Mason County Multi-Jurisdictional Natural Hazards Mitigation Plan Update

Mason County, Illinois

Draft

Participants:

Mason County
Bath, Village of
Easton, Village of
Havana, City of
Havana Community Unit School District #126
Havana Rural Fire Protection District
Kilbourne, Village of
Kilbourne Fire Department
Manito, Village of
Mason City, City of
Mason City Fire Protection District
Mason District Hospital
Midwest Central Community Unit School District #191
San Jose, Village of

April 2022

The five year update of this Plan must be completed on or before (date).

Cover photographs were provided courtesy of The Mason County Democrat and the Mason County Emergency Services and Disaster Agency.

From top to bottom:

- *February 2, 2011 Blizzard – Havana*
- *April 15, 2011 EF1 Tornado – unincorporated Mason County near Poplar City*
- *1993 Flooding – emergence of Sand Lake near Havana*

MASON COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

MASON COUNTY, ILLINOIS

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Researched and written for the Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee by American Environmental Corporation

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 Mason County. Since 1968, Mason County has been included in 14 federally-declared disasters. **Figure I-1** identifies each declaration including the year the disaster was declared and the type of natural hazard that triggered the declaration. The natural hazard(s) recognized as contributing to the declaration for Mason County is identified in bold.

Figure I-1
Federal Disaster Declarations: Mason County

Declaration #	Year	Natural Hazard(s) Covered by Declaration
242	1968	tornadoes; severe storms; ***flooding***
373	1973	severe storms; ***flooding***
438	1974	severe storms; ***flooding***
583	1979	severe storms; ***flooding***
674	1982	severe storms; tornadoes; ***flooding***
735	1985	severe storms; ***flooding***
997	1993	severe storms; ***flooding***
1025	1994	severe storms; ***flooding***
1053	1995	severe storms; ***flooding***
1416	2002	severe storms; tornadoes; ***flooding***
1469	2003	severe storms; ***tornadoes***; flooding
1960	2011	***severe winter storm; snowstorm***
4116	2013	severe storms; straight-line winds; ***flooding***
4489	2020	***COVID-19 pandemic***

In the last 10 years alone (2012 – 2021), there have been 57 heavy rain events, 38 thunderstorms with damaging winds, 28 riverine flood events, 24 excessive heat events, 23 extreme cold events, 14 severe winter storms, 7 flash flood events, 5 tornadoes, , 2 severe storms with hail one inch in diameter or greater, 2 droughts, and 1 lightning strike with verified damages 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 hazards. This process helps the County and participating jurisdictions reduce their risk from these 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 a natural hazards mitigation plan.

Why update a natural hazards mitigation plan?

By updating and adopting a natural hazards mitigation plan, participating jurisdictions remain 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 and activities 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 provides federal aid for mitigation projects, but only if the local government entity has a Federal Emergency Management Agency (FEMA) approved hazard mitigation plan.

How is this plan different from other emergency plans?

A natural hazards mitigation plan is aimed at identifying projects and activities that can be conducted prior to a natural disaster, unlike other emergency plans which provide direction on how to respond to a disaster after it occurs. This is the first time that Mason County has updated its hazard mitigation plan since the original plan was prepared in 2015. This update describes in detail the actions that can be taken to help reduce or eliminate damages caused by specific types of natural hazards.

1.1 PARTICIPATING JURISDICTIONS

Recognizing the benefits of having a natural hazards mitigation plan, the Mason County Board authorized the update of the Mason County Multi-Jurisdictional Natural Hazards Mitigation Plan (hereto referred to as the Plan). The County then invited all the local government entities within Mason County to participate. **Figure I-2** identifies the participating jurisdictions that are represented in the Plan update.

Figure I-2
Participating Jurisdictions Represented in the Plan

- Bath, Village of
- Easton, Village of
- Havana, City of
- Havana CUSD #126
- Havana Rural Fire Protection District
- Kilbourne, Village of
- Kilbourne Fire Department
- Manito, Village of
- Mason City, City of
- Mason City Fire Protection District
- Mason County
- Mason District Hospital
- Midwest Central CUSD #191
- San Jose, Village of

1.2 COUNTY PROFILE

Mason County is located in west-central Illinois and covers approximately 563 square miles. **Figure I-3** provides a location map of the County and the participating municipalities while **Figure I-4** and **I-5** identify the boundaries of the school districts and fire protection districts. A map of the Mason District Hospital campus was unavailable.

The County is bounded on the north by Tazewell County, to the east by Tazewell and Logan Counties, to the south by Menard and Cass Counties, and to the west by the Illinois River. The City of Havana is the county seat.

Figure I-3
Location Map

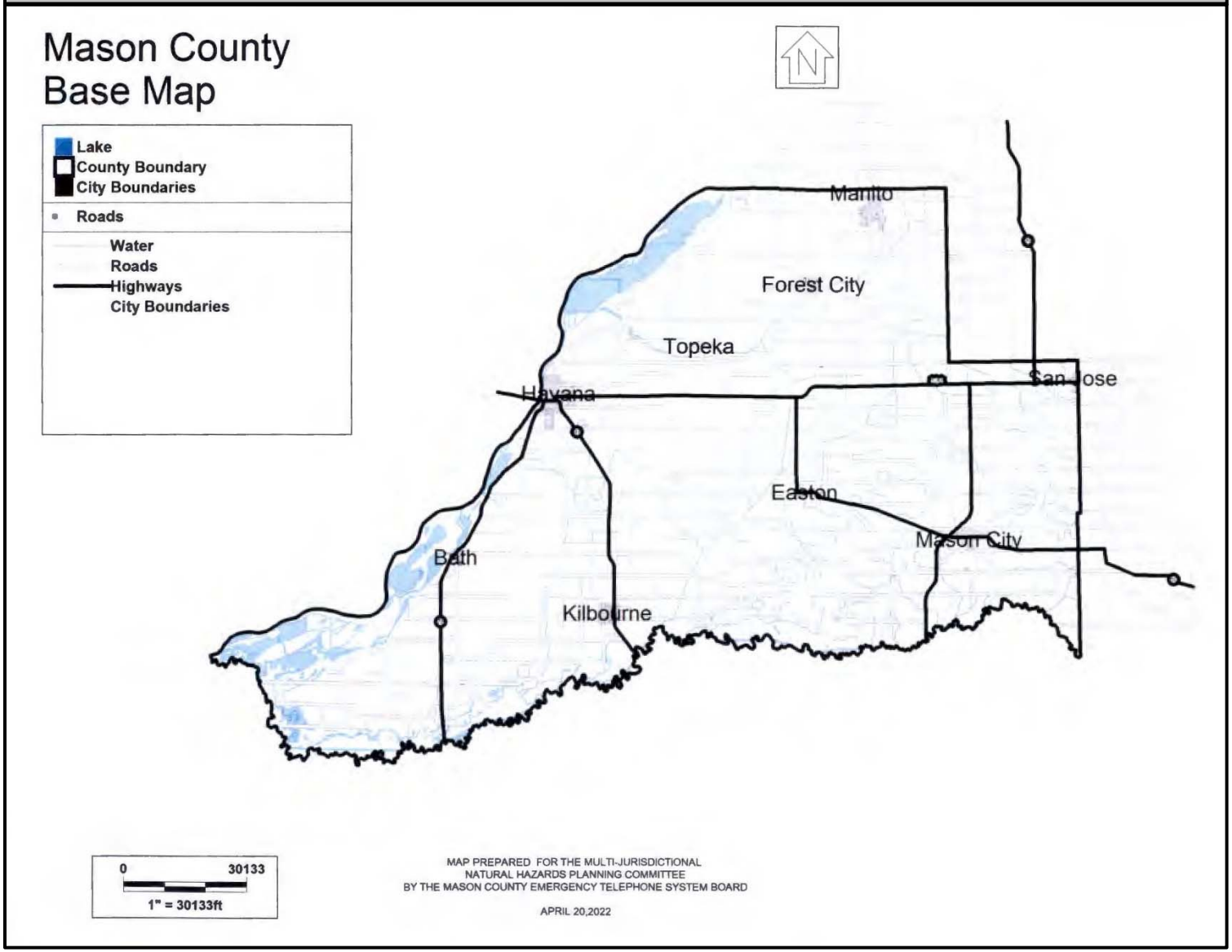


Figure I-4
School District Boundary Map

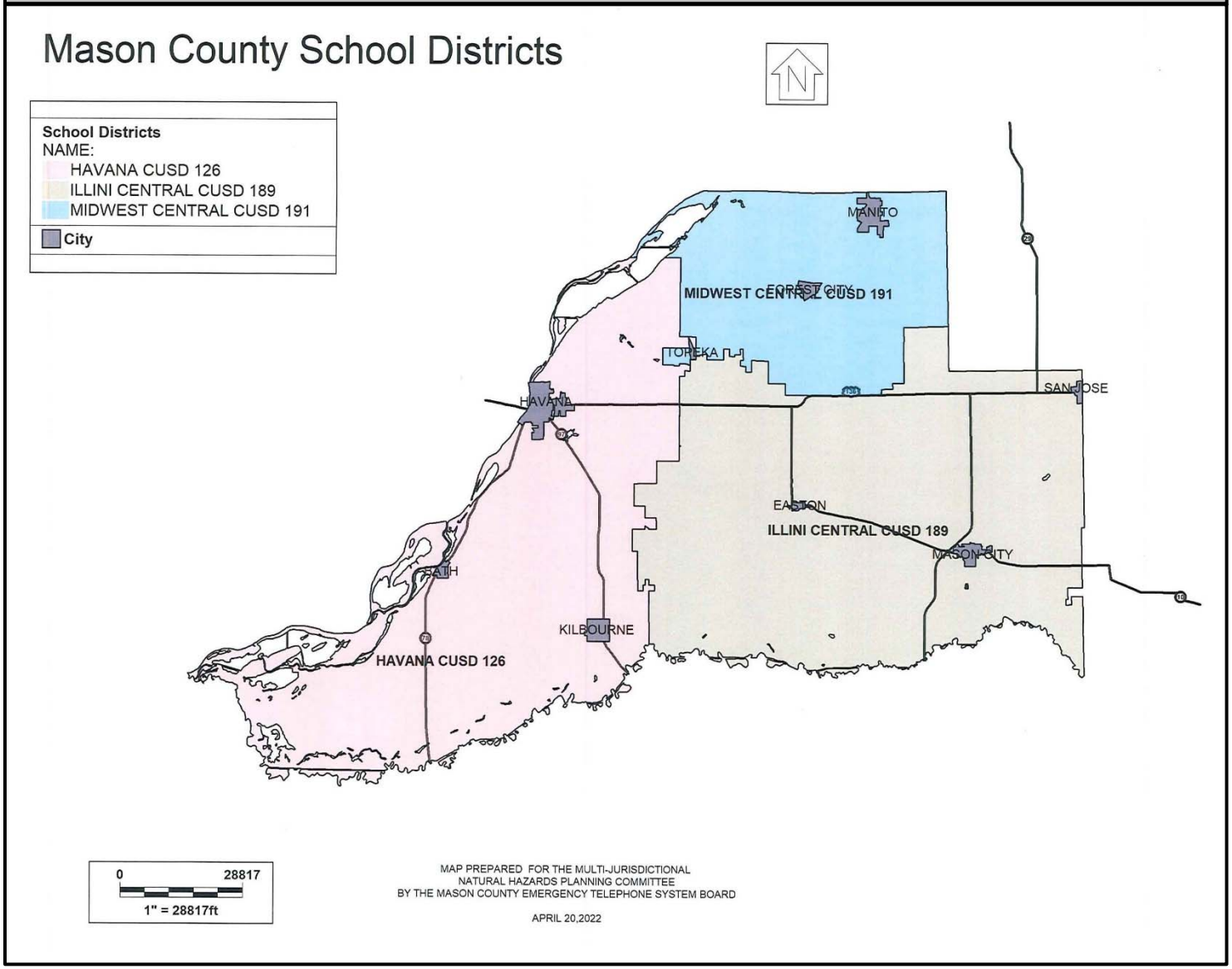
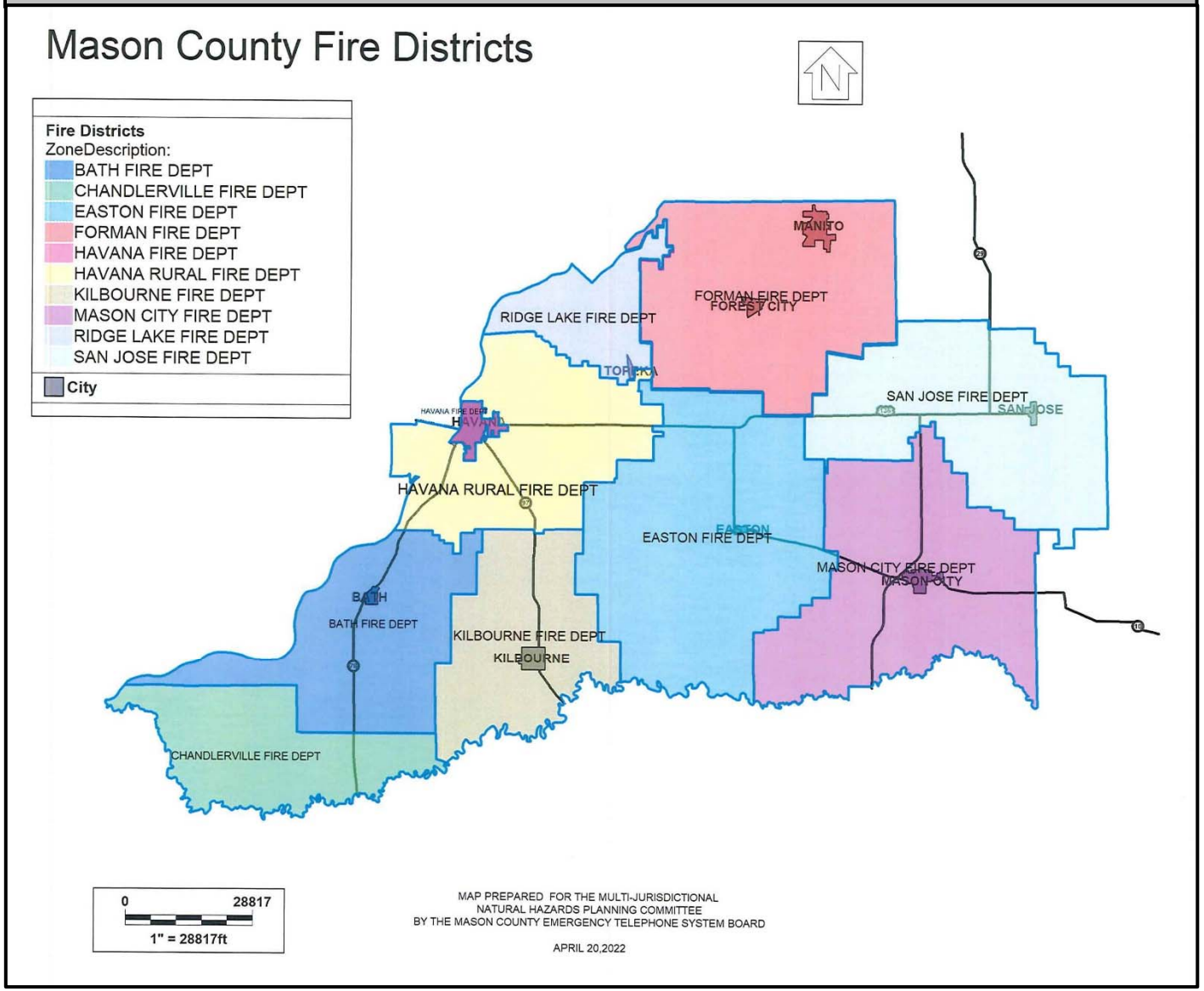


Figure I-5
Fire Protection District/Fire Department Boundary Map



The topography of the County is generally flat to gently sloping and consists of uplands, stream terraces, dunes, and floodplains. Stabilized dunes, consisting of glacially-deposited sand, are common on the terraces. The uplands, which are in the southeastern third of the County, consist of glacial till deposits, covered by loess. The floodplains along the Sangamon and Illinois rivers consist of sand, silt, and clay.

The County is part of three watersheds. The southeastern portion of the County is in the Sangamon River watershed. The north and western portions of the County drain directly to the Illinois River. A small portion of the northeast corner of the County near Manito is in the Mackinaw River watershed.

Agriculture is the predominant land use and a major enterprise in Mason County. According to the 2017 Census of Agriculture, there were 548 farms in Mason County occupying approximately 90% (311,929 acres) of the total land area in the County. In comparison, there were 490 farms occupying 84% (289,841 acres) of the total land area in the County in 2012. The major crops still include corn and soybeans. The County produces a wide variety of crops because of its sandy soils and the wide use of irrigation. The County is also a leading producer of popcorn, melons and pumpkins. The major livestock includes aquiculture, hogs, cattle and poultry. The County ranks 30th in the State for crop cash receipts and 49th for livestock cash receipts. Cash receipts for both crops and livestock have decreased since 2012.

The largest employment sectors in Mason County are health care/social assistance and retail, followed by manufacturing, public administration, educational services, and construction according to the Illinois Department of Commerce and Economic Opportunity. Leading employers include Growmark, Cargill, ADM, Kifco, and the Mason District Hospital.

Figure I-6 provides demographic data on the County and each of the participating municipalities along with information on housing units and assessed values. The assessed values are for all residential structures and associated buildings (including farm homes and buildings associated with the main residence.) The assessed value of a residence in Mason County is approximately one-third of the market value. **Figures I-7** and **I-8** provide basic demographic information about the size and populations served by the participating school districts and fire protection districts/fire departments.

1.3 LAND USE AND DEVELOPMENT TRENDS

Population growth and economic development are two major factors that trigger changes in land use. Mason County is almost entirely rural with a population that has seen a slight decrease between 1900 and 2010 from 17,491 to 14,666. Between 2010 and 2019 the population decreased by 7.1% from 14,666 to 13,621. During the same period, all of the participating municipalities experienced population decreases with the exception of Mason City which increased slightly.

Land use in Mason County is primarily agricultural. As discussed in the previous section, approximately 90 % of the land within the County is used for farming practices. Agriculture is and will continue to be a major industry within the County and a vital part of the County's economy.

Figure I-6
Demographic Data by Participating Jurisdiction

Participating Jurisdiction	Population (2015-2019)	Projected Population (2030)	Total Area (Sq. Miles) (2010)	Number of Housing Units (2015-2019)	Total Assessed Value of Housing Units (2020)
Mason County (unincorporated)	4.807	3,948	531.388	2,720	$53,535,495
Bath	279	229	0.365	155	$1,790,688
Easton	309	254	0.240	136	$2,668,605
Havana	3,197	2,626	2.741	1,500	$25,751,985
Kilbourne	274	225	0.889	163	$1,837,560
Manito	1,563	1,284	1.441	745	$18,544,352
Mason City	2,370	1,947	1.014	1,169	$19,898,141
San Jose	445	366	0.500	303	$2,843,598
Mason County (total)	13,621	11,188	539.238	7,055	$128,959,628

Sources: Poler, Kristi J., Mason County Supervisor of Assessments.
Illinois Department Public Health, Population Projections – Illinois, Chicago and Illinois Counties by Age and Sex: July 1, 2015 to July 1, 2030 (2019 Edition).
U. S. Census Bureau, 2010 Census U.S. Gazetteer Files.
U.S. Census Bureau, American FactFinder.

Figure I-7
Demographic Data by Participating School District

Participating School District	Number of Schools in District	Estimated Population Served	Area Served (Sq. Miles) (2010)	Communities / Unincorp. Areas Served in Mason County
Havana CUSD #126	3	920	225	Bath, Havana, Kilbourne
Midwest Central CUSD #191	3	5,000	200	Forest City, Goofy Ridge, Manito, Topeka

Source: Capability Assessment Worksheets – School Districts.

Figure I-8
Demographic Data by Participating Fire Protection Districts/Fire Departments

Participating School District	Number of Fire Stations	Estimated Population Served	Area Served (Sq. Miles) (2010)	Communities / Unincorp. Areas Served in Mason County
Havana Rural FPD	1	n/a	n/a	---
Kilbourne FD	1	800	98	Kilbourne
Mason City FPD	1	3,100	144	Mason City

Source: Capability Assessment Worksheets – Fire Protection Districts.

According to the Mason County Recorder's Office, the installation of a 43-turbine wind farm in the eastern portion of the County has been the main development since the original Plan was approved. Vistra Energy's Dynegy Midwest Generation Havana Power Station closed in 2019; however, that property remains as a potential site for redevelopment. In terms of development and economic initiatives within the County and the participating jurisdictions, there are plans for a large wind farm consisting of 38 new turbines between Easton and Mason City. Additionally, in that same area a 380-acre Salt Creek Solar Farm will be developed.

There are no other large-scale economic development initiatives underway in the County. Substantial changes in land use (from forested and agricultural land to residential, commercial, and industrial) are not anticipated within the County in the immediate future. No sizeable increases in commercial or industrial developments are expected within the next five years.

2.0 PLANNING PROCESS

The Mason County Multi-Jurisdictional Natural Hazards Mitigation Plan (the Plan) was updated through the Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee (Planning Committee). The Plan was prepared to comply with the Disaster Mitigation Act of 2000 and incorporates the nine recommended tasks for developing or updating a local hazard mitigation plan as outlined in Federal Emergency Management Agency's (FEMA) *Local Mitigation Planning Handbook*. **Figure PP-1** provides a brief description of the process utilized to prepare this Plan.

Figure PP-1
Description of Planning Process

Tasks	Description
Task One: Organize the Committee	The Planning Committee was formed with broad representation and specific expertise to assist the County and the Consultant in updating 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 & Vulnerability Analyses	The Consultant identified and profiled the natural hazards that have impacted the County and conducted vulnerability analyses to evaluate the risk to each participating jurisdiction.
Task Five: Goal Setting	After reviewing existing plans and completing the risk assessment, the Consultant assisted the Planning Committee in updating the goals and objectives for the Plan.
Task Six: Mitigation Strategy & Activities	The participating jurisdictions were asked to identify mitigation actions that had been started and/or completed since the original Plan was adopted. In addition, they were also asked to identify any new mitigation actions based on the results of the risk assessment. The new mitigation actions were then analyzed, categorized and prioritized.
Task Seven: Draft Plan	The draft Plan update summarized the results of Tasks One through Six. In addition, it described the responsibilities to monitor, evaluate and update the Plan. The draft Plan update was reviewed by the participants and a public forum was held to give the public an additional opportunity to provide input. Comments received were incorporated into the draft Plan update and submitted to the Illinois Emergency Management Agency (IEMA) and FEMA for review and approval.
Task Eight: Finalize Plan & Adoption	Comments received from IEMA, and FEMA were incorporated into the final Plan update. The final Plan update was then submitted to the County and participating jurisdictions for adoption. The Plan will be reviewed periodically and updated again in five years.

The Plan update and development was led at the staff level by Greg Griffin, the Mason County Emergency Management Agency Director (retired) and Richard Krum, the Mason County Emergency Management Agency Administrative Coordinator following Mr. Griffin's retirement. American Environmental Corp. (AEC) an environmental 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 local government representatives, was crucial to the development of the Plan update. 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 update. All of the participating jurisdictions met the participation requirements.

- Attend at least one Planning Committee meeting.
- Identify/update a list of documents (i.e., plans, studies, reports, maps, etc.) relevant to the natural hazard mitigation planning process.
- Identify/update a list of critical infrastructure and facilities.
- Review the risk assessment and provide additional information on events and damages when available.
- Participate in the update of the mitigation goals.
- Submit a list of mitigation actions started and/or completed since the adoption of the original Plan.
- Identify and submit a list of new mitigation actions.
- Review and comment on the draft Plan update.
- Formally adopt the Plan update.
- Where applicable, incorporate the Plan update into existing planning efforts.
- Participate in the Plan update maintenance.

2.1 PLANNING COMMITTEE

As previously mentioned, at the start of the planning process, the Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee was formed to update the hazard mitigation plan. The Planning Committee included representatives from each participating jurisdiction, as well as agriculture, educational institutions, emergency services and healthcare.

Figure PP-2 details the entities represented on the Planning Committee and the individuals who attended on their behalf. The Planning Committee was chaired by the Mason County EMA.

Additional technical expertise was provided by the staff at the Illinois Emergency Management Agency and the Illinois Department of Natural Resources Office of Water Resources.

Mission Statement

Over the course of the first two meetings, the Planning Committee reviewed and discussed the mission statement set forth in the original Plan. The Committee determined that the mission statement still accurately reflected its objectives for the Plan update and approved within no changes. The approved mission statement is provided below.

"The mission of the Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee is to develop a mitigation plan that documents projects and activities to reduce the negative impacts of natural hazards on citizens, infrastructure, private property and critical facilities."

Figure PP-2
Mason County Planning Committee Member Attendance Record

Representing	Name	Title	4/22/2021	6/24/2021	9/23/2021	1/13/2022	4/28/2022
American Environmental Corporation	Bostwick, Andrea	EMS Manager	X	X	X	X	
American Environmental Corporation	Krug, Zachary	EMS Specialist	X	X	X		
American Environmental Corporation	Runkle, Ken	Manager - Environmental Compliance				X	
Bath, Village of	Atherton, Gary	Code Enforcer				X	
Easton, Village of	Nunn, Kate	Village President	X	X	X		
Forman Fire Protection District	Hermann, Doug	Chief	X		X		
Havana CUSD #126	Plater, Matt	Superintendent		X	X	X	
Havana Rural Fire Protection District	Blakely, Gary	Fire Chief	X	X			
Havana Rural Fire Protection District	Williams, Scott	Assistant Chief	X		X	X	
Havana, City of	Fliege, Matt	Fire Marshal / Captain - Training Officer		X		X	
Havana, City of	Kachanuk, John	Fire Chief	X	X	X		
Havana, City of	Stadsholt, Brenda	Mayor	X				
Havana, City of	Stark, James	Deputy Police Chief		X			
Kilbourne Fire Department	Cowin, Tony	Fire Chief	X		X		
Kilbourne, Village of	Hodgson, Calvin	Village President		X			
Manito, Village of	Lacey, Ken	Trustee			X		
Mason City Fire Protection District	Stewart, John	Fire Chief	X	X	X	X	
Mason City, City of	Dixon, Wayne	Public Works Superintendent		X			
Mason City, City of	Donovan, Justin	Assistant Chief / Chief		X		X	
Mason City, City of	Douglas, Angie	Police Officer			X		
Mason City, City of	Burris, Mike	Municipal Services Project Manager	X	X	X	X	
Mason County - 911	Crum, Richard	911 Administrative Coordinator	X	X	X	X	
Mason County - Assessor's Office	Poler, Kristi	Assessor (Supervisor)	X		X	X	
Mason County - Clerk's Office	Brown, Summer	Clerk & Recorder	X	X		X	
Mason County - County Board	Garlisch, Eldon	County Board Member	X		X		
Mason County - County Board	Kreiling, Dorothy	County Board Member	X	X			
Mason County - EMA	Griffin, Greg	Director / Director Retired	X	X	X	X	
Mason County - EMA	Crum, Richard	Administrative Coordinator	X	X	X	X	
Mason County - Health Department	Gann, Camryn	PHEP Coordinator / EH Director		X	X	X	
Mason County - Health Department	Jibben, Curt	Director	X				
Mason County - Highway Department	Pedigo, Mike	County Engineer	X				
Mason County - Sheriff's Office	Gann, Paul	Sheriff		X	X	X	
Mason County - Sheriff's Office	Procarione, Margaux	Deputy			X		
Mason County - Zoning Office	Ragle, Joe	Zoning Officer	X				
Mason County Democrat	Martin, Wendy	Editor	X				
Mason County Farm Bureau	Weller, Jason	Manager			X		
Mason District Hospital	Kosier, Doug	Chief Executive Officer	X				
Mason District Hospital	Troxell, Chris	Emergency Department Director / Hospital Preparedness Program Coordinator	X	X	X		
Midwest Central CUSD #191	Hellrigel, Todd	Superintendent		X	X	X	
Regional Office of Education #53	Smith, Jon	Assistant Regional Superintendent	X				
San Jose, Village of	Burris, Mike	Municipal Services Project Manager				X	

Planning Committee Meetings

The Planning Committee met five times between April 2021 and April 2022. **Figure PP-2** identifies the representatives present at each meeting. **Appendices A** and **B** contain copies of the

attendance sheets and meeting minutes for each meeting. The purpose of each meeting, including the topics discussed, is provided below.

First Planning Committee Meeting – April 22, 2021

The purpose of this meeting was to explain the planning process to the Planning Committee members and give them a brief overview of what mitigation is, what a hazards mitigation plan is, why the Plan needs to be updated and the planning process. A discussion regarding the hazards to be included in the Plan update was conducted and an electronic survey was sent out following the meeting asking Committee members whether landslides should be included in the Plan. Based on the results received, the Committee chose not to include landslides in the Plan.

Information needed from each participant was discussed and representatives for the County and the participating jurisdictions were asked to complete the forms entitled "Capability Assessment Worksheet," "Critical Facilities & Infrastructure," "Identification of Severe Weather Shelters" and "Drinking Water Supply Worksheet" distributed electronically and return them at the next meeting.

Committee members were then asked to identify any recent or historic natural hazard events that have impacted the County and participants. A "Hazard Events Questionnaire Survey" was distributed electronically following the meeting to solicit information on hazard events. The County and participating jurisdictions were asked to make information available on the planning process at their offices and in the communities. A "Citizen Questionnaire," was also distributed electronically to Committee Members prior to the meeting for distribution to their constituents to gauge the public's perception about the hazards that impact the County. Finally, drafts of the original mission statement and mitigation goals were presented for review.

Due to the continuation of the COVID-19 pandemic the first meeting of Planning Committee was conducted virtually and via teleconference to ensure the safety of all participants.

Second Planning Committee Meeting – June 24, 2021

At the second Planning Committee meeting portions of the updated natural hazard risk assessment section were presented for review. Following the review of the risk assessment, the Planning Committee members participated in an exercise to calculate the Risk Priority Index (RPI) for the County and participating jurisdictions. The RPI can assist participants in determining which hazards present the highest risks and therefore which ones to focus on when formulating mitigation projects and activities. The Planning Committee then reviewed and discussed the original mission statement and mitigation goals and finalized both with no revisions.

Next, mitigation actions were defined, and examples were discussed. Committee members were asked to identify any mitigation projects and activities their jurisdictions had started and/or completed since the original Plan was adopted in 2015. Ideas for new potential mitigation projects and activities were presented. Representatives for the County and the participating jurisdictions were asked to complete the forms entitled "Existing Mitigation Project/Activity Status" and "New Hazard Mitigation Projects" and return them at the next meeting.

Third Planning Committee Meeting – September 23, 2021

The purpose of the third Planning Committee meeting was to discuss the vulnerability analysis for select natural hazards and the preliminary results of the RPI exercise. The Planning Committee members then discussed vulnerable community assets and completed the form entitled "Critical Facilities Vulnerability Survey" which will be used in the vulnerability analyses.

The Planning Committee also reviewed and discussed the original mitigation project prioritization methodology and approved it with no changes. The Planning Committee then listened to a presentation on how mitigation projects and activities identified by the participating jurisdictions would be presented in the Plan update. Participants were encouraged to provide their mitigation project lists prior to the 4th meeting when draft lists will be distributed for review.

Fourth Planning Committee Meeting – January 13, 2022

At the fourth Planning Committee meeting, Committee members reviewed the draft jurisdiction-specific mitigation action tables which identified and prioritized the new and existing mitigation projects and activities provided by the participants. Members were given the opportunity to add additional projects and activities to their tables. The sections outlining the mitigation strategy, plan maintenance and adoption were also reviewed. The concept of community lifelines was also discussed. Community lifelines enable the continuous operation of critical government and business functions essential to human health and safety or economic security. While the concept was developed to support emergency response and planning, FEMA has begun applying it to all phases of emergency management, including mitigation. Community lifelines will be included in most project descriptions to create a clear connection to the concept.

The public forum and adoption process were then discussed, and a date for the public forum was set. Finally, the plan maintenance and update requirements were discussed. The Plan update will be monitored and evaluated on an annual basis by a Plan Maintenance Subcommittee which will be made up of the participating jurisdictions and key members of the Planning Committee. The Plan must be reviewed, revised, and resubmitted to IEMA and FEMA at least once every five years.

Fifth Planning Committee Meeting – April 28, 2022

At this Planning Committee meeting the public was provided an opportunity to ask questions and provide comments on the draft Plan update.

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 update's development; and

- cultivate ownership of the Plan update, 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 hazards identified in the Plan update. 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

The citizen questionnaire used in the original Plan was updated and distributed to again help gather facts and gauge public perceptions about natural hazards that affect Mason County. The questionnaire was distributed electronically to the Planning Committee members who were encouraged to make it available to their residents. A copy of the questionnaire is contained in **Appendix C**.

A total of 28 questionnaires were completed and returned to the Planning Committee. Questionnaires were completed by residents in each participating jurisdiction, with the exception of San Jose. These responses provide useful information to decision makers as they determine how best to disseminate information on natural hazards and safeguard the public. Additionally, these responses identify the types of projects and activities the public is most likely to support. The following provides a summary of the results.

- Respondents felt that severe summer storms were the most frequently encountered natural hazard in Mason County. This result is consistent with the weather records compiled for the County and as described in this Plan update.
- The most effective means of communication identified by respondents to disseminate information about natural hazards were social media and the Internet followed closely by mailings and local government. Information disseminated via television and fact sheets also received strong support among respondents.
- In terms of the most needed mitigation projects and activities, the following four categories received the strongest support:
  - maintain power during storms by burying power lines, trimming trees and/or purchasing backup generators (71%).
  - install/maintain sirens and other alert systems (65%);
  - maintain roadway passages during snowstorms and heavy rains (61%); and
  - provide flood or drainage protection (50%).

FAQ Fact Sheet

A "Frequently Asked Questions" fact sheet was disseminated to help explain what a natural hazards mitigation plan is and briefly described the planning process. The fact sheet was made available at the participating jurisdictions. A copy of the fact sheet is contained in **Appendix D**.

Press Releases

Press releases were prepared and submitted to local media outlets and posted to the Mason County EMA Facebook page prior to each Planning Committee meeting. The releases announced the purpose of the meetings and how the public could become involved in the Plan update's development. **Appendix E** contains a list of the media outlets that received the press releases while copies of the releases, Facebook posts and any news articles published can be found in **Appendix F**.

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 local government 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 April 28, 2022 was conducted as an open-house public forum. The open-house format was chosen for this forum instead of a hearing to provide greater flexibility for residents who wished to participate. Residents were able to come and go at any time during the forum, reducing conflicts with business, family, and social obligations.

In conjunction the public forum, the draft Plan update was made available for review and comment on the Mason County website. A two-page handout summarizing the planning process and a link to a comment survey that could be used to provide feedback on the draft Plan update were also posted on the website.

At the forum, residents could review a draft of the Plan update; meet with representatives from the County, the participating jurisdictions, and the Consultant; ask any questions; and provide comments on the draft Plan update. 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 update. **Appendices G** and **H** contain copies of these materials.

Public Comment Period

After the public forum, the draft Plan update was made available for public review and comment through May 12, 2022 at the Mason County EMA Office and on the County's website. 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.

- *Acquired additional information about natural hazards.* Verifiable hazard event and damage information was obtained from participants that presents a clearer assessment of the extent and magnitude of natural hazards that have impacted the County.

- *Obtained critical facilities damage information*. Data collection surveys soliciting information about critical facilities damaged by natural hazards were used to supplement information obtained from government databases. This information was vital to the preparation of the vulnerability analysis.
- *Increased awareness of the impacts associated with natural hazard events within the County*. Understanding how mitigation actions can reduce risk to life and property helped generate ***over 40 new mitigation projects and activities*** at the local level that had not been previously identified in any other planning process.

2.3 PARTICIPATION OPPORTUNITIES FOR INTERESTED PARTIES

Businesses, schools, not-for-profit organizations, neighboring counties, and other interested parties were provided multiple opportunities to participate in the planning process. Wide-reaching applications were combined with direct, person-to-person contacts to identify anyone who might have an interest or possess information which could be helpful in updating the Plan.

Agricultural Community

Representatives from the agricultural community were invited to serve on the Planning Committee. The Mason County Farm Bureau served as technical partner on the Planning Committee and provided input into the planning process.

Education

Representatives from the Regional Office of Education #53., Havana Community Unit School District (CUSD) #126 and Midwest Central CUSD #191 served on the Planning Committee and provided input into the planning process. Both Havana CUSD #126 and Midwest Central CUSD #191 chose to be included as participating jurisdiction in the Plan update.

Healthcare

Input was sought from the healthcare community. Representatives from Mason District Hospital attended the Planning Committee meetings, provided input into the planning process, and chose to be included as a participating jurisdiction in the Plan update.

Not-for-Profit & Other Organizations

Input was sought from the fire departments/fire protection districts in the County. Representatives from the Foreman, Havana Rural and Mason City Fire Protection Districts (FPDs) and the Havana and Kilbourne Fire Departments (FDs) served on the Planning Committee. Havana Rural and Mason City FPDs and Kilbourne FD chose to be included as participating jurisdiction in the Plan update. As a department of Havana, the Havana FD is covered as a participating jurisdiction under the City.

Neighboring Counties

A memo was sent to EMA/ESDA coordinators in the neighboring counties inviting them to participate in the mitigation planning process. The counties contacted included Cass, Fulton, Logan, Menard, Schuyler and Tazewell. **Appendix I** contains a copy of the invitation memo.

2.4 EXISTING CAPABILITIES

Each participating jurisdiction has a unique set of capabilities and resources available to accomplish hazard mitigation and reduce long-term vulnerabilities to hazard events. In order to identify these existing capabilities and resources, a Capability Assessment was conducted. The Capability Assessment helps determine the ability of the participating jurisdictions to implement the Mitigation Strategy and to identify potential opportunities for establishing or enhancing specific mitigation policies, program, or projects. It is important to try and establish which goals and actions are feasible based on an understanding of the organizational capacity of those entities tasked with their implementation. This assessment is designed to provide a general overview of the key capabilities in place for each participating jurisdiction along with their potential effect of loss reduction.

In order to catalog the existing capabilities of each participant, Capability Assessment Worksheets were distributed via email to each of the participating jurisdictions following the first Planning Committee meeting on April 22, 2021. The worksheets requested information on four primary types of capabilities: planning and regulatory, administrative, and technical, financial, and education and outreach. The following provides a brief description of each capability type.

Planning & Regulatory Capabilities: Planning and regulatory capabilities are based on the implementation of existing plans, policies, codes, ordinances, resolutions, local laws, and programs that prevent or reduce the impacts of hazards and guide and manage growth and development.

Administrative & Technical Capabilities: Administrative and technical capabilities are based on the available staff and personnel resources as well as their related skills and tools that can be used development and implement mitigation actions, policies, and programs.

Financial Capabilities: Financial capabilities include those resources a jurisdiction has access to or is eligible to use to implement mitigation actions, polices, and programs.

Education & Outreach Capabilities: Education and outreach capabilities includes programs and methods already in place that could be used to support implementation of mitigation actions and communicate hazard-related information.

Figures PP-3 through **PP-12** summarize the results of the Capability Assessment by participating jurisdiction type (i.e., municipalities, schools, fire projection districts and healthcare facilities). A capability level of “Limited”, “Moderate” or “High” was assigned by capability type to each participating jurisdiction based on the number of available capabilities and resources as well as the jurisdiction’s size/area served. **Figure PP-13** summarizes the individual capability levels by capability type and provides an overall capability ranking for each participant.

This assessment provides a consolidated inventory of existing plans, ordinances, programs, and resources in place. Whenever applicable, these existing capabilities were reviewed and incorporated into the Plan.

Highlights from the Capability Assessment include:

- Only Havana and Manito have comprehensive/land use plans in place.
- Havana, Manito, Mason City and San Jose have building codes.
- The County, Bath, Havana, Manito, Mason City and San Jose all have zoning ordinances in place.
- Only the County and Havana have continuity of operations plans in place.

Mason County, Havana, Mason City, Havana CUSD #126, Midwest Central CUSD #191, Havana Rural FPD, Mason City FPD and Mason District Hospital are fortunate to have the resources and abilities to potentially expand on and improve the existing policies and programs identified. A majority of the participating municipalities have limited resources and abilities to expand on and improve the existing policies and programs identified. The lack of legal authority and policies/programs currently in place, especially with regards to building codes and zoning ordinances, hamper these participants' abilities to expand and strengthen existing policies and programs.

This is due to a general resistance from many residents towards these types of regulations which has resulted in an unwillingness by local officials to implement such policies. Their fiscal and staffing situations are also extremely limited, bordering on inadequate in most cases. These local government officials are part-time and lack the technical expertise and funds to expand or implement new programs and policies.

Overcoming these limitations will require time and a range of actions including, but not limited to improved general awareness of natural hazards and the potential benefits that may come from the development of new standards in terms of hazard loss prevention and the identification of resources available to expand and improve existing policies and programs should the opportunity arise.

Figure PP-3
County / Municipalities – Planning & Regulatory Capabilities

Capability Type	County/Municipality							
	Mason County	Bath	Easton	Havana	Kilbourne	Manito	Mason City	San Jose
Plans, Policies, Codes & Ordinances								
Comprehensive/Master Land Use Plan				X		X		
Continuity of Operations Plan	X			X				
Stormwater Management Plan				X				
Transportation Plan								
Economic Development Plan				X				
Emergency Operations Plan	X			X		X		
Disaster Recovery Plan	X			X				
Threat & Hazard Identification Risk Assessment (THIRA) - County Only	X							
Infrastructure Maps		X	X	X		X	X	X
Building Codes				X		X	X	X
Floodplain Ordinance	X	X		X			X	
Stormwater Ordinance				X		X		
Zoning Ordinance	X	X		X		X	X	X
Subdivision Ordinance				X		X	X	X
Historic Preservation Ordinance						X		
Private Sewage Disposal System Ordinance - County Only	X							
Manufactured/Mobile Home Tie Down Ordinance	X			X			X	X
Steep Slope Ordinance								
Mined Areas/Developed Over Mined Areas Ordinance								
National Incident Management System (NIMS) Adoption				X			X	
National Flood Insurance Program (NFIP) Participation	X	X		X			X	X
Community Rating System (CRS) Participation				X				
Level of Capability	**M**	**L**	**L**	**H**	**L**	**M**	**M**	**L**

An "X" indicates that the item is currently in place and being implemented.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

Figure PP-4
County / Municipalities – Administrative & Technical Capabilities

Capability Type	County/Municipality							
	Mason County	Bath	Easton	Havana	Kilbourne	Manito	Mason City	San Jose
Adminstrative & Technical								
Zoning Board	X			X		X	X	X
Public Utility Board							X	X
Planning Commission				X				
Mutual Aid Agreements	X		X	X			X	X
Administrator/Manager	X							
Building Inspector/Officer				X			X	X
Community/Economic Development Planner				X				
Emergency Manager	X							
Engineer/Construction Project Manager				X			X	X
GIS Coordinator	X			X				
Grant Administrator/Writer							X	X
Fire Chief - Municipalities Only			X	X		X	X	X
Floodplain Administrator	X			X				
Police Chief - Municipalities Only			X	X	X	X	X	X
Public Works/Streets Director - Municipalities Only			X	X	X	X	X	X
Water Superintendent - Municipalities Only			X	X		X	X	X
Zoning Officer/Administrator	X		X	X		X	X	X
Solid Waste Director - County Only								
Level of Capability	**M**	**L**	**L**	**H**	**L**	**L**	**M**	**M**

An "X" indicates the presence of staff with specified knowledge or skills.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

Figure PP-5
County / Municipalities – Financial / Education & Outreach Capabilities

Capability Type	County/Municipality							
	Mason County	Bath	Easton	Havana	Kilbourne	Manito	Mason City	San Jose
Financial								
Roadway/Bridge Improvement Plan - County Only								
Capital Improvements Program				X			X	X
Tax Levies for Special Purposes			X		X	X	X	X
Motor Fuel Tax			X	X	X	X	X	X
General Obligation Bonds and/or Special Tax Bonds				X	X		X	X
Utility Fees (Stormwater, Sewer, Water, Gas or Electric Service)			X	X			X	X
Impact Fees - New Development								
Federal Funding Programs (Non-FEMA)				X		X	X	X
Level of Capability	**L**	**L**	**L**	**M**	**L**	**L**	**M**	**L**
Education & Outreach								
StormReady Certification	X			X				
Natural Disaster/Safety-Related School Programs	X			X				
Ongoing Public Education or Information Programs (Fire Safety, Household Preparedness, Responsible Water Use)	X			X			X	X
Seasonal Outreach	X			X				
Local Citizen Groups/Non-Profit Organizations (Emergency Preparedness, Access & Functional Needs Populations)	X			X				
Public-Private Partnership Initiatives Addressing Disaster-Related Issues				X				
Level of Capability	**H**	**L**	**L**	**H**	**L**	**L**	**L**	**L**

An "X" indicates a given resource is locally available for mitigation purposes.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

Figure PP-6
Schools – Planning & Regulatory / Administrative & Technical Capabilities

Capability Type	School District	
	Havana CUSD #126	Midwest Central CUSD #191
Plans & Policies		
Comprehensive/Master Facilities Plan		X
Continuity of Operations Plan	X	X
Strategic Plan		X
Emergency/Crisis Response Plan	X	X
National Incident Management System (NIMS) Adoption		X
Level of Capability	**L**	**H**
Adminstrative & Technical		
Board of Education	X	X
Mutual Aid Agreements	X	
Superintendent	X	X
Principal(s)	X	X
Chief Financial Officer/Finance Director	X	X
Food Services Supervisor		X
Grant Writer		
Health Care Supervisor	X	X
IT Director/Specialist		X
Maintenance Manager	X	X
Communications Director		
Operations Manager		
Safety & Security Director		X
Transportation Director	X	X
Level of Capability	**M**	**M**

An "X" indicates that the item is currently in place and being implemented or the presence of staff with specified knowledge or skills.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

Figure PP-7
Schools – Financial / Education & Outreach Capabilities

Capability Type	School District	
	Havana CUSD #126	Midwest Central CUSD #191
Financial		
Capital Improvements Program	X	X
Tax Levies for Special Purposes	X	X
General Obligation Bonds and/or Special Tax Bonds	X	X
Federal Funding Programs (Non-FEMA)	X	X
Level of Capability	**H**	**H**
Education & Outreach		
StormReady Certification		
Natural Disaster/Safety-Related School Programs	X	X
Ongoing Public Education or Information Programs (Fire Safety, Household Preparedness, Responsible Water Use)		X
Seasonal Outreach		X
Public-Private Partnership Initiatives Addressing Disaster-Related Issues		
Level of Capability	**L**	**M**

An "X" indicates a given resource is locally available for mitigation purposes.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

Figure PP-8
Fire Protection Districts/Fire Departments – Planning & Regulatory

Capability Type	**Fire Protection District**		
	Havana Rural FPD	Kilbourne FPD	Mason City FPD
Plans, Policies, Codes, Ordinances, Resolutions & Technical Documents			
Standard Operating Procedures/Guidelines for Structural Fire Fighting (NFPA 1700)	X	X	
Standard Operating Procedures for Operations at Technical Search & Rescue Incidents (NFPA 1670)			
Pre-Incident Planning (NFPA 1620)		X	X
Fire Prevention Codes			
Burn Ordinance			X
National Incident Management System (NIMS) Adoption	X	X	
Incident Command System (ICS) Adoption	X	X	
Building Inspections	X		
Tier II Reports	X	X	X
County Emergency Operations Plan	X	X	
Safety Data Sheets	X	X	X
Pipeline Maps	X		X
Hazardous Materials Facilities Maps	X	X	
Water Supply Systems Maps	X	X	X
Impassable Roads & Bridges Maps	X		X
Evacuation Zones Maps			
Community & Special Residential Areas Maps (i.e., manufactured home parks, subdivisions, recreational communities)	X		X
Level of Capability	M	L	L

An "X" indicates that the item is currently in place and being implemented.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

Figure PP-9
Fire Protection Districts/Fire Departments –
Administrative & Technical Capabilities

Capability Type	**Fire Protection District**		
	Havana Rural FPD	Kilbourne FPD	Mason City FPD
Adminstrative & Technical			
Board of Trustees	X	X	X
Board of Fire Commissioners			
Mutual Aid Box Alarm System (MABAS)	X	X	X
Mutual Aid Agreements	X	X	X
Hazardous Materials Response Team			
Water Rescue/Dive Team			
Technical Rescue Team			
Fire Chief	X	X	X
Deputy Fire Chief	X	X	X
Administrative Assistant			X
Financial/Business Manager			
Inspector			
Public Education Director/Officer			
Telecom Director			
Training Coordinator	X	X	X
Level of Capability	L	L	L

An "X" indicates the presence of staff with specified knowledge or skills.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

Figure PP-10
Fire Protection Districts/Fire Departments –
Financial / Education & Outreach Capabilities

Capability Type	**Fire Protection District**		
	Havana Rural FPD	Kilbourne FPD	Mason City FPD
Financial			
Capital Improvements Program			
Tax Levies for Special Purposes	X		X
General Obligation Bonds and/or Special Tax Bonds	X		X
Federal Funding Programs (Non-FEMA)	X		X
Level of Capability	**M**	**L**	**M**
Education & Outreach			
Natural Disaster/Safety-Related School Programs			
Ongoing Public Education or Information Programs (Fire Safety, Household Preparedness, Responsible Water Use)			
Seasonal Outreach			
Public-Private Partnership Initiatives Addressing Disaster-Related Issues			
Level of Capability	**L**	**L**	**L**

An "X" indicates a given resource is locally available for mitigation purposes.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

Figure PP-11
Healthcare Facilities – Planning & Regulatory / Administrative & Technical Capabilities

Capability Type	Healthcare
	Mason District Hospital
Plans, Policies, Codes, Ordinances & Resolutions	
Continuity of Operations Plan	
Strategic Plan	X
Facilities Plan	X
Emergency Preparedness Plan	X
Medical Disaster Preparedness & Response Plan	X
Community Health Needs Assessment (CHNA)	
Severe Weather Plan	X
National Incident Management System (NIMS) Adoption	X
Level of Capability	**M**
Administrative & Technical	
Board of Directors	X
Patient Advisory Board	
Mutual Aid Agreements	X
Chief Executive Officer	X
Chief Medical Officer	
Chief Financial Officer	X
Chief Development Officer	
Chief Nursing Officer	X
Communications Director	
EMS Director	X
ER Director	X
Grant Writer	
IT Director/GIS Specialist	X
Maintenance Manager	X
Rehab & Long-Term Care Director	X
Safety Officer	X
Level of Capability	**M**

An "X" indicates that the item is currently in place and being implemented or the presence of staff with specified knowledge or skills.

Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

Figure PP-12
Healthcare Facilities – Financial / Education & Outreach Capabilities

Capability Type	**Healthcare**
	Mason District Hospital
Financial	
Capital Improvements Program	X
Tax Levies for Special Purposes	
General Obligation Bonds and/or Special Tax Bonds	
Federal Funding Programs (Non-FEMA)	
Level of Capability	**L**
Education & Outreach	
StormReady Certification	
Natural Disaster/Safety-Related School Programs	
Ongoing Public Education or Information Programs (Fire Safety, Household Preparedness, Responsible Water Use)	
Seasonal Outreach	
Local Citizen Groups/Non-Profit Organizations (Emergency Preparedness, Access & Functional Needs Populations)	
Public-Private Partnership Initiatives Addressing Disaster-Related Issues	
Level of Capability	**L**

An "X" indicates a given resource is locally available for mitigation purposes.
Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

Figure PP-13
Capability Rankings by Participating Jurisdiction

	Mason County	Bath	Easton	Havana	Kilbourne	Manito	Mason City	San Jose	Havana CUSD #126	Midwest Central CUSD #191	Havana Rural FPD	Kilbourne FPD	Mason City FPD	Mason District Hospital
Planning & Regulatory	M	L	L	H	L	M	M	L	L	H	M	L	L	M
Administrative & Technical	M	L	L	H	L	L	M	M	M	M	L	L	L	M
Financial	L	L	L	M	L	L	M	L	H	H	M	L	M	L
Education & Outreach	H	L	L	H	L	L	L	L	L	M	L	L	L	L
Overall Capability	**L/M**	**L**	**L**	**M/H**	**L**	**L**	**M**	**L**	**M**	**M/H**	**L/M**	**L**	**L/M**	**L/M**

Level of Capacity: "L" = Limited; "M" = Moderate; "H" High

3.0 RISK ASSESSMENT

Risk assessment is the process of evaluating the vulnerability of people, buildings and infrastructure in order to estimate the potential loss of life, personal injury, economic injury and property damage resulting from natural hazards. This section summarizes the results of the risk assessment conducted on the natural hazards in Mason County. The information contained in this section was gathered by evaluating local, state and federal records from the last 20 to 70 years.

This risk assessment identifies the natural hazards deemed most important to the Planning Committee and includes a profile of each hazard that identifies past occurrences, the severity or extent of the events, and the likelihood of future occurrences. It also provides a vulnerability analysis which identifies the impacts to public health and property, evaluates the assets of the participating jurisdictions (i.e., residential buildings, critical facilities, and infrastructure) and estimates the potential impacts each natural hazard would have on the health and safety of the residents as well as buildings, critical facilities and infrastructure. Where applicable, the differences in vulnerability between participating jurisdictions are described.

The subsequent sections provide detailed information on each of the selected natural hazards. The sections are color coded and ordered by the frequency with which the natural hazard has previously occurred within the County. Each natural hazard section contains three subsections: hazard identification, hazard profile and hazard vulnerability.

Hazard Selection

One of the responsibilities of the Planning Committee was to review the natural hazards detailed in the original Plan and decide if additional hazards should be included in the Plan update. Over the course of the first two meetings, the Planning Committee members discussed their experiences with natural hazard events and reviewed information on various hazards. After discussing the information provided, the Planning Committee chose not to add any additional natural hazards (i.e., landslides, etc.) to this Plan update.

The following identifies the hazards included in the Plan update:

- severe storms (thunderstorms, hail, lighting & heavy rain)
- floods (riverine & flash)
- severe winter storms (snow & ice)
- excessive heat
- extreme cold
- tornadoes
- drought
- earthquakes
- levee failures
- dam failures

The Planning Committee chose not to include the following hazards in the Plan: land/mine subsidence and landslides. Karst refers to landforms underlain by limestone that has been dissolved, producing characteristic landscapes such as sinkholes. Mapping prepared by the Illinois State Geological Survey (ISGS) does not show the presence of karst geologic characteristics in Mason County. In Illinois mine subsidence general occurs in areas where coal mining has been conducted. ISGS's *Coal Mines and Underground Industrial Mines* map for Mason County shows that no underground or surface coal mining occurred in the County.

A review of the USGS Landslide Susceptibility Viewer indicates that a majority of the County has a low incidence of landslides. There is a narrow area along the Illinois River along the western boundary of the County that has a high susceptibility but low incidence to landslides. The Illinois State Geological Survey's *Landslide Inventory of Illinois* does not contain any instances of landslides in Mason County. Discussions with the Planning Committee did not reveal any recent occurrences of landslides. An online survey was prepared and distributed to the Planning Committee members following the 1st meeting to solicit feedback on whether to include landslides in the Plan update. Based on the feedback provided, the Committee did not feel landslides warranted inclusion.

Risk Priority Index

After reviewing the preliminary results of the risk assessment at the second meeting, Planning Committee members and the participating jurisdictions were asked to complete a Risk Priority Index (RPI) exercise for the hazards that have the potential to impact the County and participating jurisdictions. The RPI provides quantitative guidance for ranking the hazards and offers participants with another tool to determine which hazards present the highest risk and therefore which ones to focus on when formulating mitigation actions.

Each hazard was scored on three categories: 1) frequency, 2) impacts on life and health and 3) impacts on property and infrastructure. A scoring system was developed that assigned specific factors to point values ranging from 1 to 4 for each category. For those hazards that were not applicable to a particular jurisdiction, a value of "NA" was assigned to each category. The higher the point value, the greater the risk associated with that hazard. **Figure R-1**, located at the end of this section, identifies the factors and point values associated with each category. Participants were asked to score the selected hazards based on the perspective of the entity they represented on the Planning Committee.

The Consultant took the point values assigned to each category and averaged the remaining results and came up with an overall value for each category. The values for each category were then added together to calculate an RPI score for each hazard. A ranking was then assigned to each hazard based on the RPI score. **Figure R-2**, located at the end of this section, provides the hazard rankings for the County and participating jurisdictions. RPI scores were not generated for Bath or Manito.

Critical Facilities & Infrastructure

Critical facilities and infrastructure are structures, institutions and systems that are critical for life safety and economic viability and necessary for a community's response to and recovery from emergencies. The loss of function of any of these assets can intensify the severity of the impacts and speed of recovery associated a hazard event. Critical facilities and infrastructure may include, but are not limited to the following:

- ***Essential Facilities***: Facilities essential to the health and welfare of the whole population including hospitals and other medical facilities, police and fire stations, emergency operations centers, evacuation shelters and schools.

- ***Government Facilities***: Facilities associated with the continued operations of government services such as courthouses, city/village halls, township buildings and highway/maintenance centers.
- ***Infrastructure Systems***: Infrastructure associated with drinking water, wastewater, transportation (roads, railways, waterways), communication systems, electric power, natural gas and oil.
- ***Housing Facilities***: Facilities that serve populations that have access and function needs such as nursing homes, skilled and memory care facilities, residential group homes and day care centers.
- ***High Potential Loss Facilities***: Facilities that would have an impact or high loss associated with them if their functionality is compromised such as nuclear power plants, dams, levees, military installations and facilities housing industrial or hazardous materials.
- ***Gathering Places***: Facilities such as parks, libraries, community centers and churches.

As part of the planning process each participating jurisdiction completed a questionnaire identifying the critical facilities and infrastructure located within their jurisdiction, both publicly and privately-owned. **Figure R-3**, located at the end of this section, identifies the number of critical facilities and infrastructure located in each participating jurisdiction for select categories. Identifying these assets makes local leaders more aware of the critical facilities and infrastructure located within their jurisdictions and helps them make informed choices on how to better protect these key resources.

While considered a "local government entity" for planning purposes, Havana Community Unit School District (CUSD) #126, Midwest Central CUSD #191, Havana Rural Fire Protection District (FPD), Kilbourne Fire Department (FD), Mason City FPD and Mason District Hospital do not have an extensive inventory of assets in which to consider when conducting the risk assessment.

Since the assets of these local government entities are located within a participating municipality and are a subset of those municipalities' critical facilities , their risk is considered to be the same or similar to the risk experienced by the municipalities for those hazards that either impact the entire planning area or can occur at any location within the planning area (i.e., severe storms, severe winter storms, etc.). For those hazards where the risk to the CUSDs, FPDs and Hospital varies from the risk facing the municipalities, a separate narrative assessment will be provided under the appropriate hazard's vulnerability subsection.

Critical Facilities Vulnerability Survey

The participating jurisdictions were also asked to complete a Critical Facilities Vulnerability Survey at the second meeting to assist in the preparation of an overall summary of each jurisdiction's vulnerability to the studied hazards. The Survey asked participants to describe their jurisdiction's greatest vulnerability. This information is summarized under the appropriate hazard's vulnerability subsection.

Figure R-1
Risk Priority Index Scoring System

Category	Factors	Point Value
Hazard Frequency	An event is anticipated to occur within the next year. Based on previous history, at least one event is expected to occur in any given year.	4
	An event is likely to occur in the next 1 to 3 years. Based on previous history, an event has at least a 33% chance of occurring in any given year.	3
	An event is possible in the next 3 to 10 years. Based on previous history, an event has a 10% to 33% chance of occurring in any given year.	2
	An event is unlikely to occur within the next 10 years. These events occur infrequently and based on previous history have a less than 10% chance of occurring in any given year.	1
Impacts on Life & Health	Fatalities are expected to occur during the event.	4
	While fatalities are unlikely, injuries, some requiring hospitalization, may occur during the event.	3
	Minor injuries not requiring hospitalization may occur during the event.	2
	Injuries or fatalities are unlikely to occur during the event.	1
Impacts on Property & Infrastructure	- Substantial property damage is likely to occur including damage to infrastructure and critical facilities. AND/OR - Loss of access/operations at multiple infrastructure and critical facilities (i.e., road & school closures, loss of power to drinking water/wastewater treatment facilities, municipal buildings, etc.) is anticipated for an extended period of time (i.e., a day or more).	4
	- Property damage is expected to occur including superficial damage to infrastructure and critical facilities. AND/OR - Loss of access/operations at multiple infrastructure and critical facilities is anticipated for a period of time (i.e., a day or less).	3
	- Some minor property damage is anticipated (i.e., shingles & siding torn off homes, windows broken, etc.) but no damage to infrastructure or critical facilities is anticipated. AND/OR - Loss of access/operations to infrastructure and critical facilities is anticipated but only for a short period of time (i.e., up to a couple hours).	2
	Property damage is likely to be negligible and no loss of access/operations is anticipated at any infrastructure/critical facilities during the event.	1

Figure R-2
Risk Priority Index Hazard Rankings by Participating Jurisdiction

Hazard	**Hazard Ranking by Participating Jurisdiction**											
	Mason County	Easton	Havana	Kilbourne	Mason City	San Jose	Havana CUSD #126	Midwest Central CUSD #191	Havana Rural FPD	Kilbourne FD	Mason City FPD	Mason District Hospital
Dam Failures	11	---	5/6	---	---	---	---	11/12/13	4/5/6	---	---	12/13
Drought	10	11	11	10/11/12	10	10	9/10/11	8/9/10	7/8/9	10/11/12	2/3/4	11.0
Earthquakes	12	2/3	13	8/9	11	11	9/10/11	11/12/13	**1/2**	8/9	10/11/12	7/8/9
Excessive Heat	6	10	7/8/9	4/5/6/7	6/7	6/4/8/9	3/4/5/6	8/9/10	7/8/9	4/5/6/7	9	5/6
Extreme Cold	5	6/7/8/9	4	4/5/6/7	6/7	6/4/8/9	3/4/5/6	3/4	4/5/6	4/5/6/7	5/6/7/8	5/6
Floods	4	6/7/8/9	5/6	2/3	9	6/4/8/9	7/8	8/9/10	10/11	2/3	10/11/12	10.0
Hail	7/8	2/3	7/8/9	8/9	4/5	3/4	**1/2**	3/4	12/13	8/9	5/6/7/8	7/8/9
Heavy Rain	9	4/5	7/8/9	10/11/12	8	6/4/8/9	3/4/5/6	5/6/7	7/8/9	10/11/12	5/6/7/8	7/8/9
Levee Failures	13	---	12	2/3	---	---	---	11/12/13	10/11	2/3	10/11/12	12/13
Lightning	7/8	6/7/8/9	10	10/11/12	3	**1/2**	7/8	**1/2**	12/13	10/11/12	2/3/4	2/3/4
Thunderstorms w/ Damaging Winds	**1**	4/5	2	4/5/6/7	**1**	**1/2**	3/4/5/6	5/6/7	4/5/6	4/5/6/7	2/3/4	2/3/4
Tornadoes	3	**1**	**1**	**1**	2	3/4	**1/2**	5/6/7	3	**1**	**1**	**1**
Severe Winter Storms	2	6/7/8/9	3	4/5/6/7	4/5	5	9/10/11	**1/2**	**1/2**	4/5/6/7	5/6/7/8	2/3/4

Figure R-3
Critical Facilities & Infrastructure by Jurisdiction

Participating Jurisdiction	Critical Facilities				Critical Infrastructure						
	Government[1]	Emergency Protection[2]	Medical & Healthcare[3]	Schools	Drinking Water[4]	Wastewater Treatment[5]	Rail Lines	Bridges	Interstates US/State Routes & Key Roads	Power Plants	Comm. Systems
Mason County	3	13	2	---	---	---	2	4	7	1	2
Bath	2	2	---	---	---	1	---	---	6	---	---
Easton	1	3	---	---	2	3	---	---	6	---	---
Havana	3	2	4	4	2	3	---	2	4	---	---
Kilbourne	3	2	---	---	---	---	1	---	1	---	---
Manito	2	2	3	4	1	3	---	---	12	---	---
Mason City	4	3	2	5	2	2	---	---	11	---	---
San Jose	3	2	---	---	2	4	---	---	5	---	---
Havana CUSD #126	---	---	---	4	---	---	---	---	---	---	---
Midwest Central #191	---	---	---	4	---	---	---	---	---	---	---
Havana Rural FPD	---	1	---	---	---	---	---	---	---	---	---
Kilbourne FD	---	1	---	---	---	---	---	---	---	---	---
Mason City FPD	2	1	---	1	1	---	---	---	2	---	---
Mason District Hospital	---	---	4	---	---	---	---	---	---	---	---

[1] Government includes: courthouses, city/village halls, township buildings, highway/road maintenance centers, libraries, etc.
[2] Emergency Protection includes: sheriff's department, police, fire, ambulance, emergency operations centers, jail/correctional facilities, and evacuation shelters.
[3] Medical & Healthcare includes: public health departments, hospitals, urgent/prompt care and medical clinics, nursing homes, skilled nursing facilities, memory care facilities, residential group homes, etc.
[4] Drinking Water includes: drinking water treatment plants, drinking water wells and water storage towers/tanks.
[5] Wastewater Treatment includes: wastewater treatment plants and lift stations.
--- Indicates the jurisdiction does not own/maintain any critical facilities within that category.

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

HAZARD IDENTIFICATION

What is the definition of a severe storm?

The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) defines a "severe storm" as any thunderstorm that produces one or more of the following:

- 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 heavy rain that may lead to flash flooding, the NWS does not use lightning/either to define a severe storm. However, a discussion of both lightning and heavy rain is included in this section because both are capable of causing extensive damage. For the purposes of this report, tornadoes and flooding are categorized as separate hazards and are not discussed under severe storms.

What is a thunderstorm?

A thunderstorm is a rain shower accompanied by lightning and thunder. An average thunderstorm is approximately 15 miles in diameter, affecting a relatively small area when compared to winter storms or hurricanes, and lasts an average of 30 minutes. Thunderstorms can bring heavy rain, damaging winds, hail, lightning, and tornadoes.

There are four basic types of thunderstorms: single-cell, multi-cell, squall line, and supercell. The following provides a brief description of each.

Single-cell Thunderstorm

Single cell storms are small, weak storms that only last about ½ hour to an hour and are not usually considered severe. They are typically driven by heating on a summer afternoon. Occasionally a single cell storm will become severe, but only briefly. When this happens, it is called a pulse severe storm.

Multi-cell Thunderstorm

Multi-cell storms are the most common type of thunderstorms. A multi-cell storm is organized in clusters of at least two to four short-lived cells. Each cell usually lasts 30 to 60 minutes while the system as whole may persist for many hours. Multi-cell storms may produce hail, strong winds, brief tornadoes, and/or flooding.

Squall Line

A Squall line is a group of storms arranged in a line, often accompanied by "squalls" of high wind and heavy rain. The line of storms can be continuous or there can be gaps and breaks in the line. Squall lines tend to pass quickly and can be hundreds of miles long but are typically only 10 to 20 miles wide. A "bow echo" is a radar signature of a squall line that "bows out" as winds fall behind the line and circulation develops on either end.

Supercell Thunderstorm

Supercell storms are long-lived (greater than one hour) and highly organized storms that feed off a rising current of air (an updraft). The main characteristic that sets a supercell storm apart from other thunderstorm types is the presence of rotation in the updraft. The rotating updraft of a supercell (called a mesocyclone when visible on radar) helps a supercell storm produce extreme weather events. Supercell storms are potentially the most dangerous storm type and have been observed to generate the vast majority of large and violet tornadoes, as well as downburst winds and large hail.

Despite their size, all thunderstorms are dangerous and capable of threatening life and property. 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 defined as any wind produced by a thunderstorm that is not associated with rotation. There are several types of straight-line winds including downdrafts, downbursts, microbursts, gust fronts and derechos.

Damage from straight-line winds is more common than damage from tornadoes and accounts for most thunderstorm wind damage. Straight-line wind speeds can exceed 87 knots (100 mph), produce a damage pathway extending for hundreds of miles and can cause damage equivalent to a strong tornado.

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 SS-1** shows conversions from knots to miles per hour for various wind speeds.

Figure SS-1
Wind Speed Conversions

Knots (kts)	Miles Per Hour (mph)	Knots (kts)	Miles Per Hour (mph)
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?

Hail is precipitation in the form of spherical or irregular-shaped pellets of ice that occur within a thunderstorm when strong rising currents of air (updrafts) carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice.

Hailstones grow by colliding with supercooled water drops. The supercooled water drops freeze on contact with ice crystals, frozen rain drops, dust, etc. Thunderstorms with strong updrafts continue lifting the hailstones to the top of the cloud where they encounter more supercooled

water and continue to grow. Eventually the updraft can no longer support the weight of the hail, or the updraft weakens, and the hail falls to the ground.

In the United States, hail causes more than $1 billion in damages to property and crops annually. Hail has been known to cause injuries, although it rarely causes fatalities or serious injury.

How is the severity of a hail event measured?

The severity or magnitude 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 SS-2** provides descriptions for various hail sizes.

Figure SS-2
Hail Size Descriptions

Hail Diameter (inches)	Description	Hail Diameter (inches)	Description
0.25 in.	pea	1.75 in.	golf ball
0.50 in.	marble/mothball	2.50 in.	tennis ball
0.75 in.	penny	2.75 in.	baseball
0.88 in.	nickel	3.00 in.	teacup
1.00 in.	quarter	4.00 in.	grapefruit
1.50 in.	ping pong ball	4.50 in.	softball

Source: NOAA, National Severe Storm Laboratory.

Hail size can vary widely. Hailstones may be as small as 0.25 inches in diameter (pea-sized) or, under extreme circumstances, as large as 4.50 inches in diameter (softball-sized). Typically hail that is one (1) inch in diameter (quarter-sized) or larger is considered severe.

The severity of a hail event 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 SS-3** 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.

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.).

Figure SS-3 TORRO Hailstorm Intensity Scale					
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 / mothball	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 / teacup	severe damage to aircraft bodywork
H9	Super Hailstorms	75-100 mm	3.0” – 4.0”	teacup / 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.

What is lightning?

Lightning, a component of all thunderstorms, is a visible electrical discharge that results from the buildup of charged particles within storm clouds. 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 approximately 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 60 fatalities and 400 injuries annually in the United States. Most fatalities and injuries occur when people are caught outdoors in the summer months during the afternoons and evenings. In addition, lightning can cause structure and forest fires. Many of the wildfires in the western United States and Alaska are started by lightning. According to the NWS lightning strikes cost more than $1 billion in insured losses each year.

Are alerts issued for severe storms?

Yes. The NWS Weather Forecast Office in the Lincoln, Illinois is responsible for issuing ***severe thunderstorm watches*** and ***warnings*** for Mason County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Watch.** A severe thunderstorm watch is issued when severe thunderstorms are possible in or near the watch area. Individuals should stay alert for the latest weather information and be prepared to take shelter.
- **Warning.** A severe thunderstorm warning is issued when severe weather 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 and individuals should seek safe shelter.

HAZARD PROFILE

The following identifies past occurrences of severe storms; details the severity or extent of each event (if known); identifies the locations potentially affected; and estimates the likelihood of future occurrences.

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

Tables 1, 2, 3 and 4, located in **Appendix J,** summarize the previous occurrences as well as the extent or magnitude of severe storm events recorded in Mason County. Severe storm events are separated into four categories: thunderstorms with damaging winds, hail, lightning, and heavy rain. In Mason County, severe storms are the most frequently occurring natural hazard.

Severe Storms Fast Facts – Occurrences

Number of recorded Thunderstorms with Damaging Winds (1974 – 2021): ***128***

Number of recorded Severe Hail Events (1985 – 2021): ***27***

Number recorded of Lightning Strike Events (2006 – 2021): ***3***

Number of Heavy Rain Events (1974 – 2021): ***314***

Highest Recorded Wind Speed: ***70 knots (August 12, 1999)***

Largest Hail Recorded: ***2.75 inches (December 8, 1991 & August 18, 2001)***

Most Likely Month for Thunderstorms with Damaging Winds to Occur: ***June***

Most Likely Month for Severe Hail to Occur: ***May***

Most Likely Month for Heavy Rain to Occur: ***July***

Thunderstorms with Damaging Winds

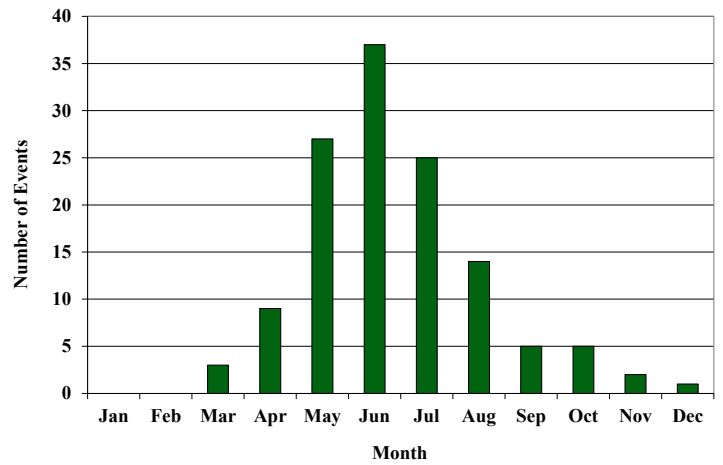
NOAA's Storm Events Database was used to document 128 reported occurrences of thunderstorms with damaging winds in Mason County between 1974 and 2021. Of the 128 occurrences, 109 had reported wind speeds of 50 knots or greater. There were 19 occurrences, however, where the wind speed was not recorded.

The highest wind speed recorded in Mason County occurred in Bath and Mason City on August 12, 1999 when winds reached 70 knots (81 mph) during a thunderstorm event. Thunderstorms with damaging winds have been *recorded* in every participating jurisdiction within the County on multiple occasions.

Figure SS-4 charts the reported occurrences of thunderstorms with damaging winds in Mason County by month. Of the 128 events, 89 (70%) took place in May, June and July making this the peak period for thunderstorms with damaging winds in Mason County. Of those 89 events, 37 (42%) occurred during June, making this the peak month for thunderstorms with damaging winds.

Of the 128 occurrences, 84% of all thunderstorms with damaging winds occurred during the p.m. hours.

Figure SS-4
Thunderstorms with Damaging Winds by Month
1974 – 2021



Hail

NOAA's Storm Events Database was used to document 27 reported occurrences of severe storms with hail one (1) inch in diameter or greater in Mason County between 1985 and 2021. Of the 27 occurrences, 20 produced hailstones 1.50 inches or larger in diameter.

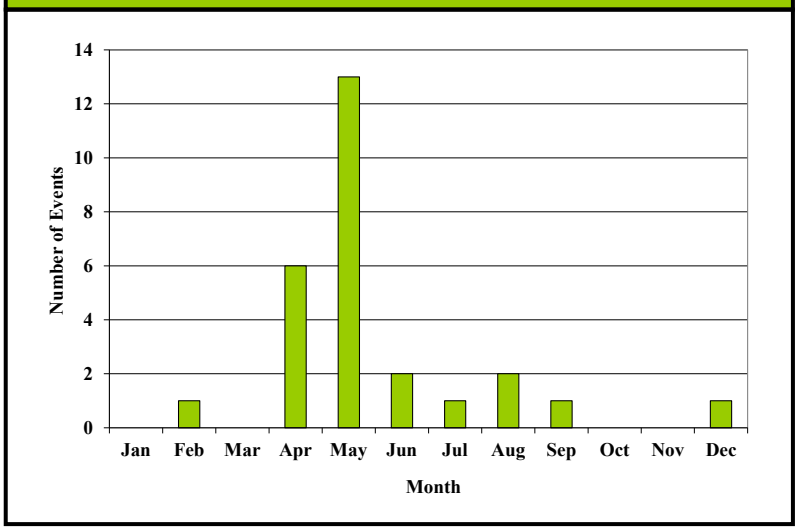
The largest hail stones documented in Mason County measured 2.75 inches in diameter (baseball-sized) and fell on December 8, 1991 in Manito and again on August 18, 2001 in Manito and San Jose. Hail one (1) inch in diameter or greater has been *recorded* in every participating jurisdiction on at least one occasion.

Figure SS-5 charts the reported occurrences of hail by month. Of the 27 occurrences, 19 (70%) took place in April and May making this the peak period for hail in Mason County. Of these 19 events, 13 (68%)occurred during May, making this the peak month for hail events. Approximately 89% of all the hail events occurred during the p.m. hours.

Lightning

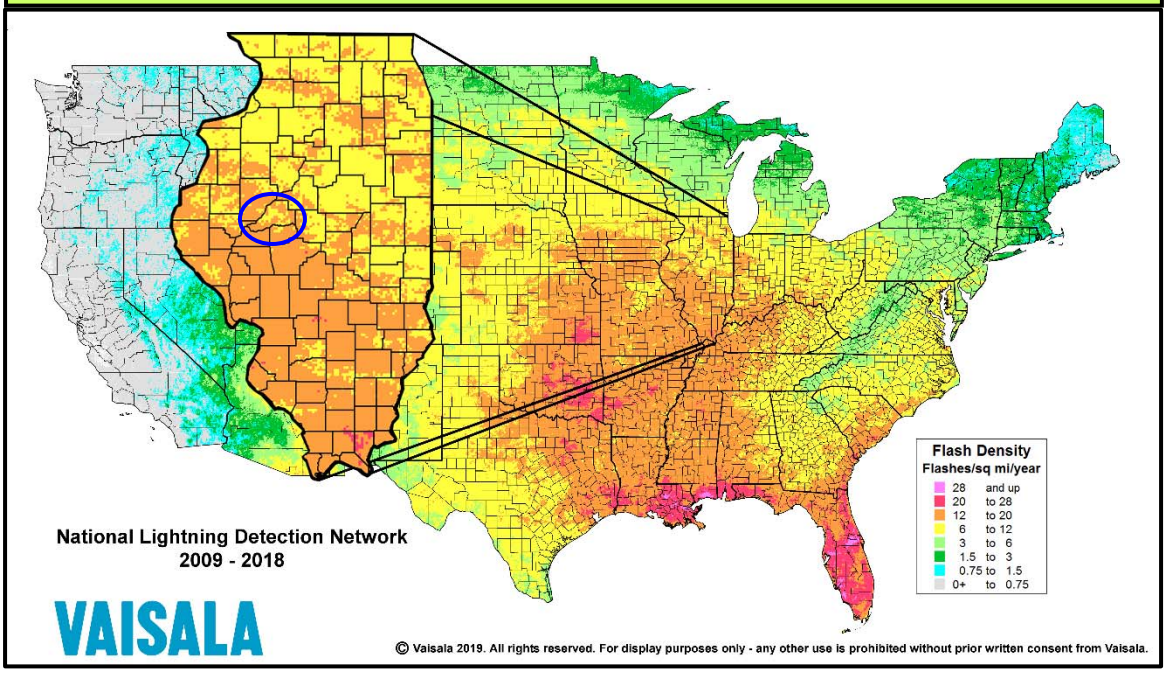
While lightning strike events occur regularly across west-central Illinois, NOAA's Storm Events Database only identified three recorded occurrences of lightning strikes in Mason County between 2006 and 2021. This is almost certainly due to the rural nature of the County. Two of the events took place during May while the remaining even took place in August. Two of the three events occurred during the p.m. hours.

Figure SS-5
Hail Events by Month
1985 – 2021



According to data from Vaisala's National Lightning Detection Network, Mason County averaged from 6 to 20 cloud-to-ground lightning flashes per square mile annually between 2009 and 2018. **Figure SS-6** illustrates the cloud-to-ground lightning flash density (number of cloud-to-ground flashes per square mile per year) by county for the continental U.S. In comparison, Illinois averaged 12.7 cloud-to-ground lightning flashes per square mile from 2009 to 2018, ranking it eighth in the Country for lightning flash density.

Figure SS-6
Cloud-to-Ground Lightning Flash Density: Continental United States

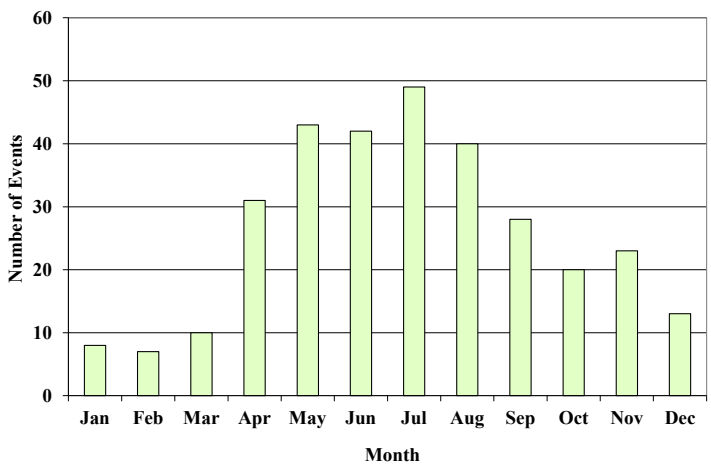


Heavy Rain

NOAA's Storm Events Database and National Weather Service's COOP data records were used to document 314 heavy rain events for Mason County between 1974 and 2021. Of the 314 occurrences, 45 events (14%) produced three inches or more of rain.

Figure SS-7 charts the reported occurrences of heavy rain by month. Of the 314 events, 174 (55%) took place in May, June, July, and August making this the peak period for heavy rain in Mason County. Of these 174 events, 49 (28%) occurred during July, making this the peak month for heavy rains. Of the events with recorded times, approximately 71% occurred during the a.m. hours.

Figure SS-7
Heavy Rain Events by Month
1974 - 2021



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 *2018 Illinois Natural Hazard Mitigation Plan* prepared by the Illinois Emergency Management Agency (IEMA) classifies Mason County's hazard rating for severe storms as "severe." (IEMA's overall hazard rating system has five levels: very low, low, medium, high, and severe.)

What is the probability of future severe storm events occurring?

Thunderstorms with Damaging Winds

Mason County has had 128 verified occurrences of thunderstorms with damaging winds between 1974 and 2021. With 128 occurrences over the past 48 years, Mason County should expect to experience at least two thunderstorms with damaging winds in any given year. There were 22 years over the last 48 years where multiple (three or more) thunderstorms with damaging winds occurred. This indicates that the probability that multiple thunderstorms with damaging winds may occur during any given year within the County is 46%.

Hail
There have been 27 verified occurrences of hail one (1) inch in diameter or greater between 1985 and 2021. With 27 occurrences over the past 37 years, the probability or likelihood that severe storm with hail will occur in the County in any given year is 73%. There were eight years over the last 37 years where two or more hail events occurred. This indicates that the probability that more than one severe storm with hail may occur during any given year within the County is 22%.

Heavy Rain
Mason County has had 314 reported occurrences of heavy rain between 1974 and 2021. With 314 occurrences over the past 48 years, the County should expect to experience at least six heavy rain events each year.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from severe storms.

Are the participating jurisdictions vulnerable to severe storms?

Yes. All of Mason 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 north-central Illinois. Since 2012, Mason County has recorded 38 thunderstorms with damaging winds, two severe storms with hail one (1) inch in diameter or greater, 57 verified heavy rain events and one verified lightning strike.

Figure SS-8 details the number thunderstorms with damaging winds and hail events that were recorded in or near each participating municipality while **Figure SS-9** details the number of thunderstorms with damaging winds and hail events that were recorded in or near unincorporated areas of Mason County. Of the three verified lightning strike events recorded, two occurred in Havana and one occurred in Bath.

Of the participating municipalities, Havana has had more recorded occurrences of thunderstorms with damaging winds and the greatest number of recorded hail events than any of the other municipalities. The difference in the number of recorded events may be due in part to the size of the municipalities as well as the fact that there was a long-term NWS COOP Observation Station is located in the Havana area.

Do any of the participating jurisdictions consider severe storms to be among their community's greatest vulnerabilities?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the following respondents considered severe storms to be among their jurisdiction's greatest vulnerabilities.

Figure SS-8
Verified Severe Storm Events by Participating Municipality

Participating Municipality	Number of Events	
	Thunderstorm & High Wind	Severe Hail
Bath[2]	7	3
Easton	12	2
Havana[1,2]	38	10
Kilbourne[2,5]	8	3
Manito[3]	24	5
Mason City[1,6]	21	3
San Jose	7	3

Figure SS-9
Verified Severe Storm Events in Unincorporated Mason County

Unincorporated Area	Number of Events	
	Thunderstorm & High Wind	Severe Hail
Biggs	5	0
Eckard[2,4]	4	0
Goofy Ridge[3]	2	0
Matanzas Beach[2,4]	1	0
Poplar City	8	0
Saidora[2]	0	2
Snicarte[2]	2	0
Teheran[6]	6	1
Sand Ridge State Park[3]	2	0

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

- *Mason County:* Lightning and high winds cause structural damage to communications towers critical to 911 communications as well as damage communications equipment. Loss of power due to downed electrical lines and/or poles caused by severe storms impacts services to critical facilities like the Courthouse and to residents. The Health Department does not have a backup generator so an extended power outage due to a severe storm could cause the loss of potentially thousands of dollars in vaccines. Severe storms can also cause damage to fields and crops. Heavy rain can cause flash flooding in low and flat areas interrupting transportation routes.
- *Easton*: Severe storms can down power lines that block access to the community, impeding emergency response efforts.
- *Havana*: If the communication tower is struck by lightning it would disrupt communications and impede emergency response services to residents.
- *Havana CUSD #126*: A severe storm could prevent or make it hazardous to transport students home following an event. Emergency backup generators are needed at District schools to ensure the heating system functions and meal preparation is available if an extended power outage occurs during a severe storm when students are present.
- *Havana Rural FPD*: severe storms and lightning could damage radio towers, impacting communications and impeding emergency response to residents.
- *Kilbourne FD*: Our radio tower could be damaged by severe storms or lightning which would impact communication and service to residents. The fire station relies on a private well for its water supply and there is no backup power supply if power is lost due to a severe storm. The station has been without power for a period of time before and had to haul water from the next town to fight fires. Lightning has also damaged the pump for the well and radio equipment.
- *Manito*: High winds and lightning associated with severe storms down trees which causes power outages, impacting service to residents. Lightning has struck the Village's warning siren previously.

- *Mason District Hospital*: Power outages resulting from severe storms can impact services provided to residents by our satellite clinic and ambulance base in Mason City. Without power these critical facilities cannot function. While the Hospital has a backup generator, it still loses critical equipment during an outage.
- *Midwest Central CUSD #191*: The schools lose communications when they lose power. The loss of power due to hazards such as severe storms in turn causes the schools to have to evacuate students. Without proper communication it is difficult to contact staff and parents. High winds associated with severe storms have knocked over a dugout, damaging the sports facility.
- *San Jose*: Severe storms and lightning strikes have the ability to disrupt operations at the drinking water treatment plant, wastewater treatment plant, sewage pump stations and elevated water tank impacting services to residents. The northwest pump station and the main pump station at the wastewater treatment plant cannot keep up with flow during heavy rain events.

What impacts resulted from the recorded severe storms?

Severe storms as a whole have caused an estimated $1.7 million in recorded property damages and $12.3 million in crop damages. The following provides a breakdown of impacts by category.

Thunderstorms with Damaging Winds

Data obtained from NOAA's Storm Events Database indicates that between 1974 and 2021, 50 of the 128 thunderstorms with damaging winds caused $1,546,050 in property damages and $12,310,000 in crop damages. Damage information was either unavailable or none was recorded for the remaining 78 reported occurrences. No injuries or fatalities were reported as a result of any of the thunderstorm with damaging wind events.

Hail

Damage information was either unavailable for none as recorded for any of the events between 1974 and 2021. No injuries or fatalities were reported as a result of any of the recorded hail events either.

Severe Storms Fast Facts – Impacts/Risk

Thunderstorms with Damaging Winds Impacts:
- Total Property Damage (50 events): ***$1,546,050***
- Total Crop Damage (2 events): ***$12,310,000***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Severe Hail Impacts:
- Total Property Damage: ***n/a***
- Total Crop Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Lightning Strike Impacts:
- Total Property Damage (3 events): ***$163,000***
- Total Crop Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Severe Storms Risk/Vulnerability:
- Public Health & Safety: ***Low***
- Buildings/Infrastructure/Critical Facilities: ***Medium to High***

Lightning

Data obtained from NOAA's Storm Events Database indicates that between 2006 and 2021 the three verified lightning strike events caused $163,000 in property damage. No injuries or fatalities were reported as a result of any of the recorded lightning events.

Heavy Rain

Damage information was either unavailable for none as recorded for any of the events between 1974 and 2021. No injuries or fatalities were reported as a result of any of the recorded heavy rain events either.

According to the Mason County Farm Bureau Manager, a total of $50.8 million in crop damages/losses resulted from heavy rains that fell during the planting and growing seasons of 2010 and 2011. The following provides a brief description of the damages for each year. These figures are not included in **Table 4** because they are not tied to a single event.

- Between April and August, 2010 approximately 24 to 30 inches of rain fell on an already high water table. This excessive rain led to an inability by many farmers to plant and destroyed crops that had already been planted. The damages and value of crops lost totaled $26.3 million.
- In 2011, approximately 15 inches of rain fell between April and June again leading to an inability by many farmers to plant and destroying crops that had already been planted. Approximately $24.5 million in damages and losses were sustained as a result of the heavy rains.

While damage information was unavailable, Planning Committee member records identified two separate events that led to property damage in Mason City. During the Fall of 1994 and Spring of 1999 heavy rains and poor drainage led to water infiltration in basements and sewer problems in the Hillcrest subdivision on the east end of the City. These events are not included in **Table 4** because they also are not tied to a single event.

What other impacts can result from severe storms?

In Mason County, the greatest risk to health and safety from severe storms is vehicle accidents. Hazardous driving conditions resulting from severe storms (i.e., wet pavement, poor visibility, high winds, etc.) can contribute to accidents that result in injuries and fatalities. Traffic accident data assembled by the Illinois Department of Transportation from 2014 through 2018 indicates that wet road surface conditions were present for 7.0% to 15.2% of all crashes recorded annually in the 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 SS-10** provides a breakdown by year of the number of crashes and corresponding injuries and fatalities that occurred when wet road surface conditions were present.

What is the level of risk/vulnerability to public health and safety from severe storms?

For Mason County the level of risk or vulnerability posed by severe storms to public health and safety is considered to be ***low***. This assessment is based on the fact that despite their relative frequency, the number of injuries and fatalities is low. In addition, there are also nearby hospitals in the Peoria area (Tazewell and Peoria Counties), Lincoln (Logan County) and Canton (Fulton County), which are equipped to provide care to persons injured during a severe storm.

Figure SS-10 Severe Weather Crash Data for Mason County				
Year	**Total # of Crashes**	**Presence of Wet Road Surface Conditions**		
		# of Crashes	**# of Injuries**	**# of Fatalities**
2014	200	22	7	0
2015	195	29	2	0
2016	200	14	4	0
2017	197	14	11	0
2018	164	25	8	0
Total:	**956**	**104**	**32**	**0**

Source: Illinois Department of Transportation.

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

Yes. All existing buildings, infrastructure and critical facilities located in Mason 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. Several of the participating jurisdictions acknowledged the need for emergency backup generators to allow continued operation of critical facilities such as municipal buildings, drinking and wastewater facilities including lift stations, heating/cooling centers and storm shelters.

According to the Critical Facilities Survey completed by the participants, Easton and Manito do not have backup at their drinking water facilities while Bath, Easton, Havana, and San Jose do not have backup generators at their wastewater facilities. Of the participating jurisdictions, only the County and San Jose have a backup generator at their administration buildings.

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 Mason 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 and No. 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 the three remaining participating municipalities do not.

In addition, infrastructure such as new communication and power lines will continue to be vulnerable to severe storms as long as they are located above ground. 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.

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

Unlike other natural hazards, such as tornadoes, there are no standard loss estimation models or methodologies for severe storms. With only 53 of the 462 recorded events listing property damage numbers for all categories of severe storms, there is no way to accurately estimate future potential dollar losses. However, according to the Mason County Supervisor of Assessments the total equalized assessed values of buildings in the planning area is $128,959,628. Since all of the structures in the planning area are vulnerable to damage, this total represents the countywide property exposure to severe storm events.

3.2 FLOODS

HAZARD IDENTIFICATION

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 or subsidence 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. On average, flooding causes more than $5 billion in damages 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 types of flooding occur in the County?

There are three main types of flooding that affect Mason County: general flooding and flash flooding. General flooding can be broken down into two categories: riverine flooding and shallow flooding. The following provides a brief description of each type.

General Flooding – Riverine Flooding

Riverine flooding occurs when the water in a river or stream gradually rises and overflows its banks. This type of flooding affects low lying areas near rivers, streams, lakes and reservoirs and generally occurs when:

- persistent storm systems enter the area and remain for extended periods of time,
- winter and spring rains combine with melting snow to fill river basins with more water than the river or stream can handle,
- ice jams create natural dams which block normal water flow, and
- torrential rains from tropical systems make landfall.

General Flooding – Shallow Flooding

Shallow flooding occurs in flat areas where there are no clearly defined channels (i.e., rivers and streams) and water cannot easily drain away. There two main types of shallow flooding: sheet flow and ponding. If the surface runoff cannot find a channel, it may flow out over a large area at a somewhat uniform depth in what's called sheet flow. In other cases, the runoff may collect in depressions and low-lying areas where it cannot drain out, creating a ponding effect. Ponding floodwaters do not move or flow away, they remain in the temporary ponds until the water can infiltrate the soil, evaporate or are pumped out.

Flash Floods

Flash flooding occurs when there is a rapid rise of water along a stream or low-lying area. This type of flooding generally occurs within six hours of a significant rain event and is usually produced when heavy localized precipitation falls over an area in a short amount of time. Considered the most dangerous type of flood event, flash floods happen quickly with little or no warning. Typically, 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. As a result, streams overflow their banks and low-lying (such as underpasses, basements etc.) areas can rapidly fill with water.

Flash floods are very strong and can tear out trees, destroy buildings and bridges and roll boulders the size of cars. Flash flood-producing rains can also weaken soil and trigger debris flows that damage homes, roads and property. A vehicle caught in swiftly moving water can be swept away in a matter of seconds. Twelve inches of water can float a car or small SUV and 18 inches of water can carry away large vehicles.

Groundwater Flooding

Groundwater flooding is an unusual phenomenon that occurs when subsurface water (i.e., the water table) emerges above the ground surface and can include the rising of groundwater into basements and other subsurface infrastructures (i.e., utilities, septic and sewer systems, etc.). This type of flooding occurs outside of a defined river or stream in low-lying or depressed areas when permeable strata become saturated and high groundwater levels are exacerbated by prolonged excessive rainfall and high river levels.

Groundwater flooding can form intermittent ponds and lakes in topographic depressions and seepages in sloping ground. If the capacity of the depressions or low-lying areas is insufficient to hold the amount of water surfacing, the water will spill over onto roads, and into ditches. This type of flooding is often lengthy in its duration.

Mason County has experienced severe groundwater flooding, especially in and around the Bath and Havana areas, on several occasions. The severity of the groundwater flooding experienced in Mason County is unique in Illinois.

What is a base flood?

A base flood refers to any flood having a 1% chance of occurring in any given year. It is also known as the 100-year flood or the one percent annual chance flood. The base flood is the national standard used by the National Flood Insurance Program (NFIP) and the State of Illinois for the purposes of requiring the purchase of flood insurance and regulating new development.

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 channelization 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.

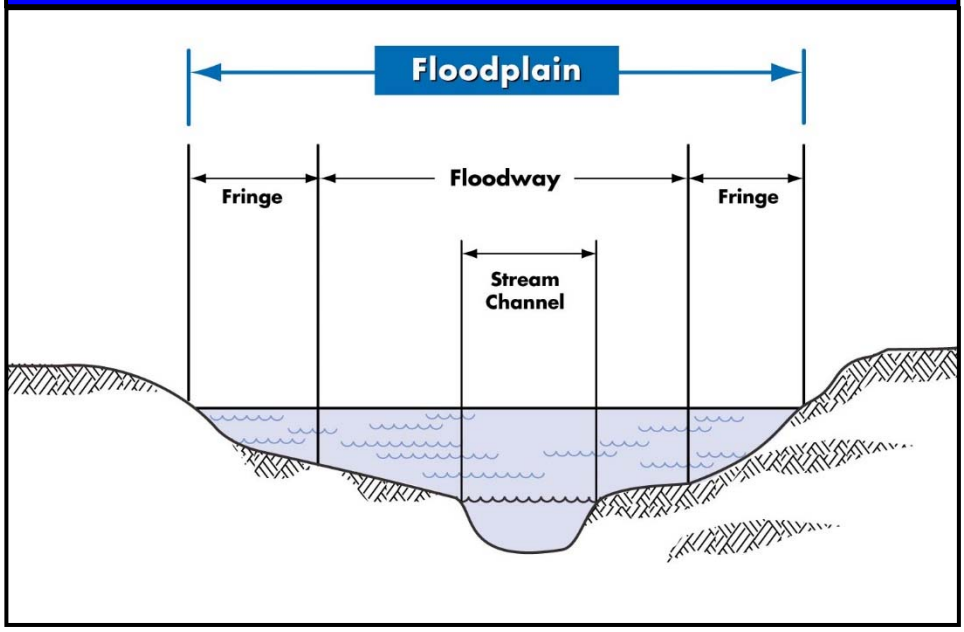
What is a floodplain?

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 or base floodplain is defined as the land area that is covered by the floodwaters of the base flood. This land area is subject to a 1% chance of flooding in any given year. The base floodplain is also known as the 100-year floodplain or a Special Flood Hazard Area (SFHA). It is this second definition that is generally most familiar to people and the one that is used by the NFIP and the State of Illinois.

A base floodplain is divided into two parts: the floodway and the flood fringe. **Figure F-1** illustrates the various components of a base floodplain.

Figure F-1
Floodplain Illustration



Source: Illinois Department of Natural Resources, Quick Guide to Floodplain Management.

The floodway is the channel of a river or stream and the adjacent floodplain 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 base flood downstream and is usually the area where water is deepest and is moving the fastest. 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 base floodplain, outside of the floodway, that is subject to shallow inundation and low velocity flows. 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 and the development is elevated above or otherwise protected to the base flood elevation.

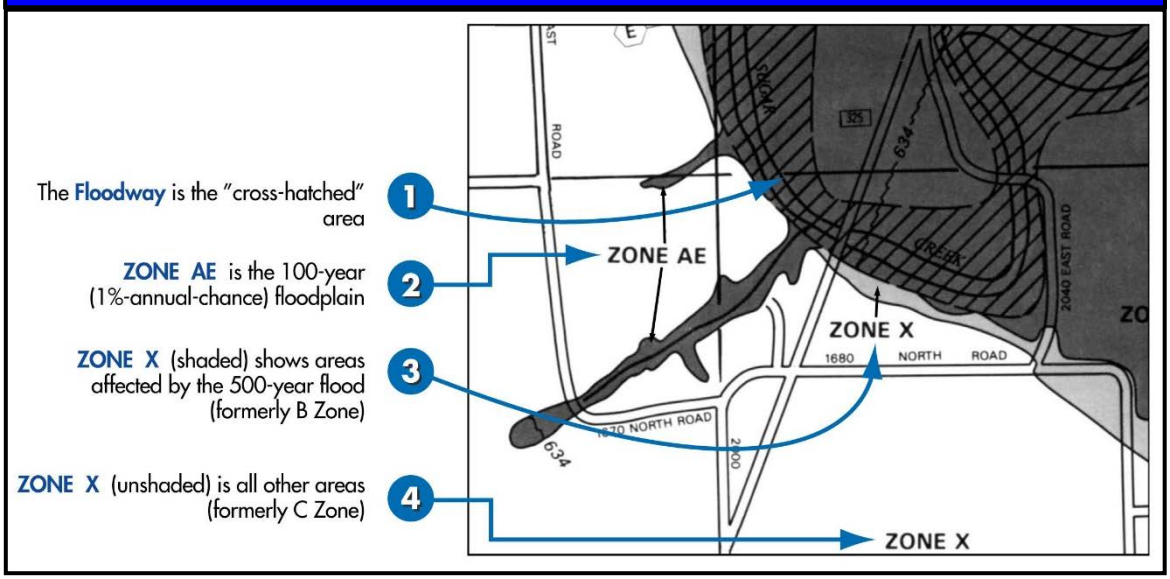
What is a Special Flood Hazard Area?

A Special Flood Hazard Area (SFHA) is the base floodplain. As discussed previously, this is the land area that is covered by the floodwaters of the base flood and has a 1% chance of flooding in any given year. The term SFHA is most commonly used when referring to the based floodplain on the Flood Insurance Rate Maps (FIRM) produced by FEMA. The SFHA is the area where floodplain regulations must be enforced by a community as a condition of participation in the NFIP and the area where mandatory flood insurance purchase requirements apply. SFHA are delineated on the FIRMs and may be designated as Zones A, AE, A1-30, AO, AH, AR, and A99 depending on the amount of flood data available, the severity of the flood hazard or the age of the flood map.

What are Flood Insurance Rate Maps?

Flood Insurance Rate Maps (FIRMs) are maps that identify both the SFHA and the risk premium zones applicable to a community. These maps are produced by FEMA in association with the NFIP for floodplain management and insurance purposes. Digital versions of these maps are referred to as DFIRMs. **Figure F-2** shows an example of a FIRM.

Figure F-2
Example of a Flood Insurance Rate Map (FIRM)



Source: Illinois Department of Natural Resources, Quick Guide to Floodplain Management.

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 the surface runoff.***

What are flood zones?

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk and type of flooding. These zones are depicted on a community's FIRM. The following provides a brief description of each flood zone.

- **Zone A.** Zone A, also known as the Special Flood Hazard Area (SFHA) or base floodplain, is defined as the floodplain area that has a 1% 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 considered high-risk flood areas.

  During a 30-year period, the length of many mortgages, there is at least a 1 in 4 chance that flooding will occur in a SFHA. The purchase of flood insurance is mandatory for all buildings in SFHAs receiving federal or federally-related financial assistance.

- **Zone X (shaded).** Zone X (shaded), formerly known as Zone B, is defined as the floodplain area between the limits of 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.

  Zone X (shaded) is also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, shallow flooding areas with average depths of less than one foot or drainage areas less than one square mile. While flood insurance is not federally required in Zone X (shaded), it is recommended for 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 to have a low or minimal risk of flooding. While flood insurance is not federally required in Zone X (unshaded), it is recommended for all property owners and renters.

What is a Repetitive Loss Structure or Property?

FEMA defines a "repetitive loss structure" as a National Flood Insurance Program-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/properties account for approximately one-fourth of all National Flood Insurance Program (NFIP) insurance claim payments since 1978.

Currently, repetitive loss properties make up about 2% of all NFIP policies, and account for approximately $9 billion in claims or approximately 16% of the total claims paid over the history of the Program. These structures not only increase the NFIP's annual losses, but they also drain funds needed to prepare for catastrophic events. As a result, FEMA and the NFIP are working with states and local governments to mitigate these properties.

What is floodplain management?

Floodplain management is the administration of an overall community program of corrective and preventative measures to reduce flood damage. These measures take a variety of forms and generally include zoning, subdivision or building requirements, special-purpose floodplain ordinances, flood control projects, education and planning. Where floodplain development is permitted, floodplain management provides a framework that minimizes the risk to life and property from floods by maintaining a floodplain's natural function. Floodplain management is a key component of the National Flood Insurance Program.

What is the National Flood Insurance Program?

The National Flood Insurance Program (NFIP) is a federal program, administered by FEMA, that:

- mitigates future flood losses nationwide through community-enforced building and zoning ordinances; and
- provides access to affordable, federally-backed insurance protection against losses from flooding to property owners in participating communities.

It is designed to provide an insurance alternative to disaster assistance to meet escalating costs of repairing damage to buildings and their contents due to flooding. The U.S. Congress established the NFIP 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. While flood-control projects were able to initially reduce losses, their gains were offset by unwise and uncontrolled development practices within floodplains. In light of the continued increase in 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 SFHA (base floodplain), then the government will make flood insurance available within the community as a financial protection against flood losses.

If a community chooses not to participate in the NFIP or a participating community decides not to adopt new floodplain management regulations or amend its existing regulations to reference new flood hazard data provided by FEMA, then the following sanctions will apply.

- Property owners will not be able to purchase NFIP flood insurance policies and existing policies will not be renewed.

- Federal disaster assistance will not be provided to repair or reconstruct insurable buildings located in identified flood hazard areas for presidentially-declared disasters that occur as a result of flooding.
- Federal mortgage insurance and loan guarantees, such as those written by the Federal Housing Administration and the Department of Veteran Affairs, will not be provided for acquisition or construction purposes within an identified flood hazard area. Federally-insured or regulated lending institutions, such as banks and credit unions, are allowed to make conventional loans for insurable buildings in identified flood hazard areas of non-participating communities. However, the lender must notify applicants that the property is in an identified flood hazard area and that it is not eligible for federal disaster assistance.
- Federal grants or loans for development will not be available in identified flood hazard areas under programs administered by federal agencies such as the Environmental Protection Agency, Small Business Administration and the Department of Housing and Urban Development.

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 to develop extra measures to provide protection from flooding. CRS discounts on flood insurance premiums range from 5% up to 45%. The discounts provide an incentive for communities to implement new flood protection activities that can help save lives and property when a flood occurs.

Are alerts issued for flooding?

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

- **Flood Watches.** A flood watch is issued when flooding or flash flooding is possible. It does not mean that flooding will occur, just that conditions are favorable. Individuals need to be prepared.
- **Flood Advisories.** A flood advisory is issued when flooding may cause significant inconvenience but is not expected to be to pose an immediate threat to life and/or property. Individuals need to be aware.
- **Warnings.** Warnings indicate a serious threat to life and/or property.
  - **Flood Warning**. A flood warning is issued when flooding is occurring or will occur soon and is expected to last for several days or weeks.
  - **Flash Flood Warning.** A flash flood warning is issued when flash flooding is occurring or is imminent. Flash flooding occurs very quickly so individuals are advised to take action immediately.

HAZARD PROFILE

The following identifies past occurrences of floods; details the severity or extent of each event (if known); identifies the locations potentially affected; and estimates the likelihood of future occurrences.

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

Tables 5 and **6**, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of flood events recorded in Mason County. The flood events are separated into two categories: general floods (riverine and shallow/overland) and flash floods.

Flood Fast Facts – Occurrences

Number of General Floods Reported (1973 – 2021): ***121***

Number of Flash Floods Reported (1995 – 2021): ***18***

Most Likely Month for General Floods to Occur: ***February***

Most Likely Month for Flash Floods to Occur: ***June***

Number of Federal Disaster Declarations Related to General and Flash Flooding: ***10***

General Floods

NOAA's Storm Events Database, NOAA's Storm Data Publications, NWS's Advanced Hydrologic Prediction Service, and the U.S. Army Corps of Engineers' river gauge data records have documented 121 occurrences of general and ground water flooding in Mason County between 1973 and 2021. Included in the 121 general flood events are 12 events that contributed to 10 separate federally-declared disasters for Mason County.

Based on historical gauge data, the record setting Illinois River flood in this area occurred on April 25, 2013 when the Illinois River crested at 27.78 feet near Havana. The second and third highest crest at this location occurred in 2015 and 1943 respectively.

Flash Floods

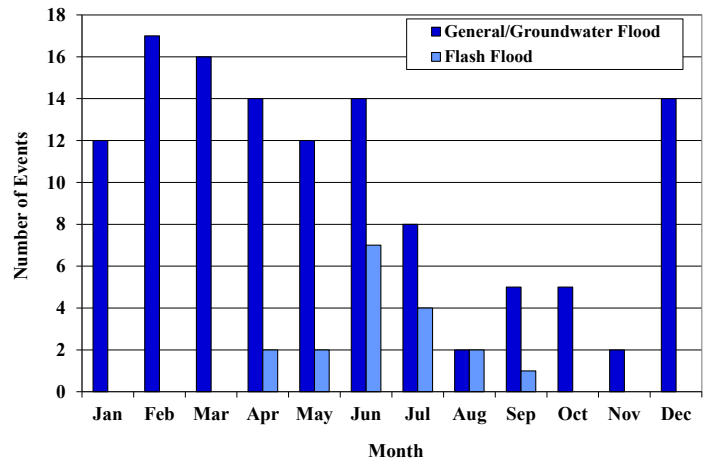
NOAA's Storm Events Database records documented 18 reported occurrences of flash flooding in Mason County between 1995 and 2021.

Figure F-3 charts the reported occurrences of flooding by month. Of the 121 general and groundwater flood events, 47 (39%) began in began in February, March, and April making this the peak period for general flooding. Of those 47 events, 17 (36%) began during February making this the peak month for general flooding. A majority of the events spanned two or more months; however, for illustration purposes only the month the event started in is graphed.

In comparison, 11 of the 18 flash flood events (61%) took place between June and July making this the peak period for flash floods. Of the 11 events, seven (64%) occurred in June making this the peak month for flash flooding.

Approximately 72% of the 18 flash flood events began during the p.m. hours, with 10 of the events (56%) taking place between 6 p.m. and 9 p.m. Start time information was unavailable for any of the general and groundwater flood events.

Figure F-3
Flood Events by Month



What locations are affected by floods?

While specific locations are affected by general and groundwater flooding, most areas of the County can be impacted by overland and flash flooding because of the topography and seasonally high water table of the area. In Mason County approximately 15.7% of the area in County is designated as being within the base floodplain and susceptible to riverine floods. The *2018 Illinois Natural Hazard Mitigation Plan* classifies Mason County's hazard rating for floods as "medium."

Figure F-4 identifies the floodplains in Mason County as well as the participating jurisdictions. This map is based on the Mason County DFIRMs that became effective January 6, 2012 and June 6, 2018. While a large portion of the area prone to riverine flooding is in unincorporated portions of the County, Bath, Havana and Manito are also susceptible to riverine flooding because of their proximity to floodplains. **Appendix K** contains maps identifying the floodplains located in the participating municipalities.

It should be noted that the floodplain delineations east of Illinois Route 78 in Bath resulted from studies conducted by the Illinois State Geological Survey and the Illinois State Water Survey following the 1993 flood. This floodplain identifies areas in and around Bath that are susceptible to groundwater flooding and basement inundation and are not part of the Illinois River floodplain.

Figure F-5 identifies the bodies of water within or immediately adjacent to participating jurisdictions that are known to cause flooding or have the potential to flood. Water bodies with Special Flood Hazard Areas located within a participating jurisdiction (as identified on the DFIRMs) are identified in bold.

Municipal, Township and County officials have reported overland flood issues outside of the base floodplain in most of the participating municipalities and many unincorporated portions of the County. This overland flooding is known to impair travel.

Figure F-4
Floodplain Areas in Mason County

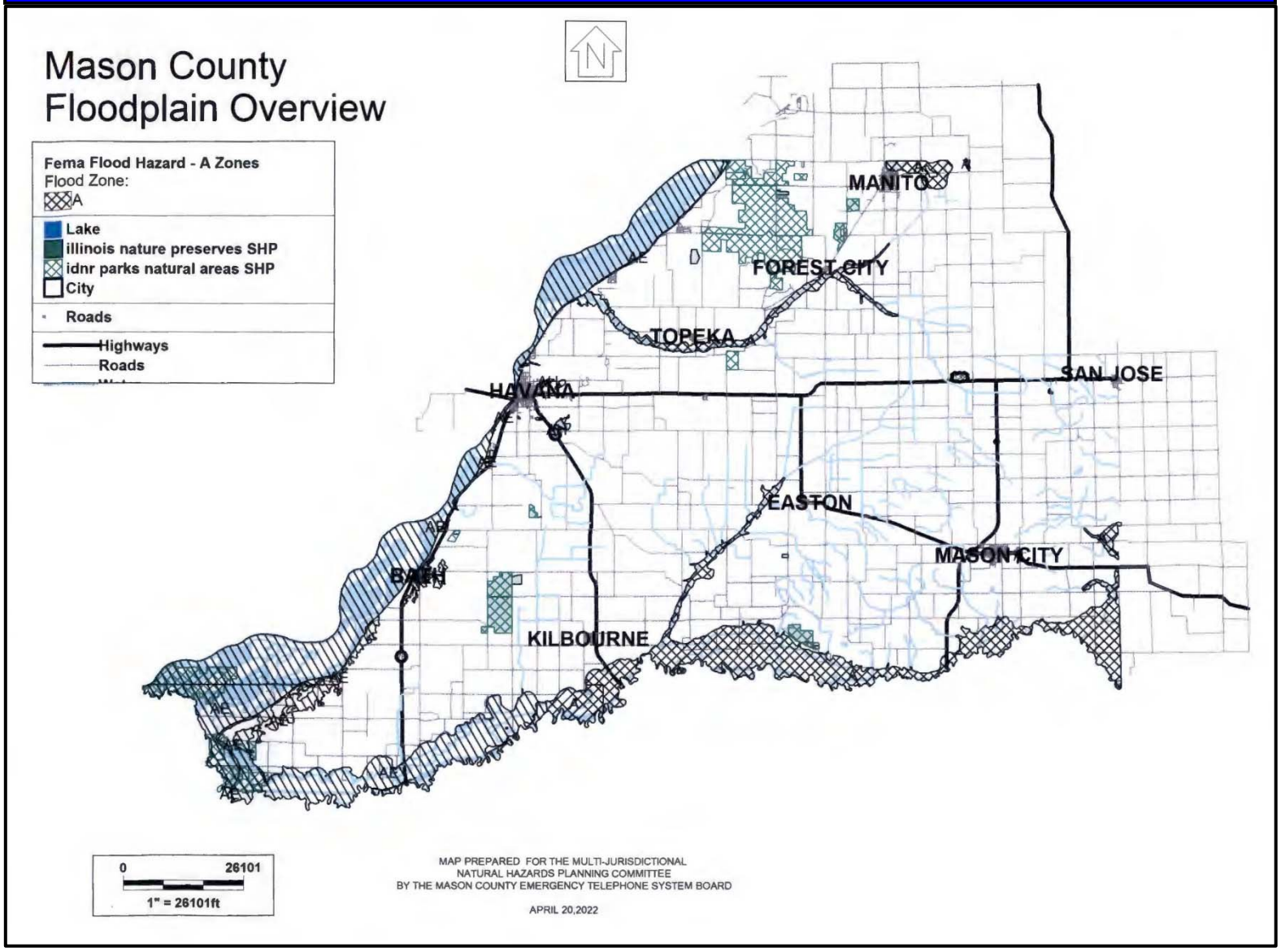


Figure F-5 Bodies of Water Subject to Flooding	
Participating Jurisdiction	**Water Bodies**
Bath	**East Branch Illinois River**
Easton	---
Havana	**Illinois River**, unnamed tributary
Kilbourne	---
Manito	**unnamed tributary**
Mason City	---
San Jose	---
Unincorporated Mason County	Allens Grove Ditch, Anderson Slough, Angela Lake, **Back Lake**, **Bath Lake**, **Beans Lake**, **Bell Lake**, Beris Lake, Biggs Ditch, Blue Hole, Bowles Lake, Breedlove Ditch, Central Ditch, **Chain Lake**, **Chautauqua Lake**, **Clear Lake**, County Creek, **Cow Lake**, **Curtis Lake**, **Crane Creek**, **Crane Lake**, Dieker Lake, **East Branch Illinois River**, Fairview Ditch, **Finch Lake**, Fish Creek, Fish Lake, Furrer Ditch, **Goose Lake**, **Grass Lake**, Hall Ditch, Hardin Ditch, **Herget Drainage Ditch**, **Hickory Slough**, Hurd Lake Ditch, **Illinois River**, **Ingram Lake**, **Jack Lake**, **Johnson Slough**, Jordan Creek, Lily Lake, **Liverpool Lake**, Main Ditch, **Mason Tazewell Ditch**, **Matanzas Lake**, Matthew Bay, McFadden Ditch, McHenry Slough, **Moscow Lake**, **Mound Lake**, **Mud Lake**, Mud Slough, Negro Lake, Newton Ditch, North Quiver Ditch, Norton Lake, Otter Lake, **Patterson Bay**, **Perry Slough**, **Picket Lake**, Prairie Creek, Pratt Lake, **Quiver Creek**, **Quiver Lake**, Red Oak Ditch, **Revis Lake**, **Salt Creek**, Samuels Ditch, **Sangamon Lake**, **Sangamon River**, **Sliver Moon Lake**, Sleepy Hollow Ditch, Smith Lake, **Snicarte Slough**, **Spring Lake**, **Stafford Lake**, **Stewart Lake**, **Sugar Creek**, **Swan Lake**, Tomlin Ditch, Waldmeier Ditch, **White Oak Creek**, **Wilcox Lake**, **Wolf Lake**

Source: FEMA DFIRMs.

What jurisdictions within the County take part in the NFIP?

Participating Jurisdictions

Mason County, Bath, Havana and Mason City all participate in the NFIP. **Figure F-6** ***provides information on each NFIP-participating jurisdiction,*** including the date each participant joined, the date of their current effective FIRM and the year of their most recently adopted floodplain zoning ordinance. Easton, Kilbourne and San Jose have no identified flood hazard boundaries within their corporate limits and do not wish to participate in the NFIP at this time.

Figure F-6 NFIP Participating Jurisdictions				
Participating Jurisdictions	**Participation Date**	**Current Effective FIRM Date**	**CRS Participation**	**Most Recently Adopted Floodplain Zoning Ordinance**
Mason County	02/01/1984	06/06/2018	No	2016
Bath	01/05/1984	01/06/2012	No	2012
Havana	07/23/1981	01/06/2012	No	2012
Mason City	07/18/1985	01/06/2012	No	2012

Sources: FEMA, Community Status Book Report: Illinois.

While the current effective DFIRM for Manito (dated January 6, 2012) does identify a small SFHA within its limits, the Village chose not to adopt floodplain regulations and participate in the NFIP. As a result, the Village is listed as a community not in the NFIP with a sanction date of January 6, 2013 in FEMA's Community Status Book Report for Illinois. The current village administration is weighing the pros and cons of becoming an NFIP participant.

Non-Participating Jurisdictions

Figure F-7 provides information on those incorporated municipalities within the County that chose not to participate in the planning process but also take part in the NFIP. While the current effective DFIRM for Topeka (dated January 6, 2012) does identify a small SFHA within its limits, the Village chose not to adopt floodplain regulations and participate in the NFIP. As a result, the Village is listed as a community not in the NFIP with a sanction date of March 21, 1976 in FEMA's Community Status Book Report for Illinois. The current Village administration does not see the need to participate since the area within the SFHA does not include any residence.

Figure F-7
Non-Participating Jurisdiction NFIP Status

Participating Jurisdictions	Participation Date	Current Effective FIRM Date	CRS Participation	Most Recently Adopted Floodplain Zoning Ordinance
Forest City	02/07/2013	01/06/2012	No	2012

Sources: FEMA, Community Status Book.
FEMA, National Flood Insurance Program Flood Insurance Manual.

Jurisdictions that participate in the NFIP are expected to adopt and enforce floodplain management regulations. In Mason County, all the NFIP participating jurisdictions have adopted the State of Illinois model floodplain ordinance. This ordinance goes above and beyond NFIP minimum standards and has much more restrictive floodway regulations. As a result, all of the NFIP participating jurisdictions are in compliance with NFIP requirements.

The Havana Nature Center flooded when the Illinois River overflowed its banks in April, 2013.

Photograph courtesy of Greg Griffin, Mason County ESDA Director

Participating jurisdictions will continue to comply with the NFIP by implementing mitigation projects and activities that enforce this ordinance to reduce future flood risks to new construction within the SFHA. At this time no new construction is planned within the base floodplain. Continued compliance with NFIP requirements is addressed in the Mitigation Action Tables of the participating jurisdictions found in Section 4.7.

What is the probability of future flood events occurring?

General Floods

Mason County has had 121 verified occurrences of general and groundwater flooding between 1973 and 2021. With 121 occurrences over the past 49 years, the County should expect to

experience at least two general flood events in any given year. There was 39 years over the past 49 years where two or more general flood events occurred. This indicates that the probability or likelihood that more than one general flood event may occur during any given year within the County is 80%.

Flash Floods

There have been 18 verified flash flood events between 1995 and 2021. With 18 occurrences over the past 27 years, the probability or likelihood of a flash flood event occurring in Mason County in any given year is 67%. There were four years over the past 27 years where two or more flash flood events occurred. This indicates that the probability that more than one flash flood event may occur during any given year within the County is approximately 15%.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure and critical facilities from floods.

Several factors including topography, precipitation and an abundance of rivers and streams make Illinois especially vulnerable to flooding. According to the Illinois State Water Survey's Climate Atlas of Illinois, since the 1940s Illinois climate records have shown an increase in heavy precipitation which has led to increased flood peaks on Illinois rivers.

Are the participating jurisdictions vulnerable to flooding?

Yes. Mason County and the participating jurisdictions are vulnerable to the dangers presented by flooding. Precipitation levels, a high water table, porous soils, and topography that includes the Illinois River, Sangamon River and their associated watersheds are all factors that cumulatively make virtually the entire County susceptible to some form of flooding. Flooding occurs along the floodplains of all the rivers, streams, and creeks within the County as well as outside of the floodplains in low-lying areas where the water table is unusually high and drainage problems occur. In the Havana and Bath areas, groundwater levels occasionally rise above the ground surface to create surface water flooding. Since 2012, Mason County has experienced 28 general flood events and seven flash flood events.

Floodwaters cover IL Rte. 97 at the railroad tracks southeast of Havana during the 1993 flood.

Photograph courtesy of Greg Griffin, Mason County ESDA Director

Figure F-8 details the number of *recorded* flash flood events by participating jurisdiction. All of the general and groundwater flood events either impacted the entire County or a large portion of it and were not location specific.

Figure F-8
Verified Flash Flood Events by Participating Jurisdiction

Participating Jurisdiction	Number	Year
Bath[2]	5	1995, 2002, 2010, 2011, 2017
Easton	4	1995, 2002, 2011, 2017
Havana[1,2]	8	1995, 2002, 2006, 2010, 2011, 2015, 2017, 2020
Kilbourne[2,5]	5	1995, 2002, 2010, 2011, 2017
Manito[3]	9	1995, 2002, 2002, 2003, 2011, 2015, 2015, 2015, 2017
Mason City[1,6]	7	1995, 2002, 2004, 2011, 2015, 2016, 2017
San Jose	6	1995, 2002, 2011, 2015, 2016, 2017
Matanzas Beach[2]	4	1995, 2002, 2010, 2017
Patterson Bay[2]	4	1995, 2002, 2010, 2017
Snicarte[2]	5	1995, 2002, 2010, 2010, 2017
countywide	3	1995, 2002, 2017
central portion of county[2,4,6]	1	2011
southern portion of county[2,5,6]	3	2010, 2010, 2011
southeastern portion of county[6]	1	2015
northern portion of county[3]	3	2011, 2015, 2015
northwestern portion of county[3,4]	1	2015
eastern portion of county[3,6]	2	2015, 2016

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

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 Land Use and Development Trends, 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.

Do any of the participating jurisdictions consider flooding to be among their community's greatest vulnerabilities?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the following respondents considered flooding to be among their jurisdiction's greatest vulnerabilities.

- *Mason County*: Drainage ditches, creeks and streams exceed their capacity during flood events and cause structural damage to bridges and roadways. Flooding also causes roadways to become impassable impacting services provided by first responders. Flood waters can contaminate water wells, overflow septic systems and impact crops.
- *Easton:* The wastewater lift station is prone to flooding.

- *Havana*: Flooding along the Illinois River has the potential to flood the west side of the Illinois River bridge, making it unusable.

What impacts resulted from the recorded floods?

Floods as a whole have caused a *minimum* of $7 million in property damages. The following provides a breakdown by category. In comparison, the State of Illinois has averaged an estimated $257 million annually in property damage losses, making flooding the single most financially damaging natural hazard in Illinois. Located throughout this section and in **Appendix L** are select photographs provided by the Mason County ESDA Director showing the extent of flooding experienced within the County.

General Floods

Data obtained from NOAA's Storm Events Database, IEMA's Public Assistance and Planning Committee member records indicates that between 1973 and 2021, three of the 121 general and groundwater flood events caused $7,052,879 million in property damages. Damage information was either unavailable or none was recorded for the remaining 118 reported occurrences.

Flood Fast Facts – Impacts/Risk

General Flood Impacts:
- Total Property Damage(3 event): ***$7,052,879***
- Total Crop Damage: ***n/a***
- Injuries: (1 event): ***20***
- Fatalities (1 event): ***1***

Flash Flood Impacts:
- Total Property Damage: ***n/a***
- Total Crop Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

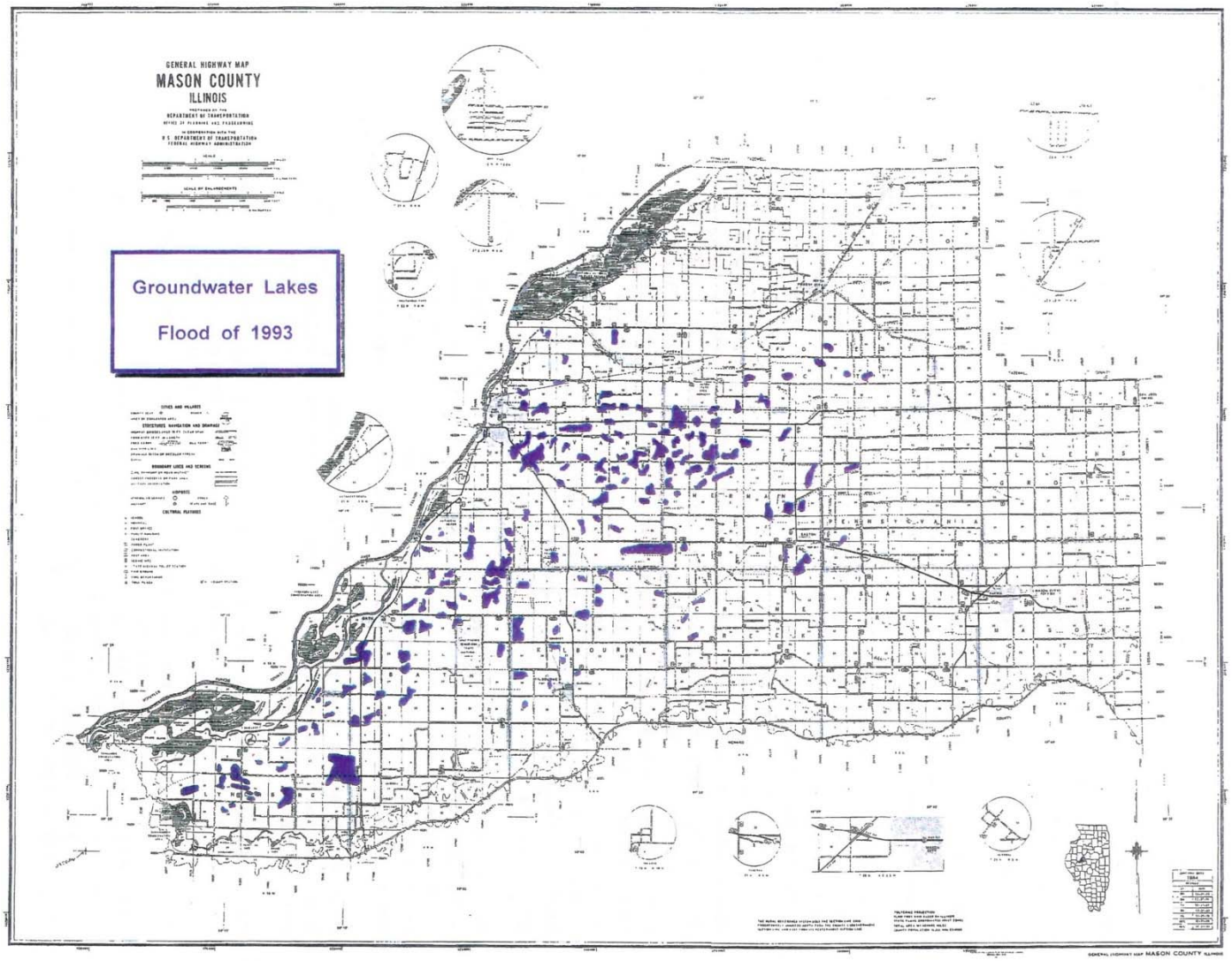
Flood Risk/Vulnerability to:
- Public Health & Safety – General Flooding: ***Low***
- Public Health & Safety – Flash Flooding: ***Medium***
- Buildings/Infrastructure/Critical Facilities: ***Medium/High***

Almost all of the property damages were the result of the 1993 and 2013 floods. A brief description of the impacts that resulted from each event area provided below.

- Nearly continuous rises in the water table beginning in the summer of 1992 culminated in serious groundwater flooding in and around Havana and Bath in September 1993. While specific damage estimates were unavailable, Planning Committee member records indicate that several million in damages was sustained in both Havana and Bath. The following provides a brief description of the infrastructure and critical facilities damaged.
  - Many portions of IL Routes 78, 79 and US Route 136 were covered by as much as three feet of water, forcing their closure.
  - The County Health Department in Havana flooded along with the southwestern third of the City.
  - In Bath, streets were covered with 1.5 feet of water and the Village's drinking water well was contaminated by flood waters. In addition, the Village lost electricity, telephone service as well as water and sewer. As a result of this event, $2 million was spent to build a new wastewater treatment facility.

    Appendix M contains news articles that document the flood and its aftermath while **Appendix L** contains photographs that show the extent of the flooding experienced. The flooding also led to the appearance of multiple groundwater lakes across the western portion of the County. **Figure F-9** illustrates the location of these lakes.

Figure F-9
Location of Groundwater Lake Occurrences during 1993 Flood



- Heavy rain combined with saturated soils led to flooding along the Illinois River during April and May, 2013 and resulted in an estimated $5 million in damages. Hundreds of cabins and sheds in wildlife areas along the Illinois River were severely damaged; 25 homes and several other structures were damaged in Bath, Snicarte, Havana and Goofy Ridge and nearly 15 miles of roads were washed out. The Illinois River crested at 27.78 feet on April 25, 2013 at the river gage in Havana and broke the 70 year-old flood of record set on May 26, 1943 at 27.1 feet.

This groundwater lake emerged along IL Rte. 78 south of Bath during the 1993 flooding.

Photograph courtesy of Greg Griffin, Mason County ESDA Director

NOAA's Storm Events Database and Planning Committee member records documented one fatality and 20 injuries as the result of two separate general and groundwater flood events. The following provides a brief description of each.

- According to the Planning Committee members from Bath, approximately 20 individuals sustained injuries during the September 1993 groundwater flood event.
- During the May/June 2002 riverine flood event, an 8 year-old boy drowned while playing in a boat that was tied to the shore along a flooded part of the Illinois River. The rope got loose, and the boat started to drift away causing the boy to panic and jump into the water.

Flash Floods

Damage information was either unavailable or none was recorded for any of the reported flash flood events. In addition, no injuries or fatalities were reported.

What other impacts can result from flooding?

One of the primary threats from flooding is drowning. Nearly half of all flash flood fatalities occur in vehicles as they are swept downstream. Most of these fatalities 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.

Structural damage, such as cracks forming in a foundation, can also result from flooding. In most cases, however, the structural damage sustained during a flood occurs to the flooring, drywall and wood framing. In addition to structural damage, a flood can also cause serious damage to a building's content.

Cleanup begins on Locust Street in Bath after the 1993 flooding.

Photograph courtesy of Greg Griffin, Mason County ESDA Director

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 infiltrate lines and cause disruptions in power and communication.

What is the level of vulnerability to public health and safety from floods?

While both general and flash floods occur on a fairly regular basis within the County, the number of injuries and fatalities is low. In terms of the risk or vulnerability to public health and safety from *general floods*, the risk is seen as ***low***. However, over half of the recorded flood events were the result of flash flooding. Since there is very little warning associated with flash flooding the risk to public health and safety from *flash floods* is elevated to ***medium***.

Are there any repetitive loss structures/properties within Mason County?

Yes. According to information obtained from IEMA, there are 30 repetitive loss structure located in unincorporated Mason County. As described previously, FEMA 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.

The Mason County Floodplain Manager reviewed the information provided by IEMA and found eight records that were for properties in other counties (i.e., Cass, Logan, Sangamon, DeWitt and Will) or could not be verified as being located in Mason County. There were also five records that did not meet the definition of a repetitive loss structure. As a result, these 13 records were not included in the County's total.

Figure F-10 identifies the repetitive flood loss structures by participating jurisdiction and provides the total flood insurance claim payments. The exact location and/or address of the insured structures are not included in this Plan to protect the owners' privacy. According to IEMA, there have been 123 flood insurance claim payments totaling $1,768,195.65 for the 30 repetitive flood loss structures.

Figure F-10 Repetitive Flood Loss Structures						
Participating Jurisdiction	**Structure Type**	**Number of Structures**	**Number of Claim Payments**	**Flood Insurance Claim Payments**		**Total Flood Insurance Claim Payments**
				Structure	**Content**	
Unincorp. Mason County	Other – Non Residential	2	29	$626,324.41	$41,013.57	$676,577.36
Unincorp. Mason County	Single Family	28	94	$979,838.22	$121,019.45	$1,100,857.67
Total:		**30**	**123**	**$1,606,162.63**	**$162,033.02**	**$1,768,195.65**

Source: Illinois Emergency Management Agency

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

Yes. **Figure F-11** identifies the number of existing residential structures by participating jurisdiction located within a floodplain. These counts were prepared by the consultant in consultation with the Mason County Floodplain Manager using the effective DFIRMs. It should be noted that while the identified residential structures are located in a floodplain, the actual number of structures impacted may differ during an actual event.

Figure F-11 Existing Residential Structures Vulnerable to Flooding			
Participating Jurisdiction	**Number of Residential Structures**	**Participating Jurisdiction**	**Number of Residential Structures**
Bath	130†	Manito	0
Easton	0	Mason City	9§
Havana	0	San Jose	0
Kilbourne	0	Unincorp. Mason County	348

† Only 14 of the 130 residential structures located in Bath are in the base floodplain of the Illinois River. The remaining 107 structures are located east of Illinois Route 78 in a base floodplain unassociated with any river, stream or creek. These structures are considered vulnerable to groundwater flooding.

§ The residential structures located on the eastern edge of Mason City are located in a base floodplain unassociated with any river, stream or creek.

Sources: FEMA DFIRMs/Mason County Floodplain Manager

Aside from key roads and bridges and buried power and communication lines, the following provides a description those jurisdictions that have specific infrastructure/critical facilities located within or adjacent to a floodplain.

- *Bath*: The Village's wastewater treatment facility, maintenance garage, park, Village Hall, U.S. Post Office and Bath Fire Protection District building are all located in a base floodplain.
- *Havana*: Riverfront Park and Campground and the Illinois River Biological Field Station are located in the Illinois River base floodplain. The City's wastewater treatment facility and Riverside Estates (an independent living community) are located adjacent to the

Illinois River base floodplain. In addition, part of Veteran's Park on the City's eastern edge is also located in a base floodplain.

- *Manito*: The Village's wastewater treatment facility and maintenance garage are located within the base floodplain of North Quiver Ditch.

While 15.7% of the land area in Mason County lies within the base floodplain and is susceptible to riverine flooding, ***almost the entire County is vulnerable to flash flooding***. As a result, ***a majority of the buildings, infrastructure and critical facilities that may be impacted by flooding are located outside of the base floodplain and are not easily identifiable.***

The risk or vulnerability of existing buildings, infrastructure and critical facilities to all forms of flooding is considered to be medium to high based on: (a) the frequency and severity of recorded flood events within the County; (b) the County's proximity to the Illinois River and the Sangamon River; (c) the unique groundwater flooding experienced in portions of the County; (d) the fact that most of the County is vulnerable to flash flooding; and (e) a majority of the buildings, infrastructure and critical facilities that may be impacted are located outside of the base floodplain.

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

The answer to this question depends on the type of flooding being discussed.

Riverine Flooding

In terms of riverine flooding, the vulnerability of future buildings, infrastructure and critical facilities located within NFIP-participating jurisdictions is low as long as the existing floodplain ordinances are enforced. Enforcement of the floodplain ordinance is the mechanism that ensures that new structures either are not built in flood-prone areas or are elevated or protected to the base flood elevation.

At the time this Plan update was prepared the effective DFIRM for Manito identifies Special Flood Hazard Areas within the Village's municipal limits; however, the Village is not a participant in the NFIP. As a result, future structures built in or near the base floodplain will be vulnerable to riverine flooding.

Flash Flooding

In terms of flash flooding, all future buildings, infrastructure and critical facilities are still vulnerable depending on the amount of precipitation that is received, the topography and any land use changes undertaken within the participating jurisdictions.

Groundwater Flooding

In terms of groundwater flooding, the vulnerability of future buildings, infrastructure and critical facilities built in areas known to have experienced groundwater flooding is considered to be medium to high based on the County's topography and high water table, proximity to two major rivers and the frequency and severity of past events.

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

An estimate of the potential dollar losses to vulnerable *residential structures* located within the *participating municipalities* can be calculated if several assumptions are made. These assumptions represent a probable scenario based on the reported occurrences of flooding in Mason County.

The purpose of providing an estimate is to help residents and local officials make informed decisions about how they can 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 flood event in each of the municipalities.

Assumptions

To calculate the overall potential dollar losses to vulnerable residential structures from a flood, a set of decisions/assumptions must be made regarding:

- type of flood event;
- scope of the flood event;
- number of potentially-damaged housing units;
- value of the potentially-damaged housing units; and
- percent damage sustained by the potentially-damaged housing units (i.e., damage scenario.)

The following provides a detailed discussion of each decision/assumption.

Type of Flood Event. The first step towards calculating the potential dollar losses to vulnerable residential structures is to determine the type of flood event that will be used for this scenario. While the County has experienced all forms of flooding, riverine floods have caused the greatest amount of recorded damages in the County. In addition, identifying residential structures vulnerable to flash flooding is problematic because most are located outside of the base floodplain and the number of structures impacted can change with each event depending on the amount of precipitation received, the topography and the land use of the area.

Assumption #1

A riverine flood event will impact vulnerable residential structures within each municipality.

Therefore, a riverine flood event will be used since it is (a) relatively easy to identify vulnerable residential structures within each municipality (i.e., those structures located within the base floodplain or Special Flood Hazard Areas of any river, stream or creek); and (b) the number of structures impacted is generally the same from event to event.

Scope of the Flood Event. To establish the number of vulnerable residential structures (potentially-damaged housing units), the scope of the riverine flood event within each municipality must first be determined. In this scenario, the scope refers to the number of rivers, streams and creeks that overflow their banks and the degree of flooding experienced along base floodplains for each river, stream and creek.

Assumption #2

All base floodplains within a municipality will flood and experience the same degree of flooding.

Generally speaking, a riverine flood event only affects one or two rivers or streams at a time depending on the cause of the event (i.e., precipitation, snow melt, ice jam, etc.) and usually does not produce the same degree of flooding along the entire length of the river, stream or creek. However, for this scenario, it was decided that:

- all rivers, streams and creeks with base floodplains would overflow their banks, and
- the base floodplains of each river, stream and/or creek located within the corporate limits of each municipality would experience the same degree of flooding.

This assumption results in the following conditions for each municipality:

- Easton, Kilbourne, Mason City and San Jose would not experience any residential flooding since there are no rivers, streams or creeks with base floodplains located in or adjacent to their municipal limits;
- *Bath*: The Illinois River would overflow its banks and flood the western edge of the Village (the base floodplain area located east of Illinois Route 78 would not experience any residential flooding since it is not associated with any river, stream or creek);
- *Havana*: The Illinois River would overflow its banks and flood the western edge of the City; and
- *Manito*: The North Quiver Ditch would overflow its banks and flood a small portion of the Village.

Assumption #3

The number of existing residential structures located within the base floodplain(s) in each municipality will be used to determine the number of potentially-damaged housing units.

Number of Potentially-Damaged Housing Units. Since this scenario assumes that all the base floodplains within a municipality will experience the same degree of flooding, the number of existing residential structures located within the base floodplain(s) of each municipality can be used to determine the number of potentially-damaged housing units. For Bath, only the 14 residential structures located in a riverine base floodplain will be used. The remaining 116 residential structures would not experience any flooding since they are not associated with a riverine base floodplain. For Havana and Manito, there are no residential structures located within the base floodplains of any rivers, streams and/or creeks.

Assumption #4

The average market value for a residential structure in each municipality will be used to determine the value of potentially-damaged housing units.

Value of Potentially-Damaged Housing Units. Now that the number of potentially-damaged housing units has been determined, the monetary value of the units must be calculated. Typically, when damage estimates are prepared after a natural disaster such as a flood, they are based on the market value of the structure. Since it would be impractical to determine the individual market value of each potentially-damaged housing unit, the average market value for a residential structure in each municipality will be used.

To determine the average market value, the average assessed value must first be calculated. The average assessed value is determined by taking the total assessed value of residential buildings

within a jurisdiction and dividing that number by the total number of housing units within the jurisdiction. The average market value is then determined by taking the averaged assessed value and multiplying that number by three (the assessed value of a structure in Mason County is approximately one-third of the market value). **Figure F-12** provides a sample calculation. The total assessed value is based on 2020 tax assessment information provided by the Mason County Supervisor of Assessments. **Figure F-13** provides the average assessed value and average market value for each participating municipality.

Figure F-12
Sample Calculation of Average Assessed Value & Average Market Value – Bath

Average Assessed Value

Total Assessed Value of Residential Buildings in the Jurisdiction÷ Total Housing Units in the Jurisdiction = Average Assessed Value

Bath: $1,780,688 ÷ 155 housing units = $11,552.825

Average Market Value

Average Assessed Value x 3 = Average Market Value
(Rounded to the Nearest Dollar)

Bath: $11,552.825 x 3 = $34,658.475
($34,659)

Figure F-13
Average Market Value of Housing Units by Participating Municipality

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2020)	Total Housing Units (2015-2019)	Average Assessed Values	Average Market Value (2020)
Bath	$1,790,688	155	$11,553	$34,659
Easton	$2,668,605	136	$19,622	$58,866
Havana	$25,751,985	1,500	$17,168	$51,504
Kilbourne	$1,837,560	163	$11,273	$33,819
Manito	$18,544,352	745	$24,892	$74,676
Mason City	$19,898,141	1,169	$9,385	$51,066
San Jose	$2,843,598	303	$9,385	$28,155

Source: Mason County Supervisor of Assessments.

Damage Scenario. The final decision that must be made to calculate potential dollar losses is to determine the percent damage sustained by the structure and the structure's contents during the flood event. In order to determine the percent damage using FEMA's flood loss estimation tables, assumptions must be made regarding (a) the type of residential structure flooded (i.e., manufactured home, one story home without a basement, one- or two-story home with a basement,

Assumption #5

The potentially-damaged housing units are manufactured homes and the flood depth is 2 foot.
Structural Damage = 63%
Content Damage = 90%

etc.) and (b) the flood depth. **Figure F-14** calculates the percent loss to a structure and its contents for different scenarios based on flood depth and structure type.

Figure F-14
FEMA Flood Loss Estimation Tables

Flood Building Loss Estimation Table

Flood Depth (feet)	One Story No Basement (% Building Damage)	Two Story No Basement (% Building damage)	One or Two Story With Basement (% Building damage)	Manufactured Home (% Building damage)
-2	0	0	4	0
-1	0	0	8	0
0	9	5	11	8
1	14	9	15	44
2	22	13	20	63
3	27	18	23	73
4	29	20	28	78
5	30	22	33	80
6	40	24	38	81
7	43	26	44	82
8	44	29	49	82
>8	45	33	51	82

Flood Content Loss Estimation Table

Flood Depth (feet)	One Story No Basement (% Contents Damage)	Two Story No Basement (% Contents damage)	One or Two Story With Basement (% Contents damage)	Manufactured Home (% Contents damage)
-2	0	0	6	0
-1	0	0	12	0
0	13.5	7.5	16.5	12
1	21	13.5	22.5	66
2	33	19.5	30	90
3	40.5	27	34.5	90
4	43.5	30	42	90
5	45	33	49.5	90
6	60	36	57	90
7	64.5	39	66	90
8	66	43.5	73.5	90
>8	67.5	49.5	76.5	90

Source: FEMA, Understanding Your Risks: Identifying Hazards and Estimating Losses

For this scenario it is assumed that the potentially-damaged housing units are manufactured homes, and the flood depth is two feet. With these assumptions the expected percent damage sustained by the ***structure*** is estimated to be 63% and the expected percent damage sustained by the structure's ***contents*** is estimated to be 90%.

Potential Dollar Losses

Now that all of the decisions/assumptions have been made, the potential dollar losses can be calculated. First the potential dollar losses to the ***structure*** of the potentially-damaged housing units must be determined. This is done by taking the average market value for a residential structure and multiplying that by the percent damage 63% to get the average structural damage per unit. Next the average structural damage per unit is multiplied by the number of potentially-damaged housing units. **Figure F-15** provides a sample calculation.

Figure F-15
***Structure:* Potential Dollar Loss Sample Calculation – Bath**

Average Market Value of a Housing Unit with the Jurisdiction x Percent Damage = Average Structural Damage per Housing Unit

Bath: $34,659 x 63% = $21,835.17 per housing unit

Average Structural Damage x Number of Potentially-Damaged Housing Units within the Jurisdiction = *Structure* Potential Dollar Losses (Rounded to the Nearest Dollar)

Bath: $21,835.17 per housing unit x 14 housing unit = $305,692.38

($305,693)

Next the potential dollar losses to the ***content*** of the potentially-damaged housing units must be determined. Based on FEMA guidance, the value of a residential housing unit's content is approximately 50% of its market value. Therefore, start by taking one-half the average market value for a residential structure and multiply that by the percent damage 90% to get the average content damage per unit. Then take the average content damage per unit and multiply that by the number of potentially-damaged housing units. **Figure F-16** provides a sample calculation.

Figure F-16
***Content:* Potential Dollar Loss Sample Calculation – Bath**

½ (Average Market Value of a Housing Unit with the Jurisdiction) x Percent Damage = Average Content Damage per Housing Unit

Bath: ½ ($34,659) x 90% = $15,596.55 per housing unit

Average Content Damage per Housing Unit x Number of Potentially-Damaged Housing Units within the Jurisdiction = *Content* Potential Dollar Losses (Rounded to the Nearest Dollar)

Bath: $15,596.55 per housing unit x 14 housing unit = $218,351.70
($218,352)

Finally, the ***total potential dollar losses*** may be calculated by adding together the potential dollar losses to the structure and the content. **Figure F-17** provides a breakdown of the total potential dollar losses by municipality.

This assessment illustrates the *potential residential dollar losses* that should be considered when municipalities and townships are deciding which mitigation projects to pursue. Potential dollar losses caused by riverine flooding to vulnerable residences in Bath are estimated to be $524,045. There are six participating municipalities in this scenario who do not have any residences considered vulnerable to riverine flooding.

Figure F-17
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Riverine Flood Event by Participating Municipality

Participating Jurisdiction	Average Market Value (2020)	Potentially-Damaged Housing Units	Potential Dollar Losses		Total Potential Dollar Losses
			Structure	Content	
Bath	$34,659	14	$305,693	$218,352	$524,045
Easton	$58,866	0	$ 0	$ 0	$ 0
Havana	$51,504	0	$ 0	$ 0	$ 0
Kilbourne	$33,819	0	$ 0	$ 0	$ 0
Manito	$74,676	0	$ 0	$ 0	$ 0
Mason City	$51,066	0	$ 0	$ 0	$ 0
San Jose	$28,155	0	$ 0	$ 0	$ 0

Vulnerability of Infrastructure/Critical Facilities

The calculations presented above are meant to provide the reader with a sense of the scope or magnitude of a large riverine flood event in dollars. These calculations do not include the physical damages sustained by businesses or other infrastructure and critical facilities.

In terms of businesses, the impacts from a flood event can be physical and/or monetary. Monetary impacts can include loss of sales revenue either through temporary closure or loss of critical services (i.e., power, drinking water and sewer). Depending on the magnitude of the flood event, the damage sustained by infrastructure and critical facilities can be extensive in nature and expensive to repair. As a result, ***the cumulative monetary impacts to businesses and infrastructure can exceed the cumulative monetary impacts to residences.*** While average dollar amounts cannot be supplied for these items at this time, they should be taken into account when discussing the overall impacts that a large-scale riverine flood event could have on the participating jurisdictions.

In terms of specific infrastructure vulnerability, the following are located within a ***base floodplain***:

- *Bath*: wastewater treatment facility, maintenance garage, Village Hall, U.S. Post Office and Bath Fire Protection District building;
- *Havana*: the Illinois River Biological Field Station; and
- *Manito*: wastewater treatment facility and maintenance garage

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

Considerations

While the potential dollar loss scenario was only for a riverine flood event, the participating jurisdictions have been made aware through the planning process of the impacts that can result from flash flood events. Mason County has experienced multiple events over the last 20 years as have adjoining and nearby counties. These events illustrate the need for officials to consider the overall monetary impacts of all forms of flooding on their communities. All participants should carefully consider the types of activities and projects that can be taken to minimize their vulnerability.

3.3 SEVERE WINTER STORMS

HAZARD IDENTIFICATION

What is the definition of a severe winter storm?

A severe winter storm can range from moderate snow over a few hours to significant accumulations of sleet and/or ice to blizzard conditions with blinding, wind-driven snow that last several days. The amount 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: blizzards, heavy snowstorms and ice storms. The following provides a brief description of each type as defined by the National Weather Service (NWS).

- **Blizzards.** Blizzards are characterized by strong winds of at least 35 miles per hour and are accompanied by considerable falling and/or blowing snow that reduces visibility to ¼ mile or less. Blizzards are the most dangerous of all winter storms.
- **Heavy Snowstorms.** Heavy snowstorms are generally defined as producing snowfall accumulations of four inches or more in 12 hours or less or six inches or more in 24 hours or less.
- **Ice Storms.** An ice storm occurs when substantial accumulations of ice, generally ¼ inch or more, build up on the ground, trees and utility lines as a result of freezing rain.

What is snow?

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?

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. 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?

Freezing rain is precipitation that falls in the form of a liquid (i.e., rain drops), but freezes into a glaze of ice upon contact with the ground or other hard surfaces. This occurs when snowflakes descend into a warmer layer of air and melt completely. When the rain drops that result from this melting fall through another thin layer of freezing air just above the surface they become "supercooled", but they do not have time to refreeze before reaching the ground. However, because the raindrops are "supercooled", they instantly refreeze upon contact with anything that is at or below 32°F (i.e., the ground, trees, utility lines, etc.).

Are alerts issued for severe winter storms?

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

- **Watch.** The following watches are issued in advance of a storm and indicate the potential for significant winter weather within the next day or two.
  - **Winter Storm Watch**. A winter storm watch is issued when conditions are favorable for the development of a hazardous winter weather event which has the potential to threaten life or property.
  - **Blizzard Watch**. A blizzard watch is issued when conditions are favorable for the development of blizzard conditions:
    - sustained winds or at least 35 mph and
    - reduced visibility of ¼ mile or less.
- **Advisories.** Winter advisories are issued for winter weather events that pose a significant inconvenience, especially to motorist, but should not be life-threatening if caution is exercised. The following advisories are generally issued 12 to 36 hours prior to an event.
  - **Freezing Rain Advisory.** A freezing rain advisory is issued when ice accumulations of up to ¼ inch are expected.
  - **Winter Weather Advisory.** A winter weather advisory is issued for one or more of the following:
    - snow accumulations of 3 to 5 inches in 12 hours or less;
    - sleet accumulations up to ¼ inch;
    - freezing rain in combination with sleet and/or snow; or
    - blowing and/or drifting snow.
- **Warnings.** The following winter weather warnings are issued when severe winter weather conditions are expected to cause a significant impact to life or property and make travel difficult to impossible. Individuals are advised to avoid travel and stay indoors.
  - **Blizzard Warning.** A blizzard warning is issued when reduced visibility of less than ¼ mile due to falling and/or blowing snow and strong winds of at least 35 mph or greater are expected for at least three hours.
  - **Ice Storm Warning.** An ice storm warning is issued when ice accumulations of ¼ inch or greater are expected, resulting in hazardous travel conditions, tree damage and extended power outages.
  - **Winter Storm Warning.** A winter storm warning is issued when there is one or more of the following expected:
    - heavy snow accumulations of at least 6 inches in 12 hours or at least 8 inches in 24 hours; or
    - sleet accumulations of at least ½ inch.

HAZARD PROFILE

The following identifies past occurrences of severe winter storms; details the severity or extent of each event (if known); identifies the locations potentially affected; and estimates the likelihood of future occurrences.

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

Severe Winter Storm Fast Facts – Occurrences

Number of Severe Winter Storm Events Reported (1950 -2021): ***118***
Maximum 24-Hour Snow Accumulation: ***16.0 inches (February 1 & 2, 2011)***
Most Likely Month for Severe Winter Storms to Occur: ***January***

Tables 7, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of severe winter storms (snow & ice) recorded in Mason County. NOAA's Storm Events Database, NWS's COOP Data, the Illinois State Water Survey, the National Weather Service Central Illinois Weather Forecast Office in Lincoln and Planning Committee member records were used to document 118 reported occurrences of severe winter storms (snow, ice and/or a combination of both) in Mason County between 1950 and 2021. Of the 118 recorded occurrences there were:

- 98 heavy snowstorms or blizzards;
- 11 combination events (freezing rain, sleet, ice and/or snow); and
- 9 ice or sleet storms.

Figure SWS-1 charts the reported occurrences of severe winter storms by month. Of the 118 events, 89 (75%) took place in in December, January and February making this the peak period for severe winter storms. Of these 89 events, 33 (37%) occurred during January, making this the peak month for severe winter storms. There were four events that spanned two months; however, for illustration purposes only the month when the event started is graphed. Of the 118 occurrences, start times were unavailable for 43 events. Of the remaining 75 severe winter storm events with recorded times, 40 (53%) began during the a.m. hours.

According to the NWS's COOP data records, the maximum 24-hour snow accumulation in Mason County is 16.0 inches, which occurred February 1 and 2, 2011 at the Havana COOP observation station. The heaviest seasonal snowfall on record for Mason County is 69.5 inches which occurred during the winter of 1981-1982, the second heaviest seasonal snowfall on record is 60.5 inches which occurred during the winter of 1977-1978.

What locations are affected by severe winter storms?

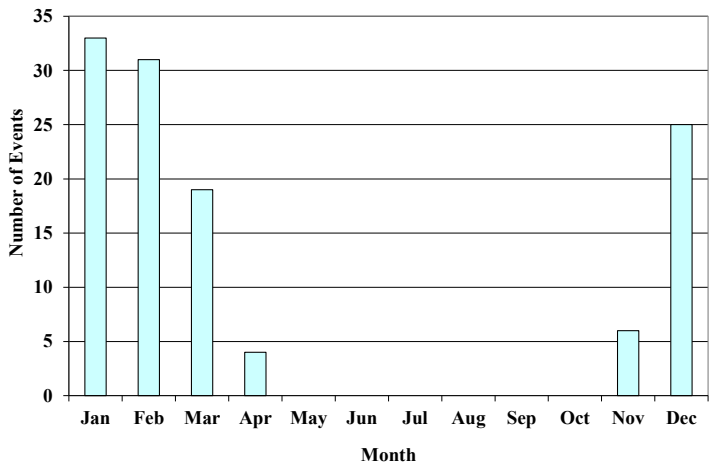
Severe winter storms affect the entire County. All communities in Mason County have been affected by severe winter storms. Severe winter storms generally extend across the entire County and affect multiple locations. The *2018 Illinois Natural Hazard Mitigation Plan* prepared by IEMA classifies Mason County's hazard rating for severe winter storms as "high."

What is the probability of future severe winter storms occurring?

Mason County has had 118 verified occurrences of severe winter storms between 1950 and 2021. With 118 occurrences over the past 72 years, Mason County should expect at least one severe

winter storm in any given year. There were 28 years over the past 72 years where two or more severe winter storms occurred. This indicates the probability that more than one severe winter storm may occur during any given year within the County is 39%.

Figure SWS-1
Severe Winter Storms by Month
1950 – 2020



HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from severe winter storms.

Are the participating jurisdictions vulnerable to severe winter storms?

Yes. All of Mason County, including the participating jurisdictions, is vulnerable to the dangers presented by severe winter storms. Severe winter storms are among the more frequently occurring natural hazards in Illinois. Since 2012, Mason County has experienced 14 severe winter storms.

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, township and municipalities must budget for snow removal and de-icing of roads and bridges as well as for roadway repairs.

Snow from the February 2011 blizzard blocks a truck in on Market Street in Havana.

Photograph courtesy of The Mason County Democrat

Do Any of the participating jurisdictions consider severe winter storms to be among their community's greatest vulnerabilities?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the following respondents consider severe winter storms to be among their community's greatest vulnerabilities.

- *Mason County*: Loss of power due to downed electrical lines and/or poles caused by severe weather such as ice storms. The Health Department does not have a backup generator so an extended power outage due to an ice storm could cause the loss of potentially thousands of dollars in vaccines.
- *Havana*: Ice and high winter winds like those experienced on January 1, 2021 can cause loss of electrical power when overhead power lines are downed, which impacts service to critical facilities and residents.
- *Havana CUSD #126*: A blizzard could prevent or make it hazardous to transport students home following an event. Emergency backup generators are needed at District schools to ensure the heating system functions and meal preparation is available if an extended power outage occurs during a severe winter storm when students are present.
- *Midwest Central CUSD #191*: The schools lose communications when they lose power. The loss of power due to hazards such as severe winter storms in turn causes the schools to have to evacuate students. Without proper communication it is difficult to contact staff and parents.

What impacts resulted from the recorded severe winter storms?

Data obtained from NOAA's Storm Events Database, the Illinois Emergency Management Agency's public assistance figures and Committee Member records indicates the February 1, 2011 blizzard caused $154,432 in property damages and emergency protective measures. Property damage information was either unavailable or none was recorded for the remaining 117 reported occurrences.

Severe Winter Storms & Extreme Cold Events
Fast Facts – Impacts/Risk

Severe Winter Storm (Snow & Ice) Impacts:
- Total Property Damage: ***$154,432***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Severe Winter Storm Risk/Vulnerability:
- Public Health & Safety: ***Low to Medium***
- Buildings/Infrastructure/Critical Facilities: ***Medium***

In comparison, the State of Illinois has averaged $102 million annually in winter storm losses according to the Illinois State Water Survey's Climate Atlas of Illinois, ranking winter storms second only to flooding in terms of economic loss in the State. 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.

NOAA's Storm Events Database did not report any injuries or fatalities associated with the recorded severe winter storm events.

What other impacts can result from severe winter storms?

In Mason County, vehicle accidents are the largest risk to health and safety from severe winter storms. Hazardous driving conditions (i.e., reduced visibility, icy road conditions, strong winds,

etc.) contribute to the increase in accidents that result in injuries and fatalities. A majority of all severe winter storm injuries result from vehicle accidents.

Traffic accident data assembled by the Illinois Department of Transportation from 2014 through 2018 indicates that treacherous road conditions caused by snow/slush and ice were present for 4.1% to 15.5% of all crashes recorded annually in the County. **Figure SWS-2** provides a breakdown by year of the number of crashes and corresponding injuries and fatalities that occurred when treacherous road conditions caused by snow and ice were present.

Figure SWS-2
Severe Winter Weather Crash Data for Mason County

Year	Total # of Crashes	Presence of Treacherous Road Conditions caused by Snow/slush and Ice		
		# of Crashes	# of Injuries	# of Fatalities
2014	200	31	5	0
2015	195	16	7	0
2016	200	26	4	0
2017	197	8	2	0
2018	164	13	1	0
Total:	**956**	**94**	**19**	**0**

Source: Illinois Department of Transportation.

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 in 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.

What is the level of risk/vulnerability to public health and safety from severe winter storms?

While severe winter storms occur regularly in Mason County, the reported number of injuries and fatalities is low. Taking into consideration the potential for hazardous driving conditions; snow-removal related injuries; and power outages that could leave individuals vulnerable to hypothermia, the risk to public health and safety from severe winter storms is seen as ***low to medium***.

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

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

Structural damage to buildings caused by severe winter storms (snow and ice) is very rare but can occur particularly to flat rooftops. Information gathered from Mason 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 lines often lead to disruptions in communications 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, township 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.

Snow plows work to clear streets, drives and parking lots following the February 2011 blizzard.

Photograph courtesy of The Mason County Democrat

Based on the frequency with which severe winter storms have occurred in Mason County; the damages described; 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***.

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 storms, the County and the three remaining participating municipalities do not.

In addition, infrastructure such as new communication and power lines will continue to be vulnerable to severe winter storms, especially to ice accumulations, as long as they are located above ground. Rural areas of the 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. In terms of new roads and bridges, there is very little that can be done to reduce or eliminate their vulnerability to severe winter storms.

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

Unlike other natural hazards, such as tornadoes, there are no standard loss estimation models or methodologies for severe winter storms. Since only one of the 118 recorded events listing property damage numbers for severe winter storms, there is no way to accurately estimate future potential dollar losses. However, since all existing structures within Mason County are vulnerable to damage, it is likely that there will be future dollar losses from severe winter storms.

3.4 EXCESSIVE HEAT

HAZARD IDENTIFICATION

What is the definition of excessive heat?

Excessive heat is generally characterized by a prolonged period of summertime weather that is substantially hotter and more humid than the average for a location at that time of year. Excessive heat criteria typically shift by location and time of year. As a result, reliable fixed absolute criteria are not generally specified (i.e., a summer day with a maximum temperature of at least 90°F).

Excessive 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.

Excessive heat is a leading cause of weather-related fatalities in the United States. According to the Centers for Disease Control and Prevention, a total of 7,415 people died from heat-related illnesses between 1999 and 2010, an average of 618 fatalities a year.

What is the Heat Index?

In an effort to raise the public's awareness of the hazards of excessive heat, the National Weather Service (NWS) devised 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 EH-1** 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.

Figure EH-1
Heat Index

Temperature (°F)

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

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Source: NOAA, National Weather Service.

- **Heat Rash.** Heat rash is a skin irritation caused by excessive sweating during hot, humid weather and is characterized by red clusters of small blisters on the skin. It usually occurs on the neck, chest, groin or in elbow creases.
- **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 and can significantly retard the skin's ability to shed excess heat.
- **Heat Cramps.** Heat cramps are characterized by heavy sweating and muscle pains or spasms, usually in the abdomen, arms, or legs that during intense exercise. 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, muscle cramps, tiredness, weakness, dizziness, headache, nausea or vomiting and faintness. Breathing may become rapid and shallow and the pulse thready (weak). The skin may appear cool, moist, and pale. If not treated, heat exhaustion may progress to heat stroke.
- **Heat Stroke (Sunstroke).** Heat stroke is a life-threatening condition characterized by a high body temperature (106°F or higher). The skin appears to be red, hot, and dry with very little perspiration present. Other symptoms include a rapid and strong pulse, throbbing headache, dizziness, nausea, and confusion. There is a possibility that the individual will become 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 EH-2 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 NWS will initiate excessive heat alert procedures.

Figure EH-2
Relationship between Heat Index and Heat Disorders

Heat Index (°F)	Heat Disorders
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.

What is an excessive heat alert?

An excessive heat alert is an advisory or warning issued by the NWS 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 excessive heat event. The following provides a brief description of each type of alert based on the ***excessive heat advisory/warning criteria*** established by NWS Weather Forecast Office in Lincoln, Illinois. The Lincoln Office is responsible for issuing alerts for Mason County.

- **Outlook.** An excessive heat outlook is issued when the potential exists for an excessive heat event to develop over the next three (3) to seven (7) days.
- **Watch.** An excessive heat watch is issued when conditions are favorable for an excessive heat event to occur within the next 24 to 72 hours.
- **Advisory.** An excessive heat advisory is issued within 12 hours of the onset of extremely dangerous heat conditions when the maximum heat index temperature is expected to be 100°F or higher for at least two (2) days and the nighttime air temperatures will not drop below 75°F.
- **Warning.** An excessive heat warning is issued within 12 hours of the onset of extremely dangerous heat conditions when the maximum heat index temperature is expected to be 105°F or higher for at least two (2) days and the nighttime air temperatures will not drop below 75°F.

HAZARD PROFILE

The following identifies past occurrences of excessive heat, details the severity or extent of each event (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

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

Table 8, located in **Appendix J**, summarizes the previous occurrences as well as the extent or magnitude of excessive heat events recorded in Mason County. NOAA's Storm Events Database and NWS's COOP Data records were used to document 52 occurrences of excessive heat in Mason County between 1994 and 2021.

Excessive Heat Fast Facts – Occurrences

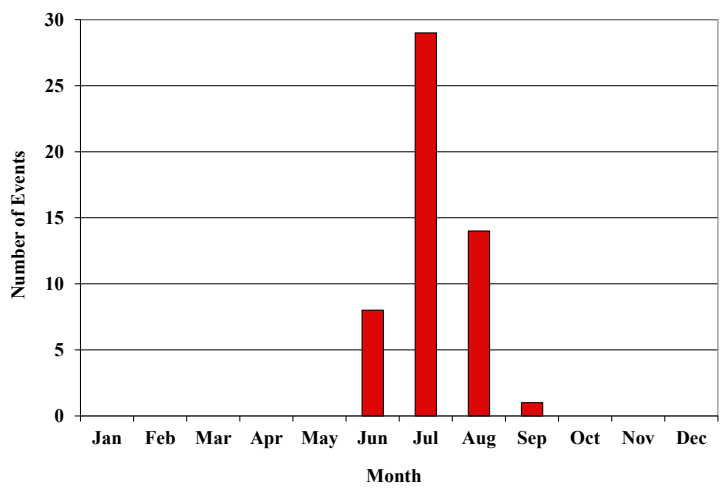
Number of Excessive Heat Events Reported (1994 – 2021): ***52***

Hottest Temperature Recorded in the County: ***113°F (July 15, 1936)***

Most Likely Month for Excessive Heat Events to Occur: ***July***

Figure EH-3 charts the reported occurrences of excessive heat by month. Twenty-nine of the 52 events (56%) began in July making this the peak month for excessive heat events in Mason County. There were four events that spanned two months; however, for illustration purposes only the month the event started is graphed.

Figure EH-3
Excessive Heat by Month
1994 – 2021



According to the Midwestern Regional Climate Center, almost continuous temperature records for Mason County were kept from 1893 to 2007 by the NWS COOP Observer Station at Havana. **Figure EH-4** lists the hottest days recorded at the Havana observation station. Based on the available records, the hottest temperature recorded in Mason County was 113°F at the Havana COOP observation station on July 15, 1936.

Figure EH-4
Hottest Days Recorded at the Havana NWS COOP Observation Station

	Date	Temperature			Date	Temperature
1	07/15/1936	113°F		6	07/13/1936	109°F
2	07/14/1936	112°F		7	07/21/1901	108°F
3	07/12/1936	110°F		8	07/27/1930	108°F
4	07/22/1901	109°F		9	07/11/1936	108°F
5	08/09/1934	109°F		10	07/27/1936	108°F

Source: Midwest Regional Climate Center cli-MATE

What locations are affected by excessive heat?

Excessive heat affects the entire County. Excessive heat events, like drought and severe winter storms, generally extend across an entire region and affecting multiple counties. The *2018 Illinois Natural Hazard Mitigation Plan* classifies Mason County's hazard rating for excessive heat as "medium."

Do any of the participating jurisdictions have designated cooling centers?

Yes. Eight of the ten participating municipalities and fire protection districts/fire departments have designated cooling centers. A "designated" cooling center is identified as any facility that has been *formally* identified by the jurisdiction (through emergency planning, resolution, Memorandum of Agreement, etc.) as a location available for use by residents of the jurisdiction during excessive heat events.

Figure EH-5 identifies the location of each cooling center by jurisdiction. At this time Easton and the Havana Rural Fire Protection District do not have any cooling centers designated within their community. In addition, there are no State of Illinois-designated cooling centers in Mason County.

Figure EH-5
Designated Cooling Centers by Participating Jurisdiction

Name/Address	Name/Address
Bath	*Mason City & Mason City FPD*
Community Center, 205 E. First St.	City Hall, 145 South Main St.
Havana	Public Works Shop, 217 North Tonica St.
Havana Fire & Police Building, 226 W. Market St.	*San Jose*
Kilbourne & Kilbourne FD	Village Hall, 309 South Second St.
Fire Station, 308 W. Walnut St.	San Jose Community Center, 311 South Second St.
Manito	
Forman Fire Department, 205 N. Broadway St.	
Forman Center, 308 S. Harrison St.	

What is the probability of future excessive heat events occurring?

Mason County has experienced 52 verified occurrences of excessive heat between 1994 and 2021. With 52 occurrences over the past 28 years, Mason County would be expected to experience at least one excessive heat event in any given year. It is important to keep in mind that there are almost certainly gaps in the excessive heat data that distort this probability. More events have

almost certainly occurred than are documented in this section, which means that the probability is almost certainly higher than reported.

There were 14 years over the last 28 years where multiple (two or more) excessive heat events occurred. This indicates that the probability that multiple excessive heat events may occur during any given year within the County is 50%.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from excessive heat.

Are the participating jurisdictions vulnerable to excessive heat?

Yes. All of Mason County, including the participating jurisdictions, is vulnerable to the dangers presented by excessive heat. Since 2012, the County has experienced 24 excessive heat events.

Do any of the participating jurisdictions consider excessive heat to be among their community's greatest vulnerabilities?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the following respondents considered excessive heat to be among their community's greatest vulnerabilities.

- *Mason City*: The City does not have any designated cooling centers for use by vulnerable residents. Any locations that are identified as designated cooling centers should have automatic emergency backup generators available to ensure the center can continue to operate during power outages.
- *Mason City FPD*: If the power was knocked out within the District, a facility with an emergency backup generator needs to be designated as a cooling center for use by vulnerable District residents.

What impacts resulted from the recorded excessive heat events?

Damage information was either unavailable or none was recorded, and no injuries or fatalities were reported as a result of any of the excessive heat events. In comparison, Illinois averages 74 heat-related fatalities annually according to the Illinois State Water Survey's Climate Atlas of Illinois.

While no recorded injuries or fatalities were reported as a result of excessive heat in Mason County, it does not mean that none occurred. It simply means that excessive heat was not identified as the primary cause. This is especially true for fatalities. Usually, heat is not listed as the primary cause of

Excessive Heat Fast Facts – Impacts/Risk

Excessive Heat Impacts:
- Total Property Damage: ***n/a***
- Total Crop Damage: ***n/a***
- Fatalities: ***n/a***
- Injuries: ***n/a***

Excessive Heat Risk/Vulnerability:
- Public Health & Safety – General Population: ***Low***
- Public Health & Safety – Sensitive Populations: ***Medium***
- Buildings/Infrastructure/Critical Facilities: ***Low***

death, but rather an underlying cause. The heat indices were sufficiently high for many of the excessive heat events to produce heat cramps or heat exhaustion with the possibility of heat stroke in cases of prolonged exposure or physical activity.

What other impacts can result from excessive heat events?

Other impacts of excessive heat include road buckling, power outages, stress on livestock, early school dismissals and school closings. In addition, excessive heat events can also lead to an increase in water usage and may result in municipalities imposing water use restrictions. In Mason County, excessive heat has the ability to impact the drinking water supplies of Bath and Kilbourne as well as those residents in unincorporated Mason County who rely on private wells for their drinking water. Based on a review of the Illinois State Water Survey's Illinois Water and Related Wells mapper, some of the private wells in these areas are shallower and therefore would be more likely to be vulnerable to excessive heat conditions.

What is the level of vulnerability to public health and safety from excessive heat?

Even if injuries and fatalities due to excessive heat were under reported in Mason County, the level of risk or vulnerability posed by excessive heat to the public health and safety of the *general population* is considered to be ***low***. This assessment is based on the fact that all but two of the participating municipalities and fire protection districts/fire departments have designated cooling centers and the County does not have many large urban areas where living conditions (such as older, poorly-ventilated high rise buildings and low-income neighborhoods) tend to contribute to heat-related injuries and fatalities.

The level of risk or vulnerability posed by excessive heat to the public health and safety of *sensitive populations* is considered to be ***medium***. Sensitive populations such as older adults (those 75 years of age and older) and small children (those younger than 5 years of age) are more susceptible to heat-related reactions and therefore their risk is elevated. **Figure EH-6** identifies the percent of sensitive populations by participating jurisdiction based on the U.S. Census Bureau's 2015-2019 American Community Survey.

Figure EH-6
Sensitive Populations by Participating Jurisdictions

Participating Jurisdiction	% of Population 75 year of age & Older	% of Population Younger than 5 years of age	Total % of Sensitive Population
Bath	4.7%	5.7%	10.4%
Easton	10.0%	6.8%	16.8%
Havana	13.3%	5.5%	18.8%
Kilbourne	6.6%	0.0%	6.6%
Manito	11.2%	9.0%	20.2%
Mason City	11.9%	3.9%	15.8%
San Jose	5.6%	5.2%	10.8%
Unincorp. Mason County	7.3%	4.3%	11.6%
Mason County	9.9%	5.1%	15.0%
State of Illinois	6.5%	6.0%	12.5%

Source: U.S. Census Bureau.

In addition, individuals with chronic conditions, those on certain medications, and persons with weight or alcohol problems are also considered sensitive populations. However, demographic information is not available for these segments of the population.

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

No. In general, existing buildings, infrastructure and critical facilities located in the County and the participating jurisdictions are not vulnerable to excessive heat. The primary concern is for the health and safety of those living in the County (including all of the municipalities).

While buildings do not typically sustain damage from excessive heat, in rare cases infrastructure and critical facilities may be directly or indirectly damaged. While uncommon, excessive heat has been known to contribute to damage caused to roadways within Mason County. The combination of excessive heat and vehicle loads has caused pavement cracking and buckling.

Excessive heat has 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 Mason 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 excessive heat is considered ***low***, even taking into consideration the potential for damage to roadways and disruptions to the electrical grid.

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

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

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

Unlike other natural hazards there are no standard loss estimation models or methodologies for excessive heat. With none of the recorded events listing property damage figures, there is no way to accurately estimate future potential dollar losses from excessive heat. Since excessive heat typically does not cause structure damage, it is unlikely that future dollar losses will be extreme. The primary concern associated with excessive heat is the health and safety of those living in the County and municipalities, especially sensitive populations such as the elderly, infants, young children, and those with medical conditions.

3.5 EXTREME COLD

HAZARD IDENTIFICATION

What is the definition of extreme cold?

Extreme cold is generally characterized by temperatures well below what is considered normal for an area during the winter months and is often accompanied or is left in the wake of a severe winter storm. Extreme cold criteria vary from region to region. As a result, reliable fixed absolute criteria are not generally specified (i.e., a winter day with a maximum temperature of 0°F).

Whenever the temperature drops below normal and the wind speeds increase, heat can leave the body more rapidly. This can lead to dangerous situations for susceptible individuals, such as those without shelter or who are stranded, or those who live in a home that is poorly insulated or without heat.

Extreme cold is a leading cause of weather-related fatalities in Illinois. According to a 2020 study published by the University of Illinois Chicago, 1,935 individuals died from cold-related illnesses between 2011 and 2018. This is 94% of all temperature-related fatalities recorded in the State during that time period.

Extreme cold can also cause infrastructure damage, especially to residential water pipes and water distribution lines and mains. According to State Farm, in 2020 Illinois was once again the national leader in losses related to frozen pipes.

What is wind chill?

Wind chill, or wind chill factor, is a measure of the rate of heat loss from exposed skin resulting from the combined effects of wind and temperature. 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.

The unit of measurement used to describe the wind chill factor is known as the wind chill temperature. The wind chill temperature is calculated using a formula. **Figure EC-1** identifies the formula and calculates the wind chill temperatures for certain air temperatures and wind speeds.

As an example, if the air temperature is 5°F and the wind speed is 20 miles per hour, then the wind chill temperature would be -15°F. The wind chill temperature is only defined for air temperatures at or below 50°F and wind speeds above three miles per hour. In addition, the wind chill temperature does not take into consideration the effects of bright sunlight which may increase the wind chill temperature by 10°F to 18°F.

Use of the current Wind Chill Temperature (WCT) index was implemented by the NWS on November 1, 2001. The new WCT index was designed to more accurately calculate how cold air feels on human skin. The new index uses advances in science, technology and computer modeling to provide an accurate, understandable and useful formula for calculating the dangers from winter

winds and freezing temperatures. The former index was based on research done in 1945 by Antarctic researchers Siple and Passel.

Exposure to extreme wind chills can be life threatening. As wind chills edge toward -19°F and below, there is an increased likelihood that exposure will lead to individuals developing cold-related illnesses.

Figure EC-1
Wind Chill Chart

Wind (mph)	Temperature (°F)																	
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Source: NOAA, National Weather Service.

What cold-related illnesses are associated with extreme cold?

Frostbite and hypothermia are both cold-related illnesses that can result when individuals are exposed to dangerously low temperatures and wind chills. The following provides a brief description of 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's temperature begins to fall because it is losing heat faster than it can produce it. 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.

What is a wind chill alert?

A wind chill alert is an advisory or warning issued by the NWS when the wind chill is expected to have a significant impact on public safety. The expected severity of cold temperatures and wind speed determines the type of alert issued. There are three types of alerts that can be issued for an extreme cold event. The following provides a brief description of each type of alert based on the ***wind chill criteria*** established by the NWS Weather Forecast Office in Lincoln, Illinois. The Lincoln Office is responsible for issuing alerts for Mason County.

Yes. The NWS Weather Forecast Office in Lincoln, Illinois is responsible for issuing ***wind chill advisories*** and ***warnings*** for Mason County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Wind Chill Watch.** A wind chill watch may be issued if conditions are favorable for wind chill temperatures to meet or exceed warning criteria but are not occurring or imminent.
- **Wind Chill Advisory.** A wind chill advisory is issued when wind chill values are expected to be between -15°F and -24°F.
- **Wind Chill Warning.** A wind chill warning is issued when wind chill values are expected to be -25°F or below.

HAZARD PROFILE

The following identifies past occurrences of extreme cold events; details the severity or extent of each event (if known); identifies the locations potentially affected; and estimates the likelihood of future occurrences.

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

Table 9, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of extreme cold events recorded in Mason County. NOAA's Storm Events Database and NWS's COOP Data records were used to document 46 occurrences of extreme cold in Mason County between 1996 and 2021.

Extreme Cold Fast Facts – Occurrences

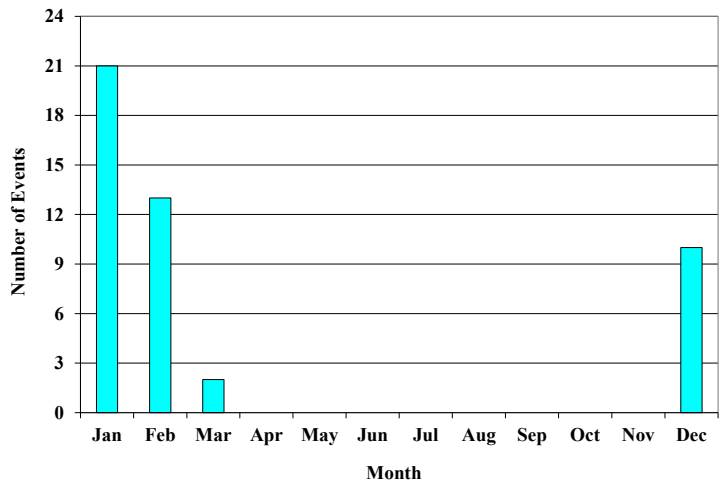
Number of Extreme Cold Events Reported (1996 - 2021): ***46***

Coldest Temperature Recorded in the County: ***-30°F (January 5, 1999)***

Most Likely Months for Extreme Cold Events to Occur: ***January***

Figure EC-2 charts the reported occurrences of extreme cold by month. Twenty-one of the 46 events (46%) took place in January, making this the peak month for extreme cold events. There were three events that spanned two months; however, for illustration purposes only the month the event started is graphed.

Figure EC-2
Extreme Cold by Month
1996 - 2020



According to the Midwestern Regional Climate Center, almost continuous temperature records for Mason County were kept from 1893 to 2007 by the NWS COOP Observer Station at Havana. **Figure EC-3** lists the coldest days recorded at the Havana observation station. Based on the available records, the coldest temperature recorded in Mason County was -30°F on January 5, 1999 at the Havana COOP observation station.

Figure EC-3
Coldest Days Recorded at the Havana NWS COOP Observation Station

	Date	Temperature			Date	Temperature
1	01/05/1999	-30°F		5	01/24/1915	-25°F
2	02/13/1905	-26°F		6	02/09/1979	-25°F
3	12/26/1914	-26°F		7	01/20/1985	-25°F
4	01/15/1979	-26°F		8	01/06/1999	-24°F

Source: Midwest Regional Climate Center cli-MATE

What locations are affected by extreme cold?

Extreme cold affects the entire County. All communities in Mason County have been affected by extreme cold. Extreme cold generally extend across the entire County and affects multiple locations.

Do any of the participating jurisdictions have designated warming centers?

Yes. Eight of the ten participating municipalities and fire protection districts/fire departments have designated warming centers. A "designated" warming center is identified as any facility that has been *formally* identified by the jurisdiction (through emergency planning, resolution, Memorandum of Agreement, etc.) as a location available for use by residents during severe winter storms and extreme cold events.

Figure EC-4 identifies the location of each warming center by jurisdiction. At this time Easton and the Havana Rural Fire Protection District do not have a warming center designated within their jurisdictions. In addition, there are no State of Illinois-designated warming centers in Mason County.

Figure EC-4
Designated Warming Centers by Participating Jurisdiction

Name/Address	Name/Address
Bath	*Mason City & Mason City FPD*
Community Center, 205 E. First St.	City Hall, 145 South Main St.
Havana	Public Works Shop, 217 North Tonica St.
Havana Fire & Police Building, 226 W. Market St.	*San Jose*
Kilbourne & Kilbourne FD	Village Hall, 309 South Second St.
Fire Station, 308 W Walnut St.	San Jose Community Center, 311 South Second St.
Manito	
Forman Fire Department, 205 N. Broadway St.	
Forman Center, 308 S. Harrison St.	

What is the probability of future extreme cold events occurring?

Mason County has experienced 46 verified occurrences of excessive heat between 1996 and 2021. With 46 occurrences over the past 26 years, Mason County should expect to experience at least one extreme cold event a year. It is important to keep in mind that there are almost certainly gaps in the extreme cold data. More events have almost certainly occurred than are documented in this section, which means that the probability is almost certainly higher than reported.

There were 15 years over the last 26 years where multiple (two or more) extreme cold events occurred. This indicates that the probability that multiple excessive heat events may occur during any given year within the County is 58%.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from extreme cold.

Are the participating jurisdictions vulnerable to extreme cold?

Yes. All of Mason County, including the participating jurisdictions, is vulnerable to the dangers presented by extreme cold. Since 2012, Mason County has experienced 23 extreme cold events.

Do any of the participating jurisdictions consider extreme cold to be among their community's greatest vulnerabilities?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the following respondents considered extreme cold to be among their community's greatest vulnerabilities.

- *Mason City*: The City does not have any designated warming centers for use by vulnerable residents. Any locations that are identified as designated warming centers should have automatic emergency backup generators available to ensure the center can continue to operate during power outages.
- *Mason City FPD*: If the power was knocked out within the District, a facility with an emergency backup generator needs to be designated as a warming center for use by vulnerable District residents.
- *Havana CUSD #126*: Emergency backup generators are needed at District schools to ensure the heating system functions and meal preparation is available if an extended power outage occurs during a cold day when students are present.

What impacts resulted from the recorded extreme cold events?

Damage information was either unavailable or none was recorded, and no injuries or fatalities were reported as a result of any of the extreme cold events. In comparison, the State of Illinois averages 18 cold-related fatalities annually according to the Illinois State Water Survey's Climate Atlas of Illinois.

Extreme Cold Fast Facts – Impacts/Risk

Extreme Cold Impacts:
- Total Property Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Extreme Cold Risk/Vulnerability:
- Public Health & Safety: ***Low to Medium***
- Buildings/Infrastructure/Critical Facilities: ***Low***

What other impacts can result from extreme cold events?

Other impacts of extreme cold include early school dismissals and school closing, power outages and frozen and ruptured water pipes and water mains. Individuals who are outdoors during and immediately following extreme cold events can experience health and safety problems. Frostbite to hands, feet, ears and nose and hypothermia are common injuries.

What is the level of risk/vulnerability to public health and safety from severe winter storms and extreme cold?

For Mason County the level of risk or vulnerability posed by extreme cold to public health and safety is considered to be ***low*** to ***medium.*** This assessment is based on the fact that while extreme cold events occur regularly, the number of injuries and fatalities reported is low even and all but two of the participating jurisdictions have designated warming centers.

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

Yes. All existing buildings, infrastructure and critical facilities located in Mason County and the participating jurisdictions are vulnerable to damage from extreme cold. Individual water pipes and distribution lines and 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 extreme cold events have occurred in Mason County; the damages described; 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 extreme cold events is ***low***.

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

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 extreme cold, the County and the three remaining participating municipalities do not. Infrastructure such as residential water pipes will continue to be vulnerable as long as they are located in areas such as outside walls, attics and crawl spaces that do not contain proper insulation.

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

Unlike other natural hazards, such as tornadoes, there are no standard loss estimation models or methodologies for extreme cold events. With none of the recorded events listing property damage figures, there is no way to accurately estimate future potential dollar losses from extreme cold. However, since all existing structures within Mason County are vulnerable to damage, it is likely that there will be future dollar losses from extreme cold.

3.6 TORNADOES

HAZARD IDENTIFICATION

What is the definition of a tornado?

A tornado is a narrow violently rotating column of air, often visible as a funnel-shaped cloud that extends from the base of a thunderstorm cloud formation to the ground. The most violent tornadoes can have wind speeds of more than 300 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. A typical tornado travels at around 10 to 20 mile per hour, but this may vary from almost stationary to 60 miles per hour. Tornadoes can occur at any time of the year and happen at any time of the day or night, although most occur between 4 p.m. and 9 p.m.

About 1,200 tornadoes hit the United States yearly, with an average 52 tornadoes occurring annually in Illinois. 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, injuries and fatalities. Tornadoes are known to blow roofs off buildings, flip vehicles and demolish homes. Typically, tornadoes cause the greatest damage to structures of light construction, such as residential homes. On average, tornadoes cause 60 to 65 facilities and 1,500 injuries in the United States annually.

How are tornadoes rated?

Originally tornadoes were rated using the Fujita Scale (F-Scale), which related the degree of damage caused by a tornado to the intensity of the tornado's wind speed. The Scale identified six categories of damage, F0 through F5. **Figure T-1** gives a brief description of each category.

Use of the original Fujita Scale was discontinued on February 1, 2007 in favor of the Enhanced Fujita Scale. The original scale had several flaws including basing a tornado's intensity and damages on wind speeds that were never scientifically tested and proven. It also did not take into consideration that a multitude of factors (i.e., structure construction, wind direction and duration, flying debris, etc.) affect the damage caused by a tornado. In addition, the process of rating the damage itself was based on the judgment of the damage assessor. In many cases, meteorologists and engineers highly experienced in damage survey techniques often came up with different F-scale ratings for the same damage.

The Enhanced Fujita Scale (EF-Scale) was created to remedy the flaws in the original scale. It continues to use the F0 through F5 categories, but it incorporates 28 different damage indicators (mainly various building types, towers/poles and trees) as calibrated by engineers and meteorologists. For each damage indicator there are eight degrees of damage ranging from barely visible damage to complete destruction of the damage indicator. The wind speeds assigned to each category are estimates, not measurements, based on the damage assessment. **Figure T-1** identifies the Enhanced Fujita Scale.

Figure T-1
Fujita & Enhanced Fujita Tornado Measurement Scales

F-Scale		EF-Scale		Description
Category	Wind Speed (mph)	Category	Wind Speed (mph)	
F0	40 – 72	EF0	65 – 85	Light damage – some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; damage to sign boards
F1	73 – 112	EF1	86 – 110	Moderate damage – peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
F2	113 – 157	EF2	111 – 135	Considerable damage – roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground
F3	158 – 207	EF3	136 – 165	Severe damage – roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown
F4	208 – 260	EF4	166 – 200	Devastating damage – well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated
F5	261 – 318	EF5	Over 200	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: NOAA, Storm Prediction Center.

The idea behind the EF-Scale is that a tornado scale needs to take into account the typical strengths and weaknesses of different types of construction, instead of applying a "one size fits all" approach. This is due to the fact that the same wind speed can cause different degrees of damage to different kinds of structures. In a real-life application, the degree of damage to each of the 28 indicators can be mapped together to create a comprehensive damage analysis. As with the original scale, the EF-Scale rates the tornado as a whole based on the most intense damage within the tornado's path.

While the EF-Scale is currently in use, ***the historical data presented in this report is based on the original F-Scale***. None of the tornadoes rated before February 1, 2007 will be re-evaluated using the EF-Scale.

Are alerts issued for tornadoes?

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

- **Watch.** A tornado watch is issued when tornadoes are possible in the area. Individuals need to be alert and prepared. Watches are typically large, covering numerous counties or even states.

- **Warning.** A tornado warning is issued when a tornado has been sighted or indicated by weather radar. Warnings indicate imminent danger to life and property for those who are in the path of the tornado. Individuals should see shelter immediately. Typically, warnings encompass a much smaller area, such as a city or small county.

HAZARD PROFILE

The following identifies past occurrences of tornadoes; details the severity or extent of each event (if known); identifies the locations potentially affected; and estimates the likelihood of future occurrences.

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

Table 10, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of tornado events recorded in Mason County. NOAA's Storm Events Database, Storm Data Publications, and Storm Prediction Center have documented 36 occurrences of tornadoes in Mason County between 1950 and 2021. In comparison, there have been 2,443 tornadoes statewide between 1950 and 2017 according to NOAA's Storm Prediction Center. **Figure T-2** charts the reported occurrences of tornadoes by magnitude. Of the 36 reported occurrences there was: 3 – F3, 6 – F2s, 11 – F1s, 9 – F0s, 3 – EF1s, and 4 – EF0s.

Tornado Fast Facts – Occurrences

Number of Tornadoes Reported (1950 – 2021): ***36***
Highest F-Scale Rating Recorded: ***F3***
(January 24, 1967, May 15, 1968, & May 13, 1995)
Most Likely Month for Tornadoes to Occur: ***April***
Most Likely Time for Tornadoes to Occur: ***Afternoon/Early Evening***
Average Length of a Tornado: ***4.44 miles***
Average Width of a Tornado: ***114 yards***
Average Damage Pathway of a Tornado: ***0.29 sq. mi.***
Longest Tornado Path in the County: ***25.6 miles (Apr. 13, 1981)***
Widest Tornado Path in the County: ***880 yards (May 13, 1995)***

Figure T-2
Tornadoes by Magnitude
1950 – 2021

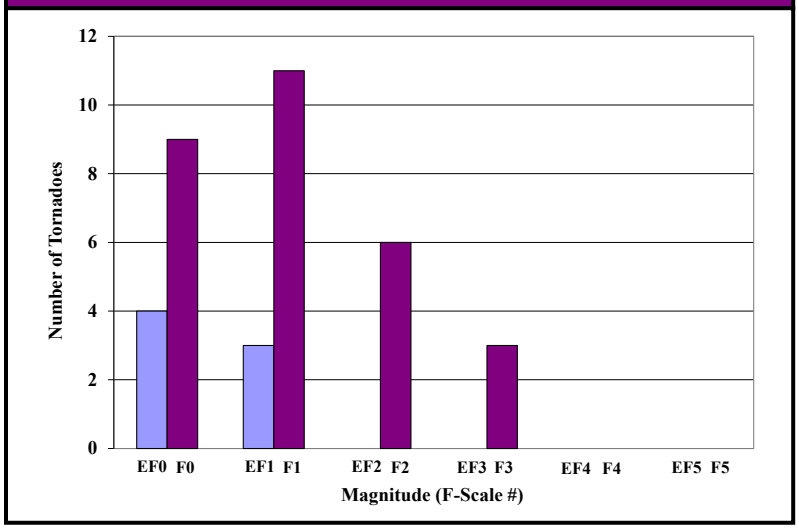


Figure T-3 charts the reported tornadoes by month. Of the 36 events, 19 (53%) took place in April, May and June making this the peak period for tornadoes in Mason County. Of those 19 events, 8 (42%) occurred during April making this the peak month for tornadoes. In comparison, 1,584 of the 2,443 tornadoes (65%) recorded in Illinois from 1950 through 2017 took place in April, May, and June.

Figure T-3
Tornadoes by Month
1950 – 2021

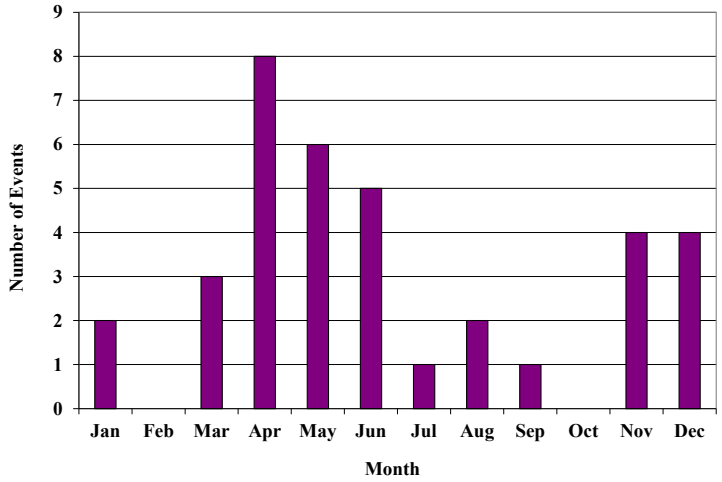
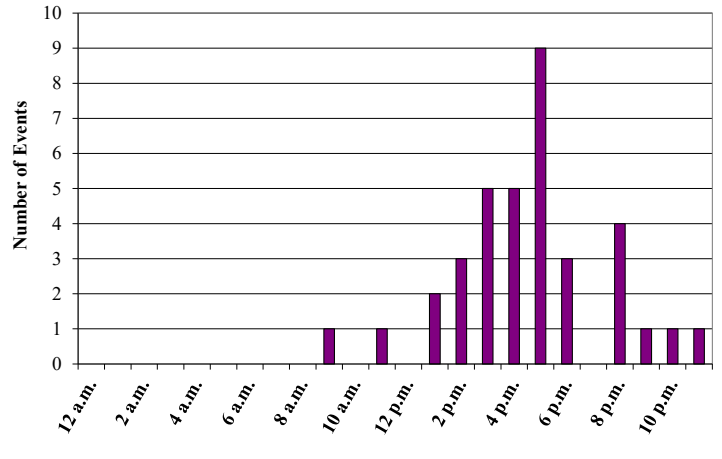


Figure T-4 charts the reported tornadoes by hour. Approximately 94% of all tornadoes occurred during the p.m. hours, with 27 of the p.m. events (75%) taking place between 1 p.m. and 7 p.m. In comparison, more than half of all Illinois tornadoes occur between 2 p.m. and 8 p.m.

Figure T-4
Tornadoes by Hour
1950 – 2021



The tornadoes that have impacted Mason County have varied from 0.1 miles (176 yards) to 25.6 miles in length and from 10 yards to 880 yards in width. The average length of a tornado in Mason County is 4.44 miles and the average width is 114 yards (0.065 miles).

Figure T-5 shows the pathway of each reported tornado. The numbers by each tornado correspond with the tornado description in **Table 10** in **Appendix J**. Records indicate that most of these tornadoes generally moved from southwest to northeast across the County. Unlike other natural hazards (i.e., severe winter storms, drought, and excessive heat), tornadoes impact a relatively small area. Typically, the area impacted by a tornado is less than four square miles. In Mason County, the average damage pathway or area impacted by a tornado is 0.29 square miles.

On April 15, 2011 an EF1 tornado near Poplar City destroyed several outbuildings, including this garage.

Photograph courtesy of The Mason County Democrat

The longest tornado recorded in Mason County occurred on April 13, 1981. This F1 tornado measured 46.1 miles in length and touched down in Lewistown (Fulton County), traveling southeast to near Havana before tracking eastward across Mason County and into Logan County where it changed course again, heading southeast before lifting off at Lincoln. The tornado was on the ground in Mason County for approximately 25.6 miles. The damage pathway of this tornado covered an estimated 2.62 square miles, with approximately 1.45 square miles occurring in Mason County.

The widest tornado recorded in Mason County occurred on May 13, 1995. This F3 tornado, measuring 880 yards wide and 25.0 miles in length, touched down northeast of Goofy Ridge and traveled northeast through Sand Ridge State Forest and into Tazewell County before lifting off in Tremont. The tornado was on the ground in Mason County for approximately 3.56 miles. The damage pathway of this tornado covered an estimated 12.5 square miles, with approximately 1.78 square miles occurring in Mason County.

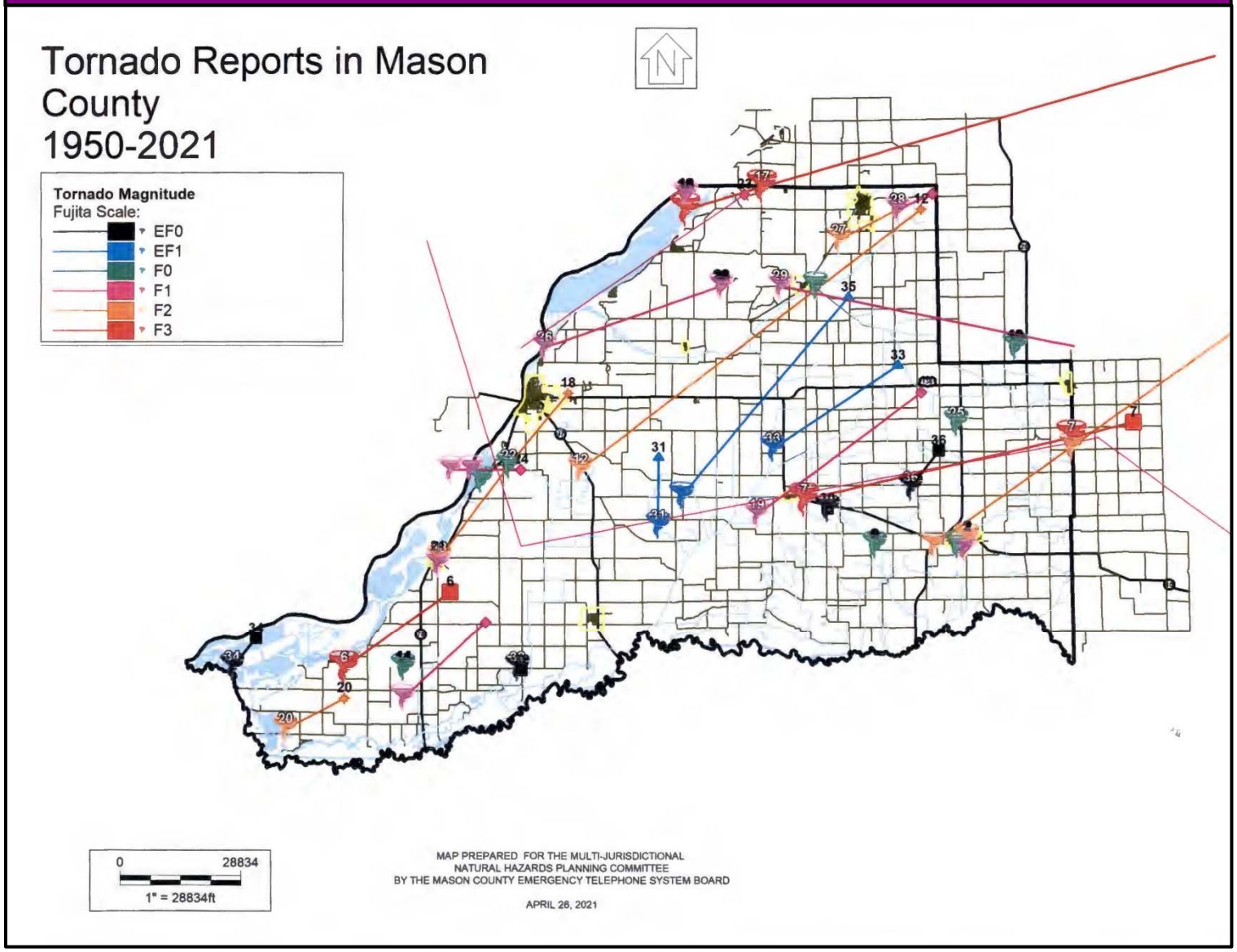
What locations are affected by tornadoes?

Tornadoes have the potential to affect the entire County. Of the seven participating municipalities, four have had reported occurrences of tornadoes within their corporate limits. The *2018 Illinois Natural Hazard Mitigation Plan* prepared by IEMA classifies Mason County's hazard rating for tornadoes as "medium."

What is the probability of future tornadoes occurring?

Mason County has had 36 verified occurrences of tornadoes between 1950 and 2021. With 36 tornadoes over the past 72 years, the probability or likelihood that a tornado will touchdown somewhere in the County in any given year is 50%. There were seven years over the last 72 years where more than one tornado occurred. This indicates that the probability that more than one tornado may occur during any given year within the County is about 10%.

Figure T-5
Tornado Pathways in Mason County



HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from tornadoes.

Are the participating jurisdictions vulnerable to tornadoes?

Yes. All of Mason County, including the participating jurisdictions, is vulnerable to the dangers presented by tornadoes. Since 2012, five tornadoes have been recorded in Mason County.

Of the participating municipalities, Bath, Easton, Manito, and Mason City have had a tornado touch down or pass through their municipal boundaries. **Figure T-6** lists the verified tornadoes that have touched down in or near or passed through each participating municipality.

Figure T-6
Verified Tornadoes In or Near Participating Municipalities

Participating Municipality	Number of Verified Tornadoes	Year	
		Touched Down/Passed Through Municipality	Touched Down/Passed Near Municipality
Bath[2]	4	1996, 1998	1967, 1995
Easton	3	1968, 1996	2017
Havana[1,2]	7	---	1975, 1981, 1996, 1998, 1998, 1999, 2003
Kilbourne[2,5]	2	---	1967, 2015
Manito[3]	3	2003	1975, 2003
Mason City[1,6]	8	1951, 1957, 1957, 1974, 1987	1974, 2001, 2021
San Jose	3	---	1974, 1981, 2003

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

In terms of unincorporated areas vulnerable to tornadoes, Snicarte has had five tornadoes touch down near its vicinity while Sand Ridge State Forest has had four tornadoes touch down in or near its territory. **Figure T-7** details the verified tornadoes that have touched down in or near unincorporated areas of Mason County.

Do any of the participating jurisdictions consider tornadoes to be among their community's greatest vulnerabilities?

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the following respondents considered tornadoes to be among their community's greatest vulnerabilities.

- *Easton*: If a tornado were to damage or destroy the Village's water tower, there would be limited space to rebuild or setup temporary service.
- *Havana CUSD #126*: A tornado could prevent or make it hazardous to transport students home following an event.
- *Kilbourne FD*: Tornadoes have touchdown in the District before causing several close calls.
- *Mason City/Mason City FPD*: Neither the City nor the FPD have storm sirens to alert residents of an impending tornado.

Figure T-7
Verified Tornadoes in or near Unincorporated Areas of Mason County

Unincorporated Area	Number of Verified Tornadoes	Year	
		Touched Down/Passed ***Through*** Unincorporated Area	Touched Down/Passed ***Near*** Unincorporated Area
Baldwin Beach[2,4]	1	1998	---
Bishop[3]	1	---	1975
Buzzville[2]	1	---	1998
Eckard[2,4]	1	---	1981
Goofy Ridge[3]	2	---	1995, 1998
Matanzas Beach[2,4]	2	1961	1999
Natrona	1	1968	---
Poplar City	2	---	2011, 2018
Quiver Beach[2,4]	1	2003	---
Sand Ridge State Forest[3]	4	1995, 2003	1990, 1998
Snicarte[2]	5	---	1967, 1967, 1995, 1998, 2018
Teheran[6]	1	---	2009

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

What impacts resulted from the recorded tornadoes?

Data obtained from NOAA's Storm Events Database, NOAAs Storm Data Publications, NOAA's Storm Prediction Center and the National Weather Service Central Illinois Weather Forecast Office in Lincoln indicates that between 1950 and 2021, 16 of the 36 tornadoes caused $6,037,500 in property damages and $2,500 in crop damages. Three of the 16 tornadoes have property damage totals of at least $500,000. Property damage information was either unavailable or none was recorded for the remaining 20 reported occurrences.

Tornado Fast Facts – Impacts/Risk

Tornado Impacts:
- Total Property Damage (16 events): ***$6,037,500***
- Total Crop Damage (1 events): ***$2,500***
- Injuries (9 events): ***59***
- Fatalities (1 event): ***1***

Tornado Risk/Vulnerability:
- Public Health & Safety – Rural Areas: ***Low/Medium***
- Public Health & Safety – Municipalities: ***High***
- Buildings/Infrastructure/Critical Facilities – Rural Areas: ***Low***
- Buildings/Infrastructure/Critical Facilities – Municipalities/Populated Unincorp. Areas: ***High***

Located in **Appendix L** are select photographs provided by the Mason County Democrat that show the extent of the property damage sustained during the EF1 tornado that touched down near Poplar City on April 15, 2011.

NOAA's Storm Events Database and Planning Committee member records documented one fatality and 59 injuries as a result of nine tornado events. Detailed information was only available for four of the events. The following provides a brief description:

- Two children were injured by flying glass when an F0 tornado touched down in Forest City on December 4, 1973.

- A woman sustained minor injuries when an F2 tornado touched down in Bath on April 19, 1996 and destroyed the mobile home she was occupying.
- On May 10, 2003 an elderly woman sustained minor injuries, a cut on her arm and bruises, while taking shelter in her walk-in pantry from an F2 tornado that touched down in Manito.
- An individual was injured by flying glass from an EF1 tornado that touched down near Poplar City on April 15, 2011.

In comparison, Illinois averages roughly four tornado fatalities annually; however, this number varies widely from year to year.

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 facilities, water towers, communication towers, antennae, 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 extended periods of time).

What is the level of risk/vulnerability to public health and safety from tornadoes?

According to the 2018 Illinois Natural Hazard Mitigation Plan, Mason County ***ranks in the top 25 counties in Illinois in terms of tornado frequency***. This fact alone suggests that the overall risk posed by tornadoes to public health and safety is relatively high. While frequency is important, other factors must be examined when assessing vulnerability including population distribution and density, the ratings and pathways of previously recorded tornadoes, the presence of high-risk living accommodations (such as high-rise buildings, mobile homes, etc.) and adequate access to health care for those injured following a tornado.

Mason County

For Mason County the level of risk or vulnerability posed by tornadoes to public health and safety is considered to be ***low*** to ***medium***. This assessment is based on the fact that despite their relative frequently, a large majority of the tornadoes that have impacted the County have touched down in rural areas away from concentrated populations. This has contributed to a low number of injuries and fatalities. In addition, the County is not densely populated and there is not a large number of high-risk living accommodations present.

In terms of adequate access to health care, Mason District Hospital in Havana is equipped to provide continuous care to persons injured by a tornado assuming that it is not directly impacted. In addition, there are also nearby hospitals in the Peoria area (Tazewell and Peoria Counties), Lincoln (Logan County) and Canton (Fulton County), which are equipped to provide care.

Participating Municipalities

In general, if a tornado were to touchdown or pass through any of the participating municipalities the risk to the public health and safety would be considered ***high***. This is based on the fact that six of the seven of the participating jurisdictions are small in size (less than 1.4 square miles) and have relatively dense and evenly distributed populations within their municipal boundaries. As a

result, if a tornado were to touch down anywhere within the corporate limits of these municipalities it will have a greater likelihood of causing injuries or even fatalities.

Do any participating jurisdictions have community safe rooms?

Yes. Bath identified the Community Center as a community safe room while Havana identified the Fire and Police Building and City Hall as having community safe rooms. None of the other participating jurisdictions have community safe rooms. As a result, if a tornado were to touch down or pass through any of the other population centers in the County, then there would be a greater likelihood of injuries and fatalities due to the lack of structures specifically designed and constructed to provide life-safety protection. Each jurisdiction should consider whether the potential impacts to public health and safety from a tornado are considered great enough to warrant the consideration of community safe rooms as a mitigation action.

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

Yes. All existing buildings, infrastructure and critical facilities located within the County and participating municipalities are vulnerable to tornado damage. Buildings, infrastructure, and critical facilities located in the path of a tornado 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 from 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.

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.

Assessing the Vulnerability of Existing Residential Structures

One way to assess the vulnerability of existing residential structures is to estimate the number of housing units that may be potentially damaged if a tornado were to touch down or pass through any of the participating municipalities or the County. In order to accomplish this, a set of decisions/assumptions must be made regarding:

- the size (area impacted) by the tornado;
- the method used to estimate the area impacted by the tornado within each jurisdiction; and
- the method used to estimate the number of potentially-damaged housing units.

The following provides a brief discussion of each decision/assumption.

Assumption #1: Size of Tornado. To calculate the number of existing residential structures vulnerable to a tornado, the size (area impacted) by the tornado must first be determined. There are several scenarios that can be used to calculate the size, including the worst case and the average. For this analysis, the area impacted by an average-sized

Assumption #1

Size of Tornado = 0.29 sq. miles

tornado in Mason County will be used since it has a higher probability of recurring. In Mason County the area impacted by an average-sized tornado is 0.29 square miles. This average is based on more than 70 years of data.

Assumption #2: Method for Estimating the Area Impacted. Next, a method for determining the area within each jurisdiction impacted by the average-sized tornado needs to be chosen. There are several methods that can be used including creating an outline of the area impacted by the average-sized tornado and overlaying it on a map of each jurisdiction (most notably the municipalities) to see if any portion of the area falls outside of the corporate limits (which would require additional calculations) or just assume that the entire area of the average-sized tornado falls within the limits of each jurisdiction. For this discussion, it is assumed that the entire area of the average-sized tornado will fall within the limits of the participating jurisdictions.

Assumption #2

The entire area impacted by the average-sized tornado falls within the limits of each participating jurisdiction.

This method is quicker, easier, and more likely to produce consistent results when the Plan is updated again. There is, however, a greater likelihood that the number of potentially-damaged housing units will be overestimated for those municipalities that have irregular shaped boundaries or occupy less than one square mile.

Assumption #3: Method for Estimating Potentially-Damaged Housing Units. With the size of the tornado selected and a method for estimating the area impacted chosen, a decision must be made on an approach for estimating the number of potentially-damaged housing units. There are several methods that can be used including overlaying the average-sized tornado on a map of each jurisdiction and counting the impacted housing units or calculating the average housing unit density to estimate the number of potentially-damaged housing units.

Assumption #3

The average housing unit density for each municipality will be used to determine the number of potentially-damaged housing units.

For this analysis, the average housing unit density will be used since it provides a realistic perspective on potential residential damages without conducting extensive counts. Using the average housing unit density also allows future updates to the Plan to be easily recalculated and provides an exact comparison to previous estimates.

Calculating Average Housing Unit Density

The average housing unit density can be calculated by taking the number of housing units in a jurisdiction and dividing that by the land area within the jurisdiction. **Figure T-8** provides a sample calculation.

Figure T-9 provides a breakdown of housing unit densities by participating municipality as well as for the unincorporated areas of the County and the County as a whole.

While the average housing unit density provides an adequate assessment of the number of housing units in areas where the housing density is fairly constant, such as municipalities, it does not

provide a realistic assessment for those counties with large, sparsely populated rural areas such as Mason County.

Figure T-8
Calculation of Average Housing Unit Density – Mason County

Total Housing Units in the Jurisdiction ÷ Land Area within the Jurisdiction = Average Housing Unit Density
(Rounded Up to the Nearest Whole Number)

Mason County: 7,055 housing units ÷ 539.238 sq. miles = 13.08 housing units/sq. miles
(14 housing units)

Figure T-9
Average Housing Unit Density by Participating Jurisdiction

Participating Jurisdiction	Township Location	Total Housing Units (2015-2019)*	Mobile Homes (2015-2019)*	Land Area (Sq. Miles) (2010)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)
Bath[2]	Bath	155	28	0.365	---
Easton	Sherman	136	2	0.240	---
Havana[1,2]	Havana	1,500	58	2.741	547.246
Kilbourne[2,5]	Kilbourne	163	12	0.889	---
Manito[3]	Manito	745	6	1.441	517.002
Mason City[1,6]	Mason City	1,169	63	1.014	1,152.860
San Jose	Allens Grove	303	8	0.500	---
Unincorp. County	---	2,720	347	531.388	5.119
County	---	7,055	549	539.238	13.083

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

* US Census Bureau, American Community Survey, 5-Year Data Profile

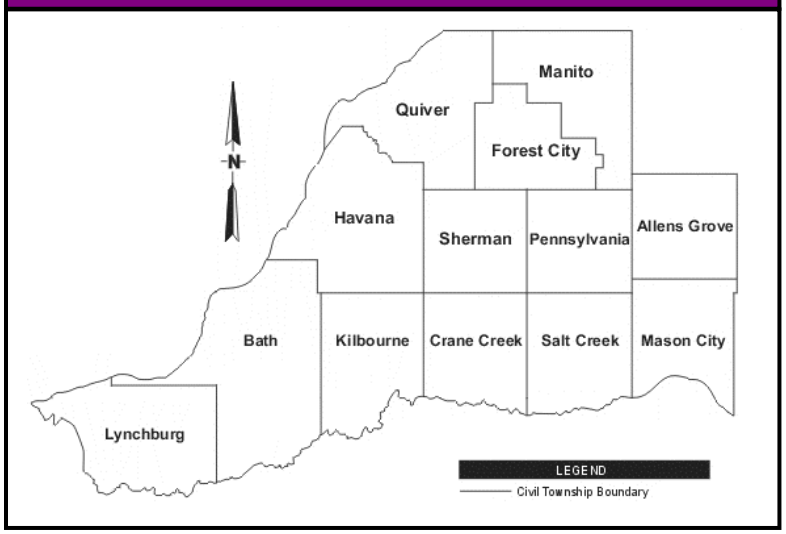
Source: U. S. Census Bureau.

In Mason County, as well as many other west-central Illinois counties, there are pronounced differences in housing unit densities within the County. More than 80% of all housing units and 86% of mobile homes are located in five of the County's 13 townships (Bath, Havana, Manito, Mason City, and Quiver). **Figure T-10** identifies the township boundaries.

This substantial difference in density skews the average *county* housing unit density in Mason County and is readily apparent when compared to the average housing unit densities for each of the townships within the County. **Figure T-11** provides a breakdown of housing unit densities by township and illustrates the differences between the various townships and the County as a whole.

For nine of the 13 townships, the *average county* housing unit density is greater (in some cases considerably greater) than the *average township* housing unit densities. However, the *average county* housing unit density is less (in most cases considerably less) than the housing unit densities for four of the most populated townships (Havana, Manito, Mason City and Quiver.)

Figure T-10
Township Boundaries – Mason County



Source: Illinois Secretary of State.

Figure T-11
Average Housing Unit Density by Township

Township	Incorporated Municipalities Located in Township	Total Housing Units (2015-2019)*	Mobile Homes (2015-2019)*	Land Area (Sq. Miles) (2010)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)
Allens Grove[6]	San Jose	334	5	35.725	9.349
Bath[2,4,5]	Bath	481	102	66.775	7.203
Crane Creek	---	55	0	34.011	1.617
Forest City[3]	Forest City	213	25	33.312	6.394
Havana[1,2,4,5]	Havana	2,181	128	57.861	37.694
Kilbourne[2,5]	Kilbourne	200	17	40.102	4.987
Lynchburg[2]	---	224	21	42.095	5.321
Manito[3]	Manito	1,087	115	43.771	24.834
Mason City[1,6]	Mason City	1,321	63	35.416	37.300
Pennsylvania	---	74	4	35.846	2.064
Quiver	Topeka	584	67	42.489	13.745
Salt Creek[6]	---	108	0	35.818	3.015
Sherman[4]	Easton	193	2	36.017	5.359
Townships - 5 most populated	---	5,654	475	246.312	22.955
County - 8 least populated	---	1,401	74	292.926	4.783

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

* US Census Bureau, American Community Survey, 5-Year Data Profile

Tornado damage to buildings (especially mobile homes), infrastructure and critical facilities in these more densely populated townships is likely to be greater than in the rest of the County. The County, Havana, Mason City and San Jose all have ordinances that require anchoring systems for mobile homes that should help limit the damage from lower rated tornadoes.

Estimating the Number of Potentially-Damaged Housing Units

Before an estimate of the number of potentially-damaged housing units can be calculated for the participating municipalities, an additional factor needs to be taken into consideration: the presence of commercial/industrial developments and/or large tracts of undeveloped land. Occasionally villages and cities will annex large tracts of undeveloped land or have commercial/industrial parks/developments located within their corporate limits. In many cases these large tracts of land include very few residential structures. Consequently, including these tracts of land in the calculations to determine the number of potentially-damaged housing units skews the results, especially for very small municipalities. Therefore, to provide a more realistic assessment of the number of potentially-damaged housing units, these areas need to be subtracted from the land area figures obtained from the U.S. Census Bureau.

In Mason County, all of the municipalities have either large, sparsely-populated undeveloped open areas or commercial/industrial areas within their municipal boundaries. These areas account for between 15% and 70% of the land area in these municipalities. If these areas are subtracted from the U.S. Census Bureau land area figures, then the remaining land areas have fairly consistent housing unit densities and contain a majority of the housing units. **Figure T-12** provides a breakdown of the refined land area figures for select municipalities. These refined land area figures will be used to update the average housing unit density calculations for these municipalities.

Figure T-12
Refined Land Area Figures for Participating Municipalities with Large Tracts of Commercial/Industrial and Undeveloped Land Areas

Participating Jurisdiction	Land Area (Sq. Miles) (2010)	Estimated Open Land Area & Commercial/ Industrial Tracts (Sq. Miles)	Refined Land Area (Sq. Miles)
Bath[2]	0.365	0.140	0.225
Easton	0.240	0.120	0.120
Havana[1,2]	2.741	1.400	1.341
Kilbourne[2,5]	0.889	0.620	0.269
Manito[3]	1.441	0.850	0.591
Mason City[1,6]	1.014	0.150	0.864
San Jose	0.500	0.240	0.260

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

With updated average housing unit densities calculated it is relatively simple to provide an estimate of the number of existing potentially-damaged housing units. This can be done by multiplying the average housing unit density by the area impacted by the average-sized Mason County tornado. **Figure T-13** provides a sample calculation.

Figure T-13 **Sample Calculation of Potentially-Damaged Housing Units – Mason County**
Average Housing Unit Density x Area Impacted by the Average-Sized Mason County Tornado = Potentially-Damaged Housing Units (Rounded Up to the Nearest Whole Number) Mason County: 13.083 housing units/sq. mile x 0.29 sq. miles = 3.79 housing units **(4 housing units)**

For those municipalities that cover less than one square mile, the average housing unit density cannot be used to calculate the number of potentially-damaged housing units. The average housing unit density assumes that the land area within the municipality is at least one square mile and as a result distorts the number of potentially-damaged housing units for very small municipalities.

To calculate the number of potentially-damaged housing units for these municipalities, the area impacted by the averaged-sized Mason County tornado is divided by the land area within the municipality to get the impacted land area. The impacted land area is then multiplied by the total number of housing units within the municipality to get the number of potentially-damaged housing units. **Figure T-14** provides a sample calculation. Since the refined land areas in Bath, Easton, Kilbourne, and San Jose are less than or equal to the average area impacted, it is assumed that all of the housing units within these villages will be potentially damaged.

Figure T-14 **Sample Calculation of Potentially-Damaged Housing Units for Municipalities Covering Less Than One Square Mile – Manito**
Area Impacted by the Average-Sized Mason County Tornado ÷ Land Area within the Jurisdiction x Total Housing Units in the Jurisdiction = Potentially-Damaged Housing Units (Rounded Up to the Nearest Whole Number) Manito: 0.29 sq. mile ÷ 0.591 sq. miles x 745 housing units = 365.56 **(366 housing units)**

Figures T-15 and **T-16** provide a breakdown of the number of potentially-damaged housing units by participating municipality as well as by township and for the unincorporated areas of the County and the County as a whole. It is important to note that for the three most densely populated townships, the estimated number of potentially-damaged housing units would only be reached if a tornado's pathway included the major municipality within the township. If the tornado remained in the rural portion of the township, then the number of potentially-damaged housing units would be considerably lower.

Figure T-15
Estimated Number of Housing Units by Participating Jurisdiction Potentially Damaged by a Tornado

Participating Jurisdiction	Total Housing Units (2015-2019)	Land Area/Refined Land Area (Sq. Miles) (2010)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.29 Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.29 Sq. Mi.) (Rounded Up)
Bath[2]	155	0.225	---	155	155
Easton	136	0.120	---	136	136
Havana[1,2]	1,500	1.341	1,118.568	324.385	324
Kilbourne[2,5]	163	0.269	---	163	163
Manito[3]	745	0.591	---	365.567	366
Mason City[1,6]	1,169	0.864	---	392.373	392
San Jose	303	0.260	---	303	303
Unincorp. County	2,720	531.388	5.119	1.484	2
County	7,055	539.238	13.083	3.794	4

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

Figure T-16
Estimated Number of Housing Units by Township Potentially Damaged by a Tornado

Township	Total Housing Units (2015-2019)	Land Area (Sq. Miles) (2010)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.29 Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.29 Sq. Mi.) (Rounded Up)
Allens Grove[6]	334	35.725	9.349	2.711	3
Bath[2,4,5]	481	66.775	7.203	2.089	3
Crane Creek	55	34.011	1.617	0.469	1
Forest City[3]	213	33.312	6.394	1.854	2
Havana[1,2,4,5]	2,181	57.861	37.694	10.931	11
Kilbourne[2,5]	200	40.102	4.987	1.446	2
Lynchburg[2]	224	42.095	5.321	1.543	2
Manito[3]	1,087	43.771	24.834	7.202	8
Mason City[1,6]	1,321	35.416	37.300	10.817	11
Pennsylvania	74	35.846	2.064	0.599	1
Quiver	584	42.489	13.745	3.986	4
Salt Creek[6]	108	35.818	3.015	0.874	1
Sherman[4]	193	36.017	5.359	1.554	2
Townships - 5 most populated	5,654	246.312	22.955	6.657	7
County - 8 least populated	1,401	292.926	4.783	1.387	2

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

What is the level of risk/vulnerability to existing buildings, infrastructure, and critical facilities vulnerable from tornadoes?

There are several factors that must be examined when assessing the vulnerability of existing buildings, infrastructure, and critical facilities to tornadoes. These factors include tornado frequency, population distribution and density, the ratings and pathways of previously recorded tornadoes, and the presence of high-risk living accommodations (such as high-rise buildings, mobile homes, etc.).

Unincorporated Mason County

For unincorporated Mason County the level of risk or vulnerability posed by tornadoes to existing buildings, infrastructure and critical facilities is considered to be ***low***. This assessment is based on the frequency with which tornadoes have occurred in the County as well as the amount of damage that has been sustained tempered by the low population density throughout most the County as well as the relative absence of high-risk living accommodations. While previously recorded tornadoes have followed largely rural pathways, they have caused significant damage on several occasions.

On April 15, 2011, an EF1 tornado near Poplar City destroyed several outbuildings.

Photograph courtesy of The Mason County Democrat

Participating Municipalities (Including Schools & the Hospital)

In general, if a tornado were to touchdown or pass through any of the participating municipalities the risk to existing buildings, infrastructure and critical facilities would be considered ***high***. This assessment is based on the population and housing unit distribution of the municipalities where wide expanses of open spaces do not generally exist. As a result, if a tornado were to touch down within any of the municipalities it will have a greater likelihood of causing substantial property damage.

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

Yes and No. While four of the participating municipalities have building codes in place that will likely lessen the vulnerability of new buildings and critical facilities to damage from tornadoes, the County and three other municipalities do not. However, even new buildings and critical facilities built to code are vulnerable to the risks posed by a higher rated tornado.

Infrastructure such as new communication and power lines will continue to be vulnerable to tornadoes as long as they are located above ground. Flying debris can disrupt power and communication lines even if they are not directly in the path of the tornado. Steps to bury all new lines would eliminate the vulnerability, but this action would be cost prohibitive in most areas.

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 the

potentially-damaged housing units determined previously can be calculated if several additional decisions/assumptions are made regarding:

- the value of the potentially-damaged housing units; and
- the percent damage sustained by the potentially-damaged housing units (i.e., damage scenario).

These assumptions represent a ***probable scenario*** based on the reported historical occurrences of tornadoes in Mason County. The purpose of providing a rough estimate is to help residents and municipal/county 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. The following provides a brief discussion of each decision/assumption.

Assumption #4

The average market value for residential structures in each participating jurisdiction will be used to determine the value of potentially-damaged housing units.

Assumption #4: Value of Potentially-Damaged Housing Units. In order to determine the potential dollar losses to the potentially-damaged housing units, the monetary value of the units must first be calculated. Typically, when damage estimates are prepared after a natural disaster such as a tornado, they are based on the market value of the structure. Since it would be impractical to determine the individual market value of each potentially-damaged housing unit, the average market value of residential structures in each municipality will be used.

To determine the average market value, the average assessed value must first be calculated. The average assessed value is calculated by taking the total assessed value of residential buildings within a jurisdiction and dividing that number by the total number of housing units within the jurisdiction. The average market value is then determined by taking the average assessed value and multiplying that number by three (the assessed value of a structure in Mason County is approximately one-third of the market value). **Figure T-17** provides a sample calculation. The total assessed value is based on 2020 tax assessment information provided by the Mason County Supervisor of Assessments.

Figure T-17
Sample Calculation of Average Assessed Value & Average Market Value – Easton

Average Assessed Value

Total Assessed Value of Residential Buildings in the Jurisdiction÷ Total Housing Units in the Jurisdiction = Average Assessed Value

Easton: $3,200,726 ÷ 136 housing units = $23,534.75

Average Market Value

Average Assessed Value x 3 = Average Market Value
(Rounded to the Nearest Dollar)

Easton: $23,534.75 x 3 = $70,604.25
($70,604)

Figures T-18 and **T-19** provide the average assessed value and average market value for each participating municipality as well as by township and for the unincorporated areas of the County and the County as a whole.

Figure T-18
Average Market Value of Housing Units by Municipality

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2020)	Total Housing Units (2015-2019)	Average Assessed Values	Average Market Value (2020)
Bath[2]	$1,790,688	155	$11,553	$34,659
Easton	$2,668,605	136	$19,622	$58,866
Havana[1,2]	$25,751,985	1,500	$17,168	$51,504
Kilbourne[2,5]	$1,837,560	163	$11,273	$33,819
Manito[3]	$18,544,352	745	$24,892	$74,676
Mason City[1,6]	$19,898,141	1,169	$17,022	$51,066
San Jose	$2,843,598	303	$9,385	$28,155
Unincorp. County	$53,535,495	2,720	$19,682	$59,046
County	$128,959,628	7,055	$18,279	$54,837

[1] Mason District Hospital [3] Midwest Central CUSD #191 [5] Kilbourne FD
[2] Havana CUSD #126 [4] Havana Rural FPD [6] Mason City FPD

Source: Mason County Supervisor of Assessments.

Figure T-19
Average Market Value of Housing Units by Township

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2020)	Total Housing Units (2015-2019)	Average Assessed Values	Average Market Value (2020)
Allens Grove[6]	$4,351,537	334	$13,029	$39,087
Bath[2,4,5]	$7,093,023	481	$14,746	$44,238
Crane Creek	$1,524,035	55	$27,710	$83,130
Forest City[3]	$4,014,619	213	$18,848	$56,544
Havana[1,2,4,5]	$42,905,851	2,181	$19,673	$59,019
Kilbourne[2,5]	$3,445,715	200	$17,229	$51,687
Lynchburg[2]	$2,503,904	224	$11,178	$33,534
Manito[3]	$25,864,278	1,087	$23,794	$71,382
Mason City[1,6]	$22,514,890	1,321	$17,044	$51,132
Pennsylvania	$1,506,194	74	$20,354	$61,062
Quiver	$6,702,023	584	$11,476	$34,428
Salt Creek[6]	$2,170,799	108	$20,100	$60,300
Sherman[4]	$4,362,760	193	$22,605	$67,815
Townships - 5 most populated	$105,080,065	5,654	$18,585	$55,755
County - 8 least populated	$23,879,563	1,401	$17,045	$51,135

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

Source: Mason County Supervisor of Assessments.

Assumption #5: Damage Scenario. Finally, a decision must be made regarding the percent damage sustained by the potentially-damaged housing units and their contents. For this scenario, the expected percent damage sustained by the structure and its contents is 100%; in other words, all of the potentially-damaged housing units would be completely destroyed. While it is highly unlikely that each and every housing unit would sustain the maximum percent damage, identifying and calculating different degrees of damage within the average area impacted is complex and provides an additional complication when updating the Plan.

Assumption #5

The tornado would completely destroy the potentially-damaged housing units.

Structural Damage = 100%
Content Damage = 100%

Calculating Potential Dollar Losses

With all the decisions and assumptions made, the potential dollar losses can now be calculated. First, the potential dollar losses to the ***structure*** of a potentially-damaged housing unit must be determined. This is done by taking the average market value for a residential structure and multiplying it by the percent damage (100%) to get the average structural damage per unit. Next the average structural damage per unit is multiplied by the number of potentially-damaged housing units. **Figure T-20** provides a sample calculation.

Figure T-20 ***Structure:* Potential Dollar Loss Sample Calculation – Easton**
Average Market Value of a Housing Unit with the Jurisdiction x Percent Damage = Average Structural Damage per Housing Unit Easton: $58,866 x 100% = $58,866 per housing unit Average Structural Damage per Housing Unit x Number of Potentially-Damaged Housing Units within the Jurisdiction = *Structure* Potential Dollar Losses Easton: $58,866 per housing unit x 136 housing units = $8,005,776 **($8,005,776)**

Next, the potential dollar losses to the ***content*** of a potentially-damaged housing unit must be determined. Based on FEMA guidance, the value of a residential housing unit's content is approximately 50% of its market value. Therefore, start by taking one-half the average market value for a residential structure and multiply by the percent damage (100%) to get the average content damage per unit. Next the average content damage per unit is multiplied by the number of potentially-damaged housing units. **Figure T-21** provides a sample calculation.

Figure T-21 ***Content:* Potential Dollar Loss Sample Calculation – Easton**
½ (Average Market Value of a Housing Unit) with the Jurisdiction x Percent Damage = Average Content Damage per Housing Unit Easton: ½ ($58,866) x 100% = $29,433.00 per housing unit Average Content Damage per Housing Unit x Number of Potentially-Damaged Housing Units within the Jurisdiction = *Content* Potential Dollar Losses (Rounded to the Nearest Dollar) Easton: $29,433.00 per housing unit x 136 housing units = $4,002,888 **($4,002,888)**

Finally, the ***total potential dollar losses*** may be calculated by adding together the potential dollar losses to the structure and content. **Figures T-22** and **T-23** give a breakdown of the total potential dollar losses by municipality and township.

This assessment illustrates why potential residential dollar losses should be considered when jurisdictions are deciding which mitigation projects to pursue. ***Potential dollar losses caused by an average tornado in Mason County would be expected to exceed at least $8 million in any of the participating municipalities.***

For comparison, an estimate of potential dollar losses was calculated for the entire County, the unincorporated portions of the County, the five most populated townships and the eight least populated townships. As discussed previously, the estimate for the entire County is skewed because it does not take into consideration the differences in the housing density.

Figure T-22
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Tornado by Participating Jurisdiction

Participating Jurisdiction	Average Market Value (2020)	Potentially-Damaged Housing Units (Rounded Up)	Potential Dollar Losses		Total Potential Dollar Losses
			Structure	Content	
Bath[2]	$34,659	155	$5,372,145	$2,686,073	$8,058,218
Easton	$58,866	136	$8,005,776	$4,002,888	$12,008,664
Havana[1,2]	$51,504	324	$16,687,296	$8,343,648	$25,030,944
Kilbourne[2,5]	$33,819	163	$5,512,497	$2,756,249	$8,268,746
Manito[3]	$74,676	366	$27,331,416	$13,665,708	$40,997,124
Mason City[1,6]	$51,066	392	$20,017,872	$10,008,936	$30,026,808
San Jose	$28,155	303	$8,530,965	$4,265,483	$12,796,448
Unincorp. County	$59,046	2	$118,092	$59,046	$177,138
County	$54,837	4	$219,348	$109,674	$329,022

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

Figure T-23
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Tornado by Township

Participating Jurisdiction	Average Market Value (2020)	Potentially-Damaged Housing Units (Rounded Up)	Potential Dollar Losses		Total Potential Dollar Losses
			Structure	Content	
Allens Grove[6]	$39,087	3	$117,261	$58,631	$175,892
Bath[2,4,5]	$44,238	3	$132,714	$66,357	$199,071
Crane Creek	$83,130	1	$83,130	$41,565	$124,695
Forest City[3]	$56,544	2	$113,088	$56,544	$169,632
Havana[1,2,4,5]	$59,019	11	$649,209	$324,605	$973,814
Kilbourne[2,5]	$51,687	2	$103,374	$51,687	$155,061
Lynchburg[2]	$33,534	2	$67,068	$33,534	$100,602
Manito[3]	$71,382	8	$571,056	$285,528	$856,584
Mason City[1,6]	$51,132	11	$562,452	$281,226	$843,678
Pennsylvania	$61,062	1	$61,062	$30,531	$91,593
Quiver	$34,428	4	$137,712	$68,856	$206,568
Salt Creek[6]	$60,300	1	$60,300	$30,150	$90,450
Sherman[4]	$67,815	2	$135,630	$67,815	$203,445
Townships - 5 most populated	$55,755	7	$390,285	$195,143	$585,428
County - 8 least populated	$51,135	2	$102,270	$51,135	$153,405

[1] Mason District Hospital
[2] Havana CUSD #126
[3] Midwest Central CUSD #191
[4] Havana Rural FPD
[5] Kilbourne FD
[6] Mason City FPD

Vulnerability of Commercial/Industrial Businesses and Infrastructure/Critical Facilities
The calculations presented above are meant to provide the reader with a sense of the scope or magnitude of an average-sized tornado in term of residential dollar losses. These calculations do not include damages sustained by businesses or other infrastructure and critical facilities within the participating jurisdictions.

In terms of businesses, the impacts from an average-sized tornado event can be physical and/or monetary. Monetary impacts can include loss of sales revenue either through temporary closure or loss of critical services (i.e., power, drinking water, and sewer). Depending on the magnitude of the event, the damage sustained by infrastructure and critical facilities can be extensive in nature and expensive to repair. As a result, the cumulative monetary impacts to businesses and infrastructure can exceed the cumulative monetary impacts to residences. ***While average dollar amounts cannot be supplied for these items at this time, they should be taken into account*** when discussing the impacts that an average-sized tornado could have on the participating jurisdictions.

3.7 DROUGHTS

HAZARD IDENTIFICATION

What is the definition of a drought?

While difficult to define, the National Drought Mitigation Center (NDMC) considers "drought" in its most general sense to be a deficiency of precipitation over an extended period of time, usually a season or more, resulting in a water shortage.

Drought is a normal and recurrent feature of climate and can occur in all climate zones, though its characteristics and impacts vary significantly from one region to another. Unlike other natural hazards, drought does not have a clearly defined beginning or end. Droughts can be short, lasting just a few months, or they can persist for several years. There have been 26 drought events with losses exceeding $1 billion each (CPI-Adjusted) across the U.S. between 1980 and 2018. This is due in part to the sheer size of the areas affected.

What types of drought occur?

There are four main types of droughts that occur: meteorological, agricultural, hydrological, and socioeconomic. 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 defined by the degree of dryness or rainfall deficit and the duration of the dry period. 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 refers to a period when rainfall deficits, soil moisture deficits, reduced ground water or reservoir levels needed for irrigation impact crop development and yields.
- **Hydrological Drought.** Hydrological drought refers to a period when precipitation deficits (including snowfall) impact surface (stream flow, reservoir and lake levels) and subsurface (aquifers) water supply levels.
- **Socioeconomic Drought.** Socioeconomic drought refers to a period when the demand for an economic good (fruit, vegetables, grains, etc.) exceeds the supply as a result of weather-related shortfall in the water supply.

How are droughts measured?

There are numerous quantitative measures (indicators and indices) that have been developed to measure drought. How these indicators and indices measure drought depends on the discipline affected (i.e., agriculture, hydrology, meteorology, etc.) and the region being considered. There is no single index or indicator that can account for and be applied to all types of drought.

Although none of the major indices are inherently superior to the rest, some are better suited than others for certain uses. The first comprehensive drought index developed in the United States was the Palmer Drought Severity Index (PDSI). The PDSI is calculated based on precipitation and temperature data, as well as the local Available Water Content of the soil. It is most effective

measuring drought impacts on agriculture. For many years it was the only operational drought index, and it is still very popular around the world.

The Standardized Precipitation Index (SPI), developed in 1993, uses precipitation records for any location to develop a probability of precipitation for any time scale in order to reflect the impact of drought on the availability of different water resources (groundwater, reservoir storage, streamflow, snowpack, etc.) In 2009 the World Meteorological Organization recommended SPI as the main meteorological drought index that countries should use to monitor and follow drought conditions.

The first operational 'composite' approach applied in the United States was the U.S. Drought Monitor (USDM). The USDM utilizes five key indicators, numerous supplementary indicators and local reports from expert observers around the country to produce a drought intensity rating that is ideal for monitoring droughts that have many impacts, especially on agriculture and water resources during all seasons over all climate types. NOAA's Storm Events Database records include USDM ratings and utilized them along with additional weather information to describe the severity of the drought conditions impacting affected counties. Therefore, this Plan will utilize USDM ratings to identify and describe previous drought events recorded within the County. The following provides a more detailed discussion of the USDM to aid the Plan's developers and the general public in understanding how droughts are identified and categorized.

U.S. Drought Monitor (USDM)

Established in 1999, the USDM 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. It is unique in that it combines a variety of numeric-based drought indices and indicators with local expert input to create a single composite drought indicator, the results of which are illustrated via a weekly map that depicts the current drought conditions across the United States. The USDM is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the U.S. Department of Agriculture, and the National Oceanic and Atmospheric Administration.

The USDM has a scale of five intensity categories, D0 through D4, that are utilized to identify areas of drought. **Figure DR-1** provides a brief description of each category.

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 indictors show and on local observations. 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. It is the combination of the best available data, location observations and experts' best judgment that make the U.S. Drought Monitor more versatile than other drought indices.

In addition to identifying and categorizing general areas of drought, the USDM also identifies whether a drought's impacts are short-term (typically less than 6 months – agriculture, grasslands) or long-term (typically more than 6 months – hydrology, ecology). **Figure DR-2** shows an

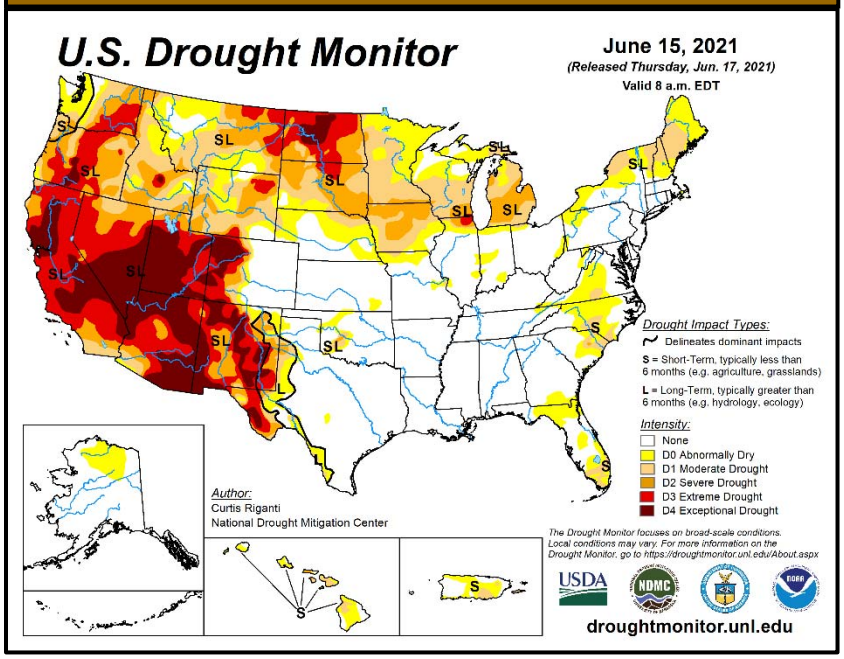
example of the USDM weekly map. The USDM is designed to provide a consistent big-picture look at drought conditions in the U.S. It is not designed to infer specifics about local conditions.

Figure DR-1
U.S. Drought Monitor – Drought Intensity Categories

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

Source: U.S. Drought Monitor.

Figure DR-2
U.S. Drought Monitor



The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map Courtesy of NDMC.

HAZARD PROFILE

The following identifies past occurrences of drought, details the severity or extent of each event (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

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

Drought Fast Facts – Occurrences

Number of Drought Events Reported (1980 – 2021): 6

Table 11, located in **Appendix J**, summarizes the previous occurrences as well as the extent or magnitude of the drought events recorded in Mason County. NOAA's Storm Events Database, the Illinois State Water Survey, the Illinois Emergency Management Agency (IEMA) and the USDA have documented six official droughts for Mason County between 1980 and 2021.

The recorded drought events ranged in length from 3.5 to 20 months, with two events (33%) beginning in June and two events (33%) beginning in August. Of the four drought events that were assigned drought intensity category ratings by the USDM, the 2005 and 2012 droughts reached D3, extreme drought.

The State of Illinois Drought Preparedness and Response Plan identified seven additional outstanding statewide droughts since 1900 based on statewide summer values of the PDSI provided by NOAA's National Center for Environmental Information. Those seven droughts occurred in 1902, 1915, 1931, 1934, 1936, 1954 and 1964; however, the extent to which Mason County was impacted was unavailable.

What locations are affected by drought?

Drought events affect the entire County. Droughts, like excessive heat and severe winter storms, tend to impact large areas, extending across an entire region and affecting multiple counties. The *2018 Illinois Natural Hazard Mitigation Plan* classifies Mason County's hazard rating for drought as "medium."

What is the probability of future drought events occurring?

Mason County, including the participating jurisdictions, has experienced six droughts between 1980 and 2021. With six occurrences over 42 years, the probability or likelihood that the County may experience a drought in any given year is 14.3%. However, if earlier recorded droughts are factored in, then the probability that Mason County may experience a drought in any given year decreases to 10.7%.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from drought.

Are the participating jurisdictions vulnerable to drought?

Yes. All of Mason County, including the participating jurisdictions, is vulnerable to drought. Neither the amount nor the distribution of precipitation; soil types; topography; or water table conditions provides protection for any area within the County. Since 2012, Mason County has experienced two droughts.

Do any of the participating jurisdictions consider drought to be among their community's greatest vulnerabilities?

No. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdictions considered drought to be among their community's greatest vulnerabilities.

What impacts resulted from the recorded drought events?

Damage information was only available for one of the six drought events experienced between 1980 and 2021. According to NOAA's Storm Events Database, the 2012 drought caused an estimated $69.4 million in crop damages in Mason County. Damage information was either unavailable or none was recorded for the remaining five reported occurrences.

Drought Fast Facts – Impacts/Risk

Drought Impacts:
- Total Property Damage: ***n/a***
- Total Crop Damage: ***$69.4 million (2012 drought)***

Drought Risk/Vulnerability:
- Public Health & Safety: ***Low***
- Buildings/Infrastructure/Critical Facilities: ***Low***

Of the six drought events, disaster relief payment information was only available for one of the events. In 1988, landowners and farmers in Illinois were paid in excess of $382 million in relief payments; however, a breakdown by county was unavailable.

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 drought events in Illinois include reductions in crop yields and drinking water shortages.

Crop Yield Reductions

Agriculture is a major economic enterprise in Mason County. Farmland accounts for approximately 84% of all the land in the County. According to the 2017 Census of Agriculture, there were 548 farms in the County occupying 311,929 acres. Of the land in farms, approximately 92.7% or 289,261 acres is in crop production. Due to its sandy soils and a plentiful supply of water from the Mahomet Aquifer, the farms within the County have developed extensive irrigation systems to help them grow specialty crops. As a result, approximately 43.9% or 136,893 acres of the land in farms is irrigated. Compared to a majority of the State and even neighboring counties, this is an unusually large number of irrigated acres.

According to the 2017 Census of Agriculture, crop sales accounted for $171.5 million in revenue while livestock sales accounted for $21.4 million. Mason County ranks 29th in Illinois for crop cash receipts and 49th in the State for livestock cash receipts. A severe drought would have a major 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, 2005, 2011, and 2012 droughts. **Figure DR-3** illustrates the reduction yields seen for corn and soybeans during the recorded drought events. The USDA's National Agricultural Statistics Service records show that the yield reduction for corn was most severe for the 1988 drought when there was a 42.1% reduction and soybeans yield reductions were most severe for the 1983 drought when there was a 35.4% reduction.

Figure DR-3
Crop Yield Reductions Due to Drought in Mason County

Year	Corn		Soybeans	
	Yield (bushel)	% Reduction Previous Year	Yield (bushel)	% Reduction Previous Year
1982	126.0	--	39.5	--
1983	**74.0**	**41.3%**	**25.5**	**35.4%**
1984	122.0	--	31.0	--
1987	121.0	--	30.5	--
1988	**70.0**	**42.1%**	**23.0**	**24.6%**
1989	114.0	--	35.5	--
2004	179.0	--	49.0	--
2005	**123.0**	**31.3%**	**39.0**	**20.4%**
2006	155.0	--	47.0	--
2010	141.0	--	48.7	--
2011	142.7	--	**44.3**	**9.0%**
2012	**110.2**	**22.8%**	**36.8**	**16.9%**
2013	163.3	--	50.4	--

Source: USDA, National Agricultural Statistics Service.

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. In Mason County, ***none of the participating municipalities rely on surface water sources*** for their drinking water supplies. All obtain water from wells in shallow unconfined aquifers except for Mason City which utilizes deeper wells in a confined aquifer. The high recharge rate found in these unconfined aquifers have generally helped prevent water shortages during drought; however, they can leave drinking water vulnerable to contamination not likely to occur at wells found in confined aquifers.

Easton, Havana, Manito, Mason City, and San Jose obtain their drinking water from wells of sufficient depth to be able to withstand a prolonged drought and are therefore not considered vulnerable to drought. Neither Bath nor Kilbourne have public drinking water supplies. Individuals in these municipalities obtain their drinking water from private wells. Based on a review of the Illinois State Water Survey's Illinois Water and Related Wells mapper, some of these private wells are shallower and therefore would be more likely to be vulnerable to prolonged drought conditions.

While most of the participating municipalities are less vulnerable to drinking water shortages, a prolonged drought or a series of droughts in close succession would also have the potential to impact water levels in aquifers used for individual drinking water wells in unincorporated areas of the County as well.

What is the level of vulnerability to public health and safety from drought?

Unlike other natural hazards that affect the County, drought events do not typically cause injuries or fatalities. The primary concern centers on the financial impacts that result from loss of crop yields and livestock and potential drinking water shortages. Even taking into consideration the potential impacts that a water shortage may have on the general public, the risk or vulnerability to public health and safety from drought is ***low***.

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

No. In general, existing buildings, infrastructure and critical facilities located in Mason County and the participating jurisdictions are not vulnerable to drought. The primary concern centers on the financial impacts that result from loss of crop yields and livestock.

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 roadway damage. 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 impacted drinking water supplies. Reductions in aquifer water levels can cause water shortages that jeopardize the supply of water needed to provide drinking water and fight fires. While water use restrictions can be enacted in an effort to maintain a sufficient supply of water, they are only temporary and do not address long-term viability issues. Drinking water supplies vulnerable to drought, such as those that rely solely on surface water or shallow wells, need to consider mitigation measures that will provide long-term stability before a severe drought, or a series of droughts occur. Effective mitigation measures include drilling additional wells, preferably deep wells, securing agreements with alternative water sources and constructing water lines to provide a backup water supply.

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 there are no standard loss estimation models or methodologies for drought. Since drought typically does not cause structure damage, it is unlikely that future dollar losses will be excessive. The primary concern associated with drought is the financial impacts that result from loss of crop yields and the potential impacts to drinking water supplies. Since a majority 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 consumers as well as businesses and industries that are water-dependent (i.e., car washes, landscapers etc.).

3.8 EARTHQUAKES

HAZARD IDENTIFICATION

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.).

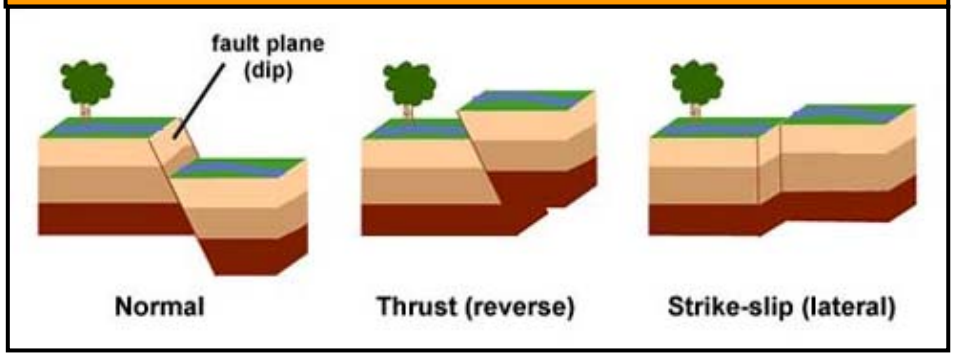
Most of the damage done by an earthquake is caused by its secondary or indirect effects. These secondary effects result from the seismic waves released by the earthquake and include ground shaking, surface faulting, liquefaction, landslides and, in rare cases, tsunamis.

According to the U.S. Geological Survey, more than 143 million Americans in the contiguous United States are exposed to potentially damaging ground shaking from earthquakes. Over 44 million of those Americans, located in 18 states, are exposed to very strong ground shaking from earthquakes. Illinois ranks 10th in terms of the number of individuals exposed to very strong ground shaking. The Federal Emergency Management Agency's Hazus analysis indicates that the annualized earthquake losses to the national building stock is $6.1 billion per year. A majority of the average annual loss is concentrated in California ($3.7 million). The central United States (including Illinois) ranks third in annualized earthquake losses at $480 billion, behind the pacific northwest (Washington and Oregon) with annualized earthquake losses at $710 billion.

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 EQ-1** provides an illustration of each type of fault.

Figure EQ-1
Fault Illustration



Source: U. S. Geological Survey.

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 EQ-2** 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 micro earthquake 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 in Prince William Sound on March 28, 1964 and registered a 9.2 on the Richter Scale.

Figure EQ-2
Earthquake Magnitude Classes

Class	Magnitude (Richter Scale)
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: Michigan Technological University, Department of Geological and Mining Engineering and Sciences, UPSeis

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 U.S. 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 EQ-3** 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.

Figure EQ-3 Comparison of Richter Scale and Modified Mercalli Intensity Scale		
Richter Scale	**Modified Mercalli Scale**	**Observations**
1.0 – 1.9	I	Felt by very few people; barely noticeable. No damage.
2.0 – 2.9	II	Felt by a few people, especially on the upper floors of buildings. No damage.
3.0 – 3.9	III	Noticeable indoors, especially on the upper floors of buildings, but may not be recognized as an earthquake. Standing cars may rock slightly; vibrations similar to the passing of a truck. No damage.
4.0	IV	Felt by many indoors and a few outdoors. Dishes, windows, and doors disturbed. Standing cars rocked noticeably. No damage.
4.1 – 4.9	V	Felt by nearly everyone. Small, unstable objects displaced or upset; some dishes and glassware broken. Negligible damage.
5.0 – 5.9	VI	Felt by everyone. Difficult to stand. Some heavy furniture moved. Weak plaster may fall and some masonry, such as chimneys, may be slightly damaged. Slight damage.
6.0	VII	Slight to moderate damage to well-built ordinary structures. Considerable damage to poorly-built structures. Some chimneys may break. Some walls may fall.
6.1 – 6.9	VIII	Considerable damage to ordinary buildings. Severe damage to poorly built buildings. Some walls collapse. Chimneys, monuments, factory stacks, columns fall.
7.0	IX	Severe structural damage in substantial buildings, with partial collapses. Buildings shifted off foundations. Ground cracks noticeable.
7.1 – 7.9	X	Most masonry and frame structures and their foundations destroyed. Some well-built wooden structures destroyed. Train tracks bent. Ground badly cracked. Landslides.
8.0	XI	Few, if any structures remain standing. Bridges destroyed. Wide cracks in ground. Train tracks bent greatly. Wholesale destruction.
> 8.0	XII	Total damage. Lines of sight and level are distorted. Waves seen on the ground. Objects thrown up into the air.

Sources: Michigan Technological University, Department of Geological and Mining Engineering and Sciences, UPSeis.
U.S. Geological Survey.

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.

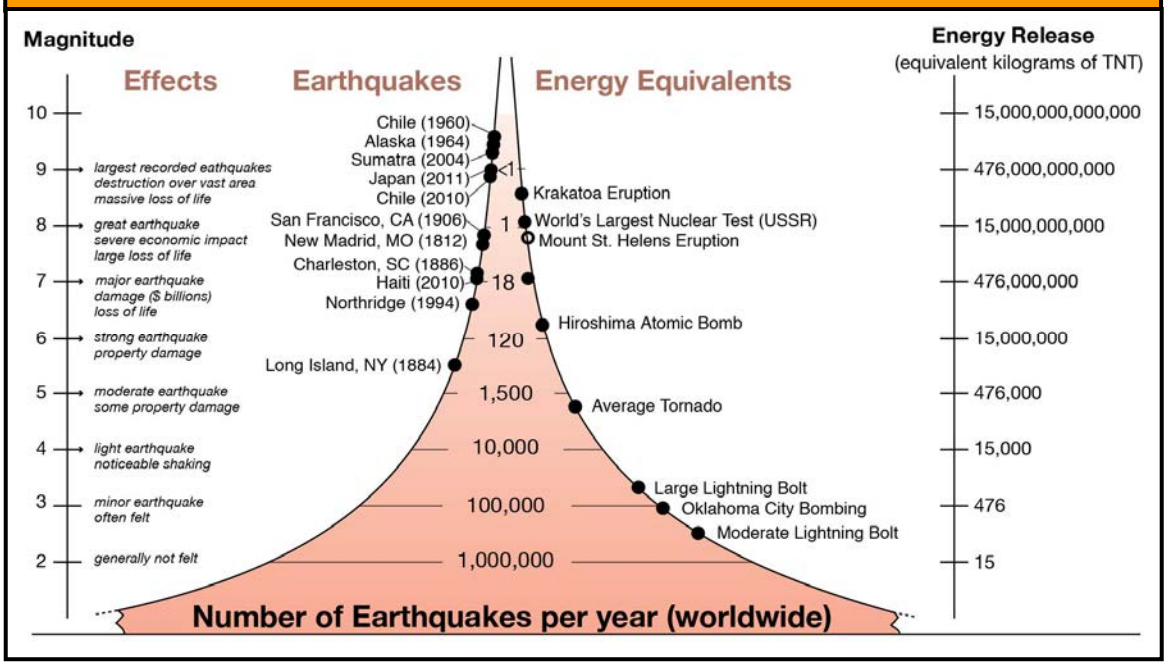
The second prominent belt is the Alpide, which extends from Java to Sumatra and through the Himalayan Mountains, the Mediterranean Sea and out into the Atlantic Ocean. It accounts for about 17 percent of the world's largest earthquakes, including those in Iran, Turkey, and Pakistan. The third belt follows 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 every day. Magnitude 2 and smaller earthquakes occur several hundred times a day worldwide. These earthquakes are known as micro earthquakes and are generally not felt by humans. Major earthquakes, greater than magnitude 7, generally occur at least once a month. **Figure EQ-4** 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 EQ-4
Approximate Number of Earthquakes Recorded Annually



Source: Incorporated Research Institutions for Seismology, Education and Outreach Series, "How Often Do Earthquakes Occur?"

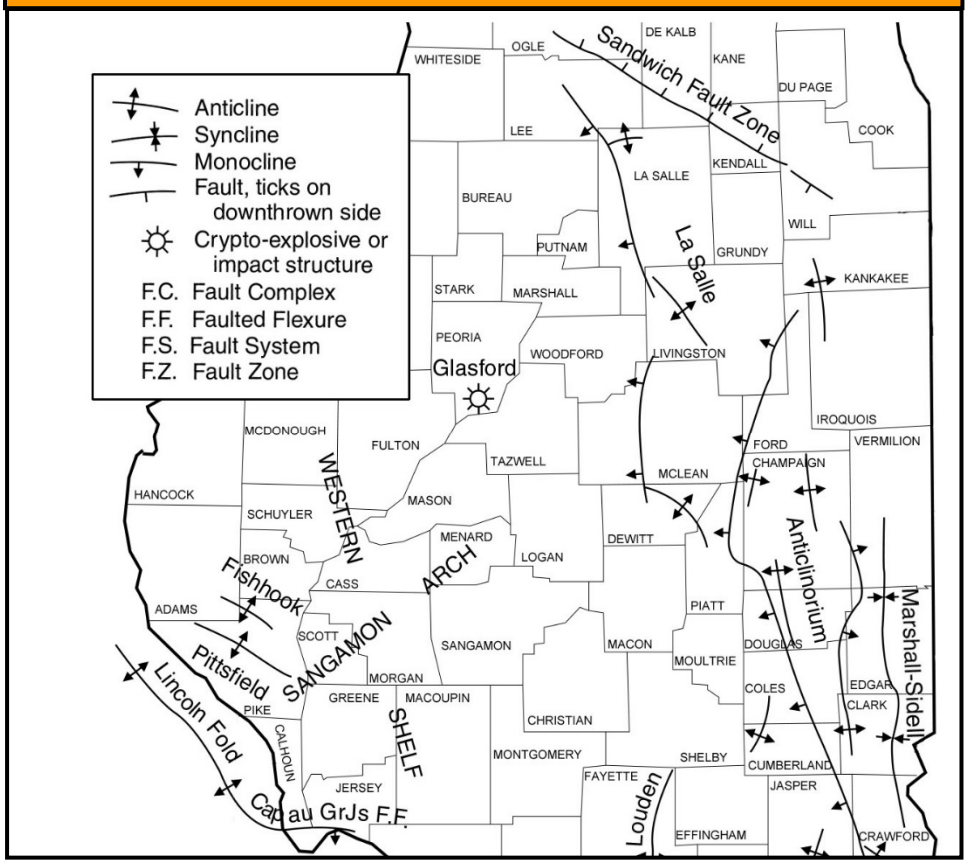
HAZARD PROFILE

The following details the location of known fault zones and geologic structures, identifies past occurrences of earthquakes, details the severity or extent of each event (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

Are there any faults located within the County?

No. There are no known fault zones or geologic structures located in Mason County or the immediate region as illustrated by **Figure EQ-5**.

Figure EQ-5
Geological Structures in Central Illinois



Source: Illinois State Geological Survey.

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

According to the Illinois State Geological Survey (ISGS), the US Geological Survey and Center for Earthquake Research and Information (CERI) at the University of Memphis, one earthquake has originated in Mason County during the last 200 years. On July 19, 1909, a 4.5 magnitude earthquake originated in Mason County approximately 3 miles north-northwest of Kilbourne. While damage information was not available for this event, ISGS estimated its maximum intensity as a VII on the Modified Mercalli Intensity Scale.

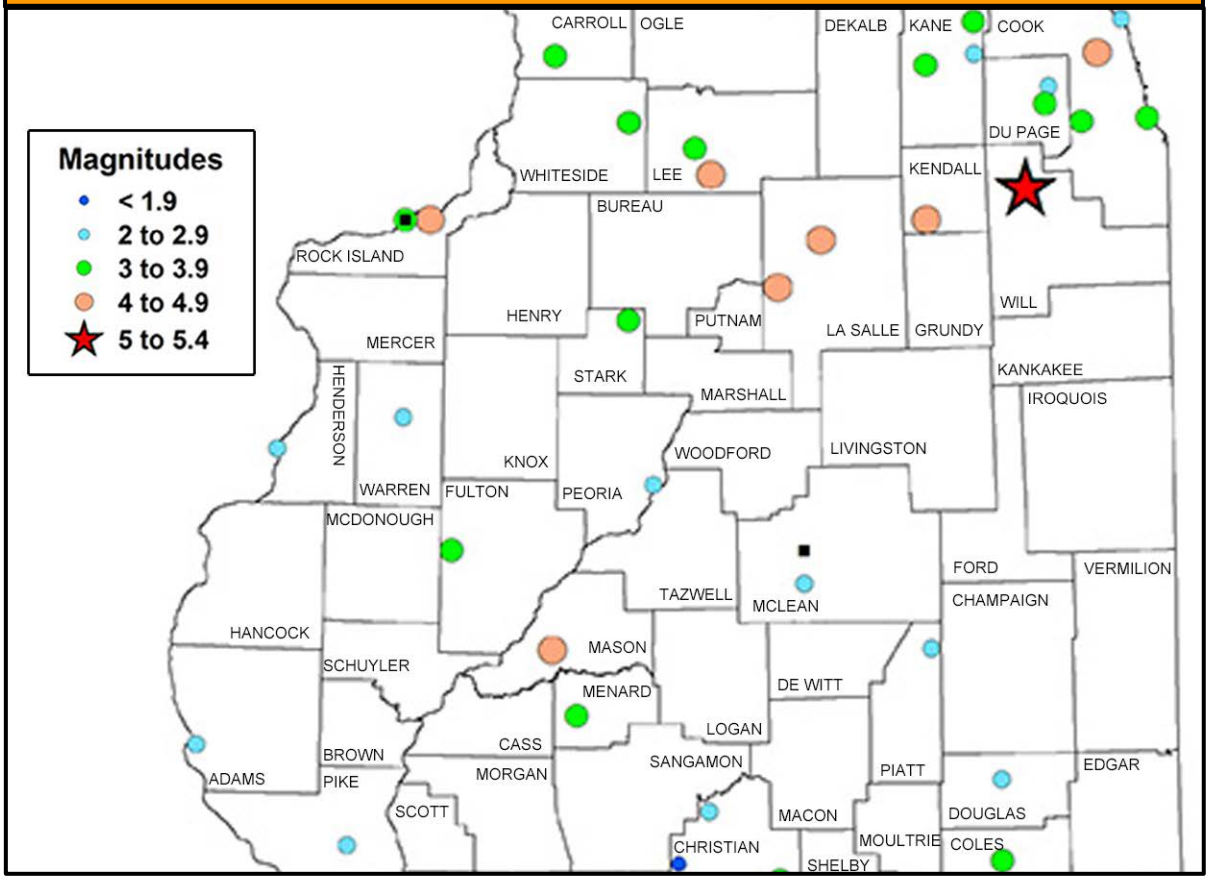
<u>Earthquake Fast Facts – Occurrences</u>

Earthquakes Originating in the County (1795 – 2015): ***1***
Fault Zones Located within the County: ***None***
Geological Structures Located within the County: ***None***
Earthquakes Originating in Adjacent Counties (1795-2015): ***3***
Fault Zones Located in Nearby Counties: ***None***
Geologic Structures Located in Adjacent Counties: ***None***

Mason County residents, including those in the participating jurisdiction,

have also felt ground shaking caused by earthquakes that have originated outside of the County. The following provides a brief description, by region, of these events. **Figure EQ-6** illustrates the epicenters of the nearby earthquakes.

Figure EQ-6
Earthquakes Originating in Mason Illinois



Source: Illinois State Geological Survey.

Central Illinois

Several earthquakes have originated in nearby Menard, Fulton, and Peoria Counties. The following provides a brief description of each.

- An earthquake originated in Menard County approximately 2 miles west-southwest of Petersburg on November 10, 1923 and was estimated to be a magnitude 3.5 earthquake with a maximum intensity of V on the Modified Mercalli Intensity Scale.
- On June 29, 1937, an earthquake originated in Peoria County near downtown Peoria with an estimated magnitude between 2.0 to 2.9 and a maximum intensity of II on the Modified Mercalli Intensity Scale.
- An earthquake originated in Fulton County just west of Marietta on March 13, 1956 with an estimated magnitude of 3.7 earthquake and a maximum intensity of IV on the Modified Mercalli Intensity Scale.

Southern Illinois

Mason County residents also felt ground shaking caused by several earthquakes that have originated in southern Illinois. The following provides a brief description of a few of the larger events that have occurred.

- On April 18, 2008, a magnitude 5.2 earthquake was reported in southeastern Illinois near Bellmont 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.
- A magnitude 5.2 earthquake took place on June 10, 1987 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 U.S. during the 20th century occurred along the Wabash Valley seismic zone in southeastern Illinois near Dale in Hamilton County. This magnitude 5.4 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 U.S. and southern Ontario, Canada.

Three of the ten largest earthquakes ever recorded within the continental U.S. took place in 1811 and 1812 along the New Madrid seismic zone. This zone lies within the central Mississippi Valley and extends from northeast Arkansas through southeast Missouri, western Tennessee, western Kentucky, and southern Illinois. These magnitude 7.5 and 7.3 major earthquakes were centered near the town of New Madrid, Missouri and caused widespread devastation to the surrounding region and were felt by people in cities as far away as Pittsburgh, Pennsylvania and Norfolk, Virginia.

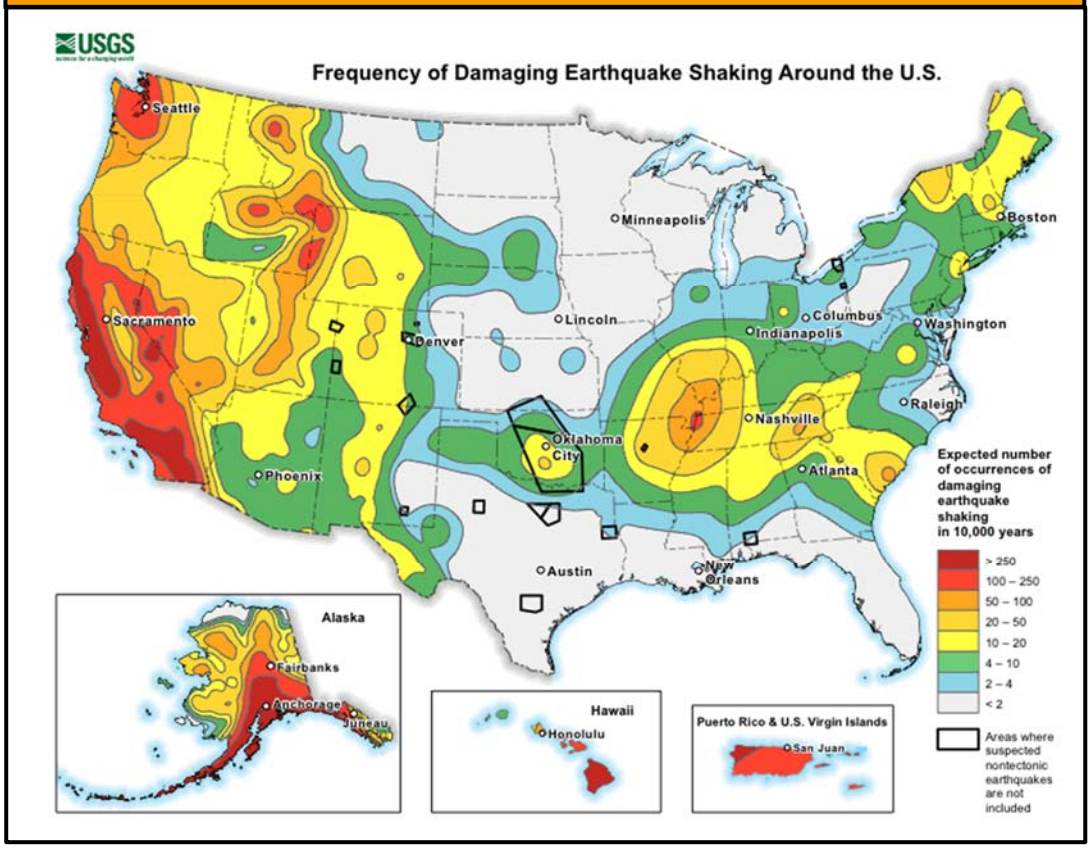
The quakes locally changed the course of the Mississippi River creating Reelfoot Lake in northwestern Tennessee. These earthquakes were not an isolated incident. The New Madrid seismic zone is one of the most seismically active areas of the U.S. east of the Rockies. Since 1974 more than 4,000 earthquakes have been recorded within this seismic zone, most of which were too small to be felt.

What locations are affected by earthquakes? What is the extent of future potential earthquakes?

Earthquake events generally affect the entire County. Earthquakes, like drought and excessive heat, impact large areas extending across an entire region and affecting multiple counties. Mason County's proximity to multiple fault zones, both large and small, makes the entire area likely to be affected by an earthquake if these faults become seismically active. The *2018 Illinois Natural Hazard Mitigation Plan* classifies Mason County's hazard rating for earthquakes as "low."

According to the USGS, Mason County can expect 2 to 10 occurrences of damaging earthquake shaking over a 10,000-year period. **Figure EQ-7** illustrates the frequency of damaging earthquake shaking around the U.S.

Figure EQ-7
Frequency of Damaging Earthquake Shaking Around the U.S.



Source: United State Geological Survey.

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 ISGS, 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%.

While the major earthquakes of 1811 and 1812 do not occur often along the New Madrid fault, they are not isolated events. In recent decades, scientists have collected evidence that earthquakes similar in size and location to those felt in 1811 and 1812 have occurred several times before within the central Mississippi Valley around 1450 A.D., 900 A.D., and 2350 B.C.

The general consensus among scientists is that earthquakes similar to the 1811-1812 earthquakes are expected to recur on average every 500 years. The U.S. Geological Survey and the Center for

Earthquake Research and Information (CERI) at the University of Memphis estimates that for a 50-year period the probability of a repeat of the 1811-1812 earthquakes is between 7% and 10% and the probability of an earthquake with a magnitude of 6.0 or larger is between 25% and 40%.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from earthquakes.

Are the participating jurisdictions vulnerable to earthquakes?

Yes. All of Mason County is vulnerable to earthquakes. The unique geological formations topped with glacial drift soils found in the central U.S. 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 Mason 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 *Projected Earthquake Intensities Map* prepared by the Missouri State Emergency Management Agency predicts that if a magnitude 6.7 earthquake were to take place anywhere along the New Madrid seismic zone, then the highest projected intensity felt in Mason County would be a V on the Modified Mercalli Intensity Scale. If a magnitude 8.6 earthquake were to occur, then the highest projected intensity felt would be a VII.

Earthquake Fast Facts – Risk

Earthquake Risk/Vulnerability:

- Public Health & Safety – Light/Moderate Quake within the County or immediate region: ***Low***
- Public Health & Safety – Major Quake in the region: ***Medium***
- Buildings/Infrastructure/Critical Facilities – Light/ Moderate Quake within the County or immediate region: ***Low***
- Buildings/Infrastructure/Critical Facilities – Major Quake in the region: ***Medium***

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

Do any of the participating jurisdictions consider earthquakes to be among their community's greatest vulnerabilities?

No. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdictions considered earthquakes to be among their community's greatest vulnerabilities.

What impacts resulted from the recorded earthquake events?

While Mason County residents almost certainly felt the earthquake that originated in the County and others that have occurred in Illinois, no damages were reported in the County as a result of any of these events. Given the magnitude of the great earthquakes of 1811 and 1812, it is almost certain that individuals in what is now Mason County felt those quakes; however historical records do not indicate the intensity or impacts that these quakes had on the County.

What other impacts can result from earthquakes?

Earthquakes can impact human life, health, and public safety. **Figure EQ-8** details the potential impacts that may be experienced by the County should a magnitude 6.0 or greater earthquake occur in the region.

Figure EQ-8
Potential Earthquake Impacts

Direct	Indirect
Buildings • Temporary displacement of businesses, households, schools, and other critical services where heat, water and power are disrupted • Long-term displacement of businesses, households, schools, and other critical services due to structural damage or fires *Transportation* • Damages to bridges (i.e., cracking of abutments, subsidence of piers/supports, etc.) • Cracks in the pavement of critical roadways • Increased traffic on U.S. and State Routes (especially if the quake originates along the Wabash Valley fault) as residents move out of the area to seek shelter and medical care and as emergency response, support services and supplies move south to aid in recovery • Misalignment of rail lines due to landslides (most likely near stream crossings), fissures and/or heaving *Utilities* • Downed power and communication lines • Breaks in drinking water and sanitary sewer lines resulting in the temporary loss of service • Disruptions in the supply of natural gas due to cracking and breaking of pipelines *Health* • Injuries/deaths due to falling debris and fires *Other* • Cracks in the earthen dams of the lakes and reservoirs within the County which could lead to dam failures	*Health* • Use of County health facilities (especially if the quake originates along the New Madrid Fault) to treat individuals injured closer to the epicenter • Emergency services (ambulance, fire, law enforcement) may be needed to provide aid in areas where damage was greater *Other* • Disruptions in land line telephone service throughout an entire region (i.e., central and southern Illinois) • Depending on the seasonal conditions present, more displacements may be expected as those who may not have enough water and food supplies seek alternate shelter due to temperature extremes that make their current housing uninhabitable

What is the level of vulnerability to public health and safety from earthquakes?

The risk or vulnerability to public health and safety from an earthquake is dependent on the intensity and location of the event. Since there are no known faults in Mason County, the likelihood that an earthquake will originate in the County is very small, decreasing the changes for catastrophic damages. However, if a light earthquake originates within the County or from the structures in the immediate region, the risk or vulnerability to public health and safety is considered ***low***. This risk is elevated from low to ***medium*** for a major earthquake originating along seismic zones in the region (i.e., Wabash Valley or New Madrid.)

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

Yes. All existing buildings, infrastructure and critical facilities located in Mason County and the participating jurisdictions are vulnerable to damage from earthquakes. However, given the County's size (just over 13,600 individuals), its population density, the fact that there are very few buildings higher than two stories (with the exception of grain elevators) and earthquakes larger than magnitude 5.0 are not expected in this region, the damage is anticipated to be slight with only superficial structure damage such as broken windows and cracks in weak plaster and masonry.

While unlikely, if a strong earthquake (6.0 – 6.9) were to occur in the immediate region then unreinforced masonry buildings would be most at risk because the walls are prone to collapse outward. Steel and wood buildings have more ability to absorb the energy from an earthquake while wood buildings with proper foundation ties have rarely collapsed in earthquakes. **Figure EQ-9** identifies the number of unreinforced masonry buildings that serve as critical facilities within the participating jurisdictions.

If the epicenter of a magnitude 7.6 earthquake were to originate anywhere along the New Madrid seismic zone, the highest projected Modified Mercalli intensity felt in Mason County would be a VI according to the *Projected Earthquake Intensities Map* prepared by the Missouri State Emergency Management Agency.

An earthquake also has the ability to damage infrastructure and critical facilities such as roads and utilities. In the event of a major 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. **Figure R-3** lists the number of each type of critical infrastructure by jurisdiction.

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 earthen 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 and location of the event. The risk to buildings, infrastructure and critical facilities is considered to be ***low*** for a light to moderate earthquake that

originates within the County or immediate region. This risk is elevated from low to ***medium*** for a major earthquake originating along seismic zones in the region (i.e., Wabash Valley or New Madrid.)

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

Yes. All future buildings, infrastructure and critical facilities located in Mason 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, there is the potential for future buildings, infrastructure, and critical facilities to 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?

Since property damage information was either unavailable or none was recorded for the documented earthquakes that have impacted Mason County, there is no way to accurately estimate future potential dollar losses to vulnerable structures. However, according to the Mason County Supervisor of Assessments the total equalized assessed values of buildings in the planning area is $128,959,628. Since all of the structures in the planning area are susceptible to earthquake impacts to varying degrees, this total represents the countywide property exposure to earthquake events.

Given Mason County's proximity to geologic structures and fault zones, both large and small, and the fact that all structures within the County are vulnerable to damage, it is likely that there will be future dollar losses from any earthquake ranging from strong to great. As a result, participating jurisdictions were asked to consider mitigation projects that could provide wide ranging benefits for reducing the impacts or damages associated with earthquakes.

Figure EQ-9
Number of Unreinforced Masonry Buildings Serving as Critical Facilities by Jurisdiction

Participating Jurisdiction	Government[1]	Law Enforcement	Fire Stations	Ambulance Service	Schools	Drinking Water	Wastewater Treatment	Medical[2]	Healthcare Facilities[3]
Mason County	---	---	3	1	---	---	---	---	---
Bath	---	---	---	---	---	---	---	---	---
Easton	1	---	---	---	---	1	---	---	---
Havana	---	1	1	---	3	---	---	---	---
Kilbourne	---	---	---	---	---	---	---	---	---
Manito	1	1	---	---	3	---	---	---	---
Mason City	---	1	---	---	---	---	---	---	---
San Jose	3	1	1	---	---	---	---	---	---
Havana CUSD #126	---	---	---	---	---	---	---	---	---
Midwest Central CUSD #191	---	---	---	---	3	---	---	---	---
Havana Rural FPD	---	---	1	---	---	---	---	---	---
Kilbourne FD	---	---	---	---	---	---	---	---	---
Mason City FPD	---	---	---	---	---	---	---	---	---
Mason District Hospital	---	---	---	---	---	---	---	---	---

[1] Government includes: courthouses, city/village halls, township buildings, highway/road maintenance centers, etc.
[2] Medical includes: public health departments, hospitals, urgent/prompt care, and medical clinics.
[3] Healthcare Facilities include: nursing homes, skilled care facilities, memory care facilities, residential group homes, etc.
--- Indicates jurisdiction does not own/maintain any critical facilities within that category.

3.9 LEVEE FAILURES

HAZARD IDENTIFICATION

What is the definition of a levee?

The U.S. Army Corps of Engineers (USACE or the Corps) defines a "levee" as an earthen embankment, floodwall or structure along a water course whose purpose is flood risk reduction or water conveyance while the National Flood Insurance Program defines a "levee" as a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control or divert the flow of water so as to provide protection from temporary flooding. Levees are typically not designed to hold back water for extended periods of time, rather they are meant to provide temporary flood protection from seasonal high water, precipitation and other weather events. While levees reduce the risk from a flooding event, they do not eliminate it. There is always the chance a flood will exceed the capacity of a levee, no matter how well it is built.

In Illinois, the Mississippi and Illinois River valleys were largely transformed from permanent, seasonal wetlands to highly productive agricultural lands by the construction of levees and the organization of drainage districts between 1879 and 1916.

What is the definition of a levee breach?

A levee breach is a rupture, break or gap in a levee which causes previously contained water to flood the land behind the levee. If the levee breach is identified as a "failure breach" then the cause of the breach is known and occurred without overtopping. In order for a breach to be termed a failure breach, an investigation is usually required to determine the cause.

What is the definition of overtopping?

Overtopping occurs when the water levels contained by the levee exceed the levee's crest elevation and flood the land behind the levee. The flooding occurs from overflow/overwash (waves) and other sources. In most cases overtopping may damage the levee but not compromise it. If the levee is compromised because of overtopping, then it is identified as an "overtopping breach."

What causes a levee breach?

Levee breaches can result from one or more of the following:

- ***erosion of the crown and land-side face of the levee*** caused by overtopping (the higher the velocity of flow over the levee, the more quickly that erosion will occur and cause a failure of the levee);
- ***sand boils and piping*** resulting from the relatively fast passage of flood waters through permeable materials under the base of the levee to the land behind the levee (depending on the amount of sand and soil transported by the waters from the base to the surface, the levee may settle unevenly, crack or even completely fail);
- ***seepage and saturation*** (prolonged exposure to water will cause levee materials to become saturated, leading to seepage and sloughing of the soil on land-side face of the levee and resulting in the loss of slope stability and ultimately failure of the levee);

- ***erosion of the river-side slope of the levee*** as a result of wave action caused by wind and/or commercial or recreational vessels over a long period of time (most Illinois levees are constructed of sand and alluvial materials, both of which are among the easiest materials to erode);
- ***structural failures*** at gates, walls or closure structures;
- ***improper maintenance*** (including failure to maintain gates, walls or closure structures; remove trees; fill in holes created by burrowing animals, etc.); and
- ***earthquakes*** which can cause loss of soil strength and destabilize the levee and foundation materials.

Who is responsible for regulating levees?

This is no single agency with responsibility for levee oversight nationwide. The USACE has specific and limited authorities for approximately 2,000 levees across the country, totaling 14,000 miles. While the Corps serves as one of the nation's largest infrastructure stewards, the misperception exists that the USACE has universal responsibility for the nation's levees. There are three different classifications of levees:

- ***Federally Authorized Levees***. A levee typically designed and built by the Corps in cooperation with a local sponsor, then turned over to the local sponsor (i.e., drainage district) to operate, maintain, repair and replace the levee.
- ***Non-Federally Authorized Levees***. A levee designed and built by a non-federal agency, which is responsible for the operation, maintenance, repair and replacement of the levee.
- ***Private or Corporate-Owned Levees***. A levee designed and built by a private citizen, company or other public entity, which is responsible for the operation, maintenance, repair and replacement of the levee. The Corps has no responsibility for this type of levee.

What is a drainage district?

A drainage district is a local unit of government formed by area landowners to "…construct, maintain or repair drains or levees or to engage in other drainage or levee work for agricultural, sanitary or mining purposes" (70 ILCS 605/3-1). Drainage districts may be organized by petition or referendum and are approved by the circuit court of the county in which the greater part of the district lies.

Each district is usually governed by three drainage commissioners, although there are districts in Illinois that have as many as five drainage commissioners. The drainage commissioners may be any adult who resides in Illinois and owns land within the district's boundaries. Commissioners are either appointed by the county or elected.

Drainage districts are funded through assessments. Each benefited landowner in a district is assessed a fee for the maintenance and upkeep of the district. Under the Illinois Drainage Code, a district which is organized to maintain levees shall include the term "drainage and levee district" in its name.

HAZARD PROFILE

According to the USACE National Levee Database, there are 17 levee systems located in Mason County. Of those 17 levee systems, only three are considered to be levee systems of significance. Levees systems of significance include those levees protecting a sizable amount of land, considerable number of structures and/or individuals. Only the levee systems of significance will be analyzed as part of this Plan update due to the limited impacts on the population, land use and infrastructure associated with the remaining levees.

While the South Sangamon Drainage and Levee District – East is identified as being located in both Cass County and Mason County, the levee protected area is located south of the Sangamon River almost exclusively in Cass County (only 17.5 acres of the 4,083 acres are technically located within Mason County.) Therefore, this levee system is not included in the following discussions.

The following details the levee systems of significance located in the county; identifies the location of these levee systems; details past occurrences of levee failures associated with these levee systems; describes the severity or extent of future potential failures (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences of levee failures.

Are there any levee systems of significance located in the County?

Yes. According to the USACE National Levee Database there are three levee systems of significance located in Mason County. **Figure LF-1** provides information about each levee system.

When have levee breaches occurred previously?

There have been *no recorded* levee breaches along any of the levee systems studied in the County.

Levee Breach Fast Facts – Occurrences

Total Number of Levee Systems Located in the County: ***17***

Number of Levee Systems Studied: ***3***

Number of Levee Breaches Reported: ***0***

Probability of Future Levee Breach Events: ***Low***

What is the extent of future potential levee breaches?

Levee System Summary Maps or Emergency Action Plans (EAPs)/Emergency Preparedness Plans (EPPs) defining the extent or magnitude of future potential levee breaches (water depth, speed of onset and warning times) have not been developed or were not made available to the Mason County Emergency Management Agency for any of the levee systems studied. As a result, a data deficiency exists in terms of defining the extent or magnitude of the inundation areas associated future potential levee breaches for these systems.

What locations are affected by levee breaches?

Levee breaches along the studied levee systems have the potential to affect portions of unincorporated Mason County. **Figures LF-2, LF-3** and **LF-4** identify the locations potentially impacted by levee breaches.

Figure LF-1
Levee Systems of Significance in Mason County

Levee System Name	Levee Category	Year Constructed	# of Levee Segments	Length of Levee (Miles)	Total Land Protected (Acres)	Land Protected in Mason County (Acres)	Inspection Rating	PL 84-99 Status
Farmers & Hergert D&LD^	Federal	1941	2	12.55 mi.	7,450 ac.	7,405 ac.	Minimally Acceptable	Active
Mason & Menard D&LD	Federal	1939	2	12.98 mi.	5,760 ac.	5,760 ac.	Unacceptable	Inactive
Old River*	Non-Federal	n/a	5	8.05 mi.	3.392 ac.	309 ac.	Minimally Acceptable	Active

^ The District extends between Cass, Mason and Menard Counties.
* The District extends between Cass and Mason Counties.
Source: US Army Corps. of Engineers, National Levee Database.

What is the probability of future levee breach events occurring?

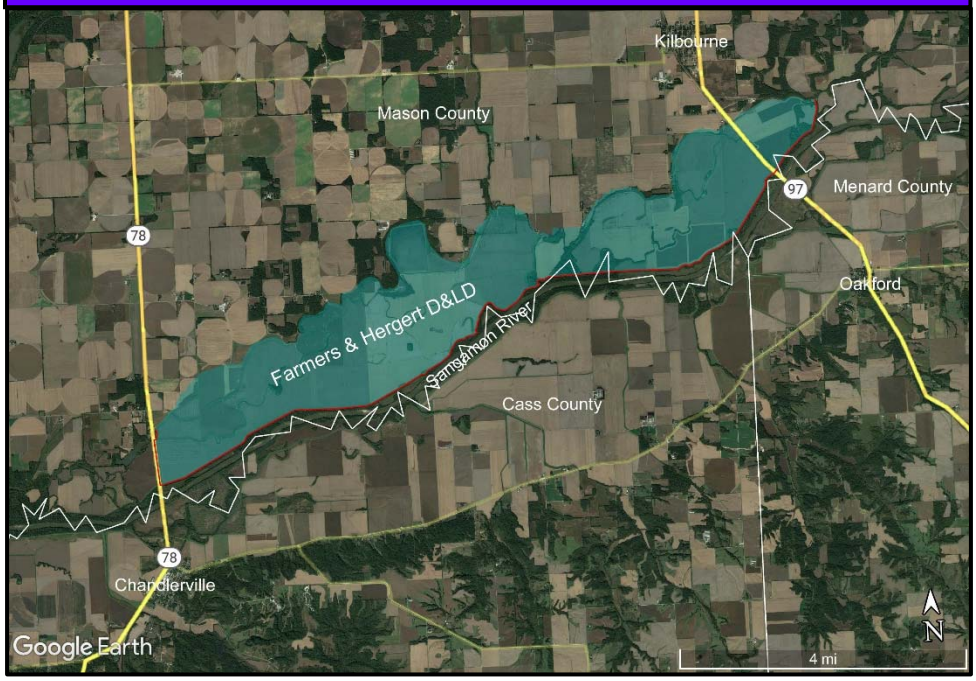
There are several factors that must be considered when calculating the probability of future levee breaches including whether a breach has occurred previously, the age and current conditions of the levee, whether proper maintenance is ongoing and the magnitude of the event. Since none of the studied levee systems have experienced a breach, it is difficult to specifically establish the probability of future levee breaches associated with these levees; however, based on the data available, it is estimated to be ***low***. For the purposes of this analysis "low" is defined as having a less than 10% chance of occurring in any given year.

According to the USACE National Levee Database, all the studied levee systems have a Levee Safety Action Classification of "Low" (likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in low risk.)

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions associated with the levee systems of significance studied, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure and critical facilities from levee failures.

Figure LF-2
Farmer & Hergert Drainage & Levee District

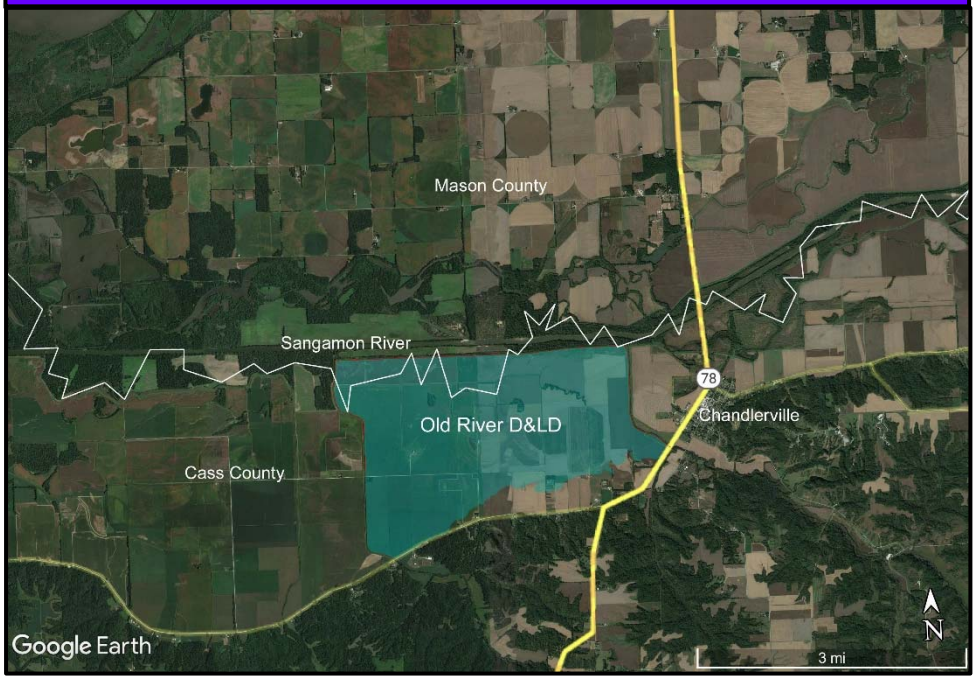


Source: US Army Corps of Engineers, National Levee Database.

Figure LF-3
Mason & Menard Drainage & Levee District

Source: US Army Corps of Engineers, National Levee Database.

Figure LF-4
Old River Drainage & Levee District



Source: US Army Corps of Engineers, National Levee Database.

Are the participating jurisdictions vulnerable to levee breaches from the levee systems of significance?

Yes. Only portions of unincorporated Mason County are vulnerable to the dangers presented by levee breaches associated with the levee systems studied. None of the other participating jurisdictions or the remainder of the County are considered vulnerable.

Levee Failure Fast Facts – Risk

Levee Breach Risk/Vulnerability:

- Public Health & Safety: ***Low***
- Buildings/Infrastructure/Critical Facilities:– ***Low***

Do any of the participating jurisdictions consider levee breaches to be among their jurisdiction's greatest vulnerabilities?

No. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdictions considered levee failures to be among their community's greatest vulnerability.

What impacts resulted from the recorded levee breaches?

Since there have been no *recorded* levee breaches associated with the levees studied in Mason County, there are no recorded impacts to report.

What other impacts can result from levee breaches?

Aside from causing damage to buildings, infrastructure and critical facilities, floodwaters released due to a levee breach 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 roads 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 also has the potential to contaminate drinking water sources used for both human and livestock consumption.

Flooding resulting from a levee breach 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 an event. Depending on the time of year, floodwaters also may carry away agricultural chemicals that have been applied to farm fields.

What is the level of vulnerability to public health and safety from levee breaches?

In terms of the risk or vulnerability to public health and safety from a levee breach associated with the studied levees, there are several factors that must be taken into consideration including the magnitude or severity of the precipitating event (whether an earthquake or flooding); the extent and type of development and infrastructure protected by the levee; the amount of time available to enact emergency measures such as evacuations; and USACE's Risk Classification Rating. **Figure LF-5** identifies the number of individuals vulnerable to a levee breach by levee system, the USACE's Levee Safety Action Classification (LSAC) Risk Rating assigned to each levee system and the assessment date. The USACE's Risk Classification Rating has five classes: Very Low, Low, Moderate, High and Very High.

Figure LF-5
Number of Individuals Vulnerable to a Levee Breach

Levee System Name	Total Number of Individuals Protected by the Levee	Estimated Number of Individuals Protected by the Levee in Mason County	USACE LSAC Risk Rating	Risk Rating Assessment Date
Farmers & Hergert D&LD^	21	21‡	Low	2/18/2020
Mason & Menard D&LD	5	5	Low	9/1/2021
Old River*	18	0†	Low	7/13/2021

^ The District extends between Cass, Mason and Menard Counties.
* The District extends between Cass and Mason Counties.
‡ Based on a visual inspection of the leveed area, all of the individuals protected reside in Mason County.
† Based on a visual inspection of the leveed area, all of the individuals protected reside in Cass County.
Source: US Army Corps of Engineers, National Levee Database.

When all these factors are taken into consideration, the overall risk to public health and safety posed by a levee breach from the levees in Mason County is considered to be ***low*** for all three levee systems.

Are existing buildings, infrastructure and critical facilities vulnerable to levee breaches?

Yes. Buildings, infrastructure and critical facilities located within the leveed areas associated with the studied levees are vulnerable to levee breaches. However, most of the leveed area is farmland

with only a few residences and farmsteads. None of the participating jurisdictions have critical facilities or specific infrastructure vulnerable to levee breaches. **Figure LF-6** identifies the number of existing structures vulnerable to a levee breach by levee system, the estimated property value of the vulnerable structures and the participating jurisdiction the structures are located within. These counts were acquired from the USACE's National Levee Database. The estimated property value is a sum of the structure value, structure contents and vehicles in the leveed area. The value does not include economic productivity loss, transportation infrastructure values (i.e., bridges, runways, roads) or land value.

Figure LF-6
Number of Existing Structures Vulnerable to a Levee Breach

Levee System Name	Total Number of Vulnerable Structures	Estimated Number of Vulnerable Structure in Mason County	Estimated Property Value of Vulnerable Structures in Mason County	Structure Location
Farmers & Hergert D&LD^	17	17‡	$1.69 million	Unincorp. Mason County
Mason & Menard D&LD	11	11	$1.8 million	Unincorp. Mason County
Old River*	12	0†	---	Unincorp. Mason County

^ The District extends between Cass, Mason and Menard Counties.
* The District extends between Cass and Mason Counties.
‡ Based on a visual inspection of the leveed area, all of the structures protected reside in Mason County.
† Based on a visual inspection of the leveed area, all of the structures protected reside in Cass County.
Source: US Army Corps of Engineers, National Levee Database.

Depending on the magnitude of the breach, all of the vulnerable buildings, infrastructure and critical facilities may be inundated by water and structural and content damage may result. In addition to impacting structures, a levee breach can damage roads and utilities. Roadways and culverts can be weakened by levee breach floodwaters and may collapse under the weight of a vehicle. Power and communication lines, both above and below ground, are also vulnerable to levee breach flooding. Depending on their location and the velocity of the water as it escapes the levee, 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 magnitude or severity of the precipitating event (whether an earthquake, general flood or flash flood), the extent and type of development and infrastructure protected by the levee, and the amount of time available to implement emergency measures such as sandbagging. In general, the risk to existing buildings, infrastructure and critical facilities from a levee breach is ***low*** for all of the levees studied.

Are future buildings, infrastructure and critical facilities vulnerable to levee breaches?

Yes. Any future buildings, infrastructure and critical facilities located within the leveed areas are vulnerable to damage from a levee breach. 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 levee breaches?

Unlike other hazards, there are no standard loss estimation models or methodologies for levee breaches. With no recorded events listing property damage numbers for levee breaches, there is no way to reasonably estimate future potential dollar losses. However, according to the National Levee Database, the total estimated property value of vulnerable structures in the leveed areas in Mason County is $3,490,000. Since all of the structures in the leveed areas are susceptible to levee breach impacts to varying degrees, this total represents the property exposure to levee breach events.

3.10 DAM FAILURES

HAZARD IDENTIFICATION

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 U.S. Army Corps of Engineers' National Inventory of Dams (NID), there are approximately 90,580 dams in the United States and Puerto Rico, with 1,607 dams located in Illinois. (The NID is maintained by the U.S. Army Corps of Engineers and is updated approximately every two years.) Of the 1,607 dams in Illinois, approximately 92% 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. In the event of a dam failure, the people, property, and infrastructure downstream could be subject to devastating damages. The potential severity of a full or partial dam failure is influenced by two factors:

- the capacity of the reservoir and
- the density, type and value of development/infrastructure located downstream.

There are two categories of dam failures, "flood" or "rainy day" failures and "sunny day" failures. A "flood" or "rainy day" 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.

No one knows precisely how many dam failures have occurred in the United States; however, it's estimated that hundreds have taken place over the last century. Some of the worst failures have caused catastrophic property and environmental damage and have taken hundreds of lives. The worst dam failure in the last 50 years occurred on February 26, 1972 in Buffalo Creek, West Virginia. A tailings dam owned by the Buffalo Mining Company failed, taking 125 lives, injuring 1,000 individuals, destroying 507 homes, and causing property damage in excess of $50 million (approximately $298.6 million in 2017 based on the Bureau of Labor Statistics Consumer Price Index Inflation Calculator.)

Dam failures have been documented in every state, including Illinois. According to the Dam Incident Database compiled by the National Performance of Dams Program, there have been 10 reported dam failures with uncontrolled releases of the reservoir in Illinois since 1950.

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 listed on the National Inventory of Dams is assigned a hazard potential classification rating per the "Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams." The classification system is based on the potential for loss of life and damage to property in the event of a dam failure. There are three classifications: High, Significant and Low. **Figure DF-1** provides a brief description of each hazard potential classification. It is important to note that the hazard potential 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.

Figure DF-1
Dam Hazard Classification System

Hazard Potential Classification	Description
High	Those dams where failure or mis-operation result in probable loss of human life, regardless of the magnitude of other losses. The probable loss of human life is defined to signify one or more lives lost.
Significant	Those dams where failure or mis-operation result in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities or can impact other concerns. Significant hazard potential classification dams are often located in predominately rural or agricultural areas but could be located in areas with population and significant infrastructure.
Low	Those dams where failure or mis-operation results in no probable loss of human life and low economic and/or or environmental losses. Losses are principally limited to the dam owner's property.

Sources: Federal Emergency Management Agency
U.S. Army Corps of Engineers

HAZARD PROFILE

According to the USACE National Inventory of Dams, there are nine classified dams located in Mason County. Of those nine dams, only three have a hazard potential classification of "High." One dam has a hazard potential classification of "Significant" and the remaining five dams all have a hazard potential classification of or "Low." These six dams do not have reservoirs with immense storage capacities and are not located in densely populated areas. Due to the limited impacts on the population, land use, and infrastructure associated with a majority of the classified dams, only those dams that have "High" hazard potential classification will be analyzed as part of this Plan update.

The following details the location of "High" hazard classified dams, identifies past occurrences of dam failures, details the severity or extent of future potential failures (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

Do any of the participating jurisdictions own "High" hazard classified dams?

No. None of the participating jurisdiction own a "High" hazard classified dam.

Dam Failure Fast Facts – Occurrences

Number of "High" Hazard Classified Dams Located in the County: ***3***

Number of Classified Dams owned by Participating Jurisdictions: ***None***

Number of Dam Failures Reported: ***None***

Probability of Future Dam Failure Events: ***Low***

Are there any publicly-owned or privately-owned "High" hazard classified dams within the County?

Yes. All three "High" hazard classified dams are privately-owned by Vistra Energy as part of the Dynegy Midwest Generation Havana Power Station that closed in November 2019. **Figure DF-2** provides a brief description of each dam.

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

According to data from Stanford University's National Performance of Dams Incident Database and discussions with Planning Committee members, there are no known recorded dam failures associated with the "High" hazard classified dams in Mason County.

What is the extent of future potential dam failures?

An Emergency Action Plan (EAP) defining the extent or magnitude of potential dam failures (water depth, speed of onset and warning times) was developed for the three "High" hazard classified dams in the County. Because these three dams are part of one system, the Havana Power Station East Ash Pond System, a single EAP covers all three dams. A review of the EAP found no detailed breach analysis. As a result, a data deficiency exists in terms of estimating inundation times for various distances downstream.

Based on a review of the flood inundation map included in the EAP, the first downstream structure potentially impacted by the flood wave will be Illinois Route 78 followed by South Street. Tinkham Street, the Illinois & Midland Railroad tracks and Promenade Street/N CR 1600E will act as the perimeter of the potential flood inundation area.

Figure DF-2
High Hazard Classified Dams Located in Mason County

Dam Name	Hazard Classification	Associated Waterway	Owner	Type	Primary Purpose	Completion Year	Height (feet)	Length (feet)	Storage (acre-feet)	Impoundment Surface Area (acres)	Drainage Area (square miles)	Emergency Action Plan
Privately-Owned												
Dynegy/Havana Station – Cell 1 & Polishing Pond Dam	High	Tributary Illinois River	Vistra Energy	Earth	Debris Control	1993	26	9,200	606	n/a	0.04	Yes
Dynegy/Havana Station – East Ash Pond System Cell 2 Dam	High	Tributary Illinois River	Vistra Energy	Earth	Other	1999	38	3,800	622	18	0.03	Yes
Dynegy/Havana Station – East Ash Pond System Cell 3 Dam	High	Tributary Illinois River	Vistra Energy	Earth	Debris Control	n/a	36	7,574	1,440	43.5	0.07	Yes

Sources: Stanford University, National Performance of Dams Program, NPDP Dams Database.
U.S. Army Corps of Engineers, National Inventory of Dams Interactive Report.

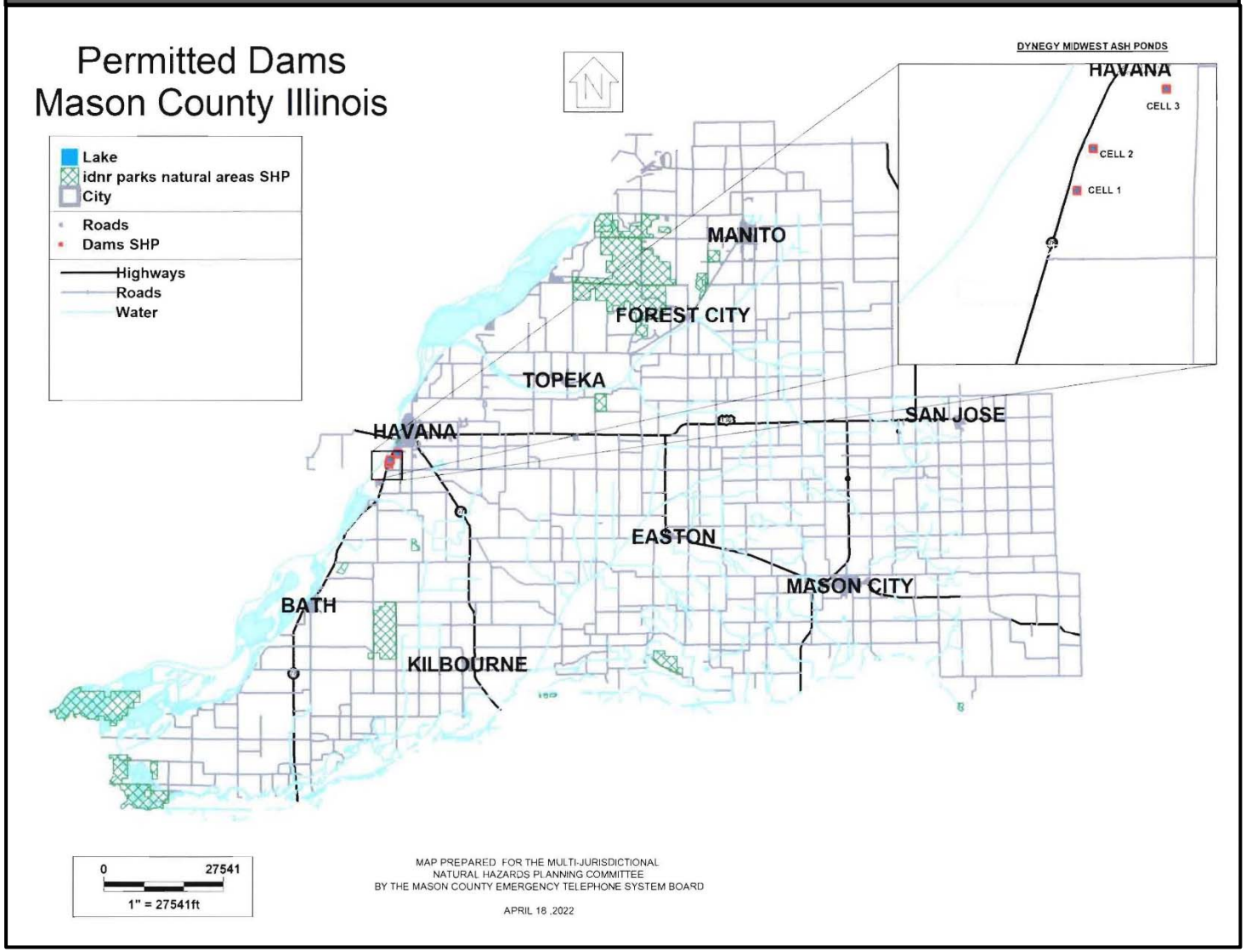
What locations are potentially affected by dam failure?

Figure DF-3 shows the locations of the "High" hazard classified dams in Mason County. Failure of the East Ash Pond System has the potential to impact commercial and residential areas at the south edge of Havana and in unincorporated Mason County between the Illinois River and Promenade Street/N CR 1600E and between the north end of the East Ash Pond System and Tinkham Street/IMRR Railroad.

What is the probability of future dam failure events occurring?

Since the "High" hazard dams have experienced a failure, it is difficult to specifically establish the probability of a future failure. However, based on the capacity of the reservoir and the scope and type of development and infrastructure located downstream, the probability is estimated to be ***low***. For the purposes of this analysis "low" is defined as having a less than 10% chance of occurring in any given year.

Figure DF-3
Location of Select Classified Dams in Mason County



HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure, and critical facilities from dam failures.

Are the participating jurisdictions vulnerable to dam failures?

Yes. A small portion of southern Havana and unincorporated Mason County are vulnerable to the dangers presented by dam failures. While these areas are vulnerable, most residents would not be impacted by a dam failure. None of the other participating municipalities or the remainder of the County are considered vulnerable.

Dam Failure Fast Facts – Risk

Dam Failure Risk/Vulnerability:

- Public Health & Safety: "High" Hazard Classification Dams – ***Low***
- Buildings/Infrastructure/Critical Facilities: "High" Hazard Classification Dams – ***Low to Medium***

Do any of the participating jurisdictions consider dam failures to be among their community's greatest vulnerabilities?

No. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdictions considered dam failures to be among their community's greatest vulnerability.

What impacts resulted from the recorded dam failures?

Since there have been no *recorded* dam failures associated with the "High" hazard classified dams studied in Mason County, there are no recorded impacts to report.

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, property damage and crop 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 roads 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 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.

What is the level of vulnerability to public health and safety from dam failures?

In terms of the risk or vulnerability to public health and safety from a dam failure, there are several factors that must be taken into consideration including the severity of the event, the capacity of the reservoir and the extent and type of development and infrastructure located downstream. When these factors are taken into consideration, the overall risk to public health and safety posed by a dam failure at the "High" hazard classified dams is considered to be ***low***.

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

Yes. **Figure DF-4** provides a ***rough estimate*** of the buildings, infrastructure, and critical facilities vulnerable to a dam failure from the "High" hazard classified dams. The EAP for the Havana Power Station East Ash Pond System included an inundation map as well as provided a list of addresses by street in the potential flood inundation area.

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 these reservoirs are not immense in size, the damage sustained from dam failure flooding may not be to the structure, but to the contents of the buildings or nearby infrastructure and critical facilities.

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. When these factors are taken into consideration, the overall risk posed by a dam failure in Mason County is considered to be ***low*** to ***medium*** for the "High" hazard classified dams**.**

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

Yes. Any future buildings, infrastructure and critical facilities located within the flood path of a classified dam 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, there are no standard loss estimation models or methodologies for dam failures. Given that there have been no recorded dam failures associated with the Dynegy Dams System, sufficient information was not available to prepare a reasonable estimate of future potential dollar losses to vulnerable structure from a dam failure.

Figure DF-4 Buildings, Infrastructure & Critical Facilities Vulnerable to a Dam Failure					
Dam Name	**Location**	**Number of Vulnerable Buildings/Infrastructure**			
		Residential	**Commercial**	**Infrastructure**	**Critical Facilities**
Havana Power Station East Ash Pond System (Dynegy/Havana Station – East Ash Pond System Cell 1 & Polishing Pond Dam, Cell 2 Dam and Cell 3 Dam)	Havana (Tinkham Street/IMRR Railroad to South Street & Illinois River to Promenade Street) Unincorporated Mason County (South Street to north end of Ash Pond System & Illinois River to Promenade Street/N CR 1600E)	55	8	- 10th Street Park - Illinois Route 78 - 10th St. - 11th St. - 12th St. - Crescent Ave. - Linwood Ave. - Maywood St. - Oakwood Ave. - Pear St. - Promenade St. - South St. - Tinkham St.	- IDNR facility - Havana City Garage

4.0 MITIGATION STRATEGY

The mitigation strategy identifies how participating jurisdictions are going to reduce or eliminate the potential loss of life and property damage that results from the natural hazards identified in the Risk Assessment section of this Plan. The strategy includes:

- Reviewing and updating the mitigation goals. Mitigation goals describe the objective(s) or desired outcome(s) that the participants would like to accomplish in terms of hazard and loss prevention. These goals are intended to reduce or eliminate long-term vulnerabilities to natural hazards.
- Evaluating the status of the existing mitigation actions and identifying a comprehensive range of jurisdiction-specific mitigation actions including those related to continued compliance with the National Flood Insurance Program (NFIP). Mitigation actions are projects, plans, activities, or programs that achieve at least one of the mitigation goals identified.
- Analyzing the existing and new mitigation actions identified for each jurisdiction. This analysis ensures each action will reduce or eliminate future losses associated with the hazards identified in the Risk Assessment section.
- Reviewing and updating the mitigation actions prioritization methodology. The prioritization methodology outlines the approach used to prioritize the implementation of each identified mitigation action.
- Identifying the entity(s) responsible for implementation and administration. For each mitigation action, the entity(s) responsible for implementing and administering that action is identified as well as the timeframes for completing the actions and potential funding sources.
- Conducting a preliminary cost/benefit analysis of each mitigation action. The qualitative cost/benefit analysis provides participants a general idea which actions are likely to provide the greatest benefit based on the financial cost and staffing efforts needed.

As part of the Plan update, the mitigation strategy was reviewed and revised. A detailed discussion of each aspect of the mitigation strategy and any updates made is provided below.

4.1 MITIGATION GOALS REVIEW

As part of the Plan update process, the mitigation goals developed in the original Plan were reviewed and re-evaluated. Planning Committee members were provided the original list of mitigation goals at the first meeting on April 22, 2021. Members were asked to review the list before the second meeting and consider whether any changes needed to be made or if additional goals should be included. At the Planning Committee's June 24, 2021 meeting the group discussed the original list of goals and approved them with no changes. **Figure MIT-1** lists the approved mitigation goals.

Figure MIT-1 Mitigation Goals	
Goal 1	Educate people about the natural 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 individuals and animals living in the County from the dangers of natural hazards.
Goal 3	Protect existing infrastructure and design new infrastructure (buildings, roads, bridges, utilities, water supplies, sanitary sewer systems, etc.) to be resilient to the impacts of natural hazards.
Goal 4	Incorporate natural hazard mitigation into existing as well as new 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 hazards.
Goal 8	Protect historic, cultural, and natural resources from the effects of natural hazards.

4.2 EXISTING MITIGATION ACTIONS REVIEW

The Plan update process included a review and evaluation of the ***existing hazard mitigation actions*** listed in the original Plan. Each jurisdiction that chose to participate in the Plan update was provided a copy of their original list of existing mitigation actions at the second meeting held on June 24, 2021. They were asked to identify those actions that were either in progress or that had been completed since the original Plan was adopted in 2015. **Figure MIT-2** through **Figure MIT-11** located at the end of this section, summarize the results of this evaluation by jurisdiction. Havana CUSD #126, Midwest Central CUSD #191, Kilbourne Fire Department and Mason City Fire Protection District did not participate in the development of the original Plan and therefore are not included in the summary. While Forest City and Topeka participated in the original Plan, they chose not to participate in the Plan update process and are not included in the summary.

4.3 NEW MITIGATION ACTION IDENTIFICATION

Following the review and evaluation of the existing mitigation actions, the Planning Committee members were asked to consult with their respective jurisdictions to identify ***new, jurisdiction-specific mitigation actions***.

Representatives of Mason County, Bath, Havana, and Mason City were also asked to identify mitigation actions that would ensure their continued compliance with the National Flood Insurance Program.

The compiled lists of new mitigation actions were then reviewed to assure the appropriateness and suitability of each action. Those actions that were not deemed appropriate and/or suitable were either reworded or eliminated.

4.4 MITIGATION ACTION ANALYSIS

Next, those existing mitigation actions retained, and the new mitigation actions identified were assigned to one of four broad mitigation activity categories, which allowed Planning Committee members to compare and consolidate similar actions. **Figure MIT-12** identifies each mitigation activity category and provides a brief description.

Figure MIT-12
Types of Mitigation Activities

Category	Description
Local Plans & Regulations (LP&R)	Local Plans & Regulations include actions that influence the way land and buildings are being developed and built. Examples include stormwater management plans, floodplain regulations, capital improvement projects, participation in the NFIP Community Rating System, comprehensive plans, and local ordinances (i.e., building codes, etc.)
Structure & Infrastructure Projects (S&IP)	Structure & Infrastructure Projects include actions that protect infrastructure and structures from a hazard or remove them from a hazard area. Examples include acquisition and elevation of structures in flood prone areas, burying utility lines to critical facilities, construction of community safe rooms, install "hardening" materials (i.e., impact resistant window film, hail resistant shingles/doors, etc.) and detention/retention structures.
Natural System Protection (NSP)	Natural System Protection includes actions that minimize damage and losses and also preserve or restore natural systems. Examples include sediment and erosion control, stream restoration, and watershed management.
Education & Awareness Programs (E&A)	Education & Awareness Programs include actions to inform and educate citizens, elected officials, and property owners about hazards and the potential ways to mitigate them. Examples include outreach/school programs, brochures and handout materials, becoming a StormReady community, evacuation planning and drills, and 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.)

Each mitigation action was then analyzed to determine:

- the hazard or hazards being mitigated;
- the general size of the population affected (i.e., small, medium, or large);
- the goal or goals fulfilled;
- whether the action would reduce the effects on new or existing buildings and infrastructure; and
- whether the action would ensure continued compliance with the National Flood Insurance Program.

4.5 MITIGATION ACTION PRIORITIZATION METHODOLOGY REVIEW

The Plan update process also included a review of the original methodology developed to prioritize mitigation actions. This original prioritization methodology is based on two key factors: 1) the frequency of the hazard and 2) the degree of mitigation attained. It was presented to the Planning Committee members at the third meeting held on September 23, 2021. The group reviewed and discussed the methodology and chose to approve it with no changes.

Figure MIT-13 identifies and describes the four-tiered prioritization methodology re-evaluated and approved by the Committee. This methodology 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.

Figure MIT-13
Mitigation Action Prioritization Methodology

		Hazard	
		Most Frequent Hazard **(M)** (i.e., severe storms, severe winter storms, floods, extreme cold, excessive heat)	Less Frequent Hazard **(L)** (i.e., tornadoes, drought, earthquakes, levee failures, dam failures)
Mitigation Action	Mitigation Action with the Potential to Virtually Eliminate or Significantly Reduce Impacts **(H)**	**HM** mitigation action will virtually eliminate damages and/or significantly reduce the probability of injuries and fatalities from the most frequently-occurring hazards	**HL** mitigation action will virtually eliminate damages and/or significantly reduce the probability of injuries and fatalities from less frequently-occurring hazards
	Mitigation Action with the Potential to Reduce Impacts **(L)**	**LM** mitigation action has the potential to reduce damages, deaths and/or injuries from the most frequently-occurring hazards	**LL** mitigation action has the potential to reduce damages, deaths and/or injuries from less frequently-occurring hazards

While prioritizing the actions is useful and provides participants with additional information, it is important to keep in mind that implementing any the mitigation actions is desirable regardless of which prioritization category an action falls under.

4.6 MITIGATION ACTION IMPLEMENTATION, ADMINISTRATION & COST/BENEFIT ANALYSIS

Finally, each participating jurisdiction was asked to identify how the mitigation actions will be implemented and administered. This included:

- Identifying the party or parties responsible for oversight and administration.
- Determining what funding source(s) are available or will be pursued.
- Describing the time frame for completion.
- Conducting a preliminary cost/benefit analysis.

Oversight & Administration

It is important to keep in mind that many of the participating jurisdictions have extremely limited capabilities related to organization and staffing for oversight and administration of the identified mitigation actions. Five of the seven participating municipalities are small in size, with populations of less than 2,000 individuals. In most cases these jurisdictions have minimal staff who are only employed part-time. Their organizational structure is such that most have very few

offices and/or departments, generally limited to public works and water/sewer. Those in charge of the offices/departments often lack the technical expertise needed to individually oversee and administer the identified mitigation actions. As a result, most of the participating jurisdictions identified their governing body (i.e., village board, city council or board) as the entity responsible for oversight and administration simply because it is the only practical option given their organizational constraints. Other participants felt that oversight and administration fall under the purview of the entity's governing body (board/council) and not individual departments.

Funding Sources

Since none of the participating jurisdictions are associated with entities that provide grant writing services and/or do not have administrators with grant writing capabilities, assistance was needed in identifying possible funding sources for the mitigation actions identified. The consultant provided written information to the participants about FEMA and non-FEMA funding opportunities that have been used previously to finance mitigation actions. In addition, funding information was discussed with participants during planning committee meetings and in one-on-one contacts so that an appropriate funding source could be identified for each mitigation action.

A handout was prepared and distributed that provided specific information on the non-FEMA grant sources available including the grant name, the government agency responsible for administering the grant, grant ceiling, contact person, and application period among other key points. Specific grants from the following agencies were identified: U.S. Department of Agricultural – Rural Development (USDA – RD), Illinois Department of Agriculture (IDOA), Illinois Department of Commerce and Economic Opportunity (DCEO), Illinois Environmental Protection Agency (IEPA), Illinois Department of Natural Resources (IDNR), and Illinois Department of Transportation (IDOT).

The funding source identified for each action is the most likely source to be pursued. However, if grant funding is unavailable through the most likely or other suggested sources, then implementation of medium and large-scale projects and activities is unlikely due to the budgetary constraints experienced by most, if not all, of the participants due to their size, projected population growth, and limited revenue streams. It is important to remember that the population for the entire County is just over 13,500 individuals. Four of the seven municipalities have populations of less than 750 individuals. Most of the jurisdictions struggle to maintain and provide the most critical of services to their residents. Additional funding is necessary if implementation is to be achieved.

Time Frame for Completion

The time frame for completion identified for each action is the timespan in which participants would like to see the action successfully completed. In many cases, however, the time frame identified is dependent on obtaining the necessary funding. As a result, a time range has been identified for many of the mitigation actions to allow for unpredictability in securing funds.

Cost/Benefit Analysis

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 eliminating or reducing the 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.

This 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 was repeatedly communicated to the Planning Committee members that when a grant application is submitted to IEMA/FEMA for a specific action, a detailed cost/benefit analysis will be required to receive funding.

4.7 RESULTS OF MITIGATION STRATEGY

Figures MIT-14 through **MIT-27**, located at the end of this section, summarize the results of the mitigation strategy. The mitigation actions are arranged alphabetically by participating jurisdiction following the County and include both existing and new actions.

Figure MIT-2
Mason County – Status of Existing Mitigation Actions
(Sheet 1 of 3)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Acquire flood-prone properties in Lynchburg Township (located in the extreme southwest corner of the County) and remove any existing structures.			✓		
Elevate flood-prone residential structures out of base (100 year) floodplains.	✓				
Conduct a study to determine the appropriate remedy(s) to alleviate recurring flooding issues associated with aquifer flooding within the County.	✓				
Select, design and construct the appropriate remedy(s) to alleviate recurring flooding issues associated with aquifer flooding within the County.	✓				
Form a rural water district to supply clean and safe drinking water to rural and unincorporated areas, aid in fire suppression as necessary during natural hazard events and provide an alternative water source to ensure resistance to drought.	✓				
Purchase and install lightning detection/notification system at Sheriff's Office to warn individuals of lightning threats during thunderstorms.	✓				
Purchase and install grounding systems at vital County facilities to protect critical systems and improve each facility's ability to survive a lightning strike.		✓			Some of the County facilities have been upgraded. The rest should be fixed when the electrical services are upgraded over the next few years.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Mason County has three infrastructure improvement projects completed or in progress that decrease the vulnerability of hazard prone areas to flooding, especially in Lynchburg Township and two infrastructure improvement projects completed or in progress that decrease the vulnerability of Safety & Security and Communication Lifelines to electrical surges/outages. There are also several administrative activities completed or in progress that also have the potential to decrease the vulnerability of hazard prone areas within the County. It is still too early to tell the degree of reduction that will be experienced from the implementation of the administrative activities.

Figure MIT-2
Mason County – Status of Existing Mitigation Actions
(Sheet 2 of 3)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install a series of weather stations around the County that would be linked to the data system of NWS Weather Forecast Office in Lincoln to improve the alert information (watches, warnings, etc.) provided to all Mason County residents.		✓			The County is partnering with the Imperial Valley Water Authority and the Illinois State Water Survey to connect their weather and well gauges to the internet. This will allow anyone to view the data in real time.
Design and construct community safe rooms (tornado/storm shelters) that are equipped with emergency backup generators and heating/air conditioning units that can also serve as emergency shelters/heating & cooling centers for residents at mobile home parks, camp grounds, etc. in unincorporated areas of the County.	✓				
Purchase and distribute NOAA weather radios to all residences and businesses within the County.	✓				
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.			✓	2019	
Make County officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.		✓			
Provide information materials to the public about the National Flood Insurance Program's voluntary Community Rating System.		✓			
Purchase and install automatic emergency backup generators at 911 centers to provide uninterrupted power to critical systems during power outages.			✓		New generators with auto transfer switches were installed at both 911 centers.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Mason County has three infrastructure improvement projects completed or in progress that decrease the vulnerability of hazard prone areas to flooding, especially in Lynchburg Township and two infrastructure improvement projects completed or in progress that decrease the vulnerability of Safety & Security and Communication Lifelines to electrical surges/outages. There are also several administrative activities completed or in progress that also have the potential to decrease the vulnerability of hazard prone areas within the County. It is still too early to tell the degree of reduction that will be experienced from the implementation of the administrative activities.

Figure MIT-2
Mason County – Status of Existing Mitigation Actions
(Sheet 3 of 3)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install automatic emergency backup generators at vital County buildings to provide uninterrupted power and maintain operations during power outages.	✓				
Raise portions of several county roads at various locations to alleviate recurring flooding/drainage issues.	✓				
Replace the CH #20 (N. Manito Rd.) bridge over Quiver Creek to address scour damage caused by repeated flooding and increase flow capacity to help alleviate recurring roadway flooding.		✓		2022	This project is under construction and will be completed in the spring of 2022.
Raise CH #20 (N. Manito Rd.) on both sides of the Quiver Creek Bridge to alleviate periodic roadway overtopping caused by flooding of Quiver Creek.		✓		2022	This project is under construction and will be completed in the spring of 2022.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Mason County has three infrastructure improvement projects completed or in progress that decrease the vulnerability of hazard prone areas to flooding, especially in Lynchburg Township and two infrastructure improvement projects completed or in progress that decrease the vulnerability of Safety & Security and Communication Lifelines to electrical surges/outages. There are also several administrative activities completed or in progress that also have the potential to decrease the vulnerability of hazard prone areas within the County. It is still too early to tell the degree of reduction that will be experienced from the implementation of the administrative activities.

Figure MIT-3
Bath – Status of Existing Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install storm/emergency warning siren system. Currently there are no warning sirens located within the Village.			✓		
Install shatter-resistant/shatter-proof glass at the Village Hall (which also acts as a storm shelter) to make the building resistant to natural hazards.	✓				
Storm Sewer Improvement. Install storm sewer lines at various locations within the Village to better manage stormwater runoff in an effort to alleviate drainage/flooding issues. The current system only covers approx. 30% of the Village, leaving major areas to flood. A five stage plan has been developed with the Village Engineer to implement storm sewer extension to cover the remaining flood-prone areas.	✓				
Install curb and gutter at various locations within the Village to help direct the flow of water runoff to drainage areas to alleviate drainage/flooding issues.	✓				
Acquire properties in flood-prone areas and remove any existing structures.	✓				
Construct a public water supply system to ensure resistance to drought, alleviate public health concerns stemming from floodwater contamination of private wells and aid in fire suppression as necessary during natural hazard events.	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Bath was only able to complete one infrastructure project due to the severe budgetary and personnel constraints experienced by a village of this size (approx. 300 individuals.) This project will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-3
Bath – Status of Existing Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install an automatic emergency backup generator at the wastewater treatment facility to provide uninterrupted power to maintain operations during power outages.	✓				
Purchase and install automatic emergency backup generators at the Village's two (2) lift stations to provide uninterrupted power to maintain operations during power outages.	✓				
Make the most recent Flood Insurance Rate Maps available at Village Hall to assist the public in considering where to construct new buildings.	✓				
Make Village officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.	✓				
Make informational materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Bath completed one infrastructure project that has the potential to decrease vulnerability to a Communications Community Lifeline within the Village. This project however will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-4
Easton – Status of Existing Mitigation Actions

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install a new electronic storm warning siren system.	✓				
Upgrade/retrofit the Village's storm sewer system to better manage stormwater runoff in an effort to alleviate drainage issues.	✓				
Purchase and install automatic emergency backup generators at the drinking water and wastewater treatment facilities to provide uninterrupted power to maintain operations during power outages.		✓			Upgrades, including a backup generator for the water plant are to be completed in the first half of 2022.
Retrofit the Village Garage to serve as a storm safe shelter for staff and Village residents.	✓				
Purchase and install an automatic emergency backup generator at Village Hall to provide uninterrupted power and maintain operation during power outages.	✓				
Identify residents with special needs in order to provide assistance during a natural hazard event.	✓				
Purchase NOAA weather radios and distribute to Village residents	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Easton has one infrastructure project in progress that has the potential to decrease vulnerability to a Food, Water, Shelter Community Lifeline within the Village. While it's still too early to tell the degree of reduction that will be experienced from the implementation of this project, it will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-5
Havana – Status of Existing Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install additional storm warning siren(s) with public address system features.			✓	2020	A new central storm warning siren was installed
Design and construct a community safe room (equipped with an emergency backup generator) as a retrofit of the existing fire station and/or as an addition to a new fire station that would function as a heating/cooling center and a shelter for staff and City residents.	✓				
Construct a new water tower at the Business Park to provide additional capacity to improve resilience to drought, serve as an auxiliary supply during natural hazard events and function as a backup in the event the existing tower becomes inoperable. Currently the City is served by only one water tower.		✓			Waiting for funding
Purchase a reverse 911 telephone warning system to notify residents/responders of a natural hazard event.	✓				
Separate the combined sewer system within the City to accommodate stormwater flow, maximize the carrying capacity of the sewer system and reduce the potential for waterborne disease outbreaks from a combined sewer overflow discharge event.	✓				
Insulate sanitary and storm sewer mains within the City to minimize service disruptions and prevent costly repairs.	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Havana has completed two infrastructure projects that have the potential to decrease vulnerability to Safety & Security and Communications Community Lifeline within the City. These projects however will not significantly change the vulnerability of hazard prone areas within the City. The city also completed two administrative activities that will not significantly change the vulnerability of hazard prone areas within the City. There is one infrastructure project in progress that has the potential to decrease the vulnerability of hazard prone areas in the City, but it is still too early to tell the degree of reduction that will be experienced from the implementation of this project.

Figure MIT-5
Havana – Status of Existing Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Insulate drinking water mains within the City to minimize service disruptions and prevent costly repairs.	✓				
Install stream gauges/warning sensors along Illinois River to alert the City to rising water levels and the potential for flooding.	✓				
Design and construct a storm safe shelter (elevated out of the floodplain, built to high wind standards, and equipped with emergency backup generator) at the Riverfront Park Campground for use by campers.	✓				
Identify and install "hardening" materials (i.e., shatter-proof glass, hail resistant shingles/doors, etc.) at the Historic Lawford Theater to the building resistant to natural hazards.	✓				
Purchase and install emergency backup generators at the City's public works buildings to provide uninterrupted power and maintain operation during power outages.			✓	2015	A new 60 kW generator was installed
Make the most recent Flood Insurance Rate Maps available at City Clerk's Office to assist the public in considering where to construct new buildings.			✓		
Make City officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.			✓		
Make informational materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Havana has completed two infrastructure projects that have the potential to decrease vulnerability to Safety & Security and Communications Community Lifeline within the City. These projects however will not significantly change the vulnerability of hazard prone areas within the City. The city also completed two administrative activities that will not significantly change the vulnerability of hazard prone areas within the City. There is one infrastructure project in progress that has the potential to decrease the vulnerability of hazard prone areas in the City, but it is still too early to tell the degree of reduction that will be experienced from the implementation of this project.

Figure MIT-6
Havana Rural Fire Protection District – Status of Existing Mitigation Actions

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Retrofit the Fire Station Building to include a community safe room (equipped with an emergency backup generator, heating/air conditioning units and upgraded bathrooms) to serve as a storm/emergency shelter and heating/cooling center for staff and district residents.	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the District's vulnerability since the original Plan was approved.
In terms of changes in vulnerability associated with mitigation actions in progress or completed, the Havana Rural Fire Protection District was not able to begin or complete any of the identified mitigation actions due to the severe budgetary and personnel constraints experienced by a rural, all-volunteer fire protection district of its size. As a result, there has been no changes in the vulnerability of hazard prone areas within the District.

Figure MIT-7
Kilbourne – Status of Existing Mitigation Actions

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install an automatic emergency backup generator at the Community Building (houses Village Hall & Police Department) to provide uninterrupted power and maintain operation during power outages.	✓				
Retrofit the Community Building (houses Village Hall & Police Department) to include a community safe room for use by Village staff and residents	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Kilbourn was not able to begin or complete any of the identified mitigation actions due to the severe budgetary and personnel constraints experienced by a village of this size (less than 300 individuals.) The Village struggles to maintain even the most critical of services to its residents. As a result, there has been no changes in the vulnerability of hazard prone areas within the Village.

Figure MIT-8
Manito – Status of Existing Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install an automatic emergency backup generator at the wastewater treatment plant to maintain operations during power outages.			✓		
Replace/update existing stormwater relief drains.		✓			
Install additional stormwater relief drains		✓			
Purchase and install additional storm warning siren(s).			✓		
Design and construct a community safe room (tornado shelter) equipped with an emergency backup generator and heating/air conditioning units that can also serve as an emergency shelter/heating and cooling center for Village residents		✓			
Develop public information materials for all natural hazards that inform residents about the risks to life and property associated with each hazard and the proactive measures that they can take to reduce or eliminate their risk.	✓				
Purchase NOAA weather radios and distribute to Village residents	✓				
Purchase and install an automatic emergency backup generator at Village Hall to provide uninterrupted power and maintain operations during power outages.		✓			

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Manito has completed two infrastructure projects that have the potential to decrease vulnerability to Food, Water, Shelter and Communications Community Lifeline within the Village. These projects however will not significantly change the vulnerability of hazard prone areas within the Village. The Village also has five infrastructure projects and three administrative activities in progress. Three of the infrastructure projects have the potential to decrease the vulnerability of hazard prone areas in the Village while the remaining two infrastructure projects and one of the administrative activities have the potential to decrease vulnerability to Food, Water, Shelter and Safety & Security Community Lifelines, but it is still too early to tell the degree of reduction that will be experienced from the implementation of these projects. The remaining two administrative activities in progress will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-8
Manito – Status of Existing Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install automatic emergency backup generator at the Midwest Central Primary School (a designated storm/emergency shelter and heating/cooling center) to provide uninterrupted power to critical systems during power outages.	✓				
Install new/upsized water lines and fire hydrants at various locations within the Village to aid in fire suppression in the event of a natural hazard.		✓			
Identify residents with special needs in order to provide assistance during a natural hazard event.		✓			
Make the most recent Flood Insurance Rate Maps available at Village Hall to assist the public in considering where to construct new buildings.*		✓			
Make Village officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*		✓			
Make informational materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.*	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Manito has completed two infrastructure projects that have the potential to decrease vulnerability to Food, Water, Shelter and Communications Community Lifeline within the Village. These projects however will not significantly change the vulnerability of hazard prone areas within the Village. The Village also has five infrastructure projects and three administrative activities in progress. Three of the infrastructure projects have the potential to decrease the vulnerability of hazard prone areas in the Village while the remaining two infrastructure projects and one of the administrative activities have the potential to decrease vulnerability to Food, Water, Shelter and Safety & Security Community Lifelines, but it is still too early to tell the degree of reduction that will be experienced from the implementation of these projects. The remaining two administrative activities in progress will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-9
Mason City – Status of Existing Mitigation Actions
(Sheet 1 of 4)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install storm warning siren(s).		✓			
Conduct drainage/hydraulic study to determine the cause(s) and identify the appropriate remedy(s) to alleviate recurring flooding/drainage problems in the Hillcrest Subdivision and along Price Ave. (County Road 3600). Remedies to consider include but are not limited to increasing size/adding drainage tile lines, elevating Price Ave., enlarging the drainage ditch and increasing culvert sizes.	✓				
Select, design, and construct the appropriate remedy(s) to alleviate recurring flooding/drainage problems in the Hillcrest Subdivision and along Price Ave. (County Road 3600).	✓				
Develop a Memorandum of Agreement, if necessary, with Drainage District to construct the appropriate remedy(s) to alleviate recurring flooding/drainage problems in the Hillcrest Subdivision and along Price Ave. (County Road 3600).	✓				
Construct a 6 inch water main loop at the Mason City Area Nursing Home and adjacent Hillcrest Subdivision to aid in fire suppression in the event of a natural hazard. There are no fire hydrants located in this area.	✓				
Upsize sewer mains from the 200 block of W. Pine St. to Arch St. to the wastewater treatment facility to increase capacity in an effort to alleviate flooding/drainage problems on Chestnut St. and Pine St.			✓	2017	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Mason City has completed two infrastructure projects that have decreased the vulnerability of hazard prone areas in the Village. The City has one infrastructure project in progress that has the potential to decrease the vulnerability to a Communications Community Lifeline within the City. This project however will not significantly change the vulnerability of hazard prone areas within the City. The Village also has six administrative activities in progress or completed. Two of the activities have the potential to decrease the vulnerability of hazard prone areas while another two activities have the potential to decrease vulnerability to Food, Water, Shelter and Safety Community Lifelines, but it is still too early to tell the degree of reduction that will be experienced from the implementation of these projects. The remaining two administrative activities will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-9
Mason City – Status of Existing Mitigation Actions
(Sheet 2 of 4)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install an automatic emergency backup generator at the Police Station to provide uninterrupted power and maintain operations during power outages.	✓				
Purchase and install an automatic emergency backup generator at Village Hall to provide uninterrupted power and maintain operations during power outages.	✓				
Purchase and install an automatic emergency backup generator at Fire Station to provide uninterrupted power and maintain operations during power outages.	✓				
Purchase a mobile trailer-mounted 4 inch pump with hoses for use in removing excess water from critical infrastructure during flood events.	✓				
Conduct drainage/hydraulic study to determine the cause(s) and identify the appropriate remedy(s) to alleviate recurring flooding problems at the intersection of Chestnut St. and N. West Ave. next to Illini Central High School/Grade School.		✓			
Select, design, and construct the appropriate remedy(s) to alleviate recurring flooding problems at the intersection of Chestnut St. and N. West Ave. next to Illini Central High School/Grade School.	✓				Drainage improvements by IDOT anticipated to be completed in 2022
Conduct drainage/hydraulic study to determine the cause(s) and identify the appropriate remedy(s) to alleviate recurring drainage/flooding problems along W. Roosevelt St. and N. Keefer St.	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Mason City has completed two infrastructure projects that have decreased the vulnerability of hazard prone areas in the Village. The City has one infrastructure project in progress that has the potential to decrease the vulnerability to a Communications Community Lifeline within the City. This project however will not significantly change the vulnerability of hazard prone areas within the City. The Village also has six administrative activities in progress or completed. Two of the activities have the potential to decrease the vulnerability of hazard prone areas while another two activities have the potential to decrease vulnerability to Food, Water, Shelter and Safety Community Lifelines, but it is still too early to tell the degree of reduction that will be experienced from the implementation of these projects. The remaining two administrative activities will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-9
Mason City – Status of Existing Mitigation Actions
(Sheet 3 of 4)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Select, design, and construct the appropriate remedy(s) to alleviate recurring drainage/flooding problems along W. Roosevelt St. and N. Keefer St.	✓				
Designate the Civic Center as a heating/cooling center and emergency shelter.	✓				City sold the Civic Center
Purchase and install an automatic emergency backup generator at the Civic Center (a designated heating/cooling center and emergency shelter) to provide uninterrupted power to critical systems during power outages.	✓				City sold the Civic Center
Separate the combined sewer system within the City to accommodate stormwater flow, maximize the carrying capacity of the sewer system and reduce the potential for waterborne disease outbreaks from a combined sewer overflow discharge event.			✓	2021	Constructed CSO Pump Station and CSO lagoon at the sewage treatment plant instead of separating sewers. Upgraded existing pumps, clarifier, electrical, standby power, and SCADA.
Purchase a stand-alone server with software to back up the City's computer files.	✓				
Develop a Memorandum of Agreement with Illini Central Middle School/High School designating the school as a storm/emergency shelter and heating/cooling center for City residents.		✓			
Develop a Memorandum of Agreement with Illini Central Grade School designating the school as a storm/emergency shelter and heating/cooling center for City residents.		✓			

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Mason City has completed two infrastructure projects that have decreased the vulnerability of hazard prone areas in the Village. The City has one infrastructure project in progress that has the potential to decrease the vulnerability to a Communications Community Lifeline within the City. This project however will not significantly change the vulnerability of hazard prone areas within the City. The Village also has six administrative activities in progress or completed. Two of the activities have the potential to decrease the vulnerability of hazard prone areas while another two activities have the potential to decrease vulnerability to Food, Water, Shelter and Safety Community Lifelines, but it is still too early to tell the degree of reduction that will be experienced from the implementation of these projects. The remaining two administrative activities will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-9
Mason City – Status of Existing Mitigation Actions
(Sheet 4 of 4)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install an automatic emergency backup generator at Illini Central Middle School/High School (a designated heating/cooling center and emergency shelter) to provide uninterrupted power to critical systems during power outages.	✓				
Purchase and install an automatic emergency backup generator at Illini Central Grade School (a designated heating/cooling center and emergency shelter) to provide uninterrupted power to critical systems during power outages.	✓				
Conduct mock natural disaster drills to provide City officials, staff, and volunteers with hands on experience in dealing with different disaster scenarios.	✓				
Make the most recent Flood Insurance Rate Maps available at City Clerk's Office to assist the public in considering where to construct new buildings.			✓	2021	
Make City officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.		✓			
Make informational materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.			✓	2021	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Mason City has completed two infrastructure projects that have decreased the vulnerability of hazard prone areas in the Village. The City has one infrastructure project in progress that has the potential to decrease the vulnerability to a Communications Community Lifeline within the City. This project however will not significantly change the vulnerability of hazard prone areas within the City. The Village also has six administrative activities in progress or completed. Two of the activities have the potential to decrease the vulnerability of hazard prone areas while another two activities have the potential to decrease vulnerability to Food, Water, Shelter and Safety Community Lifelines, but it is still too early to tell the degree of reduction that will be experienced from the implementation of these projects. The remaining two administrative activities will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-10
Mason District Hospital – Status of Existing Mitigation Actions

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Purchase and install an automatic emergency backup generator at the Mason City ambulance base to provide uninterrupted power to critical systems during power outages. Currently the building has no emergency power to open the bay doors when the power goes out.	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Hospital's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Mason District Hospital did not begin or complete any of the identified mitigation actions due to the budgetary and personnel constraints experienced by a small rural district hospital. As a result, there has been no changes in the vulnerability of hazard prone areas at any of the Hospital's facilities.

Figure MIT-11
San Jose – Status of Existing Mitigation Actions

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Design and construct a community safe room (tornado shelter) equipped with an emergency backup generator and heating/air conditioning units that can also serve as an emergency shelter/heating and cooling center for Village residents	✓				
Purchase and install automatic emergency backup generator(s) at Police Office Buildings to provide uninterrupted power and maintain operations during power outages.	✓				
Conduct a study of the storm sewer system to identify sections that require replacement/repair and modernizing to improve the capacity of the system and alleviate drainage issues.	✓				
Upgrade/retrofit the Village's storm sewer system to better manage stormwater runoff, increase capacity and alleviate drainage issues.	✓				
Purchase and install an automatic emergency backup generator for the wastewater treatment plant's main lagoon lift station to provide uninterrupted power to maintain operations during power outages.	✓				The design of a new main pump station including standby generator is planned to start later in 2022 with construction planned for 2023
Construct a new water tower to increase the amount of water available in reserve and to aid in fire suppression as necessary during natural hazard events.	✓				

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, San Jose was not able to begin or complete any of the identified mitigation actions due to the severe budgetary and personnel constraints experienced by a Village of this size (approx. 700 individuals.) The Village struggles to maintain even the most critical of services to its residents. As a result, there has been no changes in the vulnerability of hazard prone areas within the Village.

Figure MIT-14
Mason County Hazard Mitigation Actions
(Sheet 1 of 5)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Purchase and install an emergency backup generator at Mason County Health Department to establish a resilient and reliable power supply, ensure the continued operation of Community Lifelines such as Communications and Health & Medical, maintain continuity of government/operations, and assure critical storage temperatures for vaccines during power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Health Department Administrator	1-3 years	County / FEMA HMGP	Medium/High	New
HM	Elevate flood-prone residential structures out of base (100 year) floodplains.*	F	S&IP	Small	2, 6	n/a	Yes	Floodplain Manager	5 years	County / FEMA FMA	Medium/High	Existing (2015)
LM	Conduct a hydrologic/hydraulic study to identify design solutions to address recurring flooding problems associated with aquifer flooding within the County to ensure continued functionality of Transportation Community Lifelines.*	F, SS	E&A	Small	2, 3, 5	n/a	Yes	County Boar Chair County Board / Floodplain Manager / County Highway Engineer	5 years	County / IDOT Local Roads	Medium/High	Existing (2015)
HM	Construct the identified design solutions to address recurring flooding issues associated with aquifer flooding within the County to ensure continued functionality of Transportation Community Lifelines.*	F, SS	S&IP	Small	2, 3, 5	n/a	Yes	County Boar Chair County Board / Floodplain Manager / County Highway Engineer	5-10 years	County / IDOT Local Roads	High/High	Existing (2015)

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the County's size (approx. 13,600 individuals), projected population growth and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	LF	Levee Failure
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-14
Mason County Hazard Mitigation Actions
(Sheet 2 of 5)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HL	Form a rural water district to establish a constant supply of clean and safe drinking water for unincorporated areas and a backup water supply for incorporated municipalities to ensure drought resilience, establish a Flood, Water, Shelter Community Lifeline essential to human health and aid in fire suppression during natural hazard events.	DR, F	LP&R S&IP	Medium	2, 3, 5	Yes	Yes	County Board Chair / County Board	10 years	County / IEPA SRF - PWSLP	High/Medium	Existing (2015)
HM	Purchase and install lightning detection & notification equipment at Sheriff's Office to provide advance warning of dangerous weather conditions.	SS	S&IP	Small	2	n/a	n/a	County Board Chair County Board / Sheriff	5 years	County	Medium/Medium	Existing (2015)
HM	Purchase and install grounding systems at critical County facilities to improve infrastructure resilience and ensure continued operations of Community Lifelines.	SS, T	S&IP	Medium	3, 5	n/a	Yes	County Board Chair County Board / EMA Director	5 years	County	Medium/Medium	Existing (2015)
HM	Purchase and install a series of weather stations around the County that would be linked to the data system of NWS Weather Forecast Office in Lincoln to establish a Communications Community Lifeline and improve alert information (watches, warnings, etc.) provided to all Mason County residents.	EC, EH, F, SS, SWS, T	E&	Large	2	n/a	/a	County Board Chair County Board / EMA Director	1-3 years	County	Medium/High	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the County's size (approx. 13,600 individuals), projected population growth and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	LF	Levee Failure
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-14
Mason County Hazard Mitigation Actions
(Sheet 3 of 5)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Design and construct community safe rooms equipped with emergency backup generators and HVAC systems that can also serve as warming/cooling centers and emergency shelters for residents at mobile home parks, campgrounds, etc. in unincorporated areas of the County to establish a Food, Water, Shelter Community Lifelines essential to human health and safety.	EC, EH, EQ, F, SS, SWS, T	S&IP	Small	2	n/a	n/a	County Board Chair County Board / EMA Director	5-10 years	County / FEMA HMGP	High/High	Existing (2015)
HM	Purchase and install automatic emergency backup generators at essential County-owned buildings, facilities, and infrastructure systems to establish resilient and reliable power supplies, ensure the continued operation of Community Lifelines such as Communication and Safety & Security and maintain continuity of government/operations during power outages.	DF, EC EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	County Board Chair / County Board EMA Director	5 years	County / FEMA HMGP	Medium/High	Existing (2015)
HM	Purchase and install electrical hookups (pigtails) at essential County-owned buildings, facilities, and infrastructure systems for use with portable emergency backup generators to ensure the continued operation of Community Lifelines such as Communication and Safety & Security and maintain continuity of government/ operations during extended power outages.	DR, EC, EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	County Board Chair / County Board EMA Director	3-5 years	County / DCEO	Medium/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the County's size (approx. 13,600 individuals), projected population growth and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	LF	Levee Failure
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-14
Mason County Hazard Mitigation Actions
(Sheet 4 of 5)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
LL	Partner with Drainage & Levee Districts to develop Emergency Preparedness Plans/Inundation Maps that identify the extent (water depth, speed of onset, warning times, etc.) for the studied levees to address data deficiencies.	LF	E&A	Small	2, 3, 5	Yes	Yes	Floodplain Manger / EMA Director	5 years	County	Low/Low	New
LL	Partner with "high" hazard classified dam owners to develop Emergency Action Plans (EAPs) that identify the extent (water depth, speed of onset, warning times, etc.) and location (inundation areas) of potential dam failures to address data deficiencies.	DF	E&A	Small	2, 3, 5	Yes	Yes	Floodplain Manger / EMA Director	5 years	County	Low/Low	New
LM	Distribute public information materials that inform residents about the risks to life and property associated with the natural hazards that impact the County and the proactive actions they can take to reduce their risk.	DF, DR, EC, EH, EQ, F, LF, SS, SWS, T	E&A	Large	1	n/a	n/a	County Board Chair / County Board EMA Director	5 year	County	Low/Medium	New

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the County's size (approx. 13,600 individuals), projected population growth and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
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LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	LF	Levee Failure
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-14
Mason County Hazard Mitigation Actions
(Sheet 5 of 5)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	LP&R	Small	1, 2, 4 6, 7	Yes	Yes	Floodplain Manager / Code Enforcement	1-5 year	County	Low/High	New
LM	Continue to make the most recent Flood Insurance Rate Maps available at the Code Enforcement Office to assist the public in considering where to construct new buildings.*	F	E&A	Small	1, 2, 6, 7	Yes	Yes	Floodplain Manager / Code Enforcement	1-5 years	County	Low/Medium	New
LM	Make County officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	E&A	Small	1, 2, 6, 7	Yes	Yes	Floodplain Manager / Code Enforcement	1-5 years	County	Low/Medium	New
LM	Evaluate the feasibility of participating in the National Flood Insurance Program's voluntary Community Rating System to reduce flood insurance premiums.*	F	LP&R	Small	1, 2, 6, 7	Yes	Yes	Floodplain Manager / Code Enforcement	3-5 years	County	Low/Medium	New

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the County's size (approx. 13,600 individuals), projected population growth and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

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Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	LF	Levee Failure
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-15
Bath Hazard Mitigation Actions
(Sheet 1 of 4)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Purchase and install an emergency backup generator at Village Hall, a designated warming/cooling center and emergency shelter, to establish a resilient and reliable power supply, ensure the continued operation of Community Lifelines such as Communications, Safety & Security and Food, Water, Shelter and maintain continuity of government/operations during power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	2-5 years	Village / USDA – RD Critical Facilities Programs	High/High	New
HM	Replace all exterior window glass at Village Hall with shatter-resistant/shatter-proof glass to increase the building's resilience to natural hazard events an ensure the continued functionality of Community Lifelines such as Safety & Security and Food, Water, Shelter and maintain continuity of government/operations.	EC, EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	5 years	Village / FEMA HMGP	High/High	Existing (2015)
HM	Acquire properties located in flood-prone areas and remove existing structures.*	F	S&IP	Small	2, 6	n/a	Yes	President / Village Board	5 years	Village / FEMA FMA or HMGP	High/High	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 300 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-15
Bath Hazard Mitigation Actions
(Sheet 2 of 4)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Install curb and gutter at various locations within the Village to direct the flow of stormwater runoff to drainage structures in an effort to alleviate drainage/flooding issues and ensure continued functionality of Transportation Community Lifelines.	F, SS	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	5 years	Village / IDOT Local Roads	High/High	Existing (2015)
HM	*Storm Sewer Improvement:* Install storm sewer lines at various locations within the Village to better manage stormwater runoff, alleviate drainage/flooding problems and ensure continued functionality of Food, Water, Shelter and Transportation Community Lifelines. The current system only covers approx. 30% of the Village, leaving major areas to flood. A five stage plan has been developed with the Village Engineer to implement storm sewer extension to cover the remaining flood-prone areas.	F, SS	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	5-10 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – WPCLP	High/High	Existing (2015)

* Mitigation action to ensure continued compliance with NFIP.

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-15
Bath Hazard Mitigation Actions
(Sheet 3 of 4)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Construct public drinking water supply system for the Village to establish a constant supply of water for residents, ensure community resilience to drought, establish a Food, Water, Shelter Community Lifeline essential to human health, alleviate public health concerns stemming from floodwater contamination of private wells and aid in fire suppression during natural hazard events.	DR, F, SS	S&IP	Large	2, 3, 5	Yes	Yes	President / Village Board	5-10 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	High/High	Existing (2015)
HM	Purchase and install an automatic emergency backup generator at the wastewater treatment facility to establish a resilient and reliable power supply in order to maintain continuity of government/operations and mitigate risk to a Food, Water, Shelter Community Lifeline.	EC. EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	Yes	Yes	President / Village Board	3-5 years	Village / USDA – RD Critical Facilities Programs	High/High	Existing (2015)
HM	Purchase and install automatic emergency backup generators at the Village's two (2) lift stations to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Food, Water, Shelter Community Lifeline.	EC. EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	Yes	Yes	President / Village Board	3-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 300 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

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DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-15
Bath Hazard Mitigation Actions
(Sheet 4 of 4)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	LP&R	Medium	1, 2, 4, 6, 7	Yes	Yes	President / Village Board	1-5 years	Village	Low/High	New
LM	Make the most recent Flood Insurance Rate Maps available at the Village Clerk's to assist the public in considering where to construct new buildings.*	F	E&A	Small	1, 2, 6, 7	Yes	n/a	President / Village Board	1-3 years	Village	Low/Medium	Existing (2015)
LM	Make Village officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	E&A	Small	1, 2, 6, 7	Yes	n/a	President / Village Board	1-5 years	Village	Low/Medium	Existing (2015)
LM	Evaluate the feasibility of participating in the National Flood Insurance Program's voluntary Community Rating System to reduce flood insurance premiums.*	F	LP&R	Small	1, 2, 4, 6	Yes	Yes	President / Village Board	3-5 years	Village	Low/Medium	New

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 300 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-16
Easton Hazard Mitigation Actions
(Sheet 1 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Retrofit Village Hall to include a community safe room to establish a Food, Water, Shelter Community Lifeline essential to human and health and safety for staff and village residents.	SS, T	S&IP	Medium	2	n/a	Yes	President Village Board	3-5 year	Village / FEMA HMGP	High/High	New
HM	Upgrade sanitary sewer lift station system to increase pump capacity in order to handle excess runoff from storm drains during heavy rain events, minimize sewer backups, improve system resilience, and ensure continued functionality of a Food, Water, Shelter Community Lifeline essential to human health and safety.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	Superintendent / Water & Sewer Department	2-5 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	High/High	New
HM	Purchase and install automatic emergency backup generator at lift station to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Food, Water, Shelter Community Lifeline.	EC. EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	Yes	Yes	Superintendent / Water & Sewer Department	2-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	New
HM	Inspect and remove silt from sewer detention ponds to restore/improve capacity, improve system resilience and mitigate risk to a Food, Water, Shelter Community Lifeline.	F, SS	S&IP	Large	2, 3, 5	Yes	Yes	Superintendent / Water & Sewer Department	2-5 years	Village	Medium/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 300 individuals). The Village works hard to provide critical services to its residents but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-16
Easton Hazard Mitigation Actions
(Sheet 2 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Upgrade/retrofit the Village's storm sewer system to better manage stormwater runoff, alleviate drainage problems, increase system resilience, and mitigate risk to a Food, Water, Shelter Community Lifeline.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	Superintendent / Water & Sewer Department	3-5 years	Village / FEMA HMGP / IEPA SRF – WPCLP	High/High	Existing (2015)
HM	Purchase and install a natural gas emergency backup generator at Village Hall to establish a resilient and reliable power supply, ensure the continued operation of Community Lifelines such as Communications, Safety & Security and Food, Water, Shelter and maintain continuity of government/operations during power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	2-5 years	Village / USDA – RD Critical Facilities Programs	High/High	Existing (2015)
LM	Identify access and function needs residents within the Village in order to provide assistance during natural hazard events.	EC, EH, EQ, F, SS, SWS, T	E&A	Small	2	n/a	n/a	President / Village Board	1-3 years	Village	Low/High	Existing (2015)

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-17
Havana Hazard Mitigation Actions
(Sheet 1 of 4)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Design and construct a community safe room (equipped with emergency backup generator) as a retrofit the existing Fire Station and/or an addition to a new Fire Station that would also serve as a warming/cooling center and emergency shelter for staff and City residents to establish a Food, Water, Shelter Community Lifeline essential to human and health and safety.	EC, EH, SS, T	S&IP	Small	2	Yes	Yes	Mayor City Council / Fire Chief Fire Department	5 years	City / FEMA HMGP	Medium/High	Existing (2015)
HM	Construct a new water tower at the Business Park to provide additional capacity and ensure community resilience to drought, ensure functionality of a Food, Water, Shelter Community Lifeline, and aid in fire suppression during natural hazard events. Currently the City is served by only one water tower.	EC, EH, F,	S&IP	Medium	2, 3, 5	Yes	Yes	Mayor City Council / Public Works Director	5-10 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	High/High	Existing (2015)
HM	Purchase/subscribe to an automated emergency notification system (i.e., reverse 911) to establish a Communications Community Lifeline essential to human health and safety.	EC, EH, EQ, F, SS, SWS, T	E&A	Large	2	n/a	n/a	Mayor City Council / Police Chief Police Department	1-4 years	City	Medium/High	Existing (2015)

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Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-17
Havana Hazard Mitigation Actions
(Sheet 2 of 4)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Separate the combined sewer system within the City to better manage stormwater runoff, reduce flow rates to wastewater treatment plant, increase system resilience, prevent damage to the collection systems and plant during flood events and mitigate risk to a Food, Water, Shelter Community Lifeline.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	Mayor City Council / Public Works Director	5-10 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – WPCLP	High/High	Existing (2015)
HM	Insulate sanitary and storm sewer mains within the City to minimize service disruptions, improve system resilience and mitigate risk to a Food, Water, Shelter Community Lifeline.	EC, SWS	S&IP	Large	2, 3, 5	Yes	Yes	Mayor City Council / Public Works Director	5-10 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – WPCLP	Medium/High	Existing (2015)

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Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-17
Havana Hazard Mitigation Actions
(Sheet 3 of 4)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Insulate drinking water mains within the City to minimize service disruptions, improve system resilience and mitigate risk to a Food, Water, Shelter Community Lifeline.	EC, SWS	S&IP	Large	2, 3, 5	Yes	Yes	Mayor City Council / Public Works Director	5-10 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	Medium/High	Existing (2015)
LM	Install stream gauges/warning sensors along Illinois River to accurately monitor river levels and alert City officials to potential flood events.	F, SS	E&A	Medium	2, 3, 5	n/a	n/a	Mayor City Council / Public Works Director	1-3 years	City	Low/Medium	Existing (2015)
HM	Design and construct a community safe room (elevated out of the floodplain and equipped with emergency backup generator) at the Riverfront Park Campground to establish a Food, Water, Shelter Community Lifeline essential to human and health and safety for campers.	SS, T	S&IP	Small	2	Yes	n/a	Mayor City Council / Director Havana Park District	5 years	City / Park District / FEMA HMGP	Medium/High	Existing (2015)
HM	Identify and install hardening materials (i.e., shatter-proof glass, hail resistant shingles/doors, etc.) at the Historic Lawford Theater to improve building resilience to natural hazard events.	EQ, F, SS, SWS, T	S&IP	Small	2, 8	n/a	Yes	Mayor / City Council	5 years	City	Medium/Medium	Existing (2015)

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DF	Dam Failure	F	Flood
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EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-17
Havana Hazard Mitigation Actions
(Sheet 4 of 4)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
LL	Distribute public information materials that inform residents about the risks to life and property associated with a failure of the Dynegy East Ash Pond Dam and the proactive actions they can take to reduce their risk.	DF	E&A	Small	1, 2	n/a	n/a	Mayor City Council / Fire Marshal	2-4 years	City	Low/Low	New
HM	Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	LP&R	Small	1, 2, 4 6, 7	Yes	Yes	Mayor City Council / Fire Marshal	1-5 years	City	Low/High	New
LM	Continue to make the most recent Flood Insurance Rate Maps available at the City Clerk's to assist the public in considering where to construct new buildings.*	F	E&A	Small	1, 2, 6, 7	Yes	n/a	Mayor City Council / Fire Marshal	1-3 years	City	Low/Medium	New
LM	Continue to make City officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	E&A	Small	1, 2, 6, 7	Yes	n/a	Mayor City Council / Fire Marshal	1-5 years	City	Low/Medium	New
LM	Evaluate the feasibility of participating in the National Flood Insurance Program's voluntary Community Rating System to reduce flood insurance premiums.*	F	LP&R	Small	1, 2, 4, 6	Yes	Yes	Mayor City Council / Fire Marshal	3-5 years	City	Low/Medium	New

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 3,200 individuals). The City works hard to maintain critical services to its residents Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-18
Havana CUSD #126 Hazard Mitigation Actions

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Bury power lines that feed both the Jr. High and High School to establish a resilient and reliable power supply, limit service disruptions and mitigate risk to Food, Water Shelter Community Lifelines. Our schools are listed on the American Red Cross emergency use list.	EQ, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	School Superintendent / School Board	1-2 years	CUSD / FEMA HMGP	Medium/High	New
HM	Purchase and install an energy storage bank for use with the solar array to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to Food, Water Shelter Community Lifelines.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	School Superintendent / School Board	1-5 years	CUSD	Medium/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural school districts. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-19
Havana Rural Fire Protection District Hazard Mitigation Actions

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
LM	Distribute public information materials that inform residents about the risks to life and property associated with the natural hazards that impact the Village and the proactive actions they can take to reduce their risk.	DF, DR, EC, EH, EQ, F, SS, SWS, T	E&A	Large	1	n/a	n/a	Fire Chief Board of Trustees	2-5 year	FPD	Low/Medium	New
LM	Purchase and distribute NOAA weather radios to Village residents.	EC, EH, EQ, F, SS, SWS, T	E&A	Large	2	n/a	n/a	Fire Chief Board of Trustees	1-5 years	FPD	Low/High	New
HM	Identify and install hardening materials (i.e., shatter-proof glass, hail resistant shingles/doors, etc.) to increase building resilience, safeguard functionality and mitigate risk to a Safety & Security Community Lifeline.	EQ, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Fire Chief Board of Trustees	1-5 years	FPD / USDA – RD Critical Facilities Programs	High/High	New
HM	Retrofit the Fire Station Building to include a community safe room (equipped with an emergency backup generator, HVAC units and upgraded bathrooms) that can also serve as a warming/cooling center for staff and district residents to establish a Food, Water, Shelter Community Lifeline essential to human and health and safety.	EC, EH, SS, T	S&IP	Small	2	n/a	Yes	Fire Chief / Board of Trustees	5 years	FPD / FEMA HMGP	High/High	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a rural, all-volunteer fire protection district. Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	SS	Severe Storm
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-20
Kilbourne Hazard Mitigation Actions

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Purchase and install an automatic emergency backup generator at the Community Building (houses Village Hall & Police Department) to establish a resilient and reliable power supply, ensure the continued operation of Community Lifelines such as Communications and Safety & Security and maintain continuity of government/operations during power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	President Village Board / Fire Chief Board of Trustees	2-5 years	Village / FPD / USDA – RD Critical Facilities Programs	High/High	Existing (2015)
HM	Retrofit the Community Building to include a community safe room (equipped with emergency backup) for use by Village staff and residents to establish a Food, Water, Shelter Community Lifeline essential to human and health and safety.	SS, T	S&IP	Medium	2	n/a	Yes	President Village Board / Fire Chief Board of Trustees	2-5 year	Village / FPD / FEMA HMGP	High/High	Existing (2015)
LM	Distribute public information materials that inform residents about the risks to life and property associated with the natural hazards that impact the Village and the proactive actions they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	E&A	Large	1	n/a	n/a	President Village Board / Fire Chief Board of Trustees	2-5 year	Village / FPD	Low/Medium	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 300 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-21
Kilbourne Fire Department Hazard Mitigation Actions

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Purchase and install an automatic emergency backup generator at the Community Building (houses Village Hall & Police Department) to establish a resilient and reliable power supply, ensure the continued operation of Community Lifelines such as Communications and Safety & Security and maintain continuity of government/operations during power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Fire Chief Board of Trustees / President Village Board	2-5 years	FPD / Village / USDA – RD Critical Facilities Programs	High/High	New
HM	Retrofit the Community Building to include a community safe room (equipped with emergency backup) for use by Village staff and residents to establish a Food, Water, Shelter Community Lifeline essential to human and health and safety.	SS, T	S&IP	Medium	2	n/a	Yes	Fire Chief Board of Trustees / President Village Board	2-5 year	FPD / Village / FEMA HMGP	High/High	New
LM	Distribute public information materials that inform residents about the risks to life and property associated with the natural hazards that impact the Village and the proactive actions they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	E&A	Large	1	n/a	n/a	Fire Chief Board of Trustees / President Village Board	2-5 year	FPD / Village	Low/Medium	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a rural, all-volunteer fire protection district. Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-22
Manito Hazard Mitigation Actions
(Sheet 1 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Replace/upgrade existing stormwater relief drains and install additional drains to better manage stormwater runoff, alleviate drainage problems, increase system resilience, and mitigate risk to a Food, Water, Shelter Community Lifeline.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	3-5 years	Village / FEMA HMGP / IEPA SRF	High/High	Existing (2015)
HM	Design and construct a community safe room equipped with an emergency backup generator and HVAC system that can also serve as an emergency shelter and warming/cooling center for Village residents to establish a Food, Water, Shelter Community Lifeline essential to human health and safety.	EC, EH, EQ, F, SS, SWS, T	S&IP	Small	2	n/a	n/a	President / Village Board	2-5 years	Village / FEMA HMGP	High/High	Existing (2015)
LM	Distribute public information materials that inform residents about the risks to life and property associated with the natural hazards that impact the Village and the proactive actions they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	E&A	Large	1	n/a	n/a	President / Village Board	2-5 year	Village	Low/Medium	Existing (2015)
HM	Purchase and install an emergency backup generator at Village Hall to establish a resilient and reliable power supply, ensure the continued operation of Community Lifelines such as Communications and Safety & Security and maintain continuity of government/operations during power outages.	EC EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	2-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 1,500 individuals). The Village works hard to maintain critical services to its residents.

Acronyms

Priority

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-22
Manito Hazard Mitigation Actions
(Sheet 2 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Purchase and install an automatic emergency backup generator at Midwest Central Primary School, a designated warming/cooling center and emergency shelter, to establish a resilient and reliable power supply and ensure the continued operations of a Food, Water, Shelter Community Lifeline essential to human health and safety.	EC, EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	2-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2015)
LM	Purchase and distribute NOAA weather radios to Village residents.	EC, EH, EQ, F, SS, SWS, T	E&A	Large	2	n/a	n/a	President / Village Board	1-5 years	Village	Low/High	Existing (2015)
HM	Upgrade/retrofit drinking water system (water lines, mains, fire hydrants, etc.) at various locations within the Village to increase system resilience, ensure a constant supply of water for resident and aid in fire suppression during natural hazard events.	EC, EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	5-10 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	High/High	Existing (2015)
LM	Identify access and function needs residents within the Village in order to provide assistance during natural hazard events.	EC, EH, EQ, F, SS, SWS, T	E&A	Small	2	n/a	n/a	President / Village Board	1-3 years	Village	Low/High	Existing (2015)

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EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Mason City Hazard Mitigation Actions
(Sheet 1 of 9)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Purchase and install an emergency backup generator at City Hall/Police Department to establish a resilient and reliable power supply, ensure the continued operation of Community Lifelines such as Communications and Safety & Security and maintain continuity of government/operations during power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor City Council / Superintendent of Public Works	2-5 years	City / USDA – RD Critical Facilities Programs	High/High	New
LM	Develop a Memorandum of Agreement (MOA) with American Legion Post 496 designating their building as a warming & cooling center for City residents to establish another Food, Water, Shelter Community Lifeline essential to human health and safety within the City.	EC, EH	LP&R	Small	2	n/a	n/a	Mayor City Council / Municipal Services Project Manager	1 year	City	Low/Medium	New
HM	Purchase and install an automatic emergency backup generator at American Legion Post 496, a designated warming and cooling center, to establish a resilient and reliable power supply and ensure the continued operations of a Food, Water, Shelter Community Lifeline essential to human health and safety.	EC, EH	S&IP	Small	2, 3, 5	n/a	Yes	Mayor City Council / Superintendent of Public Works	1 year	City / USDA – RD Critical Facilities Programs	High/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,400 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Mason City Hazard Mitigation Actions
(Sheet 2 of 9)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Replace existing storm warning siren and purchase and install additional storm warning sirens to maximize the system's effectiveness and establish/ensure continued operation of a Communications Community Lifeline essential to human health and safety.	SS, T	E&A	Large	2	n/a	n/a	Mayor / City Council	1-3 years	City / USDA – RD Critical Facilities Programs	Medium/High	Existing (2015)
LM	Conduct a drainage/hydraulic study to determine the cause(s) and identify design solutions to address recurring flooding/drainage problems in the Hillcrest Subdivision and along Price Avenue (County Road 3600) to ensure continued functionality of Transportation Community Lifelines. Remedies to consider include but are not limited to increasing size/adding drainage tile lines, elevating Price Avenue, enlarging the drainage ditch and increasing culvert sizes.	F, SS	E&A	Small	2, 3, 5	n/a	n/a	Mayor City Council / Superintendent of Public Works	1-3 years	City / County Highway Department / Township / IDOT Local Roads	Low/Medium	Existing (2015)

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Acronyms

Priority

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Mason City Hazard Mitigation Actions
(Sheet 3 of 9)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
LM	Develop a Memorandum of Agreement with Drainage District and Mason City Township to construct the identified design solutions to address recurring flooding/drainage problems in the Hillcrest Subdivision and along Price Ave. (County Road 3600) to ensure continued functionality of Transportation Community Lifelines.	F, SS	LP&R	Small	2, 3, 5	n/a	n/a	Mayor City Council / Municipal Services Project Manager	1 year	City	Low/Medium	Existing (2015)
HM	Construct identified design solutions to address recurring flooding/drainage problems in the Hillcrest Subdivision and along Price Avenue (County Road 3600) to ensure continued functionality of Transportation Community Lifelines.	F, SS	S&IP	Small	2, 3, 5	n/a	Yes	Mayor City Council / Superintendent of Public Works	3-5 years	City / County Highway Department / IDOT Local Roads / USDA – RD Water & Waste Disposal Program	High/High	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,400 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Mason City Hazard Mitigation Actions
(Sheet 4 of 9)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Purchase and install an emergency backup generator at the Police Station to establish a resilient and reliable power supply, ensure the continued operation of Community Lifelines such as Communications and Safety & Security and maintain continuity of government/operations during power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Mayor City Council / Superintendent of Public Works	1-3 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2015)
HM	Purchase and install an emergency backup generator at City Hall, a designated warming and cooling center, to establish a resilient and reliable power supply, ensure the continued operation of Community Lifelines such as Communications, Safety & Security and Food, Water, Shelter and maintain continuity of government/operations during power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Mayor City Council / Superintendent of Public Works	1-3 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2015)
LM	Replace existing trailer-mounted 4 inch pump with hoses used to remove excess water from critical infrastructure during heavy rain/flood events.	F, SS	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor City Council / Superintendent of Public Works	2 years	City	Low/Medium	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,400 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Mason City Hazard Mitigation Actions
(Sheet 5 of 9)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
LM	In conjunction with IDOT, conduct a drainage/hydraulic study to determine the cause(s) and identify design solutions to address recurring flooding problems at the intersection of Chestnut Street and N. West Avenue next to Illini Central High School/Grade School to ensure continued functionality of Transportation Community Lifelines.	F, SS	E&A	Medium	2, 3, 5	n/a	n/a	Mayor City Council / Superintendent of Public Works	1-3 years	City / IDOT Local Roads	Low/Medium	Existing (2015)
HM	Construct the identified design solutions to address recurring flooding problems at the intersection of Chestnut Street and N. West Avenue next to Illini Central High School/Grade School to ensure continued functionality of Transportation Community Lifelines.	F, SS	S&IP	Small	2, 3, 5	n/a	Yes	Mayor City Council / Superintendent of Public Works	3-5 years	City / IDOT Local Roads / USDA – RD Water & Waste Disposal Program	High/High	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,400 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Mason City Hazard Mitigation Actions
(Sheet 6 of 9)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
LM	Conduct a drainage/hydraulic study to determine the cause(s) and identify design solutions to address recurring drainage/flooding problems along W. Roosevelt Street and N. Keefer Street to ensure continued functionality of Transportation Community Lifelines.	F, SS	E&A	Small	2, 3, 5	n/a	n/a	Mayor City Council / Superintendent of Public Works	1-3 years	City / IDOT Local Roads	Low/Medium	Existing (2015)
HM	Construct the identified design solutions to address recurring drainage/flooding problems along W. Roosevelt Street and N. Keefer Street to ensure continued functionality of Transportation Community Lifelines.	F, SS	S&IP	Small	2, 3, 5	n/a	Yes	Mayor City Council / Superintendent of Public Works	3-5 years	City / IDOT Local Roads / USDA – RD Water & Waste Disposal Program	High/High	Existing (2015)
LM	Purchase a stand-alone server with software to back up the City's computer files.	EH, EQ, F, SS, SWS, T	S&IP	Large	3, 5, 8	n/a	n/a	Mayor / City Council	1-3 years	City	Low/High	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,400 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Mason City Hazard Mitigation Actions
(Sheet 7 of 9)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
LM	Develop a Memorandum of Agreement (MOA) with Illini Central Middle School/High School designating the school as a warming/cooling center and emergency shelter for City residents to establish another Food, Water, Shelter Community Lifeline essential to human health and safety within the City.	EC, EH	LP&R	Small	2	n/a	n/a	Mayor City Council / Municipal Services Project Manager	1 year	City	Low/Medium	Existing (2015)
LM	Develop a Memorandum of Agreement (MOA) with Illini Central Grade School designating the school as a warming/cooling center and emergency shelter for City residents to establish another Food, Water, Shelter Community Lifeline essential to human health and safety within the City.	EC, EH	LP&R	Small	2	n/a	n/a	Mayor City Council / Municipal Services Project Manager	1 year	City	Low/Medium	Existing (2015)
HM	Purchase and install an automatic emergency backup generator at Illini Central Middle School/High School, a designated warming and cooling center, to establish a resilient and reliable power supply and ensure the continued operations of a Food, Water, Shelter Community Lifeline essential to human health and safety.	EC, EH	S&IP	Small	2, 3, 5	n/a	Yes	Mayor City Council / Superintendent of Public Works	1-2 year	City / USDA – RD Critical Facilities Programs	High/High	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,400 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Mason City Hazard Mitigation Actions
(Sheet 8 of 9)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Purchase and install an automatic emergency backup generator at Illini Central Grade School, a designated warming and cooling center, to establish a resilient and reliable power supply and ensure the continued operations of a Food, Water, Shelter Community Lifeline essential to human health and safety.	EC, EH	S&IP	Small	2, 3, 5	n/a	Yes	Mayor City Council / Superintendent of Public Works	1-2 year	City / USDA – RD Critical Facilities Programs	High/High	Existing (2015)
LM	Conduct mock natural disaster drills to provide City officials, staff, and volunteers with hands on experience in dealing with different disaster scenarios.	EC, EH, EQ, F, SS, SWS, T	E&A	Large	1, 2	n/a	n/a	Mayor / City Council	1-3 years	City	Low/Medium	Existing (2015)
LL	Monitor drinking water capacity to determine whether mitigation measures need to be enacted in the future to ensure community resilience to drought.	DR	E&A	Large	2, 3, 5	n/a	Yes	Mayor City Council / Municipal Services Project Manager	5-10 years	City	Low/Medium	New
HM	Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	LP&R	Small	1, 2, 4 6, 7	Yes	Yes	Mayor / City Council	1-5 years	City	Low/Medium	Existing (2015)

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,400 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Mason City Hazard Mitigation Actions
(Sheet 9 of 9)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
LM	Continue to make the most recent Flood Insurance Rate Maps available at the City Clerk's to assist the public in considering where to construct new buildings.*	F	E&A	Small	1, 2, 6, 7	Yes	n/a	Mayor / City Council	1-3 years	City	Low/Medium	New
LM	Continue to make City officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	E&A	Small	1, 2, 6, 7	Yes	n/a	Mayor / City Council	1-5 years	City	Low/Medium	New
LM	Evaluate the feasibility of participating in the National Flood Insurance Program's voluntary Community Rating System to reduce flood insurance premiums.*	F	LP&R	Small	1, 2, 4, 6	Yes	Yes	Mayor / City Council	3-5 years	City	Low/Medium	New

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,400 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-24
Mason City Fire Protection District Hazard Mitigation Actions

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Purchase and install a natural gas emergency backup generator with automatic transfer switch at the fire house to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Safety & Security Community Lifeline. Continuous power ensures charging systems for the trucks will always be operational along with the base radio system. With a continuous power supply, the fire house could be utilized as a warming & cooling center in situations where power is lost within the district for an extended period of time.	EC, EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Fire Chief / Board of Trustees	1-2 years	FPD / USDA – RD Critical Facilities Programs	Medium/High	New
HM	Purchase and install a natural gas emergency backup generator with automatic transfer switch at well house to ensure continuous operations of fire well and maintain continuity of operations during extended power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Fire Chief / Board of Trustees	2-5 year	FPD / USDA – RD Critical Facilities Programs	Medium/High	New
LM	Make information materials available to district residents that inform them of the risks to life and property associated with natural hazards that impact the Fire Protection District and the proactive actions they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	E&A	Large	1	n/a	n/a	Fire Chief / Board of Trustees	2-5 year	FPD	Low/Medium	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a rural, all-volunteer fire protection district. Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-25
Mason District Hospital Hazard Mitigation Actions
(Sheet 1 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Install hardening materials (i.e., EPDM roof system) to increase building resilience, safeguard functionality and mitigate risk to a Health & Medical Community Lifeline.	EQ, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Facility Management / Board of Directors	1-5 years	Mason District Hospital / USDA – RD Critical Facilities Programs	High/High	New
HM	Install a solar energy system to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Health & Medical Community Lifeline. The system would allow the Hospital to operate off-grid in the event of a power outage.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Facility Management / Board of Directors	1-2 years	Mason District Hospital / USDA – RD Critical Facilities Programs	High/High	New
HM	Construct drainage system at the West Campus to alleviate drainage problems experience during heavy rain/flash flood events and mitigate risk to a Health & Medical Community Lifeline.	F, SS	S&IP	Medium	2, 3, 5	n/a	Yes	Facility Management / Board of Directors	1-5 years	Mason District Hospital / USDA – RD Critical Facilities Programs	Medium/Medium	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural hospitals. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-25
Mason District Hospital Hazard Mitigation Actions
(Sheet 2 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Install fire mitigation systems (i.e., interior sprinkler systems) in those sections of the Hospital that do not contain them to improve building resilience, safeguard functionality and mitigate risk to a Health & Medical Community Lifeline.	EQ, SS	S&IP	Medium	2, 3, 5	n/a	Yes	Facility Management / Board of Directors	5-10 years	Mason District Hospital	Medium/High	New
HM	Install a fire alarm mass notification system to alert staff, patients, and visitors of natural hazard event information.	EQ, F, SS, SWS, T	E&A	Large	2	n/a	n/a	Facility Management / Board of Directors	1-2 years	Mason District Hospital	Medium/High	New
HM	Purchase and install an automatic emergency backup generator at the Mason City ambulance base to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Health & Medical Community Lifeline. Continuous power will ensure the bay doors function during power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Facility Management / Board of Directors	1-5 years	Mason District Hospital / USDA – RD Critical Facilities Programs	Medium/High	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural hospitals. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-26
Midwest Central CUSD #191 Hazard Mitigation Actions

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Purchase and install energy storage banks for use with the solar arrays at the Primary School and High School to establish resilient and reliable power supplies in order to maintain continuity of operations and mitigate risk to Food, Water Shelter Community Lifelines. Both schools are designated as warming/cooling centers and emergency shelters.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	School Superintendent / School Board	1-5 years	CUSD	Medium/High	New
HM	Purchase and install diesel automatic emergency backup generators at the Primary School, Middle School and High School to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to Food, Water Shelter Community Lifelines. Both schools have experienced brownouts in the summer months.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	School Superintendent / School Board	1-5 years	CUSD / USDA – RD Critical Facilities Programs	Medium/High	New
HM	Purchase and install a diesel emergency backup generator to charge the energy storage banks at the Primary School and High School to provide to ensure the continued operation of Food, Water Shelter Community Lifelines and maintain continuity of operations during extended power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	School Superintendent / School Board	1-5 years	CUSD / USDA – RD Critical Facilities Programs	Medium/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural school districts. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-27
San Jose Hazard Mitigation Actions
(Sheet 1 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Design and construct a community safe room equipped with an emergency backup generator and HVAC system that can also serve as an emergency shelter and warming/cooling center for Village residents to establish a Food, Water, Shelter Community Lifeline essential to human health and safety.	EC, EH, EQ, F, SS, SWS, T	S&IP	Small	2	n/a	n/a	President / Village Board	2-5 years	Village / FEMA HMGP	High/High	Existing (2015)
HM	Purchase and install an automatic emergency backup generator at Police Office Building to establish a resilient and reliable power supply, ensure the continued operation of Community Lifelines such as Communications and Safety & Security and maintain continuity of government/operations during power outages.	EC, EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	President / Village Board	2-5 years	Village / USDA – RD Critical Facilities Programs	High/High	Existing (2015)
LM	Conduct storm sewer reconnaissance study to inspect the system for capacity improvements to better manage stormwater runoff and identify locations where previous heavy rain/flood events have eroded or weakened the lines to mitigate risk to a Food, Water, Shelter Community Lifeline.	F, SS	E&A	Medium	2, 3, 5	n/a	n/a	President / Village Board	1-3 years	Village	Medium	Existing (2015)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural hospitals. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-27
San Jose Hazard Mitigation Actions
(Sheet 2 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	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	Status
						New	Existing					
HM	Upgrade/retrofit the Village's storm sewer system to better manage stormwater runoff, alleviate drainage problems, increase system resilience, and mitigate risk to a Food, Water, Shelter Community Lifeline.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	3-5 years	Village / FEMA HMGP / IEPA SRF	High/High	Existing (2015)
HM	Purchase and install an automatic emergency backup generator at the wastewater treatment plant's main lagoon lift station to establish a resilient and reliable power supply in order to maintain continuity of government/operations and mitigate risk to a Food, Water, Shelter Community Lifeline.	EC. EH, EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	Yes	Yes	President / Village Board	3-5 years	Village / USDA – RD Critical Facilities Programs	High/High	Existing (2015)
LM	Distribute public information materials that inform residents about the risks to life and property associated with the natural hazards that impact the Village and the proactive actions they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	E&A	Large	1	n/a	n/a	President Village Board	2-5 year	Village	Low/Medium	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 700 individuals). The Village works hard to provide critical services to its residents but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

5.0 PLAN MAINTENANCE

This section focuses on the Federal Emergency Management Agency (FEMA) requirements for maintaining and updating the Plan once it has been approved by FEMA and adopted by the participating jurisdictions. 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 ensure that the Plan remains an effective and relevant document. The following provides a detailed discussion of each requirement.

5.1 MONITORING, EVALUATING & UPDATING THE PLAN

Outlined below is a method and schedule for monitoring, evaluating, and updating the Plan. This method allows the participating jurisdictions to review and adjust the planning process as needed, make necessary changes and updates to the Plan, and track the implementation and results of the mitigation actions that have been undertaken.

5.1.1 Monitoring and Evaluating the Plan

The Plan update will be monitored and evaluated by a Plan Maintenance Subcommittee on an annual basis. The Plan Maintenance Subcommittee will be composed of key members from the Planning Committee, including representatives from all of the participating jurisdictions. The Mason County Emergency Management Agency (EMA) will chair the Plan Maintenance Subcommittee.

The Mason County EMA will assume lead responsibility for monitoring and tracking the implementation status of the mitigation actions identified in the Plan update. It will be the responsibility of each Plan participant to provide the Mason County EMA with an annual progress report on the status of their existing mitigation actions and identify whether any actions need to be modified. New mitigation actions may be added to the Plan during the annual monitoring and evaluation period or at any time during plan maintenance cycle by contacting the Mason County EMA Director and providing the appropriate information.

Monitoring & Evaluating

- A Plan Maintenance Subcommittee will be formed to monitor and evaluate the Plan update.
- The ***Plan update will be monitored and evaluated*** on an ***annual basis***.
- Each Plan participant will be responsible for providing an annual progress report on the status of their mitigation actions.
- Plan participants can add ***new mitigation actions*** to the Plan ***during the annual monitoring phase or by contacting*** the Mason County EMA Director.

The Mason County EMA together with the Plan Maintenance Subcommittee will also evaluate the Plan update on an annual basis to determine the effectiveness of the plan at achieving its stated purpose and goals. In order to evaluate the effectiveness of the Plan update, the Subcommittee will review the mitigation actions that have been successfully implemented and determine whether

the action achieved the identified goal(s) and had the intended result (i.e., were losses avoided or the vulnerability of hazard-prone areas reduced.)

The Subcommittee will also ask each Plan participant to identify any significant changes in development that have occurred within the previous 12 months; whether any new plans, policies, regulations, or reports have been adopted; and if any hazard-related damages to critical facilities and infrastructure have been sustained.

In order to streamline the plan maintenance process, the Mason County EMA will provide each Plan participant with a Plan Maintenance Checklist along with the necessary forms to complete and return. **Appendix N** contains a copy of Checklist and associated forms.

The Mason County EMA will then prepare a progress report detailing the results of the annual Plan monitoring and evaluation period and provide copies to the Subcommittee. The annual progress report will include:

- information on any hazard-related damages sustained by critical facilities and infrastructure within the planning area during the previous year.
- implementation status of the mitigation actions identified in the Mitigation Strategy.
- identification of any new mitigation actions proposed by the Plan participants.
- information on changes in development and planning and regulatory capabilities for the Plan participants.

If any existing mitigation actions are modified or new mitigation actions are identified for the Plan participants, then Section 4.7 of the Mitigation Strategy will be updated, and the Plan update resubmitted to the Illinois Emergency Management Agency (IEMA) and FEMA for reference.

5.1.2 Updating the Plan

The Plan must be updated within five years of the of the Plan approval date indicated on the signed FEMA final approval letter. (This date can be found in Section 6, Plan Adoption.) This ensures that all the participating jurisdictions will remain eligible to receive federal grant funds to implement those mitigation actions identified in this Plan.

The Mason County EMA, with assistance from the Plan Maintenance Subcommittee, will be responsible for updating the Plan. The update will incorporate all of the information gathered during the monitoring and evaluation phase and will also include:

Updating the Plan

- The Mason County EMA, with assistance from the Plan Maintenance Subcommittee, will be responsible for updating the Plan.
- The Plan ***must be updated within 5 years*** of the ***date of the final approval letter*** provided by FEMA.
- Any jurisdictions that did not take part in the previous Plan may do so during the 5 year update.
- Once the Plan update has received FEMA/IEMA approval, each participating jurisdiction ***must adopt the Plan to remain eligible to receive federal monies.***

- a review of the Mitigation Strategy, including potential updates to the mitigation goals;
- an assessment whether other natural hazards need to be addressed or included in the Plan;
- a review of new hazard data that may affect the Risk Assessment Section; and

- identification of any changes in development that have occurred in hazard prone areas that would increase or decrease the vulnerability of participating jurisdictions.

In addition, any jurisdictions that did not take part in the previous Plan may do so at this time. It will be the responsibility of these jurisdictions to provide all of the information needed to be integrated into the Plan.

A public forum will be held to present the Plan update to the public for review and comment. The comments received at the public forum will be reviewed and incorporated into the Plan update. The Plan update will then be submitted to IEMA and FEMA for review and approval. ***Once the Plan update has received state and federal approval, FEMA requires that each of the participating jurisdictions adopt the Plan to remain eligible to receive federal monies to implement identified mitigation actions.***

5.2 Incorporating the Mitigation Strategy into Existing Planning Mechanisms

As part of the planning process, the Planning Committee identified each participating jurisdiction's existing capabilities (i.e., existing authorities, policies, programs, technical information, etc.) and resources available to support or accomplish mitigation and reduce long-term vulnerability. **Figures PP-3** through **PP-12** identifies the existing authorities, policies, programs, technical information, and resources available by capability type by jurisdiction. It will be the responsibility of each participating jurisdiction to incorporate, where applicable, the mitigation strategy and other information contained in the Plan update into the planning mechanisms identified for their jurisdiction.

Adoption of this Plan update will trigger each participating jurisdiction to review and, where appropriate, integrate the Plan into other available planning mechanisms. The Plan Maintenance Subcommittee's annual review will help maintain awareness of the Plan among the participating jurisdictions and encourage them to actively integrate it into their day-to-day operations and planning mechanisms. Any time a mitigation action is slated for implementation by a participating jurisdiction, it will be integrated into their capital improvement plan/budget.

Based on conversations with Planning Committee members, none of the jurisdictions who participated in the original Plan have incorporated it into other planning mechanisms within their jurisdictions. This is due in part to the size, fiscal and staffing situations, and technical capacity of the participants. Havana's comprehensive plan was completed in 2016 with minor revisions adopted in 2021. The actual planning was conducted between 2013 and 2015, prior to the completion of the original hazard mitigation Plan. There is no indication that the County or any of the participating jurisdictions will be adopting, reviewing, or strengthening current policies or programs in the near future.

Most of the participating jurisdictions (Bath, Easton, Kilbourne, Manito, Mason City, and San Jose) have limited capabilities to integrate the mitigation strategy and other information contained in the Plan update into existing planning mechanisms. These jurisdictions are small in size and do not have the financial resources or trained personnel to develop planning mechanisms such as comprehensive plans or building and zoning ordinances.

5.3 CONTINUED PUBLIC INVOLVEMENT

The County and participating jurisdictions understand the importance of continued public involvement and will seek public input on the Plan update throughout the plan maintenance cycle. A copy of the approved Plan will be maintained and available for review at the Mason County EMA and Zoning offices. Individuals will be encouraged to provide feedback and submit comments for the next Plan update to the Mason County EMA Director.

The comments received will be compiled and included in the annual progress report and considered for incorporation into the next Plan update. Any meetings held by the Plan Maintenance Subcommittee will be noticed and open to the public. A separate public forum will be held prior to the next Plan update submittal to provide the public an opportunity to comment on the proposed revision to the Plan update.

6.0 PLAN ADOPTION

The final step in the planning process is the adoption of the approved Plan update by each participating jurisdiction. Each jurisdiction must formally re-adopt the Plan to remain eligible for federal grant monies to implement mitigation actions identified in this Plan.

6.1 PLAN ADOPTION PROCESS

Before the Plan update could be adopted by the participating jurisdictions, it was made available for public review and comment through a public forum and comment period. Comments received were incorporated into the Plan update and the Plan was then submitted to the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA) for their review and approval.

Upon receipt of the Approval Pending Adoption (APA) letter from FEMA, the Plan update was presented to the County and participating jurisdictions for adoption. ***Each participating jurisdiction was required to formally adopt*** the Plan to remain eligible to receive federal grant funds to implement the mitigation actions identified in this Plan. Any jurisdiction that chose not to adopt the Plan update did not affect the eligibility of those who did.

Figure PA-1 identifies the participating jurisdictions and the date each formally adopted the Plan update. Signed copies of the adoption resolutions are located in **Appendix O**. FEMA signed the final approval letter on (Date) which began the five-year approval period and set the expiration date of (Date) for the Plan.

Figure PA-1
Plan Adoption Dates

Participating Jurisdiction	Plan Adoption Date

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Provided below is a listing, by section, of the resources utilized to create this document.

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4.0 MITIGATION STRATEGY

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APPENDIX A

Attendance Sheet – Teleconference

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

April 22, 2021

Due to the COVID-19 outbreak, the 1st meeting was held via teleconference to comply with gathering restrictions. Attendance was taken verbally during the teleconference by the Consultant and recorded below.

	Name (Please Print)	***Representing (Jurisdiction/Organization)***	***Title***
1.	Gary Blakely	Havana Rural Fire Protection District	Fire Chief
2.	Andrea Bostwick	American Environmental Corporation	EMS Manager
3.	Summer Brown	Mason County	Clerk & Recorder
4.	Mike Burris	City of Mason City	Municipal Services Project Manager
5.	Tony Cowin	Kilbourne Fire Department	Fire Chief
6.	Richard Crum	Mason County	911 Coordinator
7.	Eldon Garlisch	Mason County	County Board Member
8.	Greg Griffin	Mason County EMA	Director
9.	Doug Hermann	Forman Fire Protection District	Designated Representative
10.	Curt Jibben	Mason County Health Department	Director
11.	John Kachanuk	City of Havana	Fire Chief
12.	Doug Kosier	Mason District Hospital	Chief Executive Officer
13.	Dorothy Kreiling	Mason County	County Board Member
14.	Zachary Krug	American Environmental Corporation	EMS Specialist

Attendance Sheet – Teleconference

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

April 22, 2021

Due to the COVID-19 outbreak, the 1st meeting was held via teleconference to comply with gathering restrictions. Attendance was taken verbally during the teleconference by the Consultant and recorded below.

	Name (Please Print)	***Representing (Jurisdiction/Organization)***	***Title***
1.	Wendy Martin	Mason County Democrat	Editor
2.	Kate Nunn	Village of Easton	Village President
3.	Mike Pedigo	Mason County	County Engineer
4.	Kristi Poler	Mason County	Assessor
5.	Joe Ragle	Mason County	Zoning Officer
6.	Jon Smith	Regional Office of Education #53	Assistant Regional Superintendent
7.	Brenda Stadsholt	City of Havana	Mayor
8.	John Stewart	Mason City Fire Protection District	Fire Chief
9.	Chris Troxell	Mason District Hospital	Hospital Preparedness Program Coordinator
10.	Scott Williams	Williams Insurance Agency	Agent
11.			
12.			
13.			
14.			

Attendance Sheet

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

June 24, 2021

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	GREGORY J. GRIFFIN	MASON COUNTY EMA	DIRECTOR
2.	Summer Brown	Mason County	Mason County Clerk
3.	James Stark	Havana P.D.	Dep. Chief
4.	PAUL GANN	MASON CO. SHERIFF'S OFFICE	SHERIFF
5.	DOROTHY KREILING	MASON CO BOARD	County BOARD MEMBER
6.	Justin Donovan	Mason City P.D	Assistant Chief
7.	Mike Burris	City of Mason City	Mun. Services PM
8.	Matt Plater	Havana #126	Supt.
9.	Matt Fliege	Havana Fire Dept.	Capt. - T.O.
10.	JOHN KACHNOUR	HAVANA FIRE	CHIEF
11.	Kate Nunn	Village of Easton	President
12.	Chris Troxell	Mason District Hospital	ED Director, HPP Coordinator
13.	Todd Hellinger	Midwest Central CUSD 191	Superintendent
14.			
15.			

Appendix A

Attendance Sheet

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

June 24, 2021

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Zak Krug	American Environmental Corp.	Environmental specialist
2.	Richard Crum	Mason Co. EMA	Admin. Coordr.
3.	Camryn Gann	Mason Co. Health Dept	PHEP Coordinator / EH Director
4.	Wayne Dixon	City of Mason City	Supt.
5.	John Stewart	Mason City Fire Protection Dist.	Chief
6.	Calvin Hodgson	Village of Kilbourne	Mayor
7.	GARY BLAKELY	HAVANA RURAL FIRE D	CHIEF
8.	Andrea Bostwick	American Environmental Corp	EMS Manager
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Appendix A

Attendance Sheet

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

September 23, 2021

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Zachary King	American Environmental	Specialist
2.	Gregory Gregory	Mason County EMA	
3.	Richard Crum	Mason Co. EMA	Admin. Coord.
4.	Mike Burris	City of Mason City	
5.	Chris Troxell	Mason District Hospital	HPP Coordinator
6.	Kate Nunn	Village of Easton	President
7.	Krista Poler	Mason Co Assessor	Supervisor
8.	Jason Weller	Mason Farm Bureau	Manager
9.	Todd Hellriegel	Midwest Central CUSD 191	Superintendent
10.	Eldon Garlisch	Mason Cty Board	Board Member
11.	PAUL GANN	MASON CO. SHERIFF OFFICE	SHERIFF
12.	Andrea Bostwick	American Environmental	EMS Manager
13.			
14.			
15.			

Appendix A

Attendance Sheet

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

September 23, 2021

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Matt Plater	Havana CUSD #126	Supt.
2.	Angie Douglas	Mason City PD	7 pm
3.	Ken Lacey	Manito City	7 pm
4.	[illegible]	MCSO	7
5.	Tony Herman	Forman Fire Prot. Dist	Chief
6.	Scott Williams	Havana Rural Fire	Asst. Chief
7.	Camryn Gann	Mason Co Health Dept.	PHEP Coordinator
8.	Tony Cowin	Village of Kilbourne + Fire	Chief
9.	John Stout	Mason City Fire Prot. Dist	Chief
10.	JOHN KACHANUK	CITY OF HAVANA F.D	CHIEF
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12.			
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Appendix A

Attendance Sheet

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

January 13, 2022

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Mike Burris	City of Mason City / Village of SI	Mun. Svs. Proj. Mgr.
2.	Summer Brown	Mason County	Mason County Clerk
3.	Paul Gann	Mason Co Sheriff's Dept.	Sheriff
4.	Camryn Gann	Mason Co Health Dept.	PHEP Coor.
5.	Richard Crum	Mason Co EMA	Admin. Coord.
6.	Gary Atherton	Village of Bath	Code Enforcem
7.	Matt Plater	Havana CUSD #126	Supt.
8.	Matthew Flye	Havana	Fire Marshal
9.	John Stewart	Mason City FD	Chief
10.	Todd Hellriegel	Midwest Central CUSD 191	Superintendent
11.	GAVIN MALISKA	MASON COUNTY DEMOCRAT	EDITOR
12.	Scott Williams	HAVANA RURAL FIRE	ASSIST CHIEF
13.			
14.			
15.			

Appendix A

Attendance Sheet

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

January 13, 2022

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Justin Donovan	Mason City Police	Chief
2.	GREGORY GRIFFIN	Mason County	Retired
3.	Kristi Poler	Mason County Assessor	Supervisor
4.	Ken Runkle	AEC	Manager Env.
5.	Andrea Bostwick	AEC	EMS Manager
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Appendix A

APPENDIX B

Meeting Minutes

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee

April 22, 2021
7:00 p.m.
Virtual/Teleconference

Committee Members

Easton, Village of
Forman Fire Protection District
Havana Rural Fire Protection District
Havana, City of
Kilbourne Fire Department
Mason City, City of
Mason City Fire Protection District
Mason County Offices:
- 911
- Assessor
- Clerk & Recorder
- County Board
- EMA
- Health Department
- Highway Department
- Zoning

Mason County Democrat
Mason District Hospital
Regional Office of Education #53
Williams Insurance Agency
American Environmental Corp.

<u>Welcome and Introductions</u>

Greg Griffin, Chairman of the Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee, welcomed attendees. He indicated that the purpose of this Committee is to update the Mason County Natural Hazards Mitigation Plan.

Handout materials were distributed digitally via email to each member prior to the meeting. Links to a citizen questionnaire and contact information form were provided to potential members via email as well. The questionnaire will help gauge residents and committee member understanding of the natural hazards that impact the County and also identifies communication preferences.

Andrea Bostwick, American Environmental Corporation (AEC) began the meeting by asking participants online to provide their name, title and jurisdiction represented and any questions they might have during the presentation in the chat log. For those who can't access the chat, the phone lines will be opened to take attendance mid-way through the meeting and again at the end to answer any questions. She asked all those in attendance to mute their phones or computers when not speaking to reduce background noise during the presentation.

Before discussing the plan Update, Andrea provided background on the grant and its planning process. Mason County EMA applied for and received a planning grant from FEMA to Update the County's hazard mitigation plan. This grant is administered through the Illinois Emergency Management Agency (IEMA) and pays for 75% of the planning cost. The remaining 25% will be met through in-kind services. The goal of the grant is to obtain a FEMA approved hazard mitigation plan. The process generally takes 12 to 18 months from start to finish.

What is Mitigation?

Andrea explained that for the purpose of this process, mitigation is any sustained action that reduces the long-term risk to people and property from natural hazards and their impacts. Sustained actions can include projects and activities such as building a community safe room or establishing warming and cooling centers. Mitigation is one of the phases of emergency management and is an important component in creating hazard-resistant communities.

What is a Natural Hazards Mitigation Plan?

Andrea then explained that a Natural Hazards mitigation plan details the natural hazard events that have previously impacted the County and identifies activities and projects that reduce the risk to people and property from these hazards before an event occurs. A hazard mitigation plan is different from the County's Emergency Operations Plan (EOP) because it identifies actions that can be taken before a disaster strikes whereas the EOP identifies how the County will respond during and immediately after an event occurs.

The natural hazards that will be covered in the Plan update include: floods; tornadoes; severe summer storms (including thunderstorms, hail and lightning events); severe winter storms (including ice and snow storms); extreme cold; excessive heat; drought; earthquakes and dam failures.

Andrea indicated that the Committee can also include additional hazards it feels have a significant impact on the County and then discussed mine subsidence, landslides, and levee failures. Of the three hazards, landslides has the potential to significantly impact the County. She informed the Committee that AEC would send out a survey to poll the Committee on whether to include landslides in the next week.

Why Update a Natural Hazards Mitigation Plan?

Since the early 1990s damages caused by weather extremes have risen substantially. In 2020 the United States experienced $95 billion in severe storm damages from twenty-two (22) severe weather and natural hazard events. 2020 shattered the record number of annual billion-dollar events set in 2011 and 2017 by six events. In addition, the losses experienced in 2020 were the 4th highest only behind 2017, 2005, and 2012. In the last decade the United States has experienced the top three years with the highest total number of billion dollar events and two of the top three years with the highest total losses ever recorded. Consequently, the Federal Emergency Management Agency (FEMA) continues to encourage counties throughout the United States to prepare and Update all hazard mitigation plans because what they've found is that for every dollar spent on mitigation, $6 dollars can be reaped in savings.

Updating this plan provides several major benefits including:

1.) Access to federal mitigation assistance fund. Specific projects and activities will be updated through the planning process to help each participating jurisdiction reduce

damages. By including these actions in this Plan, the participating jurisdictions will become eligible to receive state and federal funds to implement the actions.

2.) Increased awareness of the impacts associated with natural hazards. Verifiable information about the natural hazards that occur in Mason County will be gathered to help municipal and county officials make decisions about how to better protect citizens and property from storm damages.

The Planning Process

The goal of the Committee meetings is to update the Plan to meet state and federal requirements so that it can be approved by the IEMA and FEMA. The Planning Committee is an integral part of the planning process and ensures that the Plan is tailored to the needs of the County and participating jurisdictions.

A five meeting process has been developed to achieve this goal. Specific activities for the Committee meetings include:

1st Committee meeting	Orientation to the Planning Process Required Information Needed to Participate
2nd Committee meeting	Discuss the Risk Assessment Approve Mission Statement & Goals Participants Return Required Forms Begin discussing Mitigation Projects and Activities
3rd Committee meeting	Begin discussing additional Mitigation Projects and Activities Discuss and approve Mitigation Strategy Committee returns draft list of Mitigation Projects and Activities
4th Committee meeting	Finish discussing Mitigation Projects and Activities Committee discusses approval/adoption of the Plan
5th Committee meeting (Public Forum)	Present the Plan Update for public review Committee helps answer questions from the public

Jurisdictions who wish to be part of the Plan update must meet certain participation requirements that include:

- Participating in the planning meetings and public forum
- Complete required forms
- Coordinate with their constituents and the public; and
- Adopt the Plan once it's completed.

Information Needed from the Committee

At this point in the presentation, Andrea paused and with moderator Richard Crum's help took attendance.

Information Needed from the Committee

As part of the plan update, Andrea indicated that there is information that will be needed from each participating jurisdiction. The information provided will be used to meet FEMA plan requirements. She then talked about each of the forms that must be completed at the beginning of the planning process. These include:

Critical Facilities. Completed lists of Critical Facilities will be used to identify facilities vulnerable to natural hazards and will be provided to IEMA and FEMA as a separate supplement. Copies of the Plan made available to the public will not include these lists for security reasons.

Capability Assessment: Each jurisdiction has a unique set of capabilities and resources available to accomplish hazard mitigation and reduce long-term vulnerabilities to hazard events. As part of the update of the Plan, the existing capabilities of each jurisdiction need to be identified and described.

Shelter Surveys. Identifies locations designated as severe weather shelters within each jurisdiction including warming centers, cooling centers and community safe rooms.

Drinking Water Supply Worksheet: Information on the drinking water supplies that serve the participating communities needs to be identified to assist in assessing drought vulnerability.

Andrea indicated that Zachary Krug (AEC) would email the forms out to all who have expressed an interest in being included in the Plan within the next week. She asked participants to complete the forms and return them by the next meeting if possible and to let her or Zak know if they had any questions.

Severe Weather Events

Given the format of the meeting, instead of having the Committee share their recollections of recent and historic hazard events that have impacted the County verbally, Andrea asked the Committee members to jot down any events that come to mind and complete the Natural Hazard Events Questionnaire link that Zak will send out via email tomorrow.

Andrea told the Committee that, while AEC will review multiple data sources, including NOAA, NWS, and state and federal databases, these sources don't always include every event nor do they always include damage information, especially dollar amounts. In many cases, individuals at the local level are her best resource for this kind of information. The information provided in their questionnaires will be used to supplement the information for the next meeting.

Andrea also asked Committee members if they had any photos of storm damage they would be willing to share for inclusion in the Plan.

Community Participation

Andrea stressed the importance of attending each committee meeting and indicated that member participation helps the County meet its 25% match for this grant in addition

to assuring that member jurisdictions are eligible for IEMA/FEMA funds. She indicated that tag-teaming and designating substitute representatives is permissible when other obligations arise. Andrea pointed out that a designated substitute representative does not have be an official or employee of the jurisdiction.

Andrea requested that each jurisdiction consider sharing meeting information with their boards, councils, etc. at regularly scheduled meetings and consider posting the press release or adding a calendar item to their web pages. She also asked jurisdictions who are on Facebook to consider sharing information about the Plan on their pages as well.

Andrea indicated that another opportunity to include the public in the process is to post the link to the Citizen Questionnaire on their web pages or post or link to the questionnaire on their Facebook page. The more individuals who complete the survey, the better our understanding will be of the public's perception of the hazards that impact the County. Finally, she asked the participants to consider posting or making available at their offices the "Frequently Asked Questions" document in their meeting packet. It provides a quick summary of what the Plan is and why it's important to participate.

Mission Statement & Goals

Copies of the original mission statement and goals were distributed in the meeting packet. Committee Members were asked to review these prior to the next meeting. The mitigation goals describe the objectives or end results the Committee would like to accomplish in terms of hazard and loss reduction/prevention. Every project included in the Plan should be aimed at one or more of the goals identified by this Committee. Specific goals related to where you live can be added to this list as well.

What Happens Next?

The risk assessment will be the main topic of the next committee meeting.

The second meeting of the Committee was scheduled for:

Thursday, June 24th
Havana City Center
326 W. Market St, Havana
7:00 P.M.

Andrea asked Committee members to please review the "Tasks to be Completed" handout before the next meeting and indicated that Zak's contact information could be found on the last page of the meeting handout if any questions come up.

Andrea then opened up the phone lines for any questions or comments. Kate Nunn, Village President – Easton, asked if Townships could be included in the Plan update. Additionally, she asked if there was a link to the original Plan. Andrea informed the Committee that Townships could be included and that Zak would send out a link to the original Plan the next day. Greg Griffin asked if the Imperial Valley Water Authority had been invited to participate. Andrea stated that Zak would reach out to them. With no further questions Richard adjourned the meeting.

Meeting Minutes

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee

June 24, 2021
7:00 p.m.
Havana City Center
112 West Madison Street, Havana

Committee Members

Easton, Village of
Havana CUSD #126
Havana Rural Fire Protection District
Havana, City of
Kilbourne, Village of
Mason City, City of
Mason City Fire Protection District
Mason County Offices:
    911
Mason County Offices:
    Clerk & Recorder
    County Board
    EMA
    Health Department
    Sheriff
Mason District Hospital
Midwest Central CUSD #191
American Environmental Corp.

Welcome and Introductions

Greg Griffin, Chairman of the Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee, welcomed attendees. He indicated that the purpose of this Committee is to update the Mason County Natural Hazards Mitigation Plan.

Handout materials were distributed to each member.

Information Needed for the Plan

Andrea Bostwick (AEC) asked the participating jurisdictions to submit their completed "**Critical Facilities,**" **"List of Existing Planning Documents,"** and **"Identification of Severe Weather Shelters"** forms passed out at the previous meeting. This information will be used to prepare the vulnerability analysis.

Risk Assessment

Andrea began the presentation by noting that there have been fourteen (14) federally-declared disasters in Mason County since 1968. A total of 642 verified natural hazard events have been documented over the last 20 to 70 years, depending on the hazard, with 152 of those events occurring since the Plan was originally completed. A minimum of $14.8 million in damages have resulted from approximately 73 documented natural In addition, $81.7 million in crop damages were recorded for 4 events.

The actual damage amounts are actually much higher based on several facts:

1.) damage descriptions for many of the floods, tornadoes and severe storm events, did not include dollar amounts;

2.) damages to roads from heat and freeze/thaws conditions were not included; and
3.) crop damage figures were unavailable for a majority of the events.

The frequency, magnitude and property damages for each category of natural hazard were described.

Severe Storms

Severe storms are the most frequently occurring natural hazard in Mason County with 304 events verified since 1974. At least $1.7 million in damages have resulted from 55 events. Additionally, there was approximately $12.3 million in crop damages from two thunderstorms with damaging winds. At least 32 injuries can be attributed to roadway crashes where wet pavement conditions were present.

The highest recorded wind speed in the County, not associated with a tornado, is 70 knots (80.5 mph) and occurred near Bath on August 12, 1999. The largest hail recorded in the county is 2.75 inches (baseball sized) in Manito on December 8, 1991 and August 18, 2001.

Severe Winter Storms

There were at least 117 verified events involving severe winter storms (snow, ice, or extreme cold) since 1950 and 52 extreme cold events since 1996. One of the federal disaster declarations for Mason County was related to severe winter storms. Approximately $90,000 in damages results from the 2011 blizzard. Nineteen (19) injuries can be attributed to crashes involving ice and snow-covered roadways.

At least 13 major storms have occurred in every decade since 1960. Between 2010 and 2019 17 severe winter storms took place. There haven't been any severe winter storms during the current decade.

The record maximum 24-hour snowfall in the County is 16.0 inches at the Havana COOP observer station on February 1st and 2nd, 2011. The coldest recorded temperature is -30°F at the Havana COOP observer station on January 5, 1999.

Floods

Nine of the fourteen federal disaster declarations for Mason County are related to flooding. There have been a least 77 verified flood events in Mason County, 59 riverine/shallow flood events since 1973 and 18 flash food events since 1995. At least $7 million in damages has resulted from two flood events. One fatality and 20 injuries were recorded for two separate general flood events.

Tornadoes

Since 1950, 35 tornadoes have been verified in Mason County. Approximately $6 million in property damages has resulted from 15 of these tornadoes. Five of the tornadoes have recorded property damages of at least $250,000 per event.

One fatality and fifty-nine (59) injuries can be attributed to eight tornado events.

The average tornado in Mason County is approximately 4.6 miles long and 116 yards wide. The average area covered by a tornado in Mason County is 0.30 square miles.

The highest recorded F-Scale rating for a tornado in the County is an F3 on January 24, 1967, May 15, 1968 and May 13, 1995. The widest tornado in the County occurred on May 13, 1995 and was 800 yards wide (0.5 miles). The longest tornado occurred on April 13, 1981 was 25.6 miles long in Mason County and its total length was 46.1 miles.

Excessive Heat

There have been 50 *recorded* excessive heat events reported in Mason County since 1995. No damage or injury information was available for any of these events.

The hottest temperature recorded in Mason County was 113°F at the Havana COOP Station on July 15, 1936.

Drought

Six major droughts have occurred during the last four decade – 1983, 1988, 2005, 2011, 2012 and 2013. There has been at least one drought per decade with the exception of the 1990's when no substantial droughts were recorded in the region. The 2012 drought caused an estimated $69.4 million in crop damages. Following each declared drought, crop yield reductions were generally experienced, some were substantial. Yield reductions for corn were most severe for the 1988 drought when there was a 42.1% reduction. Yield reductions for soybeans were most severe for the 1983 drought when there was a 35.4% reduction.

Year	Corn	Soybeans
1983	41.3%	35.4%
1988	42.1%	24.6%
2005	31.3%	20.4%
2011	---	9.0%
2012	22.8%	16.9%
2013	---	---

Levees

According to the U.S. Army Corp of Engineer's National Levee Database, there are two federally-constructed, locally-operated levees (Herget-Farmers D&LD and Mason & Menard D&LD) and two locally-constructed and locally-operated levees (Old River D&LD and South Sangamon D&LD East) along the Sangamon River. No records were located of levees breach along any of these levees.

Dams

There are nine classified (permitted) dams located in Mason County. All of the classified dams are privately owned. Three have a "High" hazard classification rating while the remaining dams, have a "Low" dam failure classification rating. There are no known dam failures recorded in the County.

Earthquakes

In the previous 200 years, one earthquake originated in Mason County: a 4.5 magnitude earthquake originated approximately 3 miles north-northwest of Kilbourne on July 19, 1909. There are no geologic fault zones or geologic structures located in Mason County.

Risk Priority Index Exercise

Following the risk assessment, Andrea led the Committee through a Risk Priority Index (RPI) exercise. The RPI is a quantitative means of providing guidance for ranking the hazards that have the potential to impact the County. This ranking can assist participants in determining which hazards present the highest risks and therefore which ones to focus on when formulating mitigation projects and activities. Each hazard is scored on three categories: frequency, impacts on life and health and impacts on property and infrastructure based on a scoring system provided. Andrea walked the committee through the scoring system using excessive heat as an example and then provided time for the Committee to fill out the PRI form during the meeting. The results will be compiled, and the findings will be presented at the next meeting.

Mission Statement & Goals

Zachary Krug (AEC) asked Committee members to review the original mission statement and goals provided in the meeting materials. Both of these are required elements of the Plan. As part of the Plan update process both items need to be reviewed and re-evaluated.

The original mission statement was reviewed and it was determined that no revisions to the wording were needed.

Next Zachary discussed the mitigation goals which are intended to reduce long-term vulnerabilities to natural hazards. Each project included in the updated Plan should be aimed at one or more of the goals developed by the committee. The goals were originally drafted in such a way that they covered all the mitigation projects and activities that were submitted.

The original goals were reviewed and no revisions were made to the wording.

The mission statement and goals will be added to the Plan.

Mitigation

Andrea explained that mitigation actions include activities and projects that reduce the long-term risk to people and property from the natural hazards discussed in the risk assessment. The purpose of the next meeting is to review and update the list of mitigation projects for each participating jurisdiction.

Status of Existing Projects

Zachary distributed “Status of Existing Mitigation Actions” forms to each of the previously participating jurisdictions detailing the mitigation projects and activities included in the original Plan. Andrea explained that as part of the update process the

status of these projects needs to be determined. She described how the form should be completed so that this information can be included in the Plan update.

New Projects

The form titled **"Hazard Mitigation Projects"** was distributed and Andrea indicated this form should be used to submit new projects and activities for the Plan update. To help the jurisdictions think about and assemble their lists, a 2-page list of potential mitigation projects was included in the handout material along with mitigation project lists from jurisdictions in other counties. These examples can be used to help Committee members when they prepare their list. Finally, Andrea provided excerpts from a FEMA publication on mitigation ideas as another resource.

She indicated individual mitigation project lists will be developed for each participating jurisdiction and that this is a list of projects each jurisdiction would like to see accomplished if funding becomes available. FEMA is trying to stimulate mitigation to reduce the extraordinary amount of money being expended on storm damages.

The projects and activities included in the Plan should be mitigation-related, not emergency preparedness/response or maintenance.

Mitigation projects can include studies, regulatory activities, structural & infrastructure projects, and information/education activities. She provided advice for completing the mitigation project list including providing a detailed description of the project, the jurisdiction responsible for the project and the time frame to complete the project.

Committee members were encouraged to contact Andrea and Zachary if questions arise before they return to the next Committee meeting.

What Happens Next?

The vulnerability analysis and mitigation project prioritization will be the main topics of the next committee meeting.

The third meeting of the Committee was set for Thursday, September 23rd at 7:00 p.m. at the Havana City Center.

Public Comment

With no questions or comments, Greg Griffin adjourned the meeting.

Meeting Minutes

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee

September 23, 2021
7:00 p.m.
Havana City Center
112 West Madison Street, Havana

Committee Members

Easton, Village of
Forman Fire Protection District
Havana CUSD #126
Havana Rural Fire Protection District
Havana, City of
Kilbourne Fire Department
Manito, Village of
Mason City, City of
Mason City Fire Protection District

Mason County Offices:
- 911
- Assessor
- County Board
- EMA
- Health Department
- Sheriff

Mason County Farm Bureau
Mason District Hospital
Midwest Central CUSD #191
Williams Insurance Agency
American Environmental Corp.

Welcome

Greg Griffin, Chairman of the Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee, opened the meeting and welcomed attendees.

Handout materials were distributed to each Committee member.

Andrea Bostwick, American Environment Corp. (AEC), provided a brief recap to reorient Committee Members as to what has been accomplished. Before beginning the vulnerability analysis presentation, Andrea asked the participating jurisdictions to submit their completed “Critical Facilities”, “Capability Assessments” and “Shelter Surveys”, if they haven’t done so already.

Vulnerability Analysis

Andrea began the vulnerability analysis discussion by noting that the focus of this meeting is the vulnerability posed by tornadoes. The analysis estimates future potential damages in terms of dollar loss to residences, including contents, for each participating jurisdictions based on FEMA acceptable formulas. The potential damages were calculated on the magnitude most likely to be encountered, not on a worst-case event.

Tornadoes
Since 1950, 35 tornadoes have been verified in Mason County. While occurring less frequently than severe storms and severe winter storms, tornadoes have caused at least $6 million in property damages.

Using information from the 35 verified tornadoes, damages were calculated based on an "average" tornado. The average tornado in Mason County impacts approximately 0.30 square miles. Housing densities were calculated from U.S. Census Bureau information for each of the participating jurisdictions. This information, along with a set of assumptions were used to estimate the number of vulnerable residential structures.

Potential dollar losses were then calculated for these vulnerable residential structures using the provided tax assessment values and an additional assumption about the degree of damage sustained by the structures and their contents.

Potential dollar losses caused by an average-sized tornado to residences and their contents would be expected to exceed at least $8 million in any of the participating municipalities with the exception of Topeka. Losses ranged from $2.3 million in Topeka to $42.4 million in Manito. Potential dollar losses by township would be expected to range from $90,450 in Salt Creek Township to $1 million in Havana Township. Andrea noted that the damage figures for the most populated townships would only be reached if the tornado's path included a portion of the major municipality in the township.

Risk Priority Index Exercise Results

Andrea then presented the results of the Risk Priority Index Exercise which was conducted at the June 24, 2021 meeting. She provided the Committee with a brief recap on what the Risk Priority Index is and how it can help participants determine which hazards present the highest risk and therefore which ones to focus on when formulating mitigation projects and activities.

Based on the Committee's responses, thunderstorms with damaging winds scored the highest, followed by severe winter storms and tornadoes. The hazards that scored the lowest included dam failures, earthquakes and levee failures.

Critical Facilities Vulnerability Survey

As part of the Plan update, Andrea indicated that vulnerable community assets need to be identified for each participating jurisdiction. She asked Committee members to complete a 2-page survey to help identify each jurisdiction's most vulnerable assets as well as identify a list of key issues that clearly describe each jurisdiction's greatest vulnerabilities. This information will be used in the vulnerability analysis.

Mitigation Actions Prioritization Methodology

The Mitigation Actions Prioritization Methodology outlines the approach used to classify each mitigation action identified by the participating jurisdictions and is a FEMA-required element of the Plan. As part of the update process, the methodology developed for the original Plan needs to be reviewed to determine if revisions are needed.

Zachary Krug, American Environmental Corp., explained that the original methodology was based on two key factors:

1) Frequency of hazard—severe storms occur more frequently than earthquakes.
2) Degree of mitigation—some projects will *significantly reduce* damages while other projects only have the potential to reduce damages.

This methodology helps objectively identify which projects and activities have a greater likelihood to significantly reduce the long-term vulnerabilities associated with the most frequently-occurring natural hazards. After reviewing the updated methodology, the Committee determine that no changes needed to be made.

Zachary acknowledged that while this methodology does not take cost or politics into consideration, these factors may affect the order in which projects are implemented. He also noted that it is important to keep in mind that implementing all of the mitigation projects is desirable regardless of which prioritization category they fall under.

Mitigation Projects

Committee Members were asked to submit their new Mitigation Projects forms. Andrea then described how the draft methodology, the lists of mitigation projects, finalized goals and other information will be presented for Committee review.

Andrea chose a frequently requested mitigation project, a community safe room (tornado-shelter), as an example to show how a typical project is prioritized and entered into the Plan on a Mitigation Action Table. She described how each column in the Mitigation Action Table would be completed for this example project.

Andrea explained that the information in the Mitigation Action Tables would be prepared by AEC, but that the Tables cannot be completed until all of the participants submit their draft lists of projects. Committee Members will have the opportunity at the next meeting to review all of the mitigation projects submitted so that they can make adjustments to their lists.

It was noted that each jurisdiction will have their own list of jurisdiction-specific mitigation projects and they do not need to get approval from the County or any of the other participants for any of their projects. Participants were also reminded that this is a list of projects and activities they would like to see accomplished if funding becomes available. For a jurisdiction to be eligible for a project, it must be on its list.

This is a mitigation plan and there are some projects that IEMA/FEMA do not consider mitigation. Projects associated with emergency preparedness / disaster response and maintenance will not be included in the Plan update. Andrea noted that as you put your list together, if you are unsure about whether a project would be considered mitigation, go ahead and include it on your list. AEC will review the lists and help make the appropriate recommendations.

What Happens Next?

It is anticipated that participants will need time to assemble their mitigation project lists. Consequently, the Committee agreed to schedule the next meeting on:

Thursday, January 13, 2022
In-Person
Havana City Center, Havana
7 p.m.

Public Comment

No additional questions or comments were raised. Greg Griffin adjourned the meeting.

Meeting Minutes

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee

January 13, 2022
7:00 p.m.
Havana City Center
112 West Madison Street, Havana

Committee Members

Bath, Village of
Havana CUSD #126
Havana Rural Fire Protection District
Havana, City of
Mason City Fire Protection District
Mason City, City of
Mason County Offices:
- 911
- Assessor

Mason County Offices:
- Clerk & Recorder
- EMA
- Health Department
- Sheriff

Midwest Central CUSD #191
San Jose, Village of
American Environmental Corp.

Welcome and Introductions

Andrea Bostwick, American Environmental Corp. (AEC), opened the meeting and welcomed attendees. Andrea provided a brief recap to reorient Committee Members as to what has been accomplished. Handout materials were distributed to Committee Members.

Mitigation Project Submittal & Action Tables

Andrea thanked the Committee Members for assembling their lists of mitigation projects and activities. She explained that the information in the draft Mitigation Action Tables handout was prepared by AEC using the lists of mitigation projects and activities provided by the participation jurisdictions. A draft of the Mitigation Strategy language that details the development of the goals and prioritization methodology as well as how the mitigation projects were analyzed in the tables was also provided in the meeting handouts for review by the Committee.

Before reviewing the tables with the Committee, Andrea took a few minutes to discuss community lifelines. FEMA has identified seven community lifelines that are the most fundamental services in the community that, when stabilized, enable all aspects of society to function. Efforts to protect community lifelines and prevent and mitigate potential impacts to them is one of the technical evaluation criteria used to score applicants in the new FEMA BRIC grant program. A handout with a brief description of the community lifelines was included in the meeting packet. Community lifelines will be included in most project descriptions to create a clear connection to the concept.

Committee members were then asked to review the Mitigation Action Tables containing the descriptions of the mitigation projects and activities. Andrea and Ken Runkle, AEC, moved throughout the room to discuss questions with each member. Some additional mitigation projects were provided and will be added to these tables. Andrea advised Committee Members who wished to add additional projects to provide them to her as soon as possible.

Participants were reminded that this is a list of projects and activities they would like to see accomplished if the money becomes available. Also, for a jurisdiction to be eligible for a project, it must be on its list.

Since this is a mitigation plan, some projects were either removed or not included if they were not considered mitigation. Projects associated emergency preparedness/response, recovery, and maintenance will not be included in the Plan.

Public Forum and Adoption

The final Committee meeting will be conducted as an open-house style public forum to present the draft Plan for review and comment. A paper copy of the draft Plan will be available for review at the meeting and posted online on the County's website. There will be a two-week public comment period following the public forum.

Unless otherwise specified, Committee members will receive an electronic copy of the draft plan to make available for public comment.

Once the comment period is over, any comments received will be incorporated into the Plan and submitted to IEMA/FEMA. Following IEMA and FEMA reviews, any edits requested will be made and then FEMA will issue an Approval Pending Adoption letter. At this point an email will be sent to all the participating jurisdictions, along with a copy of a model adoption resolution, asking them to formally adopt the Plan by resolution. A copy of the executed resolution should then be provided to AEC. Once all the adoption resolutions are received, Andrea will submit them to IEMA and FEMA and FEMA will issue the Final Approval letter starting the clock for the five-year update.

Plan Maintenance and Update

Andrea described the Plan maintenance and update commitments that are detailed in the Plan. The Plan will be monitored and evaluated on an annual basis by a Plan Maintenance Subcommittee, which will be made up of the participating jurisdictions and key member of the Planning Committee. The Mason County EMA Office will send out a Plan Maintenance Checklist to each of the participating jurisdictions who will be responsible for providing information to the Subcommittee. This information will include: the status of their mitigation actions; any hazard-related damages to critical facilities and infrastructure; the adoption of any new plans, policies, or regulations; and any significant changes in development. The Subcommittee will also evaluate the Plan to determine its effectiveness at achieving its stated purpose and goals. Participants can also add new mitigation actions during the annual monitoring phase or by contacting the EMA Director.

The EMA Office will then prepare an annual progress report detailing the results of the annual monitoring and evaluation period and provide copies to the Subcommittee. Any

modifications or additions to the mitigation project list will require an update of the Mitigation Strategy and a resubmittal of the Plan to IEMA and FEMA for reference.

At least once every five years, the Plan must be reviewed, revised, and resubmitted to IEMA/FEMA for the participating jurisdictions to remain eligible for mitigation project funds. At the five-year update, any jurisdiction that is not already a part of the Plan and who wants to become part of the Plan may do so. New jurisdictions must supply the same information that all the current jurisdictions supplied.

What Happens Next?

Public Forum

The final Committee meeting will be conducted as an open-house style public forum where the draft Plan will be presented for review and comment.

The public forum will be held on:

Thursday, April 28, 2022
Havana City Center
5 p.m. to 7 p.m.

Public Comment

With no questions, the meeting was adjourned.

APPENDIX C

Mason County Citizen Questionnaire

You can help protect lives and property from natural hazard events in the County by taking a few moments to complete this questionnaire.

Asterisk (*) desonates required questions for form completion.

* 1. **Please indicate where you live in the County (Please check only one.):**

- ☐ Bath
- ☐ Easton
- ☐ Forest City
- ☐ Goofy Ridge
- ☐ Havana
- ☐ Kilbourne
- ☐ Other (please specify)
- ☐ Manito
- ☐ Mason City
- ☐ Matanzas Beach
- ☐ San Jose
- ☐ Topeka
- ☐ Unincorp. County

* 2. **Please place a checkmark next to each of the natural hazards listed below that you have experienced in the County. (Please check all that apply.)**

- ☐ Severe Summer Storms (thunderstorms, hail, lightning strikes)
- ☐ Floods
- ☐ Severe Winter Storms/Extreme Cold (snow,sleet, ice)
- ☐ Excessive Heat
- ☐ Tornadoes
- ☐ Drought
- ☐ Earthquakes
- ☐ Mine/Land Subsidence
- ☐ Landslides
- ☐ Dam Failures
- ☐ Levee Failures
- ☐ Other (please specify)

3. **Which of the natural hazards above have you encountered most frequently?**

4. **Rank the natural hazards listed below in order from 1 to 11 based on which hazard you feel poses the greatest threat. (1 = greatest threat and 11 = least threat)** ***Each number should only be used once.***

- ☐ Severe Summer Storms
- ☐ Floods
- ☐ Severe Winter Storms
- ☐ Excessive Heat
- ☐ Tornadoes
- Drought

Appendix C

- [ ] Earthquakes
- [ ] Mine/Land Subsidence
- [ ] Landslides
- [ ] Dam Failures
- [ ] Levee Failures

* 5. **What types of mitigation projects or activities are most needed in the 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 (i.e., culvert and drainage ditch maintenance, retention pond construction, dam or levee conctruction/maintenance and/or 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 ntural 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)

* 6. **What are the most effective ways *for you* to receive information about how to make your household and property safer from natural hazards (Please check all that apply.)**

- [ ] Newspapers
- [ ] Television
- [ ] Radio
- [ ] Internet
- [ ] Social Media (Facebook, Twitter, etc.)
- [ ] Schools
- [ ] Mailings
- [ ] 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 Hazard Mitigation Plan.

Mason County Multi-Jurisdictional Multi-Hazard Mitigation Planning Committee

Done

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See how easy it is to create a survey.

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Appendix C

APPENDIX D

Frequently Asked Questions

Mason County Multi-Jurisdictional
Natural Hazards Mitigation Plan Update

1) **What is the Mason County Natural Hazards Mitigation Plan?**
   The Mason County Multi-Jurisdictional Natural Hazards Mitigation Plan evaluates damage to life and property from the natural hazards in the County and identifies projects and activities that can reduce these damages. The Plan is considered to be multi-jurisdictional because it includes municipalities and other jurisdictions (fire protection districts, schools, hospitals, etc.) who want to participate.

2) **What is hazard mitigation?**
   Hazard mitigation is any action taken to ***reduce*** the long-term risk to life and property from a natural hazard ***before*** an event occurs.

3) **Why is this Plan being updated?**
   The Plan update fulfills federal planning requirements of the Stafford Act as amended by the Disaster Mitigation Act and the Disaster Recovery and Reform Act. While meeting federal requirements, this Plan update also provides these benefits:
   - Funding for mitigation projects and activities ***before*** disasters occur.
   - Funding for mitigation projects and activities ***following*** federally-declared disasters.
   - Increased awareness about natural hazards and closer cooperation among the various organizations and political jurisdictions involved in emergency planning and response.

4) **Who is updating this Plan?**
   The Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee is updating the Plan with assistance from technical experts in emergency planning, environmental matters, and infrastructure. The Committee includes members from education, emergency services, insurance, municipal and county government, health care, and law enforcement.

5) **How can I participate?**
   You are invited to attend public meetings of the Mason County Natural Hazards Mitigation Planning Committee. In addition, you are encouraged to provide photographs, other documentation, and anecdotal information about damages you experienced from natural hazards in Mason County. Surveys will be available online, at participating municipalities and through Mason County to help gather specific information from residents. All of this information will be used to update the Plan. A draft of the Plan update will be presented at a public forum for further public input.

More information can be obtained by contacting:

Greg Griffin, Director
Mason County Emergency Management Agency
(309) 543-4072

APPENDIX E

Media Outlets Serving Mason County

Mason County Democrat (weekly)
https://www.democratnewspapers.com/

Mason City Banner Times (weekly)
https://www.facebook.com/BTPublications/

APPENDIX F

Mason County Emergency Management Agency

125 N Plum St • Havana, Il 62644
Phone: (309) 543-3012 • Fax: (309) 543-2113
Email: mcema@masoncountyil.org

PRESS RELEASE

Contact: Greg Griffin

(309)-543-4072

Reducing Damages Caused By Severe Weather

Havana, IL (04/05/2021) — Mason County will update its plan to reduce the damages caused by natural hazards such as floods, tornadoes, snow storms, thunderstorms, and ice storms among others. The plan is called a Hazard Mitigation Plan and the process to update it will be funded through a grant from the Federal Emergency Management Agency (FEMA).

“The Plan identifies activities and projects to reduce the impacts of severe weather on residents and property before an event occurs.”, said Greg Griffin, Mason County Emergency Management Agency Director. “By having an updated hazard mitigation plan, the County will remain eligible for federal funds to construct these projects.” he added.

The Mason County Hazard Mitigation Planning Committee will hold its first meeting on Thursday, April 22nd, 2021 at 7 P.M. Due to the COVID-19 Pandemic the meeting will be conducted via teleconference. Persons interested in participating in the meeting should contact Zachary Krug at American Environmental Corporation at 217-585-9517 Ext. 8 or zkrug@aecspfld.com.

This Committee, comprised of County and municipal officials, fire protection districts, Mason District Hospital, and the Regional Office of Education, as well as technical partners and stakeholders, will meet over the next year to update this plan. 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 update the plan.

“This mitigation plan is different from the County’s Emergency Operations Plan because it focuses on ways to reduce and prevent damages before they occur,” added Griffin.

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Contact: Greg Griffin
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2

1 Share

The Mason County Democrat, Wed., April 14, 2021

Mason EMA seeks to reduce damage from severe weather

Objective is to reduce and prevent damage before it occurs

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Email: mcema@masoncountyil.org

Contact: Greg Griffin

(309)-543-4072

Reducing Damages Caused By Severe Weather

Havana, IL (6/7/2020)—The frequency and damages caused by severe storms and other natural hazards in Mason County will be discussed when the Mason County Hazards Mitigation Planning Committee meets Thursday, June 24th, beginning at 7 p.m. The meeting will be held at the Havana City Center, 326 West Market Street, in Havana, and is open to the public.

This Committee, comprised of County and municipal representatives as well as technical partners and stakeholders, will meet over the next several months to update the Mason County Natural Hazards Mitigation Plan.

"The goal of this Committee Meeting is to identify how often severe weather events occur within the County and what kinds of damages have resulted. Based on this information we will update lists of activities and projects to reduce damages caused by these events," said Greg Griffin, Mason County Emergency Management Agency Director.

The focus of this effort is on natural hazards— severe thunderstorms with damaging winds or hail, tornadoes, snow and ice storms, floods, drought, excessive heat, earthquakes, dam failures, and landslides.

Interested persons can provide input at these Hazards Mitigation Planning Committee meetings, or submit their comments and questions to their municipal or county representatives.

Participants include Mason County, Bath, Easton, Forest City, Havana, Kilbourne, Manito, Mason City, San Jose, as well as, Forman Fire Protection District, Havana Rural Fire Protection District, Kilbourne Fire Department, Mason City Fire Protection District, the school districts and Mason District Hospital.

This Plan will be our best resource for determining how to prepare for storms and other natural hazards. After the Plan update is completed, comprehensive information will be available in one document to help guide those who are making decisions about how to better protect Mason County residents," added Griffin.

XXXXXXXXXXXXXXXXX

Preparing for severe weather includes reducing damage before it happens

Minimizing damage from snow, hail, tornadoes, heat, earthquakes and more

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FOR IMMEDIATE RELEASE

Contact: Greg Griffin
(309)-543-4072

Projects to Reduce Damages Caused By Natural Hazards

Havana, IL (September 13, 2021)—Identifying projects and activities that can protect Mason County residents and property from natural hazards while maintaining vital services when severe weather hits will be discussed at the Mason County Natural Hazards Mitigation Planning Committee meeting on Thursday, September 23, 2021 at 7 p.m. at the Havana City Center located at 326 W. Market St., Havana.

“Severe weather frequently damages buildings, crops, roads and other critical infrastructure in this area. Since 1968, the County has been a part of 14 federal disaster declarations. In addition, there has been at least $14.8 million in verified property damages and $81.7 million in crop damages caused by natural hazard events in the County. Identifying steps that can be taken to reduce the dollar damages as well as protect public health before a natural hazard event occurs is the goal of this planning process,” said Greg Griffin, Mason County Emergency Management Agency Director. This Committee began work in April 2021 to update the County’s Hazard Mitigation Plan.

“Other emergency plans are directed at responding after a storm or natural disaster strikes. With this Plan update, we will identify actions that can reduce damages caused by natural hazards for each participating jurisdiction before they occur. This Plan also helps assure each participating jurisdiction is eligible to receive federal grant money for mitigation projects” added Griffin.

A few of the more frequently encountered mitigation projects in Illinois include constructing community safe rooms, resolving drainage problems, retrofitting critical facilities to better withstand hazard events, providing back-up power supplies and developing public information materials.

Committee meetings are open to the public. Persons interested in participating in the meeting should contact Zachary Krug, American Environmental Corp. at (217)-585-9517 Ext. 8, zkrug@aecspfld.com.

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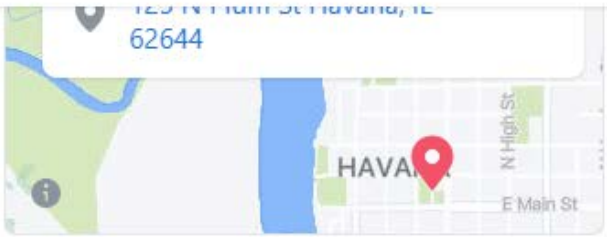

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Mason County Natural Hazards Mitigation Planning Committee meeting to be held Thursday September 23, at 7 p.m.

Mason County Emergency Management Agency

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Mason County Democrat
September 15, 2021

Mason County Emergency Management Agency

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CONTACT: Mason County EMA
(309)-543-3758

Protecting Public Health and Property In Mason County

Havana, IL (December 27, 2021)—Projects and activities to prevent injuries and fatalities while maintaining vital services for Mason County residents will be the main topic of discussion at the Mason County Natural Hazards Mitigation Planning Committee meeting on January 13, 2022 at 7:00 P.M.

The Committee began work in April 2021 to update the County's Natural Hazards Mitigation Plan. This Plan details the past severe weather events that have impacted the County and identifies mitigation projects and activities that can be taken before a severe weather event occurs to protect residents and critical services and infrastructure.

"There has been at least $14.8 million in verified property damages and $81.7 million in crop damages caused by severe weather events in the County. Obtaining FEMA's approval of our updated Plan will make all of the participants eligible to receive federal grant money for mitigation projects and activities" according Joe Ragle, Interim Mason County Emergency Management Agency Director.

Projects identified by Committee members at this meeting will become part of the Mason County Natural Hazards Mitigation Plan. While the public has provided input on portions of the Plan, the entire Plan will be presented for public review and comment before it is submitted to the state and federal government for approval.

"A public forum will be conducted later this spring for interested persons to review the Plan update and ask questions of Committee Members. A two-week public comment period will be held following the public forum to accommodate interested persons who are unable to attend. We want to make sure that anybody who is interested has an opportunity to review and comment on the draft Plan update," added Ragle.

Interested persons can submit questions and comments directly to the Mason County Emergency Management Agency.

Committee meetings are open to the public. Persons interested in participating in the meeting should contact Andrea Bostwick, American Environmental Corp. at (217)-585-9517 Ext. 9, abostwick@aecspfld.com.

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XXXXXXXXXXXXXXXXX

ɔ life with moss ball

"Ideal plants would be ones that can grow in drier conditions, such as ferns, philodendron, dracaena, spider plants, and even small orchids."

Spanish), a plant, string, scissors, and water. Akadama is a coarse clay-like mineral used as bonsai tree soil.

Start by soaking the moss in a bucket of water for one hour to rehydrate the organic material. Then, squeeze out the excess liquid and set it aside. Combine the soil mixture of 70% potting mix or peat moss and 30% bonsai soil to create the ball. Slowly add water to the mixture until it can be pressed firmly into a ball without falling apart.

Remove the plant from its container and gently break apart the root ball and remove any excess soil and expose most of the roots. Create a hole in the soil ball large enough to fit the roots of the plant inside. You can also gently break the soil ball into two pieces, lay the roots on one side, and push the soil back together around the roots.

Press the moss around the soil ball until it is fully covered. Or, create a thin layer of moss on a flat surface, set the ball in the middle, and wrap the moss around the ball. Use the string to attach the moss to the ball. Secure the string to the ball and wrap it randomly around the ball in every direction to keep the moss in place. Tie it off tightly to create a firm, sturdy ball.

"Proper watering will be key to keeping your kokedama alive," says Haag. "Stick your finger in the top of the ball near the base of the plant to feel if the soil is dry. The weight of the ball will also tell you. Is it light? It is time to water."

To water the kokedama, fill a bucket or sink with lukewarm water. Gently push the moss ball into the water so it starts to absorb the water. Soak the completely submerged ball in the water for 15 to 20 minutes. Drain the water and squeeze the moss ball to remove excess water, and let it drip dry before returning it to its decorative space. Mist the moss ball between watering to keep it from completely drying out.

SOURCE: Brittnay Haag, Horticulture Educator, University of Illinois Extension

Mason entities to focus on health & property protection

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Email: mcema@masoncountyil.org

FOR IMMEDIATE RELEASE

CONTACT: Richard Crum
309-543-3758

Mason County's Plan to Reduce Severe Weather Damages
Ready for Public Review

Havana, IL (April 11, 2022)—The Mason County Multi-Jurisdictional Natural Hazards Mitigation Plan outlining projects and activities to reduce damages caused by severe weather and other natural hazards will be available for public review and comment starting April 28, 2022. The Plan, along with a summary sheet and a comment survey, will be available on the Mason County webpage. The comment period will remain open through May 12, 2022.

If you are unable to access the Plan via the website, please contact Richard Crum, Mason County Emergency Management Agency Administrative Coordinator, at 309-543-3758 to request an appointment to view a paper copy of the Plan. Public comments received will be used to make any revisions needed before this Plan is submitted to the Illinois and Federal Emergency Management Agencies.

A public forum will be held at the Havana City Center, 326 W. Market St., Havana, from 5 p.m. to 7 p.m. on Thursday, April 28, 2022. Individuals can still review the Plan and provide comments without participating in the public forum.

"This Plan describes how the County and the participating jurisdictions have been impacted by severe weather and other natural hazards and identifies specific mitigation actions that can be taken to reduce damages to people and property before events occur," explained Sheriff Paul Gann.

The Mason County Natural Hazards Mitigation Planning Committee has been conducting working meetings open to the public since April 2021. The Committee prepared this Plan update with technical assistance from state and federal agencies as well as a consultant specializing in emergency management planning.

The municipalities of Bath, Easton, Havana, Kilbourne, Manito, Mason City, and San Jose, as well as Mason County, Havana CUSD #126, Midwest Central CUSD #191, Havana Rural FPD, Kilbourne FPD, Mason City FPD, and Mason District Hospital have participated in the planning process.

April 20, 2022
The Mason County Democrat

charge of leaving the scene of an accident.

4-9 at 2:44 p.m.

Adam C. Blanco, 36, Havana, was arrested by Havana Police on a charge of contempt of court.

4-9 at 2:59 p.m.

Shalbie D. Marinich, 37, Kilbourne, was arrested by Havana Police on an instate warrant.

4-9 at 3:04 p.m.

Vincent K. Tweedale-Whitehead, 27, Kilbourne, was arrested by Havana Police on charges of driving without a valid driver's license and possession of drug paraphernalia.

4-11 at 1:15 a.m.

Joe M. Meredith III, 36, Manito, was arrested by Mason County authorities on a charge of contempt of court/failure to appear.

4-11 at 11:02 a.m.

William M. Kubic, 22, Havana, was arrested by Mason County authorities on a charge of contempt of court/failure to appear.

4-11 at 10:04 p.m.

Diana S. Jones, 45, Havana, was arrested by Havana Police on two charges of contempt of court/failure to appear.

4-11 at 10:20 p.m.

Carson M. Bargar, 24, Manito, was arrested by a law enforcement agency outside of Mason County and charges with contempt of court/failure to appear.

Tickets

4-5

Jenna Stewart, Green Valley, 75/55

4-6

Mary Becker, Norridge, 75/55

4-8

Wendel Jones II, Pekin, unlawful display of license plate, driving with revoked license, no insurance

Heather Schaefer, Peoria, 75/55

Gabrielle Rademacker, Green Valley, 75/55

Brock Nissen, Mason City, 72/55

4-9

Dennis O'Bryan Jr, Springfield, 74/55

Enose Arrabelli, Macomb, 80/55

Jennifer King, Manito, 80/55

4-10

David Martin, Mason City, failure to avoid accident

Anyone arrested is presumed innocent until proven guilty in court.

Mason County's plan to reduce severe weather damages ready for public review

Public review and comment starting April 28

The Mason County Multi-Jurisdictional Natural Hazards Mitigation Plan outlining projects and activities to reduce damages caused by severe weather and other natural hazards will be available for public review and comment starting April 28.

The Plan, along with a summary sheet and a comment survey, will be available on the Mason County webpage. The comment period will remain open through May 12.

If you are unable to access the Plan via the website, please contact Richard Crum, Mason County Emergency Management Agency Administrative Coordinator, at 309-543-3758 to request an appointment to view a paper copy of the Plan.

Public comments received will be used to make any revisions needed before this Plan is submitted to the Illinois and Federal Emergency Management Agencies.

A public forum will be held at the Havana City Center, 326 W. Market St., Havana, from 5 p.m. to 7 p.m. on Thursday, April 28.

Individuals can still review the Plan and provide comments without participating in the public forum.

"This Plan describes how the County and the participating jurisdictions have been impacted by severe weather and other natural hazards and identifies specific mitigation actions that can be taken to reduce damages to people and property before events occur," explained Sheriff Paul Gann.

The Mason County Natural Hazards Mitigation Planning Committee has been conducting working meetings open to the public since April 2021.

The Committee prepared this Plan update with technical assistance from state and federal agencies as well as a consultant specializing in emergency management planning.

The municipalities of Bath, Easton, Havana, Kilbourne, Manito, Mason City, and San Jose, as well as Mason County, Havana CUSD #126, Midwest Central CUSD #191, Havana Rural FPD, Kilbourne FPD, Mason City FPD, and Mason District Hospital have participated in the planning process.

The Fulton County Playhouse auditions

The Fulton County Playhouse announces auditions for the following One Act shows:

Contemporary – written and directed by Patrick Bell

"Contemporary": Four soldiers are trapped inside a building awaiting enemy interaction only for drama to explode between them. Requires 4 people: 3 men, 1 woman.

The Podium – written and directed by Randy Weaver

Two older gentlemen, friends for many years, have both lost their wives and are currently rooming together. Roy spends his days watching TV. During February of this year, he becomes interested in a very unusual Winter Sport. Roy draws Dale into the competition and through their cheering on the Team USA the men become closer. Requires 2 men.

Additional actors may be needed for interlude scenes.

Auditions will be held at the Fulton County Playhouse rehearsal hall on Saturday, May 14 from 9 a.m.-12 p.m and Sunday, May 15 from 1 - 3 p.m.

Show dates are July 15, 16 and 17.

If you have questions about the auditions, please contact the Fulton County Playhouse at 309-338-7889

IFIEDS

h additional word 25¢ • Mail classified & payment to PO Box 380, Havana IL 62644 • Call (309) 518-4444 or (309) 647-9501

Appendix F

Services

Crossword Puzzle

APPENDIX G

MASON COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN PUBLIC FORUM SUMMARY HANDOUT

APRIL 28, 2022
5:00 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 Mason County residents. Since 1968, Mason County has been a part of 14 federally-declared disasters and experienced at least $14.8 million in recorded property damages and $81.7 million in recorded crop damages within the County.

In the last 10 years alone (2012 – 2021), there have been 57 heavy rain events, 38 thunderstorms with damaging winds, 28 riverine flood events, 24 excessive heat events, 23 extreme cold events, 14 severe winter storms, 7 flash flood events, 5 tornadoes, , 2 severe storms with hail one inch in diameter or greater, 2 droughts, and 1 lightning strike with verified damages 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 property damage and loss of life from natural hazards. This process helps the County and participating jurisdictions reduce their risk 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 a natural hazards mitigation plan.

Why prepare an updated natural hazards mitigation plan?
By preparing and adopting an updated natural 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 update of the Mason County Multi-Jurisdiction Natural Hazards Mitigation Plan?
Recognizing the benefits that could be gained from preparing an updated natural hazards mitigation plan, Mason County invited all the local government entities within the County to participate. The following jurisdictions chose to participate in the Plan update with the County:

- Bath, Village of
- Easton, Village of
- Havana, City of
- Havana Rural Fire Protection District
- Havana CUSD #126
- Kilbourne, Village of
- Kilbourne Fire Department
- Manito, Village of
- Mason City, City of
- Mason City Fire Protection District
- Mason District Hospital
- Midwest Central CUSD #191
- San Jose, Village of

How was the Plan update developed?
The Mason County Multi-Jurisdictional Natural Hazards Mitigation Plan update was developed through the Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee. The Planning Committee included representatives from each participating jurisdiction, as well as agriculture, education, emergency services and healthcare. The Planning Committee met five times between April 2021 and April 2022.

MASON COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

Which natural hazards are included in the Plan update?
After reviewing the risk assessment, the Planning Committee chose to include the following natural hazards in the Plan:

Natural Hazards:

- severe storms (thunderstorms, hail, etc.)
- floods (riverine & flash)
- severe winter storms (snow, ice, etc.)
- tornadoes
- excessive heat
- extreme cold
- drought
- earthquakes
- dam failures
- levee failures

What is included in the Plan update?
The Plan update is divided into sections that cover the planning process; the risk assessment; the mitigation strategy, including the jurisdiction-specific mitigation action lists; and plan maintenance and adoption. The majority of the Plan update is devoted to the risk assessment and mitigation strategy.

The risk assessment identifies the natural 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 estimates the potential impacts each natural hazard would have on the health and safety of the residents of Mason County, as well as the buildings, critical facilities, and infrastructure in the County.

The key component of the mitigation strategy is a list of the projects and activities developed by each participating jurisdiction to reduce the potential loss of life and property damage that results from the natural hazards identified in the risk assessment. These projects and activities are intended to be implement *before* a hazard event occurs.

What happens next?
Any comments received at today's public forum and during the public comment period will be reviewed and, where applicable, incorporated into the draft Plan update 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 update, each participating jurisdiction will be eligible to apply for federal mitigation funds and can begin implementing the mitigation actions identified in the Plan.

APPENDIX H

MASON COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

COMMENT SHEET

PLAN COMMENT PERIOD
APRIL 28, 2022 THRU MAY 12, 2022

The County's Multi-Jurisdictional Natural Hazards Mitigation Plan evaluates damage to life and property from natural hazards that occur in the County. This Plan also identifies projects and activities for the County and each participating jurisdiction that will help reduce these damages. This comment sheet should be used to provide feedback on the draft Plan update.

What comments, concerns or questions do you have regarding the draft Plan update?
(Use additional sheets if necessary.)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Please Print Your Name, Address, and Phone Number Below:

Name: _____ Phone: _____

Address: _____

_____ Zip Code: _____

Comments will be accepted through May 12, 2022.

Place
Stamp
Here

Mr. Richard Crum, Administrative Coordinator
Mason County EMA
125 N. Plum
Havana, IL 62644

Mason County Multi-Jurisdictional Natural Hazards Mitigation Plan Comment Survey

The Mason County Multi-Jurisdictional Natural Hazards Mitigation Plan evaluates damage to life and property from natural hazards that occur in the County. This Plan also identifies projects and activities for the County and each participating jurisdiction to help reduce these damages. This comment survey should be used to provide feedback on the draft Plan.

An Asterisk (*) denotes a question that is required for form completion.

* 1. What comments, concerns or questions do you have regarding the draft Plan?

* 2. Name:

3. Address:

4. City/Village/Town:

5. State/Province:

6. Zip Code:

* 7. Email Address:

8. Phone Number:

Comments will be accepted through March 10, 2022.

Done

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APPENDIX I

Runkle, Ken

From: mcema@masoncountyil.gov
Sent: Wednesday, April 13, 2022 2:19 PM
To: dcook@tazewell.com; emschief@co.menard.il.us; kcaruthers@logancountyil.gov; mhardy@schuylercounty.org; rdlauder@hotmail.com; esda@fultonco.org
Cc: Runkle, Ken
Subject: Hazard Mitigation Plan Update

Importance: High

The purpose of this memorandum is to inform you that Mason County is updating its countywide Natural Hazards Mitigation Plan. Since we share common boundaries, you are invited to review our draft Plan and provide comments during the public comment period, which runs from April 28 through May 12, 2022. Starting April 28, the Plan along with a summary sheet and a comment survey can be viewed on the Mason County webpage.

A public forum is scheduled for:

Thursday, April 28, 2022
5 p.m. to 7 p.m.
Havana City Center
326 W. Market St., Havana, IL

If you have any questions, you can reach me at 309-543-3758 or mcema@masoncountyil.gov

American Environmental Corp., an emergency management and environmental consulting firm experienced in preparing these plans, is leading our planning process. If you have specific questions about the Plan, please contact Ken Runkle, a consultant team member, at 217-585-9517 Ext. 8 or krunkle@aecspfld.com

Richard Crum
Administrative Coordinator
Mason County EMA
125 N Plum St
Havana, IL 62644
(309) 543-3758 Office
(309) 543-2113 Fax

APPENDIX J

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County
1974-2021

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/30/1974	3:00 PM	Easton	n/a	n/a	n/a	n/a	n/a	
6/19/1974	6:30 PM	Easton	n/a	n/a	n/a	n/a	n/a	
6/20/1974	8:54 PM	Easton[^] Teheran[^]	n/a	n/a	n/a	n/a	n/a	
7/14/1974	8:45 PM	Havana	n/a	n/a	n/a	n/a	n/a	
7/15/1976	3:10 PM	Forest City	n/a	n/a	n/a	n/a	n/a	
6/16/1977	2:45 PM	Easton Snicarte	n/a	n/a	n/a	n/a	n/a	
7/16/1977	11:35 AM	Manito	n/a	n/a	n/a	n/a	n/a	
7/5/1980	1:48 AM	Kilbourne	n/a	n/a	n/a	n/a	n/a	
4/13/1981	6:10 PM	Topeka[^] Eckard[^] Mason City San Jose	n/a	n/a	n/a	n/a	n/a	
5/30/1982	3:55 PM	Mason City	n/a	n/a	n/a	n/a	n/a	
5/21/1987	9:00 PM	Poplar City[^]	n/a	n/a	n/a	n/a	n/a	
5/8/1988	4:00 PM	Manito	n/a	n/a	n/a	n/a	n/a	
6/19/1990	11:30 PM	Havana	61 kts	n/a	n/a	n/a	n/a	
5/17/1991	8:30 PM	Biggs	n/a	n/a	n/a	n/a	n/a	
10/4/1991	4:50 PM	Manito	n/a	n/a	n/a	n/a	n/a	
7/2/1992	2:20 PM	Mason City	n/a	n/a	n/a	n/a	n/a	
7/2/1992	4:05 PM	Havana	n/a	n/a	n/a	n/a	n/a	
7/2/1992	8:20 PM	Havana	n/a	n/a	n/a	n/a	n/a	
7/2/1992	8:32 PM	Manito	n/a	n/a	n/a	n/a	n/a	
9/9/1992	12:00 PM	Poplar City[^]	n/a	n/a	n/a	n/a	n/a	

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County
1974-2021

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
8/23/1993	5:12 PM	Bath[^]	n/a	n/a	n/a	$500	n/a	winds blew down large trees 4 miles south of the Village
5/24/1994	5:32 PM	Forest City	n/a	n/a	n/a	n/a	n/a	winds uprooted 2 foot diameter trees
6/26/1994	6:09 PM	Manito	52 kts	n/a	n/a	n/a	n/a	
6/26/1994	6:34 PM	Havana	n/a	n/a	n/a	$5,000	n/a	winds blew down power lines
7/20/1994	5:20 PM	Forest City	n/a	n/a	n/a	$50	n/a	winds blew down power lines
6/21/1995	7:40 PM	Mason City	n/a	n/a	n/a	n/a	n/a	winds blew down numerous trees and power lines
7/24/1996	11:55 AM	Snicarte	52 kts	n/a	n/a	n/a	n/a	
10/29/1996	4:11 PM	Havana[^]	n/a	n/a	n/a	n/a	n/a	winds blew down several power lines 1 mile north of the City
4/5/1997	2:50 PM	Havana	n/a	0	0	n/a	n/a	winds blew down numerous trees, tree limbs and power lines across the area
4/30/1997	2:10 PM	Mason City	n/a	n/a	n/a	n/a	n/a	winds destroyed a shed and blew down several power lines in the City
6/12/1997	12:40 PM	Mason City	n/a	0	0	n/a	n/a	winds blew down a large tree
7/19/1997	5:09 PM	Havana	n/a	0	0	n/a	n/a	- winds blew down numerous trees across the area - one tree fell onto the roof of a house 2 miles south of the City - some minor street flooding was reported due to the heavy amounts of rain in a short period of time
3/27/1998	6:45 PM	San Jose[^]	n/a	0	0	n/a	n/a	wind blew down numerous trees and power lines

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1 Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County 1974-2021								
Date(s)	**Start Time**	**Location(s)**	**Maximum Magnitude (Knots)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
5/15/1998	7:52 PM	Easton[^] Teheran[^] Mason City[^]	n/a	0	0	n/a	n/a	winds blew down several large trees
5/24/1998	12:50 AM	Kilbourne	n/a	0	0	n/a	n/a	winds blew down a large tree as well as numerous tree limbs
6/11/1998	3:15 AM	Manito San Jose	n/a	0	0	n/a	n/a	- winds blew down several trees and power lines in both villages in San Jose, a tree fell onto a house causing minor damage and another fell onto a truck
6/18/1998	5:55 PM	countywide	n/a	n/a	n/a	n/a	n/a	wind blew down numerous trees, tree limbs and power lines across the county
6/28/1998	6:43 PM	Forest City	n/a	n/a	n/a	n/a	n/a	winds blew down several power lines
6/29/1998	3:37 PM	countywide	52 kts	n/a	n/a	n/a	n/a	winds caused widespread damage to trees, tree limbs, power poles, power lines and structures
7/22/1998	8:00 AM	Havana Bath	n/a	0	0	n/a	n/a	- winds blew down trees and power lines in Bath, along IL Rte. 78 between Bath & Havana, and in Havana - a grain wagon was blown across the road in Havana - the shed doors were blown in at the Havana sewage plant

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1 Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County 1974-2021								
Date(s)	**Start Time**	**Location(s)**	**Maximum Magnitude (Knots)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
11/10/1998	4:27 AM	Havana Poplar City Biggs Easton Teheran Mason City	52 kts	0	0	n/a	n/a	- in Mason City, a steel roofing system was blown off of an IDOT garage and numerous trees were blown down - 5 miles north of Mason City a tandem truck was blown off of US Rte. 136, the driver was not injured - in rural Mason City, a 2x4 was blown through a bathroom window of a farm house and the roof was blown off of a machine shed
5/12/1999	2:50 PM	Easton[^]	n/a	0	0	n/a	n/a	winds blew 2 semis off the road at the intersection of US Rte. 126 and IL Rte. 10, neither of the drivers sustained any injuries
6/1/1999	5:10 PM	Bath Havana[^] Eckard Topeka Forest City Manito	52 kts	n/a	n/a	$200,000	n/a	- winds blew down numerous trees, with some causing minor structural damage - a roof was lifted off of a house and an old drive-in movie screen was blown over - 5 miles west of Manito several power lines and trees were blown down in the Woodland Estates Subdivision, several homes sustained minor damage
6/4/1999	3:24 PM	countywide	n/a	n/a	n/a	n/a	n/a	winds blew down numerous power poles

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County
1974-2021

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
8/12/1999	6:38 PM	Bath Mason City	70 kts	0	0	$100,000	$12,300,000	- winds blew down numerous trees, tree limbs and power lines - winds blew down 1,000 acres of corn - a tree was blown over onto a van trapping its occupants at the intersection of IL Rte. 97 and the Bath Blacktop, rescue crews freed the occupants, who were uninjured - in the Sanganois Conservation Area another car was trapped by a fallen tree, but no injuries were reported
4/20/2000	4:30 AM	countywide	52 kts	n/a	n/a	$20,000	n/a	- winds blew down numerous power lines and trees across the county - in Mason City the wall of a large storage building was blown off - in the Mason City area a few homes lost sections of siding, a few sheds were demolished, and some trees were uprooted
8/26/2000	7:20 PM	Matanzas Beach	n/a	n/a	n/a	n/a	n/a	winds blew down several large trees
4/10/2001	11:55 PM	Havana Eckard Topeka Forest City	50 kts	n/a	n/a	n/a	n/a	winds blew down tree limbs and power lines across the area

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1 Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County 1974-2021								
Date(s)	**Start Time**	**Location(s)**	**Maximum Magnitude (Knots)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
6/14/2001	5:50 PM	Bath Havana[^] Eckard Topeka Forest City Manito	50 kts	n/a	n/a	n/a	n/a	winds blew down several large trees
7/17/2001	2:58 PM	Bath[^]	50 kts	n/a	n/a	n/a	n/a	winds blew down 6 to 8 power poles
7/18/2001	6:45 AM	Kilbourne[^]	50 kts	n/a	n/a	n/a	n/a	winds blew down several power poles southeast of the Village
8/2/2001	5:00 PM	Havana Poplar City Biggs Easton Teheran Mason City	50 kts	n/a	n/a	n/a	n/a	winds blew down several trees, tree limbs and power lines
8/9/2001	7:30 PM	Forest City[^] Sand Ridge State Forest	52 kts	n/a	n/a	n/a	n/a	winds blew down a large tree in Sand Ridge State Forest
8/22/2001	6:40 PM	Havana Poplar City Biggs Easton	50 kts	n/a	n/a	n/a	n/a	winds blew down trees and power lines in Havana as well as on the southern end of Easton
6/13/2002	12:20 AM	San Jose[^]	50 kts	n/a	n/a	n/a	n/a	winds blew down 2 power poles across US Rte. 136

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County
1974-2021

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
4/4/2003	2:30 PM	Kilbourne	55 kts	n/a	n/a	n/a	n/a	winds blew down several trees onto IL Rte. 97
6/25/2003	6:30 PM	Forest City Sand Ridge State Forest	55 kts	n/a	n/a	n/a	n/a	winds blew down several trees in Sand Ridge State Forest
7/8/2003	2:55 PM	Manito	50 kts	n/a	n/a	n/a	n/a	winds blew down several power lines
5/24/2004	10:39 PM	Manito Mason City	60 kts	n/a	n/a	n/a	n/a	- winds blew down numerous tree limbs between Manito and Mason City - near Manito winds flipped over an irrigation system
5/30/2004	4:21 PM	Havana	50 kts	n/a	n/a	n/a	n/a	winds blew down several trees and a road sign
5/30/2004	4:41 PM	Mason City	52 kts	n/a	n/a	n/a	n/a	
10/29/2004	10:25 PM	Forest City	50 kts	n/a	n/a	n/a	n/a	winds blew down a large tree
7/26/2005	4:00 PM	Manito	50 kts	n/a	n/a	n/a	n/a	winds blew down several trees and power lines
8/18/2005	11:50 PM	countywide	50 kts	n/a	n/a	n/a	n/a	winds blew down tree limbs across the county
11/5/2005	9:09 PM	Mason City	50 kts	n/a	n/a	n/a	n/a	winds blew down power lines
4/2/2006	5:18 PM	Mason City^ San Jose	65 kts	n/a	n/a	n/a	n/a	- winds blew down numerous trees and large tree limbs significant damage was sustained by several barns and outbuildings

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1 Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County 1974-2021								
Date(s)	**Start Time**	**Location(s)**	**Maximum Magnitude (Knots)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
5/24/2006	2:00 PM	Manito	55 kts	n/a	n/a	n/a	n/a	- winds blew down numerous trees, power lines and power poles - winds blew over an irrigation system a few outbuildings sustained some minor structural damage
7/2/2006	6:52 PM	Manito	56 kts	n/a	n/a	n/a	n/a	winds blew down a few trees and power lines
7/3/2006	5:17 PM	Teheran[^]	52 kts	n/a	n/a	n/a	n/a	winds blew down power lines
719/2006	3:29 PM	Havana	56 kts	n/a	n/a	n/a	n/a	winds blew down numerous trees and power lines
9/11/2006	6:05 PM	Havana	52 kts	n/a	n/a	n/a	n/a	
9/11/2006	6:30 PM	Havana[^]	50 kts	n/a	n/a	n/a	n/a	winds blew down tree limbs and corn
5/15/2007	12:27 PM	Forest City	52 kts	n/a	n/a	$2,000	n/a	- winds blew down tree limbs and power lines several road construction signs were pulled out of the ground
9/25/2007	1:45 PM	Goofy Ridge[^]	56 kts	n/a	n/a	$8,000	n/a	winds blew down a few large trees and numerous tree limbs
5/13/2008	1:00 PM	Kilbourne[^] Havana Regional Airport	61 kts	n/a	n/a	$25,000	n/a	- winds blew down several trees a portion of the roof was blown off an airplane hanger
6/3/2008	9:00 AM	Havana Poplar City Biggs Easton Teheran Mason City	61 kts	n/a	n/a	$25,000	n/a	winds blew down numerous trees and power lines in Havana and across much of the County

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1 Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County 1974-2021								
Date(s)	**Start Time**	**Location(s)**	**Maximum Magnitude (Knots)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
6/15/2008	1:55 PM	Manito	56 kts	n/a	n/a	$8,000	n/a	winds blew down a few trees
7/8/2008	3:10 PM	Mason City[^]	52 kts	n/a	n/a	$3,000	n/a	winds blew down 2 trees just south of the City
12/27/2008	11:30 AM	Kilbourne	61 kts	n/a	n/a	$35,000	n/a	winds blew down 30 utility poles on 600 North near the Village
6/27/2009	7:21 PM	Havana	52 kts	n/a	n/a	$20,000	n/a	winds uprooted several trees
7/24/2009	10:30 PM	Havana	52 kts	n/a	n/a	$10,000	n/a	winds blew down numerous trees
8/4/2009	7:05 AM	Havana	61 kts	n/a	n/a	$50,000	n/a	- winds blew down several power lines and large tree limbs - Planning Committee members indicated that the winds damaged the Havana Jr. High School and a communications tower and that a tree limb fell onto a power line causing a fire that damaged the Hurley Funeral Home
8/19/2009	2:50 PM	Manito	52 kts	n/a	n/a	$22,000	n/a	winds blew down a 12 inch diameter tree damaging a porch
4/4/2010	6:35 PM	Goofy Ridge	52 kts	n/a	n/a	$15,000	n/a	winds blew down numerous 6 inch diameter branches near Goofy Ridge
6/23/2010	6:26 PM	Havana	52 kts	n/a	n/a	$20,000	n/a	winds blew down power lines
7/24/2010	2:10 PM	Havana[^]	52 kts	n/a	n/a	$6,000	n/a	winds blew down 2 trees
10/26/2010	4:02 AM	Manito	52 kts	n/a	n/a	n/a	n/a	winds blew over an irrigation system in a field near the Village

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1 Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County 1974-2021								
Date(s)	**Start Time**	**Location(s)**	**Maximum Magnitude (Knots)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
5/25/2011	4:30 AM	Kilbourne	52 kts	n/a	n/a	$20,000	n/a	winds uprooted several trees and blew down a few power lines
5/25/2011	4:25 PM	Forest City	52 kts	n/a	n/a	n/a	n/a	- winds blew down several trees - a popcorn factory south of the Village sustained structural damage
6/27/2011	1:55 AM	Easton	52 kts	n/a	n/a	$60,000	n/a	- winds blew down several trees - a tree sliced through a mobile home
5/8/2014	5:20 PM	Manito[^]	52 kts	n/a	n/a	$15,000	n/a	Several tree branches were blown down southeast of the Village
5/8/2014	5:24 PM	Manito[^]	52 kts	n/a	n/a	n/a	n/a	a 6-inch diameter tree limb was blown down near the Village
6/21/2014	2:20 PM	Forest City	52 kts	n/a	n/a	$45,000	n/a	numerous power lines were knocked down
6/21/2014	2:30 PM	Forest City	52 kts	n/a	n/a	$50,000	n/a	a falling tree destroyed a motor home
6/21/2014	2:35 PM	Mason City	52 kts	n/a	n/a	$45,000	n/a	numerous power lines were knocked down
6/21/2014	2:43 PM	San Jose	52 kts	n/a	n/a	$1,500	n/a	a tree was blown down onto Highway 136
6/30/2014	9:30 PM	Matanzas Beach	52 kts	n/a	n/a	$15,000	n/a	tree limbs were blown down onto Highway 78 near Matanzas Beach
6/7/2015	4:00 PM	Forest City[^]	61 kts	n/a	n/a	$15,000	n/a	numerous large tree limbs were blown down
6/7/2015	4:02 PM	Havana[^]	61 kts	n/a	n/a	$10,000	n/a	several large tree limbs were blown down
6/20/2015	8:15 PM	Havana	52 kts	n/a	n/a	$2,000	n/a	a tree was blown down

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1 Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County 1974-2021								
Date(s)	**Start Time**	**Location(s)**	**Maximum Magnitude (Knots)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
6/28/2015	8:35 PM	Mason City[^]	52 kts	n/a	n/a	$10,000	n/a	two large trees were blown down and a pool deck was damaged
7/11/2015	12:50 PM	Havana[^]	52 kts	n/a	n/a	$18,000	n/a	a few trees and power lines were blown down
5/28/2016	7:15 PM	Havana[^]	52 kts	n/a	n/a	$6,000	n/a	four trees were blown down just northeast of the City
6/22/2016	3:47 AM	Havana Havana[^]	61 kts	n/a	n/a	$65,000	n/a	- several tree limbs and power lines were blown down - five power poles were snapped off west of IL-97 on 1550E near the power station
6/22/2016	4:00 AM	Easton[^] Easton	61 kts	n/a	n/a	$65,000	n/a	*Easton area* - four power poles were snapped off and four irrigation legs were flipped at 2900E and 850N - several 18-inch diameter trees were snapped off at 2800E just north of 850N. *Easton* Numerous power lines were blown down
3/6/2017	11:37 PM	Matanzas Beach	52 kts	n/a	n/a	$12,000	n/a	a tree was blown onto a house
3/6/2017	11:58 PM	Mason City	52 kts	n/a	n/a	n/a	n/a	a 7-foot privacy fence was blown down, snapping 5 of its poles at the base

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1 Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County 1974-2021								
Date(s)	**Start Time**	**Location(s)**	**Maximum Magnitude (Knots)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
5/10/2017	5:15 PM	Havana	61 kts	n/a	n/a	$50,000	n/a	numerous trees were blown down
5/10/2017	5:20 PM	Kilbourne[^]	61 kts	n/a	n/a	$65,000	n/a	- irrigation pivots were flipped and twisted - numerous trees were blown down and a 50-60 foot tall pine tree was snapped
5/10/2017	5:28 PM	Forest City	61 kts	n/a	n/a	$30,000	n/a	several trees were blown down
5/10/2017	5:30 PM	Manito	61 kts	n/a	n/a	$60,000	n/a	numerous trees were blown down
7/10/2017	8:00 PM	Havana	52 kts	n/a	n/a	n/a	n/a	a flagpole was snapped
6/28/2018	2:57 PM	Bath[^]	52 kts	n/a	n/a	n/a	n/a	a tree was blown down
6/28/2018	3:00 PM	Havana[^]	52 kts	n/a	n/a	n/a	n/a	a tree was blown down
6/28/2018	3:03 PM	Havana[^]	52 kts	n/a	n/a	$6,000	n/a	several tree limbs were blown down along US 136 east of the City
6/28/2018	3:30 PM	Mason City	52 kts	n/a	n/a	$65,000	n/a	several trees and power lines were blown down
8/7/2018	12:45 AM	San Jose	61 kts	n/a	n/a	$6,000	n/a	a power pole was blown down
5/25/2019	10:00 PM	Forest City[^] Manito[^]	52 kts	n/a	n/a	n/a	n/a	several trees were blown down along the Manito Blacktop between Manito and Forest City
5/25/2019	10:05 PM	Manito	52 kts	n/a	n/a	n/a	n/a	several trees were blown down
8/20/2019	8:26 AM	Manito	52 kts	n/a	n/a	n/a	n/a	a large tree fell onto a power line

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Mason County
1974-2021

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
9/29/2019	2:57 PM	Manito Manito^	52 kts	n/a	n/a	$95,000	n/a	*Manito* numerous trees and power lines were blown down *Manito area* - two outbuildings were damaged and minor siding and window damage occurred to a house southeast of the Village - a few trees were blown down as well
4/8/2020	4:00 PM	Mason City	61 kts	n/a	n/a	$30,000	n/a	several trees were blown down, including one onto a house
5/25/2020	5:25 PM	Forest City^	52 kts	n/a	n/a	n/a	n/a	several tree limbs were blown down and a patio railing was broken
7/9/2020	8:12 PM	Havana	52 kts	n/a	n/a	n/a	n/a	several tree limbs were blown down across the City
8/10/2020	1:45 PM	Havana	52 kts	n/a	n/a	$50,000	n/a	several trees were blown down
8/10/2020	2:10 PM	Havana^	52 kts	n/a	n/a	$20,000	$10,000	downed power lines caused a 4-acre field fire northeast of the City
8/10/2020	2:30 PM	Mason City	52 kts	n/a	n/a	$40,000	n/a	- a power pole in the Ameren parking lot was blown onto a car - a 1-foot diameter tree limb fell onto another car
10/11/2021	2:47 PM	Havana	52 kts	n/a	n/a	n/a	n/a	a large tree limb was blown down
GRAND TOTAL:				**0**	**0**	**$1,546,050**	**$12,310,000**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Sources: Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee Member responses to Natural Hazard Events Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

Table 2
Severe Storms – Hail Events Reported in Mason County
1985-2021

Date(s)	Start Time	Location(s)	Maximum Magnitude (Diameter)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/2/1985	5:25 p.m.	San Jose	1.75 in.	n/a	n/a	n/a	n/a	
5/6/1986	1:12 p.m.	Topeka[^]	1.75 in.	n/a	n/a	n/a	n/a	
5/6/1986	2:45 p.m.	Bath	1.00 in.	n/a	n/a	n/a	n/a	
5/6/1986	3:55 p.m.	Bath	1.75 in.	n/a	n/a	n/a	n/a	
5/17/1991	10:35 p.m.	Havana	1.00 in.	n/a	n/a	n/a	n/a	
12/8/1991	2:15 p.m.	Manito	2.75 in.	n/a	n/a	n/a	n/a	
5/18/1995	10:12 a.m.	Havana	1.75 in.	n/a	n/a	n/a	n/a	
4/7/1998	3:25 p.m.	Bath	1.75 in.	n/a	n/a	n/a	n/a	
4/7/1998	3:47 p.m.	Havana	1.75 in.	n/a	n/a	n/a	n/a	
4/7/1998	4:22 p.m.	Manito	1.00 in.	n/a	n/a	n/a	n/a	
5/12/1998	7:27 p.m.	Kilbourne Mason City	1.50 in.	n/a	n/a	n/a	n/a	
5/12/1999	2:40 p.m.	Easton	1.00 in.	n/a	n/a	n/a	n/a	
6/4/1999	3:23 p.m.	Kilbourne Havana[^]	1.75 in.	n/a	n/a	n/a	n/a	
4/19/2000	10:18 p.m.	Havana	1.00 in.	n/a	n/a	n/a	n/a	
5/12/2000	2:11 p.m.	Easton Teheran Mason City	1.00 in.	n/a	n/a	n/a	n/a	
8/18/2001	11:16 a.m.	Manito San Jose[^]	2.75 in.	n/a	n/a	n/a	n/a	
5/1/2002	1:00 p.m.	Saidora[^]	1.75 in.	n/a	n/a	n/a	n/a	
4/4/2003	2:20 p.m.	Saidora[^] Kilbourne[^] Mason City[^]	2.00 in.	n/a	n/a	n/a	n/a	

[^] Hail event verified in the vicinity of this location(s).

Table 2
Severe Storms – Hail Events Reported in Mason County
1985-2021

Date(s)	Start Time	Location(s)	Maximum Magnitude (Diameter)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/8/2003	9:03 p.m.	Havana	1.75 in.	n/a	n/a	n/a	n/a	
8/2/2003	12:40 p.m.	Havana[^]	1.75 in.	n/a	n/a	n/a	n/a	
4/20/2004	3:45 p.m.	Havana	1.75 in.	n/a	n/a	n/a	n/a	
5/2/2004	11:12 a.m.	Havana[^]	1.50 in.	n/a	n/a	n/a	n/a	
7/19/2006	3:29 p.m.	Havana	1.50 in.	n/a	n/a	n/a	n/a	
5/22/2011	12:22 p.m.	Manito[^]	1.50 in.	n/a	n/a	n/a	n/a	
2/22/2011	12:27 p.m.	Manito	1.75 in.	n/a	n/a	n/a	n/a	
9/12/2012	1:45 p.m.	San Jose	1.00 in.	n/a	n/a	n/a	n/a	
5/22/2019	9:45 p.m.	Topeka[^]	1.75 in.	n/a	n/a	n/a	n/a	
GRAND TOTAL:				**0**	**0**	**$0**	**$0**	

[^] Hail event verified in the vicinity of this location(s).

Source: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

Table 3
Severe Storms – Lightning Events Reported in Mason County
2006-2021

Date(s)	Start Time	Location(s)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/29/2006	n/a	Bath	0	0	$8,000	n/a	lightning struck a sewer lift station
8/28/2008	6:56 p.m.	Havana	0	0	$150,000	n/a	lightning struck a house setting the roof and attic ablaze, the residents were able to escape uninjured
5/10/2015	5:30 p.m.	Havana	0	0	$5,000	n/a	lightning struck a tree, which fell on a building behind the fire department
GRAND TOTAL:			**0**	**0**	**$163,000**	**$0**	

^ Lightning strike event verified in the vicinity of this location(s).

Source: Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee Member responses to Natural Hazard Events Questionnaire. NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

Table 4
Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
1/10/1975	n/a	1.54 in.	Mason City	n/a	n/a	n/a	n/a	
4/18/1975	n/a	2.30 in.	Havana Power Station	n/a	n/a	n/a	n/a	
5/24/1975 thru 5/26/1975	6:00 PM	1.67 in.		n/a	n/a	n/a	n/a	
7/6/1975	3:00 AM	1.60 in.	Mason City	n/a	n/a	n/a	n/a	
7/23/1975 thru 7/24/1975	7:00 AM	2.28 in.	Havana Power Station	n/a	n/a	n/a	n/a	
8/13/1975 thru 8/14/1975	7:00 AM	1.60 in.	Havana Power Station	n/a	n/a	n/a	n/a	
8/29/1975 thru 8/30/1975	n/a	1.50 in.	Mason City	n/a	n/a	n/a	n/a	
9/18/1975 thru 9/19/1975	6:00 PM	2.68 in.	Havana Power Station	n/a	n/a	n/a	n/a	
3/4/1976	12:00 AM	2.00 in.	Havana Power Station	n/a	n/a	n/a	n/a	
5/5/1976 thru 5/6/1976	7:30 PM	1.93 in.	Havana Power Station	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 4
Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
7/21/1976 thru 7/22/1976	12:00 PM	2.40 in.	Mason City	n/a	n/a	n/a	n/a	
7/27/1976	2:30 AM	2.46 in.	Havana Power Station	n/a	n/a	n/a	n/a	
8/14/1976 thru 8/15/1976	8:00 PM	1.50 in.	Havana Power Station	n/a	n/a	n/a	n/a	
9/25/1976 thru 9/26/1976	7:30 AM	2.08 in.	Havana Power Station	n/a	n/a	n/a	n/a	
3/11/1977 thru 3/12/1977	9:30 AM	2.53 in.	Havana Power Station	n/a	n/a	n/a	n/a	
5/4/1977 thru 5/6/1977	5:30 PM	3.47 in.	Mason City	n/a	n/a	n/a	n/a	
7/31/1977	12:00 AM	2.00 in.	Havana	n/a	n/a	n/a	n/a	
8/5/1977 thru 8/6/1977	n/a	3.00 in.	Havana	n/a	n/a	n/a	n/a	
8/7/1977 thru 8/8/1977	n/a	2.43 in.	Havana	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 4
Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
9/12/1977 thru 9/13/1977	n/a	2.80 in.	Mason City	n/a	n/a	n/a	n/a	
10/1/1977	n/a	1.73 in.	Havana	n/a	n/a	n/a	n/a	
10/23/1977 thru 10/25/1977	n/a	2.41 in.	Mason City	n/a	n/a	n/a	n/a	
11/1/1977 thru 11/2/1977	n/a	2.55 in.	Havana	n/a	n/a	n/a	n/a	
5/7/1978 thru 5/8/1978	12:00 AM	1.79 in.	Mason City	n/a	n/a	n/a	n/a	
5/12/1978 thru 5/13/1978	3:00 AM	2.07 in.	Mason City	n/a	n/a	n/a	n/a	
7/2/1978	4:30 AM	1.80 in.	Havana	n/a	n/a	n/a	n/a	
8/25/1978 thru 8/26/1978	n/a	3.53 in.	Havana	n/a	n/a	n/a	n/a	
3/19/1979	12:00 AM	1.92 in.	Mason City	n/a	n/a	n/a	n/a	
4/11/1979 thru 4/12/1979	2:30 AM	2.96 in.	Mason City	n/a	n/a	n/a	n/a	
7/14/1979	5:30 AM	1.51 in.	Havana	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 4
Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
7/24/1979 thru 7/25/1979	6:00 PM	2.87 in.	Havana	n/a	n/a	n/a	n/a	
11/21/1979	12:00 AM	1.51 in.	Havana	n/a	n/a	n/a	n/a	
12/23/1979 thru 12/25/1979	8:30 PM	2.07 in.	Mason City	n/a	n/a	n/a	n/a	
4/8/1980 thru 4/9/1980	8:00 AM	2.07 in.	Mason City	n/a	n/a	n/a	n/a	
6/1/1980 thru 6/3/1980	n/a	3.39 in.	Mason City	n/a	n/a	n/a	n/a	
8/5/1980 thru 8/6/1980	2:30 AM	2.14 in.	Havana	n/a	n/a	n/a	n/a	
8/14/1980 thru 8/16/1980	7:00 AM	2.78 in.	Mason City	n/a	n/a	n/a	n/a	
8/31/1980 thru 9/2/1980	12:00 AM	2.52 in.	Havana	n/a	n/a	n/a	n/a	
9/16/1980 thru 9/17/1980	1:00 AM	2.57 in.	Mason City	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 4
Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
10/17/1980	2:30 PM	1.90 in.	Havana	n/a	n/a	n/a	n/a	
12/7/1980 thru 12/8/1980	12:00 AM	2.05 in.	Havana	n/a	n/a	n/a	n/a	
5/10/1981 thru 5/11/1981	12:00 AM	2.18 in.	Mason City	n/a	n/a	n/a	n/a	
5/18/1981 thru 5/19/1981	1:00 AM	2.21 in.	Havana	n/a	n/a	n/a	n/a	
6/21/1981 thru 6/22/1981	1:30 AM	2.66 in.	Havana	n/a	n/a	n/a	n/a	
7/4/1981 thru 7/5/1981	12:00 AM	3.88 in.	Mason City	n/a	n/a	n/a	n/a	
7/19/1981	n/a	1.60 in.	Mason City	n/a	n/a	n/a	n/a	
7/26/1981 thru 7/28/1981	n/a	2.53 in.	Havana	n/a	n/a	n/a	n/a	
8/3/1981	n/a	2.70 in.	Mason City	n/a	n/a	n/a	n/a	
8/5/1981 thru 8/6/1981	n/a	1.59 in.	Mason City	n/a	n/a	n/a	n/a	
8/15/1981	12:30 AM	1.90 in.	Havana	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 4
Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
4/16/1982 thru 4/17/1982	4:00 PM	3.27 in.	Mason City	n/a	n/a	n/a	n/a	
9/17/1982	n/a	1.75 in.	Havana	n/a	n/a	n/a	n/a	
11/11/1982 thru 11/12/1982	3:30 AM	1.67 in.	Mason City	n/a	n/a	n/a	n/a	
12/2/1982 thru 12/6/1982	n/a	5.31 in.	Mason City	n/a	n/a	n/a	n/a	
12/24/1982 thru 12/25/1982	n/a	2.36 in.	Havana	n/a	n/a	n/a	n/a	
4/2/1983	12:00 AM	2.45 in.	Havana	n/a	n/a	n/a	n/a	
5/1/1983	n/a	1.85 in.	Havana	n/a	n/a	n/a	n/a	
5/13/1983 thru 5/14/1983	n/a	1.75 in.	Havana	n/a	n/a	n/a	n/a	
8/22/1983 thru 8/23/1983	n/a	1.87 in.	Mason City	n/a	n/a	n/a	n/a	
10/20/1983 thru 10/22/1983	6:00 AM	2.26 in.	Havana	n/a	n/a	n/a	n/a	
11/23/1983	12:30 AM	2.00 in.	Havana	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 4
Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
11/28/1983 thru 11/29/1983	n/a	1.53 in.	Havana	n/a	n/a	n/a	n/a	
4/21/1984 thru 4/22/1984	1:00 AM	2.03 in.	Havana	n/a	n/a	n/a	n/a	
5/20/1984	12:30 AM	4.35 in.	Havana	n/a	n/a	n/a	n/a	
6/9/1984	n/a	1.50 in.	Havana	n/a	n/a	n/a	n/a	
7/24/1984	n/a	1.77 in.	Mason City	n/a	n/a	n/a	n/a	
10/31/1984 thru 11/1/1984	5:00 AM	3.00 in.	Havana	n/a	n/a	n/a	n/a	
11/11/1984	9:00 AM	1.70 in.	Havana	n/a	n/a	n/a	n/a	
2/21/1985 thru 2/23/1985	n/a	2.19 in.	Mason City	n/a	n/a	n/a	n/a	
3/3/1985 thru 3/4/1985	n/a	2.04 in.	Havana	n/a	n/a	n/a	n/a	
3/11/1985	n/a	1.65 in.	Havana	n/a	n/a	n/a	n/a	
4/27/1985	n/a	1.80 in.	Havana	n/a	n/a	n/a	n/a	
9/23/1985	8:00 AM	1.85 in.	Havana	n/a	n/a	n/a	n/a	
10/31/1985 thru 11/2/1985	n/a	2.10 in.	Havana	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
11/10/1985	7:30 AM	1.50 in.	Havana	n/a	n/a	n/a	n/a	
11/14/1985 thru 11/16/1985	2:30 PM	2.70 in.	Havana	n/a	n/a	n/a	n/a	
11/18/1985 thru 11/19/1985	n/a	2.87 in.	Havana	n/a	n/a	n/a	n/a	
5/1/1986	1:00 PM	1.90 in.	Havana	n/a	n/a	n/a	n/a	
6/5/1986 thru 6/6/1986	7:00 PM	1.99 in.	Mason City	n/a	n/a	n/a	n/a	
6/10/1986	n/a	1.68 in.	Havana	n/a	n/a	n/a	n/a	
7/10/1986 thru 7/12/1986	n/a	2.92 in.	Mason City	n/a	n/a	n/a	n/a	
9/11/1986	4:00 AM	2.33 in.	Mason City	n/a	n/a	n/a	n/a	
9/23/1986 thru 9/24/1986	n/a	1.80 in.	Havana	n/a	n/a	n/a	n/a	
9/26/1986 thru 9/27/1986	n/a	2.28 in.	Havana	n/a	n/a	n/a	n/a	
10/3/1986	12:00 AM	3.70 in.	Havana	n/a	n/a	n/a	n/a	

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Table 4
Severe Storms - Heavy Rain Events Reported in Mason County
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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
10/24/1986 thru 10/25/1986	n/a	1.58 in.	Havana	n/a	n/a	n/a	n/a	
11/26/1986	n/a	1.79 in.	Mason City	n/a	n/a	n/a	n/a	
4/13/1987 thru 4/14/1987	n/a	1.55 in.	Havana	n/a	n/a	n/a	n/a	
6/20/1987	1:00 PM	1.63 in.	Havana	n/a	n/a	n/a	n/a	
8/4/1987	n/a	2.30 in.	Havana	n/a	n/a	n/a	n/a	
3/28/1988 thru 3/29/1988	n/a	1.85 in.	Mason City	n/a	n/a	n/a	n/a	
11/10/1988	5:00 AM	3.10 in.	Mason City	n/a	n/a	n/a	n/a	
4/23/1989	10:00 AM	1.75 in.	Mason City	n/a	n/a	n/a	n/a	
5/25/1989	n/a	1.78 in.	Mason City	n/a	n/a	n/a	n/a	
7/20/1989 thru 7/21/1989	n/a	1.74 in.	Mason City	n/a	n/a	n/a	n/a	
8/24/1989	7:00 AM	1.67 in.	Havana	n/a	n/a	n/a	n/a	
9/8/1989 thru 9/9/1989	n/a	1.62 in.	Mason City	n/a	n/a	n/a	n/a	
2/22/1990 thru 2/23/1990	n/a	2.21 in.	Mason City	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5/3/1990 thru 5/4/1990	n/a	1.53 in.	Mason City	n/a	n/a	n/a	n/a	
6/6/1990 thru 6/8/1990	n/a	1.89 in.	Havana	n/a	n/a	n/a	n/a	
6/14/1990	n/a	3.33 in.	Mason City	n/a	n/a	n/a	n/a	
6/20/1990	11:00 AM	2.88 in.	Havana	n/a	n/a	n/a	n/a	
6/29/1990 thru 6/30/1990	n/a	3.50 in.	Havana	n/a	n/a	n/a	n/a	
7/10/1990 thru 7/11/1990	n/a	2.02 in.	Havana	n/a	n/a	n/a	n/a	
8/20/1990	n/a	2.29 in.	Mason City	n/a	n/a	n/a	n/a	
11/4/1990 thru 11/5/1990	6:00 AM	2.80 in.	Havana	n/a	n/a	n/a	n/a	
11/27/1990 thru 11/28/1990	n/a	1.88 in.	Havana	n/a	n/a	n/a	n/a	
12/29/1990	n/a	2.32 in.	Mason City	n/a	n/a	n/a	n/a	
4/14/1991 thru 4/15/1991	2:00 AM	1.81 in.	Mason City	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5/4/1991 thru 5/5/1991	1:00 PM	2.69 in.	Havana	n/a	n/a	n/a	n/a	
8/6/1991	n/a	3.26 in.	Mason City	n/a	n/a	n/a	n/a	
8/8/1991	9:30 AM	1.62 in.	Havana	n/a	n/a	n/a	n/a	
9/10/1991	11:00 AM	1.90 in.	Havana	n/a	n/a	n/a	n/a	
10/3/1991 thru 10/5/1991	9:30 PM	5.76 in.	Mason City	n/a	n/a	n/a	n/a	
6/15/1992	n/a	2.15 in.	Mason City	n/a	n/a	n/a	n/a	
7/2/1992	n/a	1.90 in.	Mason City	n/a	n/a	n/a	n/a	
7/3/1992	3:00 PM	1.76 in.	Havana	n/a	n/a	n/a	n/a	
7/26/1992	7:00 AM	3.55 in.	Havana	n/a	n/a	n/a	n/a	
7/30/1992	n/a	2.18 in.	Mason City	n/a	n/a	n/a	n/a	
9/8/1992 thru 9/10/1992	10:00 PM	2.85 in.	Havana	n/a	n/a	n/a	n/a	
10/15/1992	n/a	2.10 in.	Havana	n/a	n/a	n/a	n/a	
11/1/1992	n/a	1.84 in.	Mason City	n/a	n/a	n/a	n/a	
1/4/1993	n/a	1.92 in.	Mason City	n/a	n/a	n/a	n/a	
4/14/1993 thru 4/15/1993	n/a	3.59 in.	Mason City	n/a	n/a	n/a	n/a	
6/25/1993	3:00 AM	2.10 in.	Havana	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6/29/1993 thru 7/1/1993	n/a	4.58 in.	Havana	n/a	n/a	n/a	n/a	
7/10/1993 thru 7/11/1993	n/a	1.72 in.	Mason City	n/a	n/a	n/a	n/a	
7/13/1993 thru 7/14/1993	n/a	1.58 in.	Havana	n/a	n/a	n/a	n/a	
7/22/1993 thru 7/24/1993	7:00 AM	3.32 in.	Havana	n/a	n/a	n/a	n/a	
8/24/1993	5:00 PM	1.64 in.	Havana	n/a	n/a	n/a	n/a	
9/2/1993 thru 9/3/1993	3:00 AM	2.72 in.	Havana	n/a	n/a	n/a	n/a	
9/14/1993 thru 9/15/1993	n/a	4.87 in.	Mason City	n/a	n/a	n/a	n/a	
10/16/1993 thru 10/17/1993	2:00 AM	2.01 in.	Havana	n/a	n/a	n/a	n/a	
4/11/1994 thru 4/13/1994	n/a	2.36 in.	Mason City	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
11/5/1994 thru 11/6/1994	7:00 AM	1.53 in.	Havana	n/a	n/a	n/a	n/a	
12/6/1994 thru 12/7/1994	n/a	1.85 in.	Havana	n/a	n/a	n/a	n/a	
1/13/1995 thru 1/14/1995	3:30 AM	1.97 in.	Mason City	n/a	n/a	n/a	n/a	
4/8/1995 thru 4/9/1995	n/a	2.10 in.	Havana	n/a	n/a	n/a	n/a	
5/8/1995 thru 5/9/1995	12:00 AM	2.24 in.	Havana	n/a	n/a	n/a	n/a	
5/17/1995 thru 5/18/1995	5:00 AM	5.22 in.	Mason City	n/a	n/a	n/a	n/a	
5/23/1995 thru 5/25/1995	n/a	3.07 in.	Havana	n/a	n/a	n/a	n/a	
10/20/1995	n/a	1.60 in.	Mason City	n/a	n/a	n/a	n/a	
5/26/1996 thru 5/27/1996	7:00 PM	2.08 in.	Mason City	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
2/21/1997 thru 2/22/1997	1:00 AM	3.20 in.	Havana	n/a	n/a	n/a	n/a	
5/27/1997	7:00 AM	1.78 in.	Havana	n/a	n/a	n/a	n/a	
7/20/1997	6:00 PM	2.09 in.	Mason City	n/a	n/a	n/a	n/a	
8/4/1997	7:00 PM	1.55 in.	Havana	n/a	n/a	n/a	n/a	
8/17/1997	2:00 AM	1.87 in.	Havana	n/a	n/a	n/a	n/a	
2/10/1998 thru 2/12/1998	n/a	1.90 in.	Havana	n/a	n/a	n/a	n/a	
3/17/1998 thru 3/18/1998	n/a	1.65 in.	Havana	n/a	n/a	n/a	n/a	
5/7/1998 thru 5/8/1998	n/a	2.65 in.	Mason City	n/a	n/a	n/a	n/a	
5/20/1998	n/a	1.57 in.	Havana	n/a	n/a	n/a	n/a	
6/11/1998	n/a	1.56 in.	Mason City	n/a	n/a	n/a	n/a	
6/16/1998	n/a	2.06 in.	Mason City	n/a	n/a	n/a	n/a	
6/29/1998	n/a	1.73 in.	Mason City	n/a	n/a	n/a	n/a	
8/18/1998	n/a	2.69 in.	Mason City	n/a	n/a	n/a	n/a	
11/10/1998	n/a	1.50 in.	Havana	n/a	n/a	n/a	n/a	
4/15/1999 thru 4/16/1999	n/a	2.16 in.	Mason City	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5/13/1999	n/a	2.00 in.	Havana	n/a	n/a	n/a	n/a	
5/17/1999 thru 5/18/1999	n/a	2.27 in.	Havana	n/a	n/a	n/a	n/a	
6/2/1999	6:00 PM	1.88 in.	Havana	n/a	n/a	n/a	n/a	
6/12/1999 thru 6/13/1999	3:00 PM	2.14 in.	Mason City	n/a	n/a	n/a	n/a	
7/1/1999	n/a	1.58 in.	Mason City	n/a	n/a	n/a	n/a	
7/27/1999 thru 7/28/1999	9:30 PM	1.53 in.	Mason City	n/a	n/a	n/a	n/a	
8/12/1999 thru 8/13/1999	2:00 AM	1.90 in.	Mason City	n/a	n/a	n/a	n/a	
5/26/2000 thru 5/27/2000	n/a	1.73 in.	Havana	n/a	n/a	n/a	n/a	
6/20/2000 thru 6/21/2000	n/a	2.06 in.	Mason City	n/a	n/a	n/a	n/a	
7/5/2000	n/a	1.69 in.	Mason City	n/a	n/a	n/a	n/a	
7/11/2000	n/a	3.39 in.	Mason City	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
2/24/2001 thru 2/25/2001	n/a	2.13 in.	Havana	n/a	n/a	n/a	n/a	
6/6/2001	2:00 AM	2.82 in.	Havana	n/a	n/a	n/a	n/a	
1/30/2002 thru 1/31/2002	1:00 AM	2.69 in.	Mason City	n/a	n/a	n/a	n/a	
4/28/2002	7:00 AM	2.19 in.	Havana	n/a	n/a	n/a	n/a	
6/12/2002 thru 6/13/2002	1:00 AM	6.10 in.	Havana	n/a	n/a	n/a	n/a	
7/27/2002	10:30 AM	3.86 in.	Havana	n/a	n/a	n/a	n/a	
8/19/2002 thru 8/20/2002	4:00 AM	2.07 in.	Havana	n/a	n/a	n/a	n/a	
8/23/2002	n/a	3.75 in.	Havana	n/a	n/a	n/a	n/a	
12/18/2002 thru 12/19/2002	12:30 AM	2.00 in.	Havana	n/a	n/a	n/a	n/a	
4/4/2003 thru 4/5/2003	n/a	1.50 in.	Havana	n/a	n/a	n/a	n/a	
4/7/2003	n/a	1.90 in.	Mason City	n/a	n/a	n/a	n/a	
6/13/2003	n/a	2.00 in.	Havana	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6/23/2003 thru 6/24/2003	8:30 PM	1.52 in.	Havana	n/a	n/a	n/a	n/a	
7/9/2003 thru 7/10/2003	2:00 PM	4.27 in.	Havana	n/a	n/a	n/a	n/a	
7/18/2003	1:00 AM	1.60 in.	Mason City	n/a	n/a	n/a	n/a	
8/3/2003 thru 8/4/2003	2:00 AM	2.20 in.	Havana	n/a	n/a	n/a	n/a	
8/29/2003	4:00 AM	2.04 in.	Mason City	n/a	n/a	n/a	n/a	
9/1/2003 thru 9/2/2003	12:30 AM	4.20 in.	Mason City	n/a	n/a	n/a	n/a	
11/18/2003	12:30 AM	2.56 in.	Mason City	n/a	n/a	n/a	n/a	
5/25/2004	5:00 PM	2.71 in.	Mason City	n/a	n/a	n/a	n/a	
6/15/2004	6:30 AM	2.03 in.	Mason City	n/a	n/a	n/a	n/a	
7/10/2004 thru 7/11/2004	9:00 PM	2.68 in.	Mason City	n/a	n/a	n/a	n/a	
8/25/2004	n/a	1.97 in.	Mason City	n/a	n/a	n/a	n/a	
10/27/2004	n/a	1.51 in.	Havana	n/a	n/a	n/a	n/a	
9/16/2004	6:30 PM	1.92 in.	Mason City	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
1/2/2005 thru 1/3/2005	7:30 AM	1.74 in.	Havana	n/a	n/a	n/a	n/a	
8/13/2005 thru 8/14/2005	3:00 AM	2.00 in.	Havana	n/a	n/a	n/a	n/a	
8/22/2005	n/a	1.69 in.	Mason City	n/a	n/a	n/a	n/a	
4/6/2006 thru 4/7/2006	n/a	1.60 in.	Havana	n/a	n/a	n/a	n/a	
7/11/2006 thru 7/12/2006	3:00 PM	1.57 in.	Mason City	n/a	n/a	n/a	n/a	
7/20/2006 thru 7/21/2006	6:00 PM	1.72 in.	Havana	n/a	n/a	n/a	n/a	
7/27/2006	n/a	1.95 in.	Mason City	n/a	n/a	n/a	n/a	
8/9/2006 thru 8/10/2006	n/a	2.16 in.	Havana	n/a	n/a	n/a	n/a	
9/11/2006 thru 9/12/2006	7:30 AM	2.15 in.	Havana	n/a	n/a	n/a	n/a	
11/11/2006	n/a	1.70 in.	Mason City	n/a	n/a	n/a	n/a	
11/30/2006	8:00 AM	2.15 in.	Havana	n/a	n/a	n/a	n/a	

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Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
12/21/2006 thru 12/22/2006	12:00 AM	2.20 in.	Mason City	n/a	n/a	n/a	n/a	
6/28/2007	1:00 AM	2.30 in.	Havana	n/a	n/a	n/a	n/a	
12/11/2007 thru 12/12/2007	n/a	2.90 in.	Mason City	n/a	n/a	n/a	n/a	
1/8/2008 thru 1/9/2008	n/a	2.67 in.	Mason City	n/a	n/a	n/a	n/a	
6/2/2008 thru 6/4/2008	12:30 PM	3.77 in.	Mason City	n/a	n/a	n/a	n/a	
7/12/2008	n/a	2.35 in.	Mason City	n/a	n/a	n/a	n/a	
8/28/2008	10:30 AM	2.10 in.	Havana	n/a	n/a	n/a	n/a	
9/3/2008 thru 9/5/2008	8:30 AM	2.67 in.	Havana	n/a	n/a	n/a	n/a	
9/11/2008 thru 9/15/2008	10:00 AM	6.30 in.	Mason City	n/a	n/a	n/a	n/a	
4/19/2009 thru 4/20/2009	n/a	1.70 in.	Havana	n/a	n/a	n/a	n/a	
4/28/2009	n/a	1.70 in.	havana	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

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Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5/13/2009	12:00 AM	1.74 in.	Havana	n/a	n/a	n/a	n/a	
5/15/2009 thru 5/16/2009	2:00 AM	3.50 in.	Havana	n/a	n/a	n/a	n/a	
6/18/2009	n/a	1.64 in.	Mason City	n/a	n/a	n/a	n/a	
7/4/2009 thru 7/5/2009	n/a	2.15 in.	Havana	n/a	n/a	n/a	n/a	
7/8/2009	n/a	2.15 in.	Havana	n/a	n/a	n/a	n/a	
7/15/2009	n/a	2.62 in.	Mason City	n/a	n/a	n/a	n/a	
7/28/2009 thru 7/29/2009	n/a	2.48 in.	Mason City	n/a	n/a	n/a	n/a	
8/17/2009 thru 8/18/2009	n/a	2.39 in.	Mason City	n/a	n/a	n/a	n/a	
8/20/2009	n/a	2.20 in.	Havana	n/a	n/a	n/a	n/a	
8/28/2009 thru 8/29/2009	n/a	3.60 in.	Havana	n/a	n/a	n/a	n/a	
9/6/2009 thru 9/7/2009	n/a	1.50 in.	Havana	n/a	n/a	n/a	n/a	
10/23/2009	n/a	2.43 in.	Mason City	n/a	n/a	n/a	n/a	
10/30/2009	n/a	2.50 in.	Havana	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

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Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
11/16/2009 thru 11/17/2009	n/a	2.20 in.	Havana	n/a	n/a	n/a	n/a	
12/24/2009 thru 12/25/2009	n/a	2.90 in.	Havana	n/a	n/a	n/a	n/a	
4/24/2010 thru 4/25/2010	n/a	1.85 in.	Havana	n/a	n/a	n/a	n/a	
5/11/2010	n/a	2.00 in.	Havana	n/a	n/a	n/a	n/a	
5/17/2010 thru 5/18/2010	n/a	2.07 in.	Mason City	n/a	n/a	n/a	n/a	
6/1/2010 thru 6/2/2010	n/a	2.48 in.	Havana	n/a	n/a	n/a	n/a	
6/13/2010 thru 6/14/2010	n/a	1.63 in.	Mason City	n/a	n/a	n/a	n/a	
6/21/2010 thru 6/24/2010	n/a	4.20 in.	Havana	n/a	n/a	n/a	n/a	
6/26/2010	n/a	2.60 in.	Mason City	n/a	n/a	n/a	n/a	

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Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
7/19/2010 thru 7/20/2010	n/a	3.30 in.	Havana	n/a	n/a	n/a	n/a	
7/28/2010	n/a	5.00 in.		n/a	n/a	n/a	n/a	
8/10/2010 thru 8/11/2010	n/a	3.18 in.	Havana	n/a	n/a	n/a	n/a	
8/14/2010	n/a	1.75 in.	Havana	n/a	n/a	n/a	n/a	
9/1/2010	n/a	1.50 in.	Havana	n/a	n/a	n/a	n/a	
9/3/2010	n/a	2.47 in.	Mason City	n/a	n/a	n/a	n/a	
10/24/2010 thru 10/25/2010	n/a	2.00 in.	Havana	n/a	n/a	n/a	n/a	
12/31/2010 thru 1/1/2011	n/a	2.44 in.	Mason City	n/a	n/a	n/a	n/a	
2/27/2011 thru 2/28/2011	n/a	1.50 in.	Havana	n/a	n/a	n/a	n/a	
3/5/2011 thru 3/6/2011	n/a	1.50 in.	Havana	n/a	n/a	n/a	n/a	
4/15/2011	n/a	4.00 in.		n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

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Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
4/19/2011 thru 4/20/2011	n/a	2.08 in.	Havana	n/a	n/a	n/a	n/a	
4/22/2011 thru 4/23/2011	n/a	1.68 in.	Mason City	n/a	n/a	n/a	n/a	
5/25/2011 thru 5/26/2011	n/a	2.70 in.	Havana	n/a	n/a	n/a	n/a	
6/14/2011 thru 6/15/2011	n/a	2.40 in.	Havana	n/a	n/a	n/a	n/a	
6/26/2011 thru 6/27/2011	n/a	2.18 in.	Havana	n/a	n/a	n/a	n/a	
9/19/2011	n/a	1.90 in.	Havana	n/a	n/a	n/a	n/a	
11/3/2011 thru 11/4/2011	n/a	1.75 in.	Havana	n/a	n/a	n/a	n/a	
12/14/2011 thru 12/15/2011	n/a	1.90 in.	Havana	n/a	n/a	n/a	n/a	
9/1/2012 thru 9/2/2012	n/a	2.76 in.	Havana	n/a	n/a	n/a	n/a	

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Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
10/13/2012	7:00 AM	2.73 in.	Mason City	n/a	n/a	n/a	n/a	
1/29/2013	4:00 PM	1.58 in.	Havana	n/a	n/a	n/a	n/a	
3/10/2013 thru 3/11/2013	n/a	1.98 in.	Havana	n/a	n/a	n/a	n/a	
4/10/2013	8:00 PM	2.20 in.	Havana	n/a	n/a	n/a	n/a	
4/18/2013	n/a	2.10 in.	Havana	n/a	n/a	n/a	n/a	
5/2/2013 thru 5/3/2013	7:00 PM	2.80 in.	Havana	n/a	n/a	n/a	n/a	
5/20/2013 thru 5/21/2013	n/a	2.00 in.	Havana	n/a	n/a	n/a	n/a	
5/25/2013 thru 5/27/2013	n/a	4.30 in.	Havana	n/a	n/a	n/a	n/a	
5/30/2013 thru 6/1/2013	7:00 PM	3.15 in.	Havana	n/a	n/a	n/a	n/a	
6/26/2013	n/a	1.65 in.	Havana	n/a	n/a	n/a	n/a	
7/10/2013	8:00 AM	1.87 in.	Mason City	n/a	n/a	n/a	n/a	
4/3/2014	n/a	1.75 in.	Havana	n/a	n/a	n/a	n/a	
5/29/2014	n/a	1.75 in.	Havana	n/a	n/a	n/a	n/a	
6/8/2014	n/a	2.60 in.	Havana	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6/22/2014 thru 6/23/2014	n/a	1.76 in.	Havana	n/a	n/a	n/a	n/a	
7/13/2014	n/a	1.75 in.	Havana	n/a	n/a	n/a	n/a	
7/26/2014 thru 7/27/2014	n/a	2.07 in.	Havana	n/a	n/a	n/a	n/a	
9/10/2014 thru 9/11/2014	n/a	4.30 in.	Havana	n/a	n/a	n/a	n/a	
10/2/2014 thru 10/3/2014	n/a	2.90 in.	Havana	n/a	n/a	n/a	n/a	
4/25/2015 thru 4/26/2015	n/a	2.30 in.	Havana	n/a	n/a	n/a	n/a	
6/8/2015	n/a	2.90 in.	Havana	n/a	n/a	n/a	n/a	
6/16/2015 thru 6/17/2015	n/a	2.05 in.	Havana	n/a	n/a	n/a	n/a	
6/25/2015	n/a	2.20 in.	Havana	n/a	n/a	n/a	n/a	
6/27/2015	n/a	2.40 in.	Havana	n/a	n/a	n/a	n/a	
7/9/2015	n/a	2.00 in.	Havana	n/a	n/a	n/a	n/a	
9/19/2015	n/a	1.60 in.	Havana	n/a	n/a	n/a	n/a	
11/18/2015	n/a	1.70 in.	Havana	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

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Severe Storms - Heavy Rain Events Reported in Mason County
1974 - 2021

Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
12/27/2015 thru 12/29/2015	n/a	3.64 in.	Havana	n/a	n/a	n/a	n/a	
5/29/2016	n/a	2.19 in.	Havana	n/a	n/a	n/a	n/a	
7/22/2016	n/a	1.67 in.	Havana	n/a	n/a	n/a	n/a	
7/28/2016	n/a	1.54 in.	Havana	n/a	n/a	n/a	n/a	
8/13/2016	n/a	2.27 in.	Havana	n/a	n/a	n/a	n/a	
8/27/2016	n/a	1.91 in.	Havana	n/a	n/a	n/a	n/a	
9/8/2016	n/a	2.53 in.	Havana	n/a	n/a	n/a	n/a	
4/30/2017	n/a	3.71 in.	Havana	n/a	n/a	n/a	n/a	
5/20/2017	n/a	1.67 in.	Havana	n/a	n/a	n/a	n/a	
7/11/2017	n/a	2.29 in.	Havana	n/a	n/a	n/a	n/a	
8/22/2017	n/a	2.04 in.	Havana	n/a	n/a	n/a	n/a	
11/19/2017	n/a	1.70 in.	Havana	n/a	n/a	n/a	n/a	
2/21/2018	n/a	1.59 in.	Havana	n/a	n/a	n/a	n/a	
3/24/2018 thru 3/25/2018	n/a	2.00 in.	Havana	n/a	n/a	n/a	n/a	
9/7/2018 thru 9/8/2018	n/a	2.09 in.	Havana	n/a	n/a	n/a	n/a	
10/6/2018 thru 10/8/2018	n/a	3.70 in.	Havana	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5/1/2019 thru 5/2/2019	n/a	2.66 in.	Havana	n/a	n/a	n/a	n/a	
5/22/2019 thru 5/23/2019	n/a	2.15 in.	Havana	n/a	n/a	n/a	n/a	
5/26/2019	n/a	2.35 in.	Havana	n/a	n/a	n/a	n/a	
5/29/2019	n/a	1.99 in.	Havana	n/a	n/a	n/a	n/a	
6/22/2019	n/a	1.88 in.	Havana	n/a	n/a	n/a	n/a	
10/30/2019 thru 10/31/2019	n/a	2.11 in.	Havana	n/a	n/a	n/a	n/a	
1/11/2020	n/a	1.65 in.	Havana	n/a	n/a	n/a	n/a	
4/26/2020	n/a	3.45 in.	Havana	n/a	n/a	n/a	n/a	
4/29/2020 thru 4/30/2020	n/a	1.80 in.	Havana	n/a	n/a	n/a	n/a	
5/17/2020	n/a	1.71 in.	Havana	n/a	n/a	n/a	n/a	
5/29/2020	n/a	2.10 in.	Havana	n/a	n/a	n/a	n/a	
7/16/2020	n/a	1.60 in.	Havana	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude Rainfall (inches)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6/25/2021 thru 6/26/2021	n/a	2.23 in.	Havana	n/a	n/a	n/a	n/a	
GRAND TOTAL:				**0**	**0**	**$ -**	**$ -**	

Sources: Midwestern Regional Climate Center, cli-MATE.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 5
General Flood Events Reported in Mason County
1973 - 2021

Date(s)	Start Time	Water Body	Location(s)	Magnitude Flood Crest Illinois River Havana[1]	Impacts[2]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
					Home	Business	Infra-structure					
12/31/1972 thru 2/16/1973	n/a	Illinois River	western portion of county	18.80 ft. 1/8/1973				n/a	n/a	n/a	n/a	
3/9/1973 thru 7/10/1973	n/a	Illinois River	western portion of county	23.90 ft. 4/28/1973				n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #373)***
1/23/1974 thru 5/2/1974	n/a	Illinois River	western portion of county	21.60 ft. 2/2/1974				n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #438)***
5/18/1974 thru 7/17/1974	n/a	Illinois River	western portion of county	23.60 ft. 6/28/1974				n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #438)***
1/16/1975 thru 1/22/1975	n/a	Illinois River	western portion of county	14.60 ft. 1/19/1975				n/a	n/a	n/a	n/a	
2/25/1973 thru 3/17/1975	n/a	Illinois River	western portion of county	16.30 ft. 3/2/1975				n/a	n/a	n/a	n/a	

[1] Flood stage at the Havana gauge location is 14.0 feet, moderate flood stage is 17.0 feet and major flood stage is 23.0 feet.

[2] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 5
General Flood Events Reported in Mason County
1973 - 2021

Date(s)	Start Time	Water Body	Location(s)	Magnitude Flood Crest Illinois River Havana[1]	Impacts[2]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
					Home	Business	Infra-structure					
4/3/1975 thru 4/15/1975	n/a	Illinois River	western portion of county	14.60 ft. 4/8/1975				n/a	n/a	n/a	n/a	
4/20/1975 thru 5/19/1975	n/a	Illinois River	western portion of county	17.00 ft. 5/2/1975				n/a	n/a	n/a	n/a	
6/20/1975 thru 7/5/1975	n/a	Illinois River	western portion of county	15.20 ft. 6/28/1975				n/a	n/a	n/a	n/a	
2/22/1976 thru 4/9/1976	n/a	Illinois River	western portion of county	20.20 ft. 3/11/1976				n/a	n/a	n/a	n/a	
4/27/1976 thru 5/24/1976	n/a	Illinois River	western portion of county	16.60 ft. 5/11/1976				n/a	n/a	n/a	n/a	
9/23/1977 thru 10/17/1977	n/a	Illinois River	western portion of county	15.10 ft. 10/11/1977				n/a	n/a	n/a	n/a	
3/21/1978 thru 5/5/1978	n/a	Illinois River	western portion of county	18.60 ft. 4/13/1978				n/a	n/a	n/a	n/a	

[1] Flood stage at the Havana gauge location is 14.0 feet, moderate flood stage is 17.0 feet and major flood stage is 23.0 feet.

[2] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

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General Flood Events Reported in Mason County
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Date(s)	Start Time	Water Body	Location(s)	Magnitude Flood Crest Illinois River Havana[1]	Impacts[2]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
					Home	Business	Infra-structure					
5/8/1978 thru 6/3/1978	n/a	Illinois River	western portion of county	18.60 ft. 5/19/1978				n/a	n/a	n/a	n/a	
7/4/1978 thru 7/12/1978	n/a	Illinois River	western portion of county	14.20 ft. 7/6/1978				n/a	n/a	n/a	n/a	
3/5/1979 thru 5/27/1979	n/a	Illinois River	western portion of county	25.50 ft. 4/17/1979 9th highest crest on record				n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #583)***
4/14/1980 thru 4/27/1980	n/a	Illinois River	western portion of county	15.10 ft. 4/21/1980				n/a	n/a	n/a	n/a	
6/4/1980 thru 6/25/1980	n/a	Illinois River	western portion of county	18.40 ft. 6/7/1980				n/a	n/a	n/a	n/a	
4/19/1981 thru 6/12/1981	n/a	Illinois River	western portion of county	19.40 ft. 5/22/1981				n/a	n/a	n/a	n/a	

[1] Flood stage at the Havana gauge location is 14.0 feet, moderate flood stage is 17.0 feet and major flood stage is 23.0 feet.

[2] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

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General Flood Events Reported in Mason County
1973 - 2021

Date(s)	Start Time	Water Body	Location(s)	Magnitude Flood Crest Illinois River Havana[1]	Impacts[2]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
					Home	Business	Infra-structure					
6/15/1981 thru 7/17/1981	n/a	Illinois River	western portion of county	18.30 ft. 6/26/1981				n/a	n/a	n/a	n/a	
7/28/1981 thru 8/28/1981	n/a	Illinois River	western portion of county	17.00 ft. 8/9/1981				n/a	n/a	n/a	n/a	
2/11/1982 thru 5/101982	n/a	Illinois River	western portion of county	24.50 ft. 3/25/1982				n/a	n/a	n/a	n/a	
6/3/1982 thru 6/10/1982	n/a	Illinois River	western portion of county	14.60 ft. 6/10/1982				n/a	n/a	n/a	n/a	
7/20/1982 thru 8/1/1982	n/a	Illinois River	western portion of county	15.10 ft. 7/23/1982				n/a	n/a	n/a	n/a	
12/3/1982 thru 1/17/1983	n/a	Illinois River	western portion of county	25.00 ft. 12/11/1982				n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #674)***
3/29/1983 thru 6/8/1983	n/a	Illinois River	western portion of county	23.40 ft. 4/18/1983				n/a	n/a	n/a	n/a	

[1] Flood stage at the Havana gauge location is 14.0 feet, moderate flood stage is 17.0 feet and major flood stage is 23.0 feet.

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General Flood Events Reported in Mason County
1973 - 2021

Date(s)	Start Time	Water Body	Location(s)	Magnitude Flood Crest Illinois River Havana[1]	Impacts[2]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
					Home	Business	Infra-structure					
12/17/1983 thru 1/14/1984	n/a	Illinois River	western portion of county	15.20 ft. 1/11/1984				n/a	n/a	n/a	n/a	
2/16/1984 thru 3/9/1984	n/a	Illinois River	western portion of county	18.70 ft. 2/22/1984				n/a	n/a	n/a	n/a	
3/18/1984 thru 5/14/1984	n/a	Illinois River	western portion of county	20.40 ft. 3/29/1984				n/a	n/a	n/a	n/a	
5/21/1984 thru 6/20/1984	n/a	Illinois River	western portion of county	18.00 ft. 6/2/1984				n/a	n/a	n/a	n/a	
1/5/1985 thru 1/14/1985	n/a	Illinois River	western portion of county	14.60 ft. 1/8/1985				n/a	n/a	n/a	n/a	
2/24/1985 thru 4/27/1985	n/a	Illinois River	western portion of county	26.44 ft. 3/9/1985 6th highest crest on record				n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #735)***

[1] Flood stage at the Havana gauge location is 14.0 feet, moderate flood stage is 17.0 feet and major flood stage is 23.0 feet.

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					Home	Business	Infra-structure					
11/16/1985 thru 12/29/1985	n/a	Illinois River	western portion of county	23.80 ft. 11/27/1985				n/a	n/a	n/a	n/a	
3/13/1986 thru 3/24/1986	n/a	Illinois River	western portion of county	14.50 ft. 3/15/1986				n/a	n/a	n/a	n/a	
10/4/1986 thru 11/2/1986	n/a	Illinois River	western portion of county	19.60 ft. 10/9/1986				n/a	n/a	n/a	n/a	
12/9/1986 thru 12/14/1986	n/a	Illinois River	western portion of county	14.60 ft. 12/13/1986				n/a	n/a	n/a	n/a	
12/281987 thru 1/7/1988	n/a	Illinois River	western portion of county	14.97 ft. 1/2/1988				n/a	n/a	n/a	n/a	
4/7/1988 thru 4/21/1988	n/a	Illinois River	western portion of county	16.30 ft. 3/2/1975				n/a	n/a	n/a	n/a	
9/12/1989 thru 9/20/1989	n/a	Illinois River	western portion of county	15.01 ft. 9/17/1989				n/a	n/a	n/a	n/a	

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					Home	Business	Infra-structure					
3/1/1990 thru 4/4/1990	n/a	Illinois River	western portion of county	19.6 ft. 3/17/1990				n/a	n/a	n/a	n/a	
5/13/1990 thru 6/9/1990	n/a	Illinois River	western portion of county	18.09 ft. 5/28/1990				n/a	n/a	n/a	n/a	
6/21/1990 thru 7/14/1990	n/a	Illinois River	western portion of county	18.19 ft. 7/2/1990				n/a	n/a	n/a	n/a	
7/23/1990 thru 7/31/1990	n/a	Illinois River	western portion of county	14.87 ft. 7/25/1990				n/a	n/a	n/a	n/a	
12/1/1990 thru 12/23/1990	n/a	Illinois River	western portion of county	18.00 ft. 12/5/1990				n/a	n/a	n/a	n/a	
12/30/1990 thru 1/27/1991	n/a	Illinois River	western portion of county	17.31 ft. 1/8/1991				n/a	n/a	n/a	n/a	
2/7/1991 1thru 2/26/1991	n/a	Illinois River	western portion of county	16.06 ft. 2/11/1991				n/a	n/a	n/a	n/a	

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					Home	Business	Infra-structure					
3/16/1991 thru 6/11/1991	n/a	Illinois River	western portion of county	18.15 ft. 3/25/1991				n/a	n/a	n/a	n/a	
11/15/1992 thru 12/11/1992	n/a	Illinois River	western portion of county	17.07 ft. 11/29/1992				n/a	n/a	n/a	n/a	
12/17/1992 thru 2/16/1993	n/a	Illinois River	western portion of county	20.90 ft. 1/11/1993				n/a	n/a	n/a	n/a	
3/6/1993 thru 5/22/1993	n/a	Illinois River	western portion of county	22.95 ft. 4/23/1993				n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #997)***

[1] Flood stage at the Havana gauge location is 14.0 feet, moderate flood stage is 17.0 feet and major flood stage is 23.0 feet.

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					Home	Business	Infra-structure					
6/12/1993 thru 11/9/1993	n/a	Illinois River	western portion of county	23.46 ft. 7/29/1993	X	X	X	20	0	$2,000,000	n/a	*Event Description Provided Below*

This event was part of a federally-declared disaster (Declaration #997)
Nearly continuous rises in the water table, beginning in the summer of 1992, culminated in serious groundwater flooding in and around Havana and Bath in September 1993. Between July 1992 and June 1993 rainfall at Havana was 151 percent of normal with another 9 inches of rain falling in July 1993. Because of the heavy rainfall over the spring and summer, farmers did not need to use their wells to irrigate their crops and therefore did not pull any of the excess water out of the ground. While August rainfall was closer to normal, the area received additional rain on September 2nd and 3rd which caused the already high water table to rise to a level that created lakes in depressed areas around Havana. An additional 3 to 4 inches of rain fell on September 14th and 15th that led to major groundwater flooding. Large capacity pumps and pipelines were procured and dewatering operations continued through at least mid-November.

Impacts

- Many portions of IL Routes 78, 79 and US Route 136 were covered by as much as 3 feet of water, forcing their closure. Roadways were raised at least temporarily with gravel in some places.
- Residential basements on the east side of Havana experienced flooding but could not be dewatered for fear of basement wall collapses. ESDA staff and local officials worked to sandbag roads and critical areas of the City. Planning Committee member records indicated that the County Health Department flooded along with the southwestern third of the City. Some basements reportedly collapsed from the pressure created by the rising groundwater levels. The flooding caused several million dollars in damages.
- In Bath, the streets were covered with 1.5 feet of water and the Village drinking water well was contaminated by flood waters. Planning Committee member records indicated that transportation routes in and out of the Village were cut off limiting emergency services access. Approximately 20 individuals sustained injuries as a result of this event. In addition, the Village lost electricity and telephone services as well as water and sewer. As a result, $2 million was spent to build a new wastewater treatment facility.
- According to Planning Committee member records, the major drainage ditch in Forest City flooded, causing the release of hazardous materials from an underground storage tank.

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					Home	Business	Infra-structure					
2/22/1994 thru 3/26/1994	n/a	Illinois River	western portion of county	16.76 ft. 3/13/1994				n/a	n/a	n/a	n/a	
4/16/1994 thru 5/14/1994	n/a	Illinois River	western portion of county	17.50 ft. 4/22/1994				n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #1025)***
1/19/1995 thru 2/2/1995	n/a	Illinois River	western portion of county	16.19 ft. 1/25/1995				n/a	n/a	n/a	n/a	
4/13/1995 thru 6/23/1995	n/a	Illinois River	western portion of county	26.33 ft. 5/31/1995 7th highest crest on record				n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #1053)***
5/11/1996 thru 7/5/1996	n/a	Illinois River	western portion of county	21.94 ft. 6/6/1996				n/a	n/a	n/a	n/a	
7/23/1996 thru 8/10/1996	n/a	Illinois River	western portion of county	16.62 ft. 7/27/1996				n/a	n/a	n/a	n/a	

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					Home	Business	Infra-structure					
2/22/1997 thru 4/2/1997	n/a	Illinois River	western portion of county	23.69 ft. 3/4/1997				n/a	n/a	n/a	n/a	
1/10/1998 thru 1/23/1998	n/a	Illinois River	western portion of county	15.44 ft. 1/17/1998				n/a	n/a	n/a	n/a	
2/15/1998 thru 3/4/1998	n/a	Illinois River	western portion of county	14.45 ft. 2/24/1998				n/a	n/a	n/a	n/a	
3/10/1998 thru 6/4/1998	n/a	Illinois River	western portion of county	20.85 ft. 5/14/1998				n/a	n/a	n/a	n/a	
1/26/1999 thru 2/24/1999	n/a	Illinois River	western portion of county	18.50 ft. 1/31/1999				n/a	n/a	n/a	n/a	
4/19/1999 thru 6/1/1999	n/a	Illinois River	western portion of county	18.46 ft. 5/2/1999				n/a	n/a	n/a	n/a	
6/5/1999 thru 6/29/1999	n/a	Illinois River	western portion of county	16.40 ft. 6/19/1999				n/a	n/a	n/a	n/a	

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					Home	Business	Infra-structure					
6/26/2000 thru 7/19/2000	n/a	Illinois River	western portion of county	15.40 ft. 6/30/2000				n/a	n/a	n/a	n/a	
2/10/2001 thru 3/28/2001	n/a	Illinois River	western portion of county	19.84 ft. 3/2/2001				n/a	n/a	n/a	n/a	
6/7/2001 thru 6/23/2001	n/a	Illinois River	western portion of county	16.99 ft. 6/12/2001				n/a	n/a	n/a	n/a	
10/29/2001 thru 11/5/2001	n/a	Illinois River	western portion of county	14.46 ft. 10/31/2001				n/a	n/a	n/a	n/a	
3/11/2002 thru 3/25/2002	n/a	Illinois River	western portion of county	16.00 ft. 3/16/2002				n/a	n/a	n/a	n/a	

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					Home	Business	Infra-structure					
4/12/2002 thru 6/27/2002	n/a	Illinois River	western portion of county	26.00 ft. 5/19/2002 8th highest crest on record				n/a	1	$32,865	n/a	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #1416) An 8 year-old boy drowned while playing in a boat that was tied to the shore in a flooded part of the Illinois River. The rope got loose and the boat started to drift away. The boy panicked and jumped into the water.										*FEMA Public Assistance Totals by Jurisdiction* - Bath, Village of: $1,397 - Farmers Drainage District: $22,048 - Lynchburg Township Road District: $9,420		
5/13/2003 thru 5/22/2003	n/a	Illinois River	western portion of county	15.06 ft. 5/18/2003				n/a	n/a	n/a	n/a	
7/20/2003 thru 7/28/2003	n/a	Illinois River	western portion of county	14.61 ft. 7/24/2003				n/a	n/a	n/a	n/a	
5/29/2004 thru 6/30/2004	n/a	Illinois River	western portion of county	17.40 ft. 6/19/2004				n/a	n/a	n/a	n/a	
12/2/2004 thru 12/24/2004	n/a	Illinois River	western portion of county	17.71 ft. 12/13/2004				n/a	n/a	n/a	n/a	

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					Home	Business	Infra-structure					
1/6/2005 thru 3/2/2005	n/a	Illinois River	western portion of county	23.04 ft. 1/20/2004				n/a	n/a	n/a	n/a	
12/6/2006 thru 1/31/2007	n/a	Illinois River	western portion of county	17.24 ft. 1/21/2007				n/a	n/a	n/a	n/a	
2/28/2007 thru 5/14/2007	n/a	Illinois River	western portion of county	19.80 ft. 4/2/2007				n/a	n/a	n/a	n/a	
8/27/2007 thru 9/11/2007	n/a	Illinois River	western portion of county	17.49 ft. 8/31/2007				n/a	n/a	n/a	n/a	
1/11/2008 thru 2/1/2008	n/a	Illinois River	western portion of county	19.16 ft. 1/18/2008				n/a	n/a	n/a	n/a	
2/7/2008 thru 5/3/2008	n/a	Illinois River	western portion of county	19.76 ft. 2/21/2008				n/a	n/a	n/a	n/a	
5/16/2008 thru 5/20/2008	n/a	Illinois River	western portion of county	14.19 ft. 5/18/2008				n/a	n/a	n/a	n/a	

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					Home	Business	Infra-structure					
6/5/2008 thru 7/5/2008	n/a	Illinois River	western portion of county	18.05 ft. 6/15/2008				n/a	n/a	n/a	n/a	
9/15/2008 thru 10/12/2008	n/a	Illinois River	western portion of county	23.54 ft. 9/23/2008				n/a	n/a	n/a	n/a	
12/29/2008 thru 1/21/2009	n/a	Illinois River	western portion of county	20.82 ft. 1/4/2009				n/a	n/a	n/a	n/a	
2/14/2009 thru 7/7/2009	n/a	Illinois River	western portion of county	25.24 ft. 5/22/2009 10th highest crest on record				n/a	n/a	n/a	n/a	
10/27/2009 thru 12/8/2009	n/a	Illinois River	western portion of county	20.75 ft. 11/6/2009				n/a	n/a	n/a	n/a	
12/26/2009 thru 1/17/2010	n/a	Illinois River	western portion of county	19.05 ft. 1/1/2010				n/a	n/a	n/a	n/a	

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1/25/2010 thru 2/10/2010	n/a	Illinois River	western portion of county	17.51 ft. 1/29/2010				n/a	n/a	n/a	n/a	
3/10/2010 thru 4/19/2010	n/a	Illinois River	western portion of county	19.20 ft. 3/20/2010				n/a	n/a	n/a	n/a	
5/14/2010 thru 7/19/2010	n/a	Illinois River	western portion of county	23.35 ft. 6/29/2010				n/a	n/a	n/a	n/a	
7/29/2010 thru 7/31/2010	n/a	Illinois River	western portion of county	14.42 ft. 7/29/2010				n/a	n/a	n/a	n/a	
2/20/2011 thru 3/30/2011	n/a	Illinois River	western portion of county	18.41 ft. 3/10/2011				n/a	n/a	n/a	n/a	
4/22/2011 thru 7/11/2011	n/a	Illinois River	western portion of county	21.14 ft. 5/3/2011				n/a	n/a	n/a	n/a	
5/11/2012 thru 5/17/2012	n/a	Illinois River	western portion of county	14.86 ft. 5/13/2012				n/a	n/a	n/a	n/a	

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3/12/2013 thru 3/27/2013	n/a	Illinois River	western portion of county	16.85 ft. 3/17/2013				n/a	n/a	n/a	n/a	
4/15/2013 thru 7/8/2013	n/a	Illinois River	western portion of county	27.78 ft. 4/25/2013 Flood of Record	X		X	n/a	n/a	$5,020,014	n/a	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #4116) *Impacts* - Hundreds of cabins and sheds in wildlife areas along the Illinois River were severely damaged. - 25 homes and several other structures were damaged near Bath, Snicarte, Havana and Goofy Ridge. - Nearly 15 miles of roads were washed out. - Planning Committee member records indicate that Patterson Bay, Snicarte and Matanzas Beach suffered flood damages to homes and roads. These areas also suffered power outages. *FEMA Public Assistance Totals by Jurisdiction* - Havana Park District: $2,254 - Mason County: $17,760												
2/23/2014 thru 3/7/2014	n/a	Illinois River	western portion of county	17.10 ft. 2/27/2014				n/a	n/a	n/a	n/a	
3/12/2014 thru 4/13/2014	n/a	Illinois River	western portion of county	17.34 ft. 3/17/2014				n/a	n/a	n/a	n/a	

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					Home	Business	Infra-structure					
6/25/2014 thru 7/22/2014	n/a	Illinois River	western portion of county	17.34 ft. 7/5/2014				n/a	n/a	n/a	n/a	
9/12/2014 thru 9/18/2014	n/a	Illinois River	western portion of county	14.36 ft. 9/13/2014				n/a	n/a	n/a	n/a	
6/10/2015 thru 8/8/2015	n/a	Illinois River	western portion of county	27.24 ft. 7/1/2015 2nd highest crest on record				n/a	n/a	n/a	n/a	
12/15/2015 thru 1/31/2016	n/a	Illinois River	western portion of county	26.30 ft. 1/4/2016 4th highest crest on record				n/a	n/a	n/a	n/a	
5/14/2016 thru 5/24/2016	n/a	Illinois River	western portion of county	15.25 ft. 5/19/2016				n/a	n/a	n/a	n/a	
8/30/2016 thru 9/20/2016	n/a	Illinois River	western portion of county	15.76 ft. 9/3/2016				n/a	n/a	n/a	n/a	

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					Home	Business	Infra-structure					
1/21/2017 thru 2/5/2017	n/a	Illinois River	western portion of county	16.15 ft. 1/28/2017				n/a	n/a	n/a	n/a	
4/2/2017 thru 6/9/2017	n/a	Illinois River	western portion of county	22.58 ft. 5/8/2017				n/a	n/a	n/a	n/a	
7/27/2017 thru 8/1/2017	n/a	Illinois River	western portion of county	14.49 ft. 7/29/2017				n/a	n/a	n/a	n/a	
2/22/2018 thru 4/6/2018	n/a	Illinois River	western portion of county	21.05 ft. 3/3/2018				n/a	n/a	n/a	n/a	
6/24/2018 thru 7/9/2018	n/a	Illinois River	western portion of county	15.92 ft. 6/30/2018				n/a	n/a	n/a	n/a	
12/4/2018 thru 12/14/2018	n/a	Illinois River	western portion of county	15.48 ft. 12/7/2018				n/a	n/a	n/a	n/a	
1/3/2019 thru 1/16/2019	n/a	Illinois River	western portion of county	15.66 ft. 1/9/2019				n/a	n/a	n/a	n/a	

[1] Flood stage at the Havana gauge location is 14.0 feet, moderate flood stage is 17.0 feet and major flood stage is 23.0 feet.

[2] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 5
General Flood Events Reported in Mason County
1973 - 2021

Date(s)	Start Time	Water Body	Location(s)	Magnitude Flood Crest Illinois River Havana[1]	Impacts[2]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
					Home	Business	Infra-structure					
2/6/2019 thru 7/21/2019	n/a	Illinois River	western portion of county	26.73 ft. 6/3/2019 5th highest crest on record				n/a	n/a	n/a	n/a	
9/30/2019 thru 10/19/2019	n/a	Illinois River	western portion of county	17.98 ft. 10/6/2019				n/a	n/a	n/a	n/a	
10/31/2019 thru 11/19/2019	n/a	Illinois River	western portion of county	17.85 ft. 11/7/2019				n/a	n/a	n/a	n/a	
1/13/2020 thru 3/6/2020	n/a	Illinois River	western portion of county	18.05 ft. 1/21/2020				n/a	n/a	n/a	n/a	
3/15/2020 thru 4/15/2020	n/a	Illinois River	western portion of county	16.60 ft. 4/2/2020				n/a	n/a	n/a	n/a	
4/27/2020 thru 6/19/2020	n/a	Illinois River	western portion of county	25.19 ft. 5/26/2020				n/a	n/a	n/a	n/a	

[1] Flood stage at the Havana gauge location is 14.0 feet, moderate flood stage is 17.0 feet and major flood stage is 23.0 feet.

[2] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 5
General Flood Events Reported in Mason County
1973 - 2021

Date(s)	Start Time	Water Body	Location(s)	Magnitude Flood Crest Illinois River Havana[1]	Impacts[2]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
					Home	Business	Infra-structure					
3/21/2021 thru 4/1/2021	n/a	Illinois River	western portion of county	14.59 ft. 3/26/2021				n/a	n/a	n/a	n/a	
5/13/2021 thru 5/29/2021	n/a	Illinois River	western portion of county	16.27 ft. 5/23/2021				n/a	n/a	n/a	n/a	
6/29/2021 thru 7/26/2021	n/a	Illinois River	western portion of county	18.27 ft. 7/6/2021				n/a	n/a	n/a	n/a	
10/28/2021 thru 11/15/2021	n/a	Illinois River	western portion of county	17.56 ft. 11/3/2021				n/a	n/a	n/a	n/a	
GRAND TOTAL:								**20**	**1**	**$7,052,879**	**$0**	

Sources: Illinois Department of Natural Resources, Office of Water Resources
Illinois State Water Survey.
Mason County Multi-Jurisdictional Natural Hazard Mitigation Planning Committee Member responses to the Natural Hazard Events Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Data.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.
NOAA, National Weather Service, River Observations, North Central River Forecast Center, Illinois River at Havana.
United States Army Corps of Engineers, RiverGages.com, Data Mining.

[1] Flood stage at the Havana gauge location is 14.0 feet, moderate flood stage is 17.0 feet and major flood stage is 23.0 feet.

[2] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 6
Flash Flood Events Reported in Mason County
1995 - 2021

Date(s)	Start Time	Location(s) Impacted	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
5/16/1995 thru 5/17/1995	6:00 PM	countywide			X	n/a	n/a	n/a	n/a	3 to 4 inches of rain fell within a short amount of time causing flash flooding of small streams and closures of flooded roads
5/11/2002	11:04 AM	Manito^			X	n/a	n/a	n/a	n/a	Several rural roads were briefly flooded
6/13/2002	7:00 AM	countywide			X	n/a	n/a	n/a	n/a	Heavy rains caused flash flooding of numerous rural roads
7/9/2003	8:00 PM	Manito			X	n/a	n/a	n/a	n/a	Very heavy rains fell for several hours resulting in flash flooding of many streets and roads in and around the Village
8/25/2004	4:46 PM	Mason City			X	n/a	n/a	n/a	n/a	Heavy rains caused flash flooding of several streets in the City
9/11/2006	6:25 PM	Havana			X	n/a	n/a	n/a	n/a	Heavy rains resulted in flash flooding of numerous roads within the City - US Route 136 had 1 to 2 feet of water flowing across it for a time
6/22/2010	9:15 AM	southern portion of county			X	n/a	n/a	n/a	n/a	1.50 to 2.25 inches of rain fell within an hour on already saturated ground producing rapid flash flooding in a small part of southern Mason County

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 6
Flash Flood Events Reported in Mason County
1995 - 2021

Date(s)	Start Time	Location(s) Impacted	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
7/19/2010 thru 7/20/2010	8:30 PM	Havana^ Matanzas Beach Bath Patterson Bay Snicarte^ southern portion of county			X	n/a	n/a	n/a	n/a	- Heavy rain fell during the late evening hours of the 19th across southern Mason County with rainfall rates of 2 inches per hour for more than 3 hours which produced widespread flash flooding. - Total rainfall accumulations reached nearly 6 inches along the Illinois River from just south of Havana to near Snicarte. - Nearly every rural road in the southern part of the county was closed.
7/28/2010 thru 7/29/2010	8:00 PM	Snicarte			X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- A slow moving thunderstorm system produced copious amounts of rain in a small part of southwest Mason County during the late evening hours of the 28th. Rainfall amounts of 4 to 5 inches were measured in 90 minutes which led to flash flooding. - Nearly 2 feet of water covered many rural roads. Nearly all roads in the vicinity of the Illinois River were closed due to flooding.										
4/15/2011	6:30 PM	central portion of county southern portion of county			X	n/a	n/a	n/a	n/a	Several rounds of heavy rain which resulted in 3 to 4 inches of rain in 4 hours caused flash flooding of rural roads and creeks

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 6
Flash Flood Events Reported in Mason County
1995 - 2021

Date(s)	Start Time	Location(s) Impacted	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
6/15/2011	2:30 AM	Manito northern portion of county			X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rain fell during the early morning hours across northern Mason County producing more than 2 inches in less than 90 minutes causing flash flooding. - Havana Rural COOP observer measured 2.40 inches of rain.							- Many streets in Manito were flooded. - Numerous rural roads near the Illinois River were impassable.			
6/7/2015 thru 6/8/2015	7:30 PM	northern portion of county eastern portion of county			X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Thunderstorms produced 5.00 to 8.00 of rainfall in northern and eastern Mason County, mainly in a 2 hour period.							- Flash flooding rapidly developed, which made nearly every rural road in northern and eastern Mason County impassable. - Parts of U.S. Highway 136 near the Logan County line were closed due to high water.			
6/26/2015	10:15 AM	Havana Manito northwestern portion of county			X	n/a	n/a	n/a	n/a	- A narrow band of thunderstorms produced 2.00 to 3.00 of rain on very saturated ground in west central and northern Mason County. - Many streets were flooded in Havana and Manito. - Numerous rural roads were also impassable from Havana to Manito during the afternoon hours of June 26th.

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 6
Flash Flood Events Reported in Mason County
1995 - 2021

Date(s)	Start Time	Location(s) Impacted	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
6/26/2015	12:00 PM	southeastern portion of county			X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Persistent thunderstorms produced 2.00 to 3.00 of rain on very saturated ground. This resulted in flash flooding of numerous secondary roads in extreme southeast Mason County, just southeast of Mason City and north of the Menard County line. - Significant flooding along the Salt Creek was also reported.										
6/28/2015	7:15 PM	northern portion of county			X	n/a	n/a	n/a	n/a	Rainfall amounts of 2.00 to 4.00, on top of waterlogged ground, were reported during the early evening of June 28th. This resulted in the flooding of many rural roads between Manito and Forest City, and from Mason City to San Jose.
8/12/2016	4:30 PM	eastern portion of county			X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Persistent thunderstorms produced heavy rainfall during the early evening in eastern Mason County with 2.50 to 6.00 inches in three hours, with the heaviest rain from 3 miles northeast of Mason City to San Jose. - Most rural roads in extreme eastern Mason County were impassable during the heavy rain. - U.S. Highway 136 was also flooded in spots near San Jose.										
4/29/2017	7:00 PM	countywide			X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Rain amounts of 3.00 to 4.00 inches in about a two hour period during the evening hours, on already saturated ground, resulted in flash flooding across much of Mason County. - Numerous streets in Havana were impassable, as were numerous rural roads and highways in the county including parts of U.S. Route 136 and Illinois Route 10.										

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 6
Flash Flood Events Reported in Mason County
1995 - 2021

Date(s)	Start Time	Location(s) Impacted	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
7/9/2020	8:16 PM	Havana			X	n/a	n/a	n/a	n/a	Several streets were flooded and barricaded in Havana
GRAND TOTAL:						**0**	**0**	**$0**	**$0**	

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Data.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 7
Severe Winter Storm Events Reported in Mason County
1950 - 2021

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
3/10/1951 thru 3/12/1951	10:00 AM	Heavy Snow	9.5 in.					Havana	n/a	n/a	n/a	
12/21/1953 thru 12/22/1953	8:00 PM	Heavy Snow	5.8 in.					Havana	n/a	n/a	n/a	
3/2/1954	10:00 AM	Heavy Snow	6.5 in.					Havana	n/a	n/a	n/a	
12/8/1956	4:30 AM	Heavy Snow	7.0 in.					Havana	n/a	n/a	n/a	
3/24/1957 thru 3/25/1957	9:00 PM	Heavy Snow	6.0 in.					Havana	n/a	n/a	n/a	
1/20/1959 thru 1/21/1959	5:30 AM	Heavy Snow	10.0 in.					Havana	n/a	n/a	n/a	
2/20/1960 thru 2/21/1960	2:00 PM	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
2/23/1960 thru 2/25/1960	4:00 PM	Heavy Snow	8.0 in.					Havana	n/a	n/a	n/a	
3/8/1960 thru 3/9/1960	8:00 PM	Heavy Snow	6.0 in.					Havana	n/a	n/a	n/a	

[1] An "X" in the snow, freezing rain, ice, sleet and/or strong winds columns indicates the presences of that weather condition during the severe winter storm event.

[2] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Mason County
1950 - 2021

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
3/15/1960 thru 3/17/1960	8:00 PM	Heavy Snow	8.5 in.					Havana	n/a	n/a	n/a	
2/2/1961 thru 2/3/1961	11:00 AM	Blizzard	5.0 in.				X	Havana	n/a	n/a	n/a	
1/6/1962	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
1/23/1962 thru 1/24/1962	7:00 AM	Heavy Snow	8.0 in.					Havana	n/a	n/a	n/a	
1/11/1964 thru 1/12/1964	4:30 AM	Heavy Snow	6.0 in.					Havana	n/a	n/a	n/a	
3/4/1964 thru 3/5/1964	11:00 AM	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
3/11/1964	12:00 PM	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
11/29/1964	3:30 AM	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
12/2/1964 thru 12/4/1964	10:30 AM	Heavy Snow	9.0 in.					Havana	n/a	n/a	n/a	

[1] An "X" in the snow, freezing rain, ice, sleet and/or strong winds columns indicates the presences of that weather condition during the severe winter storm event.

[2] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Mason County
1950 - 2021

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
2/24/1965 thru 2/25/1965	2:00 PM	Heavy Snow	8.0 in.					Havana	n/a	n/a	n/a	
3/2/1965 thru 3/3/1965	3:00 PM	Heavy Snow	5.6 in.					Havana	n/a	n/a	n/a	
1/26/1967 thru 1/27/1967	3:00 AM	Heavy Snow	11.0 in.					Mason City	n/a	n/a	n/a	
2/27/1969 thru 2/28/1969	10:30 PM	Heavy Snow	6.3 in.					Havana Power Station	n/a	n/a	n/a	
2/10/1972 thru 2/11/1972	7:30 AM	Heavy Snow	6.0 in.					Havana Power Station	n/a	n/a	n/a	
3/28/1972 thru 3/29/1972	4:00 PM	Heavy Snow	6.0 in.					Mason City	n/a	n/a	n/a	
12/18/1973 thru 12/20/1973	n/a	Heavy Snow	10.0 in.					Mason City	n/a	n/a	n/a	

[1] An "X" in the snow, freezing rain, ice, sleet and/or strong winds columns indicates the presences of that weather condition during the severe winter storm event.

[2] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Mason County
1950 - 2021

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
2/23/1975 thru 2/24/1975	n/a	Heavy Snow	7.0 in.					Mason City	n/a	n/a	n/a	
11/26/1975 thru 11/27/1975	4:30 AM	Heavy Snow	8.0 in.					Havana Power Station	n/a	n/a	n/a	
1/27/1977 thru 1/30/1977	n/a	Blizzard					X		n/a	n/a	n/a	7 inches of snow on the ground from previous snow events was blown around by a strong wind and produced blizzard conditions
11/26/1977 thru 11/27/1977	n/a	Heavy Snow	5.0 in.	in.	in.	in.	mph	Havana Power Station	n/a	n/a	n/a	
2/13/1978 thru 2/14/1978	5:00 AM	Heavy Snow	10.0 in.	in.	in.	in.	mph	Havana Power Station	n/a	n/a	n/a	
3/3/1978	7:00 AM	Heavy Snow	5.0 in.	in.	in.	in.	mph	Havana Power Station	n/a	n/a	n/a	
3/24/1978 thru 3/27/1978	n/a	Ice Storm			X				n/a	n/a	n/a	Planning Committee members indicated that the ice damaged the electrical lines and that there were power disruptions for several days

[1] An "X" in the snow, freezing rain, ice, sleet and/or strong winds columns indicates the presences of that weather condition during the severe winter storm event.

[2] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Mason County
1950 - 2021

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
12/31/1978 thru 1/1/1979	n/a	Heavy Snow	6.0 in.					Havana	n/a	n/a	n/a	
1/12/1978 thru 1/14/1978	12:30 AM	Heavy Snow	14.0 in.					Havana	n/a	n/a	n/a	
2/7/1979 thru 2/9/1979	n/a	Heavy Snow	5.5 in.					Havana	n/a	n/a	n/a	
2/5/1980	1:30 AM	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
3/12/1980 thru 3/13/1980	n/a	Heavy Snow	7.5 in.					Havana	n/a	n/a	n/a	
4/14/1980 thru 4/15/1980	12:00 AM	Heavy Snow	7.5 in.					Havana	n/a	n/a	n/a	
11/27/1980 thru 11/28/1980	5:00 AM	Heavy Snow	6.0 in.					Mason City	n/a	n/a	n/a	
2/10/1981	12:00 AM	Heavy Snow	11.0 in.					Mason City	n/a	n/a	n/a	
12/17/1981	n/a	Heavy Snow	8.0 in.					Havana	n/a	n/a	n/a	

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[2] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Mason County
1950 - 2021

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
12/31/1981 thru 1/1/1982	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
1/15/1982 thru 1/16/1982	n/a	Heavy Snow	6.0 in.					Havana	n/a	n/a	n/a	
3/3/1982 thru 3/4/1982	1:00 PM	Heavy Snow	5.5 in.					Havana	n/a	n/a	n/a	
4/8/1982 thru 4/9/1982	n/a	Heavy Snow	7.5 in.					Havana	n/a	n/a	n/a	
3/19/1983 thru 3/21/1983	8:00 AM	Heavy Snow	6.0 in.					Havana	n/a	n/a	n/a	
2/28/1984	7:30 AM	Heavy Snow	6.0 in.					Havana	n/a	n/a	n/a	
2/10/1985 thru 2/11/1985	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
2/21/1986	7:00 AM	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
2/23/1986 thru 2/24/1986	n/a	Heavy Snow	8.5 in.					Havana	n/a	n/a	n/a	

[1] An "X" in the snow, freezing rain, ice, sleet and/or strong winds columns indicates the presences of that weather condition during the severe winter storm event.

[2] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Mason County
1950 - 2021

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
1/9/1987 thru 1/10/1987	n/a	Heavy Snow	8.5 in.					Havana	n/a	n/a	n/a	
1/18/1987 thru 1/19/1987	n/a	Heavy Snow	16.0 in.					Havana	n/a	n/a	n/a	
12/14/1987 thru 12/15/1987	n/a	Blizzard	8.0 in.				50 mph	Havana	n/a	n/a	n/a	
2/4/1988	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
2/10/1988 thru 2/11/1988	n/a	Heavy Snow	9.0 in.					Havana	n/a	n/a	n/a	
12/27/1988	n/a	Heavy Snow	6.4 in.					Havana	n/a	n/a	n/a	
2/4/1989 thru 2/5/1989	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
2/20/1989 thru 2/21/1989	n/a	Heavy Snow	6.0 in.					Havana	n/a	n/a	n/a	
1/25/1990 thru 1/26/1990	n/a	Heavy Snow	7.5 in.					Havana	n/a	n/a	n/a	

[1] An "X" in the snow, freezing rain, ice, sleet and/or strong winds columns indicates the presences of that weather condition during the severe winter storm event.

[2] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Table 7
Severe Winter Storm Events Reported in Mason County
1950 - 2021

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
1/5/1991	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
1/10/1993	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
2/16/1993	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
2/25/1993 thru 2/26/1993	n/a	Heavy Snow	8.5 in.					Havana	n/a	n/a	n/a	
2/22/1993 thru 2/25/1993	n/a	Heavy Snow	12.0 in.					Havana	n/a	n/a	n/a	
12/18/1995 thru 12/19/1995	7:00 PM	Winter Storm	2.0 in.	X	X		30 mph	Mason City	n/a	n/a	n/a	*Event Description Provided Below*
- numerous accidents were reported - numerous power lines were knocked down throughout central Illinois due to the freezing rain and strong winds							- strong winds also caused considerable blowing and drifting of snow closing some roads					
1/18/1996 thru 1/19/1996	10:00 AM	Winter Storm	X	X	X		35 mph		n/a	n/a	n/a	numerous power outages and minor accidents were reported
1/8/1997 thru 1/9/1997	n/a	Heavy Snow	6.3 in.					Havana	n/a	n/a	n/a	

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1950 - 2021

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
1/15/1997 thru 1/17/1997	3:00 AM	Winter Storm	6.3 in.					Havana	n/a	n/a	n/a	numerous accidents were reported
1/24/1997	7:00 AM	Winter Storm	X	X	X	X		Mason City	n/a	n/a	n/a	the storm caused numerous accidents though no injuries were reported
1/26/1997 thru 1/27/1997	5:00 AM	Heavy Snow	8.1 in.		X	X		Havana	n/a	n/a	n/a	numerous accidents were reported, especially during the morning of the 27th
4/11/1997	n/a	Heavy Snow	10.8 in.					Havana	n/a	n/a	n/a	
12/9/1997 thru 12/10/1997	3:00 PM	Heavy Snow	6.1 in.					Havana	n/a	n/a	n/a	numerous traffic accidents were reported
1/8/1998	5:00 AM	Heavy Snow	7.2 in.					Havana	n/a	n/a	n/a	numerous traffic accidents were reported
1/14/1998	6:00 AM	Winter Storm	X	X		X			n/a	n/a	n/a	several traffic accidents were reported
3/8/1998 thru 3/9/1998	10:00 PM	Winter Storm	5.2 in.				50 mph	Havana	n/a	n/a	n/a	numerous accidents were reported
12/30/1998 thru 12/31/1998	2:30 PM	Heavy Snow	6.0 in.					Havana	n/a	n/a	n/a	

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			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
1/1/1999 thru 1/3/1999	12:00 PM	Heavy Snow	15.0 in.					Havana	n/a	n/a	n/a	many locations sustained temporary or extended power outages during the storm
3/8/1999 thru 3/9/1999	12:00 PM	Heavy Snow	11.0 in.					Havana	n/a	n/a	n/a	
12/11/2000 thru 12/12/2000	n/a	Heavy Snow	7.0 in.					Havana	n/a	n/a	n/a	
12/13/2000 thru 12/14/2000	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
12/29/2000 thru 12/30/2000	n/a	Heavy Snow	7.0 in.					Mason City	n/a	n/a	n/a	
1/30/2002 thru 1/31/2002	10:00 AM	Ice Storm			0.25 in.				n/a	n/a	n/a	*Event Description Provided Below*
- approximately ¼ inch of ice accumulated across the extreme northern part of Mason County, around Manito and Sand Ridge State Forest - several trees and power lines were downed from ice accumulations across the region with power disruptions lasting several hours to a couple of days												

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			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
3/1/2002 thru 3/3/2002	5:00 PM	Heavy Snow	5.0 in.				40 mph	Havana	n/a	n/a	n/a	*Event Description Provided Below*
- strong northwest winds, with gusts approaching 40 mph produced significant blowing and drifting - most roads were snow and ice covered, with numerous traffic accidents reported												
12/24/2002 thru 12/25/2002	12:00 PM	Heavy Snow	7.6 in.					Havana	n/a	n/a	n/a	
1/2/2003	12:00 AM	Heavy Snow	6.5 in.					Havana	n/a	n/a	n/a	
1/4/2003	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
2/10/2003 thru 2/11/2003	n/a	Heavy Snow	7.0 in.					Havana	n/a	n/a	n/a	
2/14/2003 thru 2/16/2003	5:00 PM	Heavy Snow	6.0 in.				50 mph	Havana	n/a	n/a	n/a	winds caused major blowing and drifting snow across the area, with drifts as high as 3 to 5 feet
12/14/2003	9:00 AM	Heavy Snow	5.7 in.					Havana	n/a	n/a	n/a	
11/24/2004	3:00 PM	Winter Storm	8.0 in.				50 mph		n/a	n/a	n/a	*Event Description Provided Below*
- winds caused considerable blowing and drifting - high winds and the weight of the wet snow downed numerous trees and power lines												
1/5/2005 thru 1/6/2005	1:00 PM	Ice Storm			0.5 in.				n/a	n/a	n/a	- numerous reports of downed trees and power lines - numerous traffic accidents

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Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
11/30/2006 thru 12/1/2006	7:30 AM	Winter Storm	14.6 in.	X	1.5 in.	2.25 in.		Havana	n/a	n/a	n/a	*Event Description Provided Below*
- considerable tree and power line damage resulted from the storm, power was not restored across some locales for several days - snow and ice covered roads also resulted in numerous traffic accidents												
1/12/2007 thru 1/13/2007	4:00 PM	Ice Storm			0.5 in.				n/a	n/a	n/a	- ice caused modest tree limb and power line damage - numerous traffic accidents
2/12/2007 thru 2/14/2007	n/a	Blizzard	12.0 in.				45 mph	Havana	n/a	n/a	n/a	many locations reported snow drifts ranging from 3 to 6 feet, prompting the closure of many area roadways
2/24/2007	11:00 AM	Ice Storm			0.25 in.				n/a	n/a	n/a	
12/8/2007 thru 12/9/2007	1:00 PM	Ice Storm			0.25 in.			Mason City	n/a	n/a	n/a	many minor traffic accidents were reported on the ice roads
12/15/2007 thru 12/16/2007	n/a	Heavy Snow	5.0 in.					Mason City	n/a	n/a	n/a	
1/31/2008 thru 2/1/2008	2:00 PM	Heavy Snow	9.0 in.					Mason City	n/a	n/a	n/a	

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1950 - 2021

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
12/18/2008 thru 12/19/2008	7:00 PM	Ice Storm			0.75 in.				n/a	n/a	n/a	*Event Description Provided Below*
- widespread tree damage and power outages reported - increasing west to northwest winds in the wake of the departing storm system resulted in additional downed tree branches and power outages												
3/29/2009 thru 3/30/2009	n/a	Heavy Snow	5.0 in.					Havana	n/a	n/a	n/a	
1/6/2010 thru 1/7/2010	7:30 PM	Winter Storm	6.0 in.					Havana	n/a	n/a	n/a	once the snow subsided gusty northwesterly winds created considerable blowing and drifting across the area
2/8/2010 thru 2/9/2010	n/a	Heavy Snow	7.0 in.					Havana	n/a	n/a	n/a	
12/12/2010 thru 12/13/2010	n/a	Blizzard	4.0 in.				35 mph		n/a	n/a	n/a	

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			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
2/1/2011 thru 2/2/2011	11:00 AM	Blizzard	16.0 in.			2.0 in.	55 mph	Havana	n/a	n/a	$ 154,432	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #1960) - strong winds produced blizzard conditions which resulted in drifts more than 7 feet high - planning Committee members from Bath indicated that $3,000 was spent to provide emergency protective measures, including snow removal - The County Highway Engineer's records indicated that $7,000 was spent to repair damage sustained by highway department trucks, grader, etc. - most county roads were closed and well as several interstates - all schools in the county were closed for at least 3 days - power outages were widespread *FEMA Public Assistance totals by Jurisdiction* - Allen's Grove Township: $3,233 - Bath, Village of: $1,857 - Easton, Village of: $939 - Forest City Township: $3,347 - Havana Township Road District: $7,893 - Havana, City of: $7,263 - Lynchburg Township: $1,689 - Manito Township Road District: $4,109 - Manito, Village of: $2,030 - Mason City Township: $4,753 - Mason City, City of: $4,532 - Mason County Highway Department: $10,047 - Pennsylvania Township Road District: $2,767 - Quiver Township: $3,324 - Salt Creek Township: $2,844 - San Jose, Village of: $1,731 - Sherman Township Road District: $2,074											
12/20/2012	1:00 PM	Blizzard	2.0 in.				50 mph		n/a	n/a	n/a	numerous traffic accidents were reported across the County
2/22/2013	n/a	Heavy Snow	5.5 in.					Havana	n/a	n/a	n/a	*Event Description Provided Below*
- snow accumulations led to the closing of many area schools and businesses - numerous traffic accidents were reported across the area												

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			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
3/24/3013	3:00 AM	Heavy Snow	11.2 in.					Havana	n/a	n/a	n/a	numerous traffic accidents were reported
12/13/2013 thru 12/14/2013	5:00 PM	Heavy Snow	5.5 in.					Havana	n/a	n/a	n/a	
12/21/2013 thru 12/22/2013	8:00 PM	Ice Storm			0.25 in.				n/a	n/a	n/a	
1/5/2014	2:00 AM	Heavy Snow	9.5 in.					Havana	n/a	n/a	n/a	heavy snowfall along with significant blowing & drifting caused numerous road closures & traffic accidents across the County
2/1/2014	2:00 AM	Winter Storm	7.5 in.		0.2 in.			Havana	n/a	n/a	n/a	numerous traffic accidents were reported
2/4/2014 thru 2/5/2014	6:00 PM	Heavy Snow	8.0 in.					Havana	n/a	n/a	n/a	numerous traffic accidents occurred
1/19/2016	6:00 PM	Heavy Snow	4.3 in.					Havana	n/a	n/a	n/a	numerous traffic accidents occurred
4/1/2018	12:30 PM	Heavy Snow	7.0 in.					Havana	n/a	n/a	n/a	

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			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
1/11/2019 thru 1/13/2019	11:00 PM	Heavy Snow	12.9 in.					Havana	n/a	n/a	n/a	numerous traffic accidents occurred
1/19/2019	12:00 AM	Winter Storm	3.0 in.				35 mph		n/a	n/a	n/a	*Event Description Provided Below*
- northerly winds created snow drifts 1 to 3 feet deep							-numerous traffic accidents occurred and vehicles became stuck in drifts, especially on rural roads					
12/16/2019	n/a	Heavy Snow	4.0 in.					Havana	n/a	n/a	n/a	
1/1/2021	6:00 AM	Ice Storm			0.3 in.				n/a	n/a	n/a	heavy ice accumulations snapped many tree branches, caused scattered power outages and created slick and hazardous travel conditions
GRAND TOTAL:									**0**	**0**	**$ 154,432**	

Sources: Mason County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee Member responses to Natural Hazard Events Questionnaire.
Midwestern Regional Climate Center, cli-MATE.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

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Table 8
Excessive Heat Events Reported in McDonough County
1997 - 2020

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
6/13/1994 thru 6/20/1994	n/a	99 °F	68 °F	n/a	Havana	n/a	n/a	n/a	n/a	
7/11/1995 thru 7/15/1995	n/a	104 °F	71 °F	n/a	Havana Mason City	n/a	n/a	n/a	n/a	
8/11/1995 thru 8/18/1995	n/a	96 °F	72 °F	n/a	Havana Mason City	n/a	n/a	n/a	n/a	
7/25/1997 thru 7/27/1997	n/a	100 °F	70 °F	15 °F	Havana Mason City	n/a	n/a	n/a	n/a	
6/24/1998 thru 6/28/1998	n/a	95 °F	71 °F	110 °F	Havana Mason City	n/a	n/a	n/a	n/a	
7/18/1999 thru 7/22/1999	n/a	95 °F	70 °F	110 °F	Mason City	n/a	n/a	n/a	n/a	
7/29/1999 thru 7/30/1999	n/a	98 °F	71 °F	110 °F	Havana Mason City	n/a	n/a	n/a	n/a	
7/7/2002 thru 7/9/2002	n/a	98 °F	67 °F	n/a	Havana Mason City	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
7/20/2002 thru 7/21/2002	n/a	99 °F	71 °F	n/a	Havana Mason City	n/a	n/a	n/a	n/a	
7/20/2005 thru 7/25/2005	n/a	105 °F	69 °F	115 °F	Havana Mason City	n/a	n/a	n/a	n/a	
7/28/2006 thru 8/2/2006	n/a	100 °F	71 °F	110 °F	Havana Mason City	n/a	n/a	n/a	n/a	
8/7/2007 thru 8/8/2007	n/a	n/a	n/a	109 °F		n/a	n/a	n/a	n/a	
6/23/2009 thru 6/26/2009	n/a	96 °F	70 °F	105 °F	Mason City	n/a	n/a	n/a	n/a	
8/8/2009	n/a	90 °F	95 °F	105 °F	Mason City	n/a	n/a	n/a	n/a	
7/15/2010	n/a	94 °F	76 °F	105 °F	Mason City	n/a	n/a	n/a	n/a	
7/18/2010	n/a	93 °F	73 °F	105 °F	Mason City	n/a	n/a	n/a	n/a	
7/23/2010 thru 7/25/2010	n/a	92 °F	71 °F	105 °F	Mason City	n/a	n/a	n/a	n/a	
8/2/2010 thru 8/3/2010	n/a	95 °F	72 °F	105 °F	Mason City	n/a	n/a	n/a	n/a	

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		Day (Max)	Night (Min)	Heat Index (Max)						
8/9/2010 thru 8/10/2010	n/a	95 °F	72 °F	105 °F	Mason City	n/a	n/a	n/a	n/a	
8/11/2010 thru 8/14/2010	2:00 PM	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
6/8/2011 thru 6/9/2011	n/a	94 °F	72 °F	n/a	Mason City	n/a	n/a	n/a	n/a	
6/30/2011 thru 7/1/2011	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
7/10/2011 thru 7/11/2011	n/a	n/a	n/a	110 °F		n/a	n/a	n/a	n/a	
7/17/2011 thru 7/24/2011	n/a	n/a	n/a	115 °F		n/a	n/a	n/a	n/a	
7/24/2011 thru 7/28/2011	n/a	n/a	n/a	110 °F		n/a	n/a	n/a	n/a	
8/1/2011 thru 8/2/2011	n/a	100 °F	n/a	110 °F		n/a	n/a	n/a	n/a	

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		Day (Max)	Night (Min)	Heat Index (Max)						
8/24/2011	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
9/2/2011	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
6/29/2012 thru 7/7/2012	n/a	100 °F	n/a	110 °F		n/a	n/a	n/a	n/a	
7/16/2012 thru 7/18/2012	n/a	100 °F	n/a	105 °F		n/a	n/a	n/a	n/a	
7/23/2012 thru 7/25/2012	n/a	100 °F	n/a	105 °F		n/a	n/a	n/a	n/a	
8/3/2012 thru 8/4/2012	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
8/24/2014 thru 8/25/2014	n/a	n/a	n/a	110 °F		n/a	n/a	n/a	n/a	
7/12/2015 thru 7/13/2015	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
7/17/2015 thru 7/18/2015	n/a	n/a	n/a	110 °F		n/a	n/a	n/a	n/a	

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1997 - 2020

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
7/27/2015 thru 7/28/2015	n/a	90 °F	n/a	110 °F		n/a	n/a	n/a	n/a	
7/21/2016 thru 7/24/2016	n/a	n/a	n/a	110 °F		n/a	n/a	n/a	n/a	
8/11/2016	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
7/12/2017	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
7/19/2017 thru 7/22/2017	n/a	n/a	n/a	110 °F		n/a	n/a	n/a	n/a	
6/15/2018 thru 6/18/2018	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
6/29/2018 thru 7/1/2018	n/a	n/a	n/a	115 °F		n/a	n/a	n/a	n/a	
7/4/2018 thru 7/5/2018	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
7/14/2018	n/a	n/a	n/a	108 °F		n/a	n/a	n/a	n/a	
8/26/2018 thru 8/28/2018	n/a	n/a	n/a	110 °F		n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
7/10/2019	n/a	n/a	n/a	108 °F		n/a	n/a	n/a	n/a	
7/17/2019 thru 7/20/2019	n/a	n/a	n/a	115 °F		n/a	n/a	n/a	n/a	
7/17/2020 thru 7/18/2020	n/a	n/a	n/a	110 °F		n/a	n/a	n/a	n/a	
7/26/2020	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
7/28/2021 thru 7/29/2021	n/a	n/a	n/a	110 °F		n/a	n/a	n/a	n/a	
8/9/2021 thru 8/11/2021	n/a	n/a	n/a	110 °F		n/a	n/a	n/a	n/a	
8/24/2021 thru 8/28/2021	n/a	n/a	n/a	105 °F		n/a	n/a	n/a	n/a	
GRAND TOTAL:						**0**	**0**	**$ -**	**$ -**	

Sources: Iowa State University, Iowa Environmental Mesonet, National Weather Service Data, Search for Warnings.
Midwestern Regional Climate Center, cli-MATE.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

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Table 9
Extreme Cold/Wind Chill Events Reported in Mason County
1996 - 2021

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
		Low (Min)	High (Max)	Wind Chill (Max)					
1/30/1996 thru 2/4/1996	n/a	-18 °F	18 °F	n/a	Havana Mason City	n/a	n/a	n/a	
1/11/1997 thru 1/14/1997	n/a	-11 °F	17 °F	n/a	Havana Mason City	n/a	n/a	n/a	
1/17/1997 thru 1/18/1997	n/a	-14 °F	10 °F	n/a	Havana Mason City	n/a	n/a	n/a	
12/31/1998 thru 1/1/1999	n/a	-11 °F	16 °F	n/a	Havana Mason City	n/a	n/a	n/a	
1/4/1999 thru 1/5/1999	n/a	-30 °F	17 °F	n/a	Havana Mason City	n/a	n/a	n/a	
1/8/1999 thru 1/10/1999	n/a	-13 °F	17 °F	n/a	Havana Mason City	n/a	n/a	n/a	
12/12/2000 thru 12/13/2000	n/a	-9 °F	18 °F	n/a	Havana Mason City	n/a	n/a	n/a	

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Extreme Cold/Wind Chill Events Reported in Mason County
1996 - 2021

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
		Low (Min)	High (Max)	Wind Chill (Max)					
12/22/2000	n/a	-8 °F	10 °F	n/a	Havana Mason City	n/a	n/a	n/a	
12/25/2000	n/a	-12 °F	13 °F	n/a	Havana Mason City	n/a	n/a	n/a	
1/23/2003 thru 1/24/2003	n/a	-6 °F	15 °F	n/a	Havana Mason City	n/a	n/a	n/a	
1/30/2004 thru 2/1/2004	n/a	-13 °F	13 °F	n/a	Havana	n/a	n/a	n/a	
2/18/2006	n/a	-1 °F	14 °F	n/a	Havana Mason City	n/a	n/a	n/a	
2/3/2007 thru 2/4/2007	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
2/16/2007	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
1/1/2008 thru 1/2/2008	n/a	0 °F	16 °F	n/a	Mason City	n/a	n/a	n/a	
1/19/2008 thru 1/20/2008	n/a	17 °F	-3 °F	n/a	Mason City	n/a	n/a	n/a	
2/10/2008	n/a	4 °F	10 °F	n/a	Mason City	n/a	n/a	n/a	

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Extreme Cold/Wind Chill Events Reported in Mason County
1996 - 2021

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
		Low (Min)	High (Max)	Wind Chill (Max)					
12/20/2008 thru 12/21/2008	n/a	-3 °F	4 °F	n/a	Mason City	n/a	n/a	n/a	
1/14/2009 thru 1/16/2009	n/a	-16 °F	17 °F	-40 °F	Mason City	n/a	n/a	n/a	
12/31/2010 thru 1/9/2010	n/a	-10 °F	17 °F	n/a	Mason City	n/a	n/a	n/a	
12/13/2010 thur 12/14/2010	n/a	-1 °F	14 °F	n/a	Mason City	n/a	n/a	n/a	
1/21/2011	n/a	-7 °F	14 °F	n/a	Mason City	n/a	n/a	n/a	
2/8/2011 thru 2/9/2011	n/a	-5 °F	13 °F	n/a		n/a	n/a	n/a	
1/6/2014 thru 1/7/2014	n/a	n/a	n/a	-45 °F		n/a	n/a	n/a	

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Table 9
Extreme Cold/Wind Chill Events Reported in Mason County
1996 - 2021

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
		Low (Min)	High (Max)	Wind Chill (Max)					
1/23/2014	n/a	n/a	n/a	-30 °F		n/a	n/a	n/a	
1/27/2014 thru 1/28/2014	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
2/6/2014 thru 2/7/2014	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
2/10/2014 thru 2/11/2014	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
3/2/2014 thru 3/3/2014	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
1/7/2015	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
2/18/2015 thru 2/19/2015	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
2/23/2015	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
2/27/2015	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
1/10/2016	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
1/17/2016 thru 1/18/2016	n/a	n/a	n/a	n/a		n/a	n/a	n/a	

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Table 9
Extreme Cold/Wind Chill Events Reported in Mason County
1996 - 2021

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
		Low (Min)	High (Max)	Wind Chill (Max)					
12/18/2016 thru 12/19/2016	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
12/26/2017 thru 12/28/2017	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
12/31/2017 thru 1/2/2018	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
1/4/2018 thru 1/6/2018	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
1/15/2018 thru 1/16/2018	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
1/29/2019 thru 1/31/2019	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
3/4/2019	n/a	n/a	n/a	n/a		n/a	n/a	n/a	

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1996 - 2021

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
		Low (Min)	High (Max)	Wind Chill (Max)					
1/18/2020 thru 1/19/2020	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
2/13/2020 thru 2/14/2020	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
2/7/2021 thru 2/8/2021	n/a	n/a	n/a	n/a		n/a	n/a	n/a	
2/13/2021 thru 2/17/2021	n/a	n/a	n/a	-30 °F		n/a	n/a	n/a	
GRAND TOTAL:						**0**	**0**	**$ -**	

Sources: Iowa State University, Iowa Environmental Mesonet, National Weather Service Data, Search for Warnings.
Midwestern Regional Climate Center, cli-MATE.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
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Table 10
Tornadoes Reported in Mason County
1950 - 2021

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
1	11/13/1951	1:15 PM	Mason City	F 2	7.65 mi.	50 yd.	n/a	n/a	$25,000 †	n/a	*Touchdown/Liftoff –Multiple Counties* touched down in Mason City and traveled northeast crossing southern Tazewell County before lifting off at Hudson in McLean County – total length: 47.4 miles
2	3/14/1957	2:55 PM	Mason City	F 2	0.10 mi.	100 yd.	n/a	n/a	$25,000	n/a	a dozen homes were damaged when a tornado traveled northeast across the eastern portion of the City
3	12/18/1957	3:35 PM	Mason City	F 1	0.10 mi.	10 yd.	1	n/a	$25,000	n/a	a few buildings on the southeast side of the City were damaged
4	8/19/1961	5:00 PM	Mantanzas Beach	F 0	0.10 mi.	10 yd.	n/a	n/a	$2,500	n/a	a boat dock was destroyed
5	1/24/1967	5:30 PM	Snicarte^ Kilbourne^	F 1	4.50 mi.	30 yd.	n/a	n/a	n/a *	n/a	this tornado touched down 3 ¾ mile southeast of Snicarte and moved parallel to the next tornado which touched down at the same time approx. 3 miles away

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† Property damages sustained represent losses sustained in more than one county. A detailed breakdown by county was not available.
~ Property damages sustained represent losses from both January 24, 1967 tornadoes. A detailed breakdown by tornado was not available.
* Property damage total includes crop damages. A detailed breakdown by damage type was not available.

Table 10
Tornadoes Reported in Mason County
1950 - 2021

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
6	1/24/1967	5:30 PM	Snicarte^ Bath^	F 3	5.10 mi.	80 yd.	3	1	$25,000 *	n/a	this tornado touched down ¾ mile southeast of Snicarte and moved parallel to the previous tornado which touched down at the same time approx. 3 miles away
7	5/15/1968	2:30 PM	Easton Natrona	F 3	12.37 mi.	600 yd.	25	n/a	$2,500,000 ~	n/a	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #242) *Touchdown/Liftoff – Two Counties* touched down just east of Easton and traveled northeast before lifting off southwest of Emden in Logan County – total length: 15.2 miles									Planning Committee member records indicate that the tornado destroyed farmsteads, downed power lines and littered fields with debris *Natrona* - destroyed 15 homes - injured 25 individuals - other buildings were damaged & several railroad box cars were overturned		
8	12/4/1973	9:50 AM	Forest City	F 0	0.10 mi.	10 yd.	2	n/a	n/a	n/a	2 children were injured by flying glass
9	6/14/1974	8:40 PM	Mason City^	F 0	0.10 mi.	10 yd.	n/a	n/a	n/a	n/a	
10	6/19/1974	6:30 PM	San Jose^	F 0	0.10 mi.	10 yd.	n/a	n/a	n/a	n/a	
11	6/19/1974	6:30 PM	Mason City	F 0	0.10 mi.	10 yd.	n/a	n/a	n/a	n/a	

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Table 10
Tornadoes Reported in Mason County
1950 - 2021

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
12	11/29/1975	10:20 PM	Havana^ Bishop^ Forest City^ Manito^	F 2	18.60 mi.	10 yd.	n/a	n/a	$250,000	$2,500	*Event Description Provided Below*
Havana area (5 miles southeast) - several outbuildings were destroyed or extensively damaged at a farm on IL Rte. 97 - two hogs were killed - as the tornado moved northeast it snapped tree limbs and destroyed outbuildings on at least four more farms *Evening Star Campground* - a pump house was blown into a swimming pool							*Forest City area* - only minor damage awas noted in the area *Manito area (1.5 miles east)* - at least two additional farms sustained damage before the tornado lifted off				
13	4/13/1981	4:50 PM	Havana^ Topeka^ Mason City^	F 1	25.60 mi.	100 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff –Multiple Counties* this tornado took an intermittent path touching down in Lewistown (Fulton County) and traveling southeast to near Havana before tracking eastward across Mason County and into Logan County where it changed courses again, heading southeast before lifting off at Lincoln – total length: 46.1 miles

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Table 10
Tornadoes Reported in Mason County
1950 - 2021

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14	11/18/1985	3:58 PM	Snicarte^ Bath^	F 0	0.10 mi.	10 yd.	n/a	n/a	n/a	n/a	
15	6/2/1987	1:00 PM	Mason City	F 0	0.10 mi.	10 yd.	n/a	n/a	n/a	n/a	
16	11/27/1990	2:00 PM	Sand Ridge State Forest^	F 1	0.50 mi.	50 yd.	n/a	n/a	$25,000	n/a	destroyed a mobile home near Sand Ridge State Forest
17	5/13/1995	5:15 PM	Goofy Ridge^ Sand Ridge State Forest	F 3	3.56 mi.	880 yd.	23	n/a	$2,000,000	n/a	*Event Description Provided Below*
Touchdown/Liftoff –Two Counties touched down northeast of Goofy Ridge and traveled northeast through Sand Ridge State Forest and into Tazewell County before lifting off in Tremont – total length: 25.0 miles							- damaged or destroyed over 36 homes and mobile homes - injured 23 individuals - blew down numerous trees, especially in Sand Ridge State Forest, as well as numerous power poles				
18	4/19/1996	5:07 PM	Bath Havana^	F 2	9.00 mi.	250 yd.	1	n/a	n/a	n/a	*Event Description Provided Below*
blew down numerous power lines *Unincorporated Areas* - destroyed numerous farm buildings - picked up a semi-truck and blew it into a nearby field							*Bath* - destroyed and uprooted numerous trees in the Bath Cemetery - destroyed 2 mobile homes - major damage to 1 home and minor damage to 11 homes - a woman sustained minor injuries when the tornado hit one of the mobile homes				

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Tornadoes Reported in Mason County
1950 - 2021

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19	4/19/1996	5:17 PM	Easton	F 1	9.00 mi.	250 yd.	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- numerous power lines and trees were blown down *Easton* - destroyed 1 home as it moved along the northwest side of the Village							*Unincorporated Areas* - destroyed 1 home - caused major damage to 5 homes - lifted a barn and a home off their foundations				
20	4/7/1998	3:20 PM	Snicarte^	F 2	3.00 mi.	70 yd.	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- at a farmstead the tornado moved a two-story farm house 3 feet off its foundation, blew out an exterior wall of the house and caused some roof and siding damage; uprooted two 3 foot diameter trees next to the house and destroyed 3 outbuildings and 2 grain bins just north of the house							- tipped over some irrigation equipment - destroyed another barn - blew over numerous large pine trees				
21	4/7/1998	3:35 PM	Bath	F 1	0.30 mi.	180 yd.	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- severely damaged 9 homes and caused minor damage to 34 other homes - destroyed several garages							- tore off part of the roof of the fire station - uprooted numerous 3 to 4 foot diameter trees and snapped power poles				
22	4/7/1998	4:55 PM	Havana^	F 0	0.10 mi.	30 yd.	n/a	n/a	n/a	n/a	

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1950 - 2021

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
23	4/7/1998	5:06 PM	Havana^ Baldwin Beach Buzzville^ Goofy Ridge^ Sand Ridge State Forest^	F 1	10.00 mi.	20 yd.	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Touchdown/Liftoff –Two Counties touched down in Fulton County east-southeast of Sepo and crossed the Illinois River into Mason County 2 miles north of Havana where it hopped and skipped along a northeasterly track before lifting off in the Jake Wolf Memorial Fish Hatchery adjacent to Sand Ridge State Forest – total length: 11.0 miles							- damaged 3 homes at Baldwin Beach - caused "spotty" tree damage				
24	6/1/1999	5:17 PM	Mantanzas Beach^ Havana^	F 1	3.50 mi.	200 yd.	n/a	n/a	$500,000	n/a	*Event Description Provided Below*
Touchdown/Liftoff –Two Counties touched down northeast of Marbletown (Fulton County) and crossed the Illinois River into Mason County 1 mile south of Matanzas Beach where it traveled northeast before lifting off 3 miles south of Havana – total length: 3.8 miles							- severely damaged 2 homes and a garage and caused minor damage to several other homes - blew down numerous trees				

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1950 - 2021

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25	8/18/2001	11:36 AM	Mason City^	F 0	0.10 mi.	25 yd.	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- tore the gutters off of a house and blew out some windows - blew an outdoor table into an open garage door - ripped the top off a large tree and carried it 100 feet; snapped a smaller tree											
26	5/10/2003	8:12 PM	Quiver Beach Topeka^ Forest City^	F 1	8.00 mi.	150 yd.	n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #1469)*** - destroyed a travel trailer and garage - blew down numerous trees and power lines
27	5/10/2003	8:33 PM	Manito Manito^	F 2	2.50 mi.	100 yd.	1	n/a	n/a	n/a	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #1469) - destroyed 4 homes - 24 homes sustained minor to major damage - an elderly woman sustained minor injuries, a cut on her arm and bruises, while taking shelter in her walk-in pantry - blew down power lines and trees											
28	5/10/2003	8:38 PM	Manito^	F 1	2.00 mi.	100 yd.	n/a	n/a	n/a	n/a	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #1469) - destroyed several barns, sheds and a garage caused minor damage to a couple homes - numerous trees, power lines and power poles were blown down											

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Tornadoes Reported in Mason County
1950 - 2021

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
29	5/30/2003	6:56 PM	Sand Ridge State Forest Forest City San Jose^	F 1	8.00 mi.	100 yd.	2	n/a	$100,000	n/a	*Event Description Provided Below*
Touchdown/Liftoff –Two Counties touched down in Sand Ridge State Forest and traveled southeast, impacting the southern part of Forest City, before continuing into Tazewell County and lifting off in approx. 2 miles north of San Jose – total length: 14.0 miles *Unincorporated Areas* - destroyed a mobile home as well as several outbuildings on a farm - damaged power lines, trees and irrigation systems							*Forest City* - several homes sustained minor damage - Planning Committee member records indicate that approximately $100,000 in structural damage was sustained and 2 individuals sustained minor injuries				
30	7/8/2009	4:03 PM	Tehran^	EF 0	0.10 mi.	10 yd.	n/a	n/a	n/a	n/a	
31	4/15/2011	4:30 PM	Poplar City^	EF 1	3.00 mi.	100 yd.	1	n/a	$300,000	n/a	- damaged 2 homes, 2 outbuildings and several sheds - knocked over an irrigation unit - damaged several trees - an individual sustained minor injuries from flying glass

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1950 - 2021

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
32	9/10/2015	5:45 PM	Kilbourne^	EF 0	0.21 mi.	75 yd.	n/a	n/a	$20,000	n/a	- one home sustained shingle and siding damage and had tree branches blown through a few windows - numerous power lines were knocked down in the area
33	3/6/2017	11:52 PM	Easton^ Forest City^	EF 1	6.76 mi.	150 yd.	n/a	n/a	$150,000	n/a	
- most of the damage was to power poles or overturned irrigation rigs - a machine shed was severely damaged, with most of its room rmoved and part of the north wall bowed out - a farm along County Road 2930E received damage as well - a grain silo had half its peaked roof cave in, and part of a machine shed had a couple smaller wall pieces blown out.											
34	12/1/2018	3:44 PM	Snicarte^	EF 0	1.67 mi.	25 yd.	n/a	n/a	n/a	n/a	
35	12/1/2018	4:53 PM	Poplar City^ Forest City^	EF 1	11.68 mi.	250 yd.	n/a	n/a	$65,000	n/a	uprooted some large trees, damaged power poles and tipped over many irrigation systems

[1] The length provided is only for the portion(s) of the tornado that occurred in the County.
^ Tornado touchdown verified in the vicinity of this location(s).
† Property damages sustained represent losses sustained in more than one county. A detailed breakdown by county was not available.
~ Property damages sustained represent losses from both January 24, 1967 tornadoes. A detailed breakdown by tornado was not available.
* Property damage total includes crop damages. A detailed breakdown by damage type was not available.

Table 10
Tornadoes Reported in Mason County
1950 - 2021

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
36	3/23/2021	9:28 PM	Mason City^	EF 0	2.10 mi.	30 yd.	n/a	n/a	$25,000	n/a	snapped 3 power poles along CR 1250N near the intersection with CR 3300E
GRAND TOTAL:							**59**	**1**	**$ 6,037,500**	**$ 2,500**	

Sources: Mason County Multi-Jurisdictional Natural Hazard Mitigation Planning Committee Member responses to the Natural Hazard Events Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Data.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.
NOAA, National Weather Service, Weather Forecast Office Lincoln, Illinois, Tornado Climatology for Central and Southeast Illinois, Mason County.
NOAA, National Weather Service, Storm Prediction Center, SVRGIS, Tornadoes (1950-2020) Database.

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^ Tornado touchdown verified in the vicinity of this location(s).
† Property damages sustained represent losses sustained in more than one county. A detailed breakdown by county was not available.
~ Property damages sustained represent losses from both January 24, 1967 tornadoes. A detailed breakdown by tornado was not available.
* Property damage total includes crop damages. A detailed breakdown by damage type was not available.

Table 11
Drought Events Reported in Mason County
1980 - 2021

Year(s)	Start Month	Duration (Months)	Magnitude Drought Intensity Category[1]					Percent Crop Yield Reduction from Previous Year		Designated USDA Primary Natural Disaster Area	Crop Damages	Impacts/Event Description
			D0	D1	D2	D3	D4	Corn	Soybeans			
1983	June	n/a						41.3 %	35.4 %	n/a	n/a	All 102 counties in Illinois were proclaimed state disaster areas because of high temperatures and insufficient precipitation beginning in mid-June
1988	June	16						42.1 %	24.6 %	n/a	n/a	Approximately half of all Illinois counties were impacted by drought conditions
2005	May	20	X	X	X	X		31.3 %	20.4 %	Yes	n/a	
2011	August	3.5	X	X	X			---	9.0 %	No	n/a	
2012	April	10	X	X	X	X		22.8 %	16.9 %	Yes	$ 69,400,000	Damage figures provided by Mason County Farm Bureau
2013	August	8	X	X	X			---	---	No	n/a	
GRAND TOTAL:											**$ 69,400,000**	

Sources: Illinois State Water Survey, Illinois State Climatologist.
National Drought Mitigation Center, United States Drought Monitor.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.
United States Department of Agriculture, National Agricultural Statistics Service, Quik Stats Lite.

[1] An "X" identifies the level of drought intensity reached by at least a portion of the County during the event, if available.

US Drought Monitor – Drought Intensity Category Descriptions

D0	abnormally dry	D3	extreme drought
D1	moderate drought	D4	exceptional drought
D2	severe drought		

APPENDIX K

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or flood plain management.

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

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Floodways restricted by anthropogenic features such as bridges and culverts are drawn to reflect natural conditions and may not agree with the model computed widths listed in the Floodway Data table in the Flood Insurance Study report.

Multiple **topographic sources** may have been used in the delineation of Special Flood Hazard Areas. See Flood Insurance Study report for details on source resolution and geographic extent.

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Silver Spring, Maryland 20910-3282
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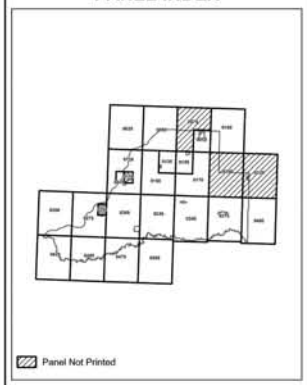
PANEL INDEX



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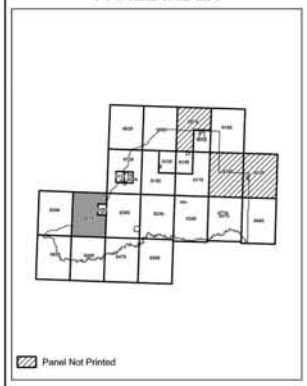
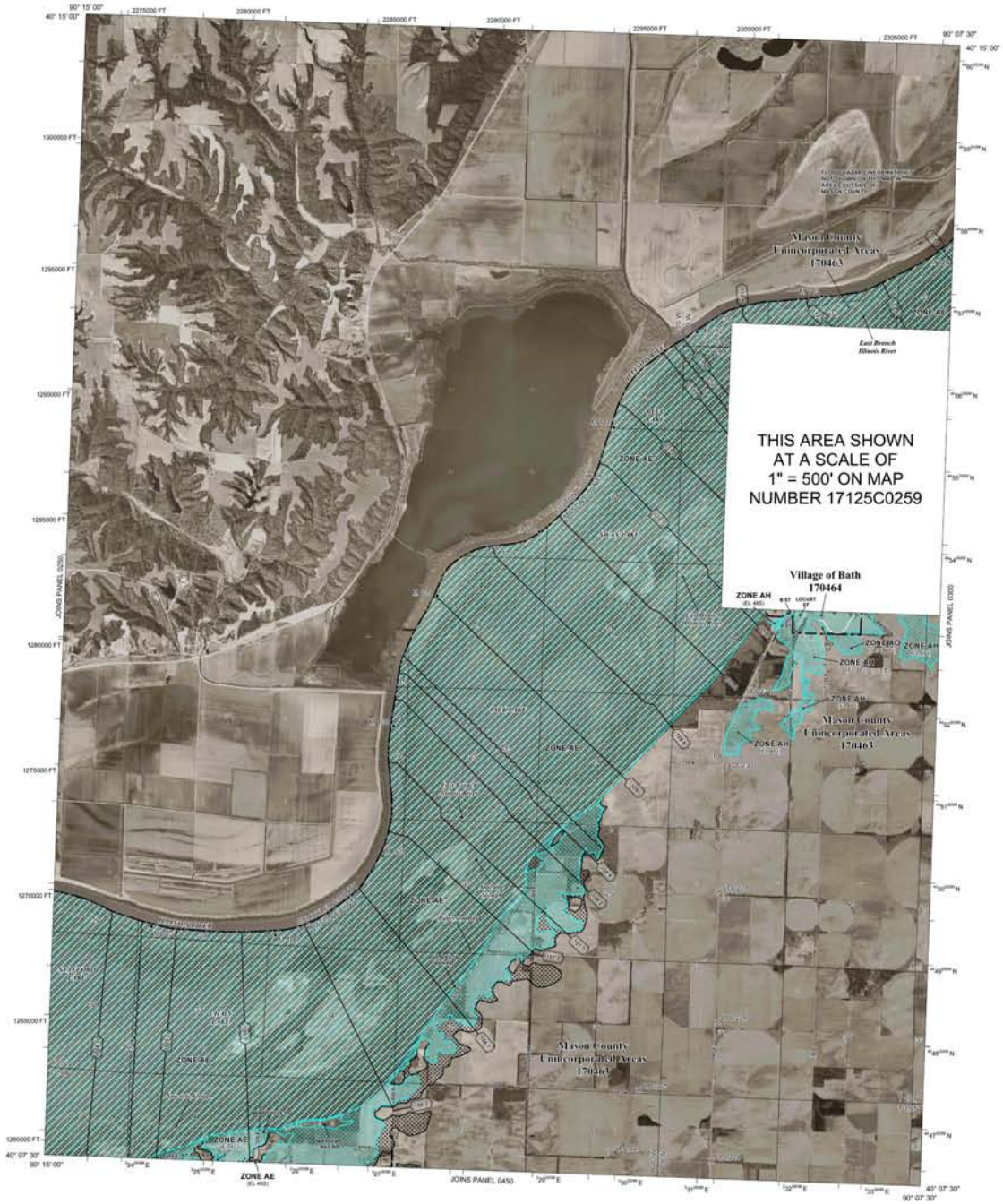
PANEL INDEX





LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
(EL 987) — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)——(A) Cross section line
(23)- - - -(23) Transect line
45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
97000m N — 1000-meter Universal Transverse Mercator grid values, zone 16
1000000 FT — 5000-foot grid ticks: Illinois State Plane West Coordinate System, 3601 zone (FIPSZONE 1202) Transverse Mercator
CM5510 $_{BM}$ — Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
JANUARY 6, 2012

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

600 0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0275D

FIRM
FLOOD INSURANCE RATE MAP
MASON COUNTY, ILLINOIS
AND INCORPORATED AREAS

PANEL 275 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BATH, VILLAGE OF	170464	0275	D
MASON COUNTY	170463	0275	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
17125C0275D

EFFECTIVE DATE
JANUARY 6, 2012

Federal Emergency Management Agency

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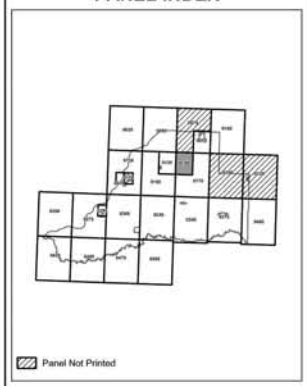

LEGEND

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DX5510 X	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

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JANUARY 6, 2012

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

NORTH

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

150 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0155D

FIRM
FLOOD INSURANCE RATE MAP
MASON COUNTY, ILLINOIS
AND INCORPORATED AREAS

PANEL 155 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FOREST CITY, VILLAGE OF	170827	0155	D
MASON COUNTY	170463	0155	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
17125C0155D

EFFECTIVE DATE
JANUARY 6, 2012

Federal Emergency Management Agency

Appendix K

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or flood plain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or flood plain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

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The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services, NOAA, N/NGS12
National Geodetic Survey SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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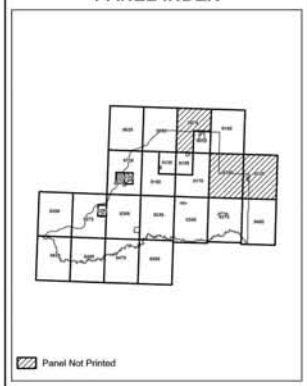
PANEL INDEX



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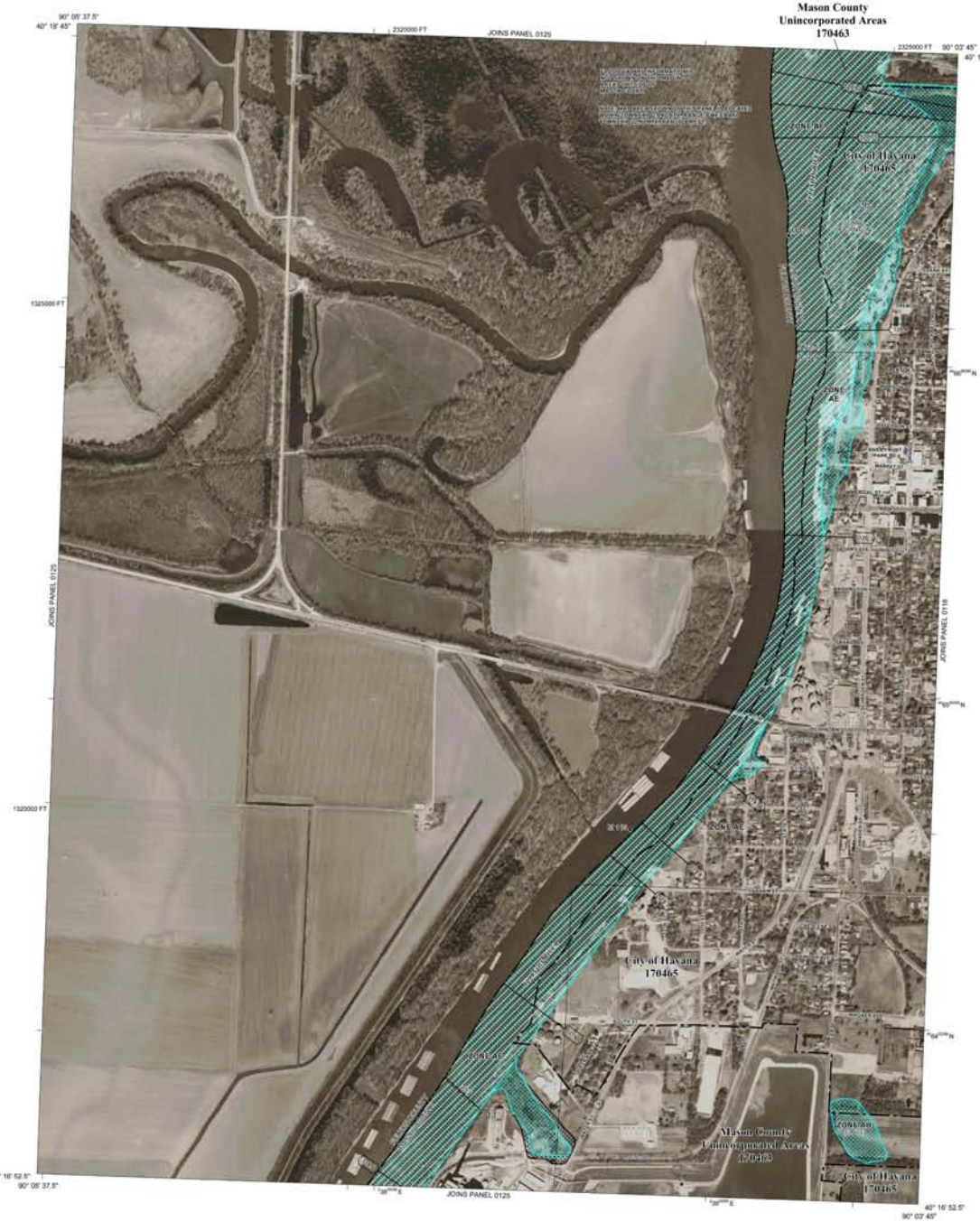

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)———(A) Cross section line

(23)- - - - -(23) Transect line

45° 02' 08", 93° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

^{4000000} N 1000-meter Universal Transverse Mercator grid values, zone 16

^{1000000} FT 5000-foot grid ticks: Illinois State Plane West Coordinate System, 3601 zone (FIPSZONE 1202) Transverse Mercator

CK5510$_{RV}$ Bench mark (see explanation in Notes to Users section of this FIRM panel)

• M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
JANUARY 6, 2012

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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NORTH

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0112D

FIRM
FLOOD INSURANCE RATE MAP
MASON COUNTY, ILLINOIS
AND INCORPORATED AREAS

PANEL 112 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HAVANA, CITY OF	170465	0112	D
MASON COUNTY	170463	0112	D

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MAP NUMBER
17125C0112D

EFFECTIVE DATE
JANUARY 6, 2012

Federal Emergency Management Agency

Appendix K

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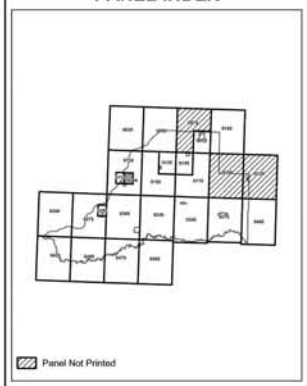
PANEL INDEX



Panel Not Printed

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
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FLOODWAY AREAS IN ZONE AE

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OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
13 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A Cross section line
23 - - - - 23 Transect line
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CK5510 X — Bench mark (see explanation in Notes to Users section of this FIRM panel)
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MAP REPOSITORIES
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EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
JANUARY 6, 2012

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0116D

FIRM
FLOOD INSURANCE RATE MAP
MASON COUNTY, ILLINOIS
AND INCORPORATED AREAS

PANEL 116 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HAVANA, CITY OF	170465	0116	D
MASON COUNTY	170463	0116	D

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MAP NUMBER
17125C0116D

EFFECTIVE DATE
JANUARY 6, 2012

Federal Emergency Management Agency

Appendix K

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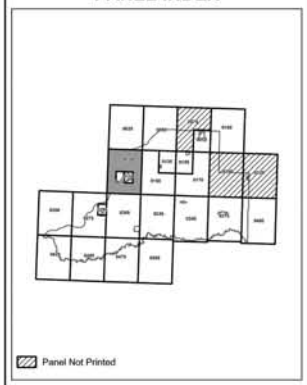
PANEL INDEX



LEGEND

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FLOODWAY AREAS IN ZONE AE

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OTHER FLOOD AREAS

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45° 02' 08", 93° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4988000 m N 1000-meter Universal Transverse Mercator grid values, zone 16
1560000 FT 5000-foot grid ticks: Illinois State Plane West Coordinate System, 3601 zone (FIPSZONE 1202) Transverse Mercator
CK5510 BM Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
JANUARY 6, 2012

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

NO

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

600 0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0125D

FIRM
FLOOD INSURANCE RATE MAP
MASON COUNTY, ILLINOIS
AND INCORPORATED AREAS

PANEL 125 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HAVANA, CITY OF	170465	0125	D
MASON COUNTY	170463	0125	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
17125C0125D

EFFECTIVE DATE
JANUARY 6, 2012

Federal Emergency Management Agency

NOTES TO USERS

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or flood plain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

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Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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NGS Information Services, NOAA, N/NGS12
National Geodetic Survey SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at www.ngs.noaa.gov.

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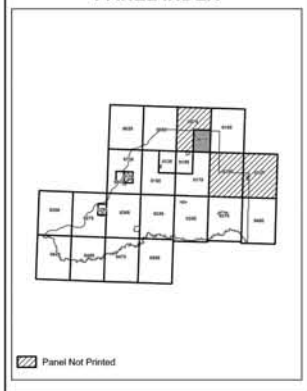
PANEL INDEX



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - - 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
7000000 FT	1000-meter Universal Transverse Mercator grid values, zone 16
1565000 FT	5000-foot grid ticks: Illinois State Plane West Coordinate System, 3601 zone (FIPSZONE 1202) Transverse Mercator
CK5510	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.6	River Mile

MAP REPOSITORIES
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EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
JANUARY 6, 2012

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0070D

FIRM
FLOOD INSURANCE RATE MAP
MASON COUNTY, ILLINOIS
AND INCORPORATED AREAS

PANEL 70 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MANITO, VILLAGE OF	171250	0070	D
MASON COUNTY	170463	0070	D

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MAP NUMBER
17125C0070D

EFFECTIVE DATE
JANUARY 6, 2012

Federal Emergency Management Agency

Appendix K

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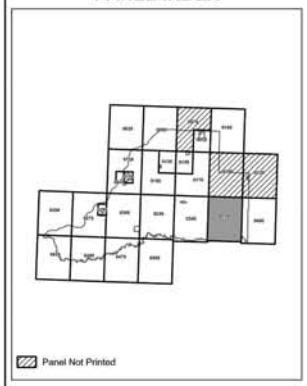
PANEL INDEX


0125
0150
0175
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0250
0275
0300
0325
0350
0375
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0425
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0475
0500

APPENDIX L

1993 Illinois River and Aquifer Flooding
Bath, Illinois

12 inch cristafoil pump in operation

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Bath, Illinois

Aftermath of flooding along Locust Street

Aftermath of flooding along Locust Street

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Bath, Illinois

Looking east on First Street at Sycamore Street

Looking west on First Street at Sycamore Street

Southeast edge of the Village

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Bath, Illinois

Looking south along IL Route 78 at Bath

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Bath, Illinois

Looking north along IL Route 78 south of Bath

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Havana, Illinois

Havana Metal Culverts along
IL Rte. 97 south of the railroad tracks
(southeast of Havana)

Looking south along IL Rte. 97 at the
railroad tracks(southeast of Havana)

Looking south along IL Rte. 97 at the
railroad tracks (southeast of Havana)

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Havana, Illinois

Dean Foods and the Paddlewheel
along IL Rte. 97
(southeast of Havana)

South of Dean Foods - driveway to
the Paddlewheel
(southeast of Havana)

Looking north along IL Rte. 97 south
of Havana

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Havana, Illinois

IL Rte. 79 south of Havana

IL Rte. 97 at the railroad tracks (southeast of Havana)

Looking north along IL Rte. 97 south of Havana

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Havana, Illinois

Looking west as IL Rte. 97 curves into Havana on the eastern edge of the City

Flood waters impacted Havana High School's football statidum

Looking south at Havana High School and IL Rte. 97 as it enters Havana on the eastern edge of the City

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Havana, Illinois

Jefferson St. at Schrader St. where high school pump is draining into sewer drain

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Havana, Illinois

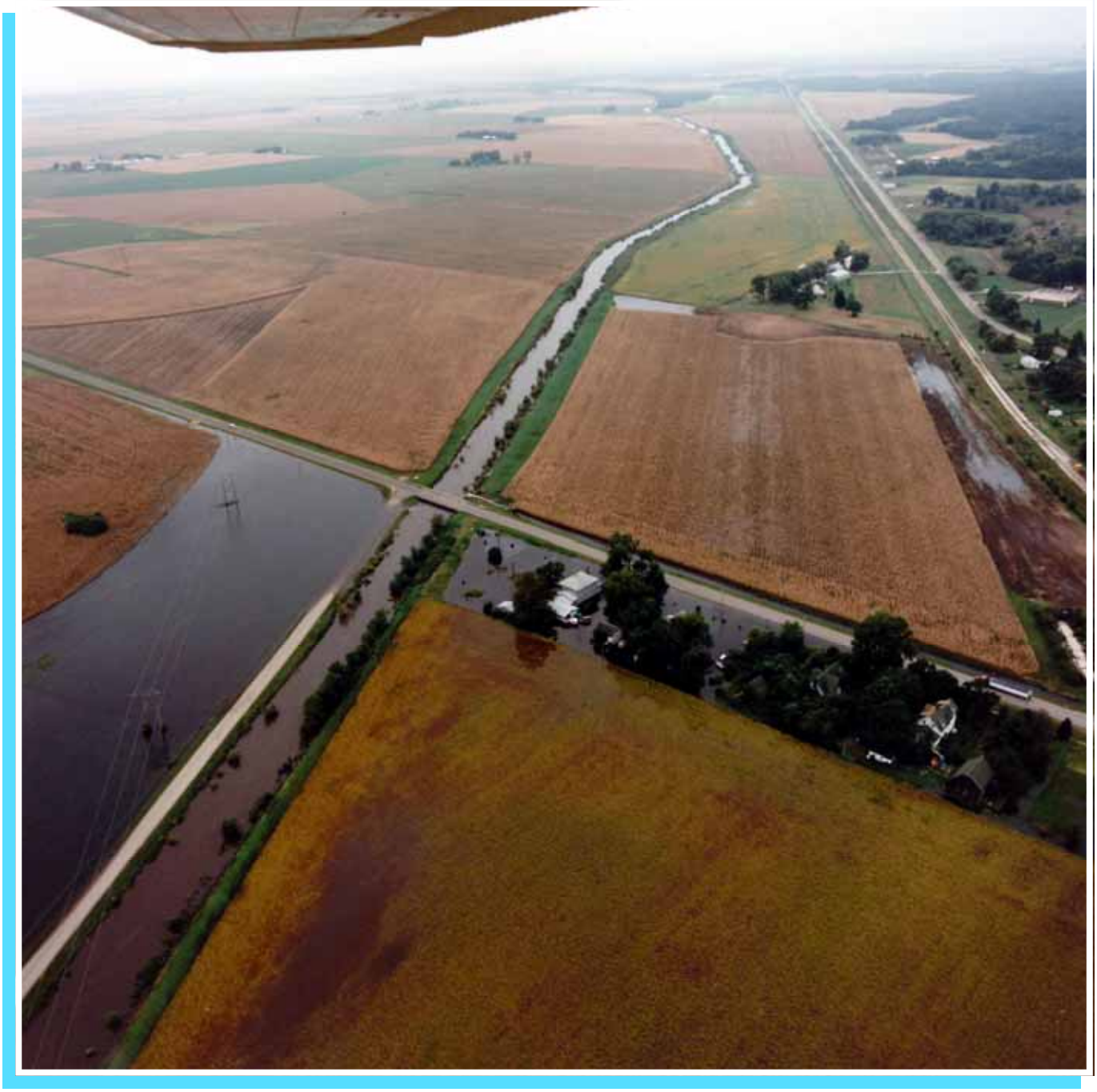
Former Scarborough Estates northeast of the City; now the site of the Park District's new Veteran's Park

Looking west of Havana approximately 1/2 mile

Looking west of Havana approximately 1/2 mile

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Forest City, Illinois



Looking southwest along the Mascon-Tazewell Drainage Ditch at Forest City

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Unincorporated Mason County, Illinois

4-H Blacktop 8 miles west of 1900E

Pond on 4-H Blacktop

4-H Blacktop 1/2 mile east of 1800E

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Unincorporated Mason County, , Illinois

Evening Star Campground off of US Rte. 136

Looking south across US Rte. 136 at Evening Star Campground

1900E directly south of US Rte. 136

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Unincorporated Mason County, Illinois

Looking east from pond at Roat's Strawberry Patch
(1900E and US Rte. 136)

Looking northeast at the Havana Regional Airport

Looking west at the Havana Regional Airport

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Unincorporated Mason County, , Illinois

Sand Lake at IL Rte. 97 southeast of Havana

Sand Lake at IL Rte. 97 southeast of Havana

One mile east of Mason District Hospital

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Unincorporated Mason County, Illinois

IL Rte. 78 at 1500N

Road Closure along IL Rte. 78 south of Bath

Looking south along IL Rte. 78 south of Bath

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Unincorporated Mason County, , Illinois

Finished drainage system in front of drive-in along IL Rte. 78

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Unincorporated Mason County, Illinois

Looking south along completed drainage system in front of the drive-in along IL Rte. 78

Drainage area into White Oak Creek near drive-in along IL Rte. 78

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Unincorporated Mason County, Illinois

Looking west at 1970E / 1700N east of Havana

Photographs provided by Greg Griffin, Mason County ESDA Director

1993 Illinois River and Aquifer Flooding
Unincorporated, Illinois

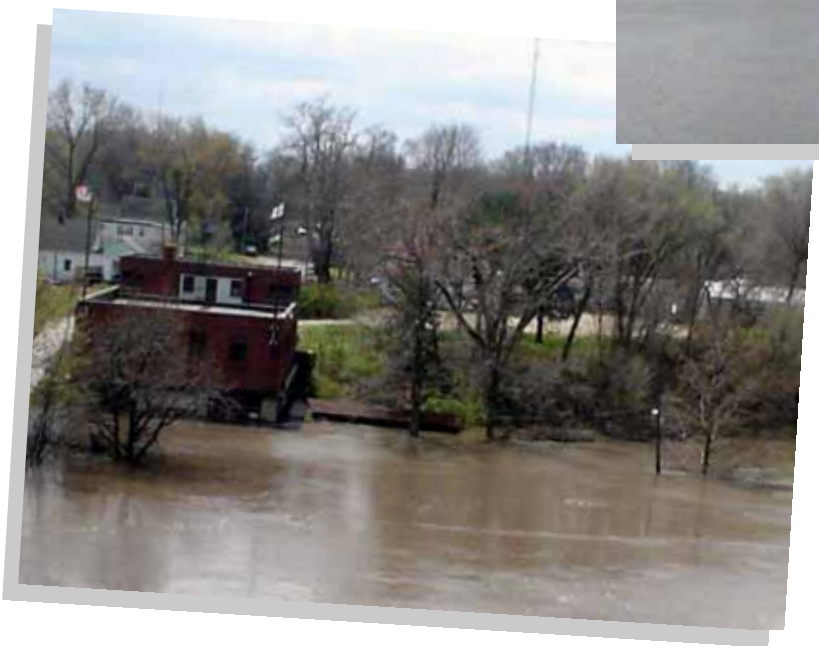
Looking south along 1970E towards US Rte. 136 east of Havana

Photographs provided by Greg Griffin, Mason County ESDA Director

Spring 2013 Illinois River Flooding
Havana, Illinois

Looking north from the Lucas Bridge

Looking northeast from Lucas Bridge



Looking southeast from the Lucas Bridge

Photographs provided by Greg Griffin, Mason County ESDA Director

Spring 2013 Illinois River Flooding
Havana, Illinois

Havana Nature Center

Photographs provided by Greg Griffin, Mason County ESDA Director

Spring 2013 Illinois River Flooding
Havana, Illinois

River Front Park

Lift Station protected by sand bags along the river front

River Front Park

Photographs provided by Greg Griffin, Mason County ESDA Director

Spring 2013 Illinois River Flooding
Havana, Illinois

Havana Marina

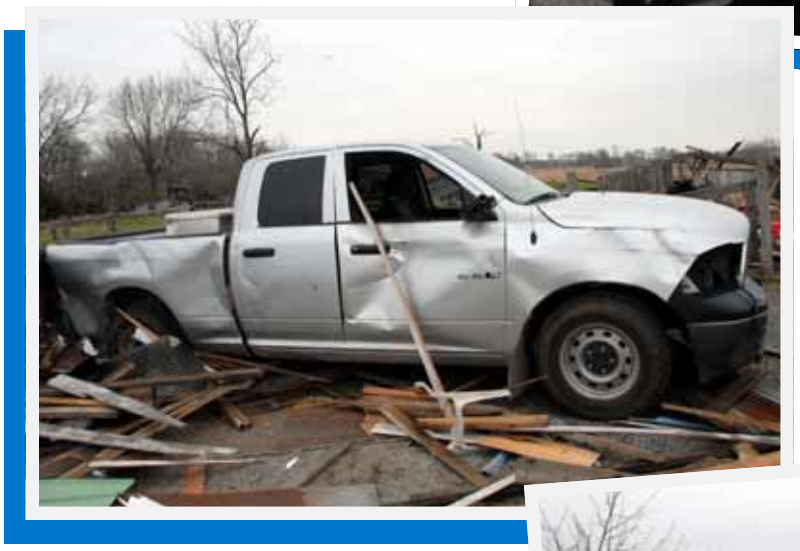
Matanzas Beach area

Photographs provided by Greg Griffin, Mason County ESDA Director

April 15, 2011 Tornado
Unincorporated Mason County, Illinois

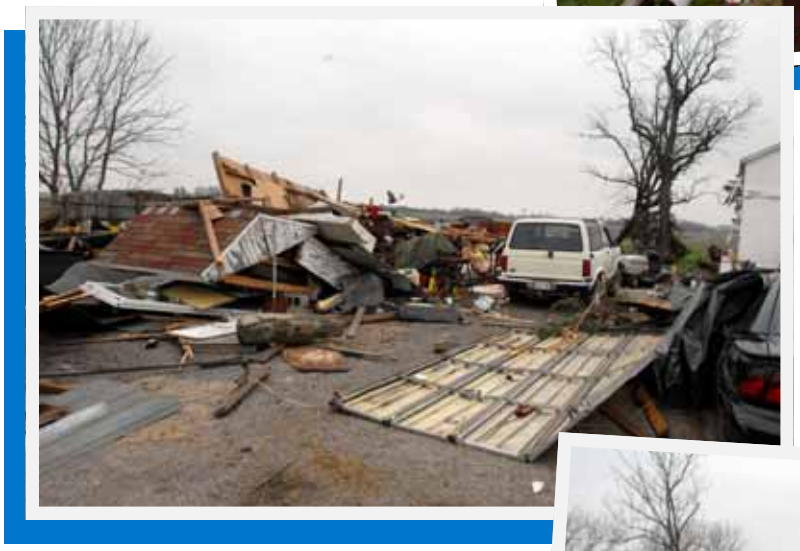
Photographs provided by The Mason County Democrat

April 15, 2011 Tornado
Unincorporated Mason County, Illinois



Photographs provided by The Mason County Democrat

April 15, 2011 Tornado
Unincorporated Mason County, Illinois



Photographs provided by The Mason County Democrat

April 15, 2011 Tornado
Unincorporated Mason County, Illinois

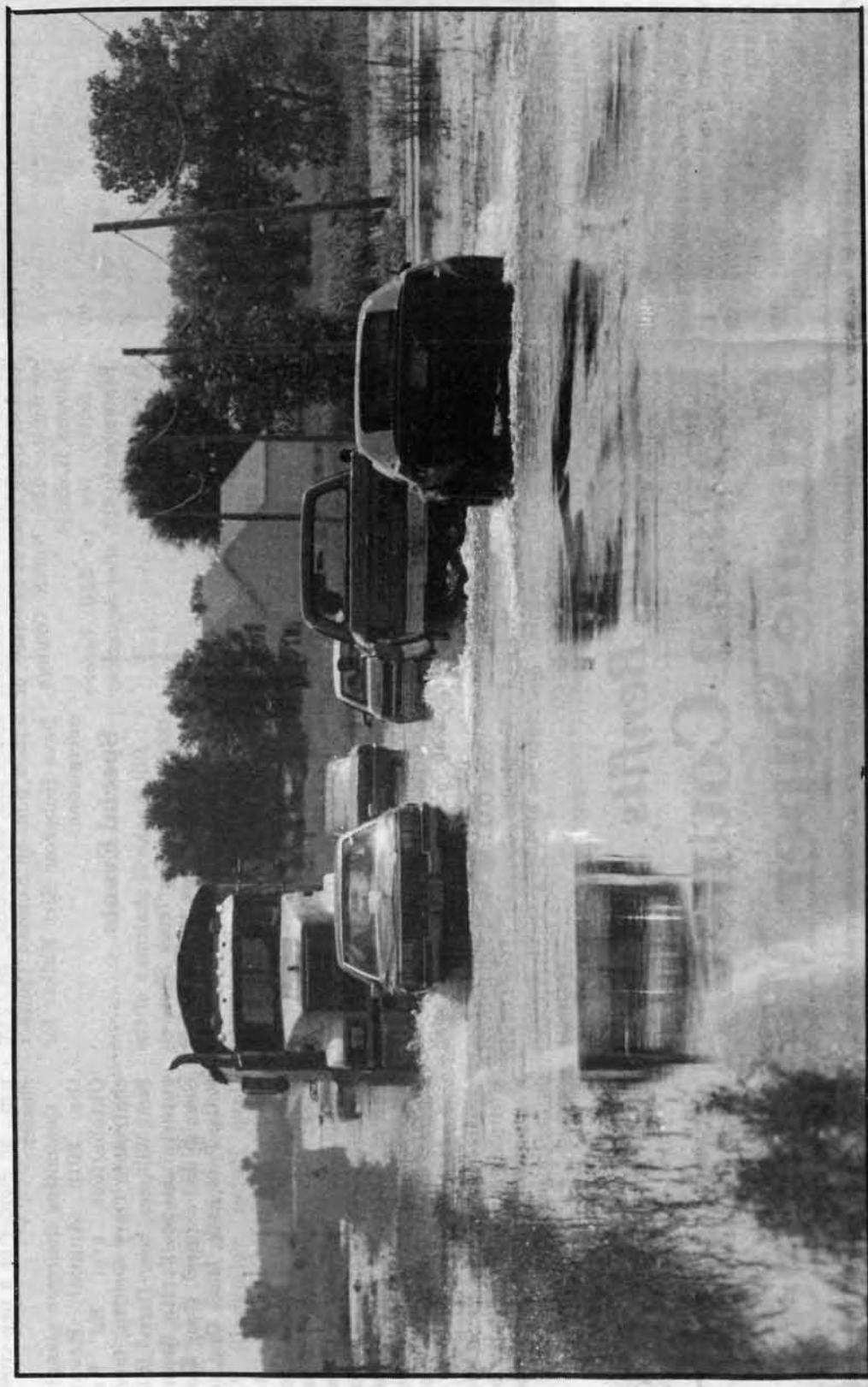
Photographs provided by The Mason County Democrat

April 15, 2011 Tornado
Unincorporated Mason County, Illinois

Photographs provided by The Mason County Democrat

APPENDIX M

The Mason County Democrat
September 8, 1993



Flooding on Route 97, to and from Havana on South of Havana, created Thursday. fear in motorists traveling The late Senator Mary Lou Kent sponsored legislation to build up the highway in 1974. Excessive flooding occurred at Walker Forge and Havana Culvert from Thursday's downpour.

The Mason County Democrat
September 15, 1993

County Beseiged By Flood From Below

by Wendy Martin

Throughout the summer a great number of Mason County residents and Havanans have donated time, energy or money or all three to assist the victims of the Great Floods of 1993, grateful, no doubt, that the Illinois River spared them.

But now many are counted among the victims of flooding from an unexpected source...the aquifer.

Local lore has always proudly told of the hidden underground river below Mason County. While the flow is not as swift as the Illinois River's, it looks like the water is cresting at near record heights.

The water table that normally rests 5 to 12 feet below the surface is at surface level or above in much of the area south of Havana.

Area residents remember at least two other times that similar water disasters occurred here. Severe flooding was seen in 1974, and was even worse in 1926.

According to Adrian Visocky, Director of the Office of Ground-water Resources for the Illinois State Water Survey, the way above normal rainfall seen here in the past 14 months is the "obvious" cause of the problems.

Visocky noted at an ad hoc emergency meeting of the Havana City Council and Mason County Board Wednesday evening that the average rainfall per year here is 36.2 inches.

But July 1992 saw nearly 10 inches of rain in a single month, and in the time between July 1992 and June 1993 more than 54 inches of precipitation has drenched this area.

While an average July sees 3.8 inches of rain, this July saw another 9 inches.

Visocky showed charts from an observation well located near Bath that has been tracked since the late 1950s.

Current levels in that well are the same as the highest levels seen in the mid-70s when the height of the well water peaked, leading Visocky to hint that based on the historic data, the water probably would not raise much more.

"I realize you don't have any crystal balls, but based on what we're seeing are we looking at the tip of the iceberg?" asked Havana Mayor Allan McNeil.

"No, I'd say you've seen most of the iceberg, based on the historic record we have here...We seem to be at a peak now, and one shouldn't expect that the worst is yet to come. It never has gotten much above what it is now," Visocky said.

At the time of that Wednesday evening meeting water was still rising in the ditches coming into Havana along Route 97 at an estimated rate of two inches every four hours.

Visocky said the high water table has been the result of a combination of situation. In addition to the increased amounts of rain, higher river levels have resulted in slower drainage from the aquifer.

He also noted that irrigation units generally draw down the water table some, but very little irrigation has been run this year because of all the rain.

The Mason County Democrat
September 15, 1993

Businesses, County Affected By Flood

Walker Forge on Route 97 was the first of several businesses to be threatened by flood waters on the southeast of Havana. On the Tuesday after Labor Day they lost one full day of production because of the water.

They have since built a wall around the plant and have had all three shifts back to work.

A spokesman for the company said Monday morning that things appeared to be fine, but he feared if there were substantially more rain things could get serious again for them and their 135 employees.

Havana Metal Culverts began taking on water the Friday before Labor Day according to President Ben Bielski.

Continuous pumping has allowed them to finally get the floor of the plant dry he said Monday, but it is now really a question of weather and how high the water rises, and how fast it is moving whether they can get back into full operation this week.

Bielski, who helped with the sandbagging late last week, said he couldn't say enough good things about the crew which has split into three shifts to keep 24-hour duty on the pumps.

He also praised local officials for their cooperation and assistance.

Some of the worst flooding appears to have affected the Country Boy Store which has been surrounded by water since early last week.

The owner could not be reached for an update.

Before Monday's rain Dairy Queen owner Jim Meyerhoff said things were getting back to normal after high water threatened to close his doors for several days.

Customers, friends and employees helped sandbag the building, and a city sewer has so far kept water below the curb at the building.

The Mason County Health Department is among those who have been affected by the rising water table.

According to Administrator Gary Zaborac three programs have had to evacuate the basement of the building on Route 136.

The Women, Infants, Children program and a new state program called Healthy Kids, Healthy Moms, have temporarily been moved to the old Gorsuch building on Plum Street.

Environmental Health has been moved out of the basement for the time being.

Zaborac added that the Health Department will be offering free water testing to those whose private water wells have been adversely affected by rising ground water.

Pumps And Pipelines Planned To Reduce Water

While polkas played on in Havana for the 20th Annual Oktoberfest monitors were being set up Saturday to track what is happening with water levels on the south and east of Havana.

The monitors are among the things Environmental Science Engineering of Peoria will do for Havana and Mason County in trying to find a way to meet the current flooding problems.

Meanwhile Soil Conservation Service employees were busy surveying over the weekend to decide where the best place would be to run a pipeline to pump surface water off from the area of Negro Lake.

Preliminary findings indicate that running along the county road at 1500 North (known as Beer Can Alley), would be more efficient than following the C&IM railroad right of way to the Illinois River.

At Sunday's evening briefing Sheriff Richard Walker reported that one to three pipes will need to be placed, either behind the pumping station at Walker Forge or behind the main lake.

Both are about the same distance, according to Walker.

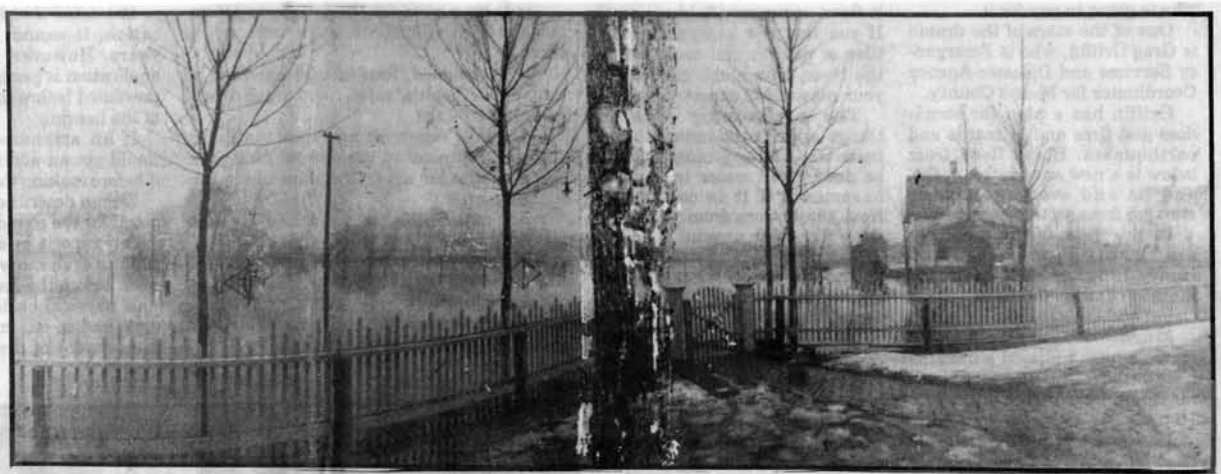
He added that the railroad right of way would have been farther and involved more landowners.

The plan is to pump off as much water as possible to reduce the flow of surface water coming from the Negro Lake area.

Local officials hope to find both short term and long term solutions to the problem of surface water. It is unlikely that anything can be done about the ground water.

An emergency agreement has been signed between the Mason County Board, City of Havana, and Soil Conservation Service that will provide 100% funding for the cost of construction.

The Mason County Democrat
September 15, 1993



This photograph of flooding on the east end of Havana was taken from the yard at 503 E. Market Street. That would put it near the intersection with McKinley.

High water in 1974 encouraged Leo Borgelt, then a correspondent for another area newspaper, to dig out what he could on flooding in Havana.

His research indicated that flooding also occurred between 1886 and 1905.

(The original photograph had been broken or torn in half and was taped back together at one time, accounting for the stripe in the middle of the picture.)

Photo courtesy of the Karl Collection.

Officials Use Emergency Powers

As rushing waters overflowing Negro Lake out-paced attempts to corral them into the Havana sewer system late last week, school, city, and county officials searched for ways to protect property.

An emergency meeting of the Havana District 126 Board of Education was called Tuesday afternoon where board members studied topographic maps showing the Junior High School to be five feet in elevation below Negro Lake, making it a likely place for water to pool if it were to continue to rise.

At Tuesday evening's meeting of the Havana City Council theories and suggestions on what to do were welcomed from the audience of forty some visitors.

An emergency joint meeting of city and county officials was held Wednesday night which spawned another emergency meeting Thursday night with engineers from Environmental Science Engineering of Peoria.

At that meeting Havana Mayor Allan McNeil and County Board Chairman Henry Imig used their emergency powers to authorize up to $10,000 each for engineering to discover what exactly is causing the problem and what the short term and long term solutions should be.

At the same time, broad emergency powers of the Soil Conservation Service will be used to bail Havana and Mason County out figuratively, if not literally.

Local SCS representative Kevin Donoho was flanked Wednesday night by two superiors when he announced that when an "exigency" exists - an urgent situation such as the one facing local officials - 100% federal funding is available.

Donaho noted that while nothing could be done to control the ground water making its way into peoples' basements, it appeared to SCS engineers that something could be done to control the surface water.

On Friday McNeil and Imig signed a cooperative agreement with the Soil Conservation Service.

SCS and ESE employees are working together to find a way to provide relief from the surface flooding. Water level monitors were placed by ESE engineers and surveying work was conducted over the weekend by SCS volunteers.

Until the crisis subsides briefings and updates on what has happened and what is being done have been scheduled for 5 p.m. at the Mason County Courthouse until further notice.

Water began crossing Route 97 and Route 78 as area residents prepared for the long Labor Day weekend.

City and county officials foundered as the water began threatening the city with no clear idea of what was causing the problem, what would relieve the problem, and whose problem was it anyway (that is, who will pay to fix it).

With no way to guess how high the water might get members of the Havana District 126 Board of Education met in emergency session Tuesday afternoon and agreed to sandbag the Junior High School as a preventative measure.

As they were meeting, a hydrologist from Springfield was getting the aerial helicopter tour of the flooded areas, using the baseball field as a heliport, and outside city employees jerry-rigged a pipe to direct water from the ditch along Route 97 to a city sewer.

School, city and county officials are concerned with both the surface water pouring in

continued on Page 3

The Mason County Democrat
September 15, 1993

Old Stories Talk About Negro Lake

Just south of Havana lies a natural depression that frequently fills up with water. More recent maps refer to it as Negro Lake, although it is commonly known by a rougher name.

According to an article written for the Mason County Democrat in the late 1950s or early 1960s by Fred C. Speckman it was almost always wet southeast of Havana at what is known as Negro Lake.

He reported that in 1883 the Havana Township Drainage District No. 1 - the first in the county - was organized. This drainage district drained the "lake" through a sewer laid along the road which joined one of the sewers in the city. The waters ultimately emptied into the Illinois River.

"In 1926, after a wet spring and summer, the low ground was again filled with water and remained that way for the better part of 3 years, owing to the poor condition of the sewer," Speckman reported. "The land owners finally corrected the trouble and the water was drained."

How the District Received Name

About 100 years ago, or thereabouts, Speckman wrote 30-some years ago, a Negro operated a small grocery store a short distance south of the Negro Lake crossroads and was there for some time. Just where he came from seems to be a mystery. Some say he was a driver of a road-circus wagon which came to Havana in the early days, and the wagon mired down on the road going through the lake area and that is how it received its name.

Later in the article Speckman said he didn't know if the story about the circus wagon was true or not, but he was pretty sure about the story about the man with the grocery store. Be that as it may, Speckman said, the fact remains that a Negro operated the store.

He also reported that a few old bricks are still around where the Negro's store used to stand on the west side of the highway and south of the cross-roads, and the presence of him in the vicinity gave the name to the lake.

Photographs by Chris Young / The State Journal-Register

Don Hughes, left, Joe Ray and Ernie Carlock sandbag a street in Bath to divert water to an area where it can be pumped out of town.

Bath getting ready for next round

Water levels drop; more rain expected

By KEVIN McDERMOTT and STEPHEN BEAVEN
STAFF WRITERS

BATH — As this tiny Mason County community attempts to dry off after a bizarre assault from below, residents are only now sorting out exactly how it happened — and preparing for it to happen again if predictions of more rain come true.

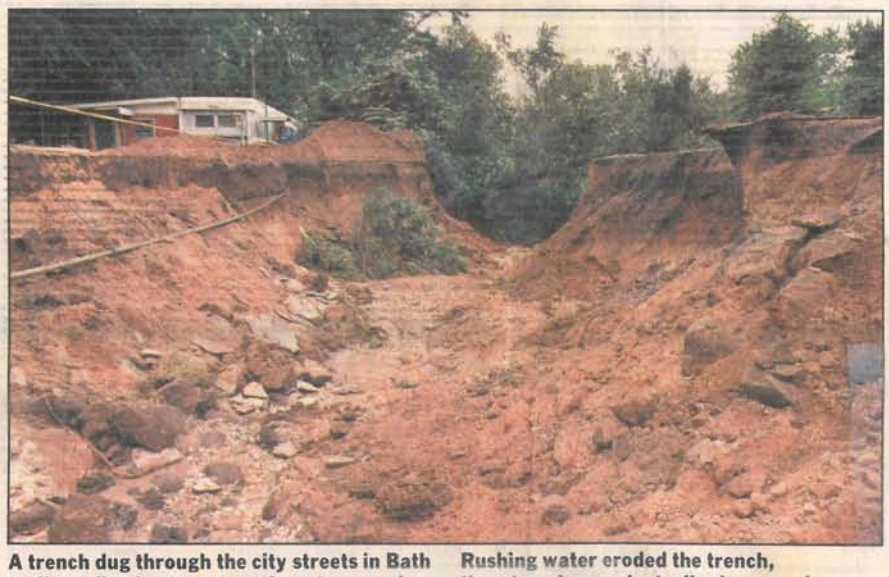
"It rained like hell Monday night, and we got a phone call at 6 in the morning (from a neighbor) saying her whole house was flooded," recalled resident Becky Conway, who didn't know at first what the neighbor was talking about.

"Then I walked outside, and it was just everywhere."

That was how Tuesday greeted most of Bath's 388 residents: They awoke to find their houses flooded, yards and streets under water and their town virtually cut off from the rest of the world.

Most surprising of all was that, for once, the

See **BATH** on page 4



A trench dug through the city streets in Bath to direct floodwaters away from town and into the Illinois River is no longer being used. Rushing water eroded the trench, threatened a nearby trailer home and exposed a gas line.

BATH

From page 1

nearby Illinois River had nothing to do with it.

Deep below the town, the Sankoty Sand Aquifer — the huge underground lake that extends beneath most of Mason County, northwest of Springfield — had taken in all the water it could hold from one of the wettest seasons on record. Over the rainy months since spring, it had gradually pushed the excess back up to the surface, giving local lawns and fields the glossy look of a saturated sponge.

Then, on Monday night, it rained one time too many.

"You've got this aquifer coming up at you from the bottom, and Mother Nature coming at you from the top, and there's nowhere for the water to go, so it stays in the middle," explained Mayor Floyd Dooley, who was assisting with fresh-water distribution and other relief efforts at Bath's community center Thursday.

"It's a shock to everybody," said Conway, whose home is surrounded on all sides by water. "Even the older people have never seen anything like it."

In the modest downtown area, two huge, jagged trenches had been gouged into two city streets to channel the water away. A white and black sign at First and Oak streets warned residents: "DON'T DRINK THE WATER; GET DRINKING WATER FROM THE COMM. CENTER."

Sandbags and plastic pipes lined wet streets, and pumps were running nonstop throughout the community Thursday, with some success.

Surface water levels were dropping as the water was pumped into the river, and areas that had been virtual lakes a day earlier had been reduced to large puddles. Motorists could get in and out of town again — provided they knew which back roads to take — and the Red Cross was providing assistance for the beleaguered residents, some of whom have been driven from their homes by the water.

One of them was Dellann Stutsman, who awoke at 4 a.m. to find one basement wall collapsed and the water rising.

"It just kept rising and rising. We couldn't stop it," said Stutsman, who is living in a camper with her husband while they wait for the water to recede. "We can't live in the camper through the winter. I don't know where we're going to live."

Drinking water throughout town remained contaminated from sewer backflows.

"All we're trying to do here is steer the water out of town," explained village board member Don Hughes, as he and two companions piled sandbags along a road next to his house in anticipation of more rain.

The road was dry, but the field just beyond it had become a lake that threatened to cross over to the house. "We're just getting ready for the next round," said Hughes, referring to a 30-day outlook that calls for more rain than normal.

The flood submerged low spots on Illinois 78, closing the highway both north and south of town. It also shut down access to virtually all the smaller back roads Tuesday and Wednesday, although they were passable in some spots Thursday.

"I hadn't been able to come to work for two days," said Trish Little, standing behind the bar in The Brick tavern, a popular duck-hunters' gathering place. Little, a bar employee who lives out of town, finally was able to get into the village Thursday, though she might as well have stayed home; the once-bustling tavern has remained utterly empty since the roads disappeared.

"I can't find anyone who remembers anything like this, not even people in their 80s and 90s," said Dooley, the mayor.

He said he had to complain to Gov. Jim Edgar's office to get the attention of Mason County's overwhelmed emergency services system, which was struggling with similar flooding problems in the larger town of Havana, to the north.

"I don't think they realized how bad it was here," Dooley said. "We've really got a situation here. The water could be down by next week if it doesn't rain anymore ... but if it rains another inch, it's going to be worse than it is now."

Major roads in Mason County remained closed on Thursday.

Illinois 97 was closed for 4 miles south of Havana, said Mason County Chief Deputy Leland Keith. U.S. 136 was closed from Illinois Route 10 to Havana, a total of about 12 miles, Keith said.

Illinois 78 is closed from Bath to just south of Havana, a total of about 3 miles, he said.

The Mason County Democrat
September 22, 1993

Bath Inundated After 6-7 Inch Rainfall

Run-off from a 6 to 7 inch rain Monday night inundated approximately one-third of the village of Bath with a foot to a foot and a half of water early last week.

Rising water Tuesday forced the American Red Cross to abandon plans to open a shelter in the village, although services were not otherwise affected.

A deep trench was dug Tuesday to channel water to the Bath Chute, but the force of the water at the end of Chestnut Street carved a deep gorge in the sandy soil, collapsing the last block of the road and threatening other property.

Up to six inches of water stood on some streets in Easton, and a drainage ditch overflowed in Forest City.

By Friday reports from Bath indicated two pools of water still standing. One was located on the south side of town and the other on the northeast side.

If more rain comes, engineers agreed a 200-foot ditch could be dug from the pond toward the river under the highway to a culvert already there.

Health Department officials arrived in Bath Friday to provide residents with tetanus shots. Meanwhile, the Red Cross provided food and drinking water to to disaster workers and victims throughout the week.

On Sunday the Red Cross conducted a Stress Recognition and Stress Management meeting in Bath.

The Mason County Democrat
September 22, 1993

Monday Rains Spawn Tuesday Flood Crisis

The east end of Havana came perilously close to being swamped with up to 5 feet of water in the dark hours between Tuesday night and Wednesday morning.

Over four inches of rain Monday, September 13 caused Sand Lake to overflow re-flooding Walker Forge and Havana Metal Culverts, and inundating the Havana Dairy Queen and the neighborhood behind it.

By early Tuesday evening the parking lots of both the high school and junior high were filled with water, as was the track around the football field. Water was filling up the baseball diamond as well.

Water poured out of the high school parking lot onto U.S. Route 136 and headed down Harpham Street to a low point at Main Street.

The flow was stanched by 9 p.m., by a wall of sandbags at the end of the parking lot, but when the water level began to threaten the school buildings a breech was made in the wall to buy time while another wall of sandbags was completed across Route 97 at the railroad tracks.

By the wee hours of the morning the sewer at Main and Harpham was overwhelmed and water crept up on the boulevard on Main Street and lapped at yards until the flow from Route 97 was stopped and the sewers had a chance to catch up.

Water also poured out of the high school's teachers parking lot at McKinley and Route 97 Tuesday night. It flowed past the McKinley St. Apartments and into Promenade Street.

A four-foot whirlpool developed around the storm sewer at the east edge of the Alco parking lot, and what the sewer couldn't handle flowed through the lot south of Alco, inundating the home of George Porter, located behind Green Oil.

Engineers worked feverishly much of day Tuesday taking elevation measurements in Havana and trying to predict where flood waters were most likely to go.

It appeared they might have run from a low place at Market and McKinley to Promenade. The next low spot appeared to be behind the Pepsi plant, then back to the river via the coal docks.

At the 5 p.m. briefing Tuesday engineers were anxious to get away to complete their calculations on the flooding.

A special briefing set for 8 p.m., started 20 minutes late as frightened residents waited for the engineers to arrive

As conditions appeared then they predicted water would reach an elevation of 472.9 at the high school when it peaked around 11 a.m. Wednesday morning.

The low point in the area east of Promenade St. and north of 136 to Adams St. was 467.2, indicating that there could be up to five-and-a-half feet of water in that neighborhood.

ESE engineer Gary Davis noted that the predictions were based on the worst case scenario, and did not take into account what would go down the storm sewers and what would percolate into the ground.

In addition to the homes in the east half of town as well as both the high school and junior high, flood waters would have threatened the city's waste water treatment plant and city wells.

The Mason County Democrat
September 22, 1993

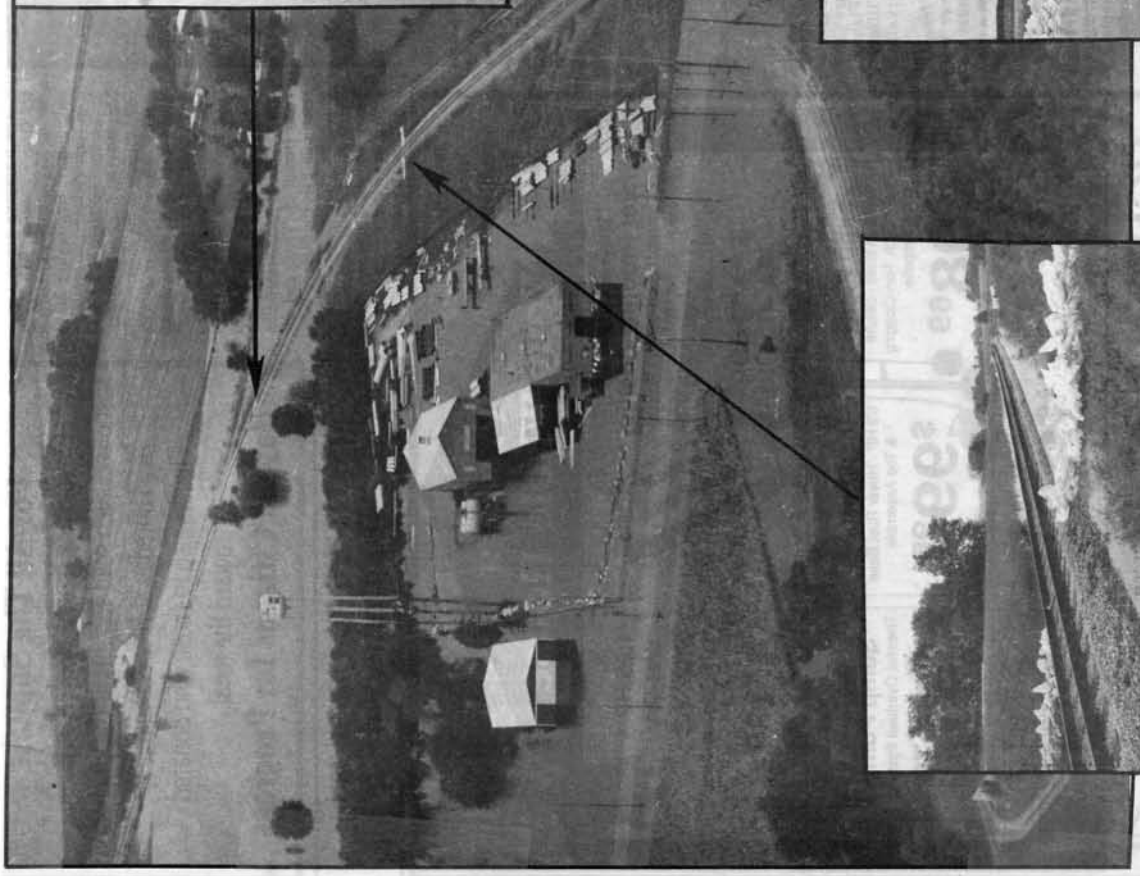
The Mason County Democrat, Havana, IL, September 22, 1993 Page 6

Flood Waters Continue To Threaten Havana Area

C&IM Railroad employees used a special trenching bucket to scoop gravel from between railroad ties Saturday so that pipes could be placed under the track to aid in moving water out of the pond behind Walker Forge.

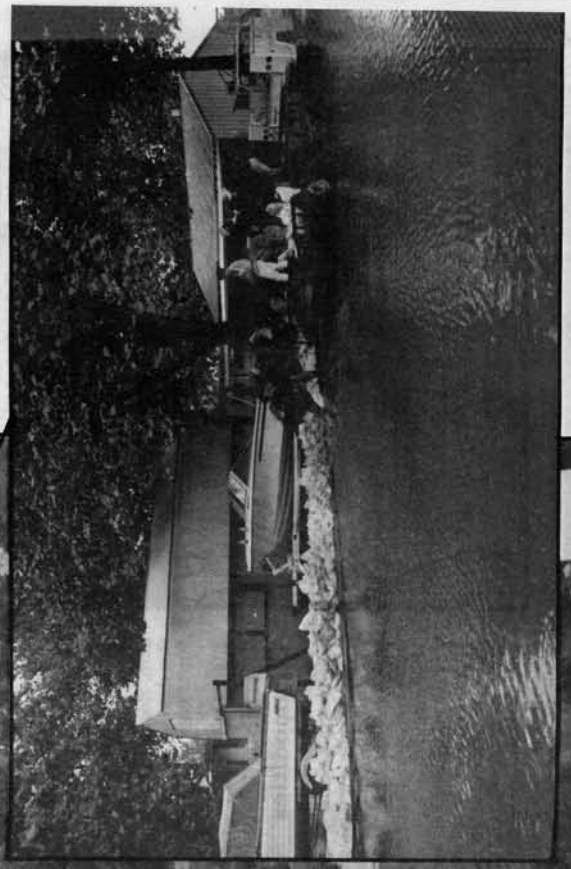
Gravel had to be dug out by hand between the rails because high water prevented the trencher from reaching at the best angle.

Sand bags were placed on Route 97 late Tuesday to stanch the flow of flood waters from Pool No. 2 into Havana.

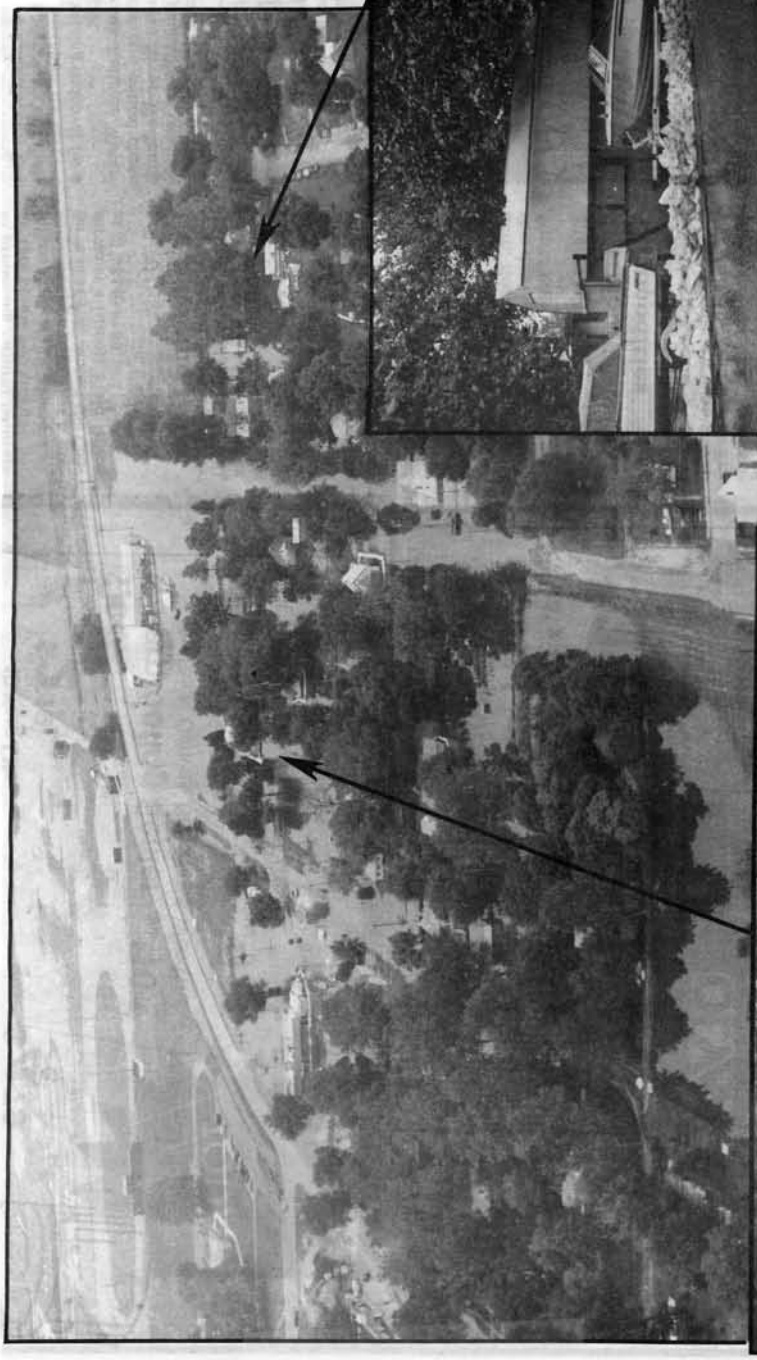


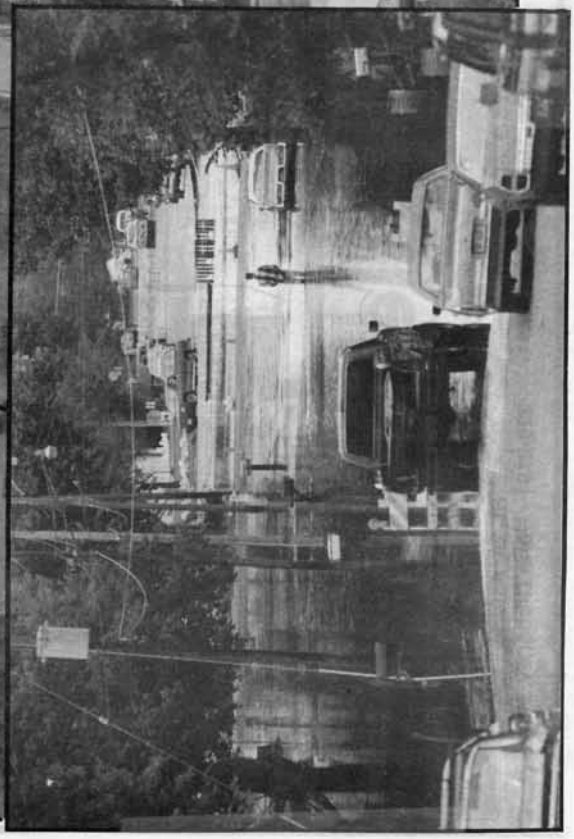
Sand bags at the G&IM railroad were used to keep water from running down Route 97 and inundating the south and east ends of Havana.

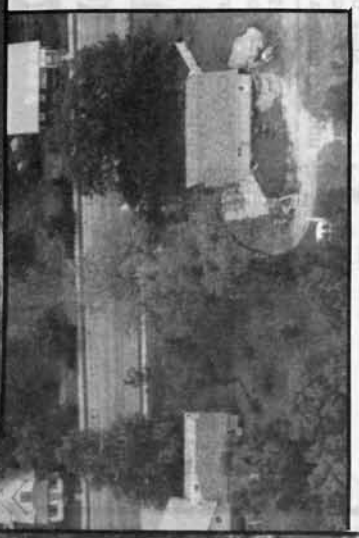
The Mason County Democrat
September 22, 1993



River Ready Marine on south McKinley was the low spot in the neighborhood behind the Dairy Queen which was swamped by flood waters following a heavy rain last Monday.



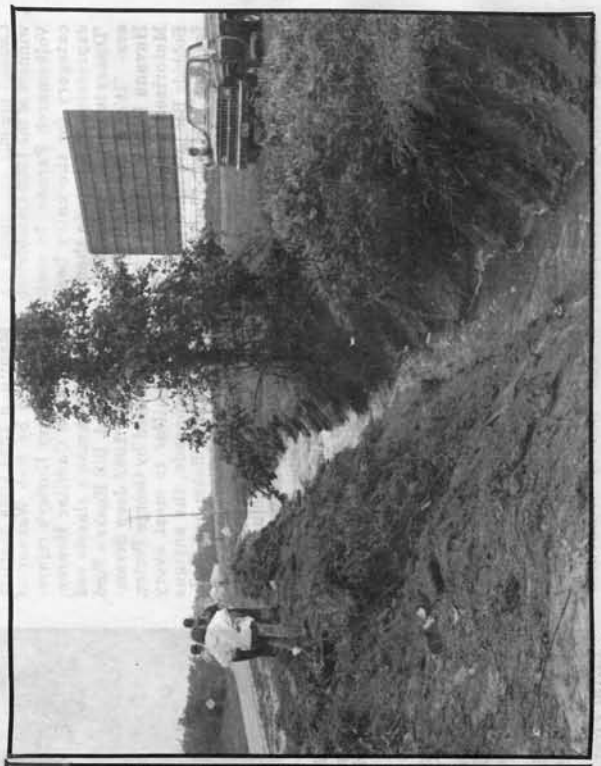




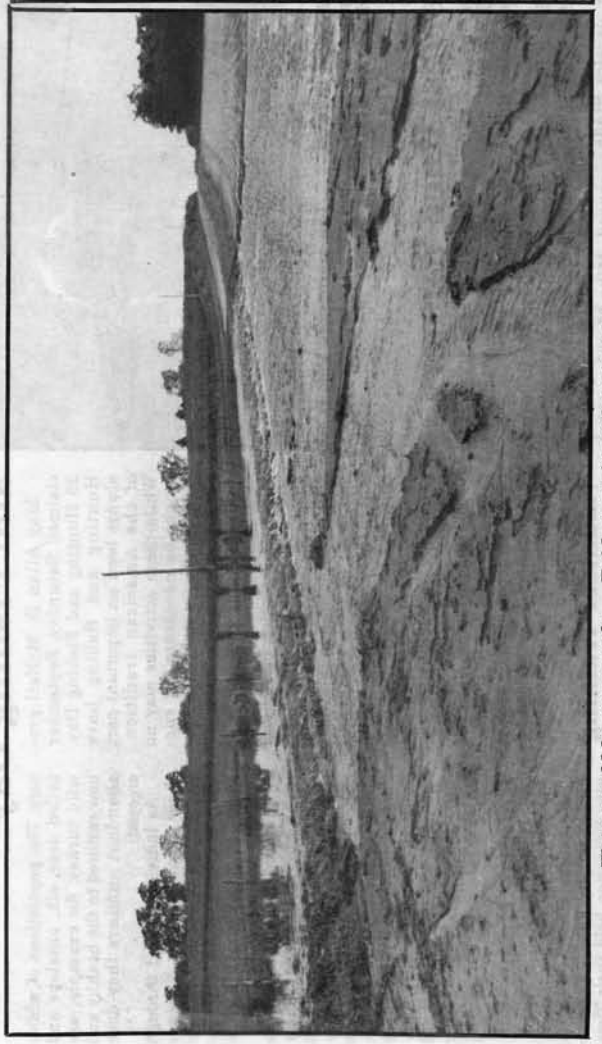
South McKinley Street.

Photos by Bob Martin

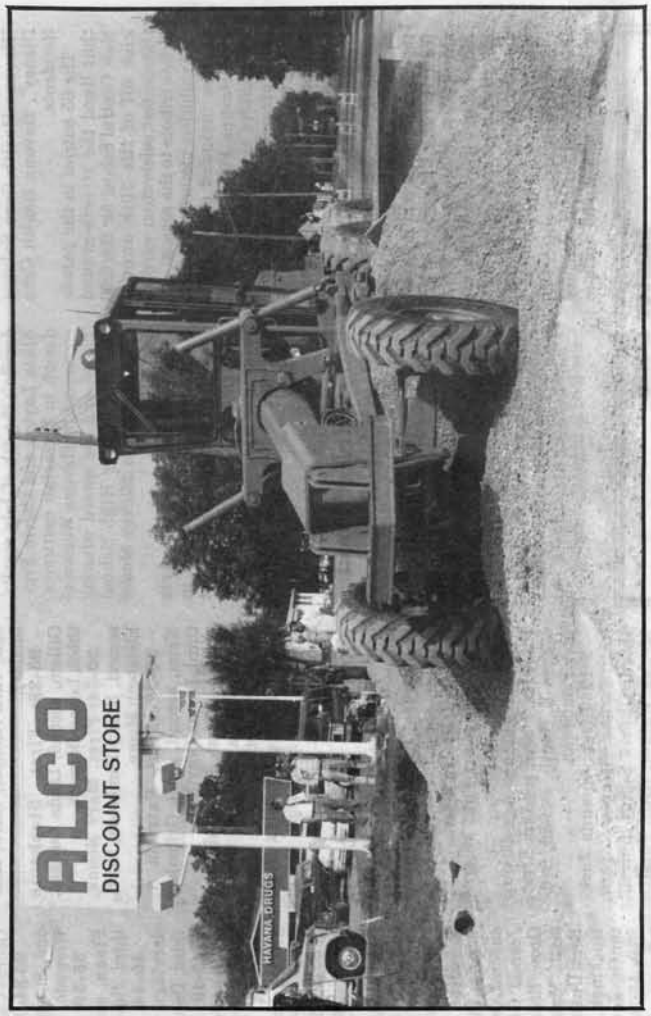
The Mason County Democrat
September 22, 1993



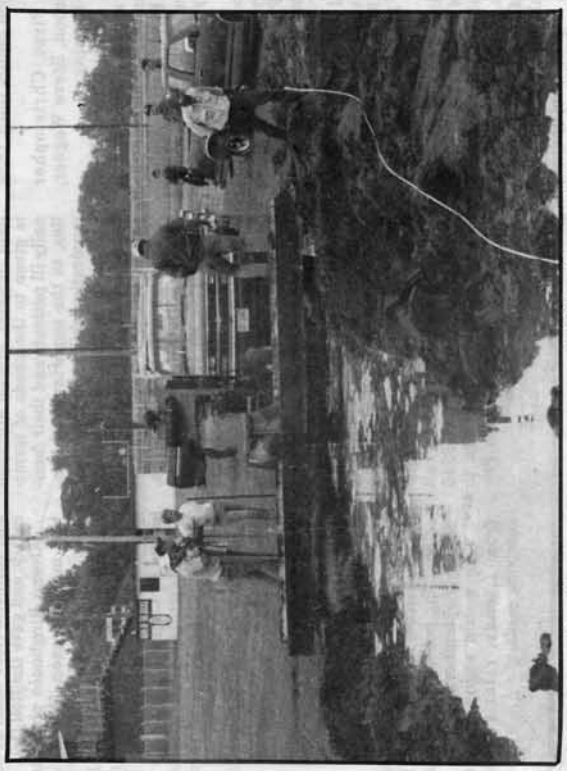
Sunday morning a trench was dug along Route 78 near the old drive-in theatre to facilitate the movement of water to White Oak Creek and into the river.



Water could be seen washing over Promenade Street just south of Beer Can Alley Friday as it makes it way toward White Oak Creek and the Illinois River.



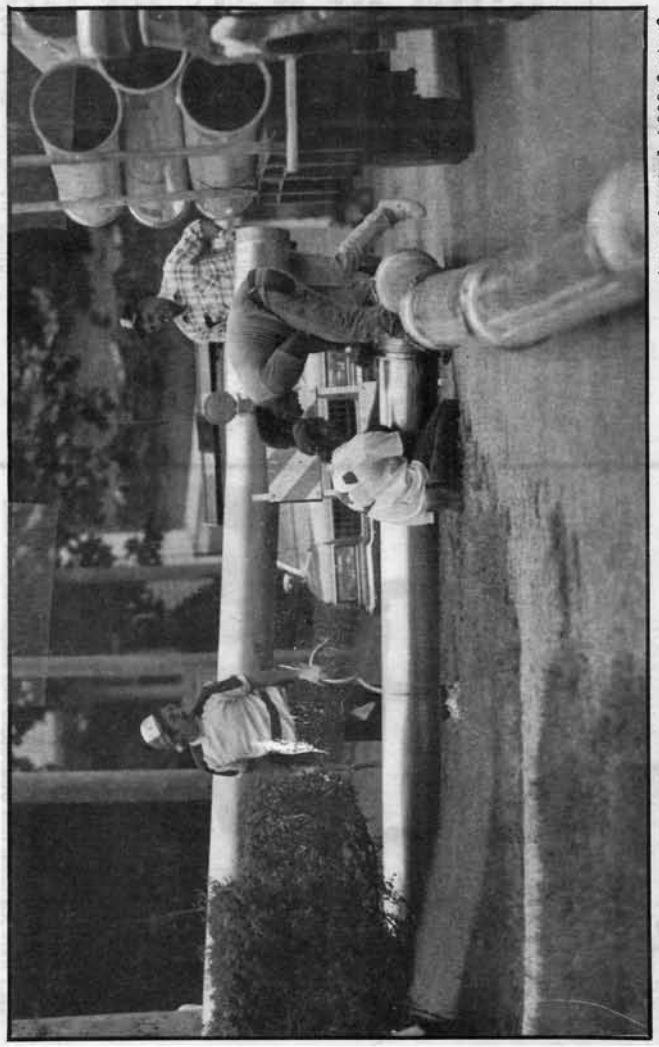
The Illinois Department of Transportation brought in white rock and equipment Saturday to build a ramp on Promenade Street in front of Alco to go over a pipeline that reached from the high sewer at the corner of Jefferson and Schrader. The ramp enabled the school ball diamond to the highway to remain open.



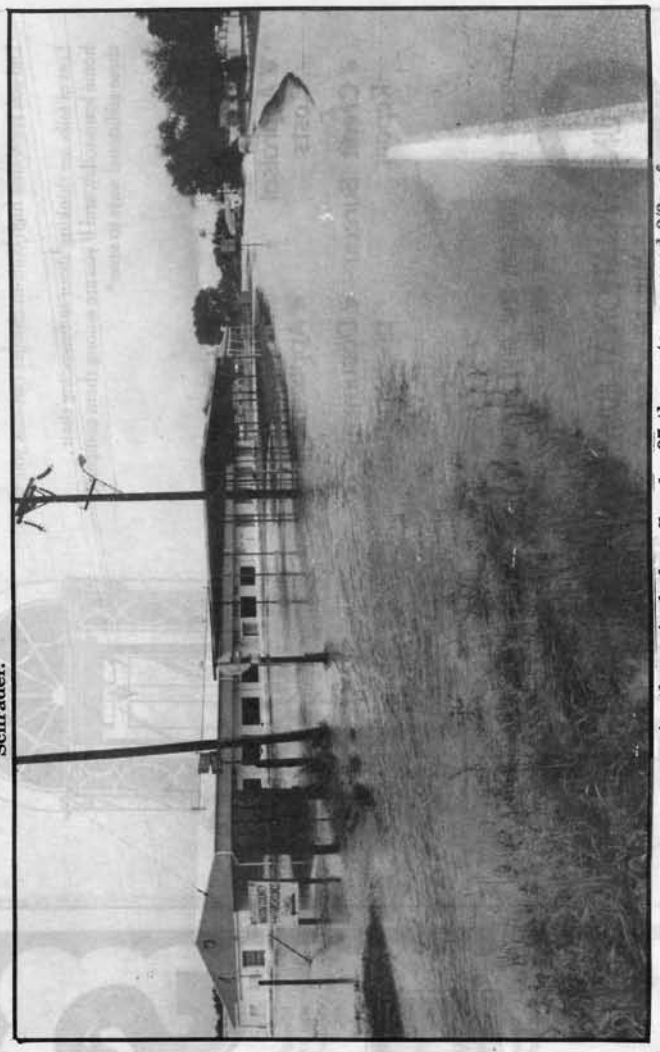
A large pump was installed at the Havana High School ball diamond Saturday afternoon. Pipes were laid Sunday and it was used to pipe water away from the south east end of Havana.

Photos by Bob Martin

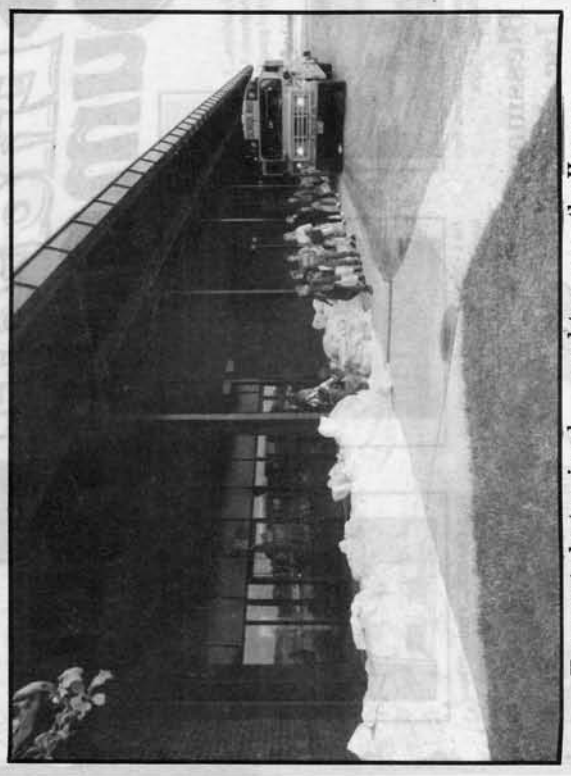
The Mason County Democrat
September 22, 1993



An estimated 4,000 feet of reusable aluminum irrigation pipe was laid Sunday across Havana to pump water from the south end to a sewer at Jefferson and Schrader.



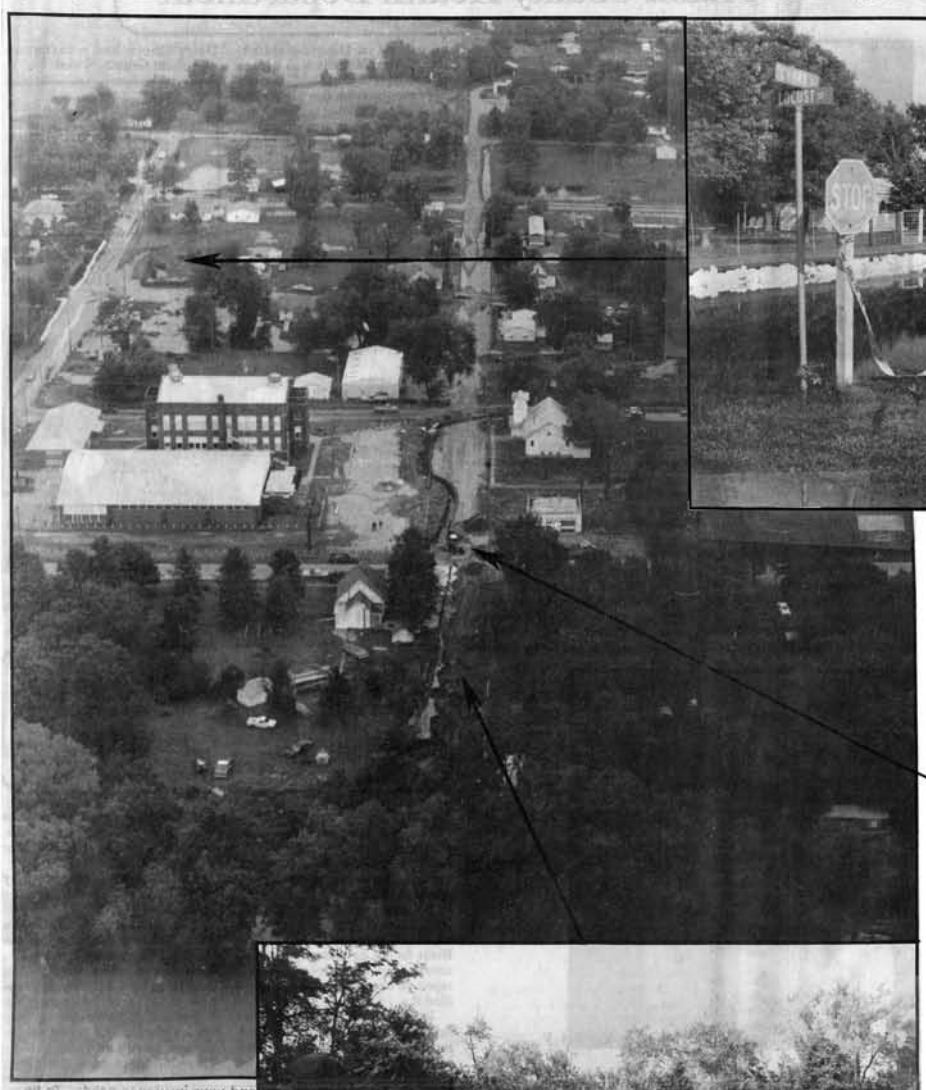
As the rain-laden flood waters peaked Tuesday at Green Bay Foods on Route 97 the water covered 2/3s of the highway.



Havana students missed two days of school last week when flood water threatened to swamp the Havana Junior High.

The Mason County Democrat
September 22, 1993

6-7 Inch Rain Inundates Bath With Overflow



Bath as seen from above Thursday morning.

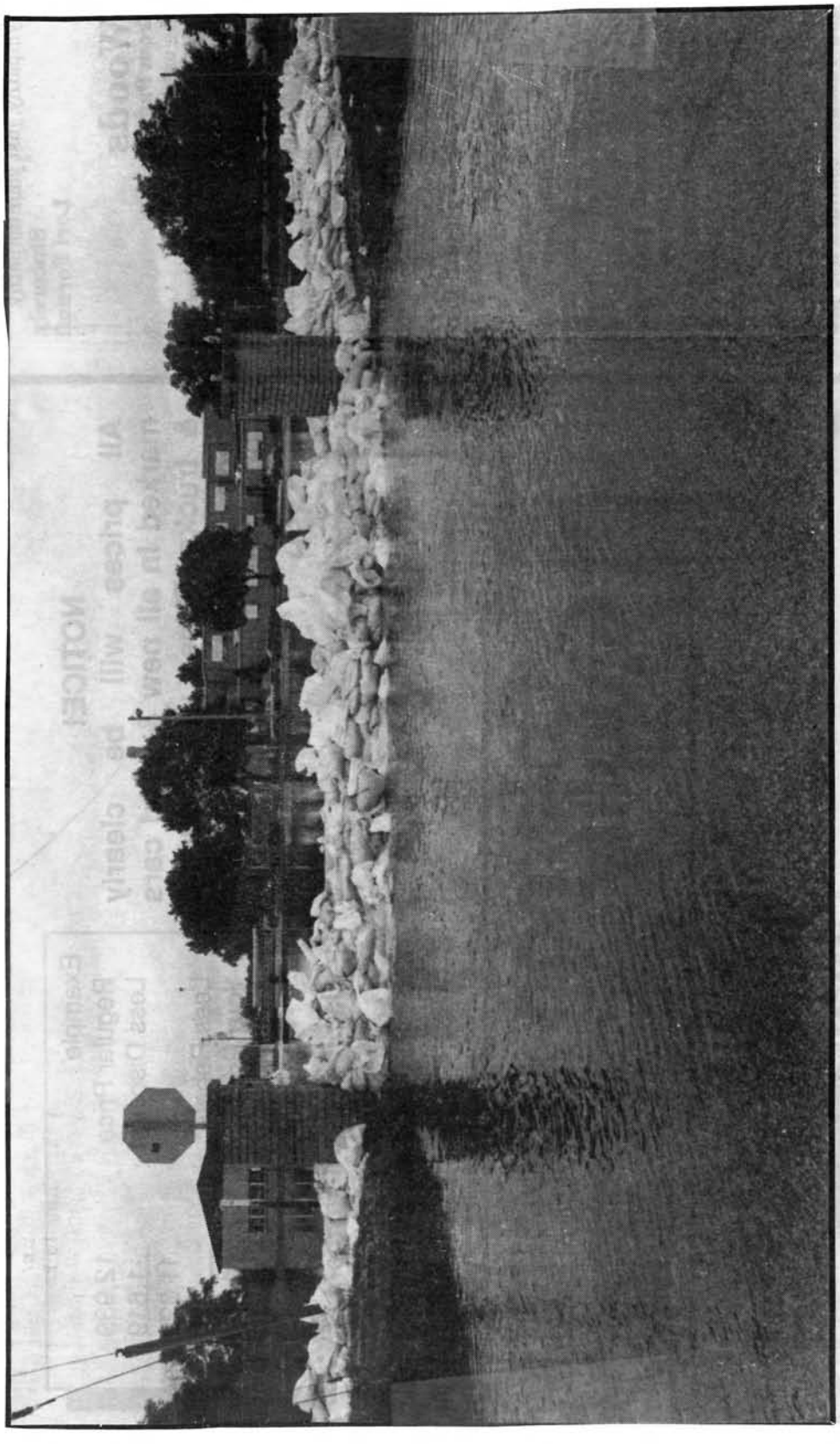
The corner of Cedar and Locust streets were still under water Friday in Bath which was drenched with 6 to 7 inches of rain Monday.

A power take off pump at Route 78 was used to lift water over the highway from a ditch in Bath. One-third of the village was under water Tuesday.

A gully washed out the end of Chestnut Street in Bath from the force of water flowing from a ditch that was dug to connect floodwaters in the village with the Bath Chute.

Photos by Bob Martin

The Mason County Democrat
September 22, 1993



A wall of sandbags was placed at the end of the parking lot at Havana High School early Tuesday evening when water began pouring through and down Harpham Street to Main. A 4 to 5 inch rainfall Monday night caused the water at Sand Lake to rise to record levels, flooding the south corner of Havana. Bath was also inundated and water was reported in the roads at Easton and Forest City as well.

Unidentified Article from 1993

Residents cope with flooding

Saturated aquifer causes water to rise

The Associated Press

HAVANA, Ill. — Like thousands in the Midwest, Julie Reed has spent months fighting a flood. The basement is awash, the water heater ruined, the building foundation weakened.

What's strange is that her house is two miles from any river.

The flood that shows no signs of receding anytime soon comes from an underground lake so swollen with rainwater that it has risen above ground.

Tears welling, Reed described the frustration: water pumps running constantly, bringing a new baby home to a damp house with no hot water and, most of all, knowing the high water won't go away.

"They say it will be a couple of years before the water really leaves," Reed said. "Our next big worry is what will happen when the ground freezes. It's so soaked with water that it could crush the water pipes."

Ponds and streams have sprung up everywhere in western Mason County, a farming area about 35 miles southwest of Peoria.

Three state roads and a dozen county roads have been closed at one time or another. Up to half the farmland might not be harvested. Sandbags surround houses to keep out the new streams, while pumps work furiously to empty basements of seepage.

The cause of all this flooding is the Sankoty Aquifer — trillions of gallons of water suspended in Mason County's loose, sandy soil. Almost twice the normal amount of rain has fallen there over the last year, filling the aquifer far beyond capacity.

But the aquifer can't drain into the Illinois River, as it usually does, because the river is at flood stage.

That means the underground water has risen above ground in low areas, forming ponds that drain into homes, businesses and fields.

Only ducks seem happy. They now enjoy "Sand Lake" — acres of waist-deep water in what are normally dry fields.

The boundaries of flooded roads must be marked with small flags so drivers can creep through. Road crews dump load after load of gravel to raise highway beds above the water.

When torrential rains hit a couple of weeks ago, Havana and nearby Bath got a taste of the flooding that plagued Mississippi River residents all summer.

The Havana Dairy Queen was surrounded by water 20 inches deep. Only emergency sandbagging and around-the-clock pumping kept water out of the restaurant, owner James Meyerhoff said.

"A lot of homes are still flooded," he said. "They're in a dilemma about whether to pump the basements out. The ones that pumped them out have had walls collapse and floors buckle."

Residents know they are only one good rainfall away from another flood. With the ground soaked, rain has nowhere to go but into their homes.

While a flooded river will subside in days or weeks, a flooded aquifer drains much more slowly — perhaps only two or three inches a week. If the area sees normal rainfall, it could take months for the pooled water to drain away and even longer for the soaked ground to dry out.

If rain falls in buckets — well, people don't want to think about that.

AP photo

A man walks around sandbag dikes used to divert water from the overflowing aquifer away from the railroad tracks in Havana, Ill.

The Mason County Democrat
December 29, 1993

The Mason County Democrat, Havana, IL, December 29, 1993 Page 2

Washington Okays Waiver For "Seepage" Flooding

While the National Flood Insurance Program (NFIP) specifically excludes coverage of losses due to seepage or other sources of underground water when no surface flooding has occurred, an exception has been made that will directly affect Havana.

Donald L. Collins, acting administrator of the Federal Insurance Administration, informed Congressman Robert Michel (R-Peoria), earlier this month that he would waive the exclusion if surface flood waters were prevented from touching the property because of sandbags or flood shields or other actions taken to protect property from flood water.

Collins' ruling was made in response to a letter from Havana insurance agent Michael Snedeker who argued that homeowners shouldn't be penalized for protecting their property.

Collins agreed. "The Federal Emergency Management Agency (FEMA) does not wish to have these policy holders, who very commendably took action to protect their property and by so doing prevented covered flood damage to their buildings, to be penalized by their actions."

Collins said he would waive the exclusion for loss from seepage or hydrostatic pressure so that the losses will be covered if individual, temporary structural protection, such as sandbags, prevented surface flood water from touching the insured structure.

"The waiver will also apply where the protective action which prevent surface waters from touching an insured structure was taken by the community," Collins said.

Ironically, while the sandbags at the intersection of Route 97 and the C&IM Railroad are the object of a lawsuit recently filed against the county, those sandbags, which may have prevented surface water flood damage to a number of Havana homes, could activate flood insurance coverage for residents with water in their basements.

The Mason County Democrat
December 29, 1993

Bath Official Investigates Water Deal

Bath Mayor Flood Dooley has expressed an interest in possibly working with the city of Havana in providing his community with municipal water.

Havana Mayor Allan McNeil relayed that he had met with Dooley last week to discuss the possibility of purchasing water for Bath from Havana.

Bath residents currently get their water from individual well supplies, but flooding this year has caused contamination problems for many.

"From talking to the engineers, I could see where this could be advantageous to both communities," McNeil said.

The Mason County Democrat
December 29, 1993

Council: County Must Take Lead On Ditch Project

Because part of the project lays outside the city's jurisdiction Havana officials said Tuesday night that Mason County should take the lead in advancing the proposed ditch project.

Meanwhile, Alderman James Stelter was named to head up a committee to decide what flood mitigation measures the city needs.

The council discussed working with the county on a long-term solution to the flooding problem at their meeting Tuesday night.

Alderman James Trimpe suggested the council vote officially to work together with the county.

"That might be a little premature," suggested City Attorney Don Boggs. "There's no plan on the table yet. You would be voting without knowing exactly what the city's role would be."

A proposal has been made to construct a $1.3 million ditch from Sand Lake through the city of Havana, but council members questioned who was in charge of getting things going.

Mayor Allan McNeil indicated that he did not think it would be appropriate for him to get vocal in the county "outside my authority and jurisdiction".

"I think its fairly evident and obvious I would like to cooperate with those people, but I can't take the leadership, the county's got to," McNeil said.

He added that he was under the impression that the county was working on finding grant money for the ditch project. McNeil noted that taxes couldn't even pay the interest on the debt it would create unless some grants are sought to pay some of the cost.

"People want answers and I don't feel we're getting anywhere," said Stelter.

"Talk to the county, not the city," McNeil suggested.

"They want to know to what extent you'll cooperate," Stelter pressed.

"I haven't said 'no' yet," McNeil replied.

One major question in regard to the ditch is how will it help city residents. McNeil reiterated that it was not expected to have any appreciable effect on water in peoples' basements.

Stelter noted that "other things" could be added to the ditch that would help with drainage.

Other things, such as individual drainage lines are not currently part of the $1.3 million ditch project.

McNeil suggested Stelter head a committee to come up with a plan for a mitigation project that would help the city. He also suggested that the committee look into ways to pay for the project.

Boggs suggested insurance companies as one possible source of funding.

"They may find it cheaper to contribute to something like this than pay the insurance," he said.

Aldermen Trimpe, Steven Spring, Ed Ray and Robert O'Shaughnessy volunteered to serve on the committee with Stelter.

The council also directed Boggs to write a letter informing county officials that they were forming a committee to come up with suggestions, but were awaiting suggestions from the county as well.

The Mason County Democrat
December 29, 1993

Volunteers Lay Pipe

Volunteers worked several days last week laying out pipe in preparation for pumping water from Walker Forge Pond to the Illinois River.

Volunteers helping with this operation included Speed Dowell, Lynnea Dowell, Kevin Miller Penny Jacobus, Ed Karasek, Ken Meyer, John Roat, John Fisk, Bill Row, Ed Haage, Robert W. Martin, Jr., Bob Oest, Larry Hatfield, Harry Fornoff, Steve Fornoff, Randy Fornoff, Darryl Fornoff, Roger Thompson, Jim Stelter, Eric Stelter, Eldon Frye, Julius Stelter, Louis Stelter, Dan Roat, Kevin Donoho, Dale Osing, and Dick Heinie.

Businesses and friends and their donations included Havana Metal Culverts (culverts), David Larson (six inch pipe), Petersburg Plumbing and Heating (pipe fittings), Griffin Electric (extra material for fittings), and Lee Gruber, Lewistown, (aluminum welding).

Oney's furnished coffee for the workers and Ceil Stelter, Shirley Fornoff and Mele Oswalt furnished cookies and donuts.

Volunteer workers put a culvert under the road by the Catholic Cemetery Thursday.

The culvert will be used to hold the pipe installed to carry water from Walker Forge Pond with the pump loaned by the City of Havana to county officials.

The Mason County Democrat
January 5, 1994

Flood Assistance Meeting Set For January 26

While some flood-affected Mason County residents feel like nothing is being done about the flooding, Cindy Geuder doesn't agree.

When the flooding first began the Central Illinois Economic Development Corporation (CIEDC), also known as Community Action Agency, immediately applied for flood mitigation funds from the Federal Emergency Management Agency (FEMA).

Among the programs they applied for was the HOME program, designed to provide low interest loans, and the Community Service Block Grant (CSBG).

According to Geuder, director in charge of managing the HOME program, about $2 million has been approved for the five county area served by CIEDC. The budget for the funds was approved in mid-December and Geuder says she was hired right away.

"I was whisked off to Springfield for two days of training," she said, before coming to Havana to open an office on the second floor of the "old jail" on the 200 block of N. Broadway.

Geuder plans an informational meeting for residents throughout the county on January 26 at the C.I. Chester Center.

That meeting is for homeowners, community officials, farmers, business owners - anyone who could possibly benefit, Geuder said.

"When you have a disaster, there's lots of devastation. We have to look at the future and how we can economically help the community," Geuder said.

The list of options includes obtaining new land, new home construction, and relocating some homes to higher ground.

"My long range goals are to get people educated as to what loans are available, qualify them, and then look at moving them or rebuilding their homes when the danger of flooding or frost is gone," she said.

Geuder noted that you can't remodel homes when there is still water in the basements to deal with and the threat of problems from frost and freezing.

"We don't want to sink thousands and thousands of dollars to do a quick fix when we can look long range about fixing it permanently," she added.

Funds from the HOME program will fill in the gaps not covered by either insurance or FEMA.

The first source of funding will be through the insurance benefits an homeowner might receive, Geuder said. That would be followed by FEMA mitigation funds which can cover up to 50% of the remaining cost for rehabilitation. The HOME program kicks in after that, providing low interest loans to cover the remaining costs.

Cathy Blankenship is in charge of the CSBG flood grant program designed to assist low income households with utilities, and cleaning supplies, water heaters, and, in some cases, even furnaces. A total of $25,000 has been allocated to Mason County for that program, with another $21,900 in direct client assistance for both Mason and Fulton counties for flood victims who have had to maintain two residences because of the flooding.

The HOME office will have four full time staff members. In addition to Geuder there will be a case manager to work directly with families, a construction specialist who will be working directly with contractors, and an office receptionist.

Those who want more information about the flood mitigation programs may call 543-2594 where applications are being taken by appointment.

The Mason County Democrat
January 5, 1994

County Wants Solution To Water Before Spring

by Wendy Martin

Members of the Mason County Board Flood Committee agreed Monday morning that they'd like to have a solution to the county's high water problems in place by spring before seasonal rains have a chance to aggravate the situation.

Whether they can avoid additional flooding is unknown, but board members indicated they felt they could lessen the impact of flood waters if they did something now.

On the top of their list is finding a way to drain down Sand Lake enough to forestall surface flooding in the spring.

Board members Richard Heinie, Dale Osing, James Griffin and Henry Imig met with Cindy Geuder who will be administering the HOME flood mitigation program from the Federal Emergency Management Agency (FEMA). They had hoped to find some funding leads through Geuder to get something under way.

Although a super ditch has been discussed at length, board members doubted anything could be started in time for it to help the immediate situation.

Committee chairman Heinie suggested that a drainage pipe, similar to what had been reported to exist in the distant past between what is now called Sand Lake and the Illinois River, be tried instead.

Heinie added that it would probably require easements only, which would be a lot easier to obtain than purchasing land for the ditch.

Board member Osing agreed that they need to start something.

"We need to be looking at something that will have an impact, very strong impact, on the water situation, but could move a lot faster. Piping would be a solution...It doesn't require a lot of land problems, and we could get something done quicker," he said.

"The whole purpose of a plan is to have something in effect working for us before spring rains come and do some real serious damage...if it can get worse," he added.

Geuder asked board members if they had considered a county-wide drainage system, similar to the irrigation systems in the southwest.

However, since this is the only time in memory the water has been this high, board members questioned the need for such an extensive response.

"Just four years ago we were worried that the county would go dry and there wouldn't be enough water to run the irrigation systems," said County Clerk William Blessman.

It wasn't clear if the program Geuder will administer will have any funds for the county. The flood mitigation program apparently will concentrate in providing funds for low income residents to pay for home repairs.

According to Geuder money is also being earmarked for buy-outs of homes too damaged to be occupied.

Blessman indicated the county will continue to search for funds to pay flood-related costs.

He reported that while FEMA only approved half of what the county spent on engineering, county officials will "strenuously" appeal that decision.

The county has also received a grant for $25,000 for planning future flood mitigation action, but it is not clear at this point what those funds can be used for.

Geuder suggested the county attempt to get publicity to call attention to Mason County's problems, and noted that she has arranged interviews with area daily newspapers.

One County Board member noted that getting an Associated Press story would bring Mason County to the attention of the powers that be in Washington D.C.

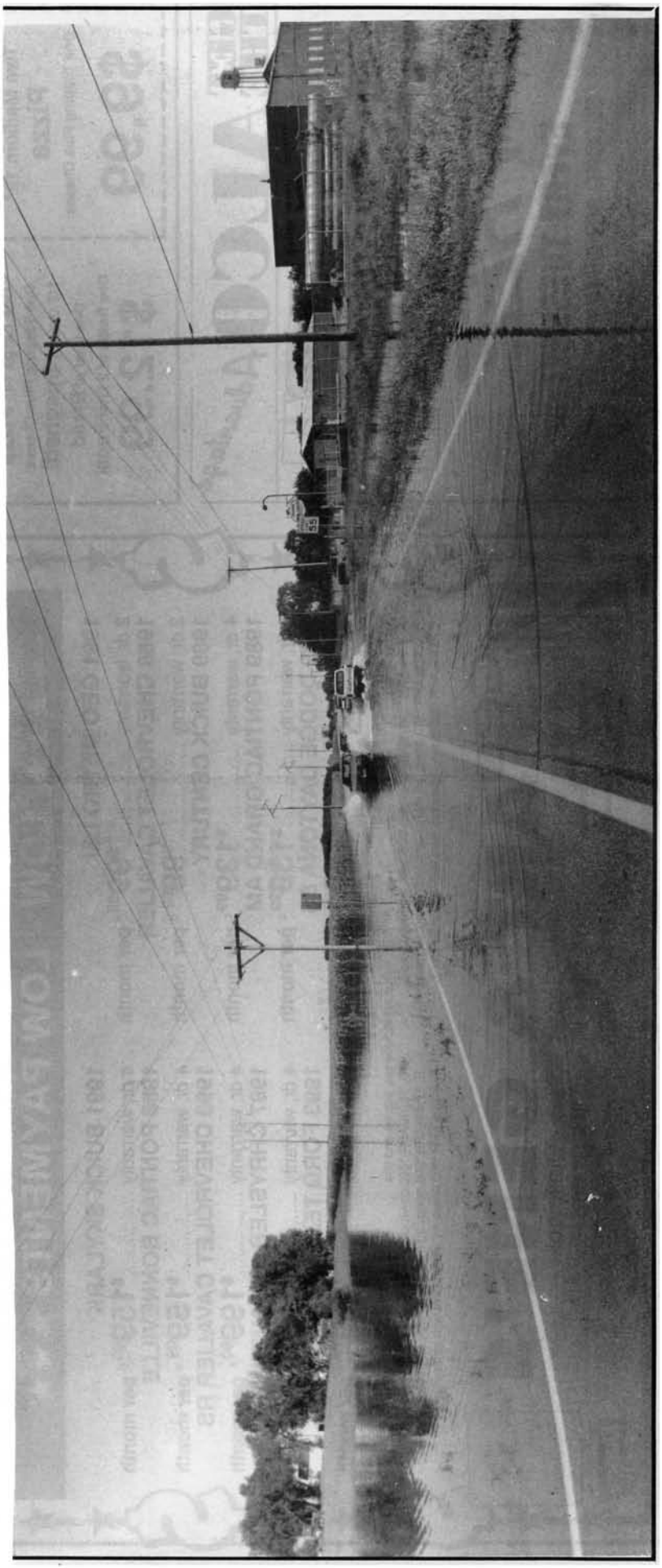
The Mason County Democrat
January 5, 1994

Appendix M

The Mason County Democrat January 5, 1994

Appendix M

The Mason County Democrat
January 5, 1994



Appendix M

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February 16 ,1994
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In 1974

Water Group Formed To Study Lowering Lake

Twenty years ago area residents were as consumed with looking for ways to address flooding problems here as they are today.

Old Times editor Mele Oswalt discovered the following story in a February 16, 1974 issue of the Mason County Democrat:

Group Formed To Study Lowering Water Level of Negro Lake

Approximately 50 interested citizens attended a meeting held at Stelters Sales and Service building on Thursday night, February 14, 1974, to discuss the problems caused by the rising water in the Negro (Sand) Lake area adjacent to and southeast of Havana.

A committee of three, composed of Dietrich Frye, Eldon Yetter and Jerry Neteler, was formed to study the feasibility of pumping the water to White Oak Creek, southwest of the area. This was suggested as a possible solution after an engineering survey was made. The engineers suggested the water could be pumped 2.15 miles south as the closest outlet.

Those landowners whose property would be affected and who were in attendance at the meeting voted to permit this action if it is found to be feasible. It was suggested that temporary pumping systems be borrowed from area farmers.

According to Trevor Jones, who acted as temporary chairman for this meeting attended by soil and water conservationists, farmers and engineers, the high water in the area is a dual problem: 1–the Mahomet underground flow, running from the eastern part of the country is rising due to heavy rainfall during the past year, and , 2 –there is a geological barrier, an underground reef of hardpan between between Negro Lake and the Illinois River which allows the water to seep out very slowly.

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Lake

from Page 1

The highest level in the Negro Lake area in memory of those present was only four feet higher than it now stands, and that was in 1926. Already it is jeopardizing hundreds of acres of land - even as far north as Forest City where water has begun to appear in basements and low places.

The records show a drain pipe was installed from Negro Lake to Havana in 1885, draining the water through the Havana sewer system and into the Illinois River. This is no longer functioning and has been out of use many years. Those attending Thursday night's meeting agreed it was no longer feasible to reinstate that system.

Future meetings concerning the matter will be announced later.

Jerry Neteler, a member of that 1974 committee, told the Democrat this week that the committee never got off the ground.

"We got about the same feed back then as now...The only way to do it was to pump. The cost at the time was prohibitive," he said.

Neteler added that it took three years to get the water down in 1974, which he said was nothing compared to the current flood.

He added that an attempt was made to dig along the highway to find an old tile to the city's sewer system, but it was never found.

The Mason County Democrat
February 16, 1994

Conclusions are disputed

Pair Cite Irrigation Wells As Cause Of Flooding

A retired mechanical engineer and a long-time resident of the Havana area have come up with a theory on what they believe has really caused the flooding this year.

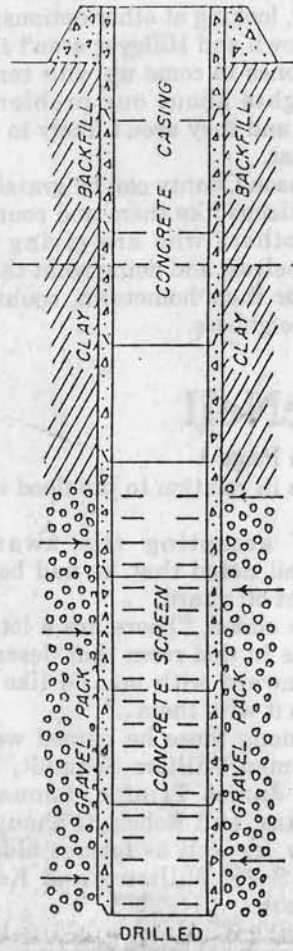
But in private meetings with city, and county officials and engineers from Environmental Science and Engineering, retired engineer Richard "Dick" Hilleyer and Havana Postmaster William Brown have had trouble obtaining acceptance for their ideas.

Hilleyer and Brown believe that irrigation wells in general, and four wells right around Havana in particular, are the source of the water that has been plaguing this area since summer.

"What is our blessing here, the aquifer, is also our downfall," said Brown.

A paragraph in a 1965 report by the Illinois Geological Survey on Groundwater Resources of the Havana Region describing artesian wells reinforces their theory that water is being forced by hydrostatic pressure up through the gravel pack around well casings from the aquifer to the surface.

The Geological Survey report says that if an aquifer is confined between two layers of non-permeable material - sometimes called hardpan - when more water is added from a higher elevation there will be hydraulic pressure.



"When such a aquifer is penetrated by a well, water will rise above the aquifer in the well to a height equal to the hydraulic head of the aquifer...Wells penetrating such aquifers are called artesian wells," the 1965 report says.

At least four wells in the Havana area are acting as artesian wells, flooding the area the new report contends.

Hilleyer and Brown believe that water under pressure under ground is able to leak out where wells have been dug through a hardpan layer, and according to their calculations, enough water could have come up to account for the flooding at Sand Lake.

The list of references for their report include a study on the Water Resources in Mason County, the Sand Lake Watershed Feasibility Study prepared by ESE, a hydraulics engineering handbook, and "just plain hydraulic engineering facts plus common sense", they say.

Among the facts they recite is a note that in 1960 there were only 11 irrigation wells in Mason County.

"The irrigation boom started in the late 60s and 70s, with several hundred or perhaps even thousands of wells existing now in Mason County."

The pair disputes ESE reports that the last four years have been wet years. They believe that gravel areas around the wells allows rainwater to get back into the aquifer faster so that pressure can build up

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February 16, 1994
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from Page 1
faster.

"The high water levels have risen, since 1965, in direct correlation with the number of irrigation wells. This proves that we are not looking at a '100 year flood' or a '20 year flood' but that it can happen again in any wet year from here forward unless something is done," they write.

In addition to flooding, the pair expresses concern that when water isn't coming up through the gravel, farm chemicals can be going down it to possibly pollute the ground water.

Their recommendations include forbidding construction below the aquifer's highest level, and "pressure grouting" existing wells to keep water from coming back to the surface through the gravel.

Both Brown and Hilleyer say they know witnesses or have seen pictures of water either coming up from around a well, or of water being pushed up and out irrigation arms.

They believe that that evidence is being ignored because of concerns of making the flood situation a "city versus farm" issue.

The pair has submitted copies of their 50-page report to a wide variety of groups, including the Soil Conservation Service, Mason County Water Authority, and Mason County Board.

It was discussed briefly at the February County Board meeting. County Clerk William Blessman noted that there is a consensus the the phenomenon Brown and Hilleyer describe probably occurs, although there is disagreement in regard to the extent to which it happens.

"There have been a lot of different ideas on cause and effect during this crisis. The board's position has been not to rule anything out. All ideas will receive due consideration," Blessman said.

The Mason County Democrat
February 23, 1994

$1,467,000 Set Aside For Buy-Out Of Scarborough

Preliminary approval has been given to provide the state of Illinois with $36 million to aid victims of the Great Flood of '93, including $1.467 million to buy out 20 homes in and around Scarborough Estates.

The subdivision is among the areas in Mason County that has flooded from below since July as the water level of the aquifer approaches ground level.

According to Mayor Allan McNeil the figure announced by Governor Jim Edgar's office Wednesday matches to the dollar what the city had requested for the besieged subdivision located just past Mason District Hospital on Franklin Street.

McNeil said the application papers he received from the governor's office had a deadline of March 15, but he expects to have them completed and submitted well in advance of that date.

"The application is a formality. It's virtually certain we'll get the money in a few weeks (after that)," Mc Neil said.

He added that two buyouts are currently being planned. In addition to the initial 20 homes in the Scarborough area, there is a "high probability" that 46 more homes will be purchased in Havana and 25 in Bath.

The grant application seeking the buy-out for Scarborough Estates sought an average of just over $73,000 per home. The actual amount each homeowner receives will depend on how each property is appraised, based on pre-flood conditions.

Over the weekend McNeil said he was not sure how the process will work, but he intended to suggest that work on obtaining appraisals begin right away to facilitate the process.

"If people knew some money was coming, at least they could go out and begin to make arrangements," McNeil said.

Three-fourths of the buy-out will be funded through federal sources. The remaining quarter will be covered by a Community Development Action Program grant from the state.

If the buy-out comes to pass, the land will eventually belong to the City of Havana with the condition that no one will be permitted to build on it ever again.

The Mason County Democrat
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Page 1 of 2

Need a place to go, way to get there

Quick Thaw Causing More Woes For Scarborough Area Residents

An estimated 200 to 250 Havana school children will have to find their own ways to school until area roads improve.

At the request of Havana Township Road Commissioner Robert Oest School District 126 has been asked to stop running busses on all roads south of U. S. Route 136 and east of Route 97 to the Easton Blacktop.

Additional roads may be closed as the frost leaves the ground, and decisions will be made on a day-to-day basis, said school superintendent Dr. Jack Wagoner.

Even the roads in the Laurel Hill Cemetery have been closed to vehicles for the time being.

Some county and township roads in the Havana area feel like sponges when you drive on them following the quick thaw that took place last week. Franklin Street, the road that leads into Scarborough Estates subdivision deteriorated quickly, turning the road to mush.

Emergency Services and Disaster Agency Coordinator Greg Griffin closed the road to all but local traffic Friday, but traffic over the weekend included both sightseers and residents moving out.

"We expected it would happen, but we never dreamed it would happen that quick," Havana Mayor Allan McNeil said.

Township and city officials worked together over the weekend hauling rock to the road in an attempt to stabilize it.

At least one family moved out over the weekend because they were afraid they would become marooned, and unable to get to work.

Allen and Debbie Trone received temporary assistance from the Salvation Army to stay at a local motel.

Trone reported that roads in the subdivision may soon be as bad as the road leading to it.

He said he was standing in the street looking at his compact car on Friday when he saw water bubbling up.

"I put my heel down on the black top and water shot out," Trone said.

"I called the police and they

continued on Page 2

Thaw from Page 1

came out. At first they didn't think too much about it, until their squad car started sinking," Trone added.

Another family moved out over the weekend after they reportedly received funding from the Federal Emergency Management Agency (FEMA) to provide temporary housing in Pekin for up to 18 months.

Griffin suggested that residents could use the temporary housing grants through FEMA until the federal buy-out of the subdivision is completed. **(See BUY-OUT)**

He said residents need to keep in touch with FEMA to get the housing assistance. While the help is available, he indicated it takes persistence to get grant money.

Others, including the McNeils who live in the subdivision, fear they have no other options at this time.

Generosity by area residents may provide some assistance. Wesley and Dixie Hilst, owners of the River Park Retirement Home have offered the temporary use of their facility to lodge stranded residents.

Work is also continuing to obtain trailers from FEMA.

Temporary use of a lot has been offered that could hold ten trailers, but McNeil indicated that FEMA needed a firmer commitment on how many are needed.

"They told Greg (Griffin) they didn't want to move ten trailers in and then have only two people use them," he said.

Griffin agreed. "For the first time this weekend we got seven residents to commit that they would use the trailers," said Griffin.

Efforts to get assistance were bogged down by the Monday state holiday.

Both McNeil and Griffin had a list of government offices they planned to contact first thing Tuesday.

"If it cools off again that might save our bacon another 30 days. A lot have moved out this weekend. Sharon and I talked it over and we'll stay as long as possible. We don't know where we can go," McNeil said.

Water forces Havana families out

Rich Saal/The State Journal-Register

Havana Mayor Allan McNeil stands in the flooded basement of his home in Scarborough Estates. McNeil will probably be forced to abandon his home when spring arrives and access to the subdivision through fields is cut off.

Government to buy 637 flooded homes

By STEPHEN BEAVEN
STAFF WRITER

The Federal Emergency Management Agency pledged this week to provide nearly $12 million to buy 637 flood-ravaged homes in Illinois.

FEMA announced on Friday that homeowners in 21 municipalities will be eligible for federal aid totaling $11.8 million. That includes $1.1 million for Havana, $540,000 for Greene County and $1.2 million for Hardin.

In Havana, the money will be used to buy 20 homes in the Scarborough Estates subdivision. Most of the people in the subdivision moved out over the last week after the only access road, Franklin Street, had deteriorated to the point it had to be closed.

"This is helpful for some of the residents," said Havana Mayor Allan McNeil, who lives in Scarborough Estates. "It's a big deal."

The state applied for $1.4 million to buy 20 homes in Havana, Gov. Jim Edgar announced two weeks ago. McNeil hopes the state will make up the approximately $300,000 the federal government won't provide.

Offers on the houses may be made in the next three months, McNeil said. But he had no timetable for the rest of the buyout process.

The approximately $1.4 million the state asked for averages out to about $73,000 per house, McNeil said Saturday.

"I've got my fingers crossed that we'll get a fair market value," McNeil said.

Next month McNeil will apply for funds to buy an additional 46 homes in Havana.

Athough he is happy with state and federal response to Havana's plight since its underground aquifer began to rise last spring, all of Mason County needs more money, he said.

"They've got to cut loose with more money," he said. "In Mason County alone, there's going to be millions of dollars (needed) just for the roads. This has got to be addressed. And it's only going to get worse."

All homes in the 21 eligible areas must be demolished. Local government bodies must then convert the land to green space and maintain it.

Other areas eligible for federal funds include:

Twenty-seven properties in the village of Fults, for $535,800; 192 properties in Monroe County for $3.225 million; 43 properties in Hardin, for $1.2 million; 69 properties in Jersey County, for $829,800; three properties in the village of Browning, for $51,000; 33 properties in Pike County, for 439,200; eight properties in the village of Rockwood, for $51,000; and 17 properties in the village of Evansville, for $222,000.

Four properties on Kaskaskia Island, for $55,200; 12 properties in Randolph County, for $229,800; 29 properties in East St. Louis, for $339,381; 21 properties in Adams County, for $140,013; 36 properties in Greene County, for $540,000; 20 properties in Kampsville, for $600,000; 38 properties in Calhoun County, for $977,846; 41 properties in Madison County, for $825,000; five properties in the village of Pearl, for $75,000; five properties in the village of Elsah, for $150,000; three properties in the village of Hamburg, for $111,900; and 11 properties in Warsaw, for $132,000.

Aquifer flood persists after rivers retreat

By STEPHEN BEAVEN
STAFF WRITER

HAVANA — Since Franklin Street Road closed about nine days ago, the half-dozen flood-weary families that still live in Scarborough Estates have been taking an alternate route.

They drive out Illinois 136, east of Havana, turn into the parking lot at the Red Lion Motor Lodge, take a right into the cornfield, and drive through to their subdivision.

In Havana, where an underground aquifer has created emergency flood conditions since last summer, this is known as coping.

But with the spring thaw and potentially heavy rains imminent, the worst may be yet to come.

"What's going to happen down the road, I don't know," Mayor Allan McNeil said last week. "But it's scary."

McNeil is still living in Scarborough Estates, pumping water from his basement all day, every day. But he may have to move soon. When the weather warms and the cornfield that is his only access to home thaws, the makeshift road he and his neighbors have been using will turn to muck.

"When it heats up, I'm not going to have any choice," McNeil said. "I'm sitting here praying for the first time for it to stay cold for a while."

Since the underground aquifer in Mason County began to rise last spring, residents of Havana and the small towns around it have fought to save homes, property and farmland. At one point last fall, all three of the highways leading into Havana were closed at the same time, McNeil said. He estimated road damage in Mason County will cost "millions and millions of dollars."

Last fall, one pump was purchased and another rented with the financial help of the U.S. Soil Conservation Service. Those pumps are now at work on the north and south sides of Havana, McNeil said.

Water along Illinois 97, south of town, was diverted last year through farmland to White Oaks Creek to avert potential flooding

See **HAVANA** on page 14

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February 27, 1994
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HAVANA

From page 9

of Mason District Hospital, Havana High School and hundreds of homes. Farmers subsequently filed suit against the city and the county.

With the arrival of spring in the next month or so comes the potential for more flooding. As the Illinois River rises, the aquifer will have no outlet. McNeil said Havana will "do what we have to do" to avoid a possibly disastrous spring and summer.

But there seem to be few solutions.

In the short term, said Mason County Emergency Services and Disaster Agency director Greg Griffin, pumps will be used to to stay ahead of the water. Long-term solutions are being considered by the Soil Conservation Service.

Pumping, McNeil said, affects only surface water, leaving groundwater behind. Digging a ditch from Sand Lake to the Illinois River was discussed. But that also addresses only the surface water and presents many logistical problems, McNeil said.

One bright spot came Friday, when the Federal Emergency Management Agency awarded Havana $1.1 million to buy the 20 homes in Scarborough Estates. McNeil hopes the state will provide another $367,000 to match the sum promised earlier this month by Gov. Jim Edgar.

The land will be converted to open space, owned and maintained by the city.

Edgar's office also has said there is a "high probability" that 46 more Havana homes will be purchased.

McNeil credited state and federal agencies for their help, but said the entire county needs more help to get by. He and his neighbors, he said, have been counting on the buyout.

Like McNeil, Terry Stein hasn't moved yet. When Stein, his wife and two children are forced to move, he's not sure where they'll go.

"We've got no place to go right now," Stein said. "We don't really want to leave everything here because of the vandalism. I guess that's the biggest (concern)."

Stein's basement flooded for the first time in July and has had water in it continually since the fall, he said. He remembers lying in bed one night when he heard a pop that sounded "like a shotgun." He went to the basement and found a crack in the foundation.

Stein said he will accept the federal buyout. But he's not looking forward to it.

"I like the house," Stein said. "It's a well-built house. I'd hate to see it bulldozed down."

Mike Cowan and his family moved out on Monday. Moving was difficult, Cowan said. But staying was worse.

"It's kind of (tough) when you have to leave a house you've lived in for 16 years," Cowan said. "It was a sad moment when we took the last load. It was a sad moment. But it was a relief. It was just too much of a hardship."

The Mason County Democrat, Havana, IL, March 9, 1994, Page 8

"We still have a crisis - fear the worst is yet to come"

White House Task Force Takes A Look At "Real America" From Mason County

For seven days last week a dozen Washington D. C. area officials left their east coast offices to take a look at what one of them called "real America".

One of the three-man teams spent Wednesday morning in Havana finding out face-to-face what local officials have had to deal with - and are still dealing with - and they looked for suggestions on how to make the system work better.

The Floodplain Management Review Committee headed by Thomas Wehri is charged with reviewing what happened in the Flood of '93.

In addition to looking at what happened physically, they are also looking at the various responses - was done, what worked and what didn't. From that information they will be making recommendations for changes in policies and programs in the future in the area of flood plain management and water resource policy.

Among those who observed the meeting were representatives of Senators Paul Simon and and Carol Mosely Braun.•

WE'RE NOT THE SAME...

Speaking on behalf of the county County Clerk William Blessman was the first to emphasize that the situation in Mason County was different than that of the rest of the country affected by the Flood of '93.

"Mason County is in the unique position of being lumped in with the Flood of '93, when the situation is very different," Blessman said.

He explained that while the Great Flood came and then went away, the water is still here.

The water here is in the Mahomet-Teays Aquifer, which is about 300 feet deep. It is usually 12 to 15 feet below the surface.

Blessman explained that three conditions led to the aquifer rising: heavier than normal rainfall; lack of the need to run irrigation systems which would draw down the level; and the high level of the Illinois River which prevented the aquifer from discharging, causing it to back up.

"When (the aquifer) rises bodies of water appear in depressional areas. When they fill up they spill over and act like a normal flood, and create a secondary flooding situation," Blessman said.

Two communities in Mason County, Havana and Bath, were inundated by run off flood waters when a heavy rain came in mid-September after the aquifer was already very saturated.

Havana Mayor Allan McNeil attempted to describe the scope of the situation by describing the size of the aquifer.

It covers 840,000 acres and measures 70 miles by 12 miles, and it recharges at a rate of 350 million gallons a day, he said.

"If it were above ground we'd be talking about the largest body of water in the state of Illinois flooding," McNeil said.

Descriptions were provided of the mold in homes, sidewalks caving in, foundations sinking, sinus and breathing problems.

"People in our area have handled it about as well as can be expected, but the people are really getting stressed out now," said McNeil, who lives in one of the worst affected areas.

McNeil also speculated that problems would continue and would get worse.

"We're all holding our breath when this thaw comes. I think it will be devastating. It will bust our townships. We'll be looking at millions and millions of dollars of roads that will be absolutely disintegrated.

McNeil added that it was wrecking havoc on the city's sewer system as well where sand pumped from basements was clogging combined sanitary and storm sewers.•

NO ONE KNEW...

Committee chairman Wehri asked Emergency Services and Disaster Agency coordinator Greg Griffin if Mason County had a hazard mitigation plan in place before the disaster struck.

"When it first started it was just a trickle," Griffin noted. "We didn't know where it was coming from, or how long it would run. And it was a holiday (Labor Day) weekend."

State agencies - the Illinois Department of Transportation's division of water resources, and State Water Survey were in the same boat as local officials. No one knew what was happening, Griffin added.

"In Mason County we have a plan for tornados and fires," commented Blessman. There's not been much reason before to plan for floods."•

DEADLINES ARE WRONG...

Mason County doesn't fit into the mold of the typical Flood of '93 disaster area, and the disaster deadlines set for other locations just don't fit here either, federal representatives were told.

For example, noted Griffin, the Disaster Assistance Center opened in August, long before flood waters headed down the streets of Havana and Bath.

Jane Poertner, executive director of the Central Illinois Economic Development Corporation added that her agency has received funds to do home repairs that must be accomplished by a certain date, but repairs haven't even been started because the water is still there.

Jan Horton, representing the Federal Emergency Management Agency expressed the same problem in her own agency.

"FEMA sees a beginning and an end, but this county is still flooding, then and now," Horton said.

One of the difficulties Mason County faces is the "window" for public assistance funding is already closed when public facility damage - such as the disintegration of Franklin Street - is still occurring.

In fact, the cutoff date for flood assistance from FEMA was October 22, 1993.•

HELP IS NEEDED...

A variety of suggestions were offered on how to best help disaster areas in general and Mason County in particular.

One problem that plagued local officials was there was no clear definition of the roles of the various governmental entities.

"We know what needs to be done, but we need the dollars and the freedom to do them. We also need the expertise," Blessman said.

Wehri suggested that more flexibility in the system would be appropriate for Mason County, and wondered if a coordinator of some kind would be helpful to identify what kinds of help are available.

While Community Action (CIEDC) has taken over the role of coordinating assistance programs, Horton said she thought engineering help is most needed.

Blessman agreed. "We've spent more than $50,000 on engineering. That's a lot of money to us. We've learned some about the water problem, but not enough. Many believe Sand Lake is the problem. We would like to know if it is."

While the Soil Conservation Service is looking into that question, Blessman said the county would be interested in listening to a second opinion.•

FLEXIBILITY IS THE KEY

In addition to providing more local authority, McNeil noted that one of the most frustrating problems has been rigidity in rules that don't allow for the most logical responses.

The prime example was the emergency response of September 14-15, 1993 when a wall of sand bags was placed across Route 97 at the C & IM Railroad tracks on the south side of Havana to staunch a torrent of water flowing into the city.

"That action by emergency personnel prevented a great magnitude of damage. The water was diverted to other areas, and created other damage, but less," Blessman said.

He noted that there are no provisions that the subsequent damage could be paid for, even though if the water had hit the city with its full force instead FEMA would have paid for that unquestionably.

The water would have been in the nursing home, the high school, and the city wells. There was no question, local officials agreed, that the right decision was made.

"That decision saved the government millions of dollars in claims," McNeil noted.

"There's no incentive to prevent damage from your point of view, except good common sense?" Wehri asked.

The decision was made on good sound economics, McNeil said. He added that they had saved millions of dollars in legitimate claims, but the government was denying those who ended up getting hurt.

"If we had done it wrong the government would have paid, but because we did it right to save money and do the best for the people those who bore the brunt of it were left out in the cold," McNeil said.•

TRADITIONAL ANSWERS...

Wehri wondered about the Mason County response to flood insurance coverage for affected areas, and turning areas into wetlands.

Wehri noted that there appeared to be only two flood insurance policies in the Village of Bath, and 387 in all of Mason County.

"In Bath there was very little advance warning before the flood. A lake like Sand Lake overflowed over night and swept the town. Nothing like that ever happened before.

There was little enthusiasm for the idea of converting more land to wetlands.

"You could have a wetland that wasn't wet for 20 years at a time," McNeil said.

Local officials speculated that the cause of some of Mason County's problems may have been preventable. They suggested that perhaps the Illinois River was kept artificially high by the release of water from Lake Michigan which prevented the aquifer from draining.

The Mason County Democrat
March 9, 1994

Pumping Must Stop Going Into Sewers

No one would suggest that any Havana residents stop pumping water from their basements, but residents of East Main Street, East Adams Street and Shawgo Avenue are being asked to direct their pumps into their own yards and not directly into city sewers.

If they don't they could end up plugging their own sewers with sand, backing sewage up into their own basements from the combined sanitary and storm sewers.

The city of Havana has spent more than $12,000 running television cameras in the sewers there which have become clogged with the "sugar sand" that is being pumped into them with the water.

An estimated $23,000 to $24,000 has also been spent lining eight of eleven sewers, and nearly $60,000 worth of additional television inspection and lining has been recommended.

The city will employ an inspector to make sure none of the 60 homes on the Main-Shawgo-Adams loop is pumping into the sewer, "or we'll be right back in the muck" said a city official.

Mayor Allan McNeil told council members Tuesday night the city may be able to turn the bills over to the Federal Emergency Management Agency (FEMA), but the city cannot get approval until a FEMA inspector makes a visit here.

That could take time since there are only one or two inspectors in the state at this time, McNeil said.

It also takes time to get money from FEMA. McNeil announced that the City of Havana has just received their first check from the federal agency, representing 90% of the expenses Havana submitted. The check for $48,900 covered emergency flood response activities by the city up to October 22, the cut off date set by FEMA.

The Pekin Daily News
March 23, 1994

Havana treads water waiting for flood aid

By Times staff

HAVANA — Ed Haage thinks city residents' efforts here to bring home government flood aid haven't garnered much more than bureaucratic hot air.

"We've talked it to death," Haage said at an ad-hoc flood meeting Tuesday among state and local officials and residents. "All we hear is the city doesn't have any money, the state doesn't have the money and the feds don't know about the money.

"It's been a big frustration."

The meeting, called by Rep. Bob Michel's Chief of Staff, Ray LaHood, focused on long-term flood solutions for the water-plagued city. The residents attending questioned the status of the government buyout of flooded homes and offered their own solutions for the area's aquifer flooding.

State officials countered that buyout funding still is being processed, and warned that finding a long-term solution will take more extensive engineering studies.

Merry Eccles / Times correspondent

Ray LaHood, Rep Bob Michel's chief of staff, talks with Havana Mayor Allan McNeil, residents and state officials at a special meeting Tuesday about solutions to aquifer flooding in the area. LaHood was representing Michel at the meeting but also is the Republican candidate to replace the retiring, long-time congressman.

But for the short-term, officials agreed to study the residents' proposed solution — to continue pumping standing standing water near the Walker Forge Inc. plant into the Illinois River.

Residents whose homes have been damaged by flooding heard state officials explain flood relief funding is working through the necessary red tape.

Allen Grosboll, an executive assistant to Gov. Jim Edgar, said that state agencies are in the process of putting together a buyout package for flooded homes around the city — $1.4 million for Scarborough Estates alone.

Grosboll said Havana is on the state's short list of communities needing flood help and could receive more cash through the Community Development Block Grant, increased by Congress this year for flood relief.

He added that the city also should start considering long-term solutions to prevent future floods.

Haage and Havana Alderman Jim Stelter said something should be done now, while the weather is dry.

"We need to continue pumping to control (the water)," Haage said. "We're only a five- or six-inch rain away from disaster."

Adrian Visocky, a senior hydrologist with the state Division of Water Resources, said it would probably take a seven- to eight-inch rain — what he called an unlikely prospect — to plunge the area back into significant flooding.

Visocky estimated that since September, the area's overflowed water table has dropped about four feet, mostly because of a recent spell of dry weather.

But he warned that a high Illinois River level is slowing down the aquifer's return to normal levels.

Haage and Stelter pushed for continued pumping of standing water west of the Walker Forge Inc. plant —

See FLOODS, A12

Floods

Continued from page A1

what residents now call Walker Pond.

Water from the flooded Sand Lake is flowing into the low-lying areas around Walker Forge. Residents fear a repeat of the area's worst flooding last fall, when Walker Pond flooded and water began flowing into town.

To protect Havana, the city and Mason County began pumping water away from Walker Pond late last year, lowering that standing water and Sand Lake in the process. Pumping stopped in mid-February and resumed last week after more water had gathered in the area.

Bill Koellner, chief of water control for the U.S. Army Corps of Engineers in Rock Island, said pumping could help, but warned a long-term fix still is required.

"This would be strictly a band-aid approach; it might give them some temporary satisfaction," Koellner said. He warned without a long-term plan the flooding will repeat.

LaHood, also a November candidate for Michel's 18th Congressional District seat, said pumping seemed the most feasible short-term fix but hoped for more divine help.

"I hope that's what they decide to do," he said. "But we have to hope the good Lord gives us a break on the rain."

The Mason County Democrat
July 6, 1994

The Sand Lake Decision

Since the fateful night of September 14-15 what to do about "Sand" Lake has been a constant question for local officials, whose first action was to give it a more acceptable name than the derogatory slang term it was commonly known by.

Long discussed was a proposed ditch - some called it a channel - that would be used to control how deep Sand Lake would be allowed to get before it overflowed into a spillway to the Illinois River.

Last week the ad hoc flood committee voted to recommend to the Mason County Board that they step back and re-evaluate their their flood mitigation plans, and suspend, for the time being, their efforts to obtain a grant for the Sand Lake ditch project.

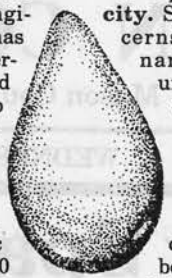
Countless hours and innumerable meetings have been held, and the committee's decision was not made lightly.

Among the items they took under consideration were:

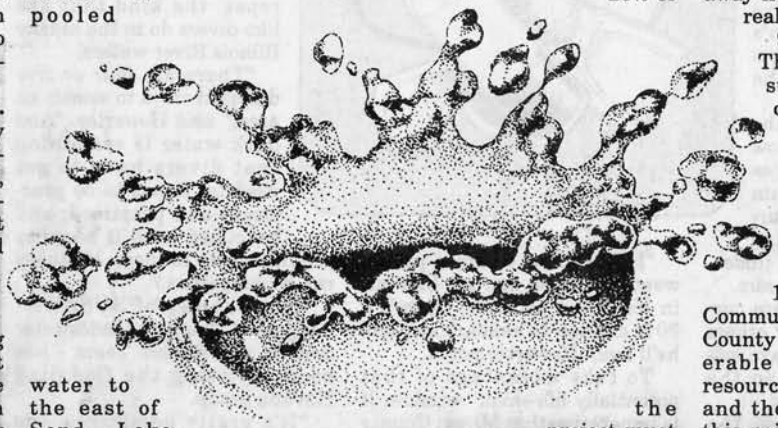
1. **Do something.** There is a perception in the area that "somebody should do something". Lack of any tangible action creates the perception that the area is vulnerable to another disaster and is unsuitable for future development.

2. **Engineering costs.** Mason County has already incurred over $50,000 in engineering costs during the flood, some of which has been reimbursed. The flood control project has cost over $7,800 so far, and is projected to cost a minimum total of $25,000. This figure could go anywhere from $50,00 to $100,000, depending on the environmental, permit and mitigation costs. If the grant is not awarded, all such costs would have to be borne by the county.

3. **404 Permit.** A good portion of the up-front engineering costs would be related to obtaining a 404 permit which deals with environmental and wetlands issues. Environmental Science and Engineering (ESE) of Peoria has cautioned that such a permit is not a certainty and would be difficult to obtain, at best. Of the anticipated 230 man-hours expected to be used to complete the planning and presentation of the Economic Development Grant, 130 of them would be devoted to the 404 permit alone.



4. **Basement de-watering.** One of the desired results of any project has been relief from flooded basements. Both ESE and the State Water Survey engineers have advised local officials that neither lowering Sand Lake or a ditch as proposed would have any significant impact on the water level in basements more than a few hundred feet from Sand Lake. They have also maintained that such a project would have very limited, if any, impact on other areas of pooled water to the east of Sand Lake. Time constraints on the grant and jurisdictional questions prohibit a more comprehensive drainage approach for eastern Havana on this grant.



5. **Open ditch through city.** Some have raised concerns of safety, maintenance, sanitation, and unsightliness of an open channel through a residential area. Changing the plans at this point to even a scaled back volume using 36-inch pipe rather than an open ditch would add to both the initial engineering costs and the total project costs. Even a scaled back project would require the same 404 permitting.

6. **Right of Way acquisition.** This would be difficult in those areas where the owner opposes the project. There is also an environmental issue of potential contamination since much of the route has been involved in commercial use for many years.

7. **Local cost share.** 20% of the project must be funded locally. This may be eligible for reimbursement through the Department of Commerce and Community Affairs (DCCA). If this source does not come through, as much as $600,000 may have to be raised through local property taxes on Havana Township. A tax rate of .25% would raise $110,000 in Havana Township and cost the owner of a $60,000 home $50.

8. **Cost versus benefit.** The Sand Lake feasibility study identifies "doing nothing" with Sand Lake other than sand bagging in the event of severe flooding as being the most cost-effective alternative by a margin of more than 15 to 1. A scaled back project would have a very narrow threshold of benefits. No benefit would occur until water in Sand Lake reached the spillway level. If a significant rainfall occurred after reaching this point, ESE estimates that the lake would overflow toward the city even with the smaller spillway in place. Every expert consulted on this project has agreed that the only significant benefit from such a project would be a degree of control over Sand Lake surface flooding. No relief from flooded basements or ground water flooding in areas away from Sand Lake would be realized.

9. **Question of chance.** The chances of being a successful grant applicant may be hampered by the fact that much of the detailed planning for the project, environmental permit issues, and right of way acquisition remain in question.

10. **Wasted effort.** Community Action and Mason County have expended considerable time, effort and resources in developing plans and the grant application to this point. Much of this effort will have been wasted if the project is abandoned or placed on hold at this point.

APPENDIX N

Plan Maintenance Checklist

We are in the process of conducting our annual evaluation/status update of the Watseka Multi-Jurisdictional Natural Hazard Mitigation Plan. Please review the following tasks and complete and return this checklist along with the necessary forms. If you have any questions, please let us know.

Jurisdiction: _____

Prepared By: _____

Title: _____ Date: _____

TASK 1: DAMAGE INFORMATION

Has your jurisdiction sustained any natural hazard-related damages to critical facilities and infrastructure within the last year?

☐ Yes ☐ No ☐ Don't Know

If Yes, please complete and return the attached critical facilities damages questionnaire.

TASK 2: STATUS OF EXISTING PROJECTS/ACTIVITIES

Please look over the attached Mitigation Action Tables for your jurisdiction and determine whether any of the mitigation projects/activities listed have been completed or are in progress (in the planning stages.)

Does your jurisdiction have any mitigation projects/activities in progress (in the planning stages) or completed?

☐ Yes ☐ No

If Yes, please fill out and return the attached Mitigation Action Progress Report for each project/activity that has been completed or is in progress.

TASK 3: IDENTIFICATION OF NEW PROJECTS/ACTIVITIES

Are there any new mitigation projects/activities your jurisdiction would like to see add to the Plan? (Remember, only projects included in the Plan are potentially eligible for federal mitigation projects funding.)

☐ Yes ☐ No

If yes, please complete and return the attached New Mitigation Project Form.

Plan Maintenance Checklist

TASK 4: JURISDICTION EVALUATION

Have there been any significant changes in development in your jurisdiction within the last 12 months (i.e. expansion of existing businesses, siting of new businesses, new subdivision development or expansion of existing subdivisions, demolition of businesses/residents to create green spaces, etc.)

☐ Yes ☐ No

If yes, please specify the type of development changes.

_____

_____

Has your jurisdiction adopted any new policies, plans, regulations, or reports that could be incorporated into this Plan?

☐ Yes ☐ No

If yes, please provide the name of the policy, plan, regulation or report and its purpose.

_____

_____

Do any new critical facilities or infrastructure need to be added to your jurisdiction's Critical Facilities Survey?

☐ Yes ☐ No

If yes, please provide the name and address of the facility.

_____

_____

Critical Facilities Damage Questionnaire

Supplemental information about ***damages to critical infrastructure/facilities*** (i.e., government buildings, schools, communication tower and radio equipment, water & sewer treatment facilities, hospitals, etc.) that have ***taken place*** in the municipalities and County is needed for the risk assessment/vulnerability analysis portion of the Plan. If you could take a moment and think about the critical infrastructure damages caused by past natural hazard occurrences and provide any available information in the form below, it would be greatly appreciated.

Please complete one record for each natural hazard event that damaged a critical facility. Do not combine multiple events on one record. Additional forms are located on the back of this page.

Prepared By: _____ Date: _____

1.) Date of Event (month/day/year if possible)**:** _____

2.) Critical Facility Damaged: _____

3.) Type of Hazard:

- ☐ thunderstorm (straight-line winds)
- ☐ hail
- ☐ lightning strike
- ☐ heavy rain
- ☐ flood
- ☐ tornado
- ☐ snow storm
- ☐ ice storm
- ☐ extreme cold
- ☐ drought
- ☐ excessive heat
- ☐ landslide
- ☐ sinkhole
- ☐ mine subsidence
- ☐ earthquake
- ☐ levee failure
- ☐ dam failure

4.) Types of Damages: _____

_____

5.) Estimate of Damages: $ _____

Mitigation Action Progress Report

As part of the Plan Maintenance "monitoring" phase, the implementation status of each project and activity listed in the Plan for the participating jurisdictions needs to be identified.

1) Please review the Mitigation Action Tables provided for your jurisdiction to determine whether any of the projects/activities listed have been ***"Completed"*** or are ***"In Progress"*** (in the planning stages.)
2) For each project or activity that is ***"Completed"*** or "***In Progress"***, please fill out the following Progress Report.

Jurisdiction: _____

Prepared By: _____

Title: _____ Date: _____

Progress Report Period	From Date: To Date:
Project/Activity Description	
Responsible Agency	
Project Status	☐ In Progress ☐ Approved by Council/Board ☐ Included in Capital Improvement Plan/Slated for Construction & Implementation ☐ Grant Completed & Submitted ☐ Letting/Contractor Selected ☐ Notice to Proceed Issued ☐ Construction Underway ☐ Anticipated Completion Date: _____ ☐ Other (please specify): _____ ☐ Completed ☐ Project Delayed ☐ Project Cancelled

SUMMARY OF PROJECT PROGRESS FOR THIS REPORT PERIOD

What was accomplished during this reporting period for this project?

Were any obstacles, problems or delays encountered?	☐ Yes	☐ No	☐ Don't Know
If Yes, please describe:			

If the project was delayed, is it still relevant?	☐ Yes	☐ No	☐ Don't Know
If Yes, should the project be changed/revised?			

Other comments:

New Hazard Mitigation Projects Form

Multi-Jurisdictional Hazard Mitigation Plan

Participating Jurisdiction _____

Prepared by: _____

Title _____ Date: _____

	Project Description	Position/Organization Responsible for Implementation & Administration of the Project *(i.e. Mayor / City Council; Public Works Director; Fire Chief / Board of Trustees)*	Time Frame to Complete the Project *(i.e. 1 year; 5 years; 2-5 years)*
1.			
2.			
3.			
4.			

APPENDIX O