disposal
- ❖ Hazardous Material Incidents
  - ❖ Nuclear Accidents
  - ❖ Terrorism

#### 3.9.1 Hazardous Substances

Hazardous substances broadly include any flammable, explosive, biological, chemical, or physical material that has the potential to harm public health or the environment. For the purposed of this Plan, the term hazardous substance includes both hazardous waste and hazardous products. A hazardous waste is defined as the byproduct of a manufacturing process that is either listed or has the characteristics of ignitability, corrosivity, reactivity or toxicity and cannot be reused. A hazardous product is as all other hazardous materials.

Hazardous substances can pose a public health threat to individuals at their workplace and where they reside. The type and quantity of the substance, the pathway of exposure (inhalation, ingestion, dermal, etc.), and the frequency of exposure are factors that will determine the degree of adverse health effects experienced by individuals. Impacts can range from minor, short-term health issues to chronic, long-term illnesses.

In addition to impacting public health, hazardous substances can also cause damage to buildings, infrastructure and the environment. Accidents involving hazardous substances can range from minor (scarring on building floors and walls) to catastrophic (i.e., destruction of entire buildings, structural damage to roadways, etc.) and lead to injuries and death. The number of accidents involving hazardous substances in Illinois and across the Nation every year underscores the need for trained and equipped emergency responders to minimize damages.

Since 1970, significant changes have occurred in regards to how hazardous substances are transported and disposed. Comprehensive regulations and improved safety and industrial hygiene practices have reduced the frequency of incidents involving hazardous substances. Based on the small number of facilities in Lee County that generate and use hazardous substances, the population size, transportation patterns, and land use, the probability of a release occurring in Lee County should remain relatively low compared to other counties in Illinois.

The following subsections identify the general pathways – transportation and disposal – by which hazardous substances pose a risk to public health and the environment in Lee County.

### 3.9.1.1 Transportation

Hazardous substances are transported throughout Lee County using roadways, railways and pipelines. The following provides a brief description of each. The relatively low number of transportation accidents identified should not diminish the commitment by the municipalities and County to provide equipment and ongoing hazardous substances training to emergency responders.

#### Roadways

Interstates 39 and 88, U.S. Route 52 and 30, and State Routes 2, 26, 38 and 251 are major highways that carry traffic north, south, east and west throughout Lee County and connect with Chicago, Rockford and other larger population centers. While this modern roadway system provides convenience and efficiency for commuters, it also aids in-state and intra-state commerce which includes the transportation of hazardous substances.

Roadway accident records involving the shipment hazardous wastes and products in Lee County from 2005 through 2009 were obtained from the Illinois Environmental Protection Agency (IEPA) and the Illinois Emergency Management Agency (IEMA). There were three recorded accidents during this time period, all involving product. **Figure 59** provides information on these accidents.

<b>Figure 59 Roadway Accidents involving Shipment of Hazardous Products in Lee County: 2005 – 2009</b>		
<b>Date</b>	<b>Location</b>	<b>Hazardous Product Released</b>
4/25/2008	IL Route 38 – Franklin Grove	diesel fuel
5/21/2008	Howlett Road – Paw Paw	herbicide
11/15/2009	Halligan Road – Amboy	fertilizer

Sources: Illinois Environmental Protection Agency, Office of Emergency Response, "FOIA Request for Lee County HazMat Incidents between 2005 and 2009", April 19, 2010.  
 Illinois Emergency Management Agency, Freedom of Information Act, Hazardous Materials Incident Reports, Lee County, 2005-2009.

#### Railways

Illinois' rail system is the country's second largest, with the Chicago and East St. Louis terminals being two of the nation's busiest. In Lee County, there are two rail lines that run through the County: the Union Pacific and the Burlington Northern and Santa Fe. The Union Pacific operates a mainline from Chicago to the west coast that runs across the northern half of Lee County and secondary line that runs south from Nelson to Springfield. The Burlington Northern and Santa Fe operates a rail line that crosses the northeastern portion of the County. Rail usage is expected to expand in Illinois and in Lee County through intermodal freight transportation. Union Pacific has constructed a 1,200 acre intermodal facility in nearby Rochelle that provides convenient access to Interstates 39 and 88.

Since 2000, hazardous substances moving through Illinois have accounted for between 6 and 10 percent of the total freight traffic. Annual tonnage of hazardous substances moving through Illinois has varied in recent years between 30 million tons to 47 million tons. In comparison, the

Association of American Railroads estimates that approximately six percent of all rail traffic in the United States involves the movement of hazardous substances.

The Illinois Commerce Commission (ICC) is required to maintain records on railway accidents which involve hazardous substances. Their records are divided into three categories. These three categories are described in **Figure 60**.

<b>Figure 60 Railroad Accident Classification Categories</b>	
Category	Description
A	railroad derailments resulting in the release of the hazards substance(s) being transported
B	railroad derailments where hazards substance(s) were being transported but no release occurred
C	releases of hazardous substance(s) from railroad equipment occurred, however no railroad derailment was involved

Source: Illinois Commerce Commission, "2009 Annual Report on Accidents/Incidents Involving Hazardous Materials on Railroads in Illinois", April 2010.

Since 2000, there has been only one Category C railway accident involving hazardous substances in Lee County. On October 16, 2001 126 gallons of diesel fuel was released from an engine due to a leaking fuel line at Nachusa. This incident did not result in any injuries or evacuations. In comparison, ICC records indicate that since 2000 the annual number of railway accidents in Illinois involving hazardous substances has ranged between 35 and 113. **Figure 61** provides a breakdown by category of the railway accidents/incidents involving hazardous substances that have occurred in Lee County as well as Illinois.

In addition to reviewing ICC records, IEMA hazmat incidents were also reviewed. IEMA records indicate an additional railway incident occurred on October 5, 2007 when an undetermined amount of diesel fuel was released from a 5,300 gallon tank on a locomotive.

<b>Figure 61 Railway Accidents/Incidents Involving Hazardous Substances: 2000 – 2009</b>					
Year	Category	Accident/Incident Location			
		Illinois	Lee County	Cook & Collar Counties	All Other Counties
2000	A	5	0	4	1
	B	6	0	1	5
	C	68	0	32	36
2001	A	4	0	1	3
	B	13	0	3	10
	C	65	1	36	29
2002	A	13	0	7	6
	B	6	0	1	5
	C	73	0	44	29
2003	A	4	0	1	3
	B	7	0	2	5
	C	73	0	46	27

<b>Figure 61</b>					
<b>Railway Accidents/Incidents Involving Hazardous Substances: 2000 – 2009 Continued...</b>					
Year	Category	Accident/Incident Location			
		Illinois	Lee County	Cook & Collar Counties	All Other Counties
2004	A	16	0	6	10
	B	4	0	2	2
	C	57	0	30	27
2005	A	11	0	4	7
	B	8	0	3	5
	C	57	0	29	28
2006	A	6	0	1	5
	B	12	0	6	6
	C	95	0	58	37
2007	A	7	0	5	2
	B	10	0	8	2
	C	81	0	46	35
2008	A	7	0	4	3
	B	4	0	2	2
	C	62	0	38	24
2009	A	5	0	1	4
	B	5	0	3	2
	C	25	0	14	11

Sources: Illinois Commerce Commission, “2000-2009 Annual Reports on Accidents/Incidents Involving Hazardous Materials on Railroads in Illinois.”

The top 20 hazardous substances moved by rail through Illinois include: sodium hydroxide, petroleum gases (liquefied), sulfuric acid, anhydrous ammonia, chlorine, sulfur, vinyl chloride, propane, fuel oil, denatured alcohol, methanol, gasoline, phosphoric acid, hydrochloric acid, styrene monomer, carbon dioxide (refrigerated liquid), ammonium nitrate, sodium chlorate, and diesel fuel.

Pipelines

Energy gases (natural gas and liquefied petroleum gas), petroleum liquids (crude oil and gasoline) and liquid and gas products used in industrial processes are carried in above-ground and buried pipelines across Illinois. In Lee County, there are five underground pipelines that run through the County: Natural Gas Pipeline of America, Megellan Midstream Partners L.P., West Shore Pipeline Co., Amoco Oil Co. and Enterprise Products Operating L.L.C. These pipelines transport such products as butane, iso-butane, crude oil, diesel, kerosene, fuel oils, gasoline, jet fuel, hydrogen sulfide, naphthalene, propane, “sweet naphtha”, toluene and natural gas.

Since 2005, there have been four pipeline incidents in Lee County involving the release of a hazardous substance. On May 28, 2007, approximately 500 gallons of a fuel oil/gasoline mix leaked from a pipeline near the intersection of Brooklyn Road and Lee Road. The other three incidents involved the release of contact water and occurred over a weeklong period at the end of May, 2007 while pipeline tests were being conducted. Additionally, since 2004 there has been ongoing remediation occurring on a Magellan Midstream Partners L.P. petroleum products pipeline near Ashton, but there have been no recent releases reported.

While all of the pipeline incidents in Lee County have been minor, there have been several high profile incidents across the Nation within the last several months that have raised public concerns about our aging pipeline infrastructure. On July 26, 2010 a 30-inch liquid product pipeline ruptured near Marshall, Michigan releasing approximately 819,000 gallons of crude oil into a creek that flows into the Kalamazoo River, a tributary of Lake Michigan. Heavy rains caused the River to overtop existing dams and carry the oil 30 miles downstream. The release was finally contained several days later, approximately 80 river miles from Lake Michigan.

Then, on September 9, 2010 a 30-in high-pressure natural gas pipeline ruptured in the San Francisco Suburb of San Bruno, California resulting in an explosion and fire that killed eight people, destroyed over 30 homes and damaged an entire neighborhood. Also on September 9<sup>th</sup>, a leak in a 34-inch liquid product pipeline in the Chicago suburb of Romeoville, Illinois released over 360,000 gallons of crude oil that flowed through the sewer system and into a retention pond, narrowly avoiding the Des Plaines River. This release triggered numerous odor complaints from residents in the adjacent communities of Lemont and Bolingbrook.

Continual monitoring and maintenance of these pipelines is necessary to prevent malfunctions from corrosion, aging, or other factors that could lead to a release. In addition, to normal wear and tear experienced by pipelines, the possibility of sabotage and seismic activity triggering a release must be considered when considering emergency response scenarios.

### **3.9.1.2 Disposal**

#### Solid Waste

Waste disposal has caused surface water and ground water contamination in Illinois and across the Nation. Beginning in the last 1970s, substantial regulatory changes strengthened the design, operating and monitoring requirements for landfills. These regulatory changes have helped to reduce the public health threat posed by landfills. Although the rise in recycling activities has reduced the amount of solid waste generated in households, the majority continues to be disposed of in landfills. The 22<sup>nd</sup> Annual Landfill Capacity Report prepared by IEPA indicates that Lee County residents generated approximately 32,900 tons of solid waste during 2008. Of the approximately 32,900 tons, nearly 30% or approximately 9,800 tons of this solid waste was recycled.

According to the Landfill Capacity Report, there is one landfill currently operating in Lee County: the Lee County Landfill in Dixon. There are no ongoing violations at this landfill that pose a threat to surface or groundwater.

Of the 45 active landfills operating in Illinois, six (including the one mentioned previously) serve Lee and the adjacent counties. Three of these six landfills (including the Lee County Landfill) are rated in the top ten landfills in Illinois based on the amount of waste accepted for disposal. The Lee County Landfill ranks third in the State, having received 3.7 million gate cubic yards in 2008. At the present rate that solid waste is being generated, the IEPA estimates that there is sufficient capacity to meet the disposal needs of this region for approximately 15 years, if not longer.

Hazardous Waste

There are currently no off-site hazardous waste disposal facilities located in Lee County. Furthermore, there are no on-site hazardous waste treatment or disposal operations located in the County.

**3.9.2 Hazardous Material Incidents**

Hazardous materials, also known as hazardous substances, broadly include any flammable, explosive, biological, chemical, or physical material that has the potential to harm public health or the environment. A hazardous material or HazMat incident refers to any accident involving the release of hazardous substances. These accidents can take place where the substances are used, generated or stored or while they are being transported. In addition, HazMat incidents also include the release of hazardous substances, such as fuel, used to operate vehicles. These releases can be the result of an accident or a leak. **Figure 62** provides information on the HazMat incidents recorded in Lee County.

<b>Figure 62 HazMat Incidents in Lee County: 2005 – 2009</b>		
<b>Date</b>	<b>Location</b>	<b>Hazardous Substances Released</b>
<b>2005</b>		
7/28/2005	Compton	gasoline
8/17/2005	Dixon	gasoline
10/1/2005	Dixon	heating oil
<b>2006</b>		
4/20/2006	Amboy	diesel fuel
4/21/2006	Amboy	diesel fuel
6/5/2006	Ashton	isoparaffinic solvent
6/13/2006	Ashton*	herbicide
6/14/2006	Steward	fertilizer
10/18/2006	Dixon	diesel fuel
12/15/2006	Dixon	gasoline
12/21/2006	Dixon	lubricating oil
<b>2007</b>		
5/11/2007	Franklin Grove	herbicide
5/24/2007	Scarboro	contact water †
5/28/2007	Rochelle*	fuel oil/gasoline mix †
5/30/2007	Scarboro*	contact water †
6/2/2007	Lee*	contact water †
6/4/2007	Dixon	cement dust
10/5/2007	Nelson	diesel fuel ◇

\* Incident verified in the vicinity of this location.

† Incident involved the transportation of a hazardous substance by pipeline. See *Section 3.9.1.1 – Transportation: Pipelines* for more information.

◇ Incident involved transportation of a hazardous substance by rail. See *Section 3.9.1.1 – Transportation: Railways* for more information.

<p align="center"><b>Figure 62</b>  <b>HazMat Incidents in Lee County: 2005 – 2009</b>  <b>Continued...</b></p>		
Date	Location	Hazardous Substances Released
<b>2008</b>		
3/12/2008	Dixon	diesel fuel
4/17/2008	Steward	diesel fuel
4/17/2008	Steward	diesel fuel
4/25/2008	Franklin Grove	diesel fuel ^
5/21/2008	Paw Paw*	herbicide ^
6/25/2008	Dixon	gasoline
9/11/2008	Dixon	asphalt sealer
10/18/2008	Amboy	motor oil, antifreeze & diesel fuel
10/20/2008	Franklin Grove	diesel fuel
11/20/2008	Dixon	gasoline & diesel fuel
12/10/2008	Dixon	soybean oil
<b>2009</b>		
2/9/2009	Dixon	lubricating oil
3/16/2009	Ashton	diesel fuel
4/10/2009	Amboy	gasoline, kerosene & diesel fuel
6/19/2009	Dixon	diesel fuel
10/2/2009	Dixon	chlorine
11/5/2009	Amboy	fertilizer ^

\* Incident verified in the vicinity of this location.

^ Incident involved the transportation of a hazardous substance by road. See *Section 3.9.1.1 – Transportation: Roadways* for more information.

Sources: Illinois Environmental Protection Agency, Office of Emergency Response, “FOIA Request for Lee County HazMat Incidents between 2005 and 2009”, April 19, 2010.

Illinois Emergency Management Agency, Freedom of Information Act, Hazardous Materials Incident Reports, Lee County, 2005-2009.

Between 2005 and 2009, there were 35 HazMat incidents recorded in Lee County. Of the 35 incidents, three involved roadway accidents, one involved a railway accident and four involved a pipeline leak where hazardous substances were being transported. Many of the incidents recorded in Lee County are similar to those reported in other rural counties in that they commonly involve agricultural chemical, fuel and oil. In 2009, six HazMat incidents were recorded in Lee County. In comparison, 1,162 incidents were recorded during that same time period for the entire state. A majority of these incidents occurred in Cook and the collar counties.

Lee County has experienced HazMat incidents more severe than those identified during the 2005 through 2009 time period. A transporter carrying acid on U.S. Route 52 was involved in an accident resulting in a substantial loss of the product. Diking was required to contain the acid from reaching nearby farm fields and surface water. In addition to the emergency response at the local level, a specialist in chemical cleanup was brought in from outside the County to assist. In another incident involving acid, the driver of a truck carrying acid was hospitalized following a release. As with the previous incident, prompt response at the local level reduced the potential damages that might have otherwise occurred.

HazMat incidents in Illinois and across the Nation have resulted in serious injuries, evacuation of nearby residents, and environmental degradation requiring emergency cleanup actions. In Lee County, at least three injuries requiring hospitalization were reported as the result of separate HazMat incidents between 2005 and 2009. None of the recorded incidents caused severe, widespread damages.

Based on the recorded incidents, Lee County experienced an average of seven HazMat incidents annually. Based on the use of hazardous substances in agribusiness, the number of facilities that handle hazardous substances within the County, and the transportation of hazardous substances via roadways, pipeline and railways, HazMat incidents are likely to continue taking place. Although these incidents should not be expected to occur with the same frequency experienced in more industrialized and urbanized areas of Illinois, constant vigilance, proper training and equipment, and prompt response are needed to minimize the potential impacts of each incident.

### 3.9.3 Nuclear Accidents

The term “nuclear accident” is used in this Plan to refer to the release of significant levels of radioactive material or exposure of the general public to radiation. This section does not address the intentional or malicious release of radioactive materials as a result of a terrorism activity. Exposure to dangerous levels of radiation can have varying health effects on people and animals. Impacts range from minor health issues to fatal illnesses. In Lee County, exposure to radioactive material/radiation could occur through an accident:

- at the Byron Generating Station located near Byron; the Quad Cities Generating Station in Cordova; or the LaSalle County Generating Station near Ottawa.
- as spent nuclear fuel rods are being transported by railway through the County.

#### 3.9.3.1 Nuclear Generating Stations

Commercial nuclear facilities constructed in the United States should withstand most natural hazards such as tornadoes and severe storms that frequently occur in Illinois. Nonetheless, the Illinois Emergency Management Agency has developed a Radiological Emergency Response Plan in cooperation with other state and local governments. Procedures are in place and exercises are conducted with state and local officials to protect the public in the unlikely event of a nuclear emergency. There are three nuclear generating stations relatively close to Lee County. **Figure 63** identified the facilities, their locations and their respective distances to the Lee County border. All three stations are owned and operated by the Exelon Corporation.

<b>Figure 63 Nuclear Generating Station Locations in Relation to Lee County</b>		
Name	Location	Distance to Lee County Border
Byron Generating Station	2 miles south of Byron	15 miles
LaSalle County Generating Station	11 miles southwest of Ottawa	30 miles
Quad Cities Generating Station	Cordova	35 miles

An Emergency Planning Zone (EPZ) around each nuclear facility is assessed to estimate potential damages to the public and critical infrastructure. EPZ's typically include a 10-mile Critical Risk Zone and a 50-mile Ingestion Pathway Zone. Ingestion refers to radiation that might enter a person's body. While none of Lee County falls within the 10-mile Critical Risk Zone for any of the generating station, portions do fall within the 50-mile Ingestion Pathway Zone. **Figure 64** identifies the general locations, including the participating municipalities within the County, that fall within the 50-mile Ingestion Pathway Zone.

<b>Figure 64</b> <b>Lee County Locations within the 50-Mile Ingestion Pathway Zone</b>	
Generating Station Name	Areas within 50-Mile Ingestion Pathway Zone
Byron Generating Station	All of Lee County
LaSalle County Generating Station	Eastern Portion of the County including Amboy, Ashton, Steward & Sublette
Quad Cities Generating Station	Western Portion of the County including Amboy, Dixon and Harmon

The consequences associated with a release at any nuclear power facility would depend on the magnitude of the accident and the prevailing weather conditions. A significant incident might require individuals to stay indoors or to evacuate to temporary relocation centers. Temporary relocation centers have been established for Lee County residents should a significant event requiring evacuation occur at any of these three nearby nuclear generator stations.

To protect the food supply, persons owning livestock may be advised to remove all livestock from pasture, shelter if possible, and provide them with stored feed and protected water. The American Nuclear Insurers Company provides insurance to cover Exelon's legal liability up to the limits imposed by the Price-Anderson Act, for bodily injury and property damage such as the loss of livestock and crops caused by a nuclear energy incident at the Byron Nuclear Power Facility.

Since 2006, the Exelon Corporation has experienced a tritium leak or spill at each of the three nuclear generating stations. After a radioactive spill or leak, tritium is generally the first radionuclide identified in groundwater. The United States Environmental Protection Agency has established 20,000 pCi/L (picocuries per liter of water) as the maximum contaminant level of tritium allowed in drinking water. While concentrations of tritium at each of the three facilities exceeded the drinking water standard, no private or public drinking water wells near these facilities were found to have tritium concentrations violating this standard.

### **3.9.3.2 Transportation of Spent Nuclear Fuel Rods by Railway**

The protocol for moving spent nuclear fuel rods from nuclear power plants requires that the train be stopped and inspected before moving through Illinois and that it be escorted as it moves through the State. Inspection of the track ahead of the train is also required to reduce the risk of derailment.

While movement of nuclear material has been minimal as the Nation grapples with the issue of developing national or regional repositories, more rail movement is anticipated eventually. At

the present time, the three nuclear generating stations previously mentioned are storing spent fuel rods on-site. If a national or regional repository is established, then the spent fuel rods will be moved off-site. According to the Illinois Commerce Commission, there has never been a railway transportation accident resulting in the release of radioactive material; however, widespread concern remains regarding its safe transportation.

#### **3.9.4 Terrorism**

Terrorism has different definitions across the globe. For the purpose of this Plan, terrorism will be defined as any event that includes *violent acts* which *threaten or harm lives, health or property* conducted by *domestic or foreign* individuals or groups *aimed at civilians, the federal government or symbolic locations* intended to *cause widespread fear*.

The attack on the World Trade Center and the Pentagon on September 11, 2001 by foreign terrorists galvanized national action against terrorism and resulted in the creation of the United States Department of Homeland Security. While the number of terrorist activities garnering national attention in the U.S. has been relatively small, approximately 80,000 terrorist events have occurred worldwide between 1970 and 2007 according to the National Consortium for the Study of Terrorism and Responses to Terrorism<sup>1</sup>. During this same time span, the Consortium documented 1,347 terrorist events within the U.S. The greatest number of these events occurred in New York (266), Miami (70), San Francisco (66), Washington (59) and Los Angeles (54). There are approximately 40 terrorist groups have been documented as operating within the U.S.

Acts of terrorism have resulted in deaths and injuries as a result of kidnappings, hijackings, bombings, and the use of chemical and biological weapons. The Global Terrorism Database has documented 18 fatalities and 44 injuries attributed to terrorism in the United States since 2000. The attack on the World Trade Center and the Pentagon on September 11, 2001 resulted in nearly 3,000 additional deaths and an estimated 12,000 injuries.

The Federal Bureau of Investigation's (FBI) provides supporting documentation on domestic terrorist attacks between 1970 and 2005 in a series of reports on terrorism. These reports provide a chronological summary of terrorist incidents in the United States with detailed information on attacks between 1980 and 2005. During this time period 192 incidents were documented within the United States. Five of these incidents occurred in Illinois; four in the Chicago area and one downstate.

In the past several years there have been other terrorism incidents in Illinois that have received media coverage. In 2001, a suspected terrorist with possible ties to al-Qaeda was apprehended after engaging in communication and fiscal activities in the Peoria and Macomb areas to support terrorism. Most recently a single individual from Macon County sought to carry out his anger at the federal government by detonating a van filled with explosive outside of the Federal Courthouse in Springfield on September 24, 2009. This attempt was thwarted by the FBI.

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<sup>1</sup> The National Consortium for the Study of Terrorism and Responses to Terrorism (START) is based at the University of Maryland and is a U.S. Department of Homeland Security Center of Excellence. The Consortium works to understand the origin, dynamics, and consequences of terrorism.

A major incident involving biological, chemical, or radiation in the Chicago metropolitan area could lead to a spontaneous evacuation. An event involving radiation, such as the detonation of a dirty bomb (a dirty bomb is a conventional bomb that spreads radioactive material) probably has the highest potential for evacuees to flee beyond the collar counties and travel as far as Lee County or beyond. Some evacuees may use Interstate Tollway 88 and U.S. 30 which leads westward to Lee County and away from prevailing winds that would carry airborne radiation. Regardless of whether these evacuees are seeking shelter in or traveling through Lee County, they will consume fuel, food, and water. Law enforcement, health care, communication, shelter and transportation resources will also be affected. The degree of impact will depend upon the number of evacuees and their physical (type and extent of injuries) and mental condition. Other factors such as adverse weather conditions (heavy snow or extreme temperatures) could compound the impacts. Sudden movement of populations caused by hurricanes and other hazards have shown that in largely rural areas, a sudden influx of additional people is likely to strain, if not overwhelm, these resources.

It is impossible to predict with any reasonable degree of accuracy how many terrorism events might be expected to occur in Lee County or elsewhere in Illinois. Although targets for terrorist activity are more likely centered in larger urban areas, recruitment, training and other support activities, such as the one described above, are as likely to occur in rural areas as in urban areas. The economic resources available to some terrorist groups coupled with the combination of global tensions, economic uncertainty and frustration towards government appear to have recently raised the frequency of attempts. Enhanced efforts by law enforcement officials and civilian vigilance for unusual activity or behavior will be needed to repel terrorists whether they are domestic or foreign in origin.

## **4.0 MITIGATION STRATEGY**

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## 4.0 MITIGATION STRATEGY

This section focuses on determining how to reduce or eliminate the potential loss of life and property damage that results from the natural and man-made hazards identified in the Risk Assessment section of this Plan. In order to accomplish this objective, the Planning Committee developed a mitigation strategy that included the following steps:

- formulating mitigation goals to reduce or eliminate long-term vulnerabilities to natural and man-made hazards;
- identifying, analyzing and prioritizing a comprehensive range of specific mitigation actions including those related to continued compliance with the National Flood Insurance Program; and
- describing how each jurisdiction will implement the mitigation actions identified.

Provided below is a detailed discussion of each mitigation strategy step.

### 4.1 HAZARD MITIGATION GOALS

The first step outlined in the mitigation strategy is to develop mitigation goals that aim to reduce or eliminate long-term vulnerabilities to the natural and man-made hazards identified. The mitigation goals are general guidelines that explain what the participants want to achieve in terms of hazard and loss prevention.

A preliminary list of eight hazard mitigation goals was developed and distributed to the Planning Committee members at the February 18, 2010 meeting. Members were asked to review the list before the next meeting and consider whether any changes needed to be made or if additional goals should be included. At the Planning Committee’s March 8, 2010 meeting, the group discussed the preliminary list of hazard mitigation goals and approved them with no changes or additions. **Figure 65** identifies the eight hazard mitigation goals approved by the Planning Committee.

<b>Figure 65 Hazard Mitigation Goals</b>	
Goal 1	Educate people about the (natural and man-made) hazards they face and the ways they can protect themselves, their homes, and their businesses from those hazards.
Goal 2	Protect the lives, health, and safety of the people and animals in the County from the dangers of natural and man-made hazards.
Goal 3	Protect existing infrastructure and design new infrastructure (roads, bridges, utilities, water supplies, sanitary sewer systems, etc.) to be resilient to the impacts of natural and man-made hazards.
Goal 4	Incorporate natural and man-made hazard mitigation into community plans and regulations.
Goal 5	Place a priority on protecting public services, including critical facilities, utilities, roads and schools.
Goal 6	Preserve and protect the rivers and floodplains in our County.
Goal 7	Ensure that new developments do not create new exposures to damage from natural and man-made hazards.
Goal 8	Protect historic, cultural, and natural resources from the effects of natural and man-made hazards.

## 4.2 IDENTIFYING, ANALYZING & PRIORITIZING MITIGATION ACTIONS

The second step outlined in the mitigation strategy involves identifying, analyzing and prioritizing a comprehensive range of specific mitigation actions. Mitigation actions include any projects, plans, activities or programs identified by participants that helps achieve one or more of the goals identified above.

### 4.2.1 Identification and Analysis

After developing hazard mitigation goals and reviewing the results of the risk assessment, Committee members representing the County and participating municipalities were asked to consult with their respective government entities to identify a comprehensive range of mitigation actions specific to the hazards and vulnerabilities associated with their jurisdiction. Representatives for the County and all of the participating municipalities were asked to pay special attention to identifying mitigation actions that ensure their continued compliance with the National Flood Insurance Program.

The compiled lists were reviewed to assure the appropriateness and suitability of each mitigation action. Actions that were not deemed appropriate and/or suitable were either reworded or eliminated. Next, each mitigation action was assigned to one of six broad categories which allowed Committee members to compare and consolidate similar actions. **Figure 66** identifies each category and provides a brief description.

<b>Figure 66 Mitigation Action Categorization</b>	
<b>Category</b>	<b>Description</b>
Regulatory Activities (RA)	Regulatory activities are designed to reduce a jurisdiction’s vulnerability to specific hazard events. These activities are especially effective in hazard prone areas where development has yet to occur. Examples include: planning and zoning, floodplain regulations and local ordinances (i.e., building codes, etc.).
Structural Projects (SP)	Structural projects lessen the impact that a hazard has on a particular structure through design and engineering. Examples include: storm sewers, road and bridge projects, storm/tornado shelters, flood walls and seismic retrofits.
Public Information & Awareness (PI)	Public information and awareness activities are used to educate individuals about the potential hazards that affect their community and the mitigation strategies that they can take part in to protect themselves and their property. Examples include: outreach programs, school programs, brochures and handout materials, evacuation planning and drills, volunteer activities (i.e., culvert cleanout days, initiatives to check in on the elderly/disabled during hazard events such as storms and extreme heat events, etc.).
Studies (S)	Studies are used to identify activities that can be undertaken to reduce the impacts associated certain hazards. Examples include: hydraulic and drainage studies.
Miscellaneous Projects (MP)	Miscellaneous projects is a catchall for those activities or projects that help to reduce or lessen the impact that a hazard may have on a critical facility or community service. Examples include: snow fences, generators, warning sirens, etc.
Property Protection (PP)	Property protection activities are designed to retrofit existing structures to withstand natural hazards or to remove structures from hazard prone areas. In Illinois, this category of activities primarily pertains to flood protection. Examples include: acquisition, relocation, foundation elevation, insurance (i.e., flood, homeowners, etc.) and retrofitting (i.e., impact resistant windows, etc.).

Finally, each mitigation action was analyzed to determine:

- which hazard or hazards are being mitigated for;
- whether the impacts associated with a particular hazard(s) would be reduced or eliminated;
- the general size of the population affected by the action (i.e., small, medium or large);
- what goal or goals would be fulfilled;
- whether the effects on new or existing buildings and infrastructure would be reduced; and
- continued compliance with the National Flood Insurance Program.

#### 4.2.2 Prioritization

After reviewing and analyzing the identified mitigation actions, the Planning Committee members worked together to develop a method to prioritize each action. **Figure 67** identifies and describes the four-tiered prioritization method adopted by the Committee. The method developed provides a means of objectively determining which actions have a greater likelihood of eliminating or reducing the long-term vulnerabilities associated with the most frequently-occurring natural hazards. While prioritizing the projects is useful and does provide the participants with additional information, it is important to keep in mind that the implementation of all the mitigation actions identified is desirable regardless of which prioritization category an action falls under.

<b>Figure 67</b>			
<b>Mitigation Action Prioritization Methodology</b>			
		<b>Hazard</b>	
		<b>Most Significant Hazard (M)</b> (i.e., severe storms, severe winter storms, tornadoes, floods)	<b>Less Significant Hazard (L)</b> (i.e., drought, extreme heat, earthquakes, dam failures)
<b>Mitigation Action</b>	Mitigation Action with the Potential to Virtually Eliminate or Significantly Reduce Impacts <b>(H)</b>	<b>HM</b> mitigation action will virtually eliminate damages and/or significantly reduce the probability of deaths and injuries from the most significant hazards	<b>HL</b> mitigation action will virtually eliminate damages and/or significantly reduce the probability of deaths and injuries from less significant hazards
	Mitigation Action with the Potential to Reduce Impacts <b>(L)</b>	<b>LM</b> mitigation action has the potential to reduce damages, deaths and/or injuries from the most significant hazards	<b>LL</b> mitigation action has the potential to reduce damages, deaths and/or injuries from less significant hazards

### **4.3 IMPLEMENTING MITIGATION ACTIONS**

The final step outlined in the mitigation strategy involves describing how each jurisdiction will implement the mitigation actions identified. For each of mitigation action identified previously, the appropriate government entity was asked to:

- identify the party or parties responsible for oversight and administration;
- determine what funding source(s) are available or will be pursued; and
- describe the time frame for completion.

In addition, a preliminary qualitative cost/benefit analysis was conducted on each mitigation action. The costs and benefits were analyzed in terms of the general overall cost to complete an action as well as the action's likelihood of permanently eliminate or reduce risk associated with a specific hazard. The general descriptors of high, medium and low were used. These terms are not meant to translate into a specific dollar amount, but rather to provide a relative comparison between the actions identified by each jurisdiction. The analysis is only meant to give the participants a starting point to compare which actions are likely to provide the greatest benefit based on the financial cost and staffing effort needed. It is understood that when a grant application is submitted for a specific action, a detailed cost/benefit analysis will most likely be required to receive funding.

### **4.4 MITIGATION STRATEGY RESULTS**

**Figures 68 through 75** summarize the results of the mitigation strategy. The mitigation actions identified are arranged by participating jurisdiction.

**Figure 68  
Lee County Hazard Mitigation Actions**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
<b>Lee County EMA</b>												
HM	Design and construct a new multi-use Emergency Operations Center.	DF, EH, EQ, F, SS, SWS, T	SP	Reduces	Large	2, 3, 5	Yes	NA	Lee County EMA	TBD	75% Federal 25% Local	High/High
HM	Design and construct storm shelters with emergency backup generators at mobile home parks in unincorporated Lee County.	SS, SWS, T	SP	Eliminates	Small	2	NA	NA	Lee County EMA	5-10 years	75% Federal 25% Local	Medium/High
HM	Design and construct storm shelters with emergency backup generators at campgrounds in unincorporated Lee County.	SS, SWS, T	SP	Eliminates	Small	2	NA	NA	Lee County EMA	5-10 years	75% Federal 25% Local	Medium/High
HM	Replace storm warning sirens as needed.	SS, T	MP	Reduces	Large	2	NA	NA	Lee County EMA	TBD	TBD	Medium/High
LM	Develop public information materials for all hazards that inform residents about the risks to life and property associated with each hazard and the proactive actions that they can take to reduce or eliminate their risk.	DF, EH, EQ, F, SS, SWS, T	PI	Reduces	Large	1, 2	Yes	Yes	Lee County EMA	TBD	County	Low/High
HM	Identify special needs populations and determine how to best alert them to an oncoming natural hazard.	DF, EH, EQ, F, SS, SWS, T	PI	Reduces	Small	1, 2	NA	NA	Lee County EMA	TBD	County	Low/High

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 68  
Lee County Hazard Mitigation Actions Continued...**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
<b>Lee County Highway Department</b>												
HM	Replace bridges and dredge/widen stream channels in selected areas where repeated flooding impairs travel and damages critical infrastructure.	F, SS, SWS	SP	Reduces	Medium	2, 3, 5, 6	Yes	Yes	Lee County Highway Department	TBD	75% Federal 25% Local	Medium/High
LM	Develop a multi-jurisdictional Memorandum of Agreement between the County, the Village of Steward and the Steward Elementary School District 220 to conduct a drainage study of Steward Creek.	F, SS, SWS	RA	Reduces	Small	2, 3, 5, 6	Yes	Yes	Lee County Highway Department	1 year	County	Low/High
LM	Conduct a drainage study of Steward Creek to determine the cause of recurring flooding/drainage problems that impact Perry Road and the Steward Elementary School.	F, SS, SWS	S	Reduces	Small	2, 3, 5, 6	Yes	Yes	Lee County Highway Department	1-3 years	75% Federal 25% Local	Medium/High
HM	Select, design and construct the appropriate drainage remedy to alleviate recurring drainage problems associated with Steward Creek.	F, SS, SWS	SP	Reduces	Small	2, 3, 5, 6	Yes	Yes	Lee County Highway Department	3-5 years	75% Federal 25% Local	High/High
<b>Lee County Sheriff's Department</b>												
HM	Purchase a reverse 911 system to notify residents/responders of emergency information.	DF, EH, EQ, F, SS, SWS, T	MP	Reduces	Large	2	NA	NA	Lee County Sheriff's Department	5 years	75% Federal 25% Local	Medium/High

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 68  
Lee County Hazard Mitigation Actions Continued...**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
<b>Lee County Zoning</b>												
LM	Make the most recent Flood Insurance Rate Maps available at the County Clerk's Office to assist the public in considering where to construct new buildings and make County Officials aware of these maps and issues related to construction in a floodplain.*	F	RA	Reduces	Large	1, 6, 7	Yes	Yes	Lee County Zoning	TBD	County	Low/High
LM	Make information materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.*	F	PP	Reduces	Large	1, 6, 7	Yes	Yes	Lee County Zoning	TBD	County	Low/High

\* Mitigation action to ensure continued compliance with NFIP.

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 69  
Amboy Hazard Mitigation Actions**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
HM	Design and construct the appropriate drainage remedy to alleviate recurring drainage problems on north end of the City.	F, SS, SWS	SP	Reduces	Medium	2, 3, 5	Yes	Yes	City Council	TBD	75% Federal 25% Local	Medium/High
HM	Upsize culverts within the City to increase capacity and alleviate street flooding.	F, SS, SWS	SP	Reduces	Medium	2, 3, 5	Yes	Yes	City Council	Ongoing	75% Federal 25% Local	Low/High
HM	Purchase and install emergency backup generators at sanitary lift stations to maintain operations during power outages.	EQ, F, SS, SWS, T	MP	Eliminates	Large	2, 3, 5	Yes	Yes	City Council	TBD	TBD	Low/High
HM	Purchase and install an emergency backup generator at the city-owned community building to provide uninterrupted power for a storm/bad weather shelter.	EH, F, SS, SWS, T	MP	Eliminates	Large	2, 3, 5	NA	Yes	City Council	TBD	TBD	Low/High
HM	Replace undersized storm drain tiles as needed to alleviate drainage problems.	F, SS, SWS	SP	Reduces	Small	2, 3, 5	Yes	Yes	City Council	TBD	75% Federal 25% Local	Medium/High
HM	Retrofit the Amboy Community Center to include a storm safe shelter.	SS, T	SP	Reduces	Medium	2, 3, 5	NA	Yes	City Council	TBD	75% Federal 25% Local	Medium/High

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 69  
Amboy Hazard Mitigation Actions Continued...**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
LM	Make the most recent Flood Insurance Rate Maps available at the City Clerk's Office to assist the public in considering where to construct new buildings and make City Officials aware of these maps and issues related to construction in a floodplain.*	F	RA	Reduces	Large	1, 6, 7	Yes	Yes	City Council	TBD	City	Low/High
LM	Make information materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.*	F	PP	Reduces	Large	1, 6, 7	Yes	Yes	City Council	TBD	City	Low/High

\* Mitigation action to ensure continued compliance with NFIP.

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 70  
Ashton Hazard Mitigation Actions**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
HM	Install shatter-proof glass at the Ashton-Franklin Center High School.	EQ, SS, T	SP	Reduces	Medium	2, 3, 5	NA	Yes	Ashton-Franklin Center School Board	2 years	75% Federal 25% Local	Low/High
HM	Install shatter-proof glass at the Mills & Petrie Memorial Building which houses the Village's library and community center.	EQ, SS, T	SP	Reduces	Medium	2, 3, 5	NA	Yes	Mills & Petrie Board	2 years	75% Federal 25% Local	Low/High
HM	Install shatter-proof glass at the Ashton Village Hall.	EQ, SS, T	SP	Reduces	Small	2, 3, 5	NA	Yes	Village Board	1 year	75% Federal 25% Local	Low/High
HM	Purchase a portable emergency backup generator for use during power outages.	EQ, F, SS, SWS, T	MP	Eliminates	Small	2, 3, 5	Yes	Yes	Village Board	1 year	TBD	Low/High
HM	Purchase and install storm sirens.	SS, T	MP	Reduces	Large	2	NA	NA	Village Board	TBD	TBD	Low/High
LM	Make the most recent Flood Insurance Rate Maps available at the Village Clerk's Office to assist the public in considering where to construct new buildings and make Village Officials aware of these maps and issues related to construction in a floodplain.*	F	RA	Reduces	Large	1, 6, 7	Yes	Yes	Village Board	TBD	Village	Low/High
LM	Make information materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.*	F	PP	Reduces	Large	1, 6, 7	Yes	Yes	Village Board	TBD	Village	Low/High

\* Mitigation action to ensure continued compliance with NFIP.

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 71  
Dixon Hazard Mitigation Actions**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
LM	Conduct drainage study of East River Road to determine the cause of recurring flooding problems.	F, SS, SWS	S	Reduces	Small	2, 3, 5	NA	Yes	City Council	TBD	75% Federal 25% Local	Low/High
HM	Select, design and construct the appropriate drainage remedy to alleviate recurring flooding problems along East River Road.	F, SS, SWS	SP	Reduces	Small	2, 3, 5	NA	Yes	City Council	TBD	75% Federal 25% Local	Medium/High
LM	Make the most recent Flood Insurance Rate Maps available at the City Clerk's Office to assist the public in considering where to construct new buildings and make City Officials aware of these maps and issues related to construction in a floodplain.*	F	RA	Reduces	Large	1, 6, 7	Yes	Yes	City Council	TBD	City	Low/High
LM	Make information materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.*	F	PP	Reduces	Large	1, 6, 7	Yes	Yes	City Council	TBD	City	Low/High

\* Mitigation action to ensure continued compliance with NFIP.

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 72  
Franklin Grove Hazard Mitigation Actions**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
HM	Purchase an emergency backup generator to provide uninterrupted power to the Village Hall which acts as a heating/cooling center.	EH, SWS	MP	Eliminates	Small	2, 3, 5	NA	Yes	Village Board	TBD	TBD	Low/High
LM	Conduct drainage/hydraulic study to determine the cause of recurring drainage problems along Illinois Route 38.	F, SS, SWS	S	Reduces	Medium	2, 3, 5	Yes	Yes	Village Board	TBD	75% Federal 25% Local	Medium/High
HM	Select, design and construct appropriate drainage remedy to alleviate recurring drainage problems along Illinois Route 38.	F, SS, SWS	SP	Reduces	Medium	2, 3, 5	Yes	Yes	Village Board	TBD	75% Federal 25% Local	Medium/High
LM	Conduct feasibility study to determine the appropriate option to maintain vital municipal services throughout Franklin Grove. Presently there is only one north/south road, Elm Street, which connects city services to all residents. Elm Street is crossed by the Union Pacific Railroad with an at-grade crossing, which is interrupted by daily train service and potential derailments.	EQ, SS, SWS, T	S	Reduces	Large	2, 3, 5	Yes	Yes	Village Board	TBD	TBD	Medium/High
HM	Select, design and construct appropriate option to maintain vital municipal services throughout Franklin Grove.	EQ, SS, SWS, T	SP	Reduces	Large	2, 3, 5	Yes	Yes	Village Board	TBD	TBD	High/High

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 73  
Harmon Hazard Mitigation Actions**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
HM	Retrofit Harmon Township Building, which houses the Village office and fire department, to include a storm safe room/shelter.	SS, T	SP	Reduces	Medium	2, 3, 5	NA	Yes	Village Board^	TBD	75% Federal 25% Local	High/High
LM	Conduct hydraulic/drainage study to determine the cause of recurring flooding problems within and adjacent to the Village.	F, SS, SWS	S	Reduces	Large	2, 3, 5	Yes	Yes	Village Board^	TBD	75% Federal 25% Local	Medium/High
HM	Select, design and construct the appropriate drainage remedy to alleviate recurring flooding problems within and adjacent to the Village.	F, SS, SWS	SP	Reduces	Large	2, 3, 5	Yes	Yes	Village Board^	TBD	75% Federal 25% Local	Medium/High
HM	Construct a storm safe room/shelter in combination with a new fire department building.	SS, T	SP	Reduces	Medium	2, 3, 5	Yes	NA	Village Board^	TBD	75% Federal 25% Local	High/High

^ Harmon Township may be partnering with the Village of Harmon on this project.

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 74  
Steward Hazard Mitigation Actions**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
HM	Purchase and install emergency backup generators to provide uninterrupted power to the Village's drinking water wells during power outages.	EQ, F, SS, SWS, T	MP	Eliminates	Large	2, 3, 5	Yes	Yes	Village Board	TBD	TBD	Low/High
LM	Conduct drainage study to determine the cause of intermittent flooding problems along Main Street.	F, SS, SWS	S	Reduces	Large	2, 3, 5	Yes	Yes	Village Board	TBD	75% Federal 25% Local	Medium/High
HM	Select, design and construct the appropriate drainage remedy to alleviate intermittent flooding problems along Main Street.	F, SS, SWS	SP	Reduces	Large	2, 3, 5	Yes	Yes	Village Board	TBD	75% Federal 25% Local	Medium/High
HM	Install shatter-proof glass at Steward Village Hall in such a way as to preserve the historical integrity of the building.	EQ, SS, T	SP	Reduces	Small	2, 3, 5	NA	Yes	Village Board	TBD	75% Federal 25% Local	Low/High
LM	Make the most recent Flood Insurance Rate Maps available at the Village Clerk's Office to assist the public in considering where to construct new buildings and make Village Officials aware of these maps and issues related to construction in a floodplain.*	F	RA	Reduces	Large	1, 6, 7	Yes	Yes	Village Board	TBD	Village	Low/High
LM	Make information materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.*	F	PP	Reduces	Large	1, 6, 7	Yes	Yes	Village Board	TBD	Village	Low/High

\* Mitigation action to ensure continued compliance with NFIP.

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 75  
Sublette Hazard Mitigation Actions**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
HM	Purchase and install an automatic emergency backup generator at the drinking water treatment facility.	EQ, F, SS, SWS, T	MP	Eliminates	Large	2, 3, 5	Yes	Yes	Village Board	TBD	TBD	Low/High
HM	Purchase and install an automatic emergency backup generator to provide uninterrupted power to the Ellice Dinges Center which serves as Village Hall and an emergency evacuation shelter.	EQ, F, SS, SWS, T	MP	Eliminates	Large	2, 3, 5	NA	Yes	Village Board	TBD	TBD	Low/High
LM	Conduct drainage study to determine the cause of recurring drainage issues within the Village.	F, SS, SWS	S	Reduces	Small	2, 3, 5	Yes	Yes	Village Board	TBD	75% Federal 25% Local	Medium/High
HM	Select, design and construct the appropriate drainage remedy to alleviate recurring drainage problems within the Village.	F, SS, SWS	SP	Reduces	Small	2, 3, 5	Yes	Yes	Village Board	TBD	75% Federal 25% Local	Medium/High
HM	Replace storm tiles as needed to alleviate drainage problems.	F, SS, SWS	SP	Reduces	Small	2, 3, 5	Yes	Yes	Village Board	TBD	75% Federal 25% Local	Medium/High
LM	Establish GIS location coordinates for all critical infrastructure within the Village so that digital maps can be generated.	DF, EQ, F, SS, SWS, T	MP	Reduces	Large	1, 2	Yes	Yes	Village Board	TBD	TBD	Low/Medium
HM	Purchase and install storm sirens.	SS, T	MP	Reduces	Large	2	NA	NA	Village Board	TBD	TBD	Low/High

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection

**Figure 75  
Sublette Hazard Mitigation Actions**

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Degree of Mitigation	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)	Cost/Benefit Analysis
							New	Existing				
LM	Make the most recent Flood Insurance Rate Maps available at the Village Clerk's Office to assist the public in considering where to construct new buildings and make Village Officials aware of these maps and issues related to construction in a floodplain.*	F	RA	Reduces	Large	1, 6, 7	Yes	Yes	Village Board	TBD	Village	Low/High
LM	Make information materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.*	F	PP	Reduces	Large	1, 6, 7	Yes	Yes	Village Board	TBD	Village	Low/High

\* Mitigation action to ensure continued compliance with NFIP.

**Acronyms**

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storms (Thunderstorms, etc.)
EH	Extreme Heat	SWS	Severe Winter Storms (Snow, etc.)
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

RA	Regulatory Activities	S	Studies
SP	Structural Projects	MP	Miscellaneous Projects
PI	Public Involvement	PP	Property Protection



## **5.0 RECOMMENDATIONS**

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## 5.0 RECOMMENDATIONS

The following recommendations came about as a result of the planning process. These recommendations should be reviewed and discussed periodically by the professional staff and elected officials of each participating jurisdiction to determine if appropriate actions should be taken.

<b>GENERAL</b>
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### Emergency Operation Plans for Schools

Develop and annually update Emergency Operation Plans for elementary, middle and high schools. These plans should include sections about how to mitigate risks from natural hazards, structure failures, shooters & hostage situations, fire and bombs. No-match federal grants are available to develop these plans and conduct tabletop and full-scale exercises involving health, law enforcement, fire, and emergency management personnel.

### Mitigating Repetitive Loss Structures and Critical Facilities

Mitigation is strongly encouraged for all structures in the mapped floodplain, with a higher priority given to repetitive loss structures and critical facilities, as funding or other resources become available.

### Land-Use Coordination to Prevent Potential Flooding Problems

Land use changes along I-88 are anticipated to continue as business, commercial and industrial developers seek locations which have direct four-lane highway access to the metropolitan Chicago area. Encourage municipalities along the I-88 corridor to work with economic development staff to foster development opportunities that prevent drainage and flooding problems before new facilities are constructed. Floodplains and wetlands provide natural stormwater storage and flood control. These and other natural areas can be maintained by adopting uniform setbacks from streams, lakes, and ponds and by requiring a vegetative buffer within the setback to trap silt and slow the movement of stormwater. New development can occur while preventing potential flooding problems by taking these protective measures.

### Developing and Disseminating Hazard Information

Public information materials should be prepared that will help residents take protective actions prior to natural hazard events. These materials should be based on risk communication principles to improve their effectiveness. Feedback from Lee County residents indicates that radio, television and the internet should be utilized to disseminate this information.

### Identifying Special Needs Persons

Physical and mental impairments can hinder persons from being able to escape dangers posed by floodwaters, tornadoes, or the release of chemicals from a transportation accident that might necessitate an evacuation. During periods of temperature extremes or severe snow or ice storms, persons with special needs may not be able to obtain vital health care and other services needed to avoid severe injury or survive. To serve special needs persons, consideration should be given to assembling a database that includes persons who live in municipalities and unincorporated

areas throughout Lee County. To make the database inclusive, Lee County intends to lead a county-wide effort that includes municipalities along with the appropriate County offices and departments.

#### Planning Tools

Lee County may want to consider conducting a workshop to discuss the issues that could strain County resources resulting from an influx of evacuees triggered by any natural or man-made disaster. The workshop should include emergency services (law enforcement, ambulance, fire protection) and health care providers along with county and municipal officials. Interactive exercises designed to identify local issues and begin discussions about mitigation measures should be part of the workshop. These exercises are recommended because they are typically designed to solicit input from attendees so that local issues and concerns can be identified. Communication, transportation, signage, food, fuel, water, shelter, health care, law enforcement, and emergency services should be among the topics discussed in the workshop. The development of plans and procedures in preparation for a spontaneous or planned evacuation of a large population will assist Lee County in dealing with evacuees when such an event occurs.

<b><i>JURISDICTION-SPECIFIC</i></b>
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#### Ashton

- The Village should work to obtain 100-year floodplain building elevations in the Beach Creek area along the south side of Ashton. These elevations are needed to determine at what elevation new buildings should be constructed to avoid flooding issues.
- In order to remain in compliance with the National Flood Insurance Program, the Village should conduct the appropriate maintenance activities outlined in Figure 70.

#### Dixon

- The City should continue to separate any remaining stormwater and wastewater sewers. Separation can be accomplished by constructing new storm sewers as streets are renovated.

#### Harmon

- Cooperation is encouraged between the Village and Harmon Township to improve their ability to provide a local match for state and federal grants. This cooperation is expected to provide mutual benefits to residents in both jurisdictions.

#### Steward

- The Village should continue to explore the feasibility of providing an emergency drinking water source and obtain information about the costs and responsibilities that Steward might incur if it were to enter into a Memorandum of Agreement with a nearby municipality.



## **6.0 PLAN MAINTENANCE**

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## **6.0 PLAN MAINTENANCE**

This section outlines the Federal Emergency Management Agency (FEMA) requirements for maintaining and updating the Plan. These requirements include:

- establishing the method and schedule for monitoring, evaluating and updating the Plan;
- describing how the mitigation strategy will be incorporated into existing planning processes; and
- detailing how continued public input will be obtained.

These requirements will help to ensure that the Plan remains an effective and relevant document. Provided below is detailed discussion of the plan maintenance approach.

### **6.1 MONITORING, EVALUATING & UPDATING THE PLAN**

Establishing a method and schedule for monitoring, evaluating and updating the Plan allows the participating jurisdictions to review the plan, the planning process and the results of the implemented mitigation actions and make changes as necessary.

#### **6.1.1 Monitoring and Evaluating the Plan**

The Plan will be monitored and evaluated by the Plan Maintenance Subcommittee on a semi-annual basis. The Plan Maintenance Subcommittee will include key members of the Planning Committee (i.e., representatives from each of the participating County entities as well as representatives from each of the participating municipalities). The Subcommittee will be chaired by the Lee County Emergency Management Agency. All meetings held by the Subcommittee will be open to the public. The information gathered at each Subcommittee meeting will be documented and provided to all participating entities for their review and use in the plan update.

The Lee County Emergency Management Agency will be responsible for monitoring the status of mitigation actions identified in the Plan. It will be the responsibility of each participating government entity to provide the Emergency Management Agency with a semi-annual progress report detailing the status of their identified mitigation actions at the Subcommittee meetings.

The Plan Maintenance Subcommittee will also evaluate the Plan on a semi-annual basis to determine the effectiveness of both the planning process and the mitigation actions implemented and to assess whether any changes need to be made. As part of the evaluation, the Subcommittee will review the goals to determine whether they are still relevant or if new goals need to be added; assess whether other natural hazards need to be addressed or included in the Plan and review any new hazard data that may affect the Risk Assessment portion of the Plan. The Subcommittee will also evaluate whether other County departments should be invited to participate.

In terms of evaluating the effectiveness of mitigation actions that have been implemented, the Subcommittee will assess whether a project is on time, in line with the budget and moving ahead as planned, whether the project achieved the goals outlined and had the intended result and whether losses were avoided as a result of the project. In addition, each of the participating government entities will be given an opportunity to add new mitigation actions to the Plan and

modify or discontinue mitigation actions already identified. In some cases a project may need to be removed from the list of mitigation actions because of unforeseen problems with implementation.

### **6.1.2 Updating the Plan**

The Plan must be updated within five years of the date the first participating government entity adopts the Plan. This ensures that all the participating government entities will remain eligible to receive federal grant money to implement those mitigation actions identified in this Plan. It will be the responsibility of the Plan Maintenance Subcommittee to update the Plan. The update will incorporate all of the information gathered and changes proposed at the previous semi-annual monitoring and evaluation meetings. In addition, any non-participating municipality that wishes to participate may be added during the update. These entities will be responsible for providing all of the information needed to be integrated into the Plan. A public forum will be held to present the updated Plan to the public for review and comment. The comments received at public forum will be reviewed and incorporated into the updated Plan.

The Subcommittee will then present the updated Plan to the participating government entities for approval. Once the Subcommittee has received approval from all of the participating entities, it will submit the updated Plan to the Illinois Emergency Management Agency and FEMA for review. After FEMA has approved the updated Plan, each of the participating government entities will again be required to formally adopt the Plan.

## **6.2 INCORPORATING THE MITIGATION STRATEGY INTO EXISTING PLANNING MECHANISMS**

As part of the planning process, the Planning Committee identified current plans, programs, policies/ordinances and maps that will supplement or help support mitigation planning efforts. **Figure 6** identifies the existing planning mechanism available by jurisdiction. It will be the responsibility of each participating government entity to incorporate, where applicable, the mitigation strategy and other information contained in the Plan into the planning mechanisms identified for their jurisdiction.

## **6.3 CONTINUED PUBLIC INVOLVEMENT**

The County and participating municipalities understand the importance of continued public involvement and will seek public input on the Plan throughout the plan maintenance process. A copy of the approved Plan will be maintained and available for review at the Lee County Emergency Management Agency website and office. Individuals will be encouraged to provide feedback and submit comments for the Plan update to the Emergency Management Agency.

The comments received will be compiled and presented at the semi-annual Plan Maintenance Subcommittee meetings where members will consider them for incorporation into the updated Plan. All meetings held by the Plan Maintenance Subcommittee will be noticed and open to the public. A separate public forum will be held prior to updating the Plan to provide the public an opportunity to comment on the updates proposed for the Plan.



## **7.0 PLAN ADOPTION**

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## 7.0 PLAN ADOPTION

The final step in the planning process is the formal adoption of the approved Plan by each participating jurisdiction. Each entity must formally adopt the Plan to be eligible for federal grant money to implement mitigation actions identified in this Plan.

### 7.1 PLAN ADOPTION PROCESS

Before each of the participating jurisdictions could formally adopt the Plan, the County had to submit it to the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA) for their review and approval. After receiving IEMA and FEMA approval, Lee County forwarded the Plan to each participating jurisdiction for formal adoption. Signed copies of these resolutions are located in **Appendix K**. **Figure 76** identifies the participating jurisdictions and the date each formally adopted the Plan.

<b>Figure 76 Multi-Jurisdictional Plan Adoption Dates</b>	
<b>Participating Jurisdiction</b>	<b>Adoption Date</b>
Steward	06/13/2011
Sublette	06/13/2011
Amboy	06/20/2011
Lee County	06/21/2011
Harmon	07/02/2011
Dixon	07/05/2011
Ashton	07/11/2011
Franklin Grove	08/08/2011

## **8.0 REFERENCES**

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## 8.0 REFERENCES

Provided below is a listing, by section, of the resources utilized to create this document.

### 1.0 INTRODUCTION

1. Federal Emergency Management Agency. Getting Started: Building Support for Mitigation Planning. FEMA 386-1. September 2002.
2. Federal Emergency Management Agency. “Illinois.” Declared Disasters and Emergencies – Disaster Database Search. 1965 – 2009. <<http://www.fema.gov/femaNews/disasterSearch.do?action=Reset>>.

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#### **6.0 PLAN MAINTENANCE**

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**9.0 TABLES**

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**Table 1**  
**Thunderstorm & High Wind Events Reported in Lee County**  
**1956 through 2009**

<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Magnitude (Knots)</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>	<b>Crop Damage</b>
5/29/1956	3:15 p.m.	Steward	0 kts	0	0	\$0	\$0
3/14/1957	3:05 p.m.	Harmon	63 kts	0	0	\$0	\$0
6/8/1958	6:30 p.m.	Nelson	0 kts	0	0	\$0	\$0
9/21/1961	6:15 p.m.	Steward	0 kts	0	0	\$0	\$0
3/11/1962	11:46 a.m.	Steward	50 kts	0	0	\$0	\$0
8/8/1962	6:15 p.m.	Harmon	0 kts	0	0	\$0	\$0
4/11/1965	3:08 p.m.	Dixon	70 kts	0	0	\$0	\$0
6/22/1965	6:43 p.m.	Steward	50 kts	0	0	\$0	\$0
7/6/1965	8:12 p.m.	Franklin Grove	0 kts	0	0	\$0	\$0
8/26/1965	9:35 p.m.	Steward	0 kts	0	0	\$0	\$0
5/23/1966	6:00 p.m.	Steward	0 kts	0	0	\$0	\$0
8/16/1968	3:00 p.m.	Dixon	0 kts	0	0	\$0	\$0
6/12/1970	12:10 p.m.	Dixon	56 kts	0	0	\$0	\$0
6/17/1970	1:05 p.m.	Dixon	57 kts	0	0	\$0	\$0
4/6/1972	6:45 p.m.	Dixon	0 kts	0	0	\$0	\$0
4/6/1972	7:00 p.m.	Franklin Grove	0 kts	0	0	\$0	\$0
3/4/1974	4:10 a.m.	Amboy	0 kts	0	0	\$0	\$0
4/13/1974	8:30 p.m.	Dixon	0 kts	0	0	\$0	\$0
6/20/1974	5:40 p.m.	Harmon	0 kts	0	0	\$0	\$0
6/20/1974	6:00 p.m.	Compton	0 kts	0	0	\$0	\$0
6/22/1974	9:15 a.m.	Ashton	0 kts	0	0	\$0	\$0
3/4/1976	6:38 p.m.	Amboy	0 kts	0	0	\$0	\$0
3/12/1976	12:00 p.m.	Amboy	0 kts	0	0	\$0	\$0
5/21/1977	2:00 p.m.	Dixon	55 kts	0	0	\$0	\$0
7/2/1983	6:50 p.m.	Amboy	0 kts	0	0	\$0	\$0
8/10/1983	6:30 p.m.	Dixon	0 kts	0	0	\$0	\$0
5/17/1986	12:45 a.m.	Dixon	0 kts	0	0	\$0	\$0
5/11/1987	5:00 p.m.	Amboy	61 kts	0	0	\$0	\$0
5/21/1987	8:45 p.m.	Harmon	60 kts	0	0	\$0	\$0
6/2/1987	1:10 a.m.	Dixon	0 kts	0	0	\$0	\$0
8/16/1987	7:10 p.m.	Amboy	68 kts	0	0	\$0	\$0
5/8/1988	4:20 p.m.	Ashton	0 kts	0	0	\$0	\$0
5/24/1989	11:00 p.m.	Dixon	0 kts	0	0	\$0	\$0
6/17/1990	3:31 a.m.	Dixon	0 kts	0	0	\$0	\$0

**Table 1 Continued...**  
**Thunderstorm & High Wind Events Reported in Lee County**  
**1956 through 2009**

<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Magnitude (Knots)</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>	<b>Crop Damage</b>
6/29/1990	1:45 a.m.	Dixon	0 kts	0	0	\$0	\$0
7/2/1992	11:37 a.m.	Dixon	0 kts	0	0	\$0	\$0
4/18/1995	9:40 a.m.	Dixon	52 kts	0	0	\$0	\$0
10/24/1995	12:00 p.m.	countywide	44 kts*	0	0	\$0	\$0
3/25/1996	12:00 a.m.	countywide	48 kts*	0	0	\$0	\$0
6/23/1996	8:25 p.m.	Ashton	0 kts	0	0	\$0	\$0
10/29/1996	4:30 p.m.	countywide	0 kts	0	0	\$0	\$0
4/5/1997	3:45 p.m.	countywide	55 kts	0	0	\$0	\$0
9/29/1997	12:00 p.m.	countywide	56 kts*	0	0	\$0	\$0
5/28/1998	8:10 p.m.	countywide	50 kts	0	0	\$0	\$0
6/18/1998	5:55 p.m.	Dixon	50 kts	0	0	\$0	\$0
6/28/1998	1:50 a.m.	Dixon	50 kts	0	0	\$0	\$0
8/24/1998	11:35 a.m.	countywide	50 kts	0	0	\$0	\$0
11/10/1998	7:30 a.m.	countywide	56 kts*	0	0	\$0	\$0
2/11/1999	2:00 p.m.	Dixon	52 kts	0	0	\$0	\$0
5/16/1999	11:30 p.m.	Amboy Harmon	50 kts	0	0	\$0	\$0
6/1/1999	5:45 p.m.	Dixon Amboy Paw Paw	61 kts	0	0	\$0	\$0
5/18/2000	3:00 p.m.	Dixon	50 kts	0	0	\$0	\$0
8/6/2000	3:35 p.m.	Amboy	50 kts	0	0	\$0	\$0
2/25/2001	4:00 a.m.	countywide	44 kts*	0	0	\$0	\$0
6/12/2001	11:12 a.m.	countywide	65 kts	1	0	\$55,000	\$0
6/14/2001	6:16 p.m.	Dixon	50 kts	0	0	\$0	\$0
10/25/2001	6:00 a.m.	countywide	51 kts*	0	0	\$75,000†	\$0
3/9/2002	11:52 a.m.	countywide	51 kts*	0	0	\$0	\$0
6/3/2002	6:40 p.m.	countywide	50 kts	0	0	\$0	\$0
7/7/2003	6:40 a.m.	Ashton	50 kts	0	0	\$0	\$0
7/7/2003	8:04 p.m.	Paw Paw Steward	52 kts	0	0	\$	\$0
7/21/2003	12:22 a.m.	Ashton Steward	65 kts	0	0	\$0	\$0

\* Denotes High Wind Event.

† The property damage total of \$75,000 for the high winds on October 25, 2001 represents losses sustained in 8 counties (including Lee County). A breakdown by county was not available.

**Table 1 Continued...**  
**Thunderstorm & High Wind Events Reported in Lee County**  
**1956 through 2009**

<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Magnitude (Knots)</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>	<b>Crop Damage</b>
7/27/2003	11:00 a.m.	Amboy	57 kts	0	0	\$0	\$0
7/27/2003	11:15 a.m.	West Brooklyn	57 kts	0	0	\$0	\$0
11/13/2003	2:00 p.m.	countywide	51 kts*	0	0	\$0	\$0
5/10/2004	3:22 p.m.	Amboy	55 kts	0	0	\$0	\$0
5/31/2004	3:45 p.m.	Amboy	60 kts	0	0	\$0	\$0
7/13/2004	11:20 a.m.	Amboy	52 kts	0	0	\$0	\$0
7/13/2004	11:35 a.m.	Amboy	60 kts	0	0	\$20,000	\$0
5/11/2005	4:00 a.m.	Harmon	52 kts	0	0	\$0	\$0
9/13/2005	4:40 p.m.	Dixon	50 kts	0	0	\$0	\$0
5/24/2006	6:45 p.m.	Dixon	50 kts	0	0	\$0	\$0
5/24/2006	7:10 p.m.	Amboy	50 kts	0	0	\$0	\$0
5/24/2006	7:15 p.m.	Amboy	50 kts	0	0	\$0	\$0
5/27/2006	3:15 p.m.	Dixon	50 kts	0	0	\$1,000	\$0
5/27/2006	4:20 p.m.	Sublette	61 kts	0	0	\$0	\$0
5/29/2006	6:55 p.m.	Sublette	50 kts	0	0	\$0	\$0
8/3/2006	3:05 a.m.	Compton	50 kts	0	0	\$0	\$0
8/10/2006	7:09 a.m.	Amboy	61 kts	0	0	\$5,000	\$0
8/10/2006	7:09 a.m.	Compton	52 kts	0	0	\$0	\$0
9/4/2006	3:05 p.m.	Paw Paw	50 kts	0	0	\$0	\$0
9/22/2006	3:33 p.m.	Amboy	62 kts	0	0	\$0	\$0
10/2/2006	8:47 p.m.	Dixon Sublette	56 kts	0	0	\$0	\$0
3/31/2007	7:40 p.m.	Compton	56 kts	0	0	\$0	\$0
3/31/2007	7:46 p.m.	Paw Paw	61 kst	0	0	\$0	\$0
6/1/2007	2:50 p.m.	Dixon	50 kts	0	0	\$1,000	\$0
6/7/2007	8:55 p.m.	Dixon	50 kts	0	0	\$2,000	\$0
6/7/2007	10:00 p.m.	Dixon	50 kts	0	0	\$0	\$0
7/17/2007	11:17 p.m.	Dixon	50 kts	0	0	\$0	\$0
7/18/2007	8:23 p.m.	Amboy	50 kts	0	0	\$0	\$0
7/18/2007	8:45 p.m.	West Brooklyn	50 kts	0	0	\$0	\$0
8/14/2007	4:09 a.m.	Steward	50 kts	0	0	\$0	\$0
8/23/2007	12:45 p.m.	Franklin Grove	55 kts	0	0	\$5,000	\$0
5/25/2008	11:30 p.m.	Amboy	55 kts	0	0	\$0	\$0

\* Denotes High Wind Event.

**Table 1 Continued...**  
**Thunderstorm & High Wind Events Reported in Lee County**  
**1956 through 2009**

<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Magnitude (Knots)</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>	<b>Crop Damage</b>
6/12/2008	10:45 p.m.	Harmon	55 kts	0	0	\$0	\$0
6/12/2008	10:47 p.m.	Dixon	55 kts	0	0	\$0	\$0
6/28/2008	2:00 p.m.	Amboy	60 kts	0	0	\$0	\$0
7/10/2008	12:40 p.m.	Amboy	52 kts	0	0	\$0	\$0
8/4/2008	5:48 p.m.	Dixon	56 kts	0	0	\$0	\$0
8/4/2008	6:17 p.m.	Compton	70 kts	0	0	\$5,000	\$0
3/24/2009	8:35 p.m.	Dixon	65 kts	0	0	\$30,000	\$0
5/13/2009	7:50 p.m.	Amboy	60 kts	0	0	\$0	\$0
6/19/2009	4:40 p.m.	Dixon	52 kts	0	0	\$1,000	\$0
6/19/2009	5:15 p.m.	Amboy	61 kts	0	0	\$20,000	\$0
6/19/2009	5:20 p.m.	Amboy	56 kts	0	0	\$0	\$0
6/19/2009	5:33 p.m.	Steward	55 kts	0	0	\$0	\$0
6/27/2009	5:10 p.m.	Franklin Grove	61 kts	0	0	\$0	\$0
<b>Totals:</b>				<b>1</b>	<b>0</b>	<b>\$220,000<sup>†</sup></b>	<b>\$0</b>

<sup>†</sup> The property damage total of \$75,000 for the high winds on October 25, 2001 represents losses sustained in 8 counties (including Lee County). A breakdown by county was not available.

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

**Table 2  
Hail Events Reported in Lee County  
1958 through 2009**

<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Magnitude (Diameter)</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>	<b>Crop Damage</b>
6/8/1958	6:30 p.m.	Nelson	2.50 in.	0	0	\$0	\$0
4/22/1970	9:00 a.m.	Dixon	1.00 in.	0	0	\$0	\$0
4/22/1970	9:20 a.m.	Steward	1.00 in.	0	0	\$0	\$0
5/1/1973	5:30 p.m.	Dixon	1.00 in.	0	0	\$0	\$0
4/18/1975	10:20 a.m.	Dixon	2.50 in.	0	0	\$0	\$0
5/11/1987	4:25 p.m.	Dixon	1.00 in.	0	0	\$0	\$0
6/19/1990	9:20 p.m.	Harmon	1.75 in.	0	0	\$0	\$0
3/27/1991	1:46 p.m.	Dixon	1.50 in.	0	0	\$0	\$0
9/9/1991	6:45 p.m.	Harmon	1.50 in.	0	0	\$0	\$0
5/9/1995	5:54 p.m.	Dixon	1.75 in.	0	0	\$0	\$0
4/18/1996	6:34 p.m.	Amboy	1.75 in.	0	0	\$0	\$0
5/18/1997	6:15 p.m.	Paw Paw	1.75 in.	0	0	\$0	\$0
5/12/1998	9:30 p.m.	Amboy	1.00 in.	0	0	\$0	\$0
5/18/2000	11:10 a.m.	Dixon	1.75 in.	0	0	\$0	\$0
6/14/2001	6:30 p.m.	Franklin Grove	1.00 in.	0	0	\$0	\$0
5/10/2003	12:05 a.m.	Paw Paw	1.00 in.	0	0	\$0	\$0
7/11/2003	4:10 p.m.	Ashton West Brooklyn	1.00 in.	0	0	\$0	\$0
7/11/2003	5:41 p.m.	Nelson Harmon	1.00 in.	0	0	\$0	\$0
5/21/2004	6:47 p.m.	Dixon	1.00 in.	0	0	\$0	\$0
7/13/2004	10:40 a.m.	Amboy	2.75 in.	0	0	\$0	\$0
7/13/2004	10:40 a.m.	Sublette	4.00 in.	0	0	\$0	\$0
3/30/2005	6:30 p.m.	Paw Paw	1.25 in.	0	0	\$0	\$0
5/11/2005	4:00 a.m.	Harmon	1.00 in.	0	0	\$0	\$0
4/13/2006	8:10 p.m.	Dixon	2.75 in.	0	0	\$0	\$0
9/4/2006	2:20 p.m.	West Brooklyn	1.00 in.	0	0	\$0	\$0
9/22/2006	3:06 p.m.	Dixon	1.00 in.	0	0	\$0	\$0
9/22/2006	3:12 p.m.	Dixon	1.00 in.	0	0	\$0	\$0
9/22/2006	3:21 p.m.	Dixon	1.75 in.	0	0	\$0	\$0
5/25/2008	11:19 a.m.	Paw Paw	1.00 in.	0	0	\$0	\$0
7/10/2008	12:19 p.m.	Amboy	1.75 in.	0	0	\$0	\$0
<b>Totals:</b>				<b>0</b>	<b>0</b>	<b>\$0</b>	<b>\$0</b>

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

<b>Table 3 Lightning Events Reported in Lee County 2000 through 2009</b>						
<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>	<b>Crop Damage</b>
9/22/2000	NA	Dixon	0	0	\$34,674	\$0
5/1/2003	12:30 a.m.	Dixon	0	0	\$0	\$0
5/12/2004	NA	Dixon	0	0	\$9,441	\$0
1/12/2005	NA	Amboy	0	0	\$8,200	\$0
8/10/2006	6:53 a.m.	Dixon	0	0	\$5,000	\$0
2/4/2008	NA	Dixon	0	0	\$23,996	\$0
5/13/2009	NA	Amboy	0	0	\$14,000	\$0
12/16/2009	NA	Dixon	0	0	\$4,800	\$0
<b>Totals:</b>			<b>0</b>	<b>0</b>	<b>\$100,111</b>	<b>\$0</b>

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

Lalley, Kevin. Lee County Emergency Management Agency Director. "damages." Email to Greg R. Michaud. July 13, 2010.

Al Stenzel.

<b>Table 4 Heavy Rain Events Reported in Lee County 2009</b>							
<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Magnitude (inches)</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>	<b>Crop Damage</b>
8/26/2009	4:30 a.m.	Dixon	2"	0	0	\$0	\$0
<b>Totals:</b>				<b>0</b>	<b>0</b>	<b>\$0</b>	<b>\$0</b>

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

**Table 5  
Snow & Ice Events Reported in Lee County  
1967 through 2009**

<b>Date</b>	<b>Time</b>	<b>Event (Magnitude)</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>
1/25/1967 thru 1/26/1967	NA	Heavy Snow 23" snow	0	0	\$0
12/6/1994	11:00 p.m.	Winter Storm 6" – 10" snow	0	0	\$0
1/18/1995 thru 1/19/1995	6:00 p.m.	Heavy Snow ≤ 8" snow; blowing & drifting snow	0	0	\$0
12/8/1995 thru 12/9/1995	12:00 p.m.	Winter Storm 2" – 4" snow; strong winds; blowing & drifting snow; low temperatures & very low wind chills	0	0	\$0
1/15/1997 thru 1/18/1997	6:00 a.m.	Winter Storm 4" – 6" snow; low temperatures & very low wind chills; blowing & drifting snow	0	0	\$0
1/8/1998	6:00 a.m.	Heavy Snow 4" – 8" snow	0	0	\$0
1/1/1999 thru 1/2/1999	7:00 p.m.	Heavy Snow 10" – 17" snow; blowing & drifting snow	0	1*	\$0
3/5/1999 thru 3/6/1999	5:00 p.m.	Heavy Snow 3" – 6" snow	0	0	\$0
3/8/1999 thru 3/9/1999	5:00 p.m.	Heavy Snow 5" – 8" snow; blowing & drifting snow	0	0	\$0
1/19/2000 thru 1/20/2000	12:00 p.m.	Heavy Snow 4" – 9" snow	0	0	\$0
2/18/2000	3:00 a.m.	Heavy Snow 12" snow; blowing & drifting snow	0	0	\$0
12/11/2000	3:00 a.m.	Heavy Snow 9" – 12" snow; blowing & drifting snow; very low wind chills	0	0	\$0

\* Information was not available on the location of the severe winter storm- related fatality. The data provided for this event covered 18 counties including Lee County.

**Table 5 Continued...  
Snow & Ice Events Reported in Lee County  
1967 through 2009**

<b>Date</b>	<b>Time</b>	<b>Event (Magnitude)</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>
1/30/2002 thru 1/31/2002	7:00 p.m.	Winter Storm 6" – 10" snow	0	0	\$0
3/2/2002 thru 3/3/2002	9:00 a.m.	Winter Storm 6" – 11" snow	0	0	\$0
3/4/2003 thru 3/5/2003	10:00 p.m.	Winter Storm 5" – 7" snow	0	0	\$0
1/4/2004 thru 1/5/2004	7:00 a.m.	Heavy Snow 5" – 7" snow	0	0	\$0
1/4/2005 thru 1/6/2005	7:00 p.m.	Heavy Snow 6" – 12" snow	0	0	\$0
1/20/2006 thru 1/21/2006	8:00 p.m.	Winter Storm 6" – 9" snow	0	0	\$0
11/30/2006 thru 12/1/2006	8:00 p.m.	Winter Storm 10" – 15" snow	0	0	\$8,500
2/25/2007 thru 2/26/2007	4:00 p.m.	Winter Storm ½" sleet & ice accumulation; 3" – 5" snow; gusting winds caused blizzard conditions	0	0	\$0
12/1/2007	10:30 a.m.	Ice Storm accumulations of 1" sleet and ¾" ice	0	0	\$0
12/11/2007	2:00 a.m.	Ice Storm ¼" ice accumulations	0	0	\$0
12/28/2007	8:00 a.m.	Heavy Snow 5" – 7" snow	0	0	\$0
1/21/2008 thru 1/22/2008	2:00 p.m.	Winter Storm 6" snow	0	0	\$0
2/5/2008 thru 2/6/2008	3:00 p.m.	Winter Storm 9" snow	0	0	\$0

**Table 5 Continued...  
Snow & Ice Events Reported in Lee County  
1967 through 2009**

<b>Date</b>	<b>Time</b>	<b>Event (Magnitude)</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>
12/18/2008 thru 12/19/2008	10:00 p.m.	Ice Storm/Winter Storm ½” sleet accumulation; 2” – 6” snow	0	0	\$0
1/13/2009 thru 1/14/2009	10:00 p.m.	Winter Storm 7” snow	0	0	\$0
12/8/2009 thru 12/9/2009	4:00 a.m.	Winter Storm 7” – 10” snow; strong winds caused blowing & drifting snow	0	0	\$0
12/23/2009 thru 12/24/2009	10:00 a.m.	Ice Storm mixture of sleet, snow & freezing rain with ¼” to ½” ice accumulation	0	0	\$0
<b>Totals:</b>			<b>0</b>	<b>1*</b>	<b>\$8,500</b>

\* Information was not available on the location of the severe winter storm- related fatality. The data provided for this event covered 18 counties including Lee County.

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

**Table 6  
Extreme Cold Events Reported in Lee County  
1996 through 2009**

<b>Date</b>	<b>Time</b>	<b>Event (Magnitude)</b>	<b>Injuries</b>	<b>Death</b>	<b>Property Damage</b>
2/2/1996 thru 2/4/1996	12:00 a.m.	Extreme Cold record low temperatures (-2°F to -33°F)	0	0	\$0
1/23/2003	1:00 a.m.	Extreme Cold/Wind Chill low temperatures (0°F to -5°F) & very low wind chills (-20°F to -25°F)	0	0	\$0
1/29/2004 thru 1/30/2004	6:00 p.m.	Extreme Cold/Wind Chill low temperatures (-5°F to -10°F) & very low wind chills (-20°F to -34°F)	0	0	\$0
2/18/2006	12:00 a.m.	Extreme Cold/Wind Chill low temperatures (3°F to -11°F) & very low wind chills (-30°F to -35°F)	0	0	\$0
2/3/2007 thru 2/6/2007	6:00 p.m.	Extreme Cold/Wind Chill low temperatures (5°F to -10°F) & very low wind chills (-20°F to -30°F)	0	0	\$0
2/10/2008	3:00 a.m.	Extreme Cold/Wind Chill low temperatures (-5°F to -10°F) & very low wind chills (-25°F to -35°F)	0	0	\$0
12/21/2008	7:00 a.m.	Extreme Cold/Wind Chill low temperatures (-5°F to -10°F) & very low wind chills (-35°F)	0	0	\$0
1/15/2009 thru 1/16/2009	1:00 a.m.	Extreme Cold/Wind Chill low temperatures (-15°F to -20°F) & very low wind chills (-30°F to -45°F)	0	0	\$0
<b>Totals:</b>			<b>0</b>	<b>0</b>	<b>\$0</b>

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

**Table 7  
Tornadoes Reported in Lee County  
1956 through 2009**

<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Magnitude (Fujita Scale)</b>	<b>Injuries</b>	<b>Deaths</b>	<b>Property Damage</b>
8/30/1956	11:00 p.m.	Dixon*	F2	0	0	\$2,500
8/15/1958	2:00 a.m.	Dixon* Compton*	F2	0	0	\$250,000
9/26/1959	4:30 p.m.	Dixon*	F1	0	0	\$25,000
4/21/1967	4:02 p.m.	Harmon* Amboy*	F2	0	0	\$25,000
4/21/1967	4:15 p.m.	Amboy* West Brooklyn*	F1	0	0	\$250,000
4/6/1972	7:05 p.m.	Dixon* Amboy*	F2	6	0	\$250,000
5/14/1972	11:45 a.m.	Compton*	F0	0	0	\$0
6/20/1974	5:45 p.m.	Dixon*	---	0	0	\$0
6/20/1975	12:06 p.m.	Compton*	F0	0	0	\$0
6/20/1975	12:30 p.m.	Ashton*	F1	0	0	\$2,500
6/20/1975	1:15 p.m.	Steward*	F0	0	0	\$300
5/14/1985	6:45p.m.	West Brooklyn*	F1	0	0	\$2,500
5/15/1986	2:30 p.m.	Dixon	F1	1	0	\$25,000
4/2/1988	4:50 p.m.	Harmon	F0	0	0	\$0
5/8/1988	4:20 p.m.	Dixon	F0	0	0	\$25,000
4/29/1991	6:30 p.m.	Paw Paw*	F1	0	0	\$25,000
5/9/1995	5:25 p.m.	Harmon	F0	0	0	\$0
6/18/1998	5:55 p.m.	Nelson	F0	0	0	\$0
5/30/2003	5:36 p.m.	Franklin Grove* Ashton*	F0	0	0	\$0
5/10/2004	4:05 p.m.	Lee*	F0	0	0	\$0
<b>Totals:</b>				<b>7</b>	<b>0</b>	<b>\$882,800</b>

\* Tornado touchdown verified in the vicinity of this location(s).

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

**Table 8  
Flood & Flash Flood Events Reported in Lee County  
1996 through 2009**

Date	Time	Location	Type	Magnitude (inches)	Injuries	Death	Property Damage
7/17/1996	6:00 p.m.	Eastern portion of the County	Flash Flood	NA	0	0	\$0
2/20/1997	6:00 p.m.	countywide	Flood	3" – 4"	0	0	\$0
10/17/1998	2:00 p.m.	countywide	Urban / Stream Flood	3" – 5"	0	0	\$0
6/12/2000	3:00 p.m.	countywide	Flood	3" – 6"	0	0	\$0
6/4/2002	2:00 a.m.	countywide	Flash Flood	6.5" – 5"	0	0	\$0
6/4/2002	7:00 a.m.	countywide	Flood	no additional rainfall – flooding caused by runoff from early morning rain event	0	0	\$0
9/4/2006	2:43 p.m.	Compton	Flash Flood	2"	0	0	\$0
7/18/2007	12:30 a.m.	Amboy	Flash Flood	3.25"	0	0	\$0
7/18/2007	12:30 a.m.	Dixon	Flood	4.36"	0	0	\$0
8/23/2007	3:00 p.m.	Dixon	Flood	NA	0	0	\$0
8/23/2007	7:57 p.m.	Amboy Compton	Flash Flood	NA	0	0	\$0
7/10/2008	2:30 p.m.	Amboy Sublette	Flood	4.75" – 6"	0	0	\$0
9/13/2008	9:50 a.m.	Amboy	Flash Flood	6.5"	0	0	\$0
12/27/2008	1:12 p.m.	Dixon Paw Paw	Flash Flood	1.44" – 1.88"	0	0	\$0
<b>Totals</b>					<b>0</b>	<b>0</b>	<b>\$0</b>

SourceS: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

Lalley, Kevin. Lee County Emergency Management Agency Director. "RE: Flood Photos." Email to Andrea J. Bostwick. December 1, 2010.





06-09-010

**RESOLUTION FOR PURSUIT OF THE PREPARATION OF A NATURAL HAZARD MITIGATION PLAN**

WHEREAS; Lee County, Illinois would like to obtain grant money through the Disaster Mitigation Act of 2000, as money is available for Planning and Projects that can reduce or eliminate the damages caused by natural hazards such as rain, snow, wind, ice storms, floods, drought and earthquakes; and

WHEREAS; Lee County, Illinois must prepare a Natural Hazard Mitigation Plan before money can be released for projects; and

WHEREAS; this plan will include a listing of potential projects that can help reduce the damages caused by these storms; and

WHEREAS; Lee County will follow the next step in this process, which will be to prepare a grant application through Johnson, Depp & Quisenberry, an environmental and engineering consulting firm, for the preparation of this plan.

NOW THEREFORE, BE IT RESOLVED; that the LEE COUNTY BOARD does Hereby pass this resolution to pursue the preparation of a Natural Hazard Mitigation Plan.

Passed this 16 day of June, 2009

James Saly  
County Board Chairman

ATTEST:  
Nancy Nelson  
County Clerk and Recorder



**Attendance Sheet**  
**Lee County Multi-Jurisdictional**  
**All Hazards Mitigation Planning Committee**  
**February 18, 2010**

Name (Please Print)	Organization/Entity
1. SHARON KERSTEN	ARC - LEE Co. UNIT
2. STEVEN PERSON	LEE Co ESDA
3. John Stenzel	Village of Spangle
4. John Nicholson	Lee Co Board
5. CHRIS Melvin	IEMA
6. Paul McMahon	POE #47
7. DAVE ANDERSON	LEE Co Hwy
8. Barb Morehead	Village of Harmon
9. Tim SHIPMAN	CITY OF DIXON
10. Andrea Bostwick	JDR
11. GREG MICHAEL	JDR
12. Diana Hoots (by phone)	IL CMS
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**Attendance Sheet**  
**Lee County Multi-Jurisdictional**  
**All Hazards Mitigation Planning Committee**  
**February 18, 2010**

Name ( Please Print)	Organization/Entity
25. Kevin Lally	LEE COUNTY EMA
26. JARED OWEN	IEMA
27. James Hettler	Ashton PD
28. Ron MDR	Franklin Grove
29. JOHN VARGON	Lee Co Sheriff Dept
30. JIM BRATKO	VILLAGE OF STEWARD, IL
31. Sue Coers	IEMA
32. DAVID PATTERNALE	RED CROSS
33. Wendy Ryerson	Lee County ASK
34. Chris Henkel	" " Young
35. Jim Fox	Com EA
36. Amy Hink	Hicks Ins Agency
37. Michael Yonkers	Amboy Building & ESDA
38. Norris Tucker	Dixon Rural FPP
39. AL STENZEL	AMBOY CITY
40. Marilyn Shuppert	Farm Bureau
41. [unclear]	HAROLD
42. Molly O'Toole	MOVA
43. Mike McBride	Lee County IT Director
44. Danny Langless	Dixon PD
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**Attendance Sheet**  
**Lee County Multi-Jurisdictional**  
**All Hazards Mitigation Planning Committee**  
**April 8, 2010**

Name (Please Print)	Organization/Entity
1. Kevin Lally	Lee Co DM
2. Jim Bratko	STEWART, LLC
3. JOHN VARBA	Lee Co Sheriff's Dept
4. John Steere	Village of S. Bluffe
5. Diane Hoots	State of ILL
6. Mike Frazier	Lee Co Health Dept
7. Jim Schaben	IL Farm Bureau
8. Paul McMahon	Lee Co ROE #47
9. Dave Anderson	Lee Co Hwy
10. Paul Morehead	Village of Norman
11. Jeff Morehead	" " "
12. Dan Campbell	D. Kan (P)
13. Jim Mahony	Lee Co Board
14. Molly O'Toole	MOA
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**Attendance Sheet**  
**Lee County Multi-Jurisdictional**  
**All Hazards Mitigation Planning Committee**  
**April 8, 2010**

Name (Please Print)	Organization/Entity
1. Mike Theriault	Ambay ESDA
2. Aue Coers	IEMA
3. Ron Miller	Franklin Grove
4. Amy Hill	
5. Ed Stenzel	City of Ambay
6. Jim Fox	ComEd
7. Wendy Ryerson	Asmt Office
8. Chris Henkel	zoning
9. Greg Michael	JDG
10. Andrea Bostwick	JDG
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**Attendance Sheet**  
**Lee County Multi-Jurisdictional**  
**All Hazards Mitigation Planning Committee**  
**July 15, 2010**

Name (Please Print)	Organization/Entity
1. GREG MICHAUD	Johnson, DEAR (Quisenberry)
2. JIM BRATKO	VILLAGE OF STEWARD
3. Mike Therriault	Amboy
4. Jim Fox	ComEd
5. STAVE PERSON	PUBLIC REP.
6. Barb Morehead	Village of Jackson
7. Jeff Morehead	" " "
8. Chris Henkel	Lee Co. Zoning
9. Dave Anderson	LEE Co. Hux
10. JOHN VARGA	LC STD.
11. Molly O'Toole	MO+A
12. Amy Hux	F
13. Dale Colms	IEMA
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**Attendance Sheet**  
**Lee County Multi-Jurisdictional**  
**All Hazards Mitigation Planning Committee**  
**July 15, 2010**

Name (Please Print)	Organization/Entity
1. <i>Levin Alley</i>	<i>Lee Co EMA</i>
2. <i>John Stj</i>	<i>Sublette</i>
3. <i>Ally Stenzel</i>	<i>Amboy</i>
4. <i>DJ Sheridan</i>	<i>Hammock Fire</i>
5. <i>John Martin</i>	<i>Village of Asa</i>
6. <i>Marilyn R. Pearson</i>	<i>Lee Co</i>
7. <i>Gregory M. Lee</i>	<i>Carroll Co.</i>
8. <i>Tom SHIPMAN</i>	<i>DIXON FIRE</i>
9. <i>Mike FRAZIER</i>	<i>Lee Co Hem 172 Dept</i>
10. <i>John Nicholas</i>	<i>Lee Co Board</i>
11. <i>Clay L. Shuler</i>	<i>Dixon Police</i>
12. <i>Andrea Bootwick</i>	<i>SOB</i>
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**Attendance Sheet**  
**Lee County Multi-Jurisdictional**  
**All Hazards Mitigation Planning Committee**  
**October 21, 2010**

	<u>Name (Please Print)</u>	<u>Organization/Entity</u>
1.	KEVIN LALLY	LEE CO ADM
2.	GREG MICHAUD	JDC
3.	Andrea Bostwick	JDA
4.	Jim Fox	COM ED
5.	JIM BRATKO	STEWART, IL
6.	Greg Hicks	
7.	Wendy Ryerson	Lee Co. ASR
8.	Dawn Anderson	Lee Co Hwy
9.	Alice Coers	FEMA
10.	Paul Morehead	Vic of Harmon
11.	Jeff Morehead	IL of IL
12.	Mike Thernonik	Amboy
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**Attendance Sheet**  
**Lee County Multi-Jurisdictional**  
**All Hazards Mitigation Planning Committee**  
**October 21, 2010**

	<u>Name (Please Print)</u>	<u>Organization/Entity</u>
1.	<i>Al Stenzel</i>	<i>City of Aubrey</i>
2.	<i>John Stenzel</i>	<i>Sublette</i>
3.	<i>Mike Fazzion</i>	<i>Lee Co Health Dept</i>
4.	<i>JOHN VARGA</i>	<i>Lee Co Sheriff Dept</i>
5.	<i>Chris Henkel</i>	<i>Lee Co. Zoning</i>
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**Attendance Sheet**  
**Lee County Multi-Jurisdictional**  
**All Hazards Mitigation Planning Committee**  
**Public Forum**  
**February 17, 2011**

Name (Please Print)	Organization/Entity
1. AL STENZEL	CITY OF AMBOY
2. Andrea Bostwick	JDR
3. Tim Fox	ComEd
4. DAVID ANDERSON	Lee County Dept
5. Larry Acher	3F Forecast
6. Sharon Kersten	American Red Cross
7. Chris Henkel	Zoning Co.
8. Dan Layless	DIXON PD
9. Dorelle Dallgas-Frey	WSDR
10. JOHN R. VADVA	Lee Co Sheriff's Dept
11. Michau Therriant	Am boy ESDA
12. John Stanzel	Village Of Sublette
13. M. ICE FRAZLEN	Lee Co HEALTH Dept
14. Wendy Rynson	
15. Greg Hicks	Hicks Ins Agency
16. Sue Coers	IEMA
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**Attendance Sheet**  
**Lee County Multi-Jurisdictional**  
**All Hazards Mitigation Planning Committee**  
**Public Forum**  
**February 17, 2011**

Name (Please Print)	Organization/Entity
1. KEVIN LALLEY	LEE Co EMA
2. JIM BRATKO	STEWART, LC
3. GREG MICHAUD	JDDQ
4. STEVE PERSON	PUBLIC
5. JAMES HETLAND	Ashton
6. JIM WELLS	LC Board
7. JIM WELLS	HARMON
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**Lee County Multi-Jurisdictional  
All Hazards Mitigation Planning Committee Meeting**

**February 18, 2010  
Lee County Sheriff's Office  
306 S. Hennepin Avenue, Dixon  
1:00 p.m.**

**Meeting Minutes**

**Committee Members**

Amboy, City of	Lee County Continued...
American Red Cross	Farm Bureau
Ashton, Village of	GIS/Internet Technology
Commonwealth Edison	Highway Department
Dixon, City of	Planning & Zoning
Dixon Police Department	Sheriff's Office
Franklin Grove, Village of	Lee-Ogle Regional Office of Education # 47
Harmon, Village of	Mitigation Planning Consultants
Hicks Insurance Agency	Johnson, Depp & Quisenberry
Illinois, State of	Molly O'Toole & Associates
Central Management Services	Steward, Village of
Emergency Management Agency (HDQ)	Sublette, Village of
Emergency Management Agency (Regional)	Public Representatives
Lee County	Steve Person
Assessor	General Public
Board	Dixon Rural Fire Protection District
Emergency Management Agency	

**Welcome and Introductions**

Kevin Lalley, Chairman of the Lee County Multi-Jurisdictional All Hazards Mitigation Planning Committee, welcomed attendees. He thanked attendees for agreeing to serve on this Committee and he noted that through their attendance they will help make the municipalities they represent and Lee County eligible for grant money to help with projects and activities aimed at reducing damages caused by natural hazards. The purpose of this Committee is to assemble a natural hazard mitigation plan (the Plan) that will focus on natural hazards, but will also evaluate some man-made hazards of concern. Kevin asked the Committee members to introduce themselves by providing their name and who they represent.

Binders and handout materials were distributed to each member.

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## **What Is A Natural Hazard Mitigation Plan and Why Should We Prepare It?**

Jared Owen, Illinois Emergency Management Agency, began his presentation by noting that mitigation planning actively began in Illinois following the “Great Flood of 1993.” He described mitigation as being projects and activities that prevent or reduce damages from natural hazards such as floods, tornadoes, snow storms and other events.

This natural hazard mitigation plan is aimed at reducing, and in some instances eliminating, the damages caused by natural hazards. The Lee County Plan should identify projects and activities to be taken before natural hazards occur. The Plan will help make Lee County and the participating municipalities eligible for money to conduct projects that might not otherwise get implemented. Another reason to prepare this Plan is to help improve cooperation between various offices.

Of the millions of dollars spent annually on damages caused by natural disasters, the Federal Emergency Management Agency (FEMA) has calculated that for every dollar spent on mitigation, \$3 to \$4 dollars can be reaped in savings. “Living snow fences,” evergreens or other vegetation used to help keep blowing snow off roads, have been shown to provide similar dollar benefits.

Other examples of mitigation projects and activities include educational materials, planning studies, infrastructure projects, and building improvements.

He closed his presentation by describing how mitigation planning is funded. When a natural hazard results in a federally declared disaster, fifteen percent of the total federal funds received are designated for mitigation planning. Mitigation planning funds can accumulate and be used for grant applications received in subsequent years. Illinois has sufficient funds to cover other counties interested in mitigation planning.

### **The Planning Process**

Greg Michaud, Johnson, Depp & Quisenberry, noted that the persons participating on this Mitigation Planning Committee have the experience and information needed to develop a useful Plan. He added that there are few opportunities to become involved with something that should have lasting benefits for future generations. He commended the participants for volunteering to serve on this Committee because their involvement shows that they are truly community leaders.

The purpose of the Committee meetings is to develop a Plan that can be adopted by the County and each participating municipality. Specific activities for the Committee meetings include:

1 <sup>st</sup> Committee meeting	Orientation to the Planning Process Begin identifying Critical Facilities
2 <sup>nd</sup> Committee meeting	Discuss the Risk Assessment Develop Mission Statement Establish Goals for the Plan Committee returns the Critical Facilities List and the List of Documents Relevant to the All Hazard Mitigation Plan

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3 <sup>rd</sup> Committee meeting	Begin discussing Mitigation Projects and Activities Develop a Mitigation Strategy
4 <sup>th</sup> Committee meeting	Finish discussion of Mitigation Projects and Activities Review and Discuss the Draft Plan
5 <sup>th</sup> Committee meeting	Present the Revised Plan for public review

Natural hazards identified in the Plan include severe storms, flooding, tornados, severe snow or ice storms, drought, and extreme heat. Other hazards may be added pending the results of the Risk Assessment. Lee County's Plan will also include man-made hazards. While yet to be chosen, some examples of man-made hazards include transportation accidents involving hazardous substances, leaks at storage and disposal facilities, and nuclear facility accidents.

Andrea Bostwick, JDQ, is a certified risk assessor who will work with Greg to prepare the Risk Assessment for Lee County. Critical Facilities for each participating municipality and the County must be identified. Andrea distributed the Critical Facilities form for each municipality and the County to complete and return at the next meeting.

Andrea also distributed the List of Documents Relevant to the All Hazard Mitigation Plan. This list includes Land Use Plans, Flood Ordinances, and related documents. Copies of these documents should be sent to Andrea or Greg so that these documents can be evaluated and described in the Plan.

Greg described how the plan is reviewed and adopted. JDQ will prepare the draft Plan for review by the Committee. Comments by the Committee will be used to revise the draft Plan. The revised Plan will be presented for public comment at a public forum which is the 5<sup>th</sup> Committee meeting. Comments from the public will be used to further revise the Plan. Following IEMA/FEMA review, further revisions to the Plan will be made as needed.

The County and each participating municipality will have the opportunity to formally adopt the Plan by resolution. After the County and each participating municipality adopt the Plan, they will become eligible for funding to implement the mitigation projects and activities identified in the Plan. Copies of each resolution will be appended to the Plan. The Plan will be monitored annually and updated every five years.

Other highlights of this discussion include:

- Submitting a list of mitigation projects does not commit any municipality or the County to obligate funds. These lists help assure eligibility for funding. All mitigation projects and activities for which federal funding will be sought, must be included in the Plan.
- FEMA's intent is to encourage mitigation. FEMA has not used these Plans to "penalize" municipalities or counties who do not implement mitigation projects included in their Plans. Even if funding appears doubtful, it is better to include a project or activity in the Plan.

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- Any community already involved in mitigation planning, such as Harmon, should bring the results of their work to the Mitigation Committee so that others are aware of these projects.

### **Mission Statement & Goals**

Since the mission statement and goals are related to natural hazards, committee members were asked to recount some natural hazards that were particularly vivid. Among the events described by Committee Members were the following:

- ❖ Twenty-three inches of snow closed some schools for a week during January, 1967.
- ❖ Major winter storms resulted in prolonged closure of schools, roads and businesses in 1977, 1978 & 1979.
- ❖ A recent winter ice storm that occurred from December 23 through December 26, 2009 resulted in approximately 10,000 residents losing electrical power and caused a power line to come down starting a fire at the only funeral home in Paw Paw.

Committee members were asked to write the answers to three questions on a sheet of paper to help us learn more about local perceptions. These questions are:

1. What is the most frequently occurring type of natural hazard in the area where you live?
2. What is the most damaging type of natural hazard in the area where you live?
3. What kinds of man-made hazards (landfill, oil/gas pipeline, highway transport of hazardous substances, etc.) should be considered for inclusion in this Plan?

To help expedite the process of developing a mission statement and goals, a sample mission statement was provided. This is a draft statement that Committee Members were asked to review and discuss at the next meeting.

Greg then directed Committee members to a handout in their materials titled “Goal Setting.” These goals are written broadly to cover many, if not all, of the kinds of mitigation projects that will be included in the Plan. However, specific goals related to where you live can be added to this list. Every project included in the Plan should be aimed at one or more of the goals developed by this Committee. Members were asked to either provide goals to Andrea and Greg before the next meeting or bring their goals to that meeting.

### **Community Participation**

In addition to the requirement that members attend Committee meetings to help assure that the Plan can be approved by IEMA and FEMA, Greg added that substitute representatives are acceptable. He pointed out that a mayor who wants to participate may not be able to attend because of other obligations; however, a substitute representative can be designated to participate in the Committee meetings.

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Committee members were asked to determine if a Fact Sheet titled “Frequently Asked Questions,” and Citizen Survey could be made available from their offices. Paper or electronic copies will be made available upon request.

### **What Happens Next?**

Greg told Committee members that the risk assessment, goal setting, and the mission statement would be the main topics of the next committee meeting.

The second meeting of the Committee was set for:

**Thursday, April 8**

**1 p.m.**

**Sheriff’s Administration Building**

### **Public Comment**

Public notice of this committee meeting clearly invited public attendance. In addition to the Committee member who is a general representative of the public, two other individuals, one from Amboy and the Dixon Rural Fire Protection District, attended. Information about a winter storm event was provided by one individual, but no other questions or comments were raised.

With no further comments or question, Kevin Lalley thanked the Committee Members for their attendance and the meeting was adjourned.

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**Lee County Multi-Jurisdictional  
All Hazards Mitigation Planning Committee Meeting**

**April 8, 2010  
Lee County Sheriff's Office  
306 S. Hennepin Avenue, Dixon  
1:00 p.m.**

**Meeting Minutes**

**Committee Members**

Amboy, City of	Lee County Continued...
Commonwealth Edison	Emergency Management Agency
Dixon, City of	Farm Bureau
Franklin Grove, Village of	Health Department
Harmon, Village of	Highway Department
Hicks Insurance Agency	Planning & Zoning
Illinois, State of	Sheriff's Office
Central Management Services	Lee-Ogle Regional Office of Education # 47
Emergency Management Agency (Regional)	Mitigation Planning Consultants
Lee County	Johnson, Depp & Quisenberry
Assessor	Molly O'Toole & Associates
Board	Steward, Village of
	Sublette, Village of

**Welcome and Introductions**

Kevin Lalley, Chairman of the Lee County Multi-Jurisdictional All Hazards Mitigation Planning Committee, welcomed attendees. He reminded Committee members that through their attendance they will help make the municipalities they represent and Lee County eligible for grant money to help with projects and activities aimed at reducing damages caused by natural hazards.

Handout materials were distributed to each member.

**Review of Meeting Minutes**

For the sake of expediting the meeting, Chairman Lalley asked that Committee members review the meeting minutes from the past meeting and provide any changes to Andrea or Greg before they leave today.

**Mission Statement**

Greg Michaud pointed out that the draft mission statement initially discussed at the previous Committee meeting is in everyone's packet. He asked if there were any suggested changes to this statement. No comments were made.

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Chairman Lalley asked for a motion to accept the mission statement. The mission statement was accepted unanimously by the Committee.

### **Risk Assessment**

Greg began the presentation by opening the floor to discussion. He asked the Committee members to describe damages caused by natural hazards. The following examples were provided:

- Sublette lost power at their warming center
- Steward and Paw Paw have experienced repeated episodes of flooding and drainage problems at their schools
- Dixon high school and Dixon park district property experienced flooding triggered by ice jams on the Rock River along with summer flooding
- Commonwealth Edison transmission towers repeatedly experienced problems in the late 70's and early 80's on the west and east sides of Dixon due to ice jam flooding on the Rock River
- Amboy and Dixon wastewater lift stations do not function because of power interruptions
- Amboy municipal park repeatedly experiences flooding problems because of changes in surface drainage flow patterns

Greg provided an overview of the Risk Assessment that covered frequency, magnitude and property damages for each category of natural hazard.

### Federal Declarations

Since 1965, Lee County has had four declarations: three involved flooding (1973, 1974 and 1985), one involved snow (2006).

### Severe Summer Storms

This is the most frequently occurring natural hazard in Lee County. These storms include thunderstorms, hail, and lightening. Tornadoes can also occur as a result of severe summer storms and are treated as a separate category of natural hazard. Lee County averages approximately three severe summer storms annually. These storms most frequently occur from April through June. No deaths were reported, but one injury was verified. At least \$225,000 in property damages were reported. More damages were likely to have occurred.

Greg Hicks and Jim Schielein asked questions about reported damages and they will see if they can provide more information, or sources who might be able to provide additional information to supplement the tables that will be included in the Plan. Diane Hoots and Susan Coers also will see if they can find information. (Note: Diane Hoots later provided contact information on an individual with the Illinois Insurance Commission.)

### Severe Winter Storms

Thirty-five severe winter storms have been recorded in Lee County since 1967. However, Greg noted that information on severe winter storms between 1967 and the 1994 is lacking. Winter

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storms that meet the criteria described in the Risk Assessment handout material are likely to have occurred even though there are gaps in weather records. Any information that members can provide on this type of storm or any other events not included in the handout are encouraged.

While one death were attributed to the recorded severe winter storms, crash data from the Illinois Department of Transportation was reviewed to identify accidents that occurred when snow, sleet, or ice was on the roads when accidents occurred. Crash data from 2004 through 2008 was reviewed. One hundred ninety-six injuries and six deaths were recorded when road conditions changed due to winter storms in Lee County.

#### Flooding

Twelve flood events were verified since 1996 in Lee County. As with Severe Winter Storms, weather records are incomplete for this hazard. Attempts are being made to acquire flood damage claims to help fill this gap. More flood events along the Rock and Green River are likely to have occurred than are reported in weather records.

#### Tornadoes

Although tornadoes occur less frequently than Severe Summer Storms and Severe Winter Storms in Lee County, this hazard has apparently caused the largest amount of property damage. Twenty-one tornadoes have been verified in Lee County since 1956 causing approximately \$883,000 in property damage. Seven injuries were attributed to tornadoes. Unlike some other counties in northern Illinois, no deaths were caused by tornadoes in Lee County.

Most tornadoes have occurred from April through June. Approximately one-third of the reported tornadoes have been in the immediate vicinity of Dixon. F2 is the most severe tornado in magnitude to have been recorded in Lee County. Four F2 magnitude tornadoes have been verified in the County.

#### Drought

Three drought events occurred in Lee County. A review of agricultural statistics revealed that substantial yield decreases accompanied each drought. The largest decrease in yields occurred in 1988 when row crops yields dropped over 40% from 123 bushels per acre the previous year to 67 bushels per acre in 1988. Yield losses exceeded 20% in 1983 and 2005.

#### Earthquakes

Seven earthquakes have been recorded in Lee County since 1795, and three of these events occurred in the last 10 years. Minor damage (cracks in plaster and chimneys) was recorded in 1972 near Amboy, but no damages were recorded during the other events.

The Sandwich fault and the Savanna Anticline are the nearest geologic structures associated with earthquakes. The Sandwich fault crosses the northeast corner of Lee County. In response to a question, Greg described the Savanna Anticline as an east-west oriented structure that splits Carroll County in nearly two equal portions.

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### Extreme Heat

One event of extreme heat that occurred in July, 1995, has been recorded in Lee County. No injuries or deaths were reported. In Illinois, most injuries and deaths associated with extreme heat have been reported in Chicago. Insufficient ventilation found primarily in multi-story housing accommodations among low income and elderly residents is where the majority of injuries and deaths occur.

Dam failures and man-made hazards will be covered at future Committee meetings. The Committee was asked if previously mentioned natural hazards should be included in the Lee County Plan and the Committee agreed.

Greg referred to a two page handout titled “**Critical Facilities**” that was distributed at the last meeting to County and municipal officials to be completed and returned at this meeting. A list of Critical Facilities is needed from each participating municipality and the County so that the Vulnerability Assessments can be completed. Andrea Bostwick collected this form and the Relevant Documents forms from those municipalities who brought them to the meeting.

### **Goals**

Greg referred Committee members to the list of draft goals provided at the previous meeting. The intent of these goals is to be sufficiently broad to cover any mitigation project or activity that is submitted. The need for general goals is to help participants tie their projects to at least one goal in the Plan when grant applications are submitted. Specific objectives can also be included. He provided an example of how a municipality in another county was concerned about drainage issues in a specific area. A specific objective can be added to any general goal.

After review of the draft goals, the Committee decided to proceed with these goals. Any additions or revisions will be discussed at the next Committee meeting.

### **What Happens Next?**

#### Mitigation Prioritization Strategy

FEMA requires that this strategy be developed and included in the Plan. A draft strategy will be prepared for discussion at the next Committee Meeting.

#### Mitigation Projects

The purpose of the next meeting is to bring ideas for mitigation projects. Greg referred everyone to the two pages of handouts that lists examples of mitigation projects for the County and municipalities.

He emphasized that long-term permanent solutions and studies should be considered when proposing mitigation actions. He proposed that Committee Members begin drafting their list by using these three categories:

- I. Projects **underway** or about to start;
- II. Projects/Activities you must do to **remain compliant with NFIP or are considering as a result of this planning process**; and

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III. **Studies when the cause of a problem is uncertain** or the need to gather more information is needed.

Molly O'Toole reminded Committee members that another way to consider projects and activities is by considering these categories: preventive measures, property protection, structural measures, resource protection, emergency services, and public information. She emphasized that building codes and zoning regulations are powerful mitigation tools. She also reminded Committee Members that outdoor sirens will not be funded through FEMA/IEMA grants in Illinois.

### **Meeting Schedule**

Greg asked attendees how long they anticipated it would take to assemble and obtain approval for their list of mitigation projects. He explained that in other counties it typically takes 2 to 3 months. The Committee agreed to schedule the third Committee meeting for:

Thursday, July 15  
Lee County Sheriff's Administrative Building  
306 Hennepin  
1 p.m.

### **Public Comment**

No attendees from the general public were present. Chairman Lalley thanked the Committee Members for their participation and adjourned the meeting.

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**Lee County Multi-Jurisdictional  
All Hazards Mitigation Planning Committee Meeting**

**July 15, 2010  
Lee County Sheriff's Office  
306 Hennepin Avenue, Dixon  
1:00 p.m.**

**Meeting Minutes**

**Committee Members**

Amboy, City of  
Ashton, Village of  
Commonwealth Edison  
Dixon, City of  
Harmon, Village of  
Hicks Insurance Agency  
Illinois, State of  
    Emergency Management Agency (Regional)  
Lee County  
    Assessor  
    Board  
    Emergency Management Agency

Lee County Continued...  
    Health Department  
    Highway Department  
    Planning & Zoning  
    Sheriff's Office  
Mitigation Planning Consultants  
    Johnson, Depp & Quisenberry  
    Molly O'Toole & Associates  
Public Representatives  
    Carroll County ESDA  
    Steve Person  
Steward, Village of  
Sublette, Village of

**Welcome and Introductions**

Kevin Lalley, Chairman of the Lee County Multi-Jurisdictional All Hazards Mitigation Planning Committee, welcomed attendees. Emergency management officials from adjacent counties were invited to attend. Greg Miller, Carroll County ESDA Coordinator, attended. Since there were other first-time attendees, Chairman Lalley asked for introductions.

Handout materials were distributed to each member.

**Review of Meeting Minutes**

For the sake of expediting the meeting, Chairman Lalley asked that Committee members review the meeting minutes from the past meeting and provide any changes to Andrea Bostwick or Greg Michaud before leaving.

**Critical Facilities and the Vulnerability Assessment**

Before beginning this presentation, Greg acknowledged special thanks to Committee members who provided additional help with three needs: information about property damages, residential property tax assessments and information on natural hazards prior to the mid-1990s, especially severe winter storms. Information about property damages including crop damage is

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consistently lacking throughout the state. Jim Schielein and Greg Hicks made some inquiries and within a short time information about crop damages in Lee County was provided. Residential property tax assessments are used to estimate potential damages from floods and tornadoes. Wendy Ryerson provided this information promptly so that Committee members will be able to review these projections at the next Committee meeting. Information about severe winter storms prior to the mid-1990s and gaps with some other natural hazards is not readily available. Susan Coers provided contact information about a local meteorologist who has detailed weather records spanning three generations. This meteorologist has been contacted and he is providing information that will supplement storm data.

Greg also provided a brief recap to help reorient Committee members as to what has been accomplished and what will be covered today. He noted that the Committee has accomplished all of its objectives up to this point and are ahead of schedule.

He described two forms:

- A two page form titled “**Critical Facilities**” was distributed to the municipalities and the County. Greg reported that everyone has completed and submitted this form.
- A form titled “**Natural Hazard Mitigation Plan Projects**” was also distributed. Nearly everyone has completed and submitted this form. This form is needed so that the projects and activities that are being considering can be included in the Plan.

Greg explained that the Critical Facilities lists will be used along with the property tax assessment figures to conduct the Vulnerability Assessment. To strengthen this assessment, Greg asked the Committee:

*“Have critical facilities been damaged by natural hazards (i.e. flood, tornado, lightning, or wind) anywhere in Lee County?”*

A one page form was distributed that Committee members can take home and complete after gathering information needed to answer this question.

### **Project Prioritization Method**

Greg referred Committee members to two pages in their packets about the proposed Project Prioritization Method developed for this Plan.

He identified the two primary factors in the development of this strategy: 1) frequency of hazard and 2) degree of mitigation. He emphasized that this Project Prioritization Method is actually a classification method that is used to place projects in one of four categories. To help each Committee Member evaluate this method they should ask whether every project and activity being proposed fits into one of the four categories. Greg acknowledged that while this methodology does not take cost or politics into consideration, these factors may affect the order in which projects are implemented.

The Mayor of Ashton pointed out that politics should not interfere with decisions involving hazard mitigation projects which involve public safety. This observation underscores another

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important aspect for this Committee. Since the Committee members are the most knowledgeable persons in the County about natural hazards, they need to convey information to those who are less knowledgeable in an effort to minimize negative political impacts.

### **Mitigation Projects**

Committee members were asked to submit their Mitigation Projects forms. Andrea then proceeded to illustrate how the Project Prioritization Method, the lists of Mitigation Projects, and other information will be presented for Committee review.

A tornado shelter was used as an example by Andrea to show how a typical project is prioritized and entered into the Plan on a Mitigation Table. She used a sufficiently large size chart so that everyone in the room could read it from where they sat. She entered information about each category describing various factors that will be used to make determinations about each project and activity.

She explained that all mitigation projects submitted will be organized by participating jurisdiction. In this way, someone who is interested in Amboy's projects can easily find them in one location.

Andrea noted that each municipality should have at least one mitigation project in the Plan before it is submitted to IEMA/FEMA. Mitigation projects can be added to the Plan after it is adopted because this Plan is a living document that will be periodically updated.

To remain in compliance with the National Flood Insurance Program, Andrea explained that there are three administrative activities that must be the Mitigation Projects list for each NFIP-participating municipality and the County. She described each activity along with a third activity relating to the Community Rating System.

### **What Happens Next?**

Greg summarized the major milestones yet to be completed:

- The draft Vulnerability Assessment and Mitigation Project Table will be prepared for Committee Review at the next meeting (Meeting #4).
- Once the Committee provides their comments, and the draft Plan is revised, a Public Forum (Meeting #5) will be held to gather public comment. This forum will be conducted in the evening to allow those who work during the day an opportunity to meet the Committee and ask questions or provide comment.
- If needed, the Plan will be revised based on these public comments. In addition, comments from IEMA and FEMA will be incorporated into the Plan.
- After the Plan is approved, the County and each participating municipality should then adopt the Plan by resolution. Each participating government entity must adopt the Plan to become eligible for mitigation project funds. If any of the participating entities chooses not to adopt the Plan, those who adopt the Plan will still be eligible for these

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funds. A model resolution will be provided to each Committee Members at the Public Forum.

### Mitigation Projects

Completing the mitigation project lists is essential for the Plan to be completed. Examples of projects and activities were distributed at the previous Committee meeting. Some Committee Members have already contacted Greg with specific questions. He encouraged Committee Members to continue asking questions. He also reminded Committee Members that Molly O'Toole specializes in flood control projects and she is available to discuss questions on this topic. Molly added that Committee Members should think about partnerships for some of their projects. For example, a tornado shelter could be sponsored by a township instead of a municipality and thus built to serve a larger population.

Any projects that involve phases and have already been started can also be added to this Plan. Funding cannot be granted retroactively for projects already constructed. However, adding later phases of a project to the Plan might prove helpful even if funding from other sources for the second or third phase of the project seems relatively secure.

Public information projects should be included too. While many people primarily think of structural projects first, projects involving notifying and educating the public can be as valuable, if not more so, in protecting public health and property.

### Meeting Schedule

Since all of the mitigation project lists have not been submitted, the committee was asked when was reasonable to expect completion of these lists. October was agreed upon. The next committee meeting was scheduled for:

**Thursday, October 21**  
Lee County Sheriff's Office  
306 Hennepin Avenue  
1 p.m.

### **Public Comment**

Chairman Lalley asked if Committee Members or members from the general public had any additional comments or questions. With none forthcoming, he thanked the Committee Members for their participation and adjourned the meeting.

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**Lee County Multi-Jurisdictional  
All Hazards Mitigation Planning Committee Meeting**

**October 21, 2010  
Lee County Sheriff's Office  
306 Hennepin Avenue, Dixon  
1:00 p.m.**

**Meeting Minutes**

**Committee Members**

Amboy, City of	Health Department
Commonwealth Edison	Highway Department
Harmon, Village of	Planning & Zoning
Hicks Insurance Agency	Sheriff's Office
Illinois, State of	Mitigation Planning Consultants
Emergency Management Agency (Regional)	Johnson, Depp & Quisenberry
Lee County	Steward, Village of
Assessor	Sublette, Village of
Emergency Management Agency	

**Welcome and Introductions**

Kevin Lalley, Chairman of the Lee County Multi-Jurisdictional All Hazards Mitigation Planning Committee, welcomed attendees.

Handout materials were distributed to each member.

**Review of Meeting Minutes & Timeline**

For the sake of expediting the meeting, Chairman Lalley asked that Committee members review the meeting minutes from the past meeting and provide any changes to Andrea Bostwick or Greg Michaud before leaving.

Greg Michaud provided a brief reminder of what occurred at the previous Committee Meeting. He used the five meetings and objectives timeline, which was displayed at the orientation meeting, to show the Committee that they have accomplished all of their objectives and are ahead of schedule.

**Mitigation Project Submittal & Action Table**

The Lee County Hazard Mitigation Actions, including those submitted by each participating municipality, were presented to the Committee for discussion.

Andrea distributed the "Action Plan" which is a multi-page table identifying each mitigation project and activity provided by the participating jurisdiction along with:

- Hazards to be mitigated

- 
- Type of mitigation activity
  - Goals
  - Effects on new and existing buildings
  - Responsible entity, timeframe, and preliminary cost-benefit estimate
  - Prioritization of each project and activity

Committee members were asked to carefully review each mitigation project and provide any clarifications and additions. Approximately 20 minutes were taken to review these projects and activities. Andrea noted that participants who find a project or activity on another list that they are interested in applying to their jurisdiction can still do so by sending their additions to her.

### **Risk / Vulnerability Assessment**

Although not part of the formal agenda, flood damage projections were included since a count of buildings in the floodplain were provided by the GIS office in time for cost estimates to be prepared. Andrea described how property tax assessment figures, provided by Wendy Ryerson from the County Assessment office, were used to develop damage estimates for each participating jurisdiction. This information will be used to finish the vulnerability assessment.

The Committee previously reviewed the risk assessment for natural hazards at the second Committee meeting. Greg proceeded to summarize the Risk Assessment for the following man-made hazards:

- ❖ landfills
- ❖ pipelines
- ❖ nuclear power facilities
- ❖ hazmat incidents
- ❖ rail transportation

### **Plan Update & Maintenance**

Andrea described the process of annual maintenance – 2 meetings per year where each participant provides a short summary of any progress made with each project on their list.

Every five years the Plan is formally updated. Andrea also described how new projects can be added during any year, but municipalities who were not part of this initial planning process cannot formally be added until every fifth year. During the update, new information on the type and frequency of storms, project status, and new projects are added to the Plan. If a municipality decides to join the Plan, a risk and vulnerability assessment, mitigation projects and activities, and demographic information must be added in a format similar to the other municipalities. Calculations estimating potential flood and tornado damages for this municipality must also be included.

### **What Happens Next?**

#### Upcoming Major Milestones

- Once the Committee provides their comments on the material presented today, and the Plan is revised, a **Public Forum** (Meeting #5) will be held in conjunction with a **public comment period** to gather public comment.

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- If needed, the **Plan will be revised based on public comments** received at the Public Forum and through the public comment period.
  - The Plan will be **formally submitted to IEMA and FEMA** for their review, comment, and approval.
  - Following IEMA/FEMA approval, **the County and each participating municipality must adopt the Plan by resolution.** Greg will issue an e-mail to all participants upon receiving FEMA approval so that everybody will know when they can adopt the Plan through formal resolution by their governing jurisdictions. A copy of each resolution must be sent to Kevin Lalley or Andrea to assure grant eligibility.

In response to a question, it was explained that if any of the participants choose not to adopt the Plan those who do adopt the plan will retain eligibility for state/federal funding.

#### Meeting Schedule

The Committee agreed to schedule the public forum for:

**Thursday, February 17**  
Dixon Public Safety Building  
220 S. Hennepin  
5 p.m. to 7 p.m.

#### **Public Comment**

Chairman Lalley asked if Committee Members had any additional comments or questions. With none forthcoming, he thanked the Committee Members for their participation and adjourned the meeting. He also reminded the Committee that their participation is a crucial part of the County's in-kind match for the grant which funds this planning process.



# Lee County Emergency Management Agency

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## Questionnaire

### Lee County All Hazards Mitigation Plan

You can help protect lives and property from storm damage in Lee County by taking a few moments to complete this questionnaire.

1. Please indicate where you live in Lee County:

<input type="checkbox"/> Amboy	<input type="checkbox"/> Nachusa
<input type="checkbox"/> Ashton	<input type="checkbox"/> Nelson
<input type="checkbox"/> Binghampton	<input type="checkbox"/> Paw Paw
<input type="checkbox"/> Compton	<input type="checkbox"/> Prairieville
<input type="checkbox"/> Dixon	<input type="checkbox"/> Scarboro
<input type="checkbox"/> Franklin Grove	<input type="checkbox"/> Steward
<input type="checkbox"/> Gap Grove	<input type="checkbox"/> Sublette
<input type="checkbox"/> Lee Center	<input type="checkbox"/> Walton
<input type="checkbox"/> Maytown	<input type="checkbox"/> Unincorporated area of Lee County

Other (please specify): \_\_\_\_\_

2. Please place a check mark next to each of the natural hazards listed below that you have experienced in Lee County. (Please check all that apply.)

Severe Summer Storms (thunderstorms, hail and/or lightning strikes)  
 Floods  
 Severe Winter Storms (snow, sleet and/or ice)  
 Extreme Heat  
 Tornadoes  
 Earthquakes  
 Drought

Other (please specify): \_\_\_\_\_

- 2a. Which of the natural hazards above have you encountered most frequently?

\_\_\_\_\_

3. Rank the natural hazards listed below from 1 to 7 based on which hazard you feel poses the greatest threat. (1 = greatest threat and 7 = least threat).

Severe Summer Storms  
 Floods  
 Severe Winter Storms  
 Extreme Heat  
 Tornadoes  
 Earthquakes  
 Drought  
 Other (please specify): \_\_\_\_\_

316 S. Hennepin Avenue, Dixon, IL 61021-3020  
Office: 815-284-3365, Fax: 815-284-3367, Emergency 24/7: 815-284-3361  
Email – [esda@countyoflee.org](mailto:esda@countyoflee.org)

# Lee County Emergency Management Agency

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4. What types of mitigation projects or activities are most needed in Lee County? (Please check the *five* you feel are most important.)

- Public information fact sheets and brochures describing actions residents can take to protect themselves and their property against natural hazard impacts
- Floodplain Ordinances
- Building Codes and Enforcement
- Sirens or other Alert Systems
- Flood or Drainage Protection (If selected, please check the type of flood or drainage activity that is needed below.)
- Culvert and drainage ditch maintenance
- Retention pond construction
- Dam or levee construction/maintenance
- Hydraulic studies to determine cause of drainage problems
- Maintain power during storms by burying power lines, trimming trees and/or purchasing a back-up generator
- Tornado Safe Shelters
- Maintain roadway passage during snow storms and heavy rains
- Provide sufficient water supply during drought
- Identify residents with special needs in order to provide assistance during a natural hazard event
- Retrofit critical infrastructure(public water supplies, schools, sewage treatment facilities, bridges, hospitals and other important services) to reduce potential damages
- Other (please specify): \_\_\_\_\_

5. What are the most effective ways *for you* to receive information about how to make your household and property safer from natural disasters? (Please check all that apply.)

- Newspapers
- Television
- Radio
- Internet
- Schools
- Mail
- Fact Sheet/Brochure
- Extension Service
- Public Workshops/Meeting
- Fire Department/Law Enforcement
- Public Health Department
- Municipal/County Government
- Other (please specify): \_\_\_\_\_

*Thank you for your time in assisting with the development of the County's All Hazards Mitigation Plan.*

## Lee County All Hazards Mitigation Planning Committee

316 S. Hennepin Avenue, Dixon, IL 61021-3020  
Office: 815-284-3365, Fax: 815-284-3367, Emergency 24/7: 815-284-3361  
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# **Lee County Multi-Jurisdictional All Hazards Mitigation Planning Committee**

## **Frequently Asked Questions**

### **1) What is the Lee County All Hazard Mitigation Plan?**

The Lee County All Hazard Mitigation Plan evaluates damage to life and property from storms and other natural hazards, including man-made hazards, in this county and identifies projects and activities that can reduce these damages. The Plan is considered to be multi-jurisdictional because it includes municipalities and institutions who want to participate.

### **2) What is hazard mitigation?**

Hazard mitigation is any action taken to reduce or eliminate long-term risk to life and property from a natural or man-made hazard.

### **3) Why is this Plan being developed?**

The Plan fulfills federal planning requirements of Section 104 of the Disaster Mitigation Act of 2000 and the Stafford Act. Three key benefits this plan will provide Lee County are:

- a) Funding following declared disasters.
- b) Funding for mitigation projects and activities before disasters occur.
- c) Increased awareness about natural and man-made hazards and closer cooperation among the various organizations and political jurisdictions involved with emergency planning and response.

### **4) Who is developing this Plan?**

The Lee County All Hazards Mitigation Planning Committee is preparing the Plan with assistance from technical experts in emergency planning, environmental matters, and infrastructure. The Committee includes members from agriculture, business and economic development, emergency services, municipal, county and state government, health care, insurance, law enforcement, and institutions such as the American Red Cross.

### **5) How can I participate?**

You are invited to attend public meetings of the Lee County All Hazards Mitigation Planning Committee. In addition you are encouraged to provide photographs, other documentation, and anecdotal information about damages you experienced with natural and man-made hazards in Lee County. Surveys will be available at participating municipalities and through Lee County to help gather specific information from residents. All of this information will be used to draft the Plan. The draft Plan will be presented in a public forum for further public input.

More information can be obtained by contacting:

Kevin Lalley, Coordinator  
Lee County Emergency Management Agency  
316 S. Hennepin Ave.  
Dixon, Illinois 61021  
Tel: (815) 284-3365



# Lee County preparing disaster plan

Lee County will begin preparing a countywide plan that will identify activities and projects to reduce the damages caused by natural hazards such as tornadoes, floods, snow storms, thunderstorms and ice storms. This plan will also evaluate man-made hazards. The plan is called an All Hazard Mitigation Plan and will be funded through a grant from the Federal Emergency Management Agency (FEMA).

All Lee County municipalities are invited to participate in this planning process. Ashton, Dixon, Franklin Grove, Harmon, and Steward have already committed to participate. There is still time for other mu-

nicipalities to join the process.

"Developing this plan will help us be better prepared before storms hit. The focus of this plan is to reduce the harm to residents and property. We have an emergency response plan. The mitigation plan we want to prepare is aimed at prevention so it will complement our response plan. The county and each participating municipality who adopts the plan will become eligible for federal funds for projects that might not otherwise be constructed," said Kevin Lalley, Lee County EMA Coordinator.

Lee County is vulnerable to severe storms, flooding, and tornado damage. Since 1980,

Lee County has had Federally declared disasters because of severe storm and flood damage in 1985, 1993, and 1996. Major weather fronts moving and colliding across northern Illinois frequently trigger severe winter storms with some of the higher snowfall accumulations in Illinois being recorded in this region of the state. While the most destructive tornadoes have occurred in other counties, Lee County has experienced 19 tornadoes since 1950.

A Lee County Hazard Mitigation Planning Committee has been created with representatives from each participating municipality along with technical partners and other stakehold-

ers. Meetings of this committee will be conducted as working sessions so that any interested resident can attend and ask questions. The purpose of these working sessions is to gather and discuss information that will be used to prepare the plan.

The first meeting of this team will be Thursday, Feb. 18, at 1 p.m., at the Lee County Sheriff's Department, 306 Hennepin St., Dixon. The committee will meet periodically through the next several months to develop a draft plan. Lee County residents are welcome to attend every meeting. "Input from various segments of the population will be used to develop this plan," added Kevin Lalley.



## Lee County agencies work on emergency plans

Channel 13 (WREX)

Posted: Feb 18, 2010 6:45 PM CST

February 18, 2010

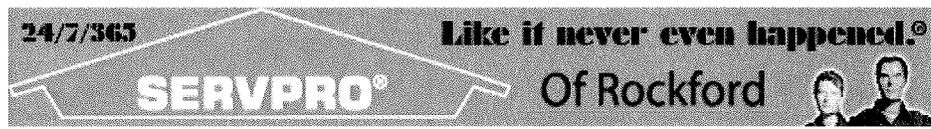


By Eric Wilson

DIXON (WREX) - Lee County agencies get together to prepare for the worst. It's one of those plans they hope they never have to use but they'll be ready. This is the first meeting of the Hazard Mitigation Planning Committee. Representatives from more than 30 different county agencies are there to set a framework of goals for the plan by sharing information. "We can talk about how power outages affect the county. Dave Anderson is Lee County Highway Department Engineer. He can tell us about snowstorms and roads that may flood. The Sheriff's Department with maybe roads that are closed," says Kevin

Lalley who works at the Lee County Emergency management Agency.

This is the first of 5 public meetings. The next one is April 8th at the Lee County Sheriff's Department.



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# Lee County Emergency Management Agency

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## PRESS RELEASE

Contact: Kevin Lalley (815)284-3365

### Plan to Reduce Storm Damages Moves Forward

**Dixon, IL (March 29, 2010)**—The advent of flood and tornado season raises important questions. How vulnerable are Lee County residents to these storms? What are the most frequently occurring natural hazards in Lee County? How much damage do storms and other natural hazards, such as drought, cause? These questions and other related issues will be discussed when representatives from Lee County and participating municipalities meet Thursday, April 8 at the Lee County Sheriff's Department on 306 Hennepin in Dixon. This group, the Lee County Hazard Mitigation Committee, will meet through the next several months to prepare the plan to reduce damages caused by natural hazards. The Committee meeting begins at 1 p.m. and all Committee Meetings are open to the public.

Amboy, Ashton, Dixon, Franklin Grove, Harmon, Steward and Sublette are participating in this planning process.

"The plan should become the best resource for hazard mitigation because it will have information to guide those who are making decisions about how to better protect Lee County residents from storms and other hazards," said Kevin Lalley, Lee County Emergency Management Agency Director.

Developing public information materials, building storm shelters, designing roads, bridges, water supplies and other services to better withstand natural disasters, are some examples of the kind of projects and activities that can reduce storm damages.

While the plan is being developed, the public will have multiple opportunities to provide input. At least four Mitigation Committee meetings will be conducted and these meetings are open to the public. Interested persons who are unable to attend these meetings can submit questions and comments to the Committee members or directly to the Lee County Emergency Management Agency.

Public comments will be used to develop a draft plan. After the draft plan is developed, a public forum will be held where the draft plan will be presented for review and comment. The draft plan will be revised based on comments from the public and the state and federal government agencies. Following these revisions, the plan will be presented for adoption at public meetings held by the County and at each of the participating municipalities.

"By identifying the frequency of these natural hazards and their magnitude in our county, we can better develop a strategy to reduce damages caused by these events," added Kevin Lalley.

XXXXXXXXXXXXXXXXXX

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[<< Back](#)



## Lee County preparing for severe weather season

Channel 13 (WREX)

Posted: Mar 29, 2010 8:48 AM CDT

March 29, 2010

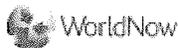
LEE COUNTY (WREX) - Leaders in Lee County will be working on new plans to make sure they are ready when natural disasters strike.

The Lee County Hazard Mitigation Committee will spend the next couple of months preparing a plan to reduce damages when natural hazards like spring and summer storms hit the area.

"By identifying the frequency of these natural hazards and their magnitude in our county, we can better develop a strategy to reduce damages caused by these events," said Kevin Lalley, Lee County Emergency Management Agency Director.

Leaders in Amboy, Ashton, Dixon, Franklin Grove, Harmon, Steward, and Sublette are all participating in the planning process.

Their next meeting is April 8 at the Lee County Sheriff's Department on 306 Hennepin in Dixon at 1:00 p.m. and is open to the public.



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Posted: 5:08 PM Mar 30, 2010

## Lee County Explores Disaster Plans

Lee County committee prepares plan for better emergency and natural disaster response

Email Address: [news@wifr.com](mailto:news@wifr.com)

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Officials in Lee County are assembling a plan that would help local emergency authorities respond in the case of a disaster.

Representatives from local communities and the county sheriff's office meet April 8 to discuss the Lee County Hazard Mitigation Committee. The committee will meet through the next several months to build the plan. Those meetings are open to the public. Next week's meeting starts at 1 p.m. at the Sheriff's office, 306 Hennepin, in Dixon.

Amboy, Ashton, Dixon, Franklin Grove, Harmon, Steward, and Sublette are participating

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"The plan should become the best resource for hazard mitigation because it will have information to guide those who are making decisions about how to better protect Lee County residents from storms and other hazards," said Kevin Lalley, Lee County Emergency Management Agency Director.

The plan includes developing public information materials, building storm shelters, designing roads, bridges, water supplies and other services to better withstand natural disasters.

**Find this article at:**

<http://www.wifr.com/news/headlines/89553567.html>

Check the box to include the list of links referenced in the article.

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*Appendix F*

# Lee County Emergency Management Agency

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FOR IMMEDIATE RELEASE

Contact: Kevin Lalley (815/284-3365)

## Preventing Harm to Public Health and Property

DIXON, IL (July 2, 2010)—Severe thunderstorms and strong winds experienced this spring can be a grim reminder of how lives and property are impacted. Identifying projects and activities to reduce damages caused by storms and other natural hazards will be the topic of discussion when representatives from Lee County and local municipalities meet Thursday, July 15 at the Lee County Sheriff's Department at 1:00 p.m. This group, called the Lee County All Hazard Mitigation Committee, is holding its third meeting to prepare a plan that will make Lee County and participating municipalities eligible for funding to implement these projects and activities. The Committee meetings are open to the public.

"We have gathered storm event information to help identify our vulnerabilities across the County. Beginning today and continuing for the next few months, the participating municipalities and various County departments will assemble lists of specific projects to prevent damages caused by these storms. In addition to storms we will evaluate other natural and man-made disasters too," said Kevin Lalley, County Emergency Management Agency Coordinator.

Amboy, Ashton, Dixon, Franklin Grove, Harmon, Steward and Sublette are participating in this planning process. The Lee County Farm Bureau and the Lee-Ogle School District are among the participants helping to prepare this plan.

Building storm shelters, resolving drainage problems, retrofitting water supplies and other critical facilities to better withstand natural disasters are a few examples of the kinds of projects that might be included in the plan. Developing public information materials and conducting drainage studies are examples of other activities that might also be included in the All Hazard Mitigation Plan.

While the Plan is being developed, the public will have multiple opportunities to provide input. "Vital information not available in state or federal files has already been provided by the public since this planning process began in February. We are still looking for photographs of severe weather events too," added Lalley.

In addition to attending meetings of the Committee, citizen surveys, the County Web site, and the municipal offices of participating communities provide ways for residents to become involved. Interested persons can submit questions and comments to the Committee members or directly to the Lee County Emergency Management Agency. A draft plan will be prepared for public review and comment before it is submitted to the Illinois Emergency Management Agency and the Federal Emergency Management Agency.

Once the state and federal emergency management agencies approve it, Lee County and the participating municipalities can adopt the Plan making them eligible for hazard mitigation funds.

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Posted: 1:58 PM Oct 6, 2010

## Reducing Damages Caused By Storms in Lee Co.

Steps to protect residents and property from storms and other hazards will be discussed at the Lee County Natural Hazards Mitigation Planning Committee meeting on October 21 at the Lee County Sheriff's Administration Building on 306 Hennepin, Dixon.

**Reporter:** From The Lee County Natural Hazards Mitigation Planning Committee



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DIXON (WIFR) -- Steps to protect residents and property from storms and other hazards will be discussed at the Lee County Natural Hazards Mitigation Planning Committee meeting on October 21 at the Lee County Sheriff's Administration Building on 306 Hennepin, Dixon. The meeting begins at 1 p.m. and is open to the public.

Amboy, Ashton, Dixon, Franklin Grove, Harmon, Steward, Sublette, and Lee County representatives are on this Committee. Agriculture, insurance, schools and utilities are also participating.

"Severe storms frequently cause damages to buildings, crops, roads, and other critical infrastructure across northern Illinois. In August, seven counties in northern Illinois were declared federal disaster areas as a result of the severe thunderstorms and floods. This recent disaster is a reminder of the need to prepare a mitigation plan," said Kevin Lalley, Lee County Emergency Management Agency Coordinator.

Lee County has an emergency response plan, but not a mitigation plan. "Emergency response plans prescribe what actions should be taken after a storm hits, this mitigation plan identifies actions that should be taken before a storm occurs," added Lalley.

Lee County and the participating municipalities have been assembling lists of mitigation projects and activities. The mitigation plan is expected to be finished in the early part of 2011.

While the public has provided input on portions of the plan, the entire plan will be presented

*Appendix F*

for public review and comment before it is submitted to the state and federal government for approval.

“A public forum will be conducted, probably in February, for interested persons to review the plan and ask questions of Committee members. A two week public comment period will be established to accommodate interested persons who are unable to attend the forum. We want to make sure that anybody who is interested has an opportunity to review and comment on the draft plan.” added Lalley.

Interested persons can submit questions and comments to the Committee members or directly to the Lee County Emergency Management Agency.

**Find this article at:**

[http://www.wifr.com/home/headlines/Reducing\\_Damages\\_Caused\\_By\\_Storms\\_in\\_Lee\\_Co\\_104432839.html](http://www.wifr.com/home/headlines/Reducing_Damages_Caused_By_Storms_in_Lee_Co_104432839.html)

Check the box to include the list of links referenced in the article.

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0 2 3 4 5 6 7 8 9 10 11+

**UV Index**  
0-2: Low, 3-5: Moderate,  
6-7: High, 8-10: Very High  
11+: Extreme Exposure  
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few showers today through Friday, with the highest temperature of 73° in Harrisburg, Ill. The Southeast will see isolated showers and thunderstorms today, mostly clear skies Thursday and Friday, with the highest temperature of 88° in Ft. Myers, Fla. The Northwest will see mostly clear skies today and Thursday, partly cloudy to cloudy skies Friday, with the highest temperature of 76° in Medford, Ore. The Southwest will see scattered showers and thunderstorms today and Thursday, partly cloudy skies Friday, with the highest temperature of 84° in Thermal, Calif.

**Weather Trivia**  
What is the name of high, dense clouds that bring steady rainfall?  
**Answer:** Altostratus.

**Weather History**  
**Oct. 20, 1983** - Remnants of Pacific Hurricane Tico caused extensive flooding in central and south central Oklahoma. Oklahoma City set daily rainfall records with 1.45 inches on Oct. 19 and 6.28 inches on Oct. 20.  
**Oct. 21, 1934** - A severe windstorm lashed the northern Pacific Coast. In Washington state, the storm claimed the lives of 22 people and caused 1.7 million dollars in damage, mostly to timber. Winds, gusting to 87 mph at North Head, Wash., produced waves twenty feet high.

## Reducing damages caused by storms mitigation meeting tomorrow

**DIXON** —Steps to protect residents and property from storms and other hazards will be discussed at the Lee County Natural Hazards Mitigation Planning Committee meeting on Oct. 21 at the Lee County Sheriff's Administration Building on 306 Hennepin, Dixon. The meeting begins at 1 p.m. and is open to the public.

Amboy, Ashton, Dixon, Franklin Grove, Harmon, Steward, Sublette, and Lee County representatives are on this Committee. Agriculture, insurance, schools and utilities are also participating.

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Interested persons can submit questions and comments to the Committee members or directly to the Lee County Emergency Management Agency.

# Lee County Emergency Management Agency

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## PRESS RELEASE

**FOR IMMEDIATE RELEASE**

**Contact** Kevin Lalley, Director  
Phone 815-284-3365

### **Public Forum on Plan to Reduce Storm Damages**

Dixon, IL (February 4, 2011)—Projects to reduce injuries, deaths and property damages caused by severe storms and other natural and man-made hazards will be presented for public comment. These projects are described in a draft of the Lee County All Hazards Mitigation Plan. Members of the Lee County All Hazards Mitigation Planning Committee will be available to discuss this Plan on Thursday February 17 from 4 p.m. to 6 p.m. at the Dixon Public Safety Building on 220 Hennepin Street.

“Persons can come and go at their convenience to review the plan and comment. This forum was designed to accommodate busy schedules. If a person only has a few minutes, they can easily provide comment or ask questions at anytime during the forum. Unlike conventional meetings, there are no formal presentations forcing attendees to wait,” according to Kevin Lalley, Lee County Hazard Mitigation Committee Chairperson.

This Committee has been conducting working meetings open to the public since February, 2010, to prepare a plan that will identify projects and activities to protect Lee County residents and property from storms and other natural disasters. This plan, unlike all other emergency plans, is aimed at identifying projects and activities that can be taken before a natural disaster occurs.

“We have received public input to develop this Plan since we began meeting last year. This input has included information about storm events, property damages, and potential projects that could reduce harm to people and property. The upcoming public forum allows the public to see the entire draft plan,” added Lalley.

Amboy, Ashton, Dixon, Franklin Grove, Harmon, Steward and Sublette are participating in the planning process. These municipalities and various County departments have been identifying the kinds of projects that should be included in the Plan.

A public comment period will remain open until March 4. A copy of the draft Plan is available for review on the Lee County website. Comments can be directed to the Lee County Emergency Management Agency. Following the public comment period, any revisions that are needed will be made before the Plan is submitted to the Illinois Emergency Management Agency and the Federal Emergency Management Agency for approval.

Each participating jurisdiction must adopt the plan to become eligible for project funds distributed by the state and federal emergency management agencies.

XXXXXXXXXXXXXXXXXXXX

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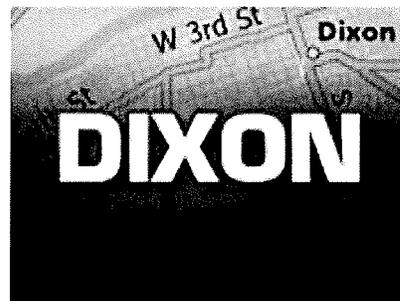
Powered by Clickability

Posted: 4:12 PM Feb 4, 2011

## Public Forum on Plan to Reduce Storm Damages

Projects to reduce injuries, deaths and property damages caused by severe storms and other natural and man-made hazards will be presented for public comment.

Reporter: From Lee County Emergency Management Agency



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*Appendix F*

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**Find this article at:**

[http://www.wifr.com/hometowns/headlines/Public\\_Forum\\_on\\_Plan\\_to\\_Reduce\\_Storm\\_Damages\\_115320764.html](http://www.wifr.com/hometowns/headlines/Public_Forum_on_Plan_to_Reduce_Storm_Damages_115320764.html)

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# Lee County Emergency Management Agency

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## PRESS RELEASE

**FOR IMMEDIATE RELEASE**

**Contact** Kevin Lalley, Director  
Phone 815-284-3365

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# LEE COUNTY NEWS MEDIA

## Newspapers

Amboy News  
219 E. Main St.  
Amboy, IL 61310  
(815) 857-2311

Ashton Gazette  
813 Main St.  
Ashton, IL 61006  
(815) 453-2551

Dixon Telegraph  
113 S. Peoria Ave.  
Dixon, IL 61021  
(815) 284-2224

## Radio Stations

WIXN (1460 AM)  
WRCV (101.7 FM)  
WSEY (95.7 FM)  
1460 S. College Ave.  
Dixon, IL 61021  
(815) 288-3341

WSDR (1240 AM)  
3101 Freeport Rd.  
Sterling, IL 61081  
(815) 625-1240

WRHL (1060 AM/102.3 FM)  
400 May Mart Dr.  
Rochelle, IL 61068  
(815) 562-7001

WLLT (107.7 FM)  
260 St. Rte 2  
Dixon, IL 61021  
(815) 284-1077

## Television Stations

Channel 4 (WHBF)  
CBS Affiliate  
231 18<sup>th</sup> St.  
Rock Island, IL 61201  
(309) 786-5441

Channel 13 (WREX)  
NBC Affiliate  
10322 Auburn Rd.  
Rockford, IL 61103  
(815) 335-2710

Channel 23 (WIFR)  
CBS Affiliate  
2523 N. Meridian Rd.  
Rockford, IL 61101  
(815) 987-5330

Channel 6 (KWQC)  
NBC Affiliate  
805 Brady St.  
Davenport, IA 52803  
(563) 383-7048

Channel 17 (WTVO)  
ABC Affiliate  
1917 N. Meridian Rd.  
Rockford, IL 61101  
(815) 963-2773

Channel 39 (WQFR)  
FOX Affiliate  
1917 N. Meridian Rd.  
Rockford, IL 61101  
(815) 963-2773

Channel 8 (WQAD)  
ABC Affiliate  
3003 Park 16<sup>th</sup> St.  
Moline, IL 61265  
(309) 736-3300





# LEE COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

## PUBLIC FORUM – OPEN HOUSE

**FEBRUARY 17, 2011**

**DIXON PUBLIC SAFETY BUILDING (POLICE & FIRE COMPLEX)**

**4:00 P.M. – 6:00 P.M.**

Each year natural hazards (i.e., severe thunderstorms, tornadoes, severe winter storms, flooding, etc.) cause damage to property and threaten the lives and health of Lee County residents. Since 1965, Lee County has had three federally-declared disasters. In addition, in the past decade alone, there have been over 80 severe storms (thunderstorms, high winds, hail, lightning strikes, heavy rain etc.), 27 severe winter storms, 11 flood events, two tornadoes, one drought and three earthquakes felt by residents in the County. While natural hazards cannot be avoided, their impacts can be reduced through effective hazard mitigation planning.

### **What is hazard mitigation planning?**

Hazard mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and man-made hazards. This process helps the County and participating municipalities reduce their risk from natural and man-made hazards by identifying vulnerabilities and developing mitigation actions to lessen and sometimes even eliminate the effects of a hazard. The results of this process are documented in an all hazards mitigation plan.

### **Why prepare an all hazards mitigation plan?**

By preparing and adopting an all hazards mitigation plan, participating jurisdictions become eligible to apply for and receive federal hazard mitigation funds to implement mitigation actions identified in the Plan. These funds, made available through the Disaster Mitigation Act of 2000, can help provide local government entities with the opportunity to complete mitigation projects that would not otherwise be financially possible.

### **Who participated in the development of the Lee County Multi-Jurisdiction All Hazards Mitigation Plan?**

Recognizing the benefits that could be gained from preparing an all hazards mitigation plan, the Lee County Board passed a resolution on June 16, 2009 authorizing the development of the Lee County Multi-Jurisdictional All Hazards Mitigation Plan. The County then invited all the municipalities within Lee County to participate. The following municipalities chose to participate in the Plan's development:

- |          |                  |            |
|----------|------------------|------------|
| ❖ Amboy  | ❖ Franklin Grove | ❖ Steward  |
| ❖ Ashton | ❖ Harmon         | ❖ Sublette |
| ❖ Dixon  |                  |            |

### **How was the Plan developed?**

The Lee County Multi-Jurisdictional All Hazards Mitigation Plan was developed through the Lee County Multi-Jurisdictional All Hazards Mitigation Planning Committee. The Planning Committee included representatives from each participating jurisdiction, the general public as well as agriculture, business, education, emergency services (ambulance, fire and law enforcement), healthcare, GIS and insurance. The Planning Committee met five times between February, 2010 and February, 2011.

### **Which natural and man-made hazards are included in the Plan?**

After much discussion, the Planning Committee chose to include the following natural and man-made hazards in this Plan:

- ❖ severe storms (thunderstorms, hail, lighting & heavy rain)
- ❖ severe winter storms (snow & ice)
- ❖ tornadoes
- ❖ flood
- ❖ drought
- ❖ extreme heat
- ❖ earthquakes
- ❖ dam failures
- ❖ man-made hazards including:
  - hazardous substances (transportation & disposal)
  - hazardous material incidents
  - nuclear accidents
  - terrorism

### **What is included in the Plan?**

The Plan is divided into sections that cover the planning process; the risk assessment conducted on each of the previously identified natural and man-made hazards; the mitigation strategy, including lists of mitigation actions identified for each participating jurisdiction; recommendations; and plan maintenance and adoption. The majority of the Plan is devoted to the risk assessment.

This risk assessment identifies the natural and man-made hazards that pose a threat to the County and includes a profile of each natural hazard which describes the location and severity of past occurrences, reported damages to public health and property, and the likelihood of future occurrences. It also provides a vulnerability assessment that evaluates the assets of the participating jurisdictions (i.e., residential buildings, critical facilities and infrastructure) and estimates the potential impacts each natural hazard and man-made hazard would have on the health and safety of the residents of Lee County as well as the buildings, critical facilities and infrastructure located within the County.

### **What happens next?**

Any comments received at tonight's public forum will be incorporated into the Plan before it is submitted to the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA) for review. Once IEMA and FEMA have reviewed and approved the Plan, it will be presented to the County and each participating jurisdiction for formal adoption. After adopting the Plan, each participating jurisdiction can apply for federal mitigation funds and begin implementation of the mitigation actions identified in the Plan.







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**Kevin Lalley  
Lee County Emergency Management Agency  
316 Hennepin Ave.  
Dixon, IL 61021-3020**

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Place  
Stamp  
Here





# Lee County Emergency Management Agency

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TO: Bureau County ( Kristine Donarski );Carroll County ESDA (Greg Miller); DeKalb County (Dennis Miller); LaSalle County ( Mike Jobst ); Jo Daviess County (Colin Fulrath), Ogle County EMA (Ron McDermott); and Whiteside County (Doug Buhler)

From: Kevin Lalley, Lee County EMA Coordinator

Subject: Hazard Mitigation Planning

Date: July 1 2010

The purpose of this memorandum is to invite you to attend a planning meeting of the Lee County Natural Hazards Mitigation Committee. This committee is preparing a countywide Natural Hazards Mitigation Plan. We are preparing this plan to meet the Federal Emergency Management Agency's (FEMA) prerequisite for hazard mitigation funds.

Johnson, Depp & Quisenberry, and environmental and engineering consulting firm experienced in preparing these plans, is leading our planning process.

The next meeting of the Committee will be:

**Thursday, July 15**

Lee County Sheriff's Administrative Office

306 S. Hennepin

Dixon, IL

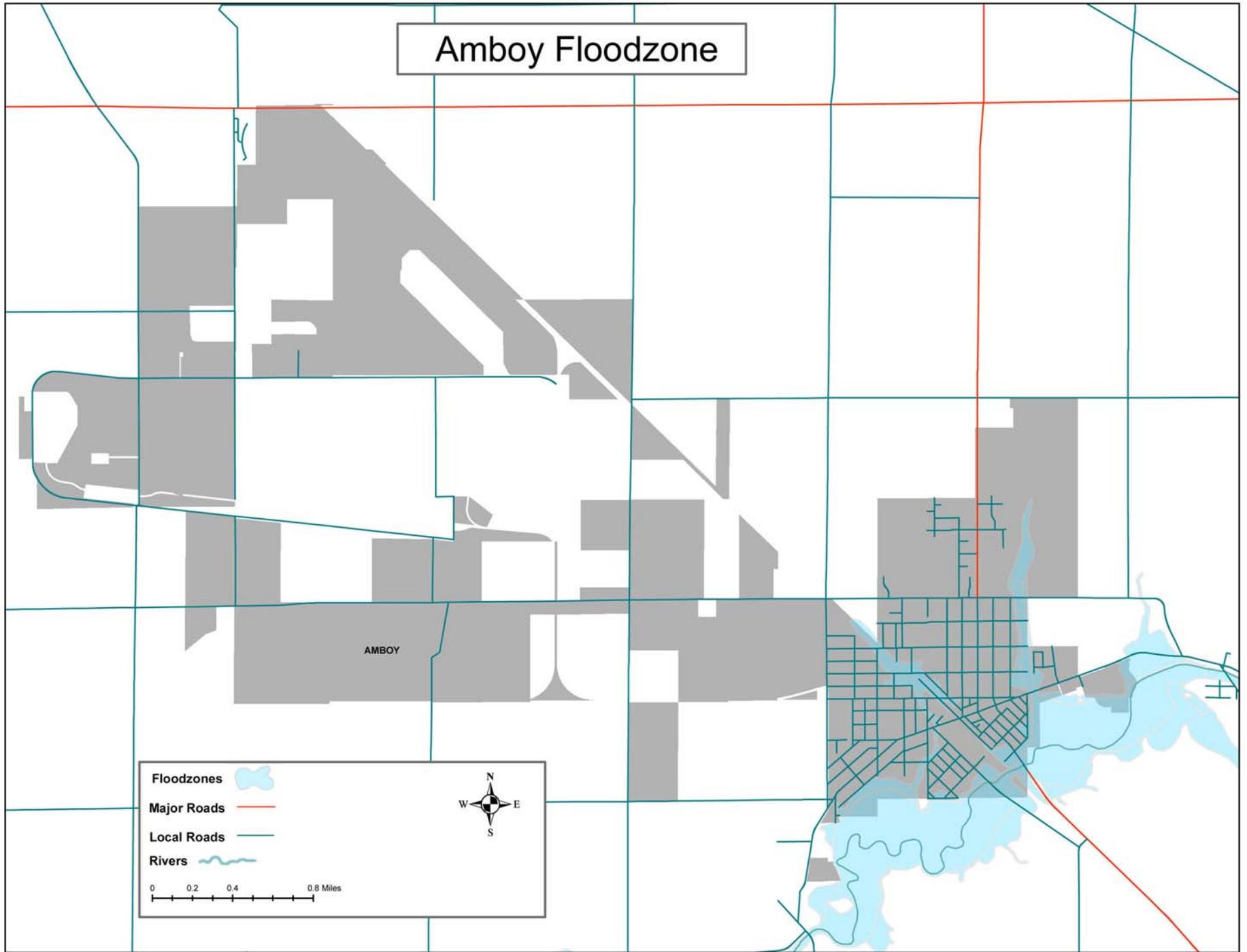
**1 pm**

The Committee meetings are open to the public.

If you have questions or comments on our mitigation planning effort, or if you would like to participate, please feel free to contact me. You may also contact Greg Michaud, our mitigation planning consultant, at 217/529-4534

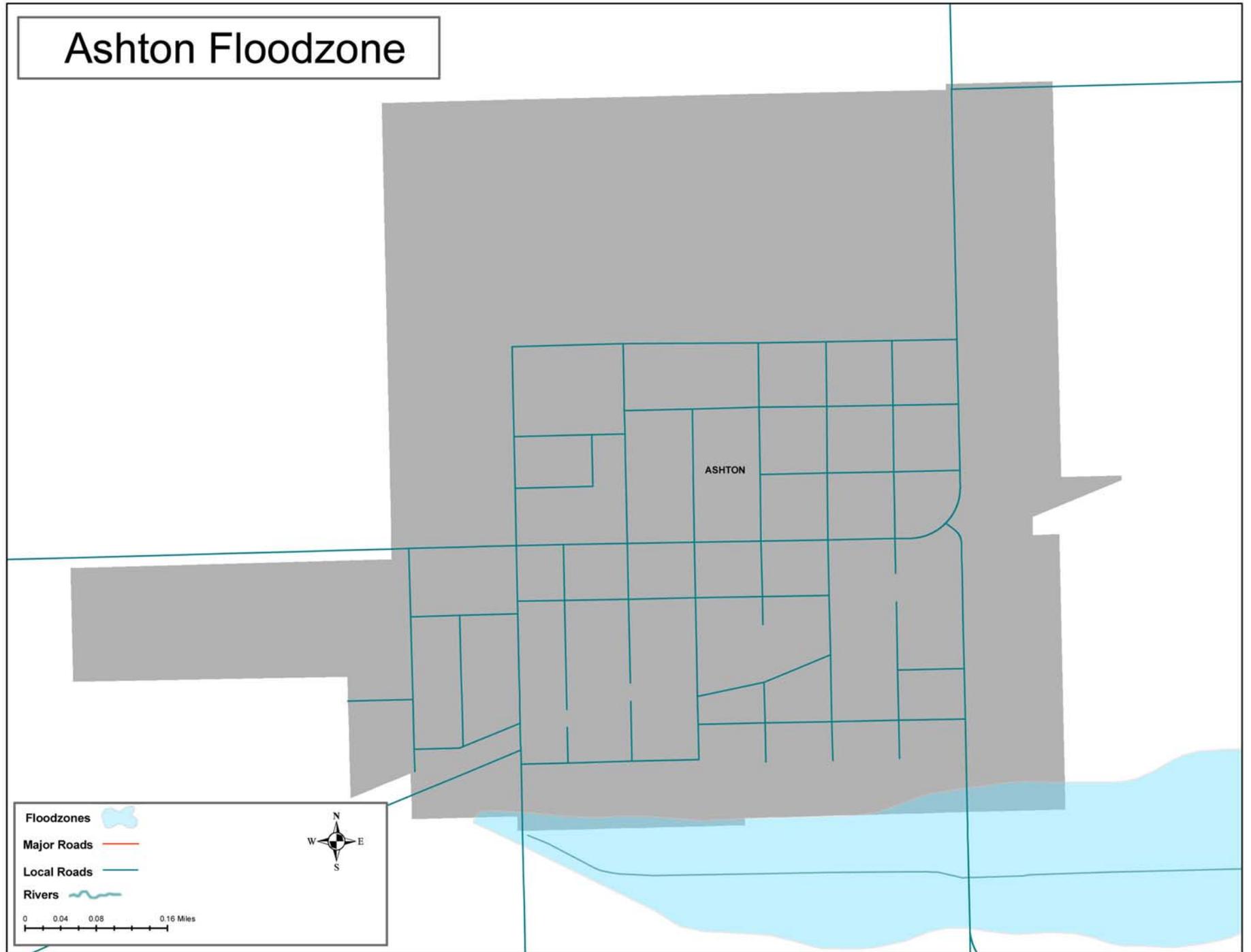
316 S. Hennepin Avenue, Dixon, IL 61021-3020  
Office: 815-284-3365, Fax: 815-284-3367, Emergency 24/7: 815-284-3361  
Email – [esda@countyoflee.org](mailto:esda@countyoflee.org)



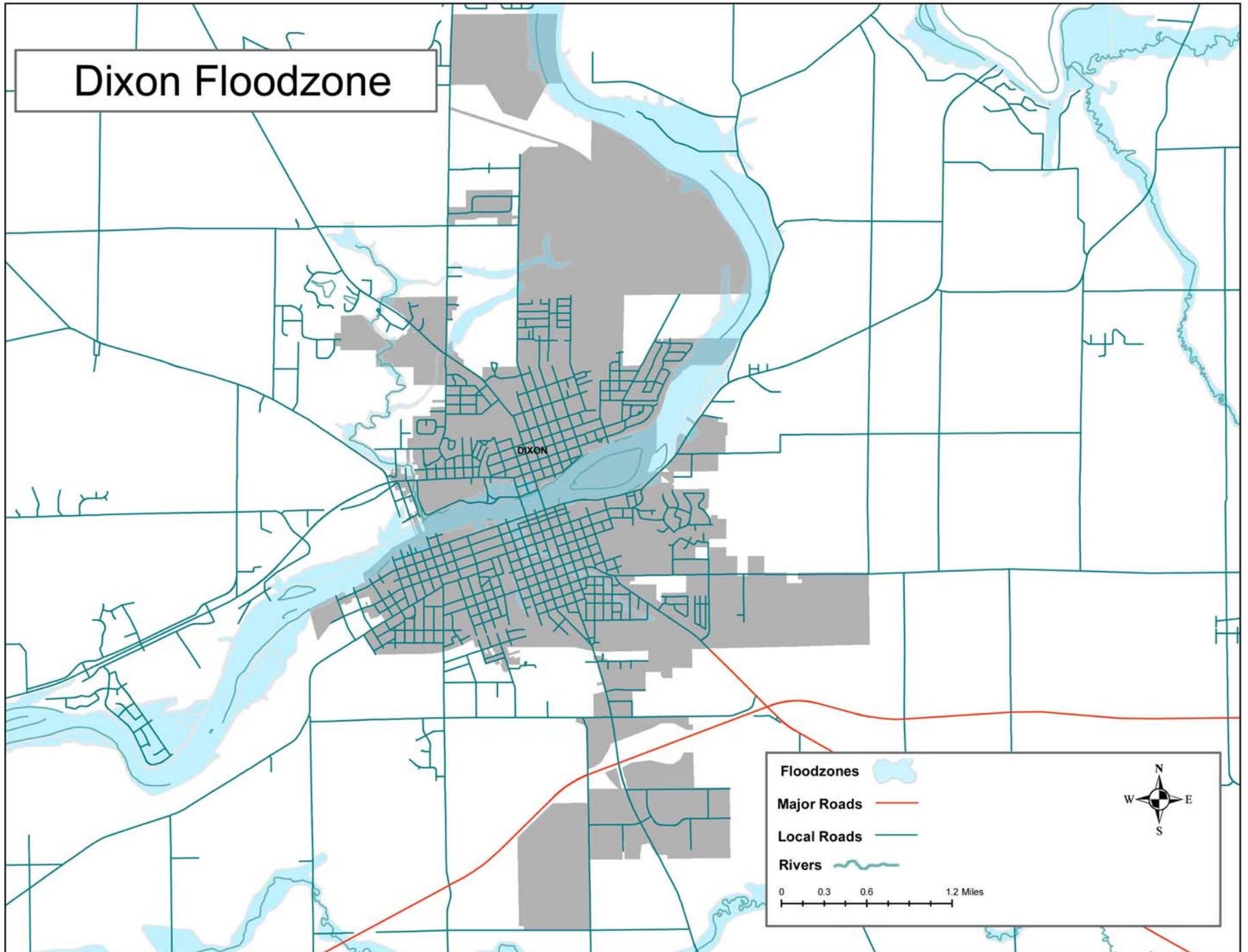


Map generated by the Lee County GIS Office, October 2010.

# Ashton Floodzone



Appendix J



Map generated by the Lee County GIS Office, October 2010.

# Steward Floodzone

STEWARD

Floodzones



Major Roads



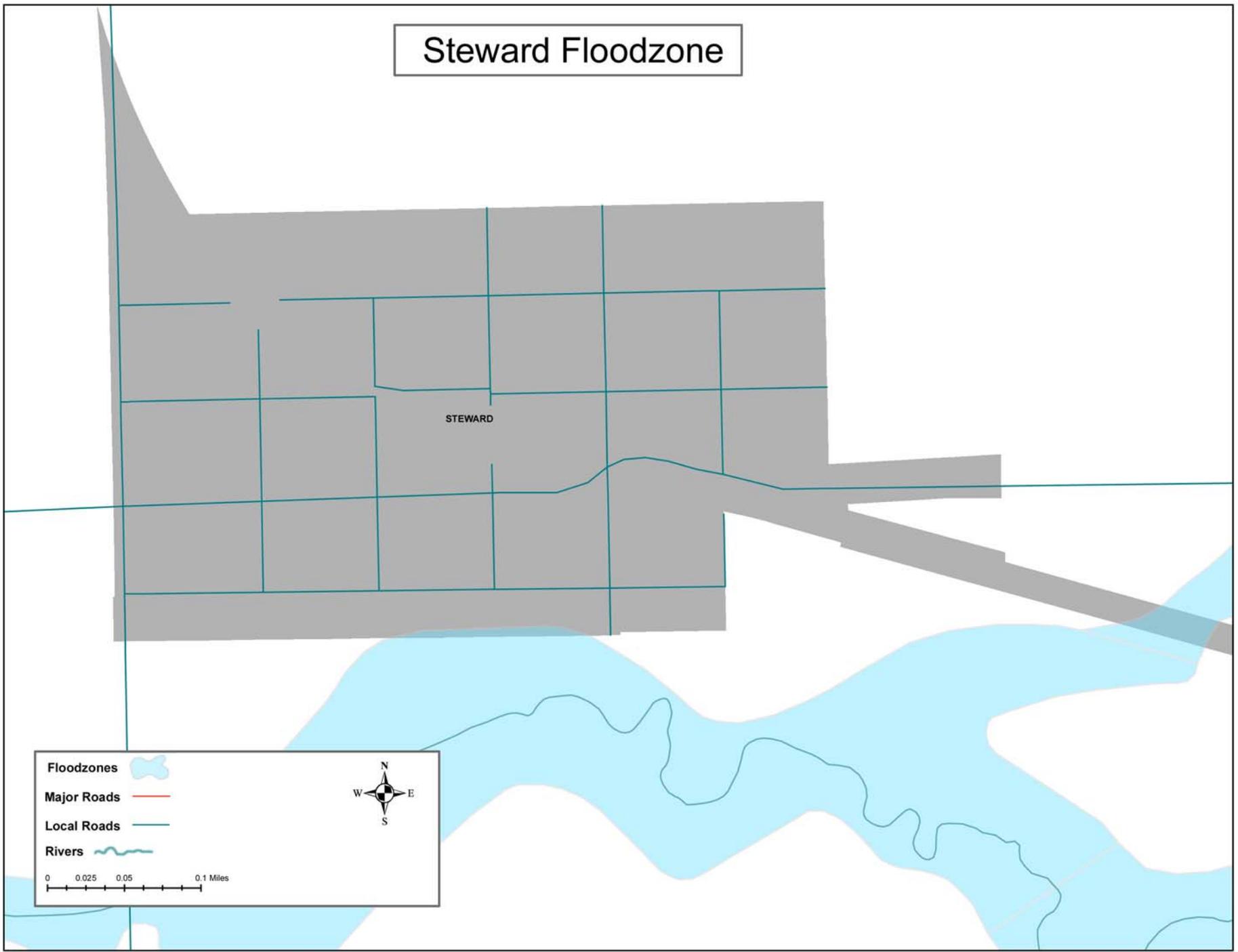
Local Roads



Rivers



0 0.025 0.05 0.1 Miles



Appendix J

Map generated by Lee County GIS Office, October 2010.





Steward, Illinois  
Resolution of Adoption  
of the  
Lee County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, the Village of Steward, Illinois, is subject to natural hazards including floods, tornadoes, severe winter storms, severe thunderstorms, and drought among others, that pose risks to public health and property; and

WHEREAS, the Village of Steward, Illinois, desires to prepare and mitigate for such natural hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Lee County Multi-Jurisdictional All Hazards Mitigation Plan was developed in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, the Village of Steward, Illinois, has participated in developing the Lee County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Lee County:

NOW THEREFORE, be it resolved that the Village of Steward, Illinois, hereby:

1. Adopts the Lee County Multi-Jurisdictional All Hazards Mitigation Plan as the official Hazard Mitigation Plan of the Village of Steward, Illinois; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on June 13, 2011

CERTIFIED by *Don Anderson*  
Name and Title Village President

(MUNCIPAL SEAL)

ATTESTED by *Angela Fulkert*  
Name and Title Village Clerk

Village of Sublette, Illinois  
Resolution of Adoption  
of the  
Lee County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, Village of Sublette is subject to natural hazards including floods, tornadoes, severe winter storms, severe thunderstorms, and drought among others, that pose risks to public health and property; and

WHEREAS, the Village of Sublette desires to prepare and mitigate for such natural hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Lee County Multi-Jurisdictional All Hazards Mitigation Plan was developed in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, Village of Sublette has participated in developing the Lee County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Lee County:

NOW THEREFORE, be it resolved that the Village of Sublette hereby:

1. Adopts the Lee County Multi-Jurisdictional All Hazards Mitigation Plan as the official Hazard Mitigation Plan of Village of Sublette; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on June 13, 2011

CERTIFIED by John R. Styer

ATTESTED by Theresa Wilson

RESOLUTION NO. 6-20-11 A

City of Amboy, Illinois

Resolution of Adoption  
of the  
Lee County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, the City of Amboy, Illinois (the "City") is subject to natural hazards including floods, tornadoes, severe winter storms, severe thunderstorms, and drought among others, that pose risks to public health and property; and

WHEREAS, the City desires to prepare for and mitigate such natural hazards;  
and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Lee County Multi-Jurisdictional All Hazards Mitigation Plan was developed in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, the City has participated in developing the Lee County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Lee County.

NOW THEREFORE, be it resolved by the Mayor and City Council of the City of Amboy, Illinois that the City adopts the portions of the Lee County Multi-Jurisdictional All Hazards Mitigation Plan applicable to the City as the official Hazard Mitigation Plan of the City.

BE IT FURTHER RESOLVED, that that City agrees to participate in the annual and 5-year updates to the Lee County Multi-Jurisdictional All Hazards Mitigation Plan.

BE IT FURTHER RESOLVED, that the City Clerk is hereby authorized and directed to provide a copy of this Resolution to the Lee County Emergency Management Agency for inclusion in the Lee County Multi-Jurisdictional All Hazards Mitigation Plan and the Lee County Emergency Management Agency shall submit, on behalf of the City and the other jurisdictions, the adopted Lee County Multi-Jurisdictional All Hazards Mitigation Plan to the Illinois Emergency Management Agency and the Federal Emergency Management Agency for final review and approval.

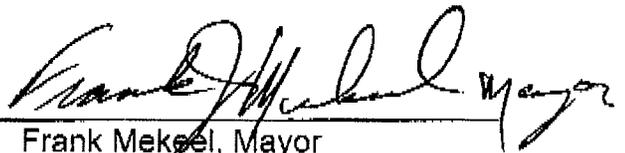
BE IT FURTHER RESOLVED, that the recitals contained in the preambles to this Resolution are true and correct and are hereby incorporated as if fully set forth herein.

BE IT FURTHER RESOLVED, that the provisions and sections of this Resolution shall be deemed to be separable, and the invalidity of any portion of this Resolution shall not affect the validity of the remainder.

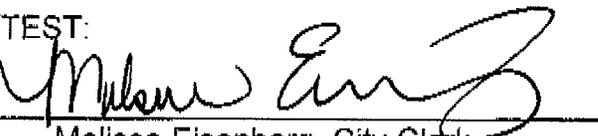
BE IT FURTHER RESOLVED, that all resolutions and parts of resolutions in conflict herewith are, to the extent of such conflict, hereby repealed.

BE IT FURTHER RESOLVED, that this Resolution shall be in full force and effect from and after its passage and approval, and publication as required by law.

This Resolution is adopted by the Mayor and City Council of the City of Amboy, Illinois this 20<sup>th</sup> day of June, 2011.

By   
Frank Mekoel, Mayor

ATTEST:

By   
Melissa Eisenberg, City Clerk

Lee County, Illinois  
Resolution of Adoption  
of the

06-11-011

**Lee County Multi-Jurisdictional All Hazards Mitigation Plan**

WHEREAS, Lee County is subject to natural hazards including floods, tornadoes, severe winter storms, severe thunderstorms, and drought among others, that pose risks to public health and property; and

WHEREAS, the Lee County desires to prepare and mitigate for such natural hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

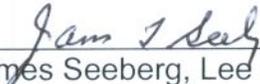
WHEREAS, the Lee County Multi-Jurisdictional All Hazards Mitigation Plan was developed in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, Lee County has participated in developing the Lee County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Lee County:

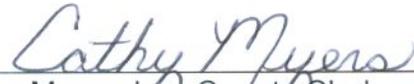
NOW THEREFORE, be it resolved that the Lee County hereby:

1. Adopts the Lee County Multi-Jurisdictional All Hazards Mitigation Plan as the official Hazard Mitigation Plan of Lee County; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on June 21, 2011

CERTIFIED by   
James Seeberg, Lee County Board Chair

(COUNTY SEAL)

ATTESTED BY   
Cathy Myers, Lee County Clerk

VILLAGE OF HARMON Illinois  
Resolution of Adoption  
of the  
Lee County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, the village of HARMON is subject to natural hazards including floods, tornadoes, severe winter storms, severe thunderstorms, and drought among others, that pose risks to public health and property; and

WHEREAS, the village of HARMON desires to prepare and mitigate for such natural hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Lee County Multi-Jurisdictional All Hazards Mitigation Plan was developed in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, the village of HARMON has participated in developing the Lee County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Lee County:

NOW THEREFORE, be it resolved that the village of HARMON hereby:

1. Adopts the Lee County Multi-Jurisdictional All Hazards Mitigation Plan as the official Hazard Mitigation Plan of the village of HARMON ; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on (MONTH, DATE, YEAR) (MUNCIPAL SEAL)  
JULY 2, 2011

CERTIFIED  
by

*[Signature]*  
Village PRESIDENT

ATTESTED  
by

*[Signature]*  
Justice

RESOLUTION NO. 2357-11

City of Dixon, Illinois

Resolution of Adoption  
of the  
Lee County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, the City of Dixon, Illinois (the "City") is subject to natural hazards including floods, tornadoes, severe winter storms, severe thunderstorms, and drought among others, that pose risks to public health and property; and

WHEREAS, the City desires to prepare for and mitigate such natural hazards;  
and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Lee County Multi-Jurisdictional All Hazards Mitigation Plan was developed in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, the City has participated in developing the Lee County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Lee County.

NOW THEREFORE, be it resolved by the Mayor and City Council of the City of Dixon, Illinois that the City adopts the portions of the Lee County Multi-Jurisdictional All Hazards Mitigation Plan applicable to the City as the official Hazard Mitigation Plan of the City.

BE IT FURTHER RESOLVED, that that City agrees to participate in the annual and 5-year updates to the Lee County Multi-Jurisdictional All Hazards Mitigation Plan.

BE IT FURTHER RESOLVED, that the City Clerk is hereby authorized and directed to provide a copy of this Resolution to the Lee County Emergency Management Agency for inclusion in the Lee County Multi-Jurisdictional All Hazards Mitigation Plan and the Lee County Emergency Management Agency shall submit, on behalf of the City and the other jurisdictions, the adopted Lee County Multi-Jurisdictional All Hazards Mitigation Plan to the Illinois Emergency Management Agency and the Federal Emergency Management Agency for final review and approval.

BE IT FURTHER RESOLVED, that the recitals contained in the preambles to this Resolution are true and correct and are hereby incorporated as if fully set forth herein.

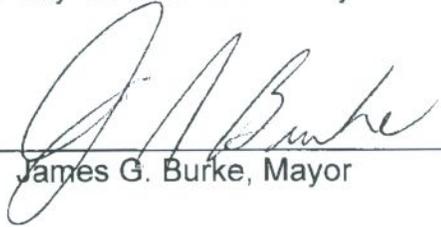
BE IT FURTHER RESOLVED, that the provisions and sections of this Resolution shall be deemed to be separable, and the invalidity of any portion of this Resolution shall not affect the validity of the remainder.

BE IT FURTHER RESOLVED, that all resolutions and parts of resolutions in conflict herewith are, to the extent of such conflict, hereby repealed.

BE IT FURTHER RESOLVED, that this Resolution shall be in full force and effect from and after its passage and approval, and publication as required by law.

This Resolution is adopted by the Mayor and City Council of the City of Dixon, Illinois this 5<sup>th</sup> day of July, 2011.

By



James G. Burke, Mayor

ATTEST:

By



Kathe A. Swanson, City Clerk

CERTIFICATION

I, KATHE A. SWANSON, the City Clerk of the City of Dixon of the County of Lee, State of Illinois, do hereby certify that I am the keeper of the books and records of the aforesaid municipality and that the foregoing is a true and correct copy of a resolution duly adopted by its City Council at a meeting duly convened and held on the 5<sup>th</sup> day of July, 20 11.

Kathe A. Swanson  
CITY CLERK

(SEAL)

RESOLUTION OF ADOPTION OF THE LEE COUNTY MULTI-  
JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

RESOLUTION NO. 071111A

THE VILLAGE OF ASHTON

COUNTY OF LEE

STATE OF ILLINOIS

Dated this 11<sup>th</sup> day of July, 2011

**Village of Ashton Illinois  
Resolution of Adoption  
of the  
Lee County Multi-Jurisdictional All Hazards Mitigation Plan**

WHEREAS, Village of Ashton is subject to natural hazards including floods, tornadoes, severe winter storms, severe thunderstorms, and drought among others, that pose risks to public health and property; and

WHEREAS, the Village of Ashton desires to prepare and mitigate for such natural hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Lee County Multi-Jurisdictional All Hazards Mitigation Plan was developed in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

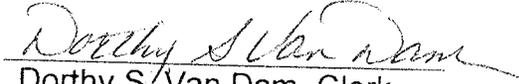
WHEREAS, Village of Ashton has participated in developing the Lee County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Lee County:

NOW THEREFORE, be it resolved that the Village of Ashton hereby:

1. Adopts the Lee County Multi-Jurisdictional All Hazards Mitigation Plan as the official Hazard Mitigation Plan of Village of Ashton; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on July 11, 2011

CERTIFIED by   
John Martinez, President

ATTESTED by   
Dorothy S. Van Dam, Clerk

Village of Franklin Grove, Illinois  
Resolution of Adoption  
of the  
Lee County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, Village of Franklin Grove is subject to natural hazards including floods, tornadoes, severe winter storms, severe thunderstorms, and drought among others, that pose risks to public health and property; and

WHEREAS, the Village of Franklin Grove desires to prepare and mitigate for such natural hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

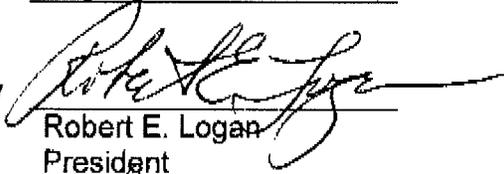
WHEREAS, the Lee County Multi-Jurisdictional All Hazards Mitigation Plan was developed in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, Village of Franklin Grove has participated in developing the Lee County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Lee County:

NOW THEREFORE, be it resolved that the Village of Franklin Grove hereby:

1. Adopts the Lee County Multi-Jurisdictional All Hazards Mitigation Plan as the official Hazard Mitigation Plan of Village of Franklin Grove; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on August 8, 2011

CERTIFIED by   
Robert E. Logan  
President

(SEAL)

ATTESTED by   
Lori J. Smith, Clerk