Draft

Fayette County Multi-Jurisdictional All Hazards Mitigation Plan

Fayette County, Illinois

Participants:

Brownstown, Village of
Brownstown CUSD # 201
Fayette County
Ramsey, Village of
Sharon Township
St. Elmo, City of
St. Elmo Fire Protection District
St. Peter, Village of
St. Peter Fire Protection District
Vandalia, City of
Vandalia Township

May 2020

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

FAYETTE COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

FAYETTE COUNTY, ILLINOIS

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

American Environmental

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 Fayette County. Since 2002, Fayette County has been included in four 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 Fayette County is identified in bold.

Figure I-1
Federal Disaster Declarations: Fayette County

Declaration #	Year	Natural Hazard(s) Covered by Declaration
1416	2002	***severe storms***; tornadoes; ***flooding***
1681	2006	***severe winter storm***
1960	2011	***severe winter storm***; snowstorm
4157	2013	severe storms; straight-line winds; ***tornadoes***

In the last 10 years alone (2010-2019), there have been 90 heavy rain events, 34 thunderstorms with damaging winds, 22 excessive heat events, 16 severe winter storms, 13 flash flood events, 10 severe storms with hail one inch in diameter or greater, nine riverine flood events, six tornadoes, two droughts, two extreme cold events and one lightning strike verified in the County.

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

What is hazard mitigation planning?

Hazard mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and man-made hazards. This process helps the County and participating 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 an all hazards mitigation plan.

Why develop an all hazards mitigation plan?

By developing and adopting an all hazards mitigation plan, participating jurisdictions become eligible to apply for and receive federal hazard mitigation funds to implement mitigation actions identified in the plan. These funds can help provide local government entities with the opportunity to complete mitigation projects 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?

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

1.1 PARTICIPATING JURISDICTIONS

Recognizing the benefits of developing a natural hazards mitigation plan, the Fayette County authorized the development of the Fayette County Multi-Jurisdictional All Hazards Mitigation Plan (hereto referred to as the Plan). The County then invited local government entities residing within Fayette County to participate. **Figure I-2** identifies the participating jurisdictions represented in the Plan who sought Plan approval.

Figure I-2
Participating Jurisdictions Represented in the Plan

- Brownstown, Village of
- Brownstown, CUSD #201
- Fayette County
- Ramsey, Village of
- Sharon Township
- St. Elmo, City of
- St. Elmo Fire Protection District
- St. Peter, Village of
- St. Peter Volunteer Fire Department
- Vandalia, City of
- Vandalia Township

1.2 COUNTY PROFILE

Fayette County is located in south-central Illinois and covers approximately 725 square miles. **Figure I-3** provides a location map of the County and the participating municipalities while **Figures I-4** and **I-5** identify the township and fire protection district boundaries. The topography is nearly level throughout the county dissected by stream valleys and drainage ways due to glacier erosion. T he County is bounded on the north by Shelby and Montgomery counties, to the east by Effingham and Clay counties, to the south by Marion and Clinton counties and to the west by Bond and Montgomery counties. The City of Vandalia is the county seat. Fayette County is home to one state park: Ramsey Lake State Recreational Area.

Agriculture is the chief industry in Fayette County. According to the 2017 Census of Agriculture, there were 1,239 farms in Fayette County occupying approximately 76.1% (349,055 acres) of the total land area in the County. The major crops include corn and soybeans while the major livestock includes cattle and sheep and lambs. The County ranks 41st in the State for crop cash receipts and 56th for livestock cash receipts.

The top three employment sectors in Fayette County include health care and social assistance followed by manufacturing and retail trade according to the Illinois Department of Commerce and Economic Opportunity.

Figure I-3
Location Map

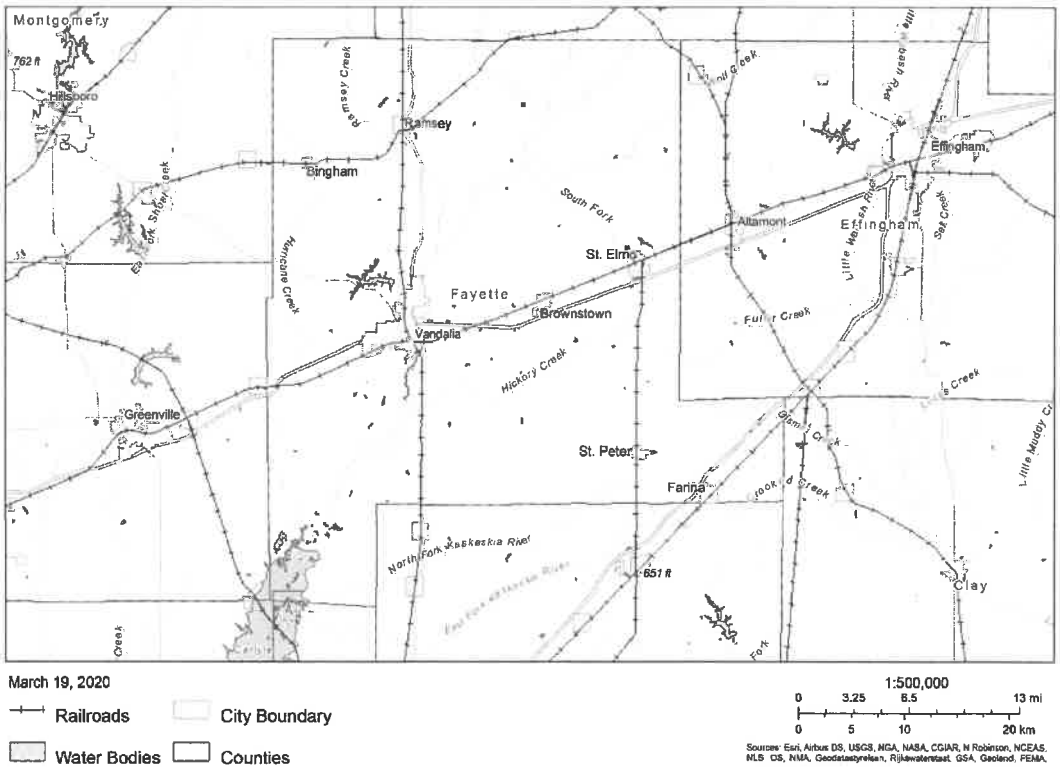


Figure I-4
Township Boundary Map

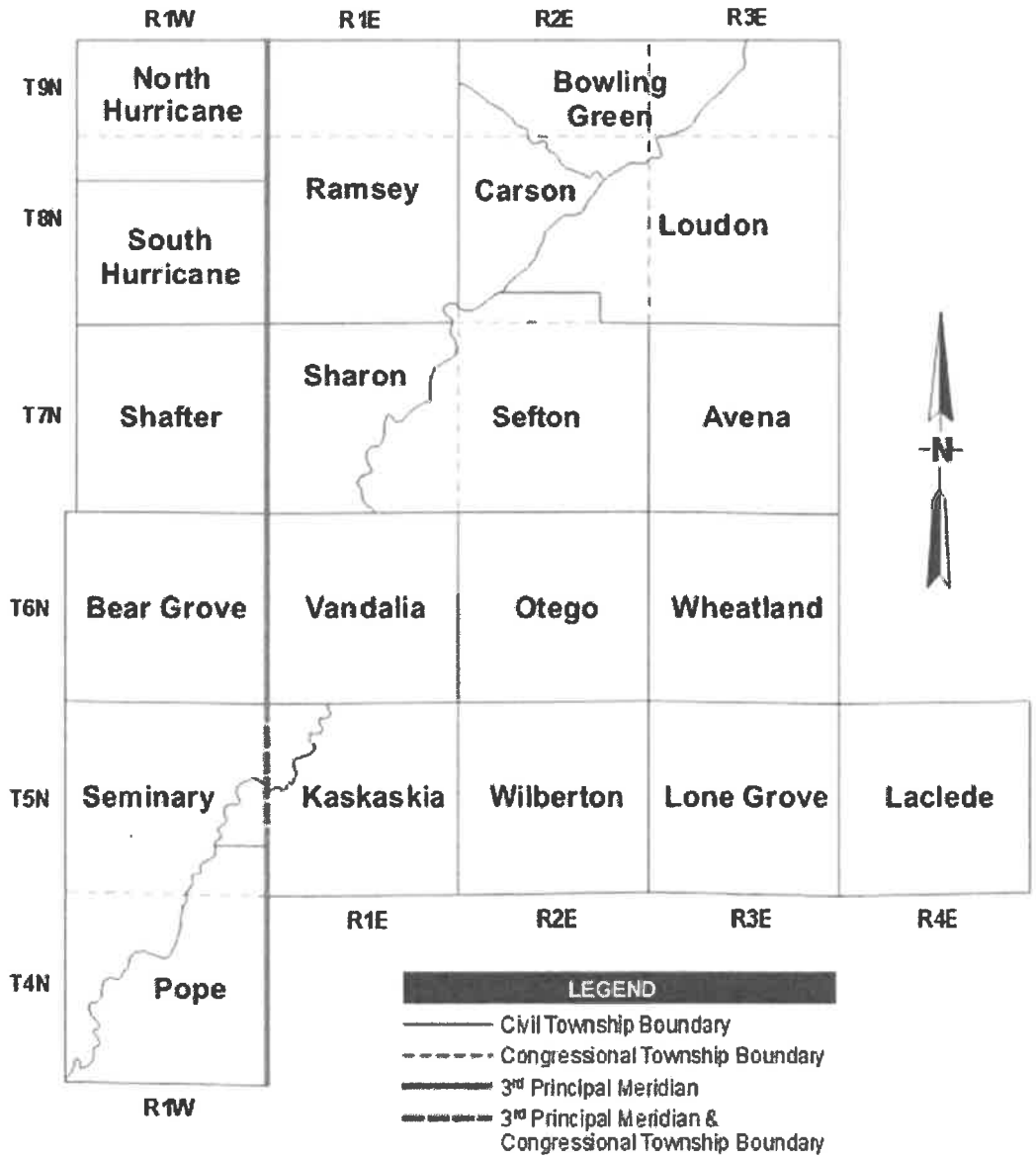


Figure I-5
Fire Protection District Boundary Map

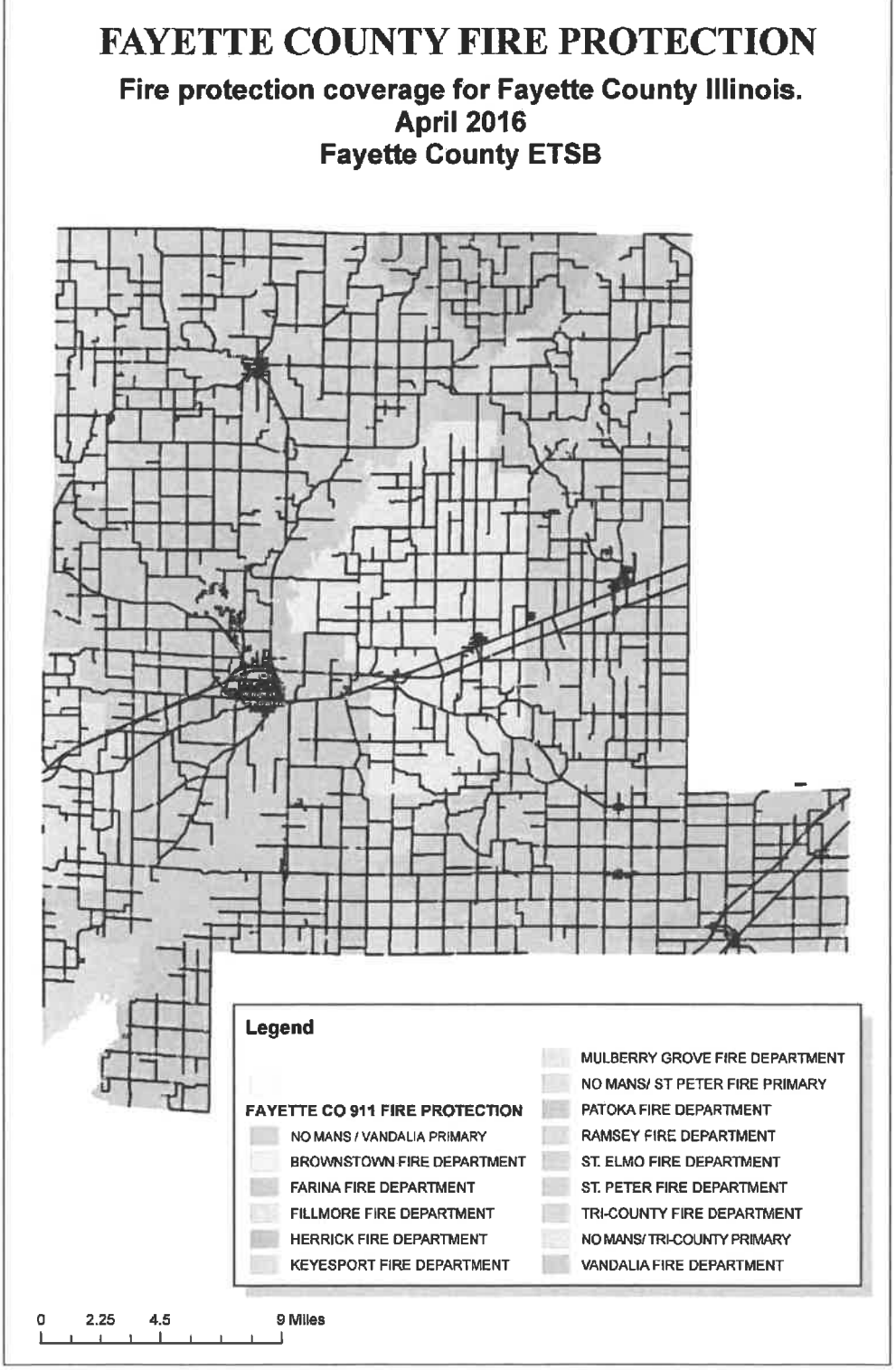


Figure I-6 provides demographic data on the County and each of the participating municipalities and townships along with information on housing units and assessed values. The assessed values are for all residential structures and associated buildings (including farm homes and buildings associated with the main residence.) The assessed value of a residence in Fayette County is approximately one-third of the market value.

Figure I-6
Demographic Data by Participating Jurisdiction

Participating Jurisdiction	Population (2010)	Projected Population (2025)	Total Area (Sq. Miles) (2010)	Number of Housing Units (2010)	Total Assessed Value of Housing Units (2018)
Fayette County (unincorporated)	10,916	11,404	720.843	4,790	$39,575,402
Brownstown	759	793	0.774	320	$2,292,657
Ramsey	1,037	1,083	1.011	458	$3,556,318
St. Elmo	1,426	1,490	0.977	616	$5,070,457
St. Peter	359	375	0.521	160	$2,187,041
Vandalia	7,042	7,357	8.117	2,667	$30,409,650
Sharon Township	2,441	---	24.771	425	$8,956,332
Vandalia Township	26,629	---	35.083	3,115	$38,380,918

Sources: Fayette County Clerk.
Illinois Department Public Health, Population Projects for Illinois Counties 2010 to 2025.
U. S. Census Bureau, 2010 Census U.S. Gazetteer Files.
U.S. Census Bureau, American FactFinder.

1.3 LAND USE AND DEVELOPMENT TRENDS

Population growth and economic development are two major factors that trigger changes in land use. Fayette County is a rural community with a population that has seen a steady decline between 1900 and 2000 from 28,065 to 21,802. Between 2000 and 2010 the population increased by 1.6% from 21,802 to 22,140. All the participating municipalities, with the exception of Brownstown and Vandalia, experienced a decrease in their populations between 2000 and 2010.

Land use in Fayette County is primarily agricultural. As discussed in the previous section, approximately 76.1% 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.

According to the Fayette County Emergency Management Agency Director, the only development and economic initiatives planned in the participating jurisdictions in the next five years is a solar farm in unincorporated Ramsey Township.

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 Fayette County Multi-Jurisdictional Natural Hazards Mitigation Plan (the Plan) was developed through the Fayette 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 Federal Emergency Management Agency's (FEMA) 10-step planning process approach. **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 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	The Consultant identified and profiled the natural hazards that have impacted the County and conducted a vulnerability assessment to evaluate the risk to each participating jurisdiction.
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 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 summarized the results of Tasks One through Six. In addition, it described the responsibilities to monitor, evaluate and update the Plan. The draft Plan was reviewed by the participants and a public forum was held to give the public an additional opportunity to provide input. Comments received were incorporated into the draft Plan and submitted to the Illinois Emergency Management Agency (IEMA) and FEMA for review and approval.
Task Eight: Final Plan	Comments received from IEMA and FEMA were incorporated in to the final Plan. The final Plan was then submitted to the County and participating jurisdictions for adoption. The Plan will be reviewed periodically and updated again in five years.

The normal planning process generally takes 12 to 14 months to complete. Due to changes in the funding mechanism, the process was compressed and accelerated to ensure the draft Plan was completed and submitted to IEMA no later than May 31, 2020. To accommodate this schedule, three Planning Committee meetings instead of five were conducted and additional coordination was handled via verbal and written correspondence.

The accelerated schedule was further complicated by the Covid-19 outbreak in the winter/spring of 2020. Executive orders 2020-10, 2020-18 and 2020-32 issued and extended stay-at-home order and prohibited any gatherings of more than 10 people from Saturday March 21 through Sunday, May 31, 2020. As a result the third Planning Committee meeting was not conducted in the traditional manner and was instead handled as a teleconference.

The Plan and development was led at the staff level by Kendra Craig, the Fayette County Emergency Management Agency (EMA) Director. 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. To ensure that all participating jurisdictions took part in the planning process, participation requirements were established. Each participating jurisdiction agreed to satisfy the following requirements in order to be included in the Plan. All of the participating jurisdictions met the participation requirements.

- Attend at least one of the three Planning Committee meetings.
- Identify/submit a list of documents (i.e., plans, studies, reports, maps, etc.) relevant to the natural hazard mitigation planning process.
- Identify/submit a list of critical infrastructure and facilities.
- Review the risk assessment and provide additional information on events and damages when available.
- Participate in the 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.
- Formally adopt the Plan.
- Where applicable, incorporate the Plan into existing planning efforts.
- Participate in the Plan maintenance.

2.1 PLANNING COMMITTEE

As previously mentioned, at the start of the planning process, the Fayette County Multi-Jurisdictional Natural Mitigation Planning Committee was formed to develop the hazard mitigation plan. The Planning Committee included representatives from each participating jurisdiction, as well as agriculture, education, emergency services (search and rescue & fire protection), healthcare, and insurance.

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 Fayette County EMA.

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

Figure PP-2
Fayette County Planning Committee Member Attendance Record

Representing	Name	Title	11/14/2019	2/20/2020	5/21/2020
American Environmental Corp.	Bostwick, Andrea	Senior Project Manager	X	X	
American Environmental Corp.	Krug, Zachary	Environmental Specialist	X	X	
Bear Grove Township	England, Daniel	Supervisor	X		
Bear Grove Township	Haupt, Gary	Road Commissioner	X		
Brookstone Estates of Vandalia	Dothager, Shelley	Executive Director		X	
Brownstown CUSD #201	Kistler, Kent	School Board Member		X	
Brownstown CUSD #201	Shackleford, Mike	Superintendent	X	X	
Effingham Co. EMA	Jacobs, Pam	Coordinator	X	X	
Fayette County - Board	Beckman, Jeff	Chairman	X		
Fayette County - Board	Bernhardt, Dean	Board Member	X		
Fayette County - Board	Cole, Keith	Member, District 5		X	
Fayette County - Board	Collins, Merrell	Member, District 2	X	X	
Fayette County - Board	Daniels, Glen	Board Member	X		
Fayette County - Board	Waggoner, Jenny	Board Member	X	X	
Fayette County - Coroner's Office	Harris, Dave	Coroner	X		
Fayette County - EMA	Craig, Kendra	Coordinator	X	X	
Fayette County - EMA	Denning, David	Communications	X	X	
Fayette County - EMA	Denning, Sue	Communications / HAM Radio	X		
Fayette County - EMA	Valencia, Gabe		X		
Fayette County - Health Department	Barringer, Marcia	PHEP Coordinator	X		
Fayette County - Health Department	Smith, Jodi	Director of Env. Health	X		
Fayette County - Highway Department	Fulk, Roger	Assistant County Engineer	X	X	
Fayette County 911	Jenne, Kevin	Coordinator		X	
Fayette County Fair Association	Craig, Andy	Board Member	X	X	
Fayette County Farm Bureau	Cayo, Katie	Manager	X		
Fayette County Soil & Water Conservation District	McElvany, Bryan	Resource Conservationist	X		
Fayette County Soil & Water Conservation District	Sanders, Karen	Administrative Coordinator	X	X	
Kaskaskia Township	Ritchey-Campbell, Heidi	Supervisor	X		
Ramsey Fire Protection District	Martin, Travis	Chief	X		
Ramsey, Village of	Waggoner, Jenny	Designated Representative	X	X	
Sharon Township	Hill, Joe	Supervisor	X	X	
St. Elmo Fire Protection District	Engeljohn, Doug	Fire Chief		X	
St. Elmo, City of	Engeljohn, Doug	Designated Representative		X	
St. Peter Fire Protection District	Jenne, Kevin	Assistant Chief		X	
St. Peter, Village of	Lotz, John	President	X		
State Farm (Vandalia)	Simpson, Clint	Agent	X		
University of Illinois Extension	Homann, Dana	4-H Youth Development Educator	X		
Vandalia Rehab & Health Care / Fayette County - EMA	Valencia, Anthony	Maintenance Director of Safety / EMA Search & Rescue	X	X	
Vandalia Rehab & Health Care / Fayette County - EMA	Valencia, Loralyn		X		
Vandalia Township	Barker, Michele	Trustee	X	X	
Vandalia Volunteer Fire Department	Stombaugh, Zac	Assistant Chief	X		
Vandalia, City of	Gottman, Ricky	Mayor	X		
Vandalia, City of	Paslay, LaTisha	Administrator	X	X	

Mission Statement

Based on early communications with Planning Committee members, a draft mission statement was developed that described their objectives for the Plan and distributed electronically for review. The Planning Committee then reviewed the mission statement at the first meeting and approved it with no changes.

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

Planning Committee Meetings

The Planning Committee met three times between November 2019 and May 2020. **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.

As mentioned previously, the process was compressed and accelerated to ensure the draft Plan was completed and submitted to IEMA no later than May 31, 2020. To accommodate this schedule, three Planning Committee meetings instead of five were conducted and additional coordination was handled via verbal and written correspondence.

As a result of the Covid-19 outbreak in the Winter/Spring 2020, the third Planning Committee meeting was not conducted in the traditional manner. Instead it was handled via teleconference to comply with the stay-at-home order and gathering restrictions.

First Planning Committee Meeting – 11/14/2019

At this meeting the planning process was explained to the Planning Committee members, including a brief overview of what a natural hazards mitigation plan is, why it needs to be developed, and the benefits. As part of the plan development, representatives for the County and the participating jurisdictions were asked to complete the forms entitled "List of Existing Planning Documents," "Critical Facilities" and "Identification of Severe Weather Shelters" and return them before the next meeting. Copies of a "Hazard Events Questionnaire," "Damages to Critical Facilities Damage Questionnaire" and "Citizen Questionnaire" were also distributed.

Committee members were asked to identify any natural hazard events that have occurred within the County. A discussion regarding the hazards to be included in the Plan was conducted and Committee members chose not to include landslides or mine subsidence due to their limited impact on the people and infrastructure within the County. Portions of the draft natural hazard risk assessment section were then presented for review.

Following the review of risk assessment, the Planning Committee members participated in an exercise to help calculate the Risk Priority Index which can assist participants in determining hazards present the highest risks and therefore which ones to focus on when formulating mitigation projects and activities.

Next, mitigation actions were defined and examples were discussed. As part of the plan development, individual mitigation action lists will be created for each participating jurisdiction. Ideas for potential mitigation projects and activities were presented. Representatives for the County and the participating jurisdictions were asked to complete the form entitled "Hazard Mitigation Projects" and return them before the next meeting.

Drafts of the mission statement and mitigation goals were presented for review. After a discussion, the Planning Committee chose to finalize both with no revisions.

Finally, community participation was discussed. The County and participating jurisdictions were asked to make information available on the planning process at their offices and in their communities.

Second Planning Committee Meeting – 02/20/2020

At this meeting a summary of the County's man-made hazards risk assessment was presented for review. 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 results of the Risk Priority Index exercise conducted at the previous meeting were presented. Tornadoes scored the highest followed by thunderstorms with damaging winds, severe winter storms and levee failures.

Next, an explanation of what a mitigation actions prioritization methodology is was provided. The various ways that mitigation actions can be prioritized and example methodologies were discussed. The Planning Committee chose to use a methodology based on hazard frequency and degree of mitigation.

A presentation on how the mitigation projects and activities identified by the participating jurisdictions would be presented in the Plan was provided. Then, the Planning Committee members reviewed the draft jurisdiction-specific mitigation action tables which identified and prioritized the new mitigation projects and activities submitted by the participants. Members were given the opportunity to add additional projects and activities to their tables.

The sections outlining the mitigation strategy and plan maintenance were also reviewed. The participating jurisdictions will meet annually to monitor the status of the mitigation projects and activities, evaluate the effectiveness of the Plan and provide information on the events that have occurred since the committee met previously. The Plan must be reviewed, revised and resubmitted to IEMA and FEMA at least once every five years. The public forum and adoption process were then discussed, and a date for the public forum was set.

Third Planning Committee Meeting – 05/19/2020

At this Planning Committee meeting the public was provided the opportunity to participate in a teleconference and given the opportunity to ask questions about the draft Plan which was made available online.

2.2 PUBLIC INVOLVEMENT

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

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

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

Citizen Questionnaire

A citizen questionnaire was developed to gather facts and gauge public perceptions about natural hazards that affect Fayette County. The questionnaire was distributed to the Planning Committee members who were encouraged to make it to their residents. A copy of the questionnaire is contained in **Appendix C**.

A total of twenty-six (26) questionnaires were completed and returned to the Planning Committee. Questionnaires were completed by residents in each participating jurisdiction, with the exception of Bingham and St. Elmo. 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 weather was the most frequently encountered natural hazard in Fayette County followed by severe winter storms, flooding, and extreme heat. These results are consistent with the weather records compiled for the County and as described in this Plan.
- The most effective means of communication identified by respondents to disseminate information about natural hazards were social media (Facebook, Twitter, etc.) and the radio followed closely by the internet and the mail. Information disseminated via the Fire Departments / Law Enforcement and public workshops / meetings also received strong support among respondents.
- In terms of the most needed mitigation projects and activities, the following four categories received the strongest support:
  - install/maintain sirens and other alert systems (74%);
  - maintain power during storms by burying power lines, trimming trees and/or purchasing backup generators (74%);

- maintain roadway passages during snow storms and heavy rains (74%);
- construct tornado safe shelters (58%).

FAQ Fact Sheet

A "Frequently Asked Questions" fact sheet was created and 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 prior to each Planning Committee meeting. The releases announced the purpose of the meetings and how the public could become involved in the Plan's development. **Appendix E** contains a list of the media outlets that received the press releases while copies of the releases 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

Due to the Covid-19 outbreak, the final meeting of the Planning Committee which was to be held as an open house public forum on Thursday, April 16, 2020 was cancelled. Executive Orders 2020-10, 2020-18 and 2020-32 issued and extended a stay-at-home order and prohibited any gatherings of more than 10 people from Saturday, March 21 through Sunday, May 31, 2020. Given the May 31 plan submission deadline and the extension of the stay-at-home order, IEMA and FEMA agreed to allow the County to conduct the public forum via teleconference and place the draft Plan for review and comment.

At the public forum teleconference, held on Thursday, May 21, a brief summary of the planning process was provided; the Plan's availability was discussed and individuals were given the opportunity to ask questions or provide comments. Individuals participating in the public forum were provided a two-page handout summarizing the planning process and directed to an online comment survey that could be used to provide feedback on the draft Plan. **Appendices G** and **H** contain copies of these materials.

Public Comment Period

The draft Plan was made available for public review and comment on the County's website from May 21 through May 28, 2020. Those unable to access the Plan via the website were directed to contact the Fayette County EMA Director to view a paper copy of the Plan. Individuals were encouraged to submit their comments electronically.

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. This information included details about flooding not available from state and federal databases.
- *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 ***fifty-nine (79) mitigation projects and activities*** at the local level that had not been previously identified in any other planning process. In addition, four townships, five, one school district and one soil & water conservation district chose to participate in the Plan's development.

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 developing the Plan.

Business Community

Representatives from those segments of the business community who had the most interest in natural hazard mitigation were invited to serve on the Planning Committee. Agriculture and agribusiness are major economic enterprises in the County. Consequently, the Fayette County Farm Bureau and Fayette County Soil and Water Conservation District (SWCD) were invited to participate again in the planning process and provide input from their membership. The Fayette County SWCD helped answer questions related to levees and provided information on hazard events. Input was also sought from the insurance industry to provide balance and context for discussions on property damages, not only to agriculture, but also to residences.

Schools

The Superintendent from Brownstown CUSD #201 served on the Planning Committee. He coordinated with other members of the district in considering what types of mitigation projects and activities would be most beneficial.

Healthcare

Input was sought from the healthcare community. Representatives from Vandalia Rehab & Health Care, Brookston Estates of Vandalia and the Fayette County Health Department the Planning Committee meetings and provided input into the planning process.

Neighboring Counties
The Effingham County Emergency Management Agency Emergency Manager attended the Planning Committee meetings and provided input into the planning process.

A memo was sent to EMA/ESDA/OEM Emergency Managers in the neighboring counties inviting them to participate in the mitigation planning process. The counties contacted included Bond, Chris-Mont, Clay, Clinton, Effingham, Marion and Shelby. **Appendix I** contains a copy of the invitation memo.

2.4 INCORPORATING EXISTING PLANNING DOCUMENTS

As part of the planning process, the County and each participating municipality was asked to identify and provide existing documents (plans, studies, reports and technical information) relevant to the Plan update. **Figure PP-3**, located at the end of this section, summarizes the availability of existing planning documents by participating jurisdiction. These documents were reviewed and incorporated into the Plan update whenever applicable.

Fayette County and most of the participating jurisdictions have limited resources and abilities to expand on and improve the existing policies and programs identified in Figure PP-3. This conclusion is based on an examination of their capabilities related to: staff and organization; technical capability; fiscal situation; policies and programs; present legal authority; and political resolve.

The lack of legal authority and policies/programs currently in place, especially with regards to building and zoning ordinances, hamper the participating jurisdictions' abilities to expand and strengthen existing policies and programs. Only two the participating municipalities have comprehensive plans and only Vandalia has building codes in place. A general resistance from many residents towards these types of regulations has resulted in an unwillingness by county and municipal officials to implement such policies. In addition, the fiscal and staffing situations of many of the participating jurisdictions are extremely limited, bordering on inadequate in some cases. Many 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. These actions have been initiated through the planning process, and some of the initial results are noted below.

- ***Awareness***. Participants in the Plan development process now have more information that they are sharing with residents about the damages caused by natural hazards. Before the development of the AHMP in Fayette County, knowledge about natural hazard damages was largely anecdotal and stored piecemeal in files not accessible by the general public. This shared information can help change attitudes and foster a collective understanding of the need to work on loss prevention.

- ***Planning & Economic Support.*** Fayette County is a member of the South Central Illinois Regional Planning and Development Commission. This Commission provides planning support and assists members in obtaining grants and loans. Participants were made aware of the services offered by the Commission and encouraged to contact them.
- ***State Government Support.*** During the Plan development process, the Planning Committee was told repeatedly how support for existing programs as well as funding for mitigation actions can come from sources other than IEMA and FEMA. Specific examples were provided to all participants. The Illinois Department of Agriculture (IDOA) and the Illinois Environmental Protection Agency (IEPA), and the Illinois Department of Natural Resources (IDNR), have helped other counties and municipalities with improving existing programs by filling the gaps when ordinances and funding is non-existent.

Figure PP-3
Existing Planning Documents by Participating Jurisdiction

Existing Planning Documents	Participating Jurisdiction										
	Fayette County	Brownstown	Ramsey	St. Elmo	St. Peter	Vandalia	Sharon Township	Vandalia Township	Brownstown CUSD	St. Elmo FPD	St. Peter FPD
PLANS											
Municipal/County/Recreational Communities											
Comprehensive Plan		X				X					
Emergency Management Plan	X	X		X							
Land Use Plan	X	X				X					
Townships											
Road/Bridge Improvement Plan							X	X			
Park/Recreational Area Shelter Plan								X			
Fire Protection Districts											
Pre-Planning of Structures & Facilities											
Tier II Reports											
County Emergency Operations Plan											
Safety Data Sheets											
School Districts											
Strategic Plan									X		
Capital Improvement Plan											
Crisis Plan									X		
CODES & ORDINANCES											
Municipal/County/Recreational Communities											
Building Codes						X					
Drainage Ordinances	X										
Historic Preservation Ordinance											
Subdivision Ordinance(s)	X	X				X					
Zoning Ordinances				X		X					
Townships											
Building Codes								X			
Septic Ordinance/Sewage Disposal Plan								X			
MAPS											
Municipal/County/Recreational Communities											
Existing Land Use Map		X				X					
Infrastructure Map		X		X	X						
Zoning Map				X		X					
Townships											
Road/Bridge Map							X	X			
Park/Recreation Map								X			
Zoning Map								X			
Transit System Route Map								X			
Food Pantry Location Map								X			
Fire Protection Districts											
Floodplain Maps											
Pipeline Maps											
District Maps											
Municipal/Special Residential Area Maps											
Impassable Roads & Bridges Map											
Hazardous Facilities Maps											
Evacuation Zone Maps											
Water Supply System Maps											
School Districts											
District Boundary Map									X		
Floor Plan Map									X		
OTHER TECHNICAL DOCUMENTS											
Municipal/County											
Flood Ordinance(s)						X					
Flood Insurance Rate Maps						X					
Repetitive Flood Loss List											
Elevation Certificates for Buildings											
Townships											
Property Tax Assessments							X	X			
Treasurer's Report							X	X			
Food Pantry Location/User Report								X			

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 and man-made hazards. This section summarizes the results of the risk assessment conducted on the natural and man-made hazards in Fayette County. The information contained in this section was gathered by evaluating local, state and federal records from the last 30 to 70 years.

This risk assessment identifies the natural and man-made 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 determine which hazards to include in the Plan. Over the course of the first two meetings, the Planning Committee members discussed their experiences with natural and man-made hazard events and reviewed information on various hazards. After much discussion, the Planning Committee chose to include the following hazards in this Plan:

- severe storms (thunderstorms, hail, lighting & heavy rain)
- severe winter storms (snow, ice & extreme cold)
- excessive heat
- floods
- tornadoes
- drought
- earthquakes
- levee failures
- dam failures
- man-made hazards including:
  - hazardous substances (generation, transportation & storage/handling)
  - waste disposal
  - hazardous materials incidents
  - waste remediation
  - terrorism

The Planning Committee chose not to include the following hazards in the Plan: mine subsidence and landslides. A review of the USGS Landslide Susceptibility Viewer indicates that all of the County has a low incidence of landslides. The Illinois State Geological Survey's *Landslide*

Inventory of Illinois does not contain any instances of landslide in Fayette County and discussions with the Planning Committee did not reveal any isolated problems.

Sinkholes commonly occur in areas where carbonate rock formations characteristic of karst geology are present. Mapping prepared by the Illinois State Geological Survey (ISGS) shows that there are no karst geologic characteristics present in Fayette County. In Illinois land subsidence general occurs in areas where coal mining has been conducted. ISGS's *Coal Mines and Underground Industrial Mines* map shows that virtually no underground or surface mining has occurred previously in Fayette County.

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. 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 a RPI score for each hazard. A ranking was then assigned to each hazard based on the RPI score. **Figures R-2** and **R-3**, located at the end of this section, provides the RPI scores and rankings for the County and participating municipalities and those participating special districts (townships, fire protection districts and CUSD #201.) RPI scores were not generated for Ramsey or St. Elmo or the fire protection districts.

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-4**, 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 "local government entities" for planning purposes, neither the townships, fire protection district or Brownstown Community Unit School District #201 (CUSD) have an extensive inventory of assets in which to consider when conducting the risk assessment. Brownstown CUSD's critical facilities are all located within a participating municipality (Brownstown). Since the assets of the CUSD are located within a participating municipality and are a subset of this municipality's 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.) The same is true for the Mound and Vandalia Township buildings and the St. Elmo and St. Peter Fire Protection District fire stations. For those hazards where the risk to the CUSD and the township buildings and fire stations varies from the risk facing the municipalities, a separate narrative assessment will be provided under the appropriate hazard's vulnerability subsection.

Both townships also have critical facilities in unincorporated Fayette County. Their risk is considered to be the same or similar to the risk experienced by the County 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 township critical facilities varies from the risk facing the planning area (i.e., County), 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 Scores by Hazard by County & Participating Municipalities

Hazard	Participating Jurisdictions							
	Fayette County		Brownstown		St. Peter		Vandalia	
	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking
Dam Failures	5.4	12/13/14	3.0	10-17	3.0	14/15/16/17	**8.0**	**2/3**
Drought	7.0	9	4.0	6/7/8/9	7.0	8/9/10	5.0	12/13/14/15/16
Earthquakes	4.6	16	3.0	10-17	7.0	8/9/10	7.0	4/5/6/7/8/9
Excessive Heat	5.4	12/13/14	5.0	2/3/4/5	**9.0**	**1/2/3/4/5**	5.0	12/13/14/15/16
Extreme Cold	6.0	11	5.0	2/3/4/5	8.0	6/7	5.0	12/13/14/15/16
Floods	8.4	5/6	3.0	10-17	6.0	11-13	5.0	12/13/14/15/16
Hail	5.4	12/13/14	5.0	2/3/4/5	**9.0**	**1/2/3/4/5**	3.0	17
HazMat Incidents: Transportation	8.2	7	3.0	10-17	6.0	11-13	7.0	4/5/6/7/8/9
HazMat Incidents: Fixed Facility	8.4	5/6	3.0	10-17	6.0	11-13	7.0	4/5/6/7/8/9
Heavy Rain	6.8	10	4.0	6/7/8/9	**9.0**	**1/2/3/4/5**	5.0	12/13/14/15/16
Levee Failures	8.6	4	3.0	10-17	3.0	14/15/16/17	7.0	4/5/6/7/8/9
Lightning	7.2	8	4.0	6/7/8/9	8.0	6/7	6.0	10/11
Mine Subsidence	3.0	17	3.0	10-17	3.0	14/15/16/17	6.0	10/11
Terrorism	5.0	15	3.0	10-17	3.0	14/15/16/17	**9.0**	**1**
Thunderstorms	**9.6**	**2**	5.0	2/3/4/5	**9.0**	**1/2/3/4/5**	7.0	4/5/6/7/8/9
Tornadoes	**9.8**	**1**	**6.0**	**1**	7.0	8/9/10	**8.0**	**2/3**
Winter Storms	8.8	3	4.0	6/7/8/9	**9.0**	**1/2/3/4/5**	7.0	4/5/6/7/8/9

Figure R-3
Risk Priority Index Scores by Hazard by Participating Special District

Hazard	Participating Jurisdictions					
	Brownstown CUSD#201		Sharon Township		Vandalia Township	
	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking
Dam Failures	8.0	4/5	**11.0**	**1**	7.0	11
Drought	7.0	6/7/8	7.0	8/9/10/11	3.0	14/15/16/17
Earthquakes	7.0	6/7/8	3.0	15/16/17	3.0	14/15/16/17
Excessive Heat	6.0	9/10/11	7.0	8/9/10/11	3.0	14/15/16/17
Extreme Cold	8.0	4/5	7.0	8/9/10/11	5.0	12/13
Floods	5.0	12/13/14/15	9.0	5/6/7	8.0	8/9/10
HazMat Incidents: Transportation	6.0	9/10/11	9.0	5/6/7	5.0	12/13
HazMat Incidents: Fixed Facility	5.0	12/13/14/15	3.0	15/16/17	11.0	4
Hail	5.0	12/13/14/15	5.0	13/14	9.0	6/7
Heavy Rain	6.0	9/10/11	9.0	5/6/7	8.0	8/9/10
Levee Failures	3.0	16/17	7.0	8/9/10/11	10.0	5
Lightning	5.0	12/13/14/15	6.0	12	8.0	8/9/10
Mine Subsidence	3.0	16/17	5.0	13/14	3.0	14/15/16/17
Thunderstorms	7.0	6/7/8	3.0	15/16/17	**12.0**	1/2/3
Terrorism	**10.0**	**1**	**10.0**	**2/3/4**	**12.0**	1/2/3
Tornadoes	**9.0**	**2/3**	**10.0**	**2/3/4**	**12.0**	1/2/3
Winter Storms	**9.0**	**2/3**	**10.0**	**2/3/4**	9.0	6/7

Figure R-4
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
Fayette County	7	4	17	0	0	0	3	2	4	0	2
Brownstown	3	0	0	2	0	1	0	0	2	0	0
Ramsey	3	2	1	1	2	1	0	0	1	0	0
St. Elmo	3	2	2	4	3	4	2	1	4	0	3
St. Peter	1	1	0	1	1	3	1	0	1	0	0
Vandalia	3	4	12	5	4	11	2	7	11	0	2
Brownstown CUSD	3	1	0	2	0	1	0	0	3	0	0
Sharon Township	1	0	0	0	0	0	0	2	3	0	1
Vandalia Township	3	2	9	5	3	1	1	1	7	0	1
St. Elmo FPD	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
St. Peter FPD	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

[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 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.	tea cup
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 / tea cup	severe damage to aircraft bodywork
H9	Super Hailstorms	75-100 mm	3.0" – 4.0"	tea cup / grapefruit	extensive structural damage, risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	> 100 mm	> 4.0"	softball	extensive structural damage, risk of severe or even fatal injuries to persons caught in the open

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

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

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 St. Louis, Missouri is responsible for issuing ***severe thunderstorm watches*** and ***warnings*** for Fayette 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 have 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 Fayette County. Severe storm events are separated into four categories: thunderstorms with damaging winds, hail, lightning and heavy rain. In Fayette County, severe storms are the most frequently occurring natural hazard.

Thunderstorms with Damaging Winds

NOAA's Storm Events Database was used to document 129 reported occurrences of thunderstorms with damaging winds in Fayette County between 1957 and 2019. Of the 129 occurrences, 108 had reported wind speeds of 50 knots or greater. There were 21 occurrences, however, where the wind speed was not recorded.

The highest wind speed recorded in Fayette County occurred in Vandalia on November 15, 1989, in St. Peter and Farina on February 5, 2008, and near the Vandalia Municipal Airport on May 29, 2019 when winds reached 70 knots (81 mph) during a thunderstorm event. With the exception of Bingham, thunderstorms with damaging winds have been *recorded* in every participating municipality within the County on multiple occasions.

Figure SS-4 charts the reported occurrences of thunderstorms with

Severe Storms Fast Facts – Occurrences

Number of recorded Thunderstorms with Damaging Winds (1957 -2019): ***129***

Number of recorded Severe Hail Events (1955 - 2019): ***39***

Number recorded of Lightning Strike Events (2013): 1

Highest Recorded Wind Speed: ***70 knots (November 15, 1989, February 5, 2008, & May 29, 2019)***

Largest Hail Recorded: ***2.75 inches (May 25, 1989)***

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

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

Most Likely Time for Thunderstorms with Damaging Winds to Occur: ***late afternoon***

Most Likely Time for Severe Hail to Occur: ***late afternoon and early evening***

damaging winds in Fayette County by month. Of the 129 events, 82 (64%) took place in May, June, and July making this the peak period for thunderstorms with damaging winds in Fayette County. Of the 129 events, 41 (32%) occurred during June, making this the peak month for thunderstorms with damaging winds.

Figure SS-4
Thunderstorms with Damaging Winds by Month
1957 - 2019

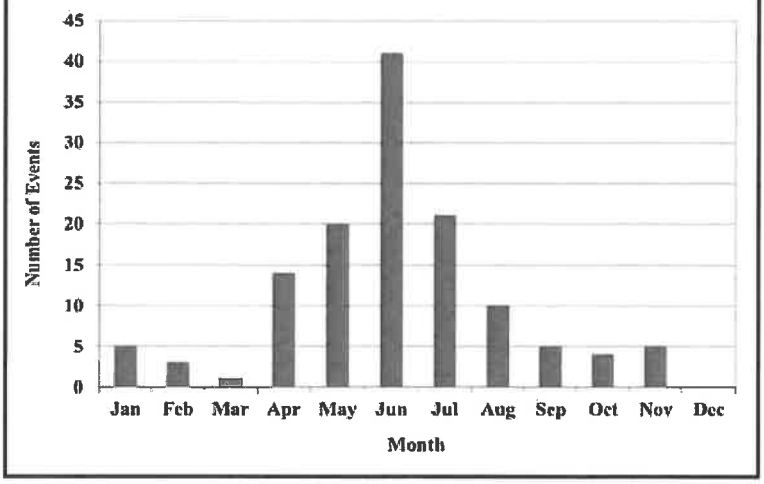
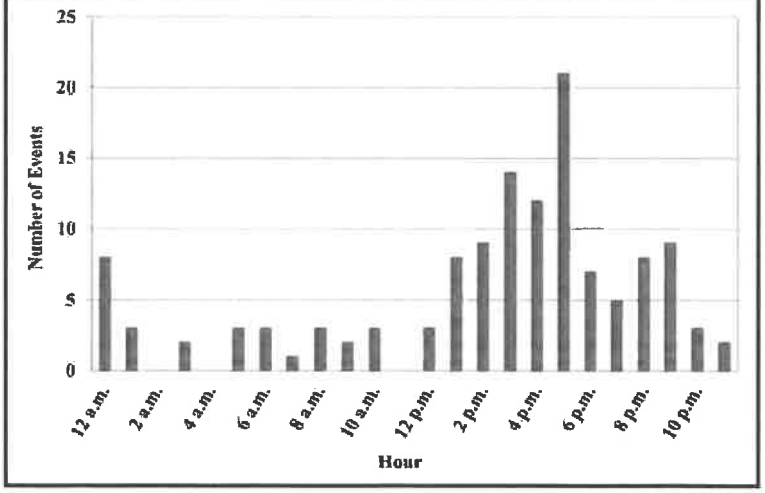


Figure SS-5 charts the reported occurrences of thunderstorms with damaging winds by hour. Of the 129 occurrences, approximately 78% of all thunderstorms with damaging winds occurred during the p.m. hours, with 47 of the events (36%) taking place between 3 p.m. and 6 p.m.

Figure SS-5
Thunderstorms with Damaging Winds by Hour
1957 - 2019



Hail

NOAA's Storm Events Database was used to document 39 reported occurrences of severe storms with hail one (1) inch in diameter or greater in Fayette County between 1955 and 2019. Of the 39 occurrences, 18 produced hailstones 1.50 inches or larger in diameter.

The largest hail stones documented in Fayette County measured 2.75 inches in diameter (tennis ball sized) and fell on May 25, 1989 along the Interstate 70 corridor from Mulberry Grove to St. Elmo. Hail one (1) inch in diameter or greater has been *recorded* in every participating municipality except Bingham on more than one occasion.

Figure SS-6 charts the reported occurrences of hail by month. Of the 39 occurrences, 21 (54%) took place in April, May, and June making this the peak period for hail in Fayette County. Of the 39 events, 10 (26%) occurred during April, making this the peak month for hail events.

Figure SS-6
Hail Events by Month
1955 - 2019

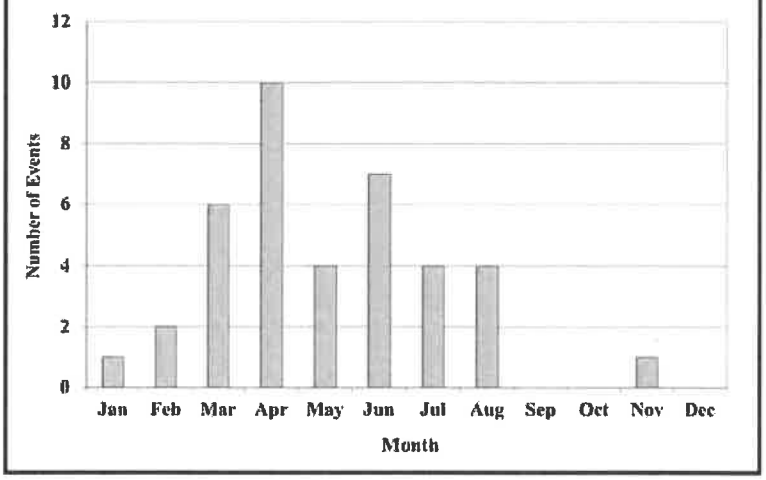
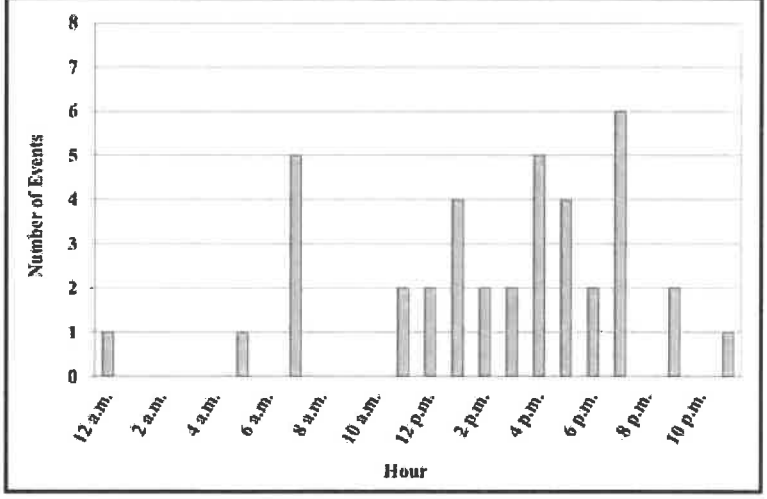


Figure SS-7 charts the reported occurrences of hail by hour. Approximately 77% of all the hail events occurred during the p.m. hours, with 17 of the events (44%) taking place between 4 p.m. and 8 p.m.

Lightning

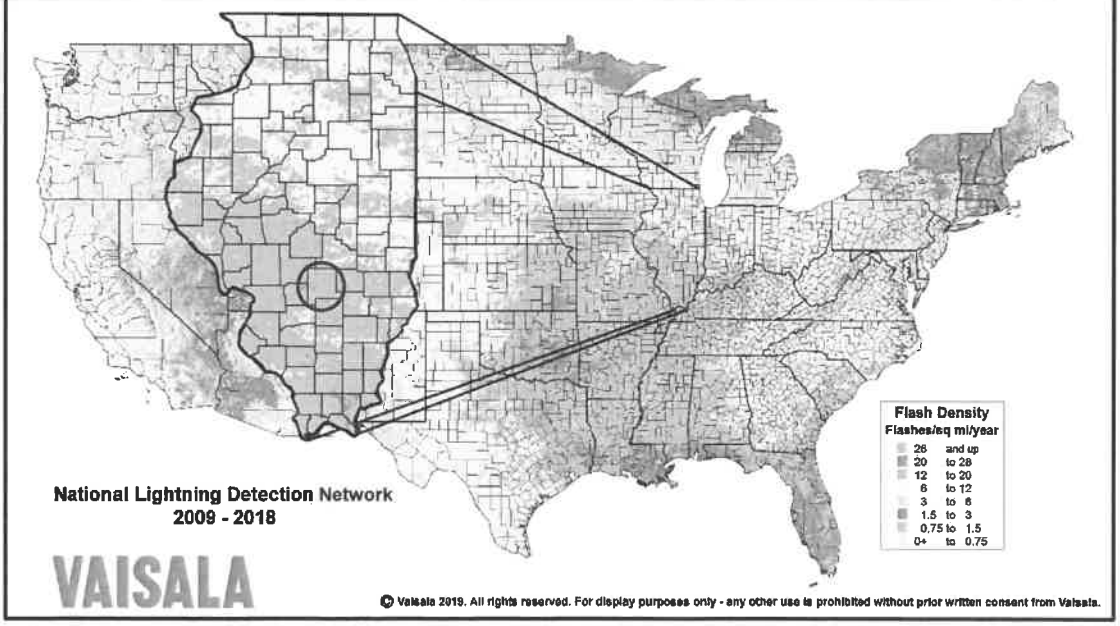
While lightning strike events occur regularly across south central Illinois, NOAA's Storm Events Database does not include any *recorded* lightning strike events for Fayette County. This is almost certainly due to the rural nature of the County. One event was reported by a member of the Planning Committee.

Figure SS-7
Hail Events by Hour
1955 - 2019



According to data from Vaisala's National Lightning Detection Network, Fayette County averaged close to 12 to 20 cloud-to-ground lightning flashes per square mile annually between 2009 and 2018. **Figure SS-8** illustrates the cloud-to-ground lightning flash density (number of cloud-to-ground flashes per square mile per year) by county for the continental United States. 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-8
Cloud-to-Ground Lightning Flash Density: Continental United States



Heavy Rain

While heavy rain events occur on a fairly regular basis across south central Illinois, NWS's COOP data records have documented 225 reported occurrences of heavy rain in Fayette County between 1990 and 2019. Of the 225 occurrences, 51 events (23%) produced three inches or more of rain.

Figure SS-9 charts the reported occurrences of heavy rain by month. Of the 225 events, 87 (39%) occurred in April, May, and June making this the peak period for heavy rains in Fayette County. Of the 225 events, 32 (14%) occurred during June, making this the peak month for heavy rains.

Figure SS-9
Heavy Rain Events by Month
1990 - 2019

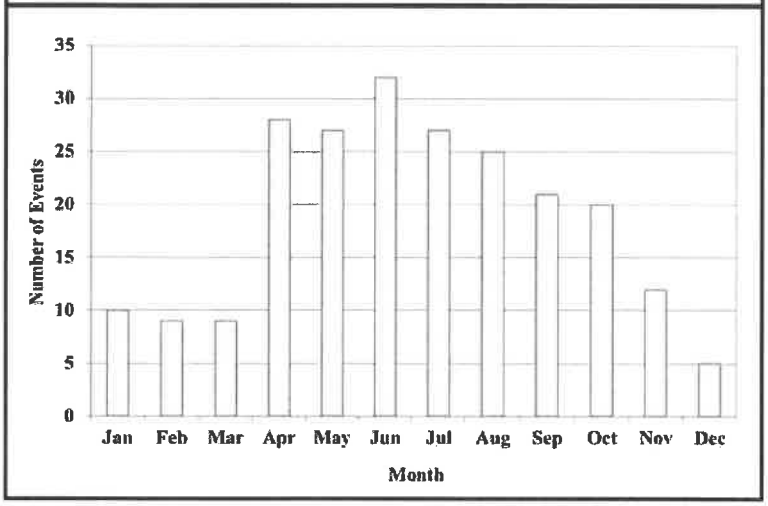
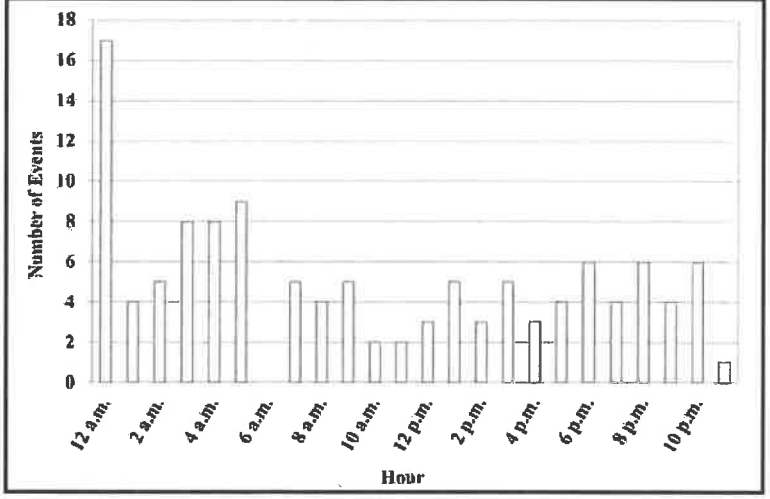


Figure SS-10 charts the reported occurrences of heavy rain by hour. Of the 225 occurrences, start times were unavailable for 106 events. Of the remaining 119 events with recorded times, approximately 58% occurred during the a.m. hours. Fifty-one of the events (43%) took place between 12 a.m. and 6 a.m.

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 Fayette County's hazard rating for severe storms as "high." (IEMA's overall hazard rating system has five levels: very low, low, medium, high and severe.)

Figure SS-10
Heavy Rain Events by Hour
1990 - 2019



What is the probability of future severe storm events occurring?

Thunderstorms with Damaging Winds

Fayette County has had 129 verified occurrences of thunderstorms with damaging winds between 1957 and 2019. With 129 occurrences over the past 63 years, Fayette County should expect to experience at least two thunderstorms with damaging winds each year. There were 19 years over the last 63 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 30%.

Hail

There have been 39 verified occurrences of hail one (1) inch in diameter or greater between 1955 and 2019. With 39 occurrences over the past 65 years, the probability or likelihood that a severe storm with hail will occur in the County in any given year is 60%. There were nine years over the last 65 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 14%.

Heavy Rain

Fayette County has had 225 reported occurrences of heavy rain between 1990 and 2019. With 225 occurrences over the past 30 years, Fayette County should expect to experience at least seven 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 Fayette 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 south central Illinois. Since 2010, there have been 90 heavy rain events, 34 thunderstorms with damaging winds, 10 severe storms with hail one inch in diameter or greater, and one lightning strike verified in the County.

Figure SS-11 details the number thunderstorms with damaging winds and hail events that were recorded in or near each participating municipality while **Figure SS-12** details the number of thunderstorms with damaging winds and hail events that were recorded in or near unincorporated areas of Fayette County. The one lightning strike recorded occurred in St. Peter.

Of the participating municipalities, Vandalia 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 a long-term NWS COOP Observation Station for Fayette County is located in the Vandalia area.

Figure SS-11
Verified Severe Storm Events by Participating Municipality

Participating Municipality	Number of Events	
	Thunderstorm & High Wind	Severe Hail
Brownstown	13	4
Ramsey	23	9
St. Elmo	15	2
St. Peter	6	4
Vandalia	38	9

Figure SS-12
Verified Severe Storm Events in Unincorporated Fayette County

Unincorporated Area	Number of Events	
	Thunderstorm & High Wind	Severe Hail
Augsburg	1	0
Bluff City	1	1
Carlyle Lake	0	1
Dean Hills	1	2
Hagarstown	3	0
Mulberry Grove	0	1
Pittsburg	1	0
Ramsay Lake	2	2
Sefton	2	0
Shabonier	6	2
Shafter	2	0
South County	1	0
Stanberry Lake	1	0
Vandalia Airport	16	2
Vandalia Lake	2	0
Vera	1	0
Wrights Corner	3	1

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.

- *St. Peter*: The Village is vulnerable to severe storms. Our biggest insurance claims have been due to hail and lightning damage.
- *Fayette County 911*: Lightning strikes has damaged to our communication tower which has caused outages.
- *Fayette County Highway:* The highway department facility is out in the open and our communications tower is at one of the highest points in the area making it vulnerable to lightning strikes.
- *Sharon Township*: Heavy rain events adversely impact travel and washout roads. Washouts must be repaired to make the roads safe to travel on. In addition, during heavy rain events water is release from Lake Shelbyville and flows down the Kaskaskia River which allows light rain flooding of the same township roads.
- *Vandalia Township*: Heavy rains cause many townships roads to flood. Heavy rains have also led to levee breaks in the past which impact township roads.

What impacts resulted from the recorded severe storms?

Severe storms as a whole have caused an estimated $7 million in recorded property damages and an estimated $2,500 in recorded crop damages. The following provides a breakdown of impacts by category.

Thunderstorms with Damaging Winds

Data obtained from NOAA's Storm Events Database and Planning Committee member records indicates that between 1957 and 2019, 12 of the 129 thunderstorms with damaging winds caused $446,000 in property damages and $2,500 in crop damages. Damage information was either unavailable or none was recorded for the remaining 117 reported occurrences.

No injuries or fatalities were recorded as the result of any of the thunderstorms with damaging wind events.

Hail

Data obtained from NOAA's Storm Events Database and Planning Committee member records indicates that between 1955 and 2019, four of the 39 hail events caused $6,580,000 in property damages. Damage information was either unavailable or none was recorded for the remaining 35 reported occurrences.

Severe Storms Fast Facts – Impacts/Risk

Thunderstorms with Damaging Winds Impacts:
- Total Property Damage (12 events): ***$446,000***
- Total Crop Damage (1 events): ***$2,500***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Severe Hail Impacts:
- Total Property Damage (4 events): ***$6,580,000***
- Total Crop Damage: ***n/a***
- Injuries (1 events): ***1***
- Fatalities: ***n/a***

Lightning Strike Impacts:
- Total Property Damage (1 event): ***$4,000***
- Total Crop Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

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

According to NOAA's Storm Events Database, one injury was reported as a result of the May 25, 1989 recorded hail event. A police officer was hit by hail and suffered a concussion.

Lightning

Data obtained from Planning Committee member records indicates that in 2013 a lightning strike events caused $4,000 in property damage. The property damage figure is composed entirely of infrastructure and critical facilities damage sustained in St. Peter. Lightning struck the sewage treatment facility damaging an electric pump motor and an aerator motor.

What other impacts can result from severe storms?

In Fayette 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 12.9% to 16.2% 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-13** provides a breakdown by year of the number of crashes and corresponding injuries and fatalities that occurred when wet road surface conditions were present.

Figure SS-13
Severe Weather Crash Data for Fayette County

Year	Total # of Crashes	Presence of Wet Road Surface Conditions		
		# of Crashes	# of Injuries	# of Fatalities
2014	485	64	24	6
2015	521	81	33	0
2016	504	65	11	0
2017	452	73	21	1
2018	487	77	20	2
Total:	**2,449**	**360**	**109**	**9**

Source: Illinois Department of Transportation.

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

For Fayette 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, Fayette County Hospital in Vandaliais equipped to provide care to persons injured during a severe storm.

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

Yes. All existing buildings, infrastructure and critical facilities located in Fayette County and the participating municipalities 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.

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 Fayette 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 two 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 remaining municipalities/townships 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 17 of the 169 recorded events listing property damage numbers for all categories of severe storms, there is no way to accurately estimate future potential dollar losses. Since all existing structures within Fayette County are vulnerable to damage, it is highly probable that there will be future dollar losses from severe storms.

3.2 SEVERE WINTER STORMS & EXTREME COLD

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 snow storms 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 Snow Storms.** Heavy snow storms 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.

While extreme cold (i.e., dangerously low temperatures and wind chill values) often accompanies or is left in the wake of a severe winter storm, the NWS does not use it to define a severe winter storm. However, a discussion of extreme cold is included in this section since it has the ability to cause property damage, injuries and even fatalities (whether or not it is accompanied by freezing rain, ice or snow).

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 rain drops are "supercooled", they instantly refreeze upon contact with anything that is at or below 32°F (i.e., the ground, trees, utility lines, etc.).

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 SWS-1** identifies the formula and calculates the wind chill temperatures for certain air temperatures and wind speeds.

Figure SWS-1
Wind Chill Chart

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Calm																		
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.

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.

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

Frostbite and hypothermia are both cold-related illnesses that can result when individuals are exposed to dangerously low temperatures and wind chills that can accompany severe winter storms. 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.

Are alerts issued for severe winter storms?

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

- **Winter Storm Watch.** A winter storm watch is issued when the risk of hazardous winter weather has increased significantly and there is a strong possibility that conditions will reach warning criteria for the area within the next 12 to 48 hours.

- **Advisories.** Winter advisories are issued for lesser winter weather events that while presenting an inconvenience, do not pose an immediate threat of injury, death or significant

property damage. The following advisories will be issued when an event is occurring, is imminent or has a high probability of occurring.

- **Winter Weather Advisory.** Depending on the time of occurrence and the temperature, a winter weather advisory is issued for:
  - snowfall of 1 to 5 inches;
  - sleet accumulations of less than ½ inch; or
  - a combination of winter precipitation which will produce hazardous conditions.
- **Freezing Rain Advisory.** A freezing rain advisory is issued when light freezing rain will produce ice accumulations of less than ¼ inch.
- **Wind Chill Advisory.** A wind chill advisory is issued when the wind chill values are expected to be between -15°F and -24°F.

➢ **Warnings.** Winter weather warnings are issued for events that can be life threatening. The following warnings will be issued when an event is occurring, is imminent, or has a high probability of occurring.

- **Blizzard Warning.** A blizzard warning is issued when sustained winds or frequent gusts greater than or equal to 35 mph are accompanied by falling and/or blowing snow that frequently reduces visibility to less than ¼ mile for three hours or more.
- **Ice Storm Warning.** An ice storm warning is issued when freezing rain is expected to produce ice accumulations of ¼ inch or more.
- **Winter Storm Warning.** A winter storm warning is issued when:
  - 6 inches or more of snow is expected;
  - ½ inch or more of sleet accumulations are expected; or
  - a combination of winter precipitation will produce life threatening conditions.
- **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 severe winter storms and extreme cold; 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 and extreme cold occurred previously? What is the extent of these previous severe winter storms and extreme cold events?
Tables 5 and **6**, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of severe winter storms (snow & ice) and extreme cold events recorded in Fayette County.

Severe Winter Storms

NOAA's Storm Events Database and NWS's COOP Data records were used to document 81 reported occurrences of severe winter storms (snow, ice and/or a combination of both) in Fayette County between 1966 and 2019. Of the 81 recorded occurrences there were:

- 43 heavy snow storms or blizzards;
- 37 combination events (freezing rain, sleet, ice and/or snow); and
- 1 ice or sleet storm.

Severe Winter Storm Fast Facts – Occurrences

Number of Severe Winter Storm Events Reported (1966 - 2019): ***81***
Number of Extreme Cold Events Reported (2000 - 2019): ***3***
Maximum 24-Hour Snow Accumulation: ***12.0 inches (December 19 & 20, 1973)***
Coldest Temperature Recorded in the County: ***-26°F (January 19, 1994)***
Most Likely Month for Severe Winter Storms to Occur: ***January***
Most Likely Time for Severe Winter Storms to Occur: ***early morning***
Most Likely Month for Extreme Cold Events to Occur: ***January***

Figure SWS-2 charts the reported occurrences of severe winter storms by month. Of the 81 events, 66 (81%) took place in December, January, and February. Of these 66 events, 32 (49%) occurred during January, making this the peak month for severe winter storms. There were three events that spanned two months; however, for illustration purposes only the month when the event started is graphed.

Figure SWS-2
Severe Winter Storms by Month
1966 - 2019

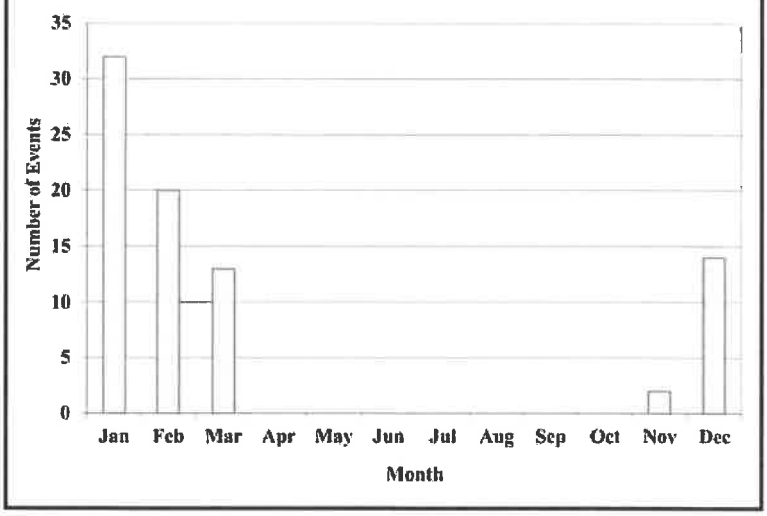
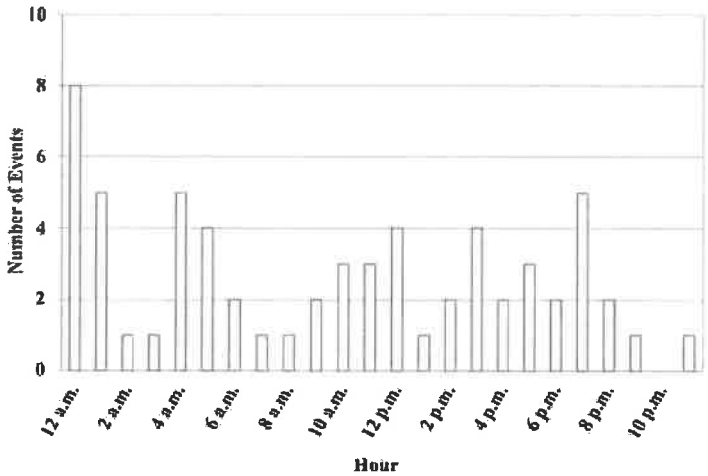


Figure SW-3 charts the reported occurrences of severe winter storms by hour. Of the 81 occurrences, start times were unavailable for 18 events. Of the remaining 63 severe winter storm events with recorded times, approximately 57% began during the a.m. hours, with 24 (38%) beginning between 12 a.m. and 6 a.m.

Figure SWS-3
Severe Winter Storms by Hour
1966 - 2019



According to the NWS's COOP data records, the maximum 24-hour snow accumulation in Fayette County is 12.0 inches, which occurred on December 19 and 20, 1973 at the Vandalia Station.

Extreme Cold

While extreme cold events occur on a fairly regular basis across south central Illinois, NOAA's Storm Events Database has only three *recorded* occurrences of extreme cold (dangerously low temperatures and wind chill values) in Fayette County between 2000 and 2019. These represent the ***reported occurrences*** of extreme cold. The NWS acknowledges that extreme cold events are not well recorded. Only those events with impacts are reported. As a result, extreme cold events often go unreported and therefore, more events have almost certainly occurred than are documented in this section.

Two of the three events (67%) took place in January, making this the peak month for extreme cold events. The remaining event took place in December. Two of the three extreme cold events began during the a.m. hours.

According to the Midwestern Regional Climate Center, temperature records for Fayette County have been kept by the NWS COOP Observer Station at Vandalia and Ramsay. Based on the available records, the coldest temperature recorded in Fayette County was -26°F on January 19, 1994.

What locations are affected by severe winter storms and extreme cold?

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

Do any of the participating jurisdiction have designated warming centers?

Yes. Three of the seven participating municipalities/townships 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 SWS-4** identifies the location of each warming center by jurisdiction. At this time Ramsey, St. Peter, Vandalia and Sharon Township do not have any warming centers designated within their municipalities.

Figure SWS-4
Designated Warming Centers by Participating Jurisdiction

Name/Address	Name/Address
Brownstown	*Vandalia Township*
Brownstown Fire Department, 306 E. Cumberland Rd.	City, 431 W. Gallatin
St. Elmo	
Arena Park Building, 500 W. 3rd	

What is the probability of future severe winter storms occurring?

Severe Winter Storms

Fayette County has had 81 verified occurrences of severe winter storms between 1966 and 2019. With 81occurrences over the past 54 years, Fayette County should expect at least one severe winter storm each year. There were 25 years over the past 54 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 46%.

Extreme Cold Events

Given the limited amount of data available for extreme cold events, it is difficult to establish a precise probability; however, Fayette County should expect to experience additional extreme cold events in the future.

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 and extreme cold.

Are the participating jurisdictions vulnerable to severe winter storms and extreme cold?

Yes. All of Fayette County, including the participating municipalities, is vulnerable to the dangers presented by severe winter storms and extreme cold. Severe winter storms are among the more frequently occurring natural hazards in Illinois. Since 2010, there have been 16 severe winter storms, and two extreme cold events verified in the County.

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

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

What impacts resulted from the recorded severe winter storms and extreme cold?

The following summarize the impacts of severe winter storms and extreme cold events recorded in Fayette County.

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

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

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

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

Severe Winter Storms

Damage information was either available or recorded for any of the reported occurrences between 1966 and 2019. In addition no injuries or fatalities were reported as a result of any of the recorded severe winter storms.

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.

Extreme Cold

Damage information was either unavailable or none was recorded for any of the three reported extreme cold events between 2000 and 2019. No injuries or fatalities were reported as a result of any of the recorded extreme cold events either.

In comparison, the State of Illinois averages 18 cold-related fatalities annually according to the Illinois State Water Survey's Climate Atlas of Illinois.

What other impacts can result from severe winter storms?

In Fayette 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 3.1% to 12.0% of all crashes recorded annually in the County. **Figure SWS-5** 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-5
Severe Winter Weather Crash Data for Fayette County

Year	Total # of Crashes	Presence of Treacherous Road Conditions caused by Snow/slush and Ice		
		# of Crashes	# of Injuries	# of Fatalities
2014	485	58	11	0
2015	521	22	9	0
2016	504	54	11	0
2017	452	14	6	0
2018	487	43	9	0
Total:	**2,449**	**191**	**46**	**0**

Source: Illinois Department of Transportation.

Persons who are outdoors during and immediately following severe winter storms and extreme cold events 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 and extreme cold?

While severe winter storms and extreme cold occur regularly in Fayette County, the number of injuries and fatalities is relatively 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***.

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

Yes. All existing buildings, infrastructure and critical facilities located in Fayette County and the participating municipalities are vulnerable to damage from severe winter storms and extreme cold. The following summarize the vulnerabilities by severe winter storms and extreme cold events.

Based on the frequency with which severe winter storms and extreme cold events have occurred in Fayette 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***.

Winter Storm

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 Fayette 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 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.

Extreme Cold

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

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

Yes and No. Yes and No. While two of the participating municipalities have building codes in place that will likely help lessen the vulnerability of new buildings and critical facilities to damage from severe winter storms, the County and the remaining municipalities/townships 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 Fayette 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 and extreme cold?

Unlike other natural hazards, such as tornadoes, there are no standard loss estimation models or methodologies for severe winter storms and extreme cold events. With none of the 84 recorded events listing property damage numbers for severe winter storms and extreme cold, there is no way to accurately estimate future potential dollar losses. Since all existing structures within Fayette County are vulnerable to damage, it is likely that there will be future dollar losses from severe winter storms and extreme cold.

3.3 EXCESSIVE HEAT

HAZARD IDENTIFICATION

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?

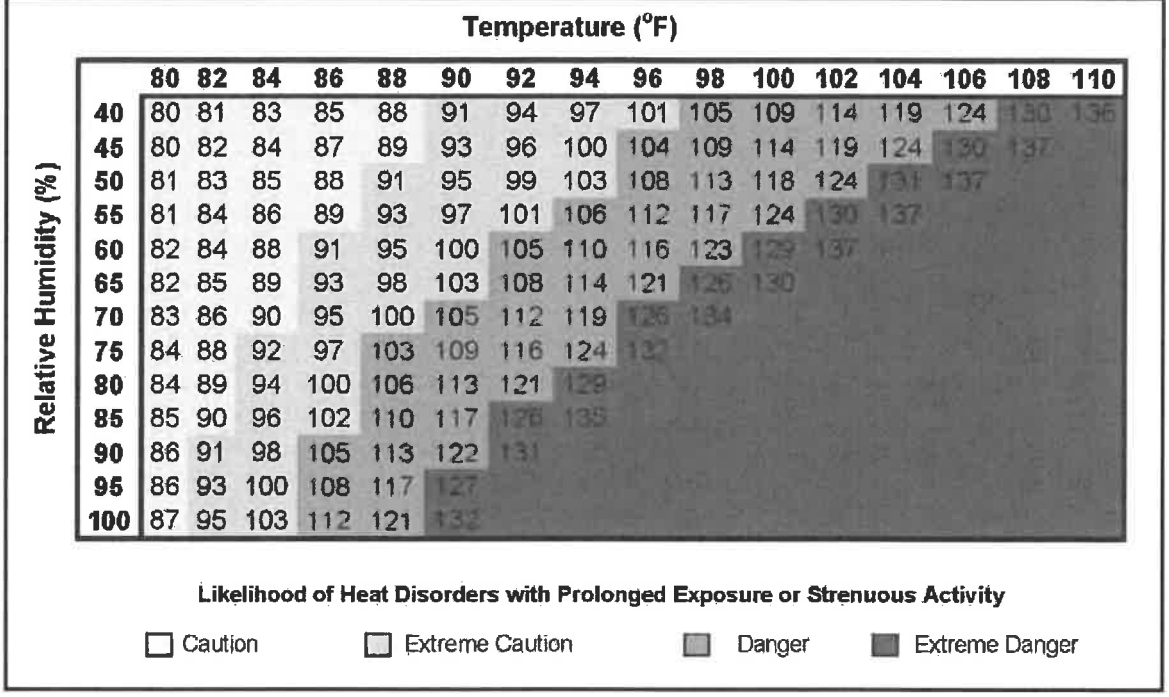
In an effort to raise the public's awareness of the hazards of excessive heat, the National Weather Service (NWS) devised the "Heat Index". The Heat Index, sometimes referred to as the "apparent temperature", is a measure of how hot it feels when relative humidity is added to the actual air temperature. **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



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 extreme 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 St. Louis, Missouri. The St. Louis Office is responsible for issuing alerts for Fayette 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 when the heat index is expected to be around 105°F, *or* when the heat index will range from 100°F to 104°F for at least four (4) consecutive days.
- **Warning.** An excessive heat warning is issued when the heat index is expected to be around 110°F, *or* when the heat index is expected to reach 105°F for four (4) consecutive days.

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 6, located in **Appendix J,** summarizes the previous occurrences as well as the extent or magnitude of excessive heat events recorded in Fayette County. NOAA's Storm Events Database and NWS's COOP Data records were used to document 45 occurrences of excessive heat in Fayette County between 1994 and 2019.

Excessive Heat Fast Facts – Occurrences

Number of Excessive Heat Events Reported (1994 – 2019): ***45***

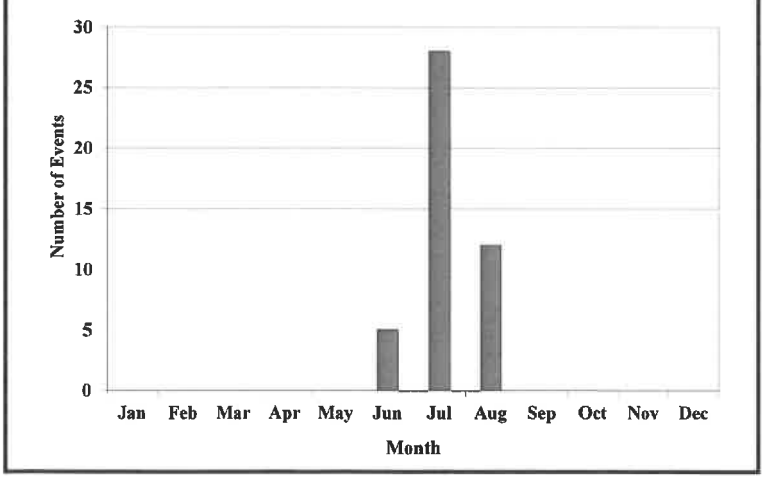
Hottest Temperature Recorded in the County: ***112°F (July 14th 1954)***

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

Most Likely Time for Excessive Heat Events to Start: ***Afternoon***

Figure EH-3 charts the reported occurrences of excessive heat events by month. Of the 45 events, 28 (62%) either began or took place in July making this the peak month for excessive heat events in Fayette County. There were seven events that spanned two months; however, for illustration purposes only the month the event started in is graphed. Of the 45 occurrences, 62% began during the p.m. hours, with 26 of those events (93%) beginning at 12:00 p.m.

Figure EH-3
Excessive Heat Events by Month
1994 – 2019



According to the Midwestern Regional Climate Center, temperature records for Fayette County have been kept by the NWS COOP Observer Station at Vandalia and Ramsay. Based on the

available records, the hottest temperature recorded in Fayette County was 112°F at the Ramsey COOP Station on July 14th 1954.

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 Fayette County's hazard rating for excessive heat as "high."

Do any of the participating municipalities have designated cooling centers?

Yes. Two of the seven participating municipalities has a designated cooling center. A "designated" cooling center is identified as any facility that has been *formally* identified by the municipality (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-4 identifies the location of each cooling center by jurisdiction. Ramsey, St. Peter, Vandalia, Sharon Township and Vandalia Township do not have any cooling centers designated within their municipalities.

Figure EH-4
Designated Cooling Centers by Participating Municipality

Name/Address	Name/Address
Brownstown	*St. Elmo*
Brownstown Fire Department, 306 E. Cumberland Rd.	Arena Park Building, 500 W. 3rd

What is the probability of future excessive heat events occurring?

Fayette County has experienced 45 verified occurrences of excessive heat between 1994 and 2019. With 45 occurrences over the past 26 years, Fayette County should expect to experience at least two excessive heat events a year. There were nine years over the 26 years were two or more excessive heat events occurred. This indicates that the probability that more than one excessive heat event may occur during any given year within the County is 35%.

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 Fayette County, including the participating municipalities, is vulnerable to the dangers presented by excessive heat. Since 2010, Fayette County has experienced 22 excessive heat events.

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

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 the Illinois State Water Survey's Climate Atlas of Illinois. Excessive heat has triggered more fatalities than any other natural hazard in Illinois. More fatalities are attributed to excessive heat than the combined number of fatalities attributed to floods, tornadoes, lightning and extreme cold.

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***

While no recorded injuries or fatalities were reported as a result of excessive heat in Fayette 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 death, but rather an underlying cause. The heat indices were sufficiently high for all 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?

In Fayette County, excessive heat has the ability to impact the drinking water supplies of several the participating municipalities. Farina, St. Peter and Vandalia rely solely on surface water sources for their drinking water supplies.

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 Fayette 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 absence of designated cooling centers in most of the participating municipalities tempered by the fact that Fayette County does not have any 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 70 years of age and older) and small children (those 5 years of age and younger) are more susceptible to

heat-related reactions and therefore their risk is elevated. **Figure EH-5** identifies the percent of sensitive populations by participating jurisdiction based on 2010 census data.

Figure EH-5
Sensitive Populations by Participating Jurisdictions

Participating Jurisdiction	% of Population 70 year of age & Older	% of Population 5 years age & Younger	Total % of Sensitive Population
Bingham village	2.4	8.4	10.8
Brownstown village	9.6	6.0	17.7
Farina village	12.9	7.9	20.8
Ramsey village	10.8	8.3	19.1
St. Elmo city	15.2	7.1	22.3
St. Peter village	15.6	7.5	23.1
Vandalia city	11.8	5.0	16.8
Unincorp. Fayette County	11.1	5.7	16.8
Fayette County	11.6	5.8	17.4
State of Illinois	8.8	6.5	15.3

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 municipalities 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 Fayette 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 Fayette 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 municipalities 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.

3.4 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 two main types of flooding that affect Fayette 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.

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.

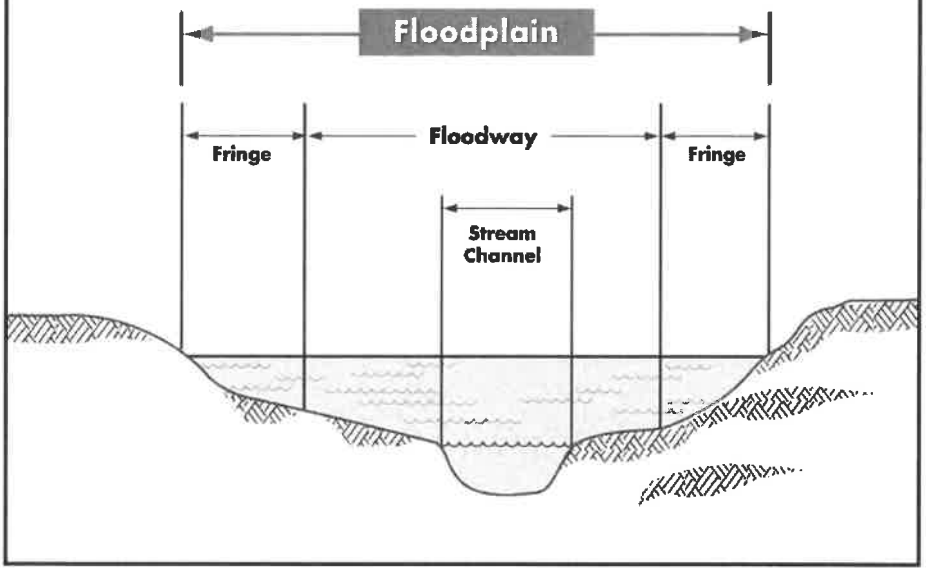
What is a floodplain?

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?

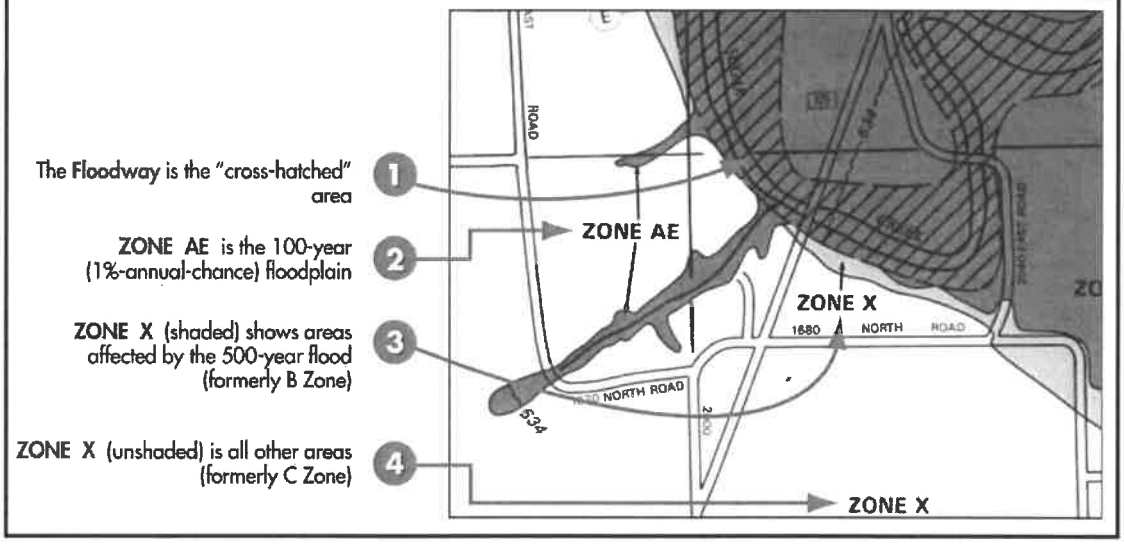
A Special Flood Hazard Area (SFHA) is the base floodplain. As discussed previously, this is the land area that is covered by the floodwaters of the base flood and has a 1% chance of flooding in any given year. The term SFHA is most commonly used when referring to the based floodplain on the Flood Insurance 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 shows 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, they 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 St. Louis, Missouri is responsible for issuing ***flood watches*** and ***warnings*** for Fayette 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 8 and **9**, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of flood events recorded in Fayette County. The flood events are separated into two categories: general floods (riverine and shallow/overland) and flash floods.

General Floods

NOAA's Storm Events Database, NOAA's Storm Data Publications, NWS Weather Forecast Office – Central Illinois records, NWS's River Observations, and the U.S. Army Corps of Engineers' river gauge data have documented 22 occurrences of general flooding in Fayette County between 1990 and 2019. Included in the 22 general flood events is one event that contributed to a federally-declared disasters for Fayette County.

Based on historical gauge data, the record setting Kaskaskia River flood in this area occurred on April 28, 2002 when the Kaskaskia River crested at 28.27 feet at Vandalia. The second and third highest crest at this location occurred in 2013 and 2015 respectively.

Flash Floods

NOAA's Storm Events Database documented 20 reported occurrences of flash flooding in Fayette County between 1996 and 2019. Included in the 20 flash flood events is one event that contributed to a federally-declared disasters in Fayette County. ***Disaster Declaration #1416 includes both flash flood and general flood events.***

Flood Fast Facts – Occurrences

Number of General Floods Reported (1990 – 2019): *22*

Number of Flash Floods Reported (1996 – 2019): *20*

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

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

Most Likely Time for Flash Floods to Occur: ***late afternoon to evening***

Number of Federal Disaster Declarations Related to General and Flash Flooding: *1*

Figure F-3 charts the reported occurrences of flooding by month. Of the 22 general flood events, 13 (59%) began in April, May, and June making this the peak period for general floods in Fayette County. Of those 22 events, six (27%) began in April making these the peak month for general flooding. There were two events that spanned two or more months; however, for illustration purposes only the month the event started in is graphed.

In comparison, 15 of the 20 flash flood events (75%) took place between May and June making this the peak period for flash floods. Of the 20 events, nine (45%) occurred in June making this the peak month for flash flooding.

Figure F-3
Flood Events by Month

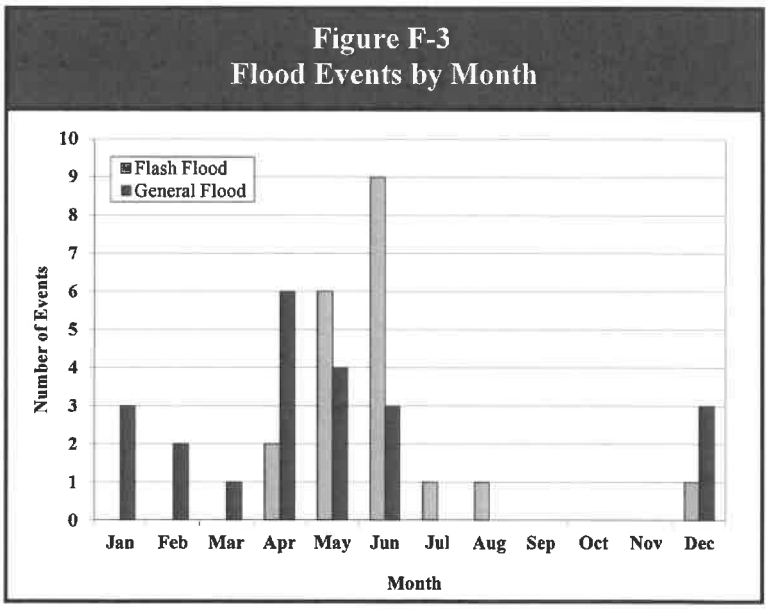
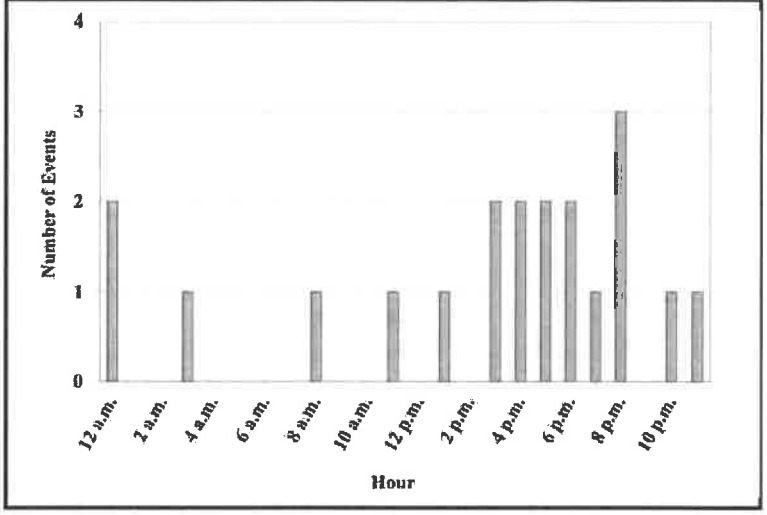


Figure F-4 charts the reported occurrences of flash flood events by hour. Approximately 75% of the 20 flash flood events began during the p.m. hours, with eight of the events (40%) taking place

between 3 p.m. and 6 p.m. In comparison 67% of general flood events with recorded times began during the a.m. hours.

Figure F-4
Flash Flood Events by Hour



What locations are affected by floods?

While specific locations are affected by general 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 Fayette 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 Fayette County's hazard rating for floods as "low."

FIRMs have only been developed for one of the participating jurisdictions within Fayette County. Vandalia's map became effective in August 16, 1988. A copy of the FIRM is located in **Appendix K.** While FIRMs have not been developed for the County, Flood Hazard Boundary Maps (FHBMs) were developed in 1977 and became effective on January 6, 1978. Copies of the County FHBMs are located in **Appendix K.**

No other FIRMs or FHBMs have been developed for any of the municipalities in Fayette County and none are anticipated to be completed or updated in the near future according to the Illinois State Water Survey's Countywide Digital FIRM Status Map.

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 are identified in bold.

Municipal 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-5 Bodies of Water Subject to Flooding in Fayette County	
Participating Jurisdiction	**Water Bodies**
Brownstown	---
Ramsey	---
St. Elmo	---
Fayette County (unincorporatd)	**Ash Creek, Bacon Branch, Bear Creek, Beck Creek, Bent Creek, Big Creek,** Bolt Creek, Brickyard Branch, **Buck Creek, Caesar Creek, Camp Creek,** Carlyle Lake, **Cassar Creek,** Cedar Creek, **Dismal Creek, Fanny Branch, Fish Lake, Fish Lake Ditch, Flat Creek, Forbis Creek,** Gamble Branch, Gatch Lake, **Goose Pond, Grass Pond, Half Mile Pond, Hem Pond, Hickory Creek, Hoffman Creek, Hog Creek, Hurricane Creek, Kaskaskia River, Lee Creek,** Liberty Creek, Lick Creek, **Linn Creek, Little Creek, Little Hickory Creek, Little Mocassin Creek, Lone Grove Branch, Mitchell Creek, Maggot Creek,** Muddy Creek, **Overcup Creek,** Nellie Lake, **Owl Creek,** Panther Creek, **Peppermill Ditch, Pett Branch, Pint Creek, Plum Branch,** Raccoon Creek, **Ramsey Creek,** Ramsey Lake, **Richland Creek,** Riley Run, **Sandy Run, Section Creek, South Fork, Steve Creek, Stone Creek, Suck Creek,** Sugar Creek, **Sugar Run,** Timberland Lake, **Vandalia Ditch, Vandalia Lake, Walnut Creek, Watson Creek, Wildcat Ditch,** Wildcat Lake, **Wolf Creek**
St. Peter	---
Vandalia	**Kaskaskia River, Intermittent Tributary of Kaskaskia River**

Source: FEMA FIRMs.

What jurisdictions within the County take part in the NFIP?
Vandalia participates 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.

Figure F-6 NFIP Participating Jurisdictions				
Participating Jurisdictions	**Participation Date**	**Current Effective FIRM Date**	**CRS Participation**	**Most Recently Adopted Floodplain Zoning Ordinance**
Vandalia, City of	6/4/1987	8/16/1988(M)	No	1988

Sources: FEMA, Community Status Book Report: Illinois.

Bingham, Brownstown, Farina, Ramsey, St. Elmo and St. Peter have no identified flood hazard boundaries within their corporate limits and are not required to participate in the NFIP. While the current effective FHBMs for Fayette County identify SFHAs within their limits, the County has not adopted floodplain regulations, and has chosen not to participate in the NFIP. As a result, Fayette County is presently sanctioned by the Program.

Jurisdictions that participate in the NFIP are expected to adopt and enforce floodplain management regulations. Vandalia has adopted the State of Illinois model floodplain ordinance. As a result, the NFIP participating jurisdiction is in compliance with NFIP requirements.

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 4.6.

What is the probability of future flood events occurring?

General Floods

Fayette County has had 22 verified occurrences of general flooding between 1990 and 2019. With 22 occurrences over the past 30 years, the probability or likelihood of a general flood event occurring in Fayette County in any given year is 73%. There were five years over the past 30 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 17%.

Flash Floods

There have been 20 verified flash flood events between 1996 and 2019. With 20 occurrences over the past 24 years, the probability or likelihood of a flash flood event occurring in Fayette County in any given year is 83%. There were five years over the past 24 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 21%.

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. Fayette County and the participating municipalities are vulnerable to the dangers presented by flooding. Precipitation levels and topography are 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 drainage problems occur. Since 2010, there have been 13 flash flood events and nine riverine flood events verified in the County.

Nineteen of the 20 flash flood events and all 222 general flood events impacted the entire County or a large portion of it and were not location specific. The only flash flood event that was location-specific occurred in Farina.

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.

- *Vandalia:* Flooding has come very close to topping the City's sewer lagoons but never completely flooded it.
- *Ramsey:* The roads in the Village are vulnerable to flooding from a release of water if the Shelbyville Dam ever fails.
- *Vandalia Township:* Township roads flood due to heavy rain and levee failures.
- *Sharon Township:* A release of water from Shelbyville Dam combined with light rain can cause flooding on township roads.
- *Fayette County Highway:* A few county roads that cross the Kaskaskia River are subject to flooding.

What impacts resulted from the recorded floods?

Floods as a whole have caused a *minimum* of $26,000 in property damages and $40,000 in crop damages. The following provides a breakdown by category.

Flood Fast Facts – Impacts/Risk

General Flood Impacts:
- Total Property Damage (2 events): ***$25,000***
- Total Crop Damage (2 events): ***$40,000***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Flash Flood Impacts:
- Total Property Damage (1 event): ***$1,000***
- 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***

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.

General Floods

Data obtained from NOAA's Storm Events Database indicates that between 1990 and 2019, two of the 22 general flood events caused over $25,000 in property damages and $40,000 in crop damages. Damage information was either unavailable or none was recorded for the remaining 20 reported occurrences.

No injuries or fatalities were reported as a result of any of the recorded events.

Flash Floods
Data obtained from NOAA's Storm Events Database indicates that between 1996 and 2019, one of the 20 flash flood events caused approximately $1,000 in property damages. Damage information was either unavailable or none was recorded for the remaining 19 reported occurrences.

No injuries or fatalities were reported as a result of any of the recorded events.

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.

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 very low. In terms of the risk or vulnerability to public health and safety from *general floods*, the risk is seen as ***low***. However, almost 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 Fayette County?

No. According to information obtained from FEMA, there are no repetitive or severe repetitive loss properties located in Fayette County.

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

Yes. **Figure F-7** identifies the number of existing residential structures by participating jurisdiction located within a base floodplain. These counts were prepared by the Consultant and are based on a review of the limited number of current FIRMs and FHBMs.

Figure F-7
Existing Residential Structures Located within a Floodplain by Participating Jurisdiction

Participating Jurisdiction	Number of Residential Structures	Participating Jurisdiction	Number of Residential Structures
Brownstown	0	St. Peter	0
Ramsey	0	Vandalia	16
St. Elmo	0	Unincorp. County	3

Source: FEMA FIRMs/FHBMs

Aside from key roads and bridges and buried power and communication lines, none of the participating jurisdiction have specific infrastructure/critical facilities located within or adjacent to a floodplain.

Only one of the participating jurisdictions (Vandalia) within Fayette County have current effective FIRMs. These FIRMs were prepared in 1988. While Flood Hazard Boundary Maps (FHBMs) were developed in 1978 for the unincorporated portions of Fayette County, FIRMs have yet to be developed.

While 15.7% of the land area in Fayette 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*** based on: (a) the frequency and severity of recorded flood events within the County; (b) the County's proximity to the Kaskaskia River and its tributaries; (c) the fact that most of the County is vulnerable to flash flooding; and (d) 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.

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.

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 jurisdictions* can be calculated if several assumptions are made. These assumptions represent a probable scenario based on the reported occurrences of flooding in Fayette County.

The purpose of providing an estimate is to help residents and municipal and county 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.

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 flash flooding accounts have occurred more frequently, riverine floods have caused more 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

Assumption #1

A riverine flood event will impact vulnerable residential structures.

event depending on the amount of precipitation received, the topography and the land use of the area.

Therefore, a riverine flood event will be used since it is (a) relatively easy to identify vulnerable residential structures within each jurisdiction (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 jurisdiction 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 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 would experience the same degree of flooding.

This assumption results in the following conditions for jurisdiction:

- ➢ Brownstown, Ramsey, St. Elmo and St. Peter would not experience any residential flooding since there are *no mapped* river, stream or creek base floodplains located within their municipal limits;
- ➢ *Vandalia:* Kaskaskia River and intermittent tributary of Kaskaskia River would overflow their banks and flood a portion of the City;
- ➢ *Unincorporated Fayette County*: All the rivers, streams and creeks would overflow their banks and flood unincorporated portions of the County.

Number of Potentially-Damaged Housing Units. Since this scenario assumes that all the base floodplains will experience the same degree of flooding, the number of existing residential structures located within the base floodplain(s) can be used to determine the number of potentially-damaged housing units. **Figure F-7** identifies the total number of existing residential structures located within the base floodplains(s).

Assumption #3

The number of existing residential structures located within the base floodplain(s) will be used to determine the number 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 will be used.

Assumption #4

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

To determine the average market value, the total assessed value must first be obtained. For Fayette County, the total assessed value of residential buildings was not available, so the total taxable assessed value was used. (It should be noted that the total taxable assessed value is less than the total assessed value due to the deduction of various exemptions including TIF districts.) The total taxable value of residential buildings within a jurisdiction is then divided by the total number of housing units within the jurisdiction to determine the *average* taxable assessed value.

A multiplier is then applied to the average taxable assessed value to determine the average market value. Normally a multiplier of 3 is applied to the average assessed value since the assessed value of a structure in Illinois is approximately one-third of the market value. A review of total assessed values and total taxable assessed values in adjacent counties indicates that the same multiplier cannot be applied to both values. It was determined that a more accurate multiplier for average taxable assessed values would be 4.

Figure T-17 provides a sample calculation. The total taxable assessed value is based on 2018 tax assessment information provided by the Fayette County Clerk. **Figure F-9** provides the average assessed value and average market value for each jurisdiction.

Figure F-8
Sample Calculation of Average Taxable Assessed Value & Average Market Value – Vandalia

Average Assessed Value

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

Vandalia: $30,409,650 ÷ 2,667 housing units = $11,402.19

Average Market Value

Average Assessed Value x 4 = Average Market Value
(Rounded to the Nearest Dollar)

Vandalia: $11,402.19 x 4 = $45,608.77
($45,609)

Figure F-9
Average Market Value of Housing Units by Municipality

Participating Jurisdiction	Total Taxable Assessed Value of Residential Buildings (2018)	Total Housing Units (2010)	Average Taxable Assessed Values	Average Market Value (2018)
Brownstown	$2,292,657	320	$7,165	$28,658
Ramsey	$3,556,318	458	$7,765	$31,060
St. Elmo	$5,070,457	616	$8,231	$32,925
St. Peter	$2,187,041	160	$13,669	$54,676
Vandalia	$30,409,650	2,667	$11,402	$45,609
Unincorp. County	$39,875,402	4,790	$8,325	$33,299
County	$85,895,094	9,302	$9,234	$36,936

Source: Fayette County Clerk.

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, etc.) and (b) the flood depth. **Figure F-10** calculates the percent loss to a structure and its contents for different scenarios based on flood depth and structure type.

Assumption #5

The potentially-damaged housing units are one or two-story homes with basements and the flood depth is two foot.
Structural Damage = 20%
Content Damage = 30%

Figure F-10
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 one or two-story homes with basements and the flood depth is two feet. With these assumptions the expected percent damage sustained by the ***structure*** is estimated to be 20% and the expected percent damage sustained by the structure's ***contents*** is estimated to be 30%.

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 (20%) 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-11** provides a sample calculation.

Figure F-11
***Structure:* Potential Dollar Loss Sample Calculation – Vandalia**

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

Vandalia: $45,609 x 20% = $9,121.80 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)

Vandalia: $9,121.80 per housing unit x 16 housing unit = $145,948.80

($145,949)

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 (30%) 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-12** provides a sample calculation.

Figure F-12
***Content:* Potential Dollar Loss Sample Calculation – Vandalia**

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

Vandalia: ½ ($45,609) x 30% = $6,841.35 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)

Vandalia: $6,841.35 per housing unit x 16 housing unit = $109,461.60

($109,462)

Finally, the ***total potential dollar losses*** may be calculated by adding together the potential dollar losses to the structure and the content. **Figure F-13** provides a breakdown of the total potential dollar losses by jurisdiction.

Figure F-13
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Riverine Flood Event by Participating Jurisdiction

Participating Jurisdiction	Average Market Value (2018)	Potentially-Damaged Housing Units	Potential Dollar Losses		Total Potential Dollar Losses (Rounded to the Nearest Dollar)
			Structure	Content	
Brownstown	$28,658	0	$ 0	$ 0	$ 0
Ramsey	$31,060	0	$ 0	$ 0	$ 0
St. Elmo	$32,925	0	$ 0	$ 0	$ 0
St. Peter	$54,676	0	$ 0	$ 0	$ 0
Vandalia	$45,609	16	$145,949	$109,462	$255,411
Unincorp. County	$36,936	3	$22,162	$16,621	$38,783

This assessment illustrates the *potential residential dollar losses* that should be considered when jurisdictions are deciding which mitigation projects to pursue. Potential dollar losses caused by riverine flooding to vulnerable residences within Vandalia would be expected to exceed $255,411. Four of the five participating municipalities in this scenario do not have any residences considered vulnerable to riverine flooding. Potential dollar losses to vulnerable structures in unincorporated Fayette County would be expected to exceed $38,783.

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, Teutopolis's wastewater treatment lagoon is located in the base floodplain of Salt Creek. 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. Fayette 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.

3.5 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 St. Louis, Missouri is responsible for issuing ***tornado watches*** and ***warnings*** for Fayette 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 Fayette County. NOAA's Storm Events Database and the NWS Weather Forecast Office in St. Louis, Missouri have documented 21 occurrences of tornadoes in Fayette County between 1954 and 2019. In comparison, there have been 2,443 tornadoes statewide between 1950 and 2017 according to NOAA's Storm Prediction Center.

Tornado Fast Facts – Occurrences

Number of Tornadoes Reported (1954 - 2019): ***21***

Highest F-Scale Rating Recorded: ***F-3 (April 5, 1958)***

Most Likely Month for Tornadoes to Occur: ***June***

Most Likely Time for Tornadoes to Occur: ***late afternoon***

Average Length of a Tornado: ***4.99 miles***

Average Width of a Tornado: ***75 yards***

Average Damage Pathway of a Tornado: ***0.21 sq. mi.***

Longest Tornado Path in the County: ***26.1 miles (July 21, 1954)***

Widest Tornado Path in the County: ***200 yards (July 21, 1954 & November 17, 2013)***

Figure T-2 charts the reported occurrences of tornadoes by magnitude. Of the 21 reported occurrences there was: 0 – F4s, 1 – F3, 3 – F2s, 5 – F1s, 5 – F0s, 0 – EF4s, 0 – EF3s, 4 – EF2s, 2 – EF1s and 1– EF0.

Figure T-3 charts the reported tornadoes by month. Of the 21 events, 13 (62%) took place in April, May, and June making this the peak period for tornadoes in Fayette County. Of those 13 events, 6 (46%) occurred during June 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-4 charts the reported tornadoes by hour. Approximately 81% of all tornadoes occurred during the p.m. hours, with 13 of the p.m. events (62%) taking place between 2 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-2
Tornadoes by Magnitude
1954 - 2019

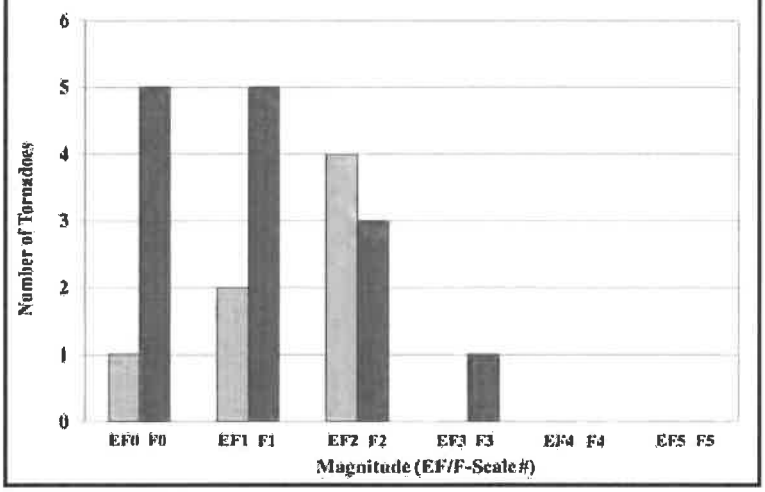


Figure T-3
Tornadoes by Month
1954 - 2019

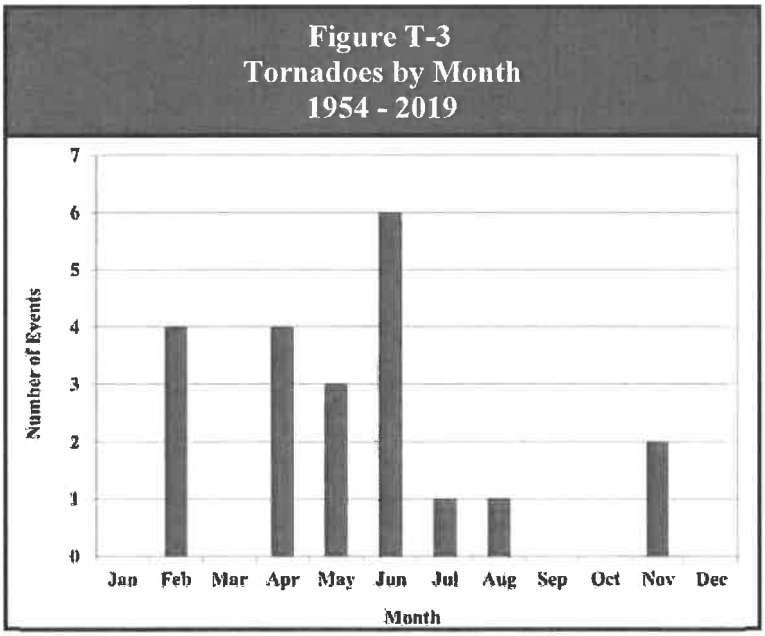
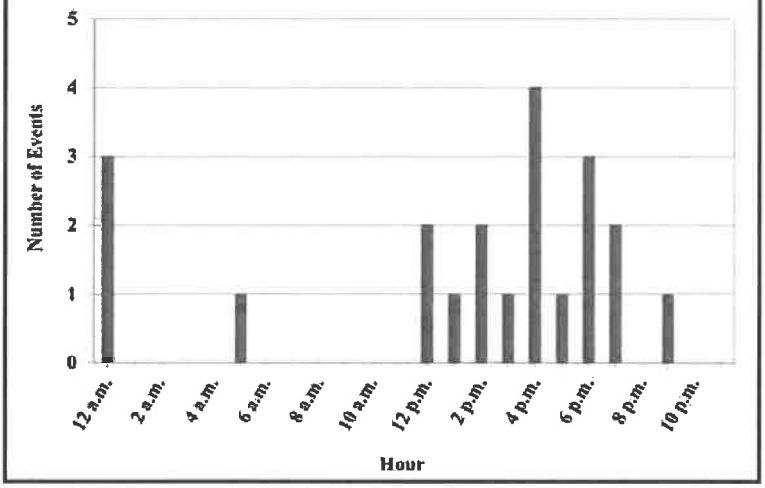


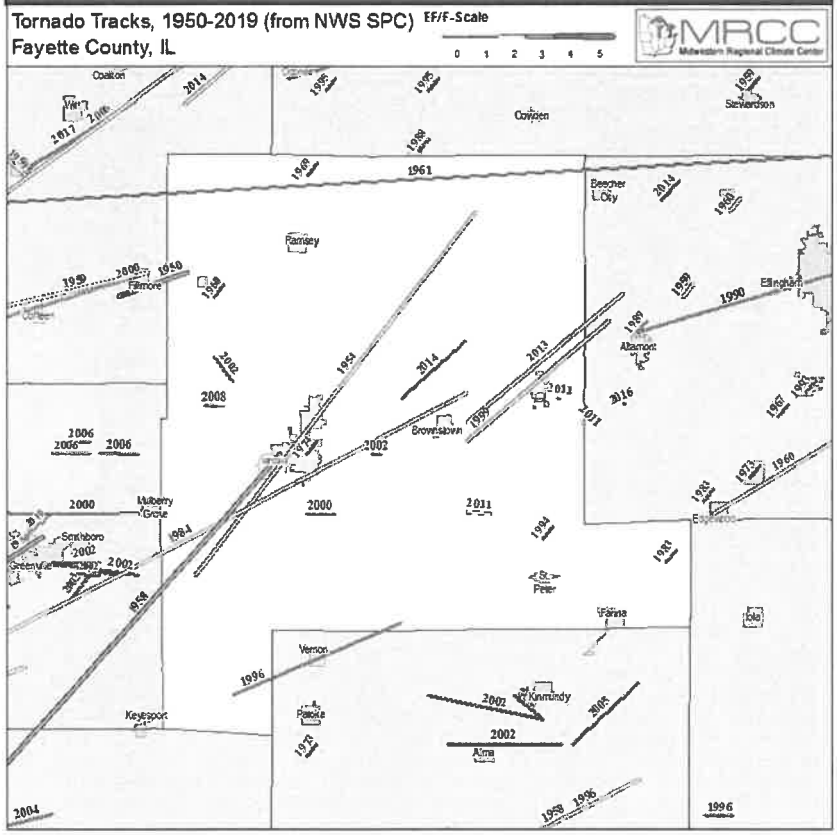
Figure T-4
Tornadoes by Hour
1954 - 2019



The tornadoes that have impacted Fayette County have varied from 0.08 miles to 26.1 miles in length and from 10 yards to 200 yards in width. The average length of a tornado in Fayette County is 4.99 miles and the average width is 75.1 yards (0.043 miles).

Figures T-5 shows the pathway of each reported tornado. The numbers by each tornado correspond with the tornado. 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 Fayette County, the average damage pathway or area impacted by a tornado is 0.21 square miles.

Figure T-5
Tornado Pathways in Fayette County



The longest and widest tornado recorded in Fayette County occurred on July 21, 1954. This F-2 tornado, measuring 26.1 miles in length and 200 yards in width, touched down near and passed through Pittsburg and traveled northeast passing through Vandalia, continuing northeast through the country before lifting off near the Dean Hills Nature Preserve.

What locations are affected by tornadoes?

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

What is the probability of future tornadoes occurring?

Fayette County has had 21 verified occurrences of tornadoes between 1954 and 2019. With 21 tornadoes over the past 66 years, the probability or likelihood that a tornado will touchdown somewhere in the County in any given year is 32%. There were two years over the last 66 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 3%.

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 Fayette County is vulnerable to the dangers presented by tornadoes. According to NOAA's Storm Events Database and the NWS Weather Forecast Office in St. Louis, a majority of the tornadoes have touched down or passed through the southern half part of the County. Since 2000, 11 tornadoes have been recorded in Fayette County.

Of the participating municipalities, Brownstown, St. Elmo, and Vandalia 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
Bingham	1		1960
Brownstown	4	1984	1999, 2013, 2014
Farina	1		1998
Ramsey	0		
St. Elmo	5	1999	1999, 2011, 2011, 2013
St. Peter	1		1994
Vandalia	4	1954, 1958, 1974	1984

In terms of unincorporated areas vulnerable to tornadoes, Pittsburg has had three tornadoes touch down in or near their vicinity while Bluffs City, Carlyle Lake, Confidence, Shaffer, and Shobonier have each had two tornados touch down in or near their vicinity. **Figure T-7** details the verified tornadoes that have touched down in or near unincorporated areas of Fayette County.

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

Unincorporated Area	Number of Verified Tornadoes	Year	
		Touched Down/Passed *Through* Unincorporated Area	Touched Down/Passed *Near* Unincorporated Area
Bluffs City	2	1984	2002
Carlyle Lake	2	---	1996, 2004
Confidence	2	---	2011, 2018
Dean Hills Nature Preserve	1	---	1954
Gatch Lake	1	---	2018
Hagarstown	1	---	1958
Laclede	1	1983	---
Loogootee	1	---	1994
Pittsburg	3	1954	1958, 1984
Sefton	1	---	2014
Shaffer	2	---	2002, 2008
Shobonier	2	---	1996, 2000

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

What impacts resulted from the recorded tornadoes?

Data obtained from NOAA's Storm Events Database, NOAAs Storm Data Publications, NOAA's Storm Prediction Center, the NWS Weather Forecast Office in St. Louis and Planning Committee member records indicates that between 1954 and 2019, eight of the 21 tornadoes caused $3,745,250 in property damages and no recorded crop damages. Four of the eight tornadoes have property damage totals of at least $250,000. Property damage information was either unavailable or none was recorded for the remaining 13 reported occurrences.

Included in the property damage total is $2.5 million in damages sustained as a result of the November 9, 1984 F-2 tornado that devastated a portion of Brownstown, destroying 169 homes.

Tornado Fast Facts – Impacts/Risk

Tornado Impacts:
- Total Property Damage (8 events): ***$3,745,250***
- Total Crop Damage: ***n/a***
- Injuries (2 events): ***12***
- Fatalities: ***n/a***

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

NOAA's Storm Events Database documented 12 injuries as a result of two tornado events. Detailed information on the injuries sustained was only available for one of the events. Eleven persons were injured on November 9, 1984 when an F-2 tornado passed about 3 miles south of Vandalia and then moved through Brownstown, damaging more than 175 homes.

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, Fayette County ***ranks in the top half of 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 medium to low. 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.

Fayette County

For Fayette County the level of risk or vulnerability posed by tornadoes to public health and safety is considered to be ***low***. This assessment is based on the fact that tornadoes do not occur frequently in the County and 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, the Fayette County Hospital in Vandalia is equipped to provide continuous care to persons injured by a tornado assuming that it is not directly impacted.

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 a majority of the participating jurisdictions are small in size (less than 1 ½ 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.

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 tornado in Fayette County will be used since it has a higher probability of recurring. In Fayette County the area impacted by an average-sized tornado is 0.20 square miles. This average is based on more than 65 years of data.

Assumption #1

Size of Tornado = 0.20 sq. miles

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

Assumption #2

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

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.

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-8
Calculation of Average Housing Unit Density – Fayette County

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

Fayette County: 9,302 housing units ÷ 716.482 sq. miles = 12.983 housing units/sq. mile
(13 housing units)

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 Fayette County.

Figure T-9
Average Housing Unit Density by Participating Jurisdiction

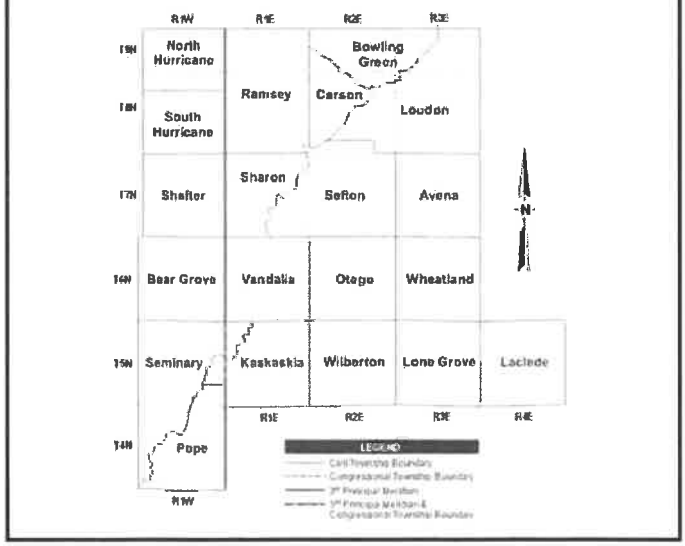
Participating Jurisdiction	Total Housing Units (2010)	Mobile Homes (2013-2017)*	Land Area (Sq. Miles) (2010)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)
Brownstown	320	36	0.774	---
Ramsey	458	107	1.011	453.017
St. Elmo	616	67	0.953	---
St. Peter	160	10	0.521	---
Vandalia	2,667	107	8.101	329.219
Unincorp. County	4,790	1,139	703.391	6.810
County	9,302	1,496	716.482	12.983

* Information on additional housing characteristics, such as mobile homes, was not covered by the 2010 Census. Instead the U.S. Census Bureau has chosen to generate 5-year estimates from American Community Survey data. The 2013-2017 5-year estimate is the most recent year for which estimates were available.

Source: U. S. Census Bureau.

In Fayette County, as well as many other central Illinois counties, there are pronounced differences in housing unit densities. Approximately 72% of all housing units are located in seven of the County's 20 townships (Avena, La Clede, Louden, Otego, Ramsey, Sharon, and Vandalia) while approximately 72% of all mobile homes are located in eight of the County's 20 townships (Avena, Kaskaskia, Louden, Otego, Ramsey, Seminary, Vandalia, and Wheatland). **Figure T-10** identifies the township boundaries. 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.

Figure T-10
Township Boundaries Fayette County



Source: Illinois Secretary of State

This substantial difference in density skews the average *county* housing unit density in Fayette 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.

Figure T-11
Average Housing Unit Density by Township

Township	Total Housing Units (2010)	Mobile Homes (2013-2017)*	Land Area (Sq. Miles) (2010)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)
Avena	885	103	36.320	24.367
Bear Grove	259	38	37.349	6.935
Bowling Green	218	68	25.531	8.539
Carson	72	8	17.795	4.046
Hurricane	106	15	27.064	3.917
Kaskaskia	289	92	34.297	8.426
La Clede	408	56	36.801	11.087
Lone Grove	294	19	36.870	7.974
Loudon	418	153	59.794	6.991
Otego	666	195	35.336	18.848
Pope	93	3	25.413	3.660
Ramsey	822	181	54.365	15.120
Sefton	256	57	49.880	5.132
Seminary	225	96	44.922	5.009
Shafter	201	42	35.606	5.645
Sharon	425	57	24.771	17.157
South Hurricane	147	35	27.077	5.429
Vandalia	3,115	177	35.083	88.789
Wheatland	246	85	36.686	6.706
Wilberton	187	16	35.522	5.264
Townships - 7 most populated	6,739	922	282	23.857
Townships - 13 least populated	2,593	574	434	5.974

* Information on additional housing characteristics, such as mobile homes, was not covered by the 2010 Census. Instead the U.S. Census Bureau has chosen to generate 5-year estimates from American Community Survey data. The 2013-2017 5-year estimate is the most recent year for which estimates were available.

Source: U.S. Census Bureau.

For 15 of the 20 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 considerably less than the housing unit densities for one of the five most populated townships.

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 undeveloped areas need to be subtracted from the land area figures obtained from the U.S. Census Bureau.

In Fayette County, all of the participating municipalities have large, sparsely-populated open areas within their municipal boundaries. These areas account for approximately 19% to 73% 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 Undeveloped Land

Participating Jurisdiction	Land Area (Sq. Miles) (2010)	Estimated Open Land Area & Commercial/ Industrial Tracts (Sq. Miles)	Refined Land Area (Sq. Miles)
Brownstown	0.774	0.310	0.464
Ramsey	1.011	0.380	0.631
St. Elmo	0.953	0.180	0.773
St. Peter	0.521	0.280	0.241
Vandalia	8.101	2.640	5.461

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 Fayette County tornado. **Figure T-13** provides a sample calculation.

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.

Figure T-13
Sample Calculation of Potentially-Damaged Housing Units – Fayette County

Average Housing Unit Density x Area Impacted by the Average-Sized Fayette County Tornado = Potentially-Damaged Housing Units
(Rounded Up to the Nearest Whole Number)

Fayette County: 12.983 housing units/sq. mile x 0.20 sq. miles = 2.60 housing units
(3 housing units)

To calculate the number of potentially-damaged housing units for these municipalities, the area impacted by the averaged-sized Fayette 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 Bingham is 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 – St. Elmo

Area Impacted by the Average-Sized Fayette 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)

St. Elmo: 0.20 sq. mile ÷ 0.773 sq. miles x 616 housing units = 159.38
(160 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 seven 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.

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.)

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

Participating Jurisdiction	Total Housing Units (2010)	Land Area/Refined Land Area (Sq. Miles) (2010)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.20 Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.20 Sq. Mi.) (Rounded Up)
Brownstown	320	0.464	---	137.93	138
Farina	248	0.397	---	124.94	125
St. Elmo	616	0.773	---	159.38	160
St. Peter	160	0.241	---	132.78	133
Vandalia	2,667	5.461	488.372	97.67	98
Unincorp. County	4,790	703.391	6.810	1.36	2
County	9,302	716.482	12.983	2.60	3

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

Township	Total Housing Units (2010)	Land Area (Sq. Miles) (2010)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.20 Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.20 Sq. Mi.) (Rounded Up)
Avena	885	36.320	24.367	4.87	5
Bear Grove	259	37.349	6.935	1.39	2
Bowling Green	218	25.531	8.539	1.71	2
Carson	72	17.795	4.046	0.81	1
Hurricane	106	27.064	3.917	0.78	1
Kaskaskia	289	34.297	8.426	1.69	2
La Clede	408	36.801	11.087	2.22	3
Lone Grove	294	36.870	7.974	1.59	2
Loudon	418	59.794	6.991	1.40	2
Otego	666	35.336	18.848	3.77	4
Pope	93	25.413	3.660	0.73	1
Ramsey	822	54.365	15.120	3.02	4
Sefton	256	49.880	5.132	1.03	2
Seminary	225	44.922	5.009	1.00	2
Shafter	201	35.606	5.645	1.13	2
Sharon	425	24.771	17.157	3.43	4
South Hurricane	147	27.077	5.429	1.09	2
Vandalia	3,115	35.083	88.789	17.76	18
Wheatland	246	36.686	6.706	1.34	2
Wilberton	187	35.522	5.264	1.05	2
Townships - 7 most populated	6,739	282.470	23.857	4.77	5
Townships - 13 least populated	2,593	434.012	5.974	1.19	2

Fayette County

For Fayette County the level of risk or vulnerability posed by tornadoes to existing buildings, infrastructure, and critical facilities is considered ***low*** to ***medium***. 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 and 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.

Participating Municipalities

In general, if a tornado were to touch down 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 within 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. While two 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 tornadoes, the County and five municipalities/townships do not.

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 Fayette 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: 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.

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.

To determine the average market value, the total assessed value must first be obtained. For Fayette County, the total assessed value of residential buildings was not available, so the total taxable assessed value was used. (It should be noted that the total taxable assessed value is less than the total assessed value due to the deduction of various exemptions including TIF districts.) The total taxable value of residential buildings within a jurisdiction is then divided by the total number of housing units within the jurisdiction to determine the *average* taxable assessed value.

A multiplier is then applied to the average taxable assessed value to determine the average market value. Normally a multiplier of 3 is applied to the average assessed value since the assessed value of a structure in Illinois is approximately one-third of the market value. A review of total assessed values and total taxable assessed values in adjacent counties indicates that the same multiplier cannot be applied to both values. It was determined that a more accurate multiplier for average taxable assessed values would be 4.

Figure T-17 provides a sample calculation. The total taxable assessed value is based on 2018 tax assessment information provided by the Fayette County Clerk.

Figure T-17
Sample Calculation of Average Taxable Assessed Value & Average Market Value – St. Elmo

Average Taxable Assessed Value

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

St. Elmo: $5,070,457 ÷ 616 housing units = $8,231.26

Average Market Value

Average Taxable Assessed Value x 4 = Average Market Value
(Rounded to the Nearest Dollar)

St. Elmo: $8,231.26 x 4 = $32,925.04
($32,925)

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 Taxable Assessed Value of Residential Buildings (2018)	Total Housing Units (2010)	Average Taxable Assessed Values	Average Market Value (2018)
Brownstown	$2,292,657	320	$7,165	$28,658
Ramsey	$3,556,318	458	$7,765	$31,060
St. Elmo	$5,070,457	616	$8,231	$32,925
St. Peter	$2,187,041	160	$13,669	$54,676
Vandalia	$30,409,650	2,667	$11,402	$45,609
Unincorp. County	$39,875,402	4,790	$8,325	$33,299
County	$85,895,094	9,302	$9,234	$36,936

Source: Fayette County Clerk.

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-19
Average Market Value of Housing Units by Township

Participating Jurisdiction	Total Taxable Assessed Value of Residential Buildings (2018)	Total Housing Units (2010)	Average Taxable Assessed Values	Average Market Value (2018)
Avena	$7,615,212	885	$8,605	$34,419
Bear Grove	$1,491,571	259	$5,759	$23,036
Bowling Green	$961,081	218	$4,409	$17,635
Carson	$325,945	72	$4,527	$18,108
Hurricane	$361,049	106	$3,406	$13,624
Kaskaskia	$1,572,299	289	$5,440	$21,762
La Clede	$3,528,664	408	$8,649	$34,595
Lone Grove	$3,189,487	294	$10,849	$43,394
Loudon	$1,738,647	418	$4,159	$16,638
Otego	$4,281,385	666	$6,429	$25,714
Pope	$534,941	93	$5,752	$23,008
Ramsey	$5,434,684	822	$6,612	$26,446
Sefton	$1,418,090	256	$5,539	$22,158
Seminary	$1,553,208	225	$6,903	$27,613
Shafter	$2,184,077	201	$10,866	$43,464
Sharon	$8,956,332	425	$21,074	$84,295
South Hurricane	$551,736	147	$3,753	$15,013
Vandalia	$38,380,918	3,115	$12,321	$49,285
Wheatland	$1,040,461	246	$4,230	$16,918
Wilberton	$775,307	187	$4,146	$16,584
Townships - 7 most populated	$69,935,842	6,739	$10,378	$41,511
Townships - 13 least populated	$15,959,252	2,593	$6,155	$24,619

Source: Fayette County Clerk.

Figure T-20
***Structure:* Potential Dollar Loss Sample Calculation – St. Elmo**

Average Market Value of a Housing Unit with the Jurisdiction x Percent Damage = Average Structural Damage per Housing Unit
St. Elmo: $32,925 x 100% = $32,925 per housing unit

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

St. Elmo: $32,925 per housing unit x 160 housing units = $5,268,000
($5,268,000)

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 – St. Elmo**

½ (Average Market Value of a Housing Unit) with the Jurisdiction x Percent Damage = Average Content Damage per Housing Unit
St. Elmo: ½ ($32,925) x 100% = $16,462.50 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)

St. Elmo: $16,462.50 per housing unit x 160 housing units = $2,634,000
($2,634,000)

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.

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

Participating Jurisdiction	Average Market Value (2018)	Potentially-Damaged Housing Units (Rounded Up)	Potential Dollar Losses		Total Potential Dollar Losses
			Structure	Content	
Brownstown	$ 28,658	138	$3,954,804	$1,977,402	$5,932,206
Ramsey	$ 31,060	146	$4,534,760	$2,267,380	$6,802,140
St. Elmo	$ 32,925	160	$5,268,000	$2,634,000	$7,902,000
St. Peter	$ 54,676	133	$7,271,908	$3,635,954	$10,907,862
Vandalia	$ 45,609	98	$4,469,682	$2,234,841	$6,704,523
Unincorp. County	$ 33,299	2	$66,598	$33,299	$99,897
County	$ 36,936	3	$110,808	$55,404	$166,212

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 Fayette County would be expected to exceed at least $5.9 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 seven most populated townships and the 13 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-23
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Tornado by Township

Participating Jurisdiction	Average Market Value (2018)	Potentially-Damaged Housing Units (Rounded Up)	Potential Dollar Losses		Total Potential Dollar Losses
			Structure	Content	
Avena	$ 34,419	5	$172,095	$86,048	$258,143
Bear Grove	$ 23,036	2	$46,072	$23,036	$69,108
Bowling Green	$ 17,635	2	$35,270	$17,635	$52,905
Carson	$ 18,108	1	$18,108	$9,054	$27,162
Hurricane	$ 13,624	1	$13,624	$6,812	$20,436
Kaskaskia	$ 21,762	2	$43,524	$21,762	$65,286
La Clede	$ 34,595	3	$103,785	$51,893	$155,678
Lone Grove	$ 43,394	2	$86,788	$43,394	$130,182
Loudon	$ 16,638	2	$33,276	$16,638	$49,914
Otego	$ 25,714	4	$102,856	$51,428	$154,284
Pope	$ 23,008	1	$23,008	$11,504	$34,512
Ramsey	$ 26,446	4	$105,784	$52,892	$158,676
Sefton	$ 22,158	2	$44,316	$22,158	$66,474
Seminary	$ 27,613	2	$55,226	$27,613	$82,839
Shafter	$ 43,464	2	$86,928	$43,464	$130,392
Sharon	$ 84,295	4	$337,180	$168,590	$505,770
South Hurricane	$ 15,013	2	$30,026	$15,013	$45,039
Vandalia	$ 49,285	18	$887,130	$443,565	$1,330,695
Wheatland	$ 16,918	2	$33,836	$16,918	$50,754
Wilberton	$ 16,584	2	$33,168	$16,584	$49,752
Townships - 7 most populated	$ 41,511	5	207,555	103,778	311,333
Townships - 13 least populated	$ 24,619	2	49,238	24,619	73,857

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.

3.6 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 United States 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 drought 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

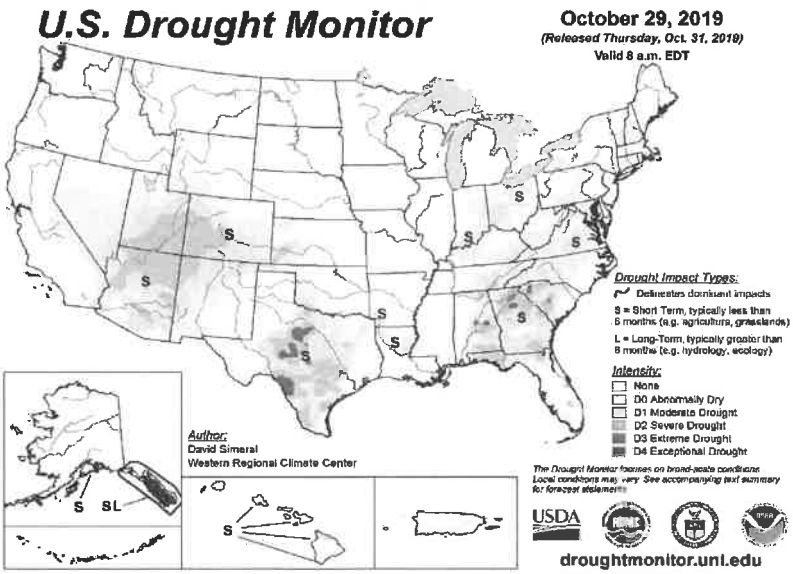
look at drought conditions in the United States. It is not designed to infer specifics about local conditions.

Figure DR-1
U.S. Drought Monitor – Drought Severity Classifications

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

Source: 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 – 2019): *5*

Table 11, located in **Appendix J**, summarizes the previous occurrences as well as the extent or magnitude of the drought events recorded in Fayette County. NOAA's Storm Events Database, the Illinois State Water Survey, the Illinois Emergency Management Agency (IEMA) and the USDA have documented five official droughts for Fayette County between 1980 and 2019.

The State of Illinois Drought Preparedness and Response Plan identified seven 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 Fayette 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 Fayette County's hazard rating for drought as "low."

What is the probability of future drought events occurring?

Fayette County has experienced five droughts between 1980 and 2019. With five occurrences over 40 years, the probability or likelihood that the County may experience a drought in any given year is 13%. However, if earlier recorded droughts are factored in, then the probability that Fayette County may experience a drought in any given year decreases to 30%.

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 Fayette County, including the municipalities, 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 2010, Fayette 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 either unavailable or none was recorded for any of the five drought events experienced between 1980 and 2019. Of the five 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.

Drought Fast Facts – Impacts/Risk

Drought Impacts:
- Total Property Damage: ***n/a***
- Total Crop Damage: ***n/a***

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

What other impacts can result from drought events?

Based on statewide drought records available from the Illinois State Water Survey, the most common impacts that result from drought events in Illinois include reductions in crop yields and drinking water shortages.

Crop Yield Reductions

Agriculture is the important industry in Fayette County. Farmland accounts for approximately 76.1% of all the land in the County. According to the 2017 Census of Agriculture, there were 1,239 farms in in the County occupying 349,055 acres. Of the land in farms, approximately 85% or 297,846 acres is in crop production. Approximately 0.07% of the land in crop production is irrigated.

According to the 2017 Census of Agriculture, crop sales accounted for $146.5 million in revenue while livestock sales accounted for $18.4 million. Fayette County ranks 56th in Illinois for livestock cash receipts and 41st for crop 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 five recorded drought events. The USDA's National Agricultural Statistics Service records show that the yield reductions for corn were most severe for the 2012 drought when there was a 78.8% reduction and soybean yield reductions were most severe for the 1983 drought when there was a 57.6% reduction.

Figure DR-3 Crop Yield Reductions Due to Drought – Fayette County				
Year	**Corn**		**Soybeans**	
	Yield (bushel)	**% Reduction Previous Year**	**Yield (bushel)**	**% Reduction Previous Year**
1982	113	---	33	---
1983	**29**	**74.3%**	**14**	**57.6%**
1984	70	---	23	---
1987	125	---	30	---
1988	**67**	**46.4%**	**21**	**30.0%**
1989	113	---	32	---
2004	171	---	47	---
2005	**117**	**31.6%**	**39**	**17.0%**
2006	121	---	40	---
2010	159.3	---	49.7	---
2011	**137.9**	**13.4%**	**40.9**	**17.7%**
2012	**29.3**	**78.8%**	**35.6**	**13.0%**
2013	161.8	---	44.3	---

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 Fayette County ***three of the five participating municipality relies on a surface water source*** for their drinking water supply. St. Elmo, St. Peter, and Vandalia rely solely on surface water to obtain their drinking water.

Because these municipalities receive their drinking water supply from a surface water source, it is more vulnerable to shortages as a result of a prolonged drought or a series of droughts in close succession. Those participants that obtain water from wells are less vulnerable to drinking water shortages, although a prolonged drought or a series of droughts in close succession do have the potential to impact water levels in aquifers used for individual drinking water wells in rural areas. This is because individual (private) water wells tend to be shallower than municipal (public) water wells.

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 Fayette County and the participating municipalities 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.).

3.7 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.).

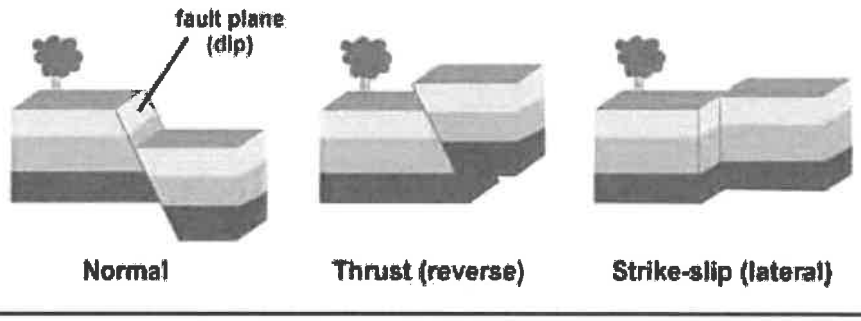
Most of the damage done by an earthquake is caused by its secondary or indirect effects. These secondary effects result from the seismic waves released by the earthquake and include ground shaking, surface faulting, liquefaction, landslides and, in rare cases, tsunamis.

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 United States is the Modified Mercalli Intensity Scale. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. The lower numbers of the intensity scale are based on human observations (i.e., felt only by a few people at rest, felt quite noticeably by persons indoors, etc.).

The higher numbers of the scale are based on observed structural damage (i.e., broken windows, general damage to foundations etc.). Structural engineers usually contribute information when assigning intensity values of VIII or greater. **Figure 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.

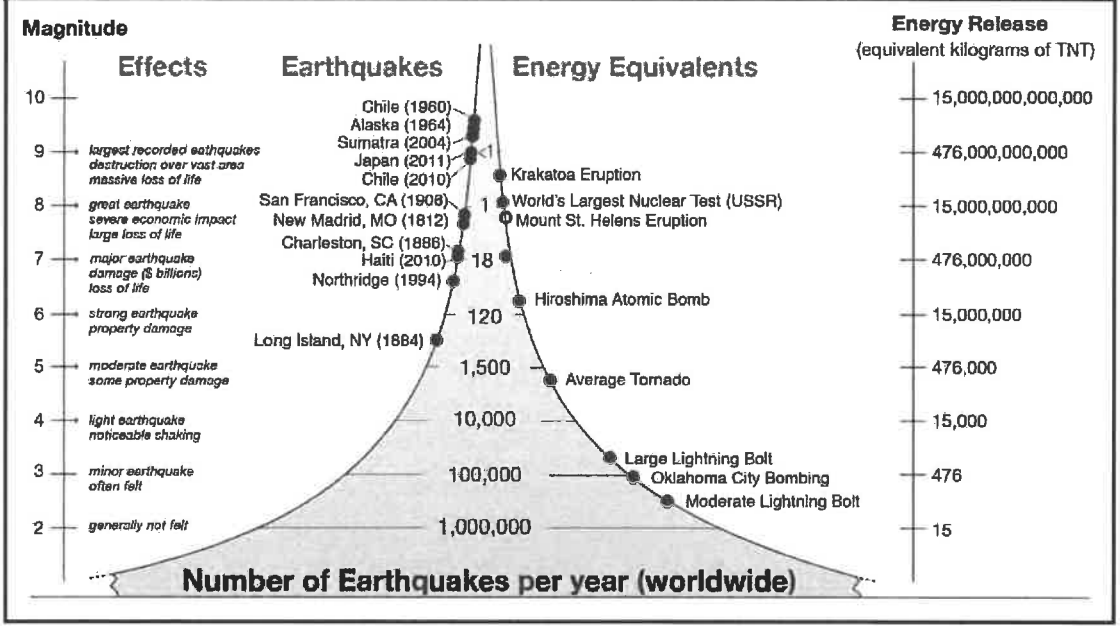
While most earthquakes occur along plate boundaries some are known to occur within the interior of a plate. (As the plates continue to move and plate boundaries change over time, weakened

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

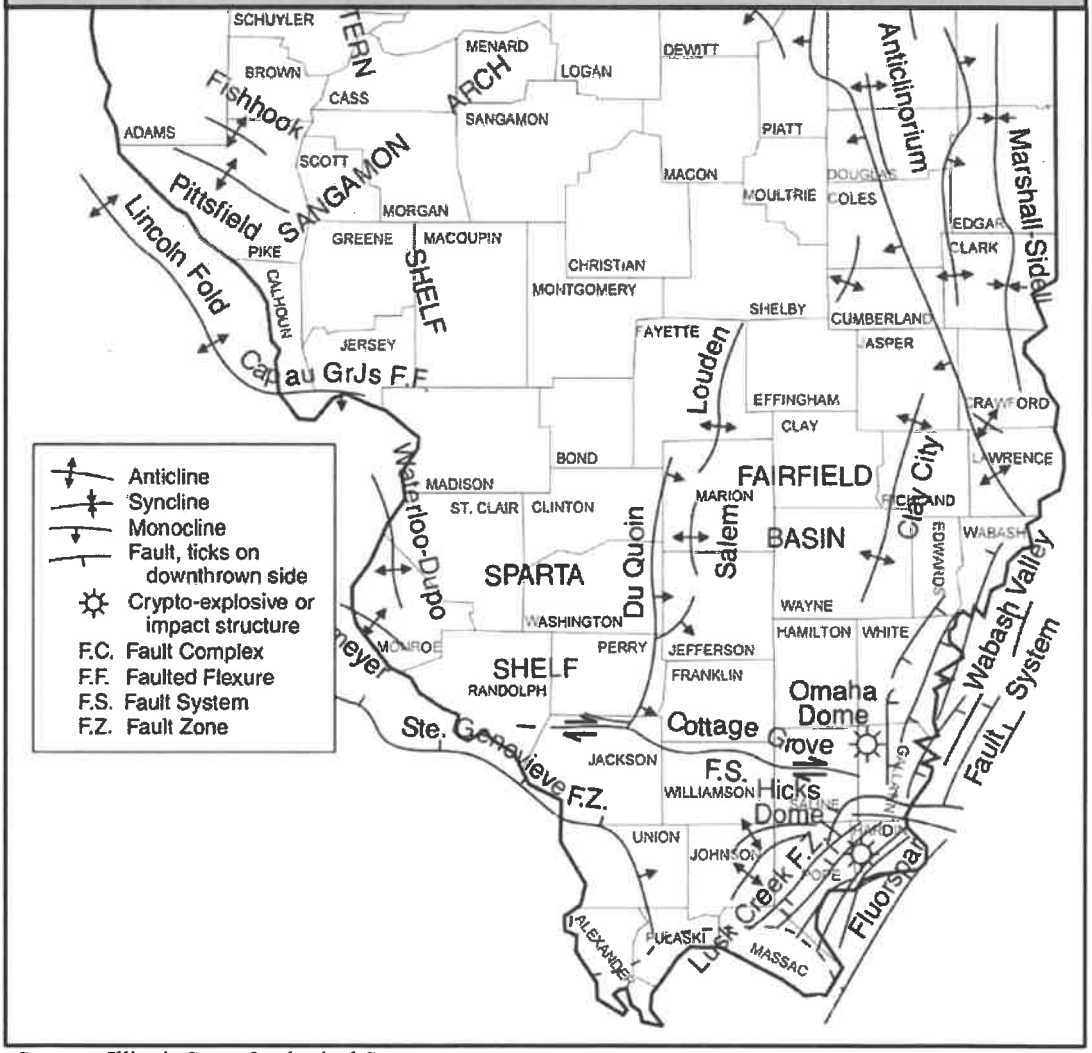
The following details the location of known fault zones and geologic structures, identifies past occurrences of earthquakes, details the severity or extent of future potential events (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

Are there any faults located within the County?

No. While there are no faults located in Fayette County, there is one geologic structure located within the County, the Lowden Anticline. The following provides a brief description while **Figure EQ-5** illustrates its location.

❖ *Louden Anticline*: Located in the northeastern part of Fayette County to northwest Marion County, the Louden Anticline is slightly sinuous with about 200 feet of closure. The west limb of the Louden Anticline is considerably steeper than the east limb. This part of the structure has the potential for normal faults at depth.

Figure EQ-5
Geological Structures in Central and Southern Illinois



Source: Illinois State Geological Survey.

There are also several known geological structures within the County and the immediate region: the Wabash Valley Fault System, the Cottage Grove Fault System, the Rough Creek-Shawneetown Fault System. **Figure EQ-5** illustrates the location of these structures.

❖ *Wabash Valley Fault System*: The Wabash Valley Fault System straddles the southern Illinois-Indiana border and is about 55 miles long and as wide as 30 miles. This broad fracture system

experiences moderate earthquake activity presently and there is evidence that strong earthquakes have occurred here within 10,000 years.

- *Cottage Grove Fault System*: The Cottage Grove Fault System is a complex fracture zone comprised of a "master fault", subsidiary faults, and a belt of anticlines mostly to the south. The zone is approximately 70 miles long and greater than 10 miles wide in some areas, that trends slightly north of west across southern Illinois from Gallatin County to Jackson County.
- *Rough Creek-Shawneetown Fault System*: The Rough Creek-Shawneetown Fault System is one of the largest fault systems in the Midwest. This braided fracture system is about 130 miles long and more than 5 miles wide in some places trending from northeastern Pope County, Illinois to Grayson County, Kentucky.

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

According to Illinois State Geological Survey, US Geological Survey and the U.S. Geological Survey and the Center for Earthquake Research and Information (CERI) at the University of Memphis, four earthquake has originated in Fayette County during the last 200 years. **Figure EQ-6** illustrates the epicenter of this earthquake.

Earthquake Fast Facts – Occurrences

Earthquakes Originating in the County (1795 – 2015): ***4***
Fault Zones Located within the County: ***none***
Fault Zones Located in Nearby Counties: ***3***

- On March 2, 1990 a magnitude 3.4 earthquake originated 8 miles south-southwest of Vandalia.
- On January 29, 1993 a magnitude 3.2 earthquake originated 5½ miles northeast of Vandalia.
- On September 5, 2004 a magnitude 2.9 earthquake originated 10 miles south-southwest of St. Elmo.
- On July 1, 2017 a magnitude 3.1 earthquake originated 10 miles southwest of Vandalia.

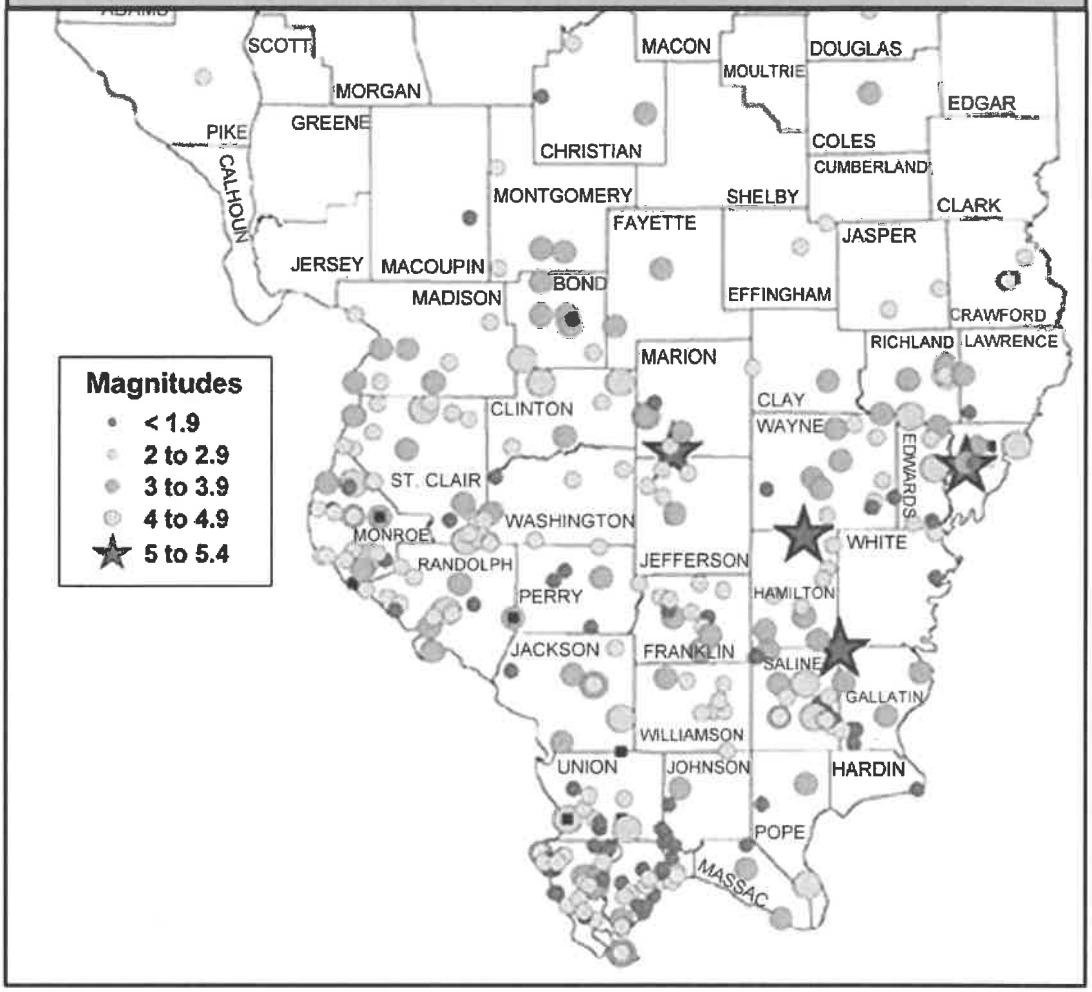
Fayette County residents, including those in the participating jurisdictions, have also felt ground shaking caused by earthquakes that have originated outside of the County. The following provides a brief description by region, of these events.

Southern Illinois

Fayette 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.

Figure EQ-6
Earthquakes Originating in Southern Illinois



Source: Illinois State Geological Survey.

- The strongest earthquake in the central United States 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 United States and southern Ontario, Canada.

Three of the ten largest earthquakes ever recorded within the continental United States 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 United States 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. Fayette County's proximity to the Wabash Valley Fault System, the Cottage Grove Fault System, the Rough Creek-Shawneetown Fault System, and the New Madrid Seismic Zone 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 Fayette County's hazard rating for earthquakes as "Medium".

According to the USGS, Fayette County can expect 10 to 50 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.

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%.

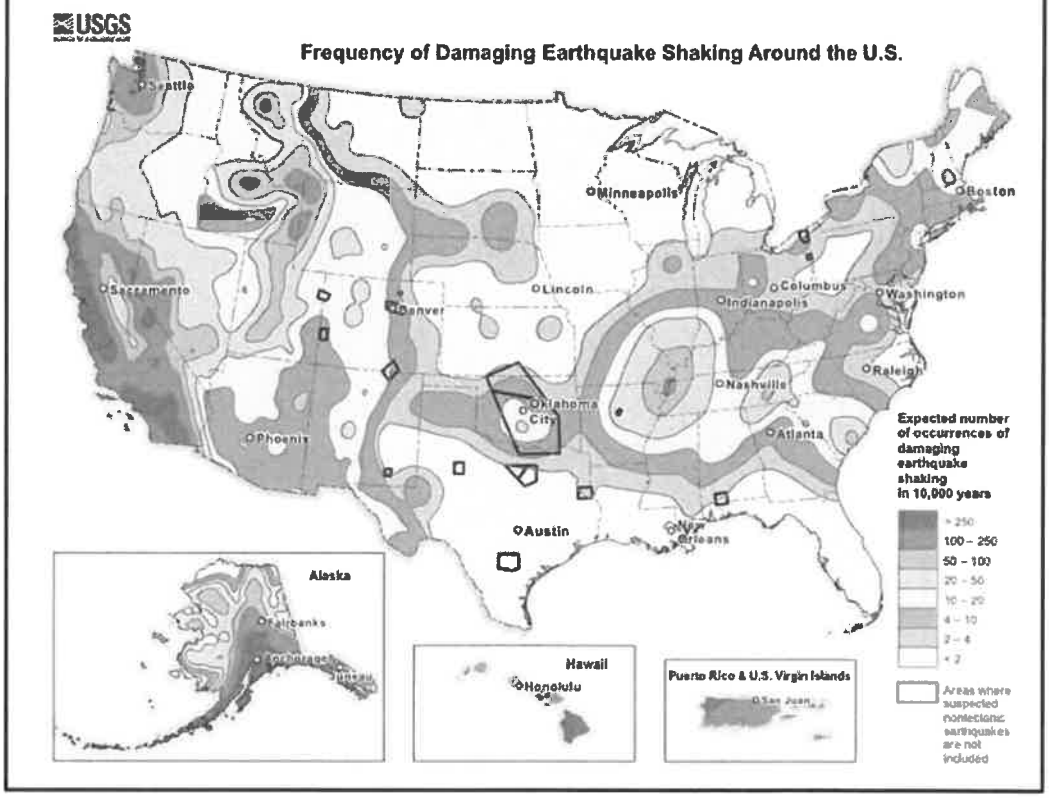
While the major earthquakes of 1811 and 1812 do not occur often along the New Madrid fault, they are not isolated events. In recent decades, scientists have collected evidence that earthquakes similar in size and location to those felt in 1811 and 1812 have occurred several times before within the central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

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



Source: United State Geological Survey.

Are the participating jurisdictions vulnerable to earthquakes?
Yes. All of Fayette County is vulnerable to earthquakes. The unique geological formations topped with glacial drift soils found in the central United States conduct an earthquake's energy farther than in other parts of the Nation. Consequently, earthquakes that originate in the Midwest tend to be felt at greater distances than earthquakes with similar magnitudes that originate on the West Coast.

This vulnerability, found throughout most of Illinois and all of Fayette 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 Fayette 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.

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

Earthquake Fast Facts – Impacts/Risk

Earthquake Risk/Vulnerability:

- Public Health & Safety – Light/Moderate Quake within the County or immediate region: ***Low***
- Public Health & Safety – Major Quake Wabash Valley/New Madrid seismic zone: ***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***

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

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the City of Vandalia and the St. Elmo Fire District considered earthquakes to be among their jurisdiction's greatest vulnerabilities.

- *Vandalia*: Vandalia Lake provides drinking water to the City and Vandalia Correctional Center. If the dam were to fail due to an earthquake, then there would be no water for the entire City.
- *St. Elmo Fire Protection District:* An earthquake has the potential to adversely impact the gas storage and oil fields in the area.

What impacts resulted from the recorded earthquake events?

Property damage information was either unavailable or none was recorded for the four documented earthquakes that occurred in Fayette County. While Fayette County residents felt the earthquakes that occurred in central and southern Illinois, no damages were reported as a result of these events. Given the magnitude of the great earthquakes of 1811 and 1812, it is almost certain that individuals in what is now Fayette 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 Interstate, US and State Routes (especially if the quake originates along the New Madrid seismic zone) 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 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 • 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 Fayette 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 faults in the immediate region, the risk or vulnerability to public health and safety is considered ***low***. This risk is elevated from ***medium*** for a major earthquake originating along the Wabash Valley or New Madrid seismic zones.

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

Yes. All existing buildings, infrastructure and critical facilities located in Fayette County and the participating jurisdictions are vulnerable to damage from earthquakes. Given the County's size (just under 22,000 individuals), it's population density and the fact that there are virtually no buildings higher than two stories (with the exception of grain elevators) tempered by the potential for magnitude 5.0 and above earthquakes to occur in the immediate region, the damage is anticipated to range from slight to considerable for well-built ordinary structures and considerable to severe for poorly-built structures.

If a strong earthquake (6.0 – 6.9) were to occur in the region then unreinforced masonry buildings are most at risk during an earthquake because the walls are prone to collapse outward. Steel and wood buildings have more ability to absorb the energy from an earthquake 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 Fayette 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 critical infrastructure 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-4** 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 considered ***medium*** for a strong earthquake originating in the region.

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]
Fayette County	1	2	---	1	---	---	---	1	1
Brownstown	3	---	---	---	2	---	0	---	---
Ramsey	0	0	0	---	4	0	0	1	---
St. Elmo	1	1	1	---	3	1	0	1	1
St. Peter	1	---	1	---	1	---	0	---	---
Vandalia	1	2	2	1	6	1	0	6	3
Sharon Township	0	---	---	---	---	---	---	---	---
Vandalia Township	2	1	1	---	5	1	1	1	5
Brownstown CUSD	0	1	0	---	4	---	0	---	---
St. Elmo FPD	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
St. Peter FPD	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

[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.

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

Yes. All future buildings, infrastructure and critical facilities located in Fayette County and the participating jurisdictions are vulnerable to damage from earthquakes. While the two of the 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 impacted Fayette County, there is no way to accurately estimate future potential dollar losses to vulnerable structures. However, according to the Fayette County Supervisor of Assessments the total equalized taxable assessed values of the structures in the planning area is $85,895,094. 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 Fayette 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.

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 Data, there are 41 levee systems located in Fayette County. Of those 41 levee systems, only nine are considered to be levee systems of significance. Levee 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 due to the limited impacts on the population, land use and infrastructure associated with the remaining levee systems.

The following details the levee systems located in the county; identifies the location of levee systems of significance; details past occurrences of levee failures associated with the levee systems of significance studied; 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 Fayette County?

Yes. According to the USACE National Levee Database there are nine levee systems of significance located in Fayette County. **Figure LF-1** provides information about each levee system.

Figure LF-1
Levee Systems of Significance in Fayette County

Levee System Name	Levee Category	Year Constructed	# of Levee Segments	Length of Levee (Miles)	Land Protected (Acres)	Inspection Rating	Year Inspected	PL 84-99 Status
Dively Drainage & Levee District System	Federal	1975	1	3.63 mi.	1,401.6 ac.	n/a	2018	Active
Vandalia 1	Non-federal	n/a	1	2.37 mi.	550.4 ac.	n/a	n/a	Not Enrolled
Vandalia 2	Non-federal	n/a	1	0.63 mi.	55.68 ac.	n/a	n/a	Not Enrolled
Vandalia 3	Non-federal	n/a	1	4.96 mi.	1,286.4 ac.	n/a	n/a	Not Enrolled
Vandalia 4	Non-federal	n/a	1	6.79 mi.	1,862.4 ac.	n/a	n/a	Not Enrolled
Vandalia 5	Non-federal	n/a	1	6.98 mi.	1,292.8 ac.	n/a	n/a	Not Enrolled
Vandalia 6	Non-federal	n/a	1	2.84 mi.	275.2 ac.	n/a	n/a	Not Enrolled
Vandalia 7	Non-federal	n/a	1	9.87 mi.	2,297.6 ac.	n/a	n/a	Not Enrolled
Vandalia Levee System	Non-federal	n/a	1	21.97 mi.	11,974.4 ac.	n/a	n/a	Inactive

Source: US Army Corps. of Engineers, National Levee Database.

When have levee breaches occurred previously?

No comprehensive, public-accessible database detailing levee failures currently exists in Illinois. A review of newspaper articles and discussions with Planning Committee members documented at least one levee system failure in Fayette County. The following provides a brief description of the event.

Levee Breach Fast Facts – Occurrences

Total Number of Levee Systems Located in the County: ***41***

Number of Levee Systems of Significance Located in the County: ***9***

Number of Levee Breaches Reported: ***1***

Probability of Future Levee Breach Events: ***Low***

- ***January 2020*** - Five and one-half to six inches of rain fell January 10-11, 2020 coupled with a controlled release of the Lake Shelbyville Dam, led to the Kaskaskia River breaching the Vandalia Levee in at least seven spots.

What is the extent of future potential levee breaches?

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 Fayette County Emergency Management Agency for any of the levee systems of significance. As a result, a data deficiency exists in terms of defining the extent or magnitude of the inundation areas associated future potential levee breaches.

What locations are affected by levee breaches?

Levee breaches along the studied levee systems of significance have the potential to affect Vandalia and portions of unincorporated areas of Fayette County. **Figure LF-2** and **LF-3** provides detailed maps of each levee systems. According to Ken Cripe, Vandalia Levee District Commissioner, there are discrepancies regarding the levee locations illustrated on the USACE National Levee Database maps and the actual location of certain portions of the Vandalia Levees. The actual boundaries based on the information from Mr. Cripe are overlayed on the USACE maps for comparison.

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. Discussions with township officials, the Fayette County Soil & Water Conservation District and levee commissions indicates that the Vandalia Levee System has experienced breaches on more than one occasion. While it is difficult to specifically establish the probability of future levee breaches associated with these levees based on the data available, it is estimated to be ***medium***. For the purposes of this analysis "medium" is defined as having up to a 50% chance of occurring in any given year.

Figure LF-2
Vandalia Levee System and Dively Drainage and Levee District System

Sources: Google Earth and US Army Corps of Engineers, National Levee Database.

Figure LF-3
Vandalia 1, 2, 3, 4, 5, 6, and 7

Sources: Google Earth and US Army Corps of Engineers, National Levee Database.

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.

Are the participating jurisdictions vulnerable to levee breaches from the levee systems of significance?

Yes. Vandalia and portions of unincorporated Fayette County are vulnerable to the dangers presented by levee breaches associated with the levee systems of significance studied. None of the other participating jurisdictions or the remainder of the County are considered vulnerable.

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.

Levee Failure Fast Facts – Risk

Levee Breach Risk/Vulnerability:

- Public Health & Safety:– ***Low***
- Buildings/Infrastructure/Critical Facilities: – ***Medium***

What impacts resulted from the recorded levee breaches along the levee systems of significance?

Damage information was either unavailable or none was recorded for the documented levee breach that occurred in Fayette County and no injuries or deaths were reported as a result of the breach.

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 along the levee systems of significance?

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 type of development and infrastructure protected by the levee. When these factors are taken into consideration, the overall risk to public health and safety posed a levee breach from the dams of significance studied in Fayette County is considered to be ***low***.

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. **Figure LF-4** identifies infrastructure and critical facilities vulnerable to a levee breach by vulnerable participating jurisdiction while **Figure LF-5** 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.

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, the amount of time available to implement emergency measures such as sandbagging and the USACE's Levee Safety Action Classification assessment. In general , the risk to existing buildings, infrastructure and critical facilities from a levee breach in Fayette County is ***medium***.

Are future buildings, infrastructure and critical facilities vulnerable to levee breaches?

Yes. Any future buildings, infrastructure and critical facilities located within the studied levee systems of significance 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.

Figure LF-4
Critical Facilities/Infrastructure Vulnerable to a Levee Breach by Jurisdiction in Fayette County

Participating Jurisdiction	Government[1]	Law Enforcement	Fire Stations	Ambulance Service	Schools	Drinking Water	Wastewater Treatment	Medical[2]	Healthcare Facilities[3]
City of Vandalia	n/a	n/a	n/a	n/a	n/a	n/a	1	n/a	n/a
Fayette County	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a

[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.

Figure LF-5
Number of Existing Structures Vulnerable to a Levee Breach in Fayette County

Levee System Name	**Number of Vulnerable Structures**	**Estimated Property Value of Vulnerable Structures**	**Structure Location**
Dively Drainage & Levee District System	6	$701,000	Unincorporated Fayette County
Vandalia 1	4	$65.8 million	Vandalia Unincorporated Fayette County
Vandalia 2	1	$1.28 million	Vandalia Unincorporated Fayette County
Vandalia 3	0	n/a	Unincorporated Fayette County
Vandalia 4	41	$12 million	Unincorporated Fayette County
Vandalia 5	6	$1.49 million	Unincorporated Fayette County
Vandalia 6	0	n/a	Unincorporated Fayette County
Vandalia 7	0	$0	Unincorporated Fayette County
Vandalia Levee System	9	$954,000	Unincorporated Fayette County

Source: US Army Corps of Engineers, National Levee Database.

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. Given the limited number of recorded levee breaches associated with the levees of significance studied in Fayette County, sufficient information is not available to prepare a reasonable estimate of future potential dollar losses to vulnerable structures from a levee breach. However, according to the National Levee Database, the total estimated property value of vulnerable structures in the leveed areas is $82,225,000. 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 91,468 dams in the United States and Puerto Rico, with 1,662 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 1,662 dams in Illinois, approximately 93% 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 13 classified dams located in Fayette County. Of those 13 dams, only five are considered to be dams of significance. Dams of significance include: a) dams that have a hazard potential classification of "High"; b) dams with reservoirs of considerable storage capacity; c) dams located in densely populated areas that have the potential to impact a considerable number of structures and/or individuals; or d) those dams identified as having special importance to the participating jurisdictions. Due to the limited impacts on the population, land use and infrastructure associated with a majority of the classified dams, only the dams of significance will be analyzed as part of this Plan update.

The following details the dams of significance located in the county; identifies the location of dams of significance; details past occurrences of dam failures associated with the dams of significance studied; describes the severity or extent of future potential failures (if known); identifies the locations potential affected and estimates the likelihood of future occurrences of dam failures.

Do any of the participating jurisdictions own any classified dams of significance?
Yes. There are four classified dams of significance owned by Vandalia and St. Elmo. **Figure DF-2** provides a brief description of each dam.

Dam Failure Fast Facts – Occurrences

Number of Classified Dams of Significance Located in the County: ***5***

Number of Classified Dams owned by Participating Jurisdictions: ***4***

Number of Dam Failures Reported: ***n/a***

Probability of Future Dam Failure Events: ***Low***

Are there any other publicly or privately-owned dams of significance within the County?
Yes. There is one publicly-owned classified dam of significance owned by the Illinois Department of Natural Resources within Fayette County. **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 classified dams of significance in Fayette County.

What is the extent of future potential dam failures?
According to the National Inventory of Dams (NID), Emergency Action Plans (EAPs) defining the extent or magnitude of potential dam failures (water depth, speed of onset and warning times) were not developed or were not required to be developed for two of the five dams. The EAPs for the Ramsey Lake Dam, St. Elmo Old City Reservoir Dam, and Lake Nellie Dam were not made available to the Fayette County Emergency Management Agency. As a result, a data deficiency exists in terms of defining the extent or magnitude of future potential dam failures.

What locations are affected by dam failure?

Figure DF-3 shows the locations of ***classified dams of significance*** in Fayette County. Dam failures have the potential to impact the following municipalities/unincorporated areas:

- Vandalia;
- St. Elmo;
- three-quarter miles west of the City of Vandalia;
- undeveloped and agricultural land approximately three-quarter miles north of St. Elmo; and
- undeveloped and agricultural land approximately one mile northwest of Ramsey.

What is the probability of future dam failure events occurring?

Since none of the classified dams of significance have experienced a dam failure, it is difficult to specifically establish the probability of a future failure. However, based on the capacity of the reservoirs 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.

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. Vandalia, St. Elmo and portions of unincorporated Fayette County are vulnerable to the dangers presented by dam failures. While the City of Vandalia, St. Elmo and portions of unincorporated Fayette County 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 (Vandalia Municipal Reservoir Dam) – ***Medium***
- Public Health & Safety: "Low" or "Significant" Hazard Classification Dams – ***Low***
- Buildings/Infrastructure/Critical Facilities: "High" Hazard Classification Dams – ***Medium***
- Buildings/Infrastructure/Critical Facilities: "Low" or "Significant" Hazard Classification Dams – ***Low***

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

Yes. Based on responses to a Critical Facilities Vulnerability Survey distributed to the participating jurisdictions, the City of Vandalia considers the Vandalia Municipal Reservoir Dam to be their jurisdiction's greatest vulnerability. The respondent for the City of Vandalia indicated that if a breach ever occurs, it would deplete the city of their freshwater drinking supply.

What impacts resulted from the recorded dam failures?

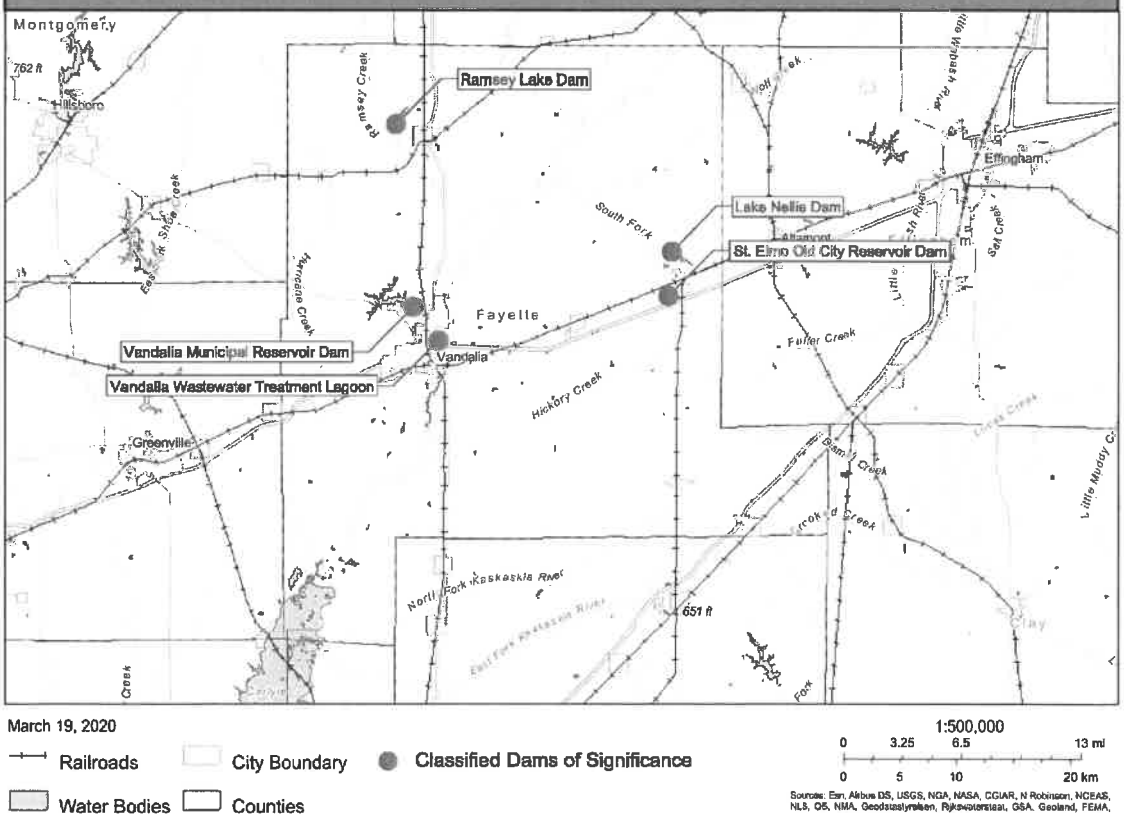
Since there have been no *recorded* dam failures associated with the classified dams of significance in Fayette County, there are no recorded impacts to report.

Figure DF-2
Classified Dams of Significance Located in Fayette 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
Publicly-Owned												
Ramsey Lake Dam	Low	Tributary Ramsey Creek	Illinois Department of Natural Resources	Earth	Recreation	1948	43 ft.	487ft.	1,064 ac.-ft.	47 ac,	2.3 sq. mi.	Yes
Vandalia Municipal Reservoir Dam	High	Bear Creek	City of Vandalia	Earth	Recreation	1965	50 ft	1,600 ft.	13,460 ac.-ft	660 ac.	25 sq. mi	No
St. Elmo Old City Reservoir Dam	Significant	Brickyard Branch	City of St. Elmo	Earth	Recreation	1903	23 ft.	715 ft.	314 ac.-ft.	25 ac.	3.8 sq. mi.	Yes
Lake Nellie Dam	Significant	South Fork Sugar Creek	City of St. Elmo	Earth	Recreation	1963	41 ft.	460 ft	1,478 ac.-ft.	67 ac	2.5 sq. mi.	Yes
Vandalia Wastewater Treatment Lagoon	Low	Kaskaskia River	City of Vandalia	Earth	Other	1986	16 ft.	4,000 ft.	300 ac.-ft.	n/a	n/a	No

Sources: U.S. Army Corps of Engineers, National Inventory of Dams Interactive Report.

Figure DF-3
Location of Classified Dams of Significance in Fayette County



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 "High" hazard classified dam of significance failure in Fayette County is considered to be ***medium***. The overall risk to public health and safety posed by a "Significant" or "Low" hazard classified dam of significance failure in Fayette County is considered to be ***low***.

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

As discussed previously, EAPs detailing the existing buildings, infrastructure and critical facilities vulnerable to a dam failure were not developed or were not required to be developed for two of the five dams. In addition, the EAPs for the Ramsey Lake Dam, St. Elmo Old City Reservoir Dam, and Lake Nellie Dam were not provided to Fayette County Emergency Management Agency. While an ERP for the Vandalia Municipal Reservoir Dam was made available to the Fayette County Emergency Management Agency, it did not contain a detailed list of buildings, infrastructure and critical facilities. As a result a data deficiency exists in terms of comprehensively identifying existing buildings, infrastructure and critical facilities vulnerable to dam failures.

While detailed information was not available, a visual inspection of the areas surrounding the classified dams indicates that there are buildings, infrastructure and critical facilities that are vulnerable to dam failures. **Figure DF-4** provides a ***rough estimate*** of the buildings, infrastructure and critical facilities by dam vulnerable to 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
Ramsey Lake Dam	1 mile Northwest of Ramsey	---	---	- CR 600 E - CR 2850 N	---
Vandalia Municipal Reservoir	¾ miles West of Vandalia	10-15	1-2	- US 51 - CR 1900 N - CR 725 E	- Vandalia Correctional Center
St. Elmo Old City Reservoir Dam	St. Elmo	1-5	1	- CR 7 (Interstate Drive) - US Rte 40	- Sewage Pond
Lake Nellie Dam	¾ miles North of St. Elmo	---	---	- CR 2150 E - CR 2050 E	---
Vandalia Wastewater Treatment Lagoon	Vandalia	---	---	---	---

Depending on whether there is a full or partial dam failure, all of the vulnerable buildings, infrastructure and critical facilities may be inundated by water and structural damage may result. Because none of the reservoirs within the County are 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 "High" hazard classified dam failure in Fayette County is considered to be ***medium***. The overall risk to by a "Significant" or "Low" hazard classified dam failure in Fayette County is considered to be ***low***.

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.

3.11 MAN-MADE HAZARDS

While the focus of this Plan update is on natural hazards, an ***overview of selected man-made hazards*** has been included. The Planning Committee recognizes that man-made hazards can also pose risks to public health and property. The extent and magnitude of the impacts that result from man-made hazard events can be influenced by natural hazard events. For example, severe winter storms can cause accidents involving trucks transporting hazardous substances. These accidents may lead to the release of these substances which can result in injury and potential contamination of the natural environment.

Consequently, the Planning Committee decided to summarize the more prominent man-made hazards in Fayette County. The man-made hazards profiled in this Plan update include:

- Hazardous Substances
  - Generation
  - Transportation
  - Storage/Handling
- Waste Disposal
  - Solid Waste
  - Medical Waste
  - Hazardous Waste
- Hazardous Material Incidents
- Hazardous Waste Remediation
- Terrorism

While the man-made hazards risk assessment does not have the same depth as the natural hazards risk assessment, it does provide useful information that places the various man-made hazards in perspective.

3.12.1 Hazardous Substances

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

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

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

Since 1970, significant changes have occurred in regards to how hazardous substances are transported and disposed. Comprehensive regulations and improved safety and industrial hygiene

practices have reduced the frequency of incidents involving hazardous substances. Based on the small number of facilities in Fayette County that generate and use hazardous substances, the population size, transportation patterns, and land use, the probability of a release occurring in Fayette County should remain relatively low compared to other counties in Illinois. The relatively low numbers of transportation incidents should not diminish municipal or county commitment to emergency management.

HAZARD PROFILE – HAZARDOUS SUBSTANCES

The following subsections identify the general pathways – generation, transportation and storage/handling – by which hazardous substances pose a risk to public health and the environment in Fayette County.

Hazardous Substances Fast Facts - Occurrences

Generation

Number of Facilities that Generate Reportable Quantities of Hazardous Substances (2017): ***n/a***

Transportation

Number of Roadway Incidents Involving Hazardous Substance Shipments (2010-2019): ***11***

Number of Railway Accidents/Incidents Involving Hazardous Substance Shipments (2009-2018): ***1***

Number of Pipeline Incidents Involving Hazardous Substances (2010 - 2019): ***33***

Storage/Handling

Number of Facilities that Store/Handle Hazardous Substances (2017): ***28***

Number of Facilities that Store/Handle Extremely Hazardous Substances (2017): ***8***

3.12.1.1 Generation

Fayette County has no facilities that generate reportable quantities of hazardous substances as a result of their operations according to the U.S. Environmental Protection Agency (USEPA) Toxic Release Inventory.

3.12.1.2 Transportation

Roadways

Illinois has the nation's third largest interstate system and third largest inventory of bridges. According to the Illinois Department of Transportation, there were just over 147,000 miles of highways and streets in Illinois in 2018. Most of the truck traffic in Fayette County is carried on Interstate 57 and Interstate 70. Interstate 57 traverses across the southeast corner of the County connecting Sikeston, MO to Chicago, IL, while Interstate 70 traverses across the middle of the County connecting St. Louis, MO to Baltimore, MA. Other major roadways that carry truck traffic include US-51 and Illinois Rte. 185. While this modern roadway system provides convenience and efficiency for commuters, it also aids in-state and intra-state commerce which includes the transportation of hazardous substances. A Commodity Flow Study to gauge chemical transport has not yet been conducted for Fayette County.

For the purposes of this report a roadway incident is generally defined as an accident/incident that occurs while in the process of transporting a hazardous substance(s) on a highway, roadway, access drive, field entrance, rest area or parking lot. Vehicles that experience a release while refueling are not considered roadway incidents, but are instead considered fixed facility incidents.

According to records obtained from the Illinois Emergency Management Agency (IEMA), there were eleven (11) recorded roadway incidents involving the shipment of hazardous waste and/or products in Fayette County from 2010 through 2019. **Figure MMH-1** provides information on these incidents.

Figure MMH-1
Roadway Incidents* Involving Shipments of Hazardous Substances
2010 – 2019

Date	Area	Location	Hazardous Product Released	Quantity Released
2/25/2010	Vandalia[^]	Vandalia South Farm, R.R. 3 – Box 389	Livestock waste	2000 gallons (estimated)
5/8/2012	Vandalia	I-70 EB, Exit 63	Diesel fuel	75 gallons
5/10/2012	Shobonier[^]	R.R. 1 – Box 218	Anhydrous ammonia	300 pounds
5/18/2012	Farina[^]	I-57 SB, M.P. #140	Diesel fuel	10-20 gallons (estimated)
7/11/2012	Vandalia	U.S. 51 SB, North of Vandalia Prison	Crude oil	Unknown
5/12/2013	Bluff City[^]	I-70 WB, Exit 68	Diesel fuel	25 gallons
5/21/2013	Saint Peter	900N, 7 miles West of St. Peter	Anhydrous ammonia	4700 pounds
10/24/2014	Hagarstown[^]	I-70, Mulbery Grove Exit – M.P. #51	Diesel fuel	> 100 gallons
11/14/2016	Brownstown	I-70 WB	Diesel fuel	> 25 gallons
9/24/2018	Farina	I-57, Exit 135	Monochloroacetic acid	24 gallons
4/24/2019	Farina[^]	IL Rte. 27, North of Farina	Anhydrous ammonia	850 gallons

* For the purposes of this report a roadway incident is generally defined as an accident/incident that occurs while in the process of transporting a hazardous substance(s) on a highway, roadway, access drive, field entrance, rest area or parking lot. Vehicles that experience a release while refueling are not considered roadway incidents, but are instead considered fixed facility incidents.

[^] Accident verified in the vicinity of this area.

Source: Illinois Emergency Management Agency, Hazardous Materials Incident Reports.

Railways

Illinois' rail system is the country's second largest, with the East St. Louis and Chicago terminals being two of the nation's busiest. In Fayette County there are three rail lines operated by three major carriers: Union Pacific Railroad (UP), Canadian National Railways(CN), and CSX Transportation (CSXT). UP operates one rail line that runs south from St. Elmo, while CN operates one rail line within the County that traverses through the southeast corner of the County. CSXT runs through the middle of Fayette County.

According to the Association of American Railroads, 4,028,000 carloads (122.1 tons) of freight originated in Illinois in 2017 (the latest year for which data is available). Hazardous substances accounted for 318,275 carloads (approximately 9.6 million tons) or 7.9% of the total freight handled. In comparison, 29,261,000 carloads of freight originated in the United States in 2017 with approximately 2,300,000 carloads (7.9%) involved in the transport of hazardous substances.

The Illinois Commerce Commission (ICC) is required to maintain records on railway accidents/incidents which involve hazardous substances. Their records are divided into three categories. These three categories are described in **Figure MMH-2**.

Figure MMH-2 **ICC Hazardous Substances Railroad Accident/Incidents Classification Categories**	
Category	**Description**
A	railroad derailments resulting in the release of the hazards substance(s) being transported
B	railroad derailments where hazards substance(s) were being transported but no release occurred
C	releases of hazardous substance(s)s from railroad equipment occurred, however no railroad derailment was involved

Since 2009, there has been one accident involving hazardous substances in Fayette County according to the ICC. On June 3rd, 2014, a mechanical failure on a Union Pacific railcar led to 1 quart of diesel fuel being released near Saint Peter. In comparison, ICC records indicate that since 2009 the annual number of railway accidents in Illinois involving hazardous substances has ranged between 35 and 122. **Figure MMH-3** provides a breakdown by category of the ICC-recorded railway accidents/incidents involving hazardous substances. Included is a comparison of the number of accidents/incidents in Fayette County to those in Cook and the Collar Counties as well as the rest of Illinois.

Figure MMH-3
ICC Recorded Railway Accidents/Incidents Involving Hazardous Substances
2009 – 2018
(Sheet 1 of 2)

Year	Category	Accident/Incident Location			
		Illinois	Fayette County	Cook & Collar Counties	All Other Counties
2009	A	5	0	1	4
	B	5	0	3	2
	C	25	0	14	11
2010	A	3	0	2	1
	B	20	0	17	3
	C	80	0	42	38
2011	A	8	0	1	7
	B	10	0	9	1
	C	60	0	33	27
2012	A	4	0	2	2
	B	13	0	11	2
	C	73	0	42	31
2013	A	5	0	3	2
	B	23	0	16	7
	C	82	0	51	31
2014	A	2	0	2	0
	B	36	0	21	15
	C	84	1	40	43
2015	A	4	0	3	1
	B	27	0	15	12
	C	69	0	36	33
2016	A	4	0	1	3
	B	14	0	6	8
	C	65	0	33	32

Figure MMH-3
ICC Recorded Railway Accidents/Incidents Involving Hazardous Substances
2009 – 2018
(Sheet 2 of 2)

Year	Category	Accident/Incident Location			
		Illinois	Fayette County	Cook & Collar Counties	All Other Counties
2017	A	2	0	1	1
	B	14	0	9	5
	C	69	0	34	35
2018	A	1	0	0	1
	B	8	0	4	4
	C	55	0	24	31

Source: Illinois Commerce Commission.

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

Pipelines

Energy gases (natural gas and liquefied petroleum gas), petroleum liquids (crude oil and gasoline) and liquid and gas products used in industrial processes are carried in above-ground and buried pipelines across Illinois. According to the U.S. Department of Transportation's National Pipeline Mapping System, there are eight interstate hazardous liquids pipeline, one interstate natural gas pipeline system, and one intrastate natural gas pipeline systems in Fayette County. The hazardous liquids pipelines are owned by BP Pipeline (North America) Inc., Mustang Pipeline LLC., Buckeye Partners, LP., Marathon Pipe LLC., Illinois Extension Pipeline Company, Plains Pipeline L.P., TC Oil Pipeline Operations Inc., DAPL-ETCO Operations Management LLC. The one interstate natural gas pipeline system is owned by Natural Gas Pipeline Co. of America. The one intrastate natural gas pipeline system is owned by Liberty Utilities (Midstates Natural Gas) Corp. D/B/A Liberty Utilities.

Thirty-three (33) pipeline releases occurred in Fayette County during a ten year period from 2010 through 2019. **Table 12,** located in **Appendix J,** provides information on pipeline releases recorded in Fayette County.

There have been several high-profile incidents across the Nation, including one in Illinois, which have raised public concerns about our aging pipeline infrastructure. The following provides a brief description of each incident.

- On July 26, 2010 a 30-inch liquid product pipeline rupture near Marshall, Michigan and released at least 840,000 gallons of oil into a creek that led to the Kalamazoo River, a tributary of Lake Michigan.
- Soon afterward on September 9, 2010, another pipeline release received national attention. A 34-inch liquid product pipeline in the Chicago Suburb of Romeoville, Illinois released over 360,000 gallons of crude oil that flowed through sewers and into a retention pond

narrowly avoiding the Des Plaines River. This release triggered numerous odor complaints from residents in the adjacent municipalities of Lemont and Bolingbrook. The property damage/cleanup costs were estimated at $46.6 million.

- Also, on September 9, 2010, a 30-inch high pressure natural gas pipeline ruptured in the San Francisco suburb of San Bruno, California that resulted in an explosion that killed eight people, injured 51, destroyed over 30 homes and damaged an entire neighborhood. The property damage was estimated at around $55 million.
- On March 12, 2014 a gas main rupture in Manhattan, New York that resulted in an explosion that killed eight people and leveled two multi-use, five story buildings.
- On May 19, 2015, a 24-inch liquid product pipeline ruptured near Refugio State Beach in Santa Barbara County, California and released approximately 100,000 gallons of crude oil. The release occurred along a rustic stretch of coastline that forms the northern boundary of the Santa Barbara Channel, home to a rich array of sea life. Oil ran down a ravine and entered the Pacific Ocean, blackening area beaches, creating a 9-mile oil slick and impacting birds, marine mammals, fish and coastal and subtidal habitats.

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

3.12.1.3 Storage/Handling

Beyond knowing where hazardous substances are generated and the methods and routes used to transport them, it is important to identify where hazardous substances are handled and stored. This information will help government officials and emergency management professionals make informed choices on how to better protect human health, property and the environment and what resources are needed should an incident take place.

Records obtained from IEMA's Tier II database were used to gather information on the facilities that generate, use and store chemicals in excess of reportable threshold quantities within Fayette County. The Tier II information was then compared with USEPA's Toxic Release Inventory (TRI) and information from IEPA's databases. This review identified twenty-eight (8) facilities within Fayette County in 2017 that store and handle hazardous substances.

Of these twenty-eight facilities, nine (9) reported the presence of Extremely Hazardous Substances (EHSs) at their facilities. An "Extremely Hazardous Substance" is any USEPA-identified chemical that could cause serious, irreversible health effects from an accidental release. There are approximately 400 chemicals identified as EHSs. Stationary sources who possess one or more of these substances at or above threshold reporting quantities are required to notify IEMA.

Figure MMH-4 identifies the types of EHSs and the facilities that store and handle them. Aside from EHSs, there are other chemicals, such as water reactives, that can pose risks that are equal to or greater than the risks posed by EHSs. These risks can be identified through a Threat and Hazard Identification and Risk Assessment (THIRA).

Figure MMH-4 Extremely Hazardous Substances by Facility – 2017	
Facility Name	**Extremely Hazardous Substance(s)**
Farina	
Centurylink – Farina	Sulfuric acid
Effingham Equity – Farina	Gramoxone SL
St. Elmo	
Pinnacle Foods – St. Elmo	Battery acid
St. Peters	
South Central FS Inc.	Paraquat dichloride gramoxone extra
Vandalia	
AT&T – Vandalia CO. – Q43890	Sulfuric acid
Heartland Ag, Inc.	Paraquat dichloride
South Central FS Inc./ Pine Ridge Vandalia	Gramoxone Inteon
Vanseal Corporation	Sulfuric acid
Woolsey Bros. Farm Supply, Inc.	Paraquat dichloride (Paraquat 3 SL)

Sources: Illinois Emergency Management Agency, Tier II Hazardous Chemical Reports.
U.S. Environmental Protection Agency, TRI Explorer.

3.12.2 Waste Disposal

Waste disposal has caused surface water and ground water contamination in Illinois and across the Nation. Beginning in the late 1970s substantial regulatory changes strengthened the design, operating and monitoring requirements for landfills where the majority of waste is disposed. These regulatory changes have helped reduce the public health threat posed by landfills.

HAZARD PROFILE – WASTE DISPOSAL

The following subsections identify the general pathways – solid, medical and hazardous – by which waste disposal poses a risk to public health and the environment in Fayette County.

3.12.2.1 Solid Waste

While recycling activities have reduced the amount of solid waste (waste generated in households), the majority continues to be disposed of in landfills. As of 2018, there were thirty-eight (38) landfills operating in Illinois.

According IEPA's Annual Landfill Capacity Report issued in September, 2019 there is no commercial landfill currently operating in Fayette County.

Waste Disposal Fast Facts - Occurrences

Solid Waste
Number of Solid Waste Landfills Operating in Fayette County (2018): ***none***

Number of Landfills Serving Fayette and adjacent counties (2018): ***3***

Potentially-Infectious Medical Waste (PIMW)
Number of Facilities within the County Permitted to Handle PIMW: ***none***

Hazardous Waste
Number of Commercial Off-Site Hazardous Waste Treatment or Disposal Facilities located in the County: ***none***

There are currently three Illinois landfills that serve Fayette and the adjacent counties. These landfills include:

- **Landfill #33 LTD, Effingham Co.**
- **Litchfield-Hillsboro Landfill, Montgomery Co.**
- **Five Oaks Recycling and Disposal Facility., Christian Co.**

3.12.2.2 Potentially- Infectious Medical Waste

Potentially-Infectious Medical Waste (PIMW) is generated in connection with medical research; biological testing; and the diagnosis, treatment or immunization of human beings or animals. PIMW is typically generated at hospitals, nursing homes, medical or veterinary clinics, dental offices, clinical or pharmaceutical laboratories and research facilities.

According to IEPA's list of permitted PIMW Facilities, there are no facilities permitted to accept medical waste for disposal in Fayette County.

3.12.2.3 Hazardous Waste

A hazardous waste is defined as the byproduct of a manufacturing process that is either listed or has the characteristics of ignitability, corrosivity, reactivity or toxicity and cannot be reused.

According to IEPA's Storage, Treatment, Recycling, Incinerating, Transfer Stations and Processing list, there are currently no off-site hazardous waste treatment or disposal facilities located in Fayette County.

3.12.3 Hazardous Material Incidents

A hazardous material or hazmat incident refers to any accident involving the release of hazardous substances which broadly include any flammable, explosive, biological, chemical, or physical material that has the potential to harm public health or the environment. These incidents can take place where the substances are used, generated or stored or while they are being transported. In addition, hazmat incidents also include the release of hazardous substances, such as fuel, used to operate vehicles. These releases can be the result of an accident or a leak.

HAZARD PROFILE – HAZARDOUS MATERIALS INCIDENTS

Hazmat Incident Fast Facts - Occurrences

Number of Hazardous Material Incidents in Fayette County (2010-2019): ***143***

Number of Transportation-Related Incidents/Accidents: ***41***

Number of Fixed Facility-Related Incidents/Accidents: ***102***

Average Number of Hazardous Material Incidents Experienced Annually: ***14***

From 2010 through 2019, there were 143 hazmat incidents recorded in Fayette County. **Table 13,** located in **Appendix J,** provides information on the hazmat incidents recorded in Fayette County. Of these incidents, ***forty-one (41) (29%) involved transportation incidents/accidents while one hundred and two (102) (71%) occurred at fixed facilities***. Thirty-three (33) of the forty-one (41) transportation incidents/accidents (80%) involved petroleum-based products.

Based on the recorded incidents, ***Fayette County experienced an average of 14 hazmat incidents annually over the last 10 years***. The types of existing industries; the major transportation corridors through the County which include interstate and Illinois highways, rail and pipeline; and chemical use within and adjacent to the County suggest that hazmat incidents are likely to continue to take place at the rate reflected in the 10-year study period. Constant vigilance, proper training and equipment, and prompt response are needed to minimize the potential impacts of each incident.

3.12.4 Waste Remediation

The improper disposal or containment of special and hazardous waste through the years has led to soil, groundwater and surface water contamination of sites across the United States. In order to safeguard human health and the environment, these contaminants must be removed or neutralized so they cannot cause harm. This process is known as waste remediation.

HAZARD PROFILE – WASTE REMEDIATION

In Illinois, waste remediation is handled through several programs including the federal Superfund program, the State Response Action Program, the state Site Remediation Program and the Leaking Underground Storage Tanks Program. The following provides a brief description of each.

Superfund (CERLCA) Program/National Priorities List

Superfund is a USEPA-led program to clean up sites within the United States contaminated by hazardous waste that has been dumped, left out in the open or otherwise improperly managed and which pose a risk to human health and/or the environment. Sites of national priority among the known or threatened releases of hazardous substances, pollutants or contaminants throughout the United States and it territories are identified on the National Priorities List (NPL). Those sites that pose the largest threat to public health and the environment are typically found on the NPL.

According to NPL database, there are 45 Superfund sites in Illinois. However, there are ***no sites*** in Fayette County being ***managed through the Superfund program***.

Waste Remediation Fast Facts - Occurrences

Superfund
Number of Superfund Sites in the County: ***none***

Illinois Site Response Action Program
Number of SRAP Sites in the County: ***2***

Illinois Site Remediation Program
Number of SRP Sites in the County: ***6***

Number of SRP Sites with NFR Letters: ***2***

Illinois Leaking Underground Storage Tanks Program
Number of LUST Sites in County: ***87***

Number of LUST Sites with NFR/Non-Lust/4Y Letters: ***74 (85%)***

State Response Action Program (SRAP)

The main objective of the State Response Action Program (SRAP) is to clean up hazardous substances at sites that present an imminent and substantial threat to human health and the environment, but which may not be addressed by other federal or state cleanup programs. The sites handled by the SRAP include abandoned landfills, old manufacturing plants, former waste oil recycling operations, contaminated agrichemical facilities and other areas where surface water, groundwater, soil and air may be contaminated with hazardous substances. Since the mid-1980s, cleanup activities have been conducted at over 500 sites in Illinois through this Program. Once the threat to human health

and the environment has been mitigated, some sites are transferred to other state cleanup programs to complete remediation activities.

There are ***two (2) SRAP sites*** in Fayette County. All of the sites have completed the Program.

Illinois Site Remediation Program (SRP)
The Site Remediation Program (SRP) is a voluntary cleanup program that provides applicants the opportunity to receive technical assistance in determining what course of action is needed to remediate sites where hazardous substances, pesticides or petroleum may be present. The goal of the SRP is to receive a no further remediation determination from IEPA. Most site remediation in Illinois is handled through this Program. Since the mid-1980s, remediation activities have been conducted and monitored at approximately 5,800 sites in Illinois. Applicants who successfully demonstrate, through proper investigation and, when warranted, remedial action, that environmental conditions at their remediation site do not present a significant risk to human health or the environment receive a No Further Remediation (NFR) letter from IEPA. The NRF letter signifies a release from further responsibilities under the Illinois Environmental Protection Act for a portion

There are ***six (6) SRP sites*** in Fayette County. Two of the six SRP sites have received NFR letters.

Leaking Underground Storage Tank Program (LUST)
The Leaking Underground Storage Tanks Program (LUST) oversees remedial activities associated with petroleum product releases from underground storage tanks (UST). This Program began in the late 1980s as a result of the threats posed by vapors in homes and businesses, contaminated groundwater, and contaminated soil. In Illinois over 14,500 acres of soil contaminated by leaking underground tanks have been remediated between 1988 and 2010 (the most recent year for which data was available).

In Fayette County there are eighty-seven (87) ***sites involving the remediation of petroleum product releases*** from underground storage tanks. Seventy-four of the eighty-seven LUST sites (approximately 85%) have received NFR, Non-Lust or 4Y Letters or remediation is virtually complete.

3.12.5 Terrorism

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

HAZARD PROFILE – TERRORISM

The attack on the World Trade Center and the Pentagon on September 11, 2001 by foreign terrorists galvanized national action against terrorism and resulted in the creation of the United States Department of Homeland Security. While the number of terrorist activities garnering national attention in the U.S. has been relatively small, approximately 181,691 terrorist events have occurred worldwide between 1970 and 2017, according to the National Consortium for the Study of Terrorism and Responses to Terrorism (the Consortium). During this same time span, the Consortium documented 2,836 terrorist events within the U.S.

Terrorism Fast Facts – Occurrences*

Number of Recorded Terrorism Events Worldwide (1970 – 2017): ***181,691***

Number of Recorded Terrorism Events in the United States (1970 – 2017): ***2,836***

Number of Recorded Terrorism Events in Illinois (1970 – 2017): ***113***

* Based on data from the National Consortium for the Study of Terrorism and Responses to Terrorism (START) Global Terrorism Database.

Acts of terrorism have resulted in fatalities and injuries as a result of kidnappings, hijackings, bombings, and the use of chemical and biological weapons. The Global Terrorism Database has documented 3,516 American fatalities in the United States between 1995 and 2017 from terrorist attacks. The attacks on September 11, 2001 account for 3,001of the 3,516 fatalities. A search of the Global Terrorism Database identified 113 incidents of terrorism in Illinois between 1970 and 2017. These incidents resulted in six fatalities and 37 injuries.

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

On September 24, 2009, a single individual from Macon County sought to carry out his anger at the federal government by detonating a van filled with explosive outside of the Federal Courthouse in Springfield. This attempt was thwarted by the FBI.

More recently an active shooter incident occurred at the High School in Dixon. On May 16, 2018 at around 8:00 a.m. in the morning approximately 180 students were in the school's gymnasium practicing for graduation when a 19-year-old boy, armed with a 9mm semi-automatic rifle, fired several shots near the gymnasium. The school's resource officer confronted the shooter, who fled from the school on foot. The shooter fired several shots at the resource officer, who returned fire, wounding the shooter in the shoulder. The gunman suffered non-life threatening injuries. No students or staff were injured in the incident. Faculty and staff barricaded doors and took cover as the incident unfolded.

It is impossible to predict with any reasonable degree of accuracy how many terrorism events might be expected to occur in Fayette County or elsewhere in Illinois. Although targets for terrorist activity are more likely centered in larger urban areas, recruitment, training and other support activities, such as the ones described above, have occurred in rural areas.

The economic resources available to some terrorist groups coupled with the combination of global tensions, economic uncertainty and frustration towards government appear to have recently raised the frequency of attempts. Enhanced efforts by law enforcement officials and civilian vigilance for unusual activity or behavior will be needed to repel terrorists whether they are domestic or foreign in origin.

4.0 MITIGATION STRATEGY

The mitigation strategy identifies how participating jurisdictions are going to reduce the potential loss of life and property damage that results from the natural and man-made hazards identified in the Risk Assessment section of this Plan. The strategy includes:

- Developing mitigation goals. Mitigation goals describe the objective(s) or desired outcome(s) that the participants would like to accomplish in term of hazard and loss prevention. These goals are intended to reduce or eliminate long-term vulnerabilities to natural and man-made hazards.
- 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 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.
- Developing 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.

A detailed discussion of each aspect of the mitigation strategy is provided below.

4.1 MITIGATION GOALS REVIEW

Developing mitigation goals was the first step in creating the mitigation strategy. Based on early communications with the Planning Committee members, the consultant developed a preliminary list of eight hazard mitigation goals. This list of goals was distributed electronically to Committee members who were asked to review the list before the first meeting and consider whether any changes needed to be made or if additional goals should be included. At the Planning Committee's November 14, 2019 meeting, the group discussed the preliminary list of goals and approved them with no changes or additions. **Figure MIT-1** lists the approved mitigation goals.

Figure MIT-1 Mitigation Goals	
Goal 1	Educate people about the hazards (natural and man-made) 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 living in the County from the dangers of natural and man-made 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 and man-made hazards.
Goal 4	Incorporate natural and man-made 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, creeks and floodplains in our County.
Goal 7	Ensure that new developments do not create new exposures to damage from natural and man-made hazards.
Goal 8	Protect historic, cultural, and natural resources from the effects of natural and man-made hazards.

4.2 MITIGATION ACTION IDENTIFICATION

Following the development of the mitigation goals, the Planning Committee members were asked to consult with their respective jurisdictions to identify a comprehensive range of ***jurisdiction-specific mitigation actions***. Representatives from Vandalia 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.

4.3 MITIGATION ACTION ANALYSIS

The mitigation actions identified were then assigned to one of four broad mitigation action categories which allowed Planning Committee members to compare and consolidate similar actions. **Figure MIT-2** identifies each mitigation action category and provides a brief description.

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.

Figure MIT-2 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.)

4.4 Mitigation Action Prioritization Methodology

Next, the Planning Committee worked with the Consultant to develop a method to prioritize mitigation actions. Various methodologies were discussed with the Committee members at the second meeting held on February 20, 2020. **Figure MIT-3** identifies and describes the four-tiered prioritization methodology adopted by the Planning Committee.

This methodology is based on two key factors: 1) the frequency of the hazard and 2) the degree of mitigation attained. The methodology developed provides a means of objectively determining which actions have a greater likelihood of reducing the long-term vulnerabilities associated with the most frequently-occurring natural 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.

4.5 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.

Figure MIT-3
Mitigation Action Prioritization Methodology

		Hazard	
		Most Frequent Hazard **(M)** (i.e., severe storms, severe winter storms/extreme cold, floods, excessive heat)	Less Frequent Hazard **(L)** (i.e., tornadoes, drought, earthquakes, 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 the less frequently-occurring hazards
	Mitigation Action with the Potential to Reduce Impacts **(L)**	**LM** mitigation action has the potential to reduce damages, injuries and/or fatalities from the most frequently-occurring hazards	**LL** mitigation action has the potential to reduce damages, injuries and/or fatalities from the less frequently-occurring hazards

Oversight & Administration

It is important to keep in mind that most of the participating municipalities have extremely limited capabilities related to organization and staffing for oversight and administration of the identified mitigation actions. Two of the five participating municipalities are very small in size, with populations of less than 800 individuals. In most cases the municipalities and townships 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. 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, board of trustees, etc.) 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 falls under the purview of the entity's governing body (board/council) and not individual departments.

Funding Sources

While the South Central Illinois Regional Planning and Development Commission has the ability to provide grant writing services to Fayette County, many of the participating jurisdictions do not have city/county administrators with grant writing capabilities. As a result, assistance was needed in identifying possible funding sources for the identified mitigation actions. 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: United State 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 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 22,000 individuals. Four of the seven municipalities/townships have populations of less than 1,500 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.

4.6 RESULTS OF MITIGATION STRATEGY

Figures MIT-4 through **MIT-14**, 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-4
Fayette County 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
						New	Existing				
County Board											
HM	Purchase and install an automatic emergency backup generator at the Fayette County Building/Jail to provide uninterrupted power and maintain continuity of government and operations during power outages.	EC, EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Chair / County Board	2 years	County / FEMA Pre-Disaster Mitigation / Illinois DCEO	Medium/High
Emergency Management Agency / County Board											
HM	Purchase portable emergency backup generators for use at designated critical facilities (i.e., nursing homes, assisted living facilities, etc.) to maintain operations during prolonged power outages.	EC, EH, F, SS, SWS, T	S&IP	Small	2, 3, 5	n/a	Yes	Chair County Board / EMA Coordinator	3-5 years	County / Illinois DCEO	Medium/High
LM	Secure Memorandums of Agreement with designated critical facilities (i.e., nursing homes, assisted living facilities, etc.) to install electrical hookups (pigtails) for use with portable emergency backup generators to maintain operations during prolonged power outages.	EC, EH, F, SS, SWS, T	LP&R	Small	2, 3, 5	n/a	Yes	Chair County Board / EMA Coordinator	3-5 years	County	Low/Medium
HM	Purchase and install electrical hookups (pigtails) at designated critical facilities (i.e., nursing homes, assisted living facilities, etc.) for use with portable emergency backup generators to maintain operations during prolonged power outages.	EC, EH, F, SS, SWS, T	S&IP	Small	2, 3, 5	n/a	Yes	Chair County Board / EMA Coordinator	3-5 years	County / Illinois DCEO	Medium/High

† 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 (just over 22,000 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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-4
Fayette County 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
						New	Existing				
Emergency Management Agency / E911											
LM	Secure Memorandums of Agreement with Bingham, Brownstown, Farina and St. Peter to purchase and install storm warning sirens.	SS, T	LP&R	Medium	2	n/a	n/a	EMA Coordinator / E911 Coordinator	1 year	County	Low/Medium
HM	Purchase and install new storm warning sirens in Bingham, Brownstown, Farina and St. Peter.	SS, T	S&IP	Medium	2	n/a	n/a	EMA Coordinator / E911 Coordinator	1-2 years	County / Illinois DCEO	Medium/High
HM	Purchase and install storm warning sirens in unincorporated communities and subdivisions in the County.	SS, T	S&IP	Medium	2	n/a	n/a	EMA Coordinator / E911 Coordinator	1-2 years	County / Illinois DCEO	Medium/High
Emergency Management Agency / Health Department											
LM	Develop/distribute public information materials that inform residents about the risks to life and property associated with natural hazards and the proactive actions they can take to reduce their risk.	DF, EC, EH, EQ, F, SS, SWS, T	E&A	Large	1, 2	n/a	n/a	EMA Coordinator / Health Department PHEP Coordinator	5-10 years	County	Low/High
	Develop information materials for schools that describe the risks associated with natural hazards, the protective measures that students should follow and procedures in place in case of an evacuation.	EC, EH, F, SS, SWS, T	E&A	Medium	1, 2	n/a	n/a	EMA Coordinator / Health Department PHEP Coordinator	5-10 years	County	Low/High
LM	Develop and implement an outreach program that works with local businesses to identify the risks to their employees and properties from natural hazard events, the actions they can take to reduce those risks and the steps they can take to maintain operations after a natural hazard event.	DF, EC, EH, EQ, F, SS, SWS, T	E&A	Medium	1, 2	n/a	n/a	EMA Coordinator / Health Department PHEP Coordinator	5-10 years	County	Low/High

† 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 (just over 22,000 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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-4
Fayette County 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
						New	Existing				
Emergency Management Agency / Health Department Continued...											
LM	Purchase and distribute NOAA weather radios to critical facilities, businesses and individuals with access and functional needs.	DF, EC, EH, EQ, F, SS, SWS, T	E&A	Medium	2	n/a	n/a	EMA Coordinator / Health Department PHEP Coordinator	10 years	County	Low/High
LL	Partner with classified dam owners to develop Emergency Action Plans (EAPs) that identify the extent (water depth, speed of onset, warning times, etc.) and location (inundation area) of potential dam failures to address data deficiencies.	DF	E&A	Small	2, 3, 5	Yes	Yes	EMA Coordinator / Health Department PHEP Coordinator	5-10 years	County / Classified Dam Owners	Low/Low
LL	Partner with levee owners to develop Emergency Preparedness Plan/Inundation Maps that identify the extent (water depth, speed of onset, warning times, etc.) for the studied levees to address identified data deficiencies.	LF	E&A	Small	2, 3, 5	n/a	Yes	EMA Coordinator / Health Department PHEP Coordinator	5-10 years	County / D&LD / Levee Owners	Low/Medium
E911											
HM	Purchase a multi-site VHF repeater system (simulcast system) to consolidate communications among various agencies (Sheriff's Office, EMS, emergency services, etc.)	DF, EC, EH, EQ, F, MMH, SS, SWS, T	E&A	Large	2	n/a	n/a	911 Coordinator	5 years	County / FEMA Emergency Management Performance Grant	High/High

† 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 (just over 22,000 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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-4
Fayette County 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
						New	Existing				
E911 Continued...											
HM	Subscribe to an automated emergency notification system such as Hyper-Reach (i.e., reverse 911) to notify residents/responders of natural and man-made hazard event information within the County.	DF, EC, EH, EQ, F, MMH, SS, SWS, T	E&A	Large	2	n/a	n/a	911 Coordinator	2-5 years	County / FEMA Emergency Management Performance Grant	Medium/High
Highway Department											
HM	Purchase and install a permanent, automatic emergency backup generator at the County Highway Department to provide uninterrupted power and maintain continuity of operations during power outages.	EC, EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	County Highway Engineer	5 years	County / FEMA Pre-Disaster Mitigation / Illinois DCEO	Medium/High
HM	Purchase and install a weather station at the County Highway Department to provide employees with real-time weather information.	EC, EH, F, SS, SWS, T	E&A	Small	2	n/a	n/a	County Highway Engineer	5 years	County	Low/High

† 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 (just over 22,000 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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-5
Brownstown 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
						New	Existing				
HM	Replace/upsize roadway culverts as needed to increase carrying capacity and alleviate drainage/flooding problems.	F, SS	S&IP	Medium	2, 3, 5	n/a	Yes	President / Board of Trustees	3 years	Village / IDOT Local Roads	Medium/High
HM	Purchase a portable emergency backup generator for use at critical facilities/infrastructure within the Village to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Board of Trustees	3 years	Village / USDA – RD Critical Facilities Programs	Medium/High
HM	Purchase and install additional storm warning sirens.	SS, T	E&A	Medium	2	n/a	n/a	President / Board of Trustees	5 years	Village / USDA – RD Critical Facilities Programs	Medium/High
LM	Conduct sewer line reconnaissance study to identify locations where storm water infiltrates the lines.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Board of Trustees	5 years	Village	Medium/High
HM	Repair/reline sewer line sections/mains where storm water infiltration is occurring to prevent sewage backups.	F, SS	S&IP	Small	2, 3, 5	Yes	Yes	President / Board of Trustees	5 years	Village / USDA – RD Water & Waste Disposal Program	High/High

† 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 (approximately 700 individuals). The Village works hard to maintain 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MS	Mine Subsidence
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-6
Brownstown Community Unit School District #201 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
						New	Existing				
HM	Purchase and install emergency backup generators at Elementary and Jr./Sr. High schools to provide uninterrupted power to critical systems and maintain continuity of operations during extended power outages. The schools would be used as warming/cool centers and emergency shelters in the event of a natural hazard event.	EH, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Brownstown CUSD #201 Board of Education	2 years	Board of Education / USDA – RD Community Facilities Programs	Medium/High
HM	Identify and install "hardening" materials (i.e., shatter-proof glass, hail resistant shingles/doors, etc.) at the Elementary and Jr./Sr. High schools to increase infrastructure resilience to natural hazards.	EQ, SS, T	S&IP	Large	2, 3, 5	n/a	Yes	Brownstown CUSD #201 Board of Education	2-5 years	Board of Education / FEMA Pre-Disaster Mitigation	Medium/Medium

† 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MS	Mine Subsidence
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-7
Ramsey 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
						New	Existing				
LM	Develop a Memorandum of Agreement with Ramsey CUSD #204 to designate the school complex as an emergency shelter.	EQ, F, SS, SWS T,	LP&R	Large	2	n/a	n/a	President Village Board / Fayette County Board District #1	5 years	Village	Low/Medium
HM	Purchase and install an automatic emergency backup generator at the Ramsey CUSD school complex to provide uninterrupted power and maintain operations during a power outage.	EQ, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	President Village Board / Fayette County Board District #1	5 years	Village / USDA – RD Critical Facilities Program	Medium/High
HM	Identify and install "hardening" materials (i.e., shatter-proof glass etc.) at the Ramsey CUSD school complex to increase infrastructure resilience to natural hazards.	EQ, SS, T	S&IP	Large	2, 3, 5	n/a	Yes	President Village Board / Fayette County Board District #1	5 years	Villagen / FEMA Pre-Disaster Mitigation	Medium/Medium

† 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 (just over 1,000 individuals). The Village works hard to maintain 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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-8
Sharon Township 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
						New	Existing				
LM	Provide reliable internet electronic connectivity to assist in the application, implementation and maintenance of mitigation projects and activities.	F, SS, SWS, T	S&IP	Large	3, 5	n/a	n/a	Supervisor / Board of Trustees	5 years	Township / County / USDA – RD Community Connects	High/High
LM	Conduct discussions with US Army Corps of Engineers and levee & drainage district regarding the need to raise the levee to eliminate recurring levee overtopping which floods agricultural land and causes damage to roads and bridges in the township.	F, SS	E&A	Small	2, 3, 5	yes	Yes	Supervisor / Board of Trustees	5 years	Township	Low/Medium
LM	Conduct discussions with IDOT regarding the need for informational road signs on US Route 51 to alert the public of hazardous conditions, detours, etc. associated with natural and man-made hazards events.	EH, EQ, F, MMH, SS, SWS, T	E&A	Medium	2	n/a	n/a	Supervisor / Board of Trustees	3 years	Township	Low/Medium
HM	Clean debris/obstructions out of Kaskaskia River within the township limits to maximize carrying capacity and reduce drainage problems.	F, SS	NSP	Small	2, 3, 5, 6	Yes	Yes	Supervisor / Board of Trustees	3 years	Township	Low/High

† 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 townships of this size (just under 2,500 individuals). The Township 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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-9
St. Elmo 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
						New	Existing				
HM	Purchase and install additional storm warning sirens.	SS, T	E&A	Medium	2	n/a	n/a	President / Village Board	5 years	Village / USDA – RD Critical Facilities Programs	Medium/High
HM	Purchase and install an emergency backup generator at Village Hall to provide uninterrupted power and maintain continuity of government and operations during power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	2-5 years	Village / USDA – RD Community Facilities Programs	Medium/High
HM	Purchase and install an emergency backup generator at Police Department to provide uninterrupted power and maintain continuity of operations during power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	2-5 years	Village / USDA – RD Community Facilities Programs	Medium/High

† 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 (approximately 1,400 individuals). The Village 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MS	Mine Subsidence
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-10
St. Elmo 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
						New	Existing				
HM	Purchase and install an emergency backup generator at the Fire Station to provide uninterrupted power and maintain continuity of operations during power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Fire Chief / Board of Trustee	2-5 years	Fire Protection District / USDA – RD Community Facilities Programs	Medium/High

† 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MS	Mine Subsidence
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-11
St. Peter 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
						New	Existing				
LM	Conduct sewer line reconnaissance study to identify locations where storm water infiltrates the lines.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	3 years	USDA – RD Water & Waste Disposal Program	Medium/High
HM	Repair/reline sewer line sections where storm water infiltration is occurring to prevent sewage backups.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	5 years	USDA – RD Water & Waste Disposal Program	High/High
LM	Designate the Old City Hall as a warming/cooling center for Village residents.	EC, EH	E&A	Large	2	n/a	n/a	President / Village Board	1-2 years	Village	Low/High
HM	Purchase and install an emergency backup generator at the Old City Hall, a designated warming/cooling center, to provide uninterrupted power during power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	3 years	USDA – RD Community Facilities Programs	Medium/High
HM	Purchase and install an emergency backup generator at EJ Water Coop/Fayette Water Co. interconnect building with St. Peter's water system to increase system resilience and maintain operations during extended power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	4 years	USDA – RD Community Facilities Programs	Medium/High
HM	Purchase and install an emergency backup generator at the west sewer lagoon lift station to increase system resilience and maintain operations during extended power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	2 years	USDA – RD Community Facilities Programs	Medium/High

† 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 (less than. 400 individuals). The Village works hard to maintain 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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-12
St. Peter 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
						New	Existing				
HM	Purchase and install an emergency backup generator at the Fire Station to provide uninterrupted power and maintain continuity of operations during power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Fire Chief / Board of Trustee	2-5 years	Fire Protection District / USDA – RD Community Facilities Programs	Medium/High

† 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MS	Mine Subsidence
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-13
Vandalia Hazard Mitigation Actions
(Sheet 1 of 3)

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
						New	Existing				
HM	Repair damage to Vandalia Lake resulting from January 2020 heavy rain event.	SS	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor City Council / Lake Committee	1 year	City	Medium/High
HL	"Harden" the Vandalia Lake Dam to make it resistant to natural hazard events. Potential hardening activities could include: replacing the spillway panels, reinforcing the dams, sealing below the spillways to prevent water infiltration and leaks that have the potential to lead to a dam/spillway failure.	DF, F, SS	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor City Council / Lake Committee	3-5 years	City / USDA – NRCS Watershed Rehabilitation Program	High/Medium
HM	Repair/update existing storm warning sirens and purchase and install additional storm warning sirens to improve coverage.	SS, T	E&A	Medium	2	n/a	n/a	Mayor / City Council	3-5 years	USDA – RD Critical Facilities Programs	Medium/High
HM	Purchase and install an emergency backup generator at the Public Safety Building to provide uninterrupted power and maintain continuity of operations during power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor City Council / Building & Grounds Committee	1-3 years	USDA – RD Community Facilities Programs	Medium/High
HM	Purchase and install an automatic emergency backup generator at the wastewater treatment plant terminal to increase system resilience and maintain operations during extended power outages.	EH, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Mayor City Council / Water & Sewer Committee	1-3 years	USDA – RD Community Facilities Programs	Medium/High

† 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 (approximately 7,000 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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-13
Vandalia Hazard Mitigation Actions
(Sheet 2 of 3)

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
						New	Existing				
HM	Purchase portable emergency backup generators for use at lift stations to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor City Council / Water & Sewer Committee	1-3 years	USDA – RD Community Facilities Programs	Medium/High
HM	Purchase and install an automatic emergency backup generator at the drinking water treatment plant to increase system resilience and maintain operations during extended power outages.	EH, F, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Mayor City Council / Water & Sewer Committee	1-3 years	USDA – RD Community Facilities Programs	Medium/High
HM	Purchase and install an automatic emergency backup generator at the Vandalia Lake water intake to increase system resilience and maintain operations during extended power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor City Council / Water & Sewer Committee	1-3 years	USDA – RD Community Facilities Programs	Medium/High
HM	Purchase and install an automatic emergency backup generator at the drinking water treatment plant booster pump station to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor City Council / Water & Sewer Committee	1-3 years	USDA – RD Community Facilities Programs	Medium/High
HM	Review the updated Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to reflect the revised FIRMs and present both for adoption. *	F	LP&R	Small	1, 2, 4 6, 7	Yes	Yes	Mayor City Council	1-5 years	City	Low/High

* 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 (approximately 7,000 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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-13
Vandalia Hazard Mitigation Actions
(Sheet 3 of 3)

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
						New	Existing				
HM	Make the most recent Flood Insurance Rate Maps available to assist the public in considering where to construct new buildings. *	F	LP&R	Small	1, 2, 6, 7	Yes	Yes	Mayor City Council	1-5 years	City	Low/Medium
LM	Make City officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain. *	F	LP&R	Small	1, 2, 6, 7	Yes	Yes	Mayor City Council	1-5 years	City	Low/Medium

* 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 (approximately 7,000 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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
Vandalia Township 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
						New	Existing				
HM	Purchase portable/towable emergency backup generator with lighting system for use during power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Supervisor / Board of Trustees	2 years	County / USDA – RD Critical Facilities Programs / Illinois DCEO	Medium/High
HM	Purchase road signage and barricades to alert the public of hazardous conditions, detours, etc. associated with natural and man-made hazard events.	EH, EQ, F, MMH, SS, SWS, T	S&IP	Medium	2	n/a	n/a	Supervisor / Board of Trustees	2 years	Township	Medium/High
HM	Purchase and distribute NOAA weather radios to township employees.	EC, EH, EQ, F, SS, SWS, T	E&A	Small	2	n/a	n/a	Supervisor / Board of Trustees	2 years	Township	Low/High
HM	Replace/upsize select roadway culverts to increase carrying capacity and alleviate recurring flooding/drainage problems.	F, SS	S&IP	Small	2, 3, 5	n/a	Yes	Supervisor / Board of Trustees	2 years	Township / County / IDOT Local Roads	Medium/High
HM	Purchase and install storm warning siren in unincorporated Bluff City.	SS, T	S&IP	Small	2	n/a	n/a	Supervisor / Board of Trustees	2 years	Township / USDA – RD Critical Facilities Programs	Medium/High

† 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 townships of this size (approximately 6,600 individuals). The Township 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	F	Flood
DR	Drought	MMH	Man-Made Hazard
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 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 Subcommittee will be chaired by the Fayette County Emergency Management Agency (EMA). All meetings held by the Subcommittee will be open to the public. The information gathered at each Subcommittee meeting will be documented and provided to all participating jurisdictions for their review and use in the Plan update.

The Fayette County EMA will be responsible for monitoring the status of the mitigation actions identified in the Plan and providing the Illinois Emergency Management Agency (IEMA) with an annual progress report. It will be the responsibility of each participating jurisdiction to provide a progress report on the status of their mitigation actions at each Subcommittee meeting.

Monitoring & Evaluating

- A Plan Maintenance Subcommittee will be formed to monitor and evaluate the Plan.
- The ***Plan will be monitored and evaluated*** on an ***annual basis***.
- Each participating jurisdiction will be responsible for providing an annual progress report on the status of their mitigation actions.
- ***New mitigation actions can be added*** by participating jurisdictions ***during the annual evaluation.***

The Plan Maintenance Subcommittee will also evaluate the Plan on an annual basis to determine the effectiveness of the planning process and identify any implemented mitigation actions. In addition, the Subcommittee will decide whether any changes need to be made. As part of the evaluation of the planning process, the Subcommittee will review the goals to determine whether they are still relevant or if new goals need to be added; assess whether other natural or man-made hazards need to be addressed or included in the Plan; and

review any new hazard data that may affect the Risk Assessment portion of the Plan. The Subcommittee will also evaluate whether other County departments should be invited to participate.

In terms of evaluating the effectiveness of the mitigation actions that have been implemented, the Subcommittee will assess whether a project is on time, in line with the budget and moving ahead as planned; whether the project achieved the goals outlined and had the intended result; and whether losses were avoided as a result of the project. In addition, each of the participating jurisdictions will be given an opportunity to add new mitigation actions to the Plan and modify or discontinue mitigation actions already identified. In some cases a project may need to be removed from the list of mitigation actions because of unforeseen problems with implementation.

5.1.2 Updating the Plan

The Plan must be updated within five years 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 money to implement those mitigation actions identified in this Plan.

The Fayette 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 and changes proposed at the previous annual monitoring and evaluation meetings. In addition, any jurisdictions that did not take part in the previous planning process 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 update.

Updating the Plan

- The Fayette 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 Plan approval date indicated on the signed FEMA final approval letter.***
- Any jurisdictions that did not take part in the previous planning process who now wish to participate may do so.
- Once the Plan update has received FEMA/IEMA approval, each participating jurisdiction ***must re-adopt the Plan to remain eligible to receive federal monies.***

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 re-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 current plans, policies/ordinances and maps that supplement or help support mitigation planning efforts. **Figure PP-3** identifies the existing planning mechanism available 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 into the planning mechanisms identified for their jurisdiction.

Adoption of this Plan 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.

Currently most of the participating municipalities have limited capabilities to integrate the mitigation strategy and other information contained in the Plan into existing planning mechanisms. Two of the five municipalities are very small in size (less than 800 residents) and do not have the financial resources or trained personnel to develop planning mechanisms such as comprehensive plans. Vandalia is the only participating jurisdiction with building codes and only Brownstown and Vandalia comprehensive plans in place. While the South Central Illinois Regional Planning and Development Commission is available to assist participating jurisdictions with planning and community development, a general reluctance by the participants to implement such policies may hinder implementation.

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 throughout the plan maintenance process. A copy of the approved Plan will be maintained and available for review at the Fayette County EMA Office. Individuals will be encouraged to provide feedback and submit comments for the next Plan update to the Fayette County EMA.

The comments received will be compiled and presented at the annual Plan Maintenance Subcommittee meetings where members will consider them for incorporation into the next Plan update. All meetings held by the Plan Maintenance Subcommittee will be noticed and open to the public. A separate public forum will be held prior to the Plan update submittal to provide the public an opportunity to comment on the proposed revision to the Plan.

6.0 PLAN ADOPTION

The final step in the planning process is the adoption of the approved Plan by each participating jurisdiction. Each jurisdiction must formally 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 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 draft Plan 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 review and approval by IEMA and FEMA, the Plan was presented to the County and participating jurisdictions for adoption. ***Each participating jurisdiction was required to formally adopt*** the Plan to become eligible to receive federal grant monies to implement the mitigation actions identified in this Plan. Any jurisdiction that chose not to adopt the Plan did not affect the eligibility of those who did.

Figure PA-1 identifies the participating jurisdictions and the date each formally adopted the Plan. Signed copies of the adoption resolutions are located in **Appendix L**. FEMA signed the final approval letter on (date) which began the five-year approval period and set the an expiration date of (date) for the Plan.

FigurePA-1
Plan Adoption Dates

Participating Jurisdiction	Plan Adoption Date
Fayette County	
Brownstown, Village of	
Brownstown CUSD #201	
Ramsey, Village of	
Sharon Township	
St. Elmo, City of	
St. Elmo Fire Protection District	
St. Peter, Village of	
St. Peter Fire Protection District	
Vandalia, City of	
Vandalia Township	

PLANNING COMMITTEE MEETING
ATTENDANCE SHEETS

APPENDIX A

Attendance Sheet

Fayette County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

November 14, 2019

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Karen Sanders	Fayette Co. SWCD	AC
2.	Kendra Craig	Fayette Co EMA	Coordinator
3.	Pamela Jacobs	Effingham Co EMA	Coordinator
4.	Joe Hill	Sharon Township	Supervisor
5.	Mychill Barker	Vandalia Township	Trustee
6.	ZAC STOMBAUGH	VANDALIA FIRE DEPT	ASSISTANT CHIEF
7.	Clint Simpson	VANDALIA	STATE FARM AGENT
8.	Jenny Waggoner	County Board	Board member
9.	Bryan McElvany	Fayette Co. SWCD	RC
10.	Heidi Ritchey	Kaskaskia Township	Supervisor
11.	Marcia Barringer	Fayette Co HD	PHEP Coord
12.	[illegible]	FC EMA	COMMUNICATIONS
13.	LaTisha Paslay	City of Vandalia	Administrator
14.	Loralyn Valencia	Fayette EMA	
15.	Gabe Valencia	Fayette EMA	
16.	Gary Haupt	BEAR GROVE ROAD COMM	ROAD COMM.

Attendance Sheet

Fayette County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

November 14, 2019

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Zachary Kruz	American Environmental	Specialist
2.	Andrea Bostwick	American Environmental	Sr. Project Manager
3.		FAYETTE CO. FAIR ASSO.	
4.		EMA Volunteer - Communications	
5.	Russell Colbin	Fayette Co Board Dist 2	
6.	Roger Folk	Fayette Co. Hwy Dept	Assistant Co Engr
7.	Dave Harris	Fayette County Coroner	Coroner
8.	Anthony Valerio	Fayette EMA	
9.	DANIEL ENGLAND	BEAR GROVE TOWNSHIP	SUPERVISOR
10.			
11.			
12.			
13.			
14.			
15.			
16.			

Attendance Sheet

Fayette County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

November 14, 2019

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	JEFF BECKMAN	FAY COUNTY BD	CHMN
2.	John LOTZ	Village St. Peter	President
3.	Dana Homann	University of Illinois Extension	Educator
4.	[illegible]	1208 W CO Board	Member
5.	[illegible]	2512 Whitler	Board member
6.	Travis Martin	Ramsey Fire Protection District	Chief
7.	Mayor Ricky Gottman	City of Vandalia	Mayor
8.	Jodi Smith	Fayette County Health Dept	Director of Env. Health
9.	Katie Cargo	Fayette County Farm Bureau	
10.	Mike Shackelford	Brownstown CUSD #201	Supt.
11.			
12.			
13.			
14.			
15.			
16.			

Attendance Sheet

Fayette County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

February 20, 2020

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Zachary King	American Environmental	Specialist
2.	Karen Sanders	Fayette Co SWCD	AC
3.	Doug Engeljohn	St Elmo Fire City of St Elmo	Chief
4.	[illegible]	Vandalia FEMA	Communications
5.	Pam Jacobs	Fa Co EMA	Emergency Manager
6.	Jennifer Waggoner	Fay Co Board	Board member Ramsey
7.	Kent Kistler	Brownstown Board Member	" "
8.	Andy Craig	Fayette Co. Fair	
9.	[illegible]	Sharon Township	Supervisor
10.	Michele Baile	Vandalia Township	Trustee
11.	[illegible]	Fayette Co 911 / St Peter Fire	911 Coordinator / Ast Chief
12.	Mike Shackelford	Brownstown Schools	Superintendent
13.	Kendra Craig	Fayette CHD	PHEP Coord
14.	LaTisha Paslay	City of Vandalia + Vandalia Fire	City Administrator
15.	Shelby Dillman	Brookstone	Manager
16.	Maurice Allen		

Appendix A

Attendance Sheet

Fayette County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

February 20, 2020

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Keith Cole	Fayette Co. Board	Member Dist. #5
2.	Anthony Valencia	Val. La Rehab & Health Care	
3.	Roger Folk	Fayette Co. Hwy	Assistant County Engr.
4.	Andrea Bostwick	American Environment	EMS Manager
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PLANNING COMMITTEE MEETING MINUTES

APPENDIX B

Meeting Minutes

Fayette County Multi-Jurisdictional
All Hazards Mitigation Planning Committee

November 14, 2019
6 P.M.
Fayette County Health Department
416 West Edwards Street, Vandalia

Committee Members

Bear Grove Township
Brownstown CUSD #201
Effingham County EMA
Fayette County Fair Association
Fayette County Farm Bureau
Fayette County Soil & Water Conservation District
Fayette County Offices:
- County Board
- Coroner
- EMA
- Health Department
- Highway Department

Kaskaskia Township
Ramsey Fire Protection District
Sharon Township
St. Peter, Village of
State Farm
University of Illinois Extension
Vandalia, City of
Vandalia Volunteer Fire Department
Vandalia Rehab & Health Care
Vandalia Township
American Environmental Corp.

Welcome and Introductions

Kendra Craig, Chairman of the Fayette County Multi-Jurisdictional All Hazards Mitigation Planning Committee, welcomed attendees. She indicated that the purpose of this Committee is to develop the Fayette County All Hazards Mitigation Plan.

Handout materials were distributed to each member, including a Citizen Questionnaire. The questionnaire will help gauge residents and committee member understanding of the Natural Hazards that impact the County and also identifies communication preferences.

What is an All Hazards Mitigation Plan?

Andrea Bostwick, American Environmental Corporation (AEC) explained that an All Hazards mitigation plan details the natural and man-made 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. The natural and man-made hazards include floods; tornadoes; severe summer storms (including thunderstorms, hail and lightning events); severe winter storms (including ice and snow storms); extreme cold; excessive heat; heat; drought; earthquakes; dam failures; transportation, generation and storage/handling of hazardous substances; hazardous materials incidents; waste disposal and waste remediation.

Why Should We Develop Our All Hazards Mitigation Plan?

Andrea, described why mitigation planning is needed and how participating jurisdictions can benefit. In addition, she detailed the AHMP process.

Since the early 1990s damages caused by weather extremes have risen substantially. In 2018 the United States experienced $90.7 billion in severe storm damages from fourteen (14) severe weather and natural hazard events. The losses experienced in 2018 were the 4th highest only behind 2017, 2015, and 2012. Consequently, the Federal Emergency Management Agency (FEMA) is encouraging counties throughout the United States to prepare and update natural hazard mitigation plans because what they 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.) Specific projects and recommendations will be developed through the planning process to help each participating jurisdiction reduce damages. By including these projects in this Plan, the participating jurisdictions will have an opportunity to receive state and federal funds to complete the projects.

2.) Verifiable information about the natural hazards that occur in Fayette County will be gathered to help participants in municipal and county meetings make decisions about how to better protect citizens and property from storm damages.

The Planning Process

The goal of the Committee meetings is to develop a Plan to meet state and federal criteria so that it can be approved by the Illinois Emergency Management Agency (IEMA) and FEMA. Andrea explained that the schedule for this Plan development has been compressed and accelerated due to changes in the grant funding mechanisms. So instead of conducting five meetings, a three meeting process has been developed that will satisfy FEMA's criteria and still provide a draft plan to IEMA by May 1, 2020. Specific activities for the Committee meetings include:

1st Committee meeting	Orientation to the Planning Process Complete Critical Facilities & Existing Planning Documents Complete the Severe Weather Shelter Survey Discuss the Risk Assessment Approve Mission Statement & Goals
2nd Committee meeting	Complete Critical Facilities Vulnerability Survey Discuss Mitigation Projects and Activities Review Mitigation Strategy Committee discusses approval/adoption of the Plan
3rd Committee meeting (Public Forum)	Present the Plan for public review Committee helps answering questions from the public

Information Needed from the Committee

Andrea explained that as part of the Plan development process, AEC would need information from each of the participating jurisdictions to help meet the state and federal criteria. Zachary Krug, AEC, distributed the following forms to each participating jurisdiction to complete:

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.

List of Existing Planning Documents. This list identifies planning documents (Land Use Plans, Flood Ordinances, and related documents) a jurisdiction already has in place.

Shelter Surveys. Identifies locations designated as severe weather shelters.

Contact Information. Committee members should provide contact information about themselves to help AEC staff during this planning process.

Andrea asked participants to return the completed forms before the next meeting and to let her know if anyone would like electronic copies of the forms.

Severe Weather Events

Committee members were asked to share their memories of severe weather events that have occurred in the County including any damages to critical infrastructure and facilities. Flooding, severe thunderstorms and lightning strikes were mentioned. Other hazard events related include:

- Committee Members talked about an ice storm in 1978 or 1979 in St. Peter and caused power to be out for a week. The storm snapped off 18 power poles.
- In 1989 high winds and hail caused damage to the correctional center and homes in Brownstown.
- Many Committee Members mentioned lightning damage, such as loss of lift stations and communication towers.
- In November 2015, 37 homes were damaged by a tornado.
- In July 2019, Vandalia Airport sustained damage from straight-line winds.
- Committee Members discussed the damages from levees on the Kaskaskia river and Caryle Dam which have caused significant flooding in the area.

Andrea asked participants to identify any hazard events that have impacted their jurisdiction by completing the forms titled "***Hazard Event Questionnaire and Critical Facilities Damage Questionnaire.***" The information provided will help supplement the information included in the risk assessment.

Andrea then asked the Committee about whether any instances of mine subsidence or landslides had occurred in the County. Andrea asked the Committee if they would like to include mine subsidence and/or landslides in the Plan and after a brief discussion the Committee decided that neither should be included.

Risk Assessment

Andrea began the risk assessment presentation by noting that there have been four (4) federally-declared disasters in Fayette County since 1989. Approximately 518 natural hazard events have been verified over approximately 50 years in Fayette County. There have been a minimum of 13 injuries recorded from 3 natural hazard events. A minimum of $9.7 million in property damages and $40,000 in crop damages have resulted from approximately 28 documented natural hazard events verified in Fayette County. The actual damage amounts are actually much higher based on several facts:

1.) damage descriptions for many of the flood and thunderstorms event 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 Fayette County with 323 events verified since 1957. One of the four federal disaster declarations included severe storms. Approximately $6 million in property damages have resulted from 15 severe storm events. Almost all the property damage is the result of three hail events. At least 1 injuries can be attributed to the May 25, 1989 hail event.

The highest wind speed recorded in the County, not associated with a tornado, is 70 knots (81 mph) on November 15, 1989 near Vandalia, February 5, 2008 in St. Peter, and May 29, 2019 at the Vandalia Municipal Airport. The largest hail recorded in the County is 2.75 inches in Vandalia on May 25, 1989.

Severe Winter Storms

At least 81 verified severe winter storms (snow, ice, or extreme cold) have occurred since 1966. Two of the four federal disaster declarations include severe winter storms. Damage information was unavailable for any of the events and no injuries or fatalities were reported.

Between 2000 and 2009 at least 19 severe winter storms took place. There has been 16 events in the current decade. The record maximum 24-hour snowfall in the County is 12.0 inches at the Vandalia COOP Station on December 19 & 20, 1973. The coldest recorded temperature is -26°F at Vandalia COOP Station on January 19, 1994.

Floods

One of the four federal disaster declarations for Fayette County is related to flooding. There have been a least 41 verified flood events in Fayette County, 21 riverine/shallow flood events since 1990 and 20 flash food events since 1996. Approximately $26,000 in property damages and $40,000 in crop damages was recorded for four general and one flash flood events. No injuries or fatalities were recorded for any of the flood events.

Excessive Heat

There have been 44 *recorded* excessive heat events reported in Fayette County since 1994. No damages or injuries/fatalities were recorded for any of the excessive heat events.

The hottest temperature recorded in Fayette County was 112°F at the Vandalia Airport on July 14, 1954.

Drought

Five major droughts have occurred during the last four decades – 1983, 1988, 2005, 2011 and 2012. The County has been designated a Primary Natural Disaster Area by the USDA for the three most recent droughts. Corn yield reductions were most severe for the 2012 drought when there was a 78.8% reduction in corn yields. Soybean yield reductions were most severe for the 1983 drought when there was a 57.6% reduction in soybean yields.

Year	Corn	Soybeans
1983	74.3%	57.6%
1988	46.4%	30.0%
2005	31.6%	17.0%
2011	13.4%	17.7%
2012	78.8%	13.0%

Tornadoes

Since 1950, 20 tornadoes have been verified in Fayette County. The 2013 federal disaster declaration for Fayette County included tornadoes. A minimum of $3.7 million in property damages has resulted from 8 tornadoes. Four of the tornadoes have recorded property damages of at least $250,000 per event. Twelve injuries can be attributed to two separate tornado events in the County.

The average tornado in Fayette County is approximately 4.7 miles long and 74 yards wide. The average area covered by a tornado in Fayette County is 0.20 square miles.

The highest recorded F-Scale rating for a tornado in the County since 1950 is an F2 which has occurred seven (7) times. The longest and widest recorded tornado in the County was an F2 tornado that occurred on July 21, 1954 and was 200 yards wide and 26.1 miles long in Fayette County.

Earthquakes

In the previous 200 years, four (4) earthquakes have originated in Fayette County while multiple earthquakes have originated in adjacent counties. The largest was a 3.4 magnitude earthquake that occurred on March 2, 1990. Damage information was unavailable for any of the events and no injuries or fatalities were reported. While no fault zones or systems are located in Fayette County, there are multiple geologic structures. There are also three known fault systems located in the immediate region: the Wabash Valley, the Cottage Grove and the Rough Creek-Shawneetown.

Dams

There are 13 classified (permitted) dams located in Fayette County, according to the U.S. Army Corp of Engineers. Five (5) of these dams are publicly-owned: Vandalia owns two (Municipal reservoir Dam & Wastewater Treatment Lagoon), St. Elmo owns two (Old City Reservoir Dam & Lake Nellie) and IDNR owns one (Ramsey Lake Dam). The 8 remaining dams are privately-owned. Only one damn has a "high" hazard classification rating (Vandalia Municipal Reservoir Dam) which indicates it has a high potential to cause loss of life and property damage in the event of a dam failure. Two dams have a hazard classification of "significant". The remaining 10 dams have a hazard classification of "low" or "undetermined". There are no known dam failures recorded in the County.

Risk Priority Index Exercise

Following the risk assessment, Andrea led the Committee through an exercise that will help calculate the Risk Priority Index for the hazards that have the potential to impact the participating jurisdictions. She explained that the Risk Priority Index is a quantitative means of providing guidance for ranking the hazards. 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. The Committee elected to take the exercise home and submit it to Andrea at a later date.

Mitigation

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 develop a list of mitigation projects for each participating jurisdiction.

The form titled **"Hazard Mitigation Projects"** was distributed and Andrea indicated this form should be used to submit projects and activities for the Plan. 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 and excerpts from a FEMA publication on mitigation ideas. A 1-page list of required projects for NFIP-participating jurisdictions was also handed out. These examples can be used to help Committee members when they prepare their list.

She emphasized that submitting a project does not obligate any jurisdiction to complete the project. FEMA is trying to stimulate mitigation to reduce the extraordinary amount of money being expended on storm damages.

Mitigation projects can include studies, structural 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 if questions arise before they return to the next Committee meeting.

Mission Statement & Goals

Zak asked Committee members to review the draft mission statement and goals provided in the meeting materials. Both are necessary to satisfy required elements of the Plan. Zak asked if any revisions need to be made or if additional goals need to be added.

The draft mission statement was reviewed and no revisions were made to the wording.

Zak indicated that the mitigation goals are intended to reduce long-term vulnerabilities to All Hazards and that each action included in the Plan should be aimed at one or more of the goals developed by the committee. These goals were drafted in such a way that they covered all the mitigation projects and activities that were submitted.

The goals were reviewed and no revisions were made to the wording.

The mission statement and goals will be added to the Plan.

Community Participation

Zak 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. He indicated that tag-teaming and designating substitute representatives is permissible when other obligations arise. Zak pointed out that a designated substitute representative does not have be an official or employee of the jurisdiction.

Providing the public with opportunities to have input is an important part of the planning process. Zak requested that each jurisdiction consider making the **"Frequently Asked Questions"** handout in the meeting packet available for public review within your jurisdiction as well as the **"Citizen Questionnaire"** passed out at the beginning of the meeting.

What Happens Next?

The mitigation project tables will be the main topic of the next committee meeting. Andrea also indicated that the project prioritization methodology would be discussed.

The second meeting of the Committee was scheduled for:

Thursday, February 20, 2020
5:30 P.M.
Fayette County Health Department
416 W. Edwards Street, Vandalia

With no further questions the meeting was adjourned.

Appendix B

Meeting Minutes

Fayette County's Multi-Jurisdictional All Hazards Mitigation Planning Committee

February 20, 2020
5:30 p.m.
Fayette County Health Department
416 West Edwards Street, Vandalia

Committee Members

Brookstone Estates of Vandalia
Brownstown CUSD #201
Effingham County EMA
Fayette County Fair Association
Fayette County Soil & Water Conservation District
Fayette County Offices:
- 911
- County Board
- EMA

Fayette County Offices Continued:
- Highway Department

Ramsey, Village of
Sharon Township
St. Elmo, City of
St. Elmo Fire Protection District
St. Peter Fire Protection District
Vandalia, City of
Vandalia Rehab & Health Care
Vandalia Township
American Environmental Corp.

Welcome

Kendra Craig, the Fayette County EMA Director, welcomed attendees. She indicated that the purpose of this Committee is to develop the Fayette County's All Hazards Mitigation Plan.

Handout materials, including the draft mitigation project tables, 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. She noted that the Committee has accomplished all of its objectives up to this point and is on schedule.

Critical Facilities Vulnerability

Andrea discussed critical facilities vulnerability and asked the Committee Members to complete a three question survey to help identify:

1.) What each jurisdiction's greatest vulnerabilities are and why; and
2.) Each jurisdiction's most vulnerable assets.

She also asked each participating jurisdiction to provide a list of permanent backup generators associated with critical infrastructure. Andrea explained this information would be used as part of the vulnerability analyses.

Man-Made Hazards Risk Assessment

Zachary began the presentation by reminding Committee members that at a previous meeting we identified the most frequently occurring natural hazards in Fayette County. While the focus of this planning effort is directed at natural hazards, FEMA allows a small portion of the planning process to be devoted to an overview of select man-made hazards.

Although this overview does not have the same depth as the assessment of natural hazards, it provides useful information to place various man-made hazards in perspective. Some of this information should be helpful to first responders so that they can take necessary safety precautions to protect themselves and others.

This assessment focused on the following categories of man-made hazards:

- generation and storage/handling of hazardous substances;
- waste disposal;
- hazardous materials (hazmat) incidents (both transportation and fixed facility); and
- waste remediation.

Hazardous substances broadly include flammable, explosive, biological, chemical or physical material that has the potential to harm public health or the environment. For the purposes of this Plan, the term includes both hazardous product and hazardous waste.

Generation and Storage/Handling of Hazardous Substances

In 2017, there were no companies in Fayette County who generated reportable quantities of hazardous substances according to the USEPA.

Based on records obtained from IEMA's Tier II database, there were 28 stationary facilities within Fayette County that stored and/or handled hazardous substances. Eight (8) of these facilities stored and/or handled chemicals identified as "Extremely Hazardous Substances".

Waste Disposal

There are no active commercial solid waste (household) landfills operating in Fayette County. There are no facilities within the county permitted to handle Potentially Infectious Medical Waste and no commercial off-site hazardous waste treatment or disposal facilities.

Hazardous Materials (Hazmat) Incidents

A hazardous materials (hazmat) incident refers to any incident involving the release of hazardous substances. Incidents can take place at fixed facilities or as they are being transported. Between 2010 and 2019, there were one hundred and forty-three (143) hazmat incidents recorded in Fayette County. Of the 143 incidents, 96 occurred at fixed facilities, while the remaining 47 occurred during transport.

Of the 47 transportation incidents, there were eleven (11) roadway accidents/incidents, one (1) rail accident/incident, thirty-three (33) pipeline releases and two (2) waterway accidents/incidents.

Waste Remediation

Waste remediation in Illinois is primarily conducted through three programs: the federal Superfund Program (for sites posing the largest threat to public health and the environment), the Illinois Site Remediation Program (SRP) and the Illinois Leaking Underground Storage Tank (LUST) Program.

Superfund: There are no Superfund sites in Fayette County.

Illinois SRP: There are six (6) SRP sites located in Fayette County. Two of the sites have received "No Further Remediation" (NFR) letters.

Illinois LUST: There are 87 LUST sites located in Fayette County. Approximately 85% of these sites have received NFR, Non-Lust Determination or Section 4(y) letters or remediation is virtually complete.

Risk Priority Index Exercise Results

Andrea then presented the results of the Risk Priority Index Exercise which was conducted at the November 14, 2019 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, tornadoes scored the highest, followed by thunderstorms with damaging winds, severe winter storms and levee failures. The hazards that scored the lowest included earthquakes and mine subsidence.

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 required element of the Plan's mitigation strategy. As part of the Plan development process, a methodology needs to be selected.

Andrea explained that mitigation actions can be prioritized in a number of ways and provided information on two different methodologies. The Committee asked questions and after discussing the pros and cons of both options, the Committee chose the methodology 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.

Andrea acknowledged that while this methodology does not take cost or politics into consideration, these factors may affect the order in which projects are implemented. She

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

Andrea reminded the Committee Members that mitigation actions are those projects and activities that reduce the long-term risk to people and property from the natural and man-made hazards that impact the County. She then described how the lists of mitigation actions provided by each jurisdiction, the Mitigation Actions Prioritization Methodology, the goals and other information were used to complete the Mitigation Actions Tables handout.

Andrea using a frequently requested project – a community safe room – to walk the Committee through how a typical project is prioritized and entered into the mitigation action tables. 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 handout was prepared by AEC. Andrea thanked the Committee Members for assembling their lists of mitigation projects and activities. The participants did a wonderful job preparing their lists. Committee members were then asked to review the Action Tables containing the descriptions of the mitigation projects and activities. Andrea 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 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 now consider 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 one-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 submit it to IEMA/FEMA. Following IEMA and FEMA review, any edits requested will be made and then FEMA will issue an Approval Pending Adoption (APA) letter. At this point an email will be issued to all the participating jurisdictions with a copy of a model adoption resolution attached asking them to formally adopt the Plan by resolution and provide a copy of the signed resolution to Andrea or Ms. Craig.

Plan Maintenance and Update

Zak then described the Plan maintenance and update commitments that are detailed in the Plan. A subgroup of the Planning Committee will meet annually, under the direction of the Fayette County EMA, to report on the progress of their projects, make any additions or edits to their project lists, evaluate the effectiveness of the Plan and provide information on any events that have occurred since the Committee met previously. The information gathered at these annual meetings will be provided to IEMA and will make the five year Plan update process easier.

Every five years, the Plan must be reviewed, revised and resubmitted to IEMA/FEMA to remain eligible for mitigation project funds. At the five year update, any jurisdiction that did not take part in the previous update but who now wished to become part of the Plan may do so. Any new jurisdiction must supply the same information that all of the current jurisdictions supplied.

What Happens Next?

The public forum will be held on:

Thursday, April 16, 2020
Fayette County Health Department
416 West Edwards Street, Vandalia
6 P.M. – 8 P.M.

Public Comment

With no additional questions or comments raised, Ms. Craig adjourned the meeting.

After conversations between AEC and the Fayette County EMA, the public forum scheduled for Thursday, April 16th was cancelled due to the COVID-19 outbreak and Executive Orders 2020-10, 2020-18 and 2020-32 which extends the stay-at-home order and prohibits any gathering of more than ten people through Sunday, May 31st. Given the May 31st Plan submission deadline and the extension of the stay-at-home order, IEMA and FEMA agreed to allow the County to place the draft Plan online for review and comment and conduct the Public Forum via teleconference. The Plan will be made available on the County's website from May 21 through May 28, 2020. The Public Forum will be held on May 21 at 6:00 P.M. The Committee members and public were notified of the change.

CITIZEN QUESTIONNAIRE

APPENDIX C

QUESTIONNAIRE

Fayette County Multi-Jurisdictional All Hazards Mitigation Plan

You can help protect lives and property from natural hazard events in the County by taking a few moments to complete this questionnaire.

1. Please indicate where you live in the County:

   ☐ Bingham
   ☐ Brownstown
   ☐ Farina
   ☐ Hagarstown
   ☐ Ramsey
   ☐ St. Elmo
   ☐ St. Peter
   ☐ Vandalia
   ☐ Vera
   ☐ Unincorporated Fayette County
   ☐ Other (please specify): _____

2. Please place a check mark 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 and/or lightning strikes)
   ☐ Floods
   ☐ Severe Winter Storms (snow, sleet, ice and/or extreme cold)
   ☐ Excessive Heat
   ☐ Tornadoes
   ☐ Drought
   ☐ Earthquakes
   ☐ 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 7 based on which hazard ***you feel*** poses the greatest threat. (1 = greatest threat and 7 = least threat).
   Each number should only be used once.

   _____ Severe Summer Storms
   _____ Floods
   _____ Severe Winter Storms
   _____ Excessive Heat
   _____ Tornadoes
   _____ Drought
   _____ Earthquakes

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 (If selected, please check the type(s) of flood or drainage activity that is needed below.)
  - ☐ Culvert and drainage ditch maintenance
  - ☐ Retention pond construction
  - ☐ Dam or levee construction/maintenance
  - ☐ Hydraulic studies to determine cause of drainage problems
- ☐ Maintain power during storms by burying power lines, trimming trees and/or purchasing a back-up generator
- ☐ Tornado Safe Shelters
- ☐ Maintain roadway passage during snow storms and heavy rains
- ☐ Provide sufficient water supply during drought
- ☐ Identify residents with special needs in order to provide assistance during a natural hazard event
- ☐ Retrofit critical infrastructure (public water supplies, schools, sewage treatment facilities, bridges, hospitals and other important services) to reduce potential damages
- ☐ Other (please specify): _____

6. What are the most effective ways ***for you*** to receive information about how to make your household and property safer from natural disasters? (Please check all that apply.)

- ☐ Newspapers
- ☐ Television
- ☐ Radio
- ☐ Internet
- ☐ Schools
- ☐ Social Media (Facebook, Twitter, etc.)
- ☐ Mail
- ☐ Fact Sheet/Brochure
- ☐ Extension Service
- ☐ Public Workshops/Meetings
- ☐ 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 Hazards Mitigation Plan.

Fayette County Multi-Jurisdictional All Hazards Mitigation Planning Committee

FREQUENTLY ASKED QUESTIONS FACT SHEET

APPENDIX D

Frequently Asked Questions

Fayette County Multi-Jurisdictional All Hazards Mitigation Plan

1) **What is the Fayette County All Hazards Mitigation Plan?**
The Fayette County Multi-Jurisdictional All Hazards Mitigation Plan evaluates damage to life and property from natural and man-made 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, 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 or man-made hazard.

3) **Why is this Plan being developed?**
The Plan fulfills federal planning requirements of Section 104 of the Disaster Mitigation Act of 2000 and the Stafford Act. Developing this Plan fulfills federal requirements that provide these benefits:
   - Funding ***following*** declared disasters.
   - Funding for mitigation projects and activities ***before*** disasters occur.
   - Increased awareness about natural hazards and closer cooperation among the various organizations and political jurisdictions involved in emergency planning and response.

4) **Who is developing this Plan?**
The Fayette County Multi-Jurisdictional All Hazards Mitigation Planning Committee is developing the Plan with assistance from technical experts in emergency planning, environmental matters, and infrastructure. The Committee includes members from agriculture, education, emergency services, insurance, municipal, township and county government, health care, and law enforcement.

5) **How can I participate?**
You are invited to attend public meetings of the Fayette County All Hazards Mitigation Planning Committee. In addition, you are encouraged to provide photographs, other documentation, and anecdotal information about damages you experienced from natural and man-made hazards in Fayette County. Surveys will be available at participating municipalities and through Fayette County to help gather specific information from residents. All of this information will be used to develop the Plan. The draft Plan will be presented at a public forum for further public input.

More information can be obtained by contacting:

Kendra Craig, Coordinator
Fayette County Emergency Management Agency
221 South 7th Street
Vandalia, Illinois 62471
(618) 283-4292

MEDIA OUTLETS SERVING THE COUNTY

APPENDIX E

Media Outlets Serving Fayette County

Newspapers

The Farina News (weekly)
109 N Walnut St.
Farina IL, 62838
618-245-6216

The Leader Union (weekly)
229 S. Fifth St.
Vandalia IL 62471
618-283-3374
https://www.leaderunion.com

The Ramsey Journal (weekly)
223 S. Superior
Ramsey IL, 62080
618-423-4142

Saint Elmo Devonian News (weekly)
423 N. Main St.
Saint Elmo IL, 62458
618-829-5800

Radio Stations

WKRV (107.1 FM)
232 4th St.
Vandalia Il, 62471
618-283-2325

WPMB (1500 AM/104.7 FM)
232 4th St.
Vandalia IL, 62471
618-283-2325

PRESS RELEASES AND NEWS ARTICLES PUBLISHED

APPENDIX F

Fayette County plans to reduce damages caused by severe weather

Fayette County will develop a plan to reduce the damages caused by natural hazards such as floods, thunderstorms, hail, snow and ice storms, tornados, drought, and excessive heat, among others. Develoopement of the All Hazard Mitigation Plan will be funded through a grant from the Illinois Emergency Management Agency (IEMA).

"The goal of this plan is to identify projects and activities that will reduce the impacts to residents and property from natural hazard events," said Fayette County Emergency Management Agency coordinator Kendra Craig. "This plan is different from an emergency response plan because it focuses on ways to reduce and prevent damages before they occur."

The Fayette County Hazard Mitigation Planning Committee will hold its first meeting to develop the plan at 5:30 p.m. on Thursday, November 14 at the Fayette County Health Department in Vandalia.

This committee, comprised of county and municipal representatives as well as technical partners and stakeholders, will meet over the next several months. Meetings of this committee will be conducted as working sessions so that any interested resident can attend and ask questions.

The process to develop this plan, as well as the frequency and damages caused by severe storms and other natural disasters in Fayette County, will be discussed at the first meeting. "The purpose of this 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 begin to develop each participant's list of mitigation activities and projects," said Craig.

After a draft of the plan is prepared, a public forum will be held for review and comment. Following any revisions, the plan will be presented for adoption at public meetings held by the county and at each of the participating municipalities.

FAYETTE COUNTY EMERGENCY MANAGEMENT AGENCY

221 South 7th Street Vandalia, IL 62471
618-283-4292 fcesda@yahoo.com
Kendra Craig, Director Kiley Depew, Deputy Director

Contact: Kendra Craig
(618)- 283-4292

Reducing Damages Caused By Severe Weather

Vandalia, IL (10/28/2019) — Fayette County will develop a plan to reduce the damages caused by natural hazards such as floods, thunderstorms, hail, snow and ice storms, tornados, drought, and excessive heat, among others. This plan is called an All Hazard Mitigation Plan and the process to develop it will be funded through a grant from the Illinois Emergency Management Agency (IEMA).

"The goal of this Plan is to identify projects and activities that will reduce the impacts to residents and property from natural hazard events", said Kendra Craig, Fayette County Emergency Management Agency Coordinator. "This Plan is different from an emergency response plan because it focuses on ways to reduce and prevent damages before they occur", added Craig.

The Fayette County Hazard Mitigation Planning Committee will hold its first meeting to develop the Plan on Thursday, November 14th, 2019, at the Fayette County Health Department, 416 West Edwards Street, in Vandalia, beginning at 5:30 P.M. This Committee, comprised of County and municipal representatives as well as technical partners and stakeholders, will meet over the next several months. Meetings of this committee will be conducted as working sessions so that any interested resident can attend and ask questions.

The process to develop this Plan as well as the frequency and damages caused by severe storms and other natural disasters in Fayette County will be discussed at this first meeting. "The purpose of this 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 begin to develop each participant's list of mitigation activities and projects," said Craig.

After a draft of the Plan is prepared, a public forum will be held to present the Plan for review and comment. The draft Plan will be revised based on comments from the public and the state and federal government agencies. Following these revisions, the Plan will be presented for adoption at public meetings held by the County and at each of the participating municipalities.

XXXXXXXXXXXXXXXX

FAYETTE COUNTY EMERGENCY MANAGEMENT AGENCY

221 South 7th Street Vandalia, IL 62471
618-283-4292 fcesda@yahoo.com
Kendra Craig, Director

FOR IMMEDIATE RELEASE

Contact: Kendra Craig
(618)- 283-4292

Projects to Reduce Damages Caused By Natural Disasters

Vandalia, IL (February 3, 2020)— Projects to prevent injuries and fatalities while maintaining vital services for Fayette County residents during severe storms will be the main topic of discussion at the Fayette County All Hazards Mitigation Planning Committee meeting on Thursday, February 20th, 2020 at 5:30 P.M. The meeting will be held at the Fayette County Health Department, 416 West Edwards Street, in Vandalia and is open to the public.

This Committee began work in November 2019 to develop the County's Plan. This All Hazards Mitigation Plan will identify projects and activities to protect Fayette County residents and property from storms and other natural disasters. Unlike other emergency plans, this Plan is aimed at identifying projects and activities that can be taken before these disasters occur.

"Severe storms frequently damage buildings, crops, roads, and other critical infrastructure in this area. Consequently we are seeking to identify preventative steps that can reduce the dollar damages as well as protecting public health before severe weather strikes," according to Kendra Craig, Fayette County Emergency Management Agency Coordinator

The municipalities of Ramsey, St. Elmo, St. Peter, and Vandalia, in addition to the County, and Bear Grove Township, Kaskaskia Township, Sharon Township, the Vandalia Volunteer Fire Department, Brownstown CUSD #201, Fayette County SWCD and the University of Illinois Extension Office have been participating in the planning process.

Building storm shelters, resolving drainage problems, providing back-up power supplies, retrofitting water supplies and other critical facilities to better withstand natural disasters are a few of the more frequently encountered mitigation projects in Illinois. Developing public information materials and conducting drainage studies are examples of other activities that might also be included in the All Hazards Mitigation Plan.

"A public forum will be conducted later this Spring for interested persons to review the Plan update and ask questions of Committee Members. A public comment period will be established to accommodate interested persons who are unable to attend the forum. We want to make sure that anybody who is interested has an opportunity to review and comment on the draft Plan," added Craig.

Interested persons can submit questions and comments to the Committee members or directly to the Fayette County Emergency Management Agency.

EMA hosting planning meeting Feb. 20

Projects to prevent injuries and fatalities while maintaining vital services for Fayette County residents during severe storms will be the main topic of discussion at the Fayette County All Hazards Mitigation Planning Committee meeting at 5:30 p.m. on Thursday, Feb. 20, at the Fayette County Health Department, 416 W. Edwards St. in Vandalia.

The meeting is open to the public.

This committee began work in November 2019 to develop the county's plan. This All Hazards Mitigation Plan will identify projects and activities to protect Fayette County residents and property from storms and other natural disasters.

Unlike other emergency plans, this plan is aimed at identifying projects and activities that can be taken before these disasters occur.

"Severe storms frequently damage buildings, crops, roads, and other critical infrastructure in this area," Kendra Craig, Fayette County Emergency Management Agency coordinator, said.

"Consequently, we are seeking to identify preventative steps that can reduce the dollar damages as well as protecting public health before severe weather strikes," Craig said.

Participating in the planning process were representatives of the municipalities of Ramsey, St. Elmo, St. Peter and Vandalia, Fayette County, Bear Grove Township, Kaskaskia Township, Sharon Township, Vandalia Volunteer Fire Department, Brownstown CUSD #201, Fayette County Soil and Water Conservation District, and the University of Illinois Extension Office.

Building storm shelters, resolving drainage problems, providing bac-up power supplies, retrofitting water supplies and other critical facilities to better withstand natural disasters are a few of the more frequently encountered mitigation projects in Illinois.

Developing public information materials and conducting drainage studies are examples of other activities that might also be included in the All Hazards Mitigation Plan.

"A public forum will be conducted later this spring for interested persons to review the Plan update and ask questions of Committee Members," Craig said.

"A public comment period will be established to accommodate interested persons who are unable to attend the forum. We want to make sure that anybody who is interested has an opportunity to review and comment on the draft plan," she said.

Interested individuals can submit questions and comments to the committee members or directly to the Fayette County Emergency Management Agency.

CONTACT: Kendra Craig
618-283-4294

FOR IMMEDIATE RELEASE

Fayette County's Plan to Reduce Severe Weather Damages Ready for Public Review

May 11, 2020—The Fayette County Multi-Jurisdictional All Hazards Mitigation Plan outlining projects and activities to lessen damages caused by severe weather and other natural hazards will be available for public review and comment from May 21 through May 28, 2020. The Plan, along with a summary sheet and a comment survey, can be viewed on the Emergency Management Agency page of the Fayette County website. If you are unable to access the Plan via the website, please contact Kendra Craig, Emergency Management Agency (EMA) Director at (618)-382-4292 to schedule an appointment to view a paper copy of the Plan. The comment period will remain open through Thursday, May 28, 2020. Public comments will be used to make any revisions needed before this Plan is submitted to the Illinois Emergency Management Agency and FEMA.

A public forum will also be conducted on May 21 at 6 P.M. Due to the COVID-19 crisis which prohibits any gatherings of more than ten people, the public forum will be conducted via teleconference. Persons interested in participating in the public forum should contact Kendra Craig, EMA Director at (618)-283-4294. Individuals can still review this Plan and comment 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 life and health, infrastructure, and property before events occur," according to Ms. Craig.

The Fayette County All Hazards Mitigation Planning Committee prepared this draft Plan with technical assistance from state and federal agencies as well as a consultant specializing in emergency management planning. The Committee is comprised of representatives from various County departments in addition to Bingham, Brownstown, Ramsey, St. Elmo, St. Peter, Vandalia, as well as Brownstown CUSD #201, Sharon Township, Vandalia Township, St. Elmo Fire Protection District and St. Peter Fire Protection District. The Committee began meeting last fall to prepare this Plan.

PUBLIC FORUM – PLANNING PROCESS
SUMMARY HANDOUT

APPENDIX G

FAYETTE COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN PUBLIC FORUM TELECONFERENCE

MAY 21, 2020
6:00 P.M.

Each year natural hazards (i.e., severe thunderstorms, tornadoes, severe winter storms, flooding, etc.) cause damage to property and threaten the lives and health of Fayette County residents. Since 2002, Fayette County has been included in four federally-declared disasters and experienced at least $10.8 million in verified property and $42,500 in crop damage within the County.

Since 2010. there have been 90 heavy rain events, 34 thunderstorms with damaging winds, 22 excessive heat events, 16 severe winter storms, 13 flash flood events, 10 severe storms with hail one inch in diameter or greater, nine riverine flood events, six tornadoes, two droughts, two extreme cold events and one lightning strike verified 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 and man-made hazards. This process helps the County and participating municipalities 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 an all hazards mitigation plan.

Why prepare an all hazards mitigation plan?

By preparing and adopting an all hazards mitigation plan, participating jurisdictions become eligible to apply for and receive federal hazard mitigation funds to implement mitigation actions identified in the Plan. These funds, made available through the Disaster Mitigation Act of 2000, can help provide local government entities with the opportunity to complete mitigation projects that would not otherwise be financially possible.

Who participated in the development of the Fayette County Multi-Jurisdiction All Hazards Mitigation Plan?

Recognizing the benefits that could be gained from preparing an all hazards mitigation plan, Fayette County invited all the local government entities within the County to participate. The following jurisdictions chose to participate in the Plan development:

- Brownstown, Village of
- Brownstown CUSD #201
- Ramsey, Village of
- Sharon Township
- St. Elmo, City of
- St. Elmo Fire Protection District
- St. Peter, Village of
- St. Peter Volunteer Fire Department
- Vandalia, City of
- Vandalia Township

How was the Plan developed?

The Fayette County Multi-Jurisdictional All Hazards Mitigation Plan was developed through the Fayette County Multi-Jurisdictional All Hazards Mitigation Planning Committee. The Planning Committee included representatives from each participating jurisdiction, as well as agriculture, education, emergency services (search and rescue & fire protection), healthcare, and insurance. The Planning Committee met three times between November 2019 and May 2020.

Which natural and man-made hazards are included in the Plan?

After reviewing the risk assessment, the Planning Committee chose to include the following natural and man-made hazards in the Plan:

Natural Hazards:

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

Man-Made Hazards:

- hazardous substances (generation, transportation and storage/handling)
- waste disposal
- hazardous material incidents
- waste remediation
- terrorism

What is included in the Plan?

The Plan is divided into sections that cover the planning process; the risk assessment; the mitigation strategy, including lists of mitigation actions identified for each participating jurisdiction; and plan maintenance and adoption. Much of the Plan is devoted to the risk assessment and mitigation strategy.

This risk assessment identifies the natural and man-made hazards that pose a threat to the County and includes a profile of each natural hazard which describes the location and severity of past occurrences, reported damages to public health and property, and the likelihood of future occurrences. It also provides a vulnerability assessment that estimates the potential impacts each natural and man-made hazard would have on the health and safety of the residents of Fayette 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 and man-made 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 during the public comment period will be incorporated into the draft Plan before it is submitted to the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA) for review. Once IEMA and FEMA have reviewed and approved the Plan, it will be presented to the County and each participating jurisdiction for formal adoption. After adopting the Plan, each participating jurisdiction can apply for federal mitigation funds and begin implementation of the mitigation actions identified in the Plan.

PUBLIC FORUM – PLAN COMMENT SURVEY

APPENDIX H

Fayette County All Hazard Mitigation Plan Comment Survey

The Fayette County Multi-Jurisdictional All Hazards Mitigation Plan evaluates damage to life and property from natural and man-made hazards that occur in the County. This Plan also identifies projects and activities submitted by the County and each participating jurisdiction that will help reduce these damages. This comment survey should be used to provide feedback on the draft Plan.

* 1. What comments, concerns or questions do you have regarding the draft Plan?

2. If you would like a follow-up to your comment, please provide your contact information below:

Name

Address

City/Town

State/Province

ZIP/Postal Code

Email Address

Phone Number

DONE

0 of 2 answered

HAZARD MITIGATION PLANNING MEMO SENT ADJACENT COUNTIES

APPENDIX I

To: Bond County ESDA, Allan Davis (Bond911@sbcglobal.net)
Chris-Mont EMA, Greg Nimmo (gregn@montgomeryco.com)
Clay County ESDA, Steve Lewis (floraesda@florail.us)
Clinton County ESDA, Tim Schleper (Timschleper@charter.net)
Effingham County EMA, Pam Jacobs (ema@co.effingham.il.us)
Marion County ESDA, Donald Brooks (drb64@sbcglobal.net)
Shelby County EMA, Jared Rowcliffe (Shelbyema@shelbycounty-il.com)

From: Kendra Craig, Fayette County Emergency Management Agency Emergency Manager

Subject: Hazard Mitigation Plan

Date: 5/6/2020

The purpose of this memorandum is to let you know that Fayette County is developing its countywide All Hazards Mitigation Plan. Since we share common boundaries, you are invited to review this draft Plan and provide comments during the public comment period which runs from May 21st through May 28th, 2020. The Plan along with a summary sheet and a comment survey can be viewed on the Fayette County Website.

The public forum has been scheduled for Thursday, May 21 at 6 p.m. Due to the COVID-19 crisis, the public forum will be conducted via teleconference. You will receive a separate email invitation with the phone number and access code for the teleconference in the next couple of days.

If you have any questions, you can reach my office at 618-283-4292 or fcesda@yahoo.com.

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 update, please contact Zachary Krug, our planning consultant at (217) 585-9517 Ext. 8 or zkrug@aecspfld.com

HAZARD EVENT RISK ASSESSMENT TABLES

APPENDIX J

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 1 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/21/1957	5:30 p.m.	Vandalia	65 kts	n/a	n/a	n/a	n/a	
6/14/1957	10:08 a.m.	Vandalia Municipal Airport[A]	63 kts	n/a	n/a	n/a	n/a	
4/20/1960	8:00 p.m.	Vandalia Municipal Airport[A]	65 kts	n/a	n/a	n/a	n/a	
4/20/1960	8:30 p.m.	Ramsey[A]	n/a	n/a	n/a	n/a	n/a	
1/19/1964	8:08 p.m.	Vandalia	50 kts	n/a	n/a	n/a	n/a	
11/27/1964	9:00 p.m.	Vandalia Municipal Airport[A]	50 kts	n/a	n/a	n/a	n/a	
11/26/1965	5:25 p.m.	Vandalia Municipal Airport[A]	52 kts	n/a	n/a	n/a	n/a	
4/28/1966	1:26 a.m.	Vandalia Municipal Airport[A]	60 kts	n/a	n/a	n/a	n/a	
5/17/1966	10:00 p.m.	Vandalia Municipal Airport[A]	58 kts	n/a	n/a	n/a	n/a	
7/5/1966	9:20 p.m.	Vandalia Municipal Airport[A]	55 kts	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

[A] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 2 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
7/9/1966	9:00 p.m.	Vandalia Municipal Airport^	58 kts	n/a	n/a	n/a	n/a	
1/24/1967	8:30 p.m.	Vandalia Municipal Airport^	50 kts	n/a	n/a	n/a	n/a	
6/28/1969	9:17 p.m.	Vandalia Municipal Airport^	50 kts	n/a	n/a	n/a	n/a	
10/11/1969	12:30 a.m.	Vandalia	n/a	n/a	n/a	n/a	n/a	
6/14/1970	5:10 p.m.	Vandalia Municipal Airport^	62 kts	n/a	n/a	n/a	n/a	
3/18/1971	10:10 p.m.	Vandalia Municipal Airport^	52 kts	n/a	n/a	n/a	n/a	
4/11/1972	7:53 p.m.	Vandalia Municipal Airport^	65 kts	n/a	n/a	n/a	n/a	
4/3/1974	2:30 p.m.	Vera^	n/a	n/a	n/a	n/a	n/a	
6/9/1974	3:30 a.m.	Vandalia	n/a	n/a	n/a	n/a	n/a	
8/18/1974	1:30 p.m.	Vandalia Municipal Airport^	n/a	n/a	n/a	n/a	n/a	
9/28/1974	2:30 p.m.	St. Elmo	n/a	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 3 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/28/1980	2:20 p.m.	St. Elmo	n/a	n/a	n/a	n/a	n/a	
4/11/1981	3:37 p.m.	Wrights Corner^	n/a	n/a	n/a	n/a	n/a	
7/19/1982	1:15 p.m.	countywide	56 kts	n/a	n/a	$25,000	n/a	powerful winds uprooted trees and damaged buildings
7/19/1982	1:45 p.m.	Ramsey	n/a	n/a	n/a		n/a	- suffered tree and power line damage - one tree crushed a car while another was blown against a house - a tall antenna was blown over
7/19/1982	2:00 p.m.	St. Elmo	n/a	n/a	n/a		n/a	- a bus garage roof was completely lifted off and its east brick wall was toppled - several buses and a car inside the garage were damaged - a large tree crushed a car in another part of town
7/6/1987	4:40 p.m.	Vandalia	52 kts	n/a	n/a	n/a	n/a	
8/3/1987	9:00 p.m.	Vandalia	n/a	n/a	n/a	n/a	n/a	
4/22/1988	5:50 p.m.	Ramsey^	n/a	n/a	n/a	n/a	n/a	high winds downed trees
11/15/1989	6:05 a.m.	Vandalia^	70 kts	n/a	n/a	n/a	n/a	
5/9/1990	7:30 p.m.	Farina^	n/a	n/a	n/a	$25,000	n/a	- a tractor-semitrailer was blown off I-57 and overturned - roof damage was reported
5/12/1990	5:30 p.m.	Vandalia^	n/a	n/a	n/a	n/a	$2,500	trees were downed
Subtotal:				**0**	**0**	**$50,000**	**$2,500**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 4 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/15/1990	5:45 p.m.	Ramsey Vandalia	n/a	n/a	n/a	$250,000	n/a	a roof was blown off a newly built home with other scattered damage to structures and trees
5/16/1990	12:01 a.m.	Ramsey	n/a	n/a	n/a	$25,000	n/a	damage to structures and trees
7/2/1992	8:40 p m.	Vandalia	n/a	n/a	n/a	$25,000	n/a	- the sheriff's office reported telephone poles and large trees downed - a VFW club building was damaged by large trees
7/2/1992	8:45 p.m.	St. Elmo	n/a	n/a	n/a	$25,000	n/a	
4/15/1994	5:20 a m.	Brownstown^ St Peter	n/a	n/a	n/a	$5,000 $50,000	n/a	*Brownstown Area* - trees and power lines were blown down just north of the Village *St. Peter* - a barn and garage were heavily damaged
6/12/1994	6:15 p.m.	Vandalia Lake	n/a	n/a	n/a	$500	n/a	several large trees were downed
5/18/1995	1:04 p.m.	Farina	52 kts	n/a	n/a	$200	n/a	wind gusts knocked down several trees
8/9/1995	8:00 p.m.	Vandalia	n/a	n/a	n/a	$300	n/a	several large trees and power lines were downed
1/18/1996	10.20 a m	Vandalia	50 kts	n/a	n/a	n/a	n/a	- downed trees and power lines - the roof of a car wash was also blown off
Subtotal:				**0**	**0**	**$381,000**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 5 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
10/17/1996	5:10 p.m.	Vandalia^	55 kts	n/a	n/a	$15,000	n/a	- 3 unoccupied older mobile homes were destroyed, and 4 others were damaged on County Rd. 1800 N, just off IL Rte. 185
7/14/1997	2:20 p.m.	Ramsey	50 kts	n/a	n/a	n/a	n/a	trees were downed
7/14/1997	2:30 p.m.	Brownstown	50 kts	n/a	n/a	n/a	n/a	trees were downed
6/14/1998	6:19 p.m.	Vandalia	60 kts	n/a	n/a	n/a	n/a	downed trees and power lines
6/29/1998	6:10 p.m.	Vandalia	60 kts	n/a	n/a	n/a	n/a	trees and utility lines were downed
6/29/1998	6:20 p.m.	Ramsey	60 kts	n/a	n/a	n/a	n/a	- wind gusts downed numerous trees and power lines - a machine shed and utility bar were also destroyed
7/7/1998	1:10 p.m.	Vandalia	52 kts	n/a	n/a	n/a	n/a	wind gusts downed a few trees and utility lines
7/22/1998	5:15 p.m.	Ramsey Vandalia	61 kts	n/a	n/a	n/a	n/a	wind gusts downed trees
7/22/1998	5:17 p.m.	Brownstown	61 kts	n/a	n/a	n/a	n/a	wind gusts downed trees
11/10/1998	5:55 a.m.	Vandalia	56 kts	n/a	n/a	n/a	n/a	trees, power poles, and 3 utility poles were downed
4/8/1999	9:40 p.m.	Vandalia^	60 kts	n/a	n/a	n/a	n/a	2 tractor-trailer trucks on I-70 were overturned
4/8/1999	10:50 p.m.	Shafter^	53 kts	n/a	n/a	n/a	n/a	wind gusts downed some trees and power lines
6/1/1999	7:52 p.m.	Ramsey	50 kts	n/a	n/a	n/a	n/a	wind gusts downed trees
Subtotal:				**0**	**0**	**$15,000**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 6 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/4/1999	5:45 p.m.	St. Elmo	55 kts	n/a	n/a	n/a	n/a	trees and power lines were downed
6/4/1999	5:50 p.m.	Vandalia	55 kts	n/a	n/a	n/a	n/a	wind gusts blew the windows out of a restaurant
6/4/1999	5:50 p.m.	St. Peter	55 kts	n/a	n/a	n/a	n/a	trees and power lines were downed
6/11/1999	1:40 p.m.	Vandalia	56 kts	n/a	n/a	n/a	n/a	wind gusts downed trees along IL Rte. 51 from Vandalia through Ramsey
6/11/1999	1:42 p.m.	Ramsey	56 kts	n/a	n/a	n/a	n/a	wind gusts downed trees along IL Rte. 51 from Vandalia through Ramsey
4/20/2000	9:40 a.m.	St. Peter	55 kts	n/a	n/a	n/a	n/a	a couple of grain bins were blown over
6/14/2000	12:15 p.m.	Vandalia	53 kts	n/a	n/a	n/a	n/a	scattered trees and power lines were downed
6/20/2000	2:20 p.m.	Ramsey[A]	50 kts	n/a	n/a	n/a	n/a	trees were downed
6/20/2000	9:48 p.m.	Vandalia	56 kts	n/a	n/a	n/a	n/a	- several large trees and power lines were downed - one home was damaged by falling trees
7/4/2001	11:45 p.m.	Wrights Corner	52 kts	n/a	n/a	n/a	n/a	some trees were downed
8/18/2001	3:45 p.m.	Shobonier[A]	55 kts	n/a	n/a	n/a	n/a	power poles and large trees were downed
10/24/2001	1:50 p.m.	Augsburg[A]	51 kts	n/a	n/a	n/a	n/a	trees were downed
6/11/2002	4:00 p.m.	Ramsey	60 kts	n/a	n/a	n/a	n/a	numerous trees and power lines were downed from Ramsey northeast to the Henick community, some roads were blocked by the downed power lines
Subtotal:				**0**	**0**	**$0**	**$0**	

[A] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 7 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/11/2002	4:10 p.m.	Ramsey[A]	60 kts	n/a	n/a	n/a	n/a	numerous trees and power lines were downed from Ramsey northeast to the Henick community, some roads were blocked by the downed power lines
6/11/2002	4:10 p.m.	Shobonier[A], Brownstown[A]	55 kts	n/a	n/a	n/a	n/a	numerous trees and power lines were downed south of Vandalia and in the Brownstown area
6/11/2002	4:15 p.m.	Wrights Corner[A]	55 kts	n/a	n/a	n/a	n/a	trees were down
6/11/2002	4:15 p.m.	Brownstown	55 kts	n/a	n/a	n/a	n/a	numerous trees and power lines were downed
7/9/2002	6:20 p.m.	Ramsey[A]	55 kts	n/a	n/a	n/a	n/a	trees downed partially blocking IL Rte. 51
7/9/2002	6:40 p.m.	St. Elmo	52 kts	n/a	n/a	n/a	n/a	power lines were downed
7/18/2003	5:41 a.m.	Ramsey Lake	56 kts	n/a	n/a	n/a	n/a	the roof of a barn was blown off
5/25/2004	12:25 a.m.	Shafter[A]	52 kts	n/a	n/a	n/a	n/a	trees were downed blocking streets
5/25/2004	12:28 a.m.	Shobonier[A]	52 kts	n/a	n/a	n/a	n/a	4 large trees were blown down
5/25/2004	12:30 a.m.	Vandalia Shobonier	52 kts	n/a	n/a	n/a	n/a	*Vandalia* - trees were downed blocking streets *Shobonier* - trees were blown down - a mobile home suffered considerable damage
5/25/2004	12:35 a.m.	St. Elmo	52 kts	n/a	n/a	n/a	n/a	trees were downed on the west side of the City
Subtotal:				**0**	**0**	**$0**	**$0**	

[A] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 8 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/30/2004	4:15 p.m.	Hagarstown^ Vandalia^	51 kts	n/a	n/a	n/a	n/a	some trees were downed
5/30/2004	5:00 p.m.	Ramsey	60 kts	n/a	n/a	n/a	n/a	several outbuildings and grain bins were destroyed, and a couple of homes suffered roof damage
5/30/2004	5:15 p.m.	Ramsey^	61 kts	n/a	n/a	n/a	n/a	several trees were uprooted
1/13/2005	12:51 a.m.	Vandalia^	55 kts	n/a	n/a	n/a	n/a	trees were downed blocking IL Rte. 51 south of the City
1/13/2005	1:00 p.m.	Brownstown^	55 kts	n/a	n/a	n/a	n/a	several power lines were downed
8/13/2005	5:00 p.m.	Shobonier^	57 kts	n/a	n/a	n/a	n/a	trees and power lines were downed
8/13/2005	5:05 p.m.	Vandalia	55 kts	n/a	n/a	n/a	n/a	a couple of large trees came down and damaged a couple of cars
11/5/2005	11:25 p.m.	Vandalia	55 kts	n/a	n/a	n/a	n/a	some trees and power lines were downed
4/2/2006	5:15 p.m.	Brownstown^	56 kts	n/a	n/a	n/a	n/a	wind gusts downed trees and destroyed several outbuildings
6/22/2006	3:25 p.m.	Hagarstown^ Vandalia^	55 kts	n/a	n/a	n/a	n/a	numerous trees were blown down
8/10/2006	12:30 p.m.	Farina	52 kts	n/a	n/a	n/a	n/a	large tree limbs were downed
Subtotal:				**0**	**0**	**$0**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 9 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
2/5/2008	6:15 p.m.	St. Peter Farina	70 kts	n/a	n/a	n/a	n/a	*St. Peter* - two large machine sheds sustained damage with debris extending around 100 yards to the east-southeast *Farina* - an expansion roof over the gymnasium and library at South Central High School was damaged, much of the roof sheathing buckled - part of the roof of another machine shed was uplifted and tossed over IL Rte. 37 on the south side of the Village - parts of a large grain bin were damaged
6/6/2008	3:30 p.m.	Brownstown St. Elmo	56 kts	n/a	n/a	n/a	n/a	*Brownstown* - winds blew the roof off of a small shed *St. Elmo* - another small shed was destroyed - a 60-foot radio tower was destroyed
6/27/2008	3:10 p.m.	Vandalia	52 kts	n/a	n/a	n/a	n/a	numerous large tree limbs were blown down throughout the City
6/2/2009	3:38 p.m.	Vandalia	52 kts	n/a	n/a	n/a	n/a	- winds blew down several large tree limbs and power lines around the City - a semi was blown over on I-70
Subtotal:				**0**	**0**	**$0**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 10 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/10/2009	9:00 p.m.	Brownstown Brownstown[^]	52 kts	n/a	n/a	n/a	n/a	- a few windows were blown out of a trailer - several large tree limbs were blown down
8/19/2009	4:35 p.m.	Vandalia Vandalia[^]	56 kts	n/a	n/a	n/a	n/a	*Vandalia* - tree damage was extensive and two large trees were totally uprooted - some minor damage to two metal roofs occurred *Vandalia Area* - a corn field west of the U.S. Hwy 40 & I-70 interchange was completely flattened - numerous large tree limbs, trees and power lines were blown down
6/12/2010	3:55 p.m.	Hagarstown[^]	56 kts	n/a	n/a	n/a	n/a	winds caused minor to moderate damage to a couple of barns and blew down some power poles
6/14/2010	2:34 p.m.	Ramsey[^]	52 kts	n/a	n/a	n/a	n/a	winds blew down a power pole and a tree
6/14/2010	2:40 p.m.	Vandalia Lake	52 kts	n/a	n/a	n/a	n/a	winds blew down several large tree limbs; limbs partially blocked IL Rte 185 for a time
6/14/2010	3:02 p.m.	St. Elmo	56 kts	n/a	n/a	n/a	n/a	winds blew down several large trees and tree limbs on the south side of the Village
Subtotal:				**0**	**0**	**$0**	**$0**	

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 11 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/27/2010	5:55 p.m.	Vandalia Brownstown St. Elmo	56 kts	n/a	n/a	n/a	n/a	winds blew down numerous large trees, tree limbs, and power lines
2/28/2011	12:23 a.m.	Sefton[^]	52 kts	n/a	n/a	n/a	n/a	
4/19/2011	7:50 p.m.	Sefton[^]	52 kts	n/a	n/a	n/a	n/a	winds blew down numerous tree limbs
5/23/2011	12:40 p.m.	Bingham[^]	52 kts	n/a	n/a	n/a	n/a	winds blew down a large tree; the tree fell onto the roof of a church causing minor damage to one corner of the roof and knocking down a power line
6/10/2011	9:05 p.m.	Ramsey Lake	56 kts	n/a	n/a	n/a	n/a	winds blew down numerous large tree limbs
6/18/2011	6:33 a.m.	Pittsburg[^]	52 kts	n/a	n/a	n/a	n/a	winds blew down several trees; a couple of the trees fell onto power lines, knocking them down
6/18/2011	6:38 a.m.	Ramsey	52 kts	n/a	n/a	n/a	n/a	several trees were blown down, a few of the trees fell onto power lines, knocking them down
6/21/2011	3:30 p.m.	Vandalia	52 kts	n/a	n/a	n/a	n/a	winds blew down numerous large tree limbs and one large tree
7/26/2011	3:45 p.m.	Ramsey	56 kts	n/a	n/a	n/a	n/a	several large oak trees were blown down
4/28/2012	5:50 p.m.	St. Elmo	52 kts	n/a	n/a	n/a	n/a	several power lines and large tree limbs were blown down
8/16/2012	3:20 p.m.	Shobonier	56 kts	n/a	n/a	n/a	n/a	several large trees were blown down
Subtotal:				**0**	**0**	**$0**	**$0**	

[^] Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 12 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
9/5/2012	8:30 a.m.	Ramsey Ramsey^	56 kts	n/a	n/a	n/a	n/a	- numerous large trees, tree limbs and power lines were blown down - one tree fell on top of a roof causing minor shingle damage - part of the roof of a mobile home was ripped off - a large pine tree caused major roof damage to a home - a large antenna was blown over
9/5/2012	8:35 a.m.	Dean Hills Nature Preserve^	56 kts	n/a	n/a	n/a	n/a	a couple of trees and power lines were blown down
9/5/2012	8:55 a.m.	St. Elmo^	56 kts	n/a	n/a	n/a	n/a	winds blew down a power pole blocking IL Rte. 4
9/5/2012	9:00 a.m.	Bluff City	56 kts	n/a	n/a	n/a	n/a	winds blew down several large trees
5/31/2013	8:40 p.m.	Vandalia^	52 kts	n/a	n/a	n/a	n/a	winds blew down a large tree limb onto U.S. Hwy. 51 north of the City
2/20/2014	4:30 p.m.	Ramsey	52 kts	n/a	n/a	n/a	n/a	winds blew shingles and sheeting off a home
8/23/2014	5:10 p.m.	Brownstown^	56 kts	n/a	n/a	n/a	n/a	winds blew a large tree limb down and blew an empty grain bin across a yard and onto a road
6/14/2015	3:20 p.m.	St. Peter	56 kts	n/a	n/a	n/a	n/a	- winds blew the roof off of a carport at the corner of Walnut St. and IL Rte. 185 - several power poles along IL Rte. 185 were leaning at a 45 degree angle - several large tree limbs were blown down
Subtotal:				**0**	**0**	**$0**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 13 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/7/2016	4:20 p.m.	Vandalia	52 kts	n/a	n/a	n/a	n/a	winds blew down numerous large tree limbs around the City
5/26/2016	7:34 a.m.	St. Elmo	56 kts	n/a	n/a	n/a	n/a	numerous large tree limbs were blown down around the Village
7/13/2016	3:43 p.m.	Ramsey Vandalia Brownstown St. Elmo	56 kts	n/a	n/a	n/a	n/a	- numerous trees, tree limbs and power lines were blown down *Ramsey* - several trees and numerous tree limbs and power lines were blown down around the Village *Vandalia* - a few of the fallen trees blocked U.S. Hwy 51
7/13/2016	3:58 p.m.	Farina	56 kts	n/a	n/a	n/a	n/a	winds blew down a few trees and numerous tree limbs and power lines around the Village
10/19/2016	7:07 p.m.	St. Elmo	56 kts	n/a	n/a	n/a	n/a	winds blew down numerous large tree limbs around the Village
6/18/2017	1:20 a.m.	Vandalia Stanbery Lake^	61 kts	n/a	n/a	n/a	n/a	- numerous large trees, tree limbs and power lines were blown down *Vandalia* - several homes sustained moderate to major damage from the fallen trees *Stanbery Lake Area* - a home was destroyed by two large trees; one home owner was briefly trapped in the home, but was rescued unharmed
Subtotal:				**0**	**0**	**$0**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Fayette County
1957 – 2019
(Sheet 14 of 14)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/18/2017	1:30 a.m.	southern portion of the county	65 kts	n/a	n/a	n/a	n/a	- numerous trees and power poles were blown down across the southern half of the County *St. Peter* - straight line winds blew down a grain bin, damaged roofs, trees and limbs blown down
7/23/2017	3:35 a.m.	Vandalia Municipal Airport^	50 kts	n/a	n/a	n/a	n/a	
5/31/2018	10:08 a.m.	St. Peter	56 kts	n/a	n/a	n/a	n/a	winds blew down several trees
6/28/2018	4:48 p.m.	countywide	56 kts	n/a	n/a	n/a	n/a	- winds blew down numerous trees, tree limbs and power lines across the County *Brownstown* - a tree was blown down onto an unoccupied car causing major damage to the vehicle
5/29/2019	5:45 p.m.	Vandalia Municipal Airport^	70 kts	n/a	n/a	n/a	n/a	- one airplane was flipped over and sustained significant damage - 4 hangers were destroyed and 2 more were severely damaged - 8-9 power poles were snapped off
Subtotal:				**0**	**0**	**$0**	**$0**	
GRAND TOTAL:				**0**	**0**	**$446,000**	**$2,500**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Sources: Fayette County Multi-Jurisdictional All Hazards Mitigation Planning Committee Member responses to Natural Hazard Events Questionnaire
NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database.

Table 2
Severe Storms – Hail Events Reported in Fayette County
1955 – 2019
(Sheet 1 of 4)

Date(s)	Start Time	Location(s)	Magnitude (Diameter)	Injuries	Fatalities	Property Damage	Crop Damage	Description
11/15/1955	4:00 p.m.	Vandalia Municipal Airport^	2.00 in.	n/a	n/a	n/a	n/a	
1/19/1964	7:15 a.m.	St. Elmo^	1.75 in.	n/a	n/a	n/a	n/a	nearly half of the windows in six greenhouses were broken
8/18/1974	1:30 p.m.	Vandalia Municipal Airport^	1.75 in.	n/a	n/a	n/a	n/a	
6/7/1982	7:10 p.m.	Ramsey Lake	1.50 in.	n/a	n/a	n/a	n/a	
6/7/1982	7:20 p.m.	Wrights Corner^	1.00 in.	n/a	n/a	n/a	n/a	
4/3/1984	7:25 p.m.	Vandalia^	2.50 in.	n/a	n/a	n/a	n/a	
6/24/1985	12:26 p.m.	Vandalia^	1.75 in.	n/a	n/a	n/a	n/a	
7/6/1987	4:40 p.m.	Ramsey	1.00 in.	n/a	n/a	n/a	n/a	
5/25/1989	1:30 p.m.	Mulberry Grove Vandalia Bluff City Brownstown St. Elmo	2.75 in.	1	n/a	$4,000,000	n/a	*Event Description Provided Below*
- knocked out hundreds of windows in many homes and vehicles - siding on homes and metal on many cars were dented - roofs were also severely damaged on many homes; trees were stripped of leaves and, in some cases, bark - about 8 percent of the winter wheat crop was crushed						*Vandalia* - the Vandalia Correctional Center received about $4 million in damage that included 1000 broken windows, major roof damage to buildings and damage to 20 state vehicles; hail even cracked 196 bulletproof windows in the inmate transfer bus - a police officer was hit by hail and suffered a concussion		
6/6/1990	12:15 a.m.	Vandalia	1.00 in.	n/a	n/a	n/a	n/a	
Subtotal:				**1**	**0**	**$4,000,000**	**$0**	

^ Hail event verified in the vicinity of this location(s).

Table 2
Severe Storms – Hail Events Reported in Fayette County
1955 – 2019
(Sheet 2 of 4)

Date(s)	Start Time	Location(s)	Magnitude (Diameter)	Injuries	Fatalities	Property Damage	Crop Damage	Description
4/26/1994	9:55 p.m.	Vandalia^	1.00 in.	n/a	n/a	n/a	n/a	
3/28/1997	4:20 p.m.	Shobonier	1.00 in.	n/a	n/a	n/a	n/a	
3/28/1997	4:25 p.m.	Brownstown	1.00 in.	n/a	n/a	n/a	n/a	
2/27/1999	12:54 p.m.	Vandalia	1.75 in.	n/a	n/a	$50,000	n/a	a few vehicles were damaged
2/27/1999	2:15 p.m.	Farina	1.00 in.	n/a	n/a	n/a	n/a	
8/6/2000	6:05 p.m.	Shobonier^	1.00 in.	n/a	n/a	n/a	n/a	
4/10/2001	11:30 p.m.	Vandalia	1.00 in.	n/a	n/a	n/a	n/a	
4/24/2002	2:10 p.m.	Ramsey	1.75 in.	n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #1416)***
5/1/2002	1:07 p.m.	St. Peter	1.75 in.	n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #1416)***
5/1/2002	1:20 p.m.	Farina	2.00 in.	n/a	n/a	$1,500,000	n/a	***This event is part of a federally-declared disaster (Declaration #1416)*** - roofs took a beating, skylights and windows were broken, screens were torn, siding was damaged, and vehicles were dented - a local automobile dealership had at least 200 vehicles damaged
4/4/2003	5:20 p.m.	Carlyle Lake State Wildlife Management Area^	1.00 in.	n/a	n/a	n/a	n/a	
4/4/2003	5:35 p.m.	St. Peter	1.00 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$1,550,000**	**$0**	

^ Hail event verified in the vicinity of this location(s).

Table 2
Severe Storms – Hail Events Reported in Fayette County
1955 – 2019
(Sheet 3 of 4)

Date(s)	Start Time	Location(s)	Magnitude (Diameter)	Injuries	Fatalities	Property Damage	Crop Damage	Description
7/18/2003	5:30 a.m.	Ramsey	1.75 in.	n/a	n/a	n/a	n/a	- some roofs and the siding of homes were damaged - crops in area fields were also damaged; it was estimated that about 8,000 acres of corn and 8,000 acres of soybeans were damaged; dollar estimates of the crop damage was not available
3/31/2005	7:40 p.m.	Brownstown	1.00 in.	n/a	n/a	n/a	n/a	
6/3/2008	7:07 a.m.	Farina[1]	1.00 in.	n/a	n/a	n/a	n/a	
6/27/2008	3:05 p.m.	Vandalia[1]	1.00 in.	n/a	n/a	n/a	n/a	
6/10/2009	9:05 p.m.	Brownstown	1.75 in.	n/a	n/a	n/a	n/a	
8/19/2009	4:33 p.m.	Vandalia[1]	1.00 in.	n/a	n/a	n/a	n/a	
8/19/2009	5:35 p.m.	Ramsey[1]	1.00 in.	n/a	n/a	n/a	n/a	
7/11/2010	7:42 p.m.	Ramsey Ramsey[1]	2.00 in.	n/a	n/a	n/a	n/a	
4/19/2011	7:42 a.m.	St. Peter	1.00 in.	n/a	n/a	n/a	n/a	
4/19/2011	7:49 p.m.	Dean Hills Nature Preserve[1]	1.50 in.	n/a	n/a	n/a	n/a	
5/25/2011	11:57 a.m.	Ramsey	1.75 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

[1] Hail event verified in the vicinity of this location(s).

Table
Severe Storms – Hail Events Reported in Fayette County
1955 – 2019
(Sheet 4 of 4)

Date(s)	Start Time	Location(s)	Magnitude (Diameter)	Injuries	Fatalities	Property Damage	Crop Damage	Description
3/2/2012	7:20 a.m.	Ramsey Lake Ramsey	1.75 in.	n/a	n/a	n/a	n/a	
3/2/2012	7:30 a.m.	Dean Hills Nature Preserve^A	1.75 in.	n/a	n/a	n/a	n/a	
3/2/2012	11:20 a.m.	Farina	1.00 in.	n/a	n/a	n/a	n/a	
4/28/2012	5:55 p.m.	St. Peter	1.00 in.	n/a	n/a	$1,030,000	n/a	Mayor of St. Peter identified $30,000 in roof damage to City Hall and Old City Hall and $1 million in roof damage to numerous buildings throughout the village
4/28/2012	6:00 p.m.	Farina	1.00 in.	n/a	n/a	n/a	n/a	
7/2/2012	3:20 p.m.	Ramsey^A	1.00 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$1,030,000**	**$0**	
GRAND TOTAL:				**1**	**0**	**$6,580,000**	**$0**	

^A Hail event verified in the vicinity of this location(s).

Sources: Fayette County Multi-Jurisdictional All Hazards Mitigation Planning Committee Member responses to Natural Hazard Events Questionnaire
NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database.

Table 3
Severe Storms – Lightning Events Reported in Fayette County
2013 - 2019

Date(s)	Start Time	Location(s)	Injuries	Fatalities	Property Damage	Crop Damage	Description
2013	n/a	St Peter	n/a	n/a	$4,000	n/a	The Mayor identified lighting strike damage to an electric pump motor and an aerator motor at the sewage treatment lagoon
GRAND TOTAL:			**0**	**0**	**$4,000**	**$0**	

Sources: Fayette County Multi-Jurisdictional All Hazards Mitigation Planning Committee Member responses to Natural Hazard Events Questionnaire
NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database.

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 1 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
2/14/1990 thru 2/15/1990	12:00 a.m.	Vandalia	1.62 in	n/a	n/a	n/a	n/a	
5/15/1990 thru 5/16/1990	4:30 a.m.	Vandalia	3.39 in.	n/a	n/a	n/a	n/a	
5/25/1990 thru 5/26/1990	10:30 p.m.	Vandalia	2.87 in	n/a	n/a	n/a	n/a	
6/20/1990	2:00 a.m.	Vandalia	2.02 in.	n/a	n/a	n/a	n/a	
11/27/1990	5:00 p.m.	Ramsey Vandalia	1.91 in	n/a	n/a	n/a	n/a	
8/28/1991	9:00 a.m.	Ramsey	1.96 in.	n/a	n/a	n/a	n/a	
10/26/1991 thru 10/27/1991	2:00 a.m.	Ramsey Vandalia	1.90 in	n/a	n/a	n/a	n/a	
8/27/1992	12:00 a.m.	Ramsey Vandalia	1.94 in.	n/a	n/a	n/a	n/a	
9/20/1992 thru 9/21/1992	12:00 a.m.	Vandalia	1.77 in	n/a	n/a	n/a	n/a	
11/10/1992 thru 11/12/1992	4:00 a.m.	Ramsey Vandalia	3.41 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 2 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
1/3/1993 thru 1/4/1993	10:30 p.m.	Vandalia	2.00 in.	n/a	n/a	n/a	n/a	
4/14/1993 thru 4/15/1993	12:30 a.m.	Ramsey	1.95 in.	n/a	n/a	n/a	n/a	
4/24/1993 thru 4/25/1993	11:30 p.m.	Ramsey	1.67 in.	n/a	n/a	n/a	n/a	
7/23/1993 thru 7/24/1993	n/a	Ramsey	1.87 in.	n/a	n/a	n/a	n/a	
8/12/1993	5:00 a.m.	Ramsey	2.14 in.	n/a	n/a	n/a	n/a	
9/2/1993 thru 9/3/1993	2:00 p.m.	Vandalia	3.44 in.	n/a	n/a	n/a	n/a	
9/22/1993 thru 9/23/1993	7:00 a.m.	Ramsey Vandalia	2.99 in.	n/a	n/a	n/a	n/a	
10/8/1993 thru 10/9/1993	6:30 p.m.	Vandalia	1.69 in.	n/a	n/a	n/a	n/a	
11/13/1993 thru 11/14/1993	7:00 p.m.	Ramsey Vandalia	3.60 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 3 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
4/10/1994 thru 4/12/1994	12:00 a.m.	Ramsey Vandalia	3.89 in.	n/a	n/a	n/a	n/a	
4/28/1994 thru 4/29/1994	3:00 a.m.	Ramsey Vandalia	2.79 in.	n/a	n/a	n/a	n/a	
6/8/1994	11.30 a.m.	Ramsey	3.83 in.	n/a	n/a	n/a	n/a	
6/23/1994 thru 6/24/1994	6:00 p.m.	Ramsey Vandalia	2.56 in.	n/a	n/a	n/a	n/a	
7/21/1994 thru 7/22/1994	9:30 p.m.	Vandalia	1.83 in.	n/a	n/a	n/a	n/a	
1/12/1995 thru 1/13/1995	8:00 p.m.	Ramsey	2.35 in.	n/a	n/a	n/a	n/a	
3/6/1995 thru 3/7/1995	9:00 p.m.	Ramsey Vandalia	2.60 in.	n/a	n/a	n/a	n/a	
5/8/1995 thru 5/9/1995	7:30 a.m.	Ramsey Vandalia	3.36 in.	n/a	n/a	n/a	n/a	
5/16/1995 thru 5/18/1995	4:30 a.m.	Ramsey Vandalia	5.41 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 4 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
4/21/1996 thru 4/23/1996	10:30 p.m.	Vandalia Ramsey	3.46 in.	n/a	n/a	n/a	n/a	
4/27/1996 thru 4/29/1996	7:00 p.m.	Vandalia Ramsey	3.43 in.	n/a	n/a	n/a	n/a	
5/5/1996	9:30 a.m.	Vandalia	2.20 in.	n/a	n/a	n/a	n/a	
5/26/1996 thru 5/27/1996	12:00 a.m.	Ramsey	2.36 in.	n/a	n/a	n/a	n/a	
7/1/1996	12:00 a.m.	Vandalia Ramsey	1.61 in.	n/a	n/a	n/a	n/a	
7/20/1996	12:00 a.m.	Ramsey	1.77 in.	n/a	n/a	n/a	n/a	
9/6/1996 thru 9/7/1996	3:30 p.m.	Ramsey	2.43 in.	n/a	n/a	n/a	n/a	
11/6/1996 thru 11/7/1996	2:00 p.m.	Ramsey Vandalia	2.41 in.	n/a	n/a	n/a	n/a	
11/24/1996 thru 11/25/1996	12:00 p.m.	Ramsey Vandalia	2.26 in.	n/a	n/a	n/a	n/a	
2/26/1997	12:00 a.m.	Vandalia	2.73 in.	n/a	n/a	n/a	n/a	
8/11/1997	1:00 p.m.	Ramsey	2.33 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 5 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
1/7/1998 thru 1/8/1998	5:00 p.m.	Ramsey Vandalia	1.77 in.	n/a	n/a	n/a	n/a	
3/19/1998 thru 3/20/1998	1:00 p.m.	Vandalia Ramsey	2.26 in.	n/a	n/a	n/a	n/a	
3/27/1998 thru 3/28/1998	8:00 p.m.	Ramsey	1.94 in.	n/a	n/a	n/a	n/a	
4/15/1998	5:00 a.m.	Vandalia	2.17 in.	n/a	n/a	n/a	n/a	
5/22/1998	2:00 a.m.	Vandalia	3.35 in.	n/a	n/a	n/a	n/a	
6/4/1998 thru 6/5/1998	5:00 a.m.	Vandalia	1.76 in.	n/a	n/a	n/a	n/a	
6/14/1998	5:00 a.m.	Vandalia	1.75 in.	n/a	n/a	n/a	n/a	
7/7/1998	1:00 a.m.	Vandalia	1.92 in.	n/a	n/a	n/a	n/a	
7/22/1998	6:00 p.m.	Vandalia	1.96 in.	n/a	n/a	n/a	n/a	
9/25/1998	1:00 a.m.	Vandalia	2.75 in.	n/a	n/a	n/a	n/a	
2/6/1999 thru 2/7/1999	9:00 p.m.	Ramsey Vandalia	2.69 in.	n/a	n/a	n/a	n/a	
6/1/1999 thru 6/2/1999	n/a	Ramsey	2.10 in.	n/a	n/a	n/a	n/a	
6/13/1999	5:00 a.m.	Ramsey	1.90 in.	n/a	n/a	n/a	n/a	
7/10/1999	n/a	Vandalia	1.86 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 6 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
10/8/1999 thru 10/9/1999	3:00 a.m.	Vandalia	1.73 in.	n/a	n/a	n/a	n/a	
2/17/2000 thru 2/18/2000	3:00 p.m.	Vandalia	1.89 in.	n/a	n/a	n/a	n/a	
5/7/2000	3:00 a.m.	Ramsey Vandalia	2.03 in.	n/a	n/a	n/a	n/a	
5/26/2000 thru 5/27/2000	9:00 a.m.	Ramsey Vandalia	2.83 in.	n/a	n/a	n/a	n/a	
6/16/2000	8:00 a.m.	Vandalia	1.90 in.	n/a	n/a	n/a	n/a	
6/20/2000 thru 6/21/2000	3:00 p.m.	Ramsey	1.60 in.	n/a	n/a	n/a	n/a	
6/23/2000 thru 6/24/2000	8:00 p.m.	Vandalia Ramsey	3.72 in.	n/a	n/a	n/a	n/a	
7/5/2000	9:00 a.m.	Ramsey	1.87 in.	n/a	n/a	n/a	n/a	
7/28/2000 thru 7/29/2000	2:30 a.m.	Ramsey	2.51 in.	n/a	n/a	n/a	n/a	
8/22/2000 thru 8/24/2000	3:00 a.m.	Vandalia Ramsey	3.25 in.	n/a	n/a	n/a	n/a	
9/25/2000	2:00 a.m.	Vandalia	1.69 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 7 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
10/4/2000 thru 10/5/2000	7:30 a.m.	Ramsey	2.96 in.	n/a	n/a	n/a	n/a	
7/17/2001 thru 7/18/2001	6:00 p.m.	Ramsey	2.29 in.	n/a	n/a	n/a	n/a	
8/24/2001	1:00 a.m.	Vandalia	1.98 in.	n/a	n/a	n/a	n/a	
9/9/2001	12:30 a.m.	Ramsey	1.64 in.	n/a	n/a	n/a	n/a	
10/11/2001 thru 10/12/2001	12:00 a.m.	Vandalia	1.94 in.	n/a	n/a	n/a	n/a	
12/16/2001 thru 12/17/2001	1:00 a.m.	Vandalia	1.87 in.	n/a	n/a	n/a	n/a	
4/19/2002 thru 4/21/2002	8:00 p.m.	Ramsey	2.01 in.	n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #1416)***
4/27/2002	4:00 a.m.	Vandalia Ramsey	1.89 in.	n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #1416)***
5/6/2002 thru 5/7/2002	4:00 a.m.	Ramsey Vandalia	5.46 in.	n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #1416)***
5/12/2002 thru 5/13/2002	5:00 a.m.	Ramsey Vandalia	3.44 in.	n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #1416)***
6/10/2002	11:30 a.m.	Vandalia	1.89 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 8 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/5/2003	n/a	Vandalia	1.55 in.	n/a	n/a	n/a	n/a	
5/9/2003	n/a	Vandalia	2.44 in.	n/a	n/a	n/a	n/a	
6/10/2003 thru 6/11/2003	n/a	Vandalia	2.64 in.	n/a	n/a	n/a	n/a	
7/18/2003 thru 7/19/2003	n/a	Ramsey	3.87 in.	n/a	n/a	n/a	n/a	
8/30/2003 thru 9/1/2003	12:00 a.m.	Ramsey	6.89 in.	n/a	n/a	n/a	n/a	
10/9/2003	12:00 p.m.	Vandalia	1.88 in.	n/a	n/a	n/a	n/a	
11/17/2003 thru 11/18/2003	1:30 p.m.	Vandalia Ramsey	4.14 in.	n/a	n/a	n/a	n/a	
1/4/2004 thru 1/5/2004	12:00 a.m.	Vandalia Ramsey	2.66 in.	n/a	n/a	n/a	n/a	
3/26/2004	3:00 a.m.	Vandalia	1.67 in.	n/a	n/a	n/a	n/a	
4/30/2004 thru 5/1/2004	5:30 a.m.	Vandalia	1.76 in.	n/a	n/a	n/a	n/a	
5/26/2004 thru 5/28/2004	12:00 a.m.	Vandalia Ramsey	3.56 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 9 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/30/2004	4:30 p.m.	Ramsey	2.15 in.	n/a	n/a	n/a	n/a	
7/5/2004	10:00 a.m.	Vandalia	1.95 in.	n/a	n/a	n/a	n/a	
7/30/2004	3:00 a.m.	Vandalia	2.24 in.	n/a	n/a	n/a	n/a	
8/25/2004	7:30 p.m.	Vandalia Ramsey	2.22 in.	n/a	n/a	n/a	n/a	
10/18/2004	3:00 a m	Ramsey Vandalia	2 22 in.	n/a	n/a	n/a	n/a	
11/10/2004 thru 11/11/2004	10:30 p.m.	Ramsey Vandalia	1.85 in.	n/a	n/a	n/a	n/a	
1/2/2005 thru 1/3/2005	6:00 p.m.	Ramsey Vandalia	2.80 in.	n/a	n/a	n/a	n/a	
1/4/2005 thru 1/5/2005	12:30 p.m.	countywide	3.29 in.	n/a	n/a	n/a	n/a	
1/13/2005	12:00 a m	Vandalia Ramsey	1 92 in.	n/a	n/a	n/a	n/a	
3/22/2005 thru 3/23/2005	4:00 a.m.	Vandalia Ramsey	2.04 in.	n/a	n/a	n/a	n/a	
6/10/2005 thru 6/11/2005	10:30 p m	Vandalia	1 58 in.	n/a	n/a	n/a	n/a	
8/7/2005	5:30 p.m.	Vandalia	1.62 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 10 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
10/31/2005 thru 11/1/2005	9:00 a.m.	Vandalia Ramsey	1.93 in.	n/a	n/a	n/a	n/a	
11/27/2005 thru 11/28/2005	3:00 a.m.	Ramsey Vandalia	1.71 in.	n/a	n/a	n/a	n/a	
5/10/2006 thru 5/11/2006	1:00 p.m.	Vandalia	1.94 in.	n/a	n/a	n/a	n/a	
5/25/2006	6:00 p.m.	Vandalia	1.66 in.	n/a	n/a	n/a	n/a	
6/22/2006	4:00 p.m.	Vandalia	2.04 in.	n/a	n/a	n/a	n/a	
8/8/2006 thru 8/9/2006	5:00 a.m.	Ramsey Vandalia	2.71 in.	n/a	n/a	n/a	n/a	
10/16/2006 thru 10/17/2006	8:00 a.m.	Vandalia Ramsey	2.05 in.	n/a	n/a	n/a	n/a	
10/25/2006 thru 10/27/2006	9:00 p.m.	Ramsey	2.95 in.	n/a	n/a	n/a	n/a	
11/30/2006 thru 12/1/2006	12:00 a.m.	Vandalia	2.43 in.	n/a	n/a	n/a	n/a	
1/12/2007 thru 1/13/2007	8:00 a.m.	Vandalia Ramsey	2.34 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 11 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
3/14/2007 thru 3/15/2007	8:00 p.m.	Vandalia Ramsey	1.64 in.	n/a	n/a	n/a	n/a	
8/24/2007	3:00 p.m.	Ramsey	1.82 in.	n/a	n/a	n/a	n/a	
9/6/2007	7:00 a.m.	Ramsey	1.53 in.	n/a	n/a	n/a	n/a	
10/15/2007	5:00 p.m.	Ramsey	1.83 in.	n/a	n/a	n/a	n/a	
10/17/2007	1:00 p.m.	Ramsey	1.65 in.	n/a	n/a	n/a	n/a	
2/5/2008	12:00 a.m.	Vandalia	2.05 in.	n/a	n/a	n/a	n/a	
3/17/2008 thru 3/19/2008	10:00 a.m.	Vandalia Ramsey	3.88 in.	n/a	n/a	n/a	n/a	
3/26/2008 thru 3/27/2008	4:00 p.m.	Vandalia	2.19 in.	n/a	n/a	n/a	n/a	
4/10/2008	5:00 a.m.	Vandalia Ramsey	2.40 in.	n/a	n/a	n/a	n/a	
5/7/2008 thru 5/8/2008	7:00 p.m.	Vandalia	2.95 in.	n/a	n/a	n/a	n/a	
6/6/2008	2:00 p.m.	Vandalia Ramsey	4.00 in	n/a	n/a	n/a	n/a	
6/27/2008	3:00 p.m.	Vandalia	1.56 in.	n/a	n/a	n/a	n/a	
7/29/2008 thru 7/30/2008	8:00 p.m.	Ramsey	2.10 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 12 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
9/4/2008 thru 9/5/2008	4:00 a.m.	Ramsey Vandalia	1.86 in.	n/a	n/a	n/a	n/a	
9/14/2008	4:00 a.m.	Ramsey Vandalia	2.10 in.	n/a	n/a	n/a	n/a	
12/27/2008 thru 12/28/2008	7:00 a.m.	Ramsey Vandalia	2.26 in.	n/a	n/a	n/a	n/a	
2/10/2009 thru 2/11/2009	10:00 p.m.	Vandalia Ramsey	3.31 in.	n/a	n/a	n/a	n/a	
4/9/2009	n/a	Vandalia Ramsey	2.10 in.	n/a	n/a	n/a	n/a	
4/27/2009 thru 4/28/2009	8:00 a.m.	Ramsey	1.61 in.	n/a	n/a	n/a	n/a	
6/10/2009 thru 6/11/2009	n/a	Ramsey	2.34 in.	n/a	n/a	n/a	n/a	
6/19/2009 thru 6/20/2009	n/a	Ramsey	2.23 in.	n/a	n/a	n/a	n/a	
7/14/2009	n/a	Ramsey	1.76 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 13 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
8/19/2009	n/a	Ramsey Vandalia	2.41 in.	n/a	n/a	n/a	n/a	
10/8/2009 thru 10/9/2009	n/a	Ramsey Vandalia	3.72 in.	n/a	n/a	n/a	n/a	
10/22/2009	n/a	Vandalia Ramsey	2.05 in.	n/a	n/a	n/a	n/a	
10/29/2009 thru 10/30/2009	n/a	Ramsey	2.87 in.	n/a	n/a	n/a	n/a	
12/23/2009 thru 12/24/2009	n/a	Vandalia	2.45 in.	n/a	n/a	n/a	n/a	
5/10/2010 thru 5/11/2010	n/a	Vandalia	1.91 in.	n/a	n/a	n/a	n/a	
6/14/2010 thru 6/15/2010	n/a	Vandalia Ramsey	2.06 in.	n/a	n/a	n/a	n/a	
6/27/2010	n/a	Vandalia Ramsey	4.55 in.	n/a	n/a	n/a	n/a	
7/8/2010	n/a	Ramsey Vandalia	1.71 in.	n/a	n/a	n/a	n/a	
7/19/2010 thru 7/20/2010	n/a	Vandalia Ramsey	2.78 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 14 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
8/13/2010	n/a	Ramsey	1.67 in.	n/a	n/a	n/a	n/a	
9/1/2010 thru 9/2/2010	n/a	Ramsey	2.69 in.	n/a	n/a	n/a	n/a	
11/24/2010 thru 11/25/2010	n/a	Vandalia Ramsey	3.63 in	n/a	n/a	n/a	n/a	
3/4/2011	n/a	Vandalia Ramsey	1.65 in.	n/a	n/a	n/a	n/a	
4/19/2011	n/a	Ramsey	2.63 in.	n/a	n/a	n/a	n/a	
4/22/2011 thru 4/23/2011	n/a	Vandalia Ramsey	2.51 in.	n/a	n/a	n/a	n/a	
4/25/2011 thru 4/27/2011	n/a	Ramsey Vandalia	3.40 in	n/a	n/a	n/a	n/a	
5/25/2011	n/a	Ramsey Vandalia	2.24 in.	n/a	n/a	n/a	n/a	
6/10/2011	n/a	Vandalia Ramsey	2.50 in.	n/a	n/a	n/a	n/a	
6/17/2011 thru 6/18/2011	n/a	Vandalia Ramsey	3.87 in.	n/a	n/a	n/a	n/a	
6/25/2011	n/a	Vandalia	3.44 in.	n/a	n/a	n/a	n/a	
7/7/2011	n/a	Ramsey	1.57 in.	n/a	n/a	n/a	n/a	
7/24/2011	n/a	Ramsey	1.67 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 15 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
8/2/2012	n/a	Ramsey Vandalia	3.89 in.	n/a	n/a	n/a	n/a	
8/16/2012	n/a	Vandalia	2.71 in.	n/a	n/a	n/a	n/a	
9/1/2012 thru 9/2/2012	n/a	Ramsey Vandalia	5.00 in.	n/a	n/a	n/a	n/a	
9/7/2012	n/a	Vandalia	1.58 in.	n/a	n/a	n/a	n/a	
9/25/2012	n/a	Vandalia	1.83 in.	n/a	n/a	n/a	n/a	
10/22/2012	n/a	Ramsey	2.27 in.	n/a	n/a	n/a	n/a	
1/12/2013	n/a	Ramsey	1.70 in.	n/a	n/a	n/a	n/a	
1/30/2013	n/a	Vandalia	1.55 in.	n/a	n/a	n/a	n/a	
4/16/2013	n/a	Ramsey	1.79 in.	n/a	n/a	n/a	n/a	
4/18/2013	n/a	Ramsey	3.64 in.	n/a	n/a	n/a	n/a	
4/24/2013	n/a	Vandalia	1.67 in.	n/a	n/a	n/a	n/a	
5/3/2013 thru 5/4/2013	n/a	Ramsey	2.32 in.	n/a	n/a	n/a	n/a	
5/31/2013 thru 6/1/2013	n/a	Vandalia	3.28 in.	n/a	n/a	n/a	n/a	
6/23/2013 thru 6/24/2013	n/a	Vandalia	3.14 in.	n/a	n/a	n/a	n/a	
7/3/2013	n/a	Vandalia	3.79 in.	n/a	n/a	n/a	n/a	
7/11/2013	n/a	Vandalia	1.77 in.	n/a	n/a	n/a	n/a	
8/22/2013	n/a	Ramsey Vandalia	2.40 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 16 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
12/21/2013 thru 12/22/2013	n/a	Ramsey Vandalia	2.39 in.	n/a	n/a	n/a	n/a	
4/2/2014 thru 4/3/2014	n/a	Ramsey Vandalia	3.37 in.	n/a	n/a	n/a	n/a	
4/27/2014 thru 4/28/2014	n/a	Ramsey Vandalia	2.34 in.	n/a	n/a	n/a	n/a	
6/27/2014	n/a	Ramsey	1.70 in.	n/a	n/a	n/a	n/a	
8/7/2014 thru 8/8/2014	n/a	Ramsey Vandalia	2.85 in.	n/a	n/a	n/a	n/a	
8/17/2014	n/a	Vandalia	1.77 in.	n/a	n/a	n/a	n/a	
9/2/2014	n/a	Vandalia	3.47 in.	n/a	n/a	n/a	n/a	
9/10/2014	n/a	Ramsey Vandalia	1.82 in.	n/a	n/a	n/a	n/a	
10/1/2014 thru 10/2/2014	n/a	Ramsey Vandalia	2.92 in.	n/a	n/a	n/a	n/a	
4/10/2015	n/a	Ramsey	1.62 in.	n/a	n/a	n/a	n/a	
5/9/2015 thru 5/10/2015	n/a	Ramsey	2.08 in.	n/a	n/a	n/a	n/a	
5/11/2015	n/a	Vandalia	1.53 in.	n/a	n/a	n/a	n/a	
6/7/2015	n/a	Ramsey Vandalia	4.38 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 17 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/18/2015 thru 6/19/2015	n/a	Ramsey Vandalia	4.13 in.	n/a	n/a	n/a	n/a	
8/5/2015 thru 8/6/2015	n/a	Ramsey Vandalia	4.31 in.	n/a	n/a	n/a	n/a	
8/18/2015	n/a	Ramsey Vandalia	2.01 in.	n/a	n/a	n/a	n/a	
9/8/2015 thru 9/9/2015	n/a	Ramsey	3.94 in.	n/a	n/a	n/a	n/a	
9/30/2015	n/a	Vandalia	1.77 in.	n/a	n/a	n/a	n/a	
11/16/2015 thru 11/17/2015	n/a	Ramsey Vandalia	2.79 in.	n/a	n/a	n/a	n/a	
11/28/2015	n/a	Vandalia	1.92 in.	n/a	n/a	n/a	n/a	
12/26/2015 thru 12/28/2015	n/a	Ramsey Vandalia	6.99 in.	n/a	n/a	n/a	n/a	
4/10/2016 thru 4/11/2016	n/a	Ramsey Vandalia	2.46 in.	n/a	n/a	n/a	n/a	
4/26/2016 thru 4/27/2016	n/a	Ramsey	2.06 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 18 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/27/2016	n/a	Vandalia	1.56 in.	n/a	n/a	n/a	n/a	
7/2/2016 thru 7/3/2016	n/a	Ramsey Vandalia	3.44 in.	n/a	n/a	n/a	n/a	
7/13/2016	n/a	Ramsey	2.18 in.	n/a	n/a	n/a	n/a	
7/20/2016	n/a	Ramsey	3.06 in.	n/a	n/a	n/a	n/a	
8/15/2016 thru 8/16/2016	n/a	Ramsey Vandalia	4.51 in.	n/a	n/a	n/a	n/a	
9/10/2016	n/a	Vandalia	2.69 in.	n/a	n/a	n/a	n/a	
9/17/2016	n/a	Vandalia	1.62 in.	n/a	n/a	n/a	n/a	
10/19/2016	n/a	Ramsey Vandalia	3.58 in.	n/a	n/a	n/a	n/a	
4/28/2017 thru 4/29/2017	n/a	Ramsey Vandalia	5.06 in.	n/a	n/a	n/a	n/a	
5/3/2017 thru 5/4/2017	n/a	Ramsey Vandalia	3.10 in.	n/a	n/a	n/a	n/a	
5/11/2017	n/a	Vandalia	2.08 in.	n/a	n/a	n/a	n/a	
6/15/2017	n/a	Vandalia	2.24 in.	n/a	n/a	n/a	n/a	
7/27/2017	n/a	Vandalia	2.20 in.	n/a	n/a	n/a	n/a	
8/16/2017	n/a	Ramsey Vandalia	1.91 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 19 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
2/19/2018 thru 2/20/2018	n/a	Ramsey Vandalia	3.62 in	n/a	n/a	n/a	n/a	
2/24/2018 thru 2/25/2018	n/a	Vandalia	2.41 in.	n/a	n/a	n/a	n/a	
3/27/2018 thru 3/28/2018	n/a	Vandalia	2.06 in.	n/a	n/a	n/a	n/a	
4/2/2018 thru 4/3/2018	n/a	Ramsey Vandalia	2.33 in.	n/a	n/a	n/a	n/a	
6/10/2018 thru 6/11/2018	n/a	Ramsey Vandalia	3.70 in	n/a	n/a	n/a	n/a	
7/2/2018	n/a	Vandalia	1.63 in.	n/a	n/a	n/a	n/a	
7/29/2018 thru 7/30/2018	n/a	Ramsey	2.26 in.	n/a	n/a	n/a	n/a	
8/15/2018 thru 8/16/2018	n/a	Ramsey	2.57 in.	n/a	n/a	n/a	n/a	
8/24/2018	n/a	Ramsey Vandalia	1.94 in.	n/a	n/a	n/a	n/a	
9/9/2018	n/a	Vandalia	1.53 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Fayette County
1990 – 2019
(Sheet 20 of 20)

Date(s)	Start Time	Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
4/17/2019	n/a	Ramsey	1.94 in.	n/a	n/a	n/a	n/a	
5/21/2019 thru 5/22/2019	n/a	Ramsey Vandalia	3.04 in.	n/a	n/a	n/a	n/a	
6/14/2019 thru 6/15/2019	n/a	Ramsey	1.62 in.	n/a	n/a	n/a	n/a	
6/21/2019	n/a	Ramsey Vandalia	1.81 in.	n/a	n/a	n/a	n/a	
8/11/2019 thru 8/12/2019	n/a	Ramsey Vandalia	3 13 in	n/a	n/a	n/a	n/a	
8/20/2019 thru 8/21/2019	n/a	Ramsey	1.99 in.	n/a	n/a	n/a	n/a	
10/11/2019	n/a	Ramsey Vandalia	2 30 in	n/a	n/a	n/a	n/a	
10/27/2019	n/a	Ramsey Vandalia	2.22 in.	n/a	n/a	n/a	n/a	
SUBTOTAL:				**0**	**0**	**$0**	**$0**	
GRAND TOTAL:				**0**	**0**	**$0**	**$0**	

Source: 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.

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 1 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
2/1/1966	n/a	Heavy Snow	7.0 in.					COOP (Vandalia)	n/a	n/a	n/a	COOP observer noted blowing snow
1/12/1968 thru 1/14/1968	n/a	Winter Storm	8.7 in.	X				COOP (Vandalia)	n/a	n/a	n/a	
3/12/1968	n/a	Heavy Snow	6.0 in.					COOP (Vandalia)	n/a	n/a	n/a	COOP observer noted blowing snow
12/22/1969 thru 12/23/1969	n/a	Heavy Snow	5.5 in.					COOP (Vandalia)	n/a	n/a	n/a	COOP observer noted blowing snow
12/29/1969 thru 12/30/1969	n/a	Heavy Snow	5.0 in.					COOP (Vandalia)	n/a	n/a	n/a	
12/19/1973 thru 12/20/1973	n/a	Heavy Snow	12.0 in.					COOP (Vandalia)	n/a	n/a	n/a	
12/30/1973	n/a	Heavy Snow	8.0 in.					COOP (Vandalia)	n/a	n/a	n/a	
3/10/1975	n/a	Heavy Snow	4.0 in.					COOP (Vandalia)	n/a	n/a	n/a	
1/10/1977	n/a	Heavy Snow	4.0 in.					COOP (Vandalia)	n/a	n/a	n/a	
2/27/1977	7:00 a.m.	Heavy Snow	7.0 in.					COOP (Vandalia)	n/a	n/a	n/a	
Subtotal:									**0**	**0**	**$0**	

[1] An "X" in the freezing rain, ice, sleet and/or strong winds columns indicates the presences of that particular type of weather condition during a severe winter storm event.

[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 2 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
1/17/1978 thru 1/18/1978	1:00 a.m.	Heavy Snow	7.5 in.					COOP (Vandalia)	n/a	n/a	n/a	
3/1/1978 thru 3/3/1978	8:00 p.m.	Heavy Snow	12.5 in.					COOP (Vandalia)	n/a	n/a	n/a	
3/8/1978 thru 3/10/1978	n/a	Heavy Snow	13.0 in.					COOP (Vandalia)	n/a	n/a	n/a	
1/13/1979	1:00 a.m.	Winter Storm	5.0 in.	X				COOP (Ramsey)	n/a	n/a	n/a	COOP observer noted blowing snow
1/23/1979 thru 1/24/1979	10:30 a.m.	Winter Storm	6.0 in	X	X			COOP (Ramsey)	n/a	n/a	n/a	COOP observer noted blowing snow
1/27/1979 thru 1/28/1979	12:00 a.m.	Heavy Snow	7.0 in.					COOP (Vandalia) (Ramsey)	n/a	n/a	n/a	
3/1/1980	12:00 a.m.	Heavy Snow	4.0 in.					COOP (Ramsey)	n/a	n/a	n/a	COOP observer noted blowing snow
11/27/1980 thru 11/28/1980	12:00 a.m.	Heavy Snow	8.8 in.					COOP (Vandalia) (Ramsey)	n/a	n/a	n/a	
Subtotal:									**0**	**0**	**$0**	

[1] An "X" in the freezing rain, ice, sleet and/or strong winds columns indicates the presences of that particular type of weather condition during a severe winter storm event.

[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 3 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
2/9/1981 thru 2/10/1981	9:00 p.m.	Heavy Snow	8.1 in.					COOP (Ramsey)	n/a	n/a	n/a	
12/16/1981	11:30 a.m.	Heavy Snow	6.0 in.					COOP (Ramsey)	n/a	n/a	n/a	
1/30/1982 thru 1/31/1982	12:00 a.m.	Winter Storm	9.3 in.	1.23 in.				COOP (Ramsey)	n/a	n/a	n/a	COOP observer noted blowing snow
1/22/1983	9:00 a.m.	Heavy Snow	6.0 in.					COOP (Vandalia)	n/a	n/a	n/a	COOP observer noted blowing snow
2/26/1984 thru 2/28/1984	7:00 p.m.	Heavy Snow	6.5 in.					COOP (Ramsey)	n/a	n/a	n/a	
3/12/1984	9:00 a.m.	Heavy Snow	4.0 in.					COOP (Ramsey)	n/a	n/a	n/a	
1/9/1987	5:30 a.m.	Heavy Snow	8.2 in.					COOP (Vandalia)	n/a	n/a	n/a	
1/18/1987	2:00 p.m.	Heavy Snow	6.5 in.					COOP (Ramsey)	n/a	n/a	n/a	
12/27/1988	5:00 p.m.	Heavy Snow	7.0 in.					COOP (Ramsey)	n/a	n/a	n/a	
3/5/1989 thru 3/6/1989	2:00 p.m.	Winter Storm	5.2 in.	X				COOP (Vandalia)	n/a	n/a	n/a	
Subtotal:									**0**	**0**	**$0**	

[1] An "X" in the freezing rain, ice, sleet and/or strong winds columns indicates the presences of that particular type of weather condition during a severe winter storm event.

[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 4 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
2/3/1990 thru 2/4/1990	7:00 p.m.	Heavy Snow	6.4 in.					COOP (Ramsey)	n/a	n/a	n/a	
3/23/1990 thru 3/24/1990	3:00 p.m.	Heavy Snow	9.0 in.					COOP (Vandalia)	n/a	n/a	n/a	
12/21/1990 thru 12/22/1990	7:00 p.m.	Winter Storm	3.0 in.	0.25 in.		X		COOP (Vandalia) (Ramsey)	n/a	n/a	n/a	
1/9/1993 thru 1/10/1993	4:00 p.m.	Heavy Snow	4.7 in.					COOP (Vandalia)	n/a	n/a	n/a	
2/15/1993 thru 2/16/1993	3:00 p.m.	Heavy Snow	6.0 in.					COOP (Vandalia)	n/a	n/a	n/a	
2/24/1993 thru 2/25/1993	11:00 p.m.	Heavy Snow	8.2 in.					COOP (Vandalia)	n/a	n/a	n/a	
1/16/1994	12.00 p.m.	Winter Storm	7.1 in.			X	X	COOP (Ramsey) (Vandalia)	n/a	n/a	n/a	
1/27/1994 thru 1/28/1994	11:00 a.m.	Heavy Snow	5.7 in.					COOP (Ramsey)	n/a	n/a	n/a	
Subtotal:									**0**	**0**	**$0**	

[1] An "X" in the freezing rain, ice, sleet and/or strong winds columns indicates the presences of that particular type of weather condition during a severe winter storm event.

[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 5 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
2/3/1995	3:00 a.m.	Winter Storm	3.0 in.		X		X	COOP (Ramsey)	n/a	n/a	n/a	COOP observer noted blowing and badly drifted snow
1/2/1996 thru 1/5/1996	4:30 a.m.	Winter Storm	13.0 in.	X		X	X	COOP (Vandalia) (Ramsey)	n/a	n/a	n/a	COOP observer noted drifting and blowing snow
1/8/1997 thru 1/9/1997	6:00 p.m.	Winter Storm	8.0 in.				X	COOP (Vandalia) (Ramsey)	n/a	n/a	n/a	- winds caused drifting snow and very cold wind chills - schools remained closed for several days
1/15/1997 thru 1/16/1997	1:00 a.m.	Winter Storm	4.5 in.	X	X	X		COOP (Vandalia) (Ramsey) SED	n/a	n/a	n/a	- numerous auto accidents occurred along with some power outages - most area schools were closed - COOP observer noted drifting snow
12/30/1997	8:00 a.m.	Heavy Snow	4.0 in.					COOP (Ramsey)	n/a	n/a	n/a	
1/12/1998	2:00 a.m.	Winter Storm		X	X			COOP (Vandalia) (Ramsey) SED	n/a	n/a	n/a	a thin coating of ice on trees and roads caused widespread early morning travel problems
12/21/1998 thru 12/22/1998	12:00 a.m.	Winter Storm	X	X		X		COOP (Ramsey) (Vandalia) SED	n/a	n/a	n/a	
Subtotal:									**0**	**0**	**$0**	

[1] An "X" in the freezing rain, ice, sleet and/or strong winds columns indicates the presences of that particular type of weather condition during a severe winter storm event.

[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 6 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
1/1/1999 thru 1/2/1999	11:00 a.m.	Winter Storm	7.0 in.	X	X	X		COOP (Vandalia) SED	n/a	n/a	n/a	- transportation across the area came to a stop through the holiday weekend - most area schools were closed through the middle of the week
1/13/1999	1:00 a.m.	Ice Storm		X	0.26 in.			COOP (Vandalia) SED	n/a	n/a	n/a	- ice covered roads made travel difficult to impossible - area schools were closed through the end of the week
1/17/2000	12:00 p.m.	Winter Storm		0.48 in.	X			COOP (Vandalia) (Ramsey) SED	n/a	n/a	n/a	a thin layer of ice on area roads resulted in hazardous driving conditions; numerous accidents were reported
1/29/2000 thru 1/30/2000	7:00 a.m.	Winter Storm	2.9 in.	0.25 in.				COOP (Vandalia) (Ramsey) SED	n/a	n/a	n/a	
3/11/2000	5:00 a.m.	Heavy Snow	6.0 in.					COOP (Vandalia) SED	n/a	n/a	n/a	
12/11/2000	4:00 a.m.	Winter Storm	4.4 in.		X			COOP (Ramsey)	n/a	n/a	n/a	
Subtotal:									**0**	**0**	**$0**	

[1] An "X" in the freezing rain, ice, sleet and/or strong winds columns indicates the presences of that particular type of weather condition during a severe winter storm event.

[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 7 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
12/13/2000	5:00 a.m.	Heavy Snow	8.7 in.					COOP (Ramsey) SED	n/a	n/a	n/a	- some schools in rural areas remained closed into the middle of the next week - travel conditions were poor
1/26/2001	1:00 a.m.	Winter Storm	0.2 in.	X	0.18 in.	X		COOP (Vandalia) (Ramsey) SED	n/a	n/a	n/a	- a thin coating of ice on the area roads resulted in numerous traffic accidents - most schools across the area were closed
2/25/2002	3:30 p.m.	Winter Storm	3.8 in.			X		COOP (Vandalia) (Ramsey)	n/a	n/a	n/a	COOP observers noted near blizzard conditions with blowing snow
12/24/2002	6:00 a.m.	Heavy Snow	7.0 in.					COOP (Vandalia) (Ramsey) SED	n/a	n/a	n/a	difficult traveling conditions throughout the holiday
1/1/2003 thru 1/2/2003	8:00 p.m.	Winter Storm	4.2 in.			X		COOP (Ramsey) SED	n/a	n/a	n/a	
2/15/2003 thru 2/16/2003	1:00 p.m.	Winter Storm	3.8 in.	X	X			COOP (Ramsey) SED	n/a	n/a	n/a	
Subtotal:									**0**	**0**	**$0**	

[1] An "X" in the freezing rain, ice, sleet and/or strong winds columns indicates the presences of that particular type of weather condition during a severe winter storm event.

[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 8 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
1/25/2004	6:00 a.m.	Winter Storm	1.5 in.	X	X	X		COOP (Ramsey) (Vandalia) SED	n/a	n/a	n/a	- transportation was brought to a halt across the region - many schools across the region were closed into mid-week
3/21/2006	12:00 a.m.	Heavy Snow	9.3 in.					COOP (Ramsey)	n/a	n/a	n/a	COOP observer noted limbs breaking under the weight of the snow
11/30/2006 thru 12/1/2006	4:00 p.m.	Winter Storm	1.0 in.	0.25 in.		X		COOP (Ramsey) (Vandalia) SED	n/a	n/a	n/a	*Event Description Provided Below*
This event is part of a federally-declared disaster (Declaration #1681) - many customers lost electric service across the area due to downed power lines								- many rural schools were closed for several days due to slick roads and power outages - numerous buildings and automobiles were damaged by falling trees and tree limbs				
1/21/2007	12:00 p.m.	Heavy Snow	4.5 in.					COOP (Vandalia)	n/a	n/a	n/a	
2/12/2007 thru 2/13/2007	5:00 p.m.	Winter Storm	5.1 in.	X	X	X		COOP (Vandalia) (Ramsey)	n/a	n/a	n/a	COOP observer noted drifting snow and 1/8-inch ice on trees
12/15/2007 thru 12/16/2007	4:00 a.m.	Winter Storm	4.9 in.	X		X		COOP (Ramsey) (Vandalia) SED	n/a	n/a	n/a	travel was disrupted across the area through the weekend
Subtotal:									**0**	**0**	**$0**	

[1] An "X" in the freezing rain, ice, sleet and/or strong winds columns indicates the presences of that particular type of weather condition during a severe winter storm event.

[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 9 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
1/31/2008 thru 2/1/2008	12:00 p.m.	Heavy Snow	7.8 in.					COOP (Ramsey) (Vandalia) SED	n/a	n/a	n/a	
2/21/2008	4:00 a.m.	Winter Storm				1.0 in.		COOP (Ramsey) SED	n/a	n/a	n/a	- many auto accidents were reported - most area schools were closed on the 21st and 22nd
3/3/2008 thru 3/4/2008	4:00 a.m.	Winter Storm	2.2 in.	X	X	X		COOP (Vandalia) (Ramsey) SED	n/a	n/a	n/a	downed trees and power outages were reported across the area
1/26/2009 thru 1/28/2009	7:00 p.m.	Heavy Snow	10.2 in.					COOP (Vandalia) (Ramsey) SED	n/a	n/a	n/a	
2/14/2010	n/a	Heavy Snow	4.0 in.					COOP (Vandalia) (Ramsey)	n/a	n/a	n/a	
1/11/2011 thru 1/12/2011	n/a	Heavy Snow	4.7 in.					COOP (Vandalia) (Ramsey)	n/a	n/a	n/a	
Subtotal:									**0**	**0**	**$0**	

[1] An "X" in the freezing rain, ice, sleet and/or strong winds columns indicates the presences of that particular type of weather condition during a severe winter storm event.

[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 10 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
1/20/2011	12:00 a.m.	Heavy Snow	6.0 in.					COOP (Ramsey) (Vandalia) SED	n/a	n/a	n/a	
1/31/2011 thru 2/2/2011	12:00 p.m.	Winter Storm	2.8 in.	X	0.75 in.	2.0 in.	X	COOP (Ramsey) (Vandalia) SED	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #1960)***
2/5/2011 thru 2/6/2011	n/a	Heavy Snow	6.0 in.					COOP (Vandalia)	n/a	n/a	n/a	
2/21/2013	10:00 a.m.	Winter Storm	4.0 in.	X	X			COOP (Ramsey) SED	n/a	n/a	n/a	
3/24/2013	10:00 a.m.	Heavy Snow	8.5 in.					COOP (Ramsey) SED	n/a	n/a	n/a	- COOP observer noted badly drifting snow - most area schools were closed
12/14/2013 thru 12/15/2013	n/a	Winter Storm	5.3 in.			X		COOP (Ramsey)	n/a	n/a	n/a	
1/5/2014	5:00 a.m.	Winter Storm	11.0 in.		X		X	COOP (Vandalia) (Ramsey) SED	n/a	n/a	n/a	- COOP observer noted drifting snow - most schools and businesses were closed on the 5th and 6th
Subtotal:									**0**	**0**	**$0**	

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[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Fayette County
1966 – 2019
(Sheet 11 of 11)

Date(s)	Start Time	Event Type	Magnitude (Maximum)					Data Source[2]	Injuries	Fatalities	Property Damages	Description
			Snow	Freezing Rain[1]	Ice[1]	Sleet[1]	Strong Winds[1]					
2/5/2014	n/a	Winter Storm	5.5 in.	X		X		COOP (Ramsey)	n/a	n/a	n/a	COOP observer noted badly drifting snow
3/1/2014 thru 3/2/2014	7:00 p.m.	Winter Storm	1.8 in.	X		1.0 in.		COOP (Ramsey) SED	n/a	n/a	n/a	
2/15/2015 thru 2/16/2015	6:00 p.m.	Winter Storm	6.3 in.	X	X			COOP (Ramsey) SED	n/a	n/a	n/a	
2/21/2015	n/a	Winter Storm	3.0 in.	X		X		COOP (Ramsey)	n/a	n/a	n/a	
2/28/2015 thru 3/1/2015	3:00 p.m.	Winter Storm	5.3 in.		X			COOP (Ramsey) SED	n/a	n/a	n/a	
2/25/2016	n/a	Winter Storm	3.5 in.		X		X	COOP (Ramsey)	n/a	n/a	n/a	COOP observer noted badly drifting snow
1/11/2019 thru 1/13/2019	5:00 p.m.	Winter Storm	7.8 in.		X			COOP (Ramsey) SED	n/a	n/a	n/a	
Subtotal:									**0**	**0**	**$0**	
GRAND TOTAL:									**0**	**0**	**$0**	

[1] An "X" in the freezing rain, ice, sleet and/or strong winds columns indicates the presences of that particular type of weather condition during a severe winter storm event.

[2] Observation Location information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Source: 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.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 6
Extreme Cold Events Reported in Fayette County
2000 – 2019

Date(s)	Start Time	Event Type	Magnitude (Temperature °F)			Data Source[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
			Low (Min)	High (Max)	Wind Chill (Max)					
12/16/2000 thru 12/17/2000	8:00 p.m.	Extreme Cold/ Wind Chill	-2°F	35°F	-30°F	COOP (Ramsey) SED	n/a	n/a	n/a	
1/1/2010 thru 1/12/2010	12:00 a.m.	Extreme Cold/ Wind Chill	-10°F	28°F	n/a	COOP (Ramsey) SED	n/a	n/a	n/a	
1/6/2014 thru 1/7/2014	12:00 a.m.	Extreme Cold/ Wind Chill	-14°F	19°F	-39°F	COOP (Ramsey) SED	n/a	n/a	n/a	
GRAND TOTAL:							**0**	**0**	**$0**	

Source: 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.

Table 7
Excessive Heat Events Reported in Fayette County
1994 - 2019
(Sheet 1 of 6)

Date(s)	Start Time	Magnitude (Temperature °F)			Data Source[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
6/12/1994 thru 6/23/1994	12:00 a.m.	95°F	65°F	105°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/17/1995 thru 7/17/1995	12:00 p.m.	99°F	69°F	120°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/28/1995 thru 7/31/1995	12:00 p.m.	93°F	66°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/9/1995 thru 8/24/1995	1:00 p.m.	96°F	57°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/26/1997 thru 7/27/1997	9:00 a.m.	99°F	72°F	115°F	COOP (Ramsey) SDP	n/a	n/a	n/a	n/a	
6/23/1998 thru 6/29/1998	9:00 a.m.	95°F	73°F	110°F	COOP (Ramsey) SDP	n/a	n/a	n/a	n/a	
7/18/1999 thru 7/31/1999	12:00 p.m.	99°F	62°F	115°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/7/2001	11:00 a.m.	95°F	69°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
Subtotal:						**0**	**0**	**$0**	**$0**	

[1] Information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 7
Excessive Heat Events Reported in Fayette County
1994 - 2019
(Sheet 2 of 6)

Date(s)	Start Time	Magnitude (Temperature °F)			Data Source[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
7/17/2001	11:00 a.m.	91°F	70°F	115°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/29/2001 thru 8/2/2001	11:00 a.m.	92°F	67°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/7/2001 thru 8/9/2001	12:00 a.m.	94°F	69°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/21/2001 thru 8/22/2001	12:00 a.m.	97°F	57°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/8/2002 thru 7/9/2002	11:00 a.m.	96°F	68°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/20/2002 thru 7/22/2002	11:00 a.m.	96°F	69°F	115°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/26/2002 thru 8/6/2002	11:00 a.m.	97°F	63°F	115°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
Subtotal:						**0**	**0**	**$0**	**$0**	

[1] Information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 7
Excessive Heat Events Reported in Fayette County
1994 - 2019
(Sheet 3 of 6)

Date(s)	Start Time	Magnitude (Temperature °F)			Data Source[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
8/15/2003 thru 8/21/2003	12:00 p.m.	95°F	59°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/24/2003 thru 8/28/2003	12:00 p.m.	95°F	58°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/20/2004 thru 7/22/2004	12:00 p.m.	92°F	66°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/20/2005 thru 7/26/2005	12:00 p.m.	98°F	65°F	121°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/17/2006 thru 7/21/2006	12:00 p.m.	93°F	72°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/30/2006 thru 8/2/2006	12:00 p.m.	98°F	72°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/5/2007 thru 8/16/2007	12:00 p.m.	104°F	63°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	many area schools went to an early dismissal schedule in order to combat the heat
Subtotal:						**0**	**0**	**$0**	**$0**	

[1] Information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 7
Excessive Heat Events Reported in Fayette County
1994 - 2019
(Sheet 4 of 6)

Date(s)	Start Time	Magnitude (Temperature °F)			Data Source[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
6/21/2009 thru 6/29/2009	11:00 a.m.	95°F	66°F	105°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/14/2010 thru 7/15/2010	12:00 p.m.	94°F	71°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/17/2010	12:00 p.m.	92°F	76°F	105°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/22/2010 thru 7/24/2010	12:00 p.m.	93°F	70°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/2/2010 thru 8/4/2010	1:00 p.m.	92°F	66°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/8/2010 thru 8/14/2010	1:00 p.m.	98°F	69°F	115°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/1/2011 thru 7/3/2011	12:00 p.m.	95°F	69°F	105°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/10/2011 thru 7/12/2011	12:00 p.m.	97°F	67°F	115°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
Subtotal:						**0**	**0**	**$0**	**$0**	

[1] Information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 7
Excessive Heat Events Reported in Fayette County
1994 - 2019
(Sheet 5 of 6)

Date(s)	Start Time	Magnitude (Temperature °F)			Data Source[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
7/17/2011 thru 8/3/2011	12:00 p.m.	100°F	68°F	115°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/6/2011 thru 8/7/2011	12:00 p.m.	93°F	71°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/31/2011 thru 9/3/2011	12:00 p.m.	100°F	64°F	105°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
6/27/2012 thru 7/8/2012	12:00 p.m.	106°F	57°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/16/2012 thru 7/19/2012	12:00 p.m.	104°F	70°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/22/2012 thru 7/27/2012	12:00 p.m.	106°F	63°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/30/2013 thru 9/1/2013	11:00 a.m.	96°F	64°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
8/20/2014 thru 8/27/2014	12:00 p.m.	95°F	66°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
Subtotal:						**0**	**0**	**$0**	**$0**	

[1] Information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 7
Excessive Heat Events Reported in Fayette County
1994 - 2019
(Sheet 6 of 6)

Date(s)	Start Time	Magnitude (Temperature °F)			Data Source[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
7/12/2015 thru 7/14/2015	11:00 a.m.	94°F	63°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/18/2015 thru 7/19/2015	11:00 a.m.	92°F	68°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/27/2015 thru 7/29/2015	11:00 a.m.	93°F	63°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/18/2016 thru 7/24/2016	11:00 a.m.	94°F	67°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/19/2017 thru 7/23/2017	12:00 p.m.	99°F	67°F	110°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
6/28/2018 thru 6/30/2018	3:00 p.m.	90°F	69°F	105°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
7/18/2019 thru 7/21/2019	12:00 p.m.	93°F	70°F	105°F	COOP (Ramsey) SED	n/a	n/a	n/a	n/a	
Subtotal:						**0**	**0**	**$0**	**$0**	
GRAND TOTAL:						**0**	**0**	**$0**	**$0**	

[1] Information obtained from National Weather Service's (NWS's) COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database.

Acronyms:
COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Sources: 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.

Table 8
General Flood Events Reported in Fayette County
1990 - 2019
(Sheet 1 of 7)

Date(s)	Start Time	Body of Water	Location(s) Impacted	Magnitude				Injuries	Fatalities	Property Damages	Crop Damages	Event Description
				Flood Crest Kaskaskia River at Vandalia[1]	Impacts							
					Home[2]	Business[2]	Infra-structure[2]					
5/18/1990	n/a	Kaskaskia River, area creeks and streams	countywide	26.45 feet 5/18/1990	X	n/a	X	n/a	n/a	n/a	n/a	
1/6/1993	n/a	Kaskaskia River, area creeks and streams	countywide	24.10 feet 1/6/1993	n/a	n/a	X	n/a	n/a	n/a	n/a	
4/13/1994	n/a	Kaskaskia River, area creeks and streams	countywide	26.57 feet 4/13/1994	X	n/a	X	n/a	n/a	n/a	n/a	
5/18/1995	n/a	Kaskaskia River, area creeks and streams	countywide	27.40 feet 5/18/1995 8th highest crest on record	X	n/a	X	n/a	n/a	n/a	n/a	
Subtotal:								**0**	**0**	**$0**	**$0**	

[1] Flood stage at the Kaskaskia River at Vandalia gauge location is 18.0 feet, moderate flood stage is 24.0 feet and major flood stage is 26.0 feet. At 18.0 unprotected farmland begins to flood; at 19.2 State Highway J just east of County Road 206 beings to flood; 23.0 agricultural levee begins to be slightly overtopped; at 25.5 South 4th Street begins flooding near and south of Jefferson Street in Vandalia; at 25.8 Along South 4th Street, numerous homes begin flooding near the St. Clair Street intersections; at 26.0 The Dively and Vandalia Levees begin to be overtopped; at 27.5 the left bank levee just south of the US Hwy 51 bridge is overtopped; at 27.9 US Hwy 51 south of Vandalia begins to flood; at 30.5 flood waters reach the floor of the gage house; at 31.0 floodwaters will threaten the wastewater treatment facility; at 33.29 flood waters reach the instrument shelf of the manometer gage house

[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 Event Description column if available.

Table 8
General Flood Events Reported in Fayette County
1990 - 2019
(Sheet 2 of 7)

Date(s)	Start Time	Body of Water	Location(s) Impacted	Magnitude				Injuries	Fatalities	Property Damages	Crop Damages	Event Description
				Flood Crest Kaskaskia River at Vandalia[1]	Impacts							
					Home[2]	Business[2]	Infra-structure[2]					
4/30/1996 thru 5/31/1996	12 00 a.m.	Kaskaskia River, area creeks and streams	countywide	27.41 feet 4/30/1996 7th highest crest on record	X	n/a	X	n/a	n/a	n/a	n/a	- heavy rain from late April into early May caused flooding on the Mississippi River and several smaller rivers in the area - damage was primarily limited to agricultural lowlands, although some towns had some roads closed
2/8/1999	n/a	Kaskaskia River, area creeks and streams	countywide	26.41 feet 2/8/1999	X	n/a	X	n/a	n/a	n/a	n/a	
Subtotal:								**0**	**0**	**$0**	**$0**	

[1] Flood stage at the Kaskaskia River at Vandalia gauge location is 18.0 feet, moderate flood stage is 24.0 feet and major flood stage is 26.0 feet. At 18.0 unprotected farmland begins to flood; at 19.2 State Highway J just east of County Road 206 beings to flood; 23.0 agricultural levee begins to be slightly overtopped; at 25.5 South 4th Street begins flooding near and south of Jefferson Street in Vandalia; at 25.8 Along South 4th Street, numerous homes begin flooding near the St. Clair Street intersections; at 26.0 The Dively and Vandalia Levees begin to be overtopped; at 27.5 the left bank levee just south of the US Hwy 51 bridge is overtopped; at 27.9 US Hwy 51 south of Vandalia begins to flood; at 30.5 flood waters reach the floor of the gage house; at 31.0 floodwaters will threaten the wastewater treatment facility; at 33.29 flood waters reach the instrument shelf of the manometer gage house

[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 Event Description column if available.

Table 8
General Flood Events Reported in Fayette County
1990 - 2019
(Sheet 3 of 7)

Date(s)	Start Time	Body of Water	Location(s) Impacted	Magnitude				Injuries	Fatalities	Property Damages	Crop Damages	Event Description
				Flood Crest Kaskaskia River at Vandalia[1]	Impacts							
					Home[2]	Business[2]	Infra-structure[2]					
4/28/2002 thru 5/30/2002	1 18 a.m.	Kaskaskia River, area creeks and streams	countywide	28.27 feet 5/8/2002 highest crest on record	X	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
This event is part of a federally-declared disaster (Declaration #1416) - heavy rain during the last week in April and into May pushed the Kaskaskia River out of its banks and over flood stage most of the time - IL Rte. 51 from Vandalia to Salem had to be closed for a while due to the flooding - the river did drop below flood stage at Vandalia on May 19th, but remained in flood throughout the month in most other locations												
1/6/2004	n/a	Kaskaskia River, area creeks and streams	countywide	25.20 feet 1/6/2004	n/a	n/a	X	n/a	n/a	n/a	n/a	
1/6/2005	n/a	Kaskaskia River, area creeks and streams	countywide	27.70 feet 1/6/2005 4th highest crest on record	X	n/a	X	n/a	n/a	n/a	n/a	
Subtotal:								**0**	**0**	**$0**	**$0**	

[1] Flood stage at the Kaskaskia River at Vandalia gauge location is 18.0 feet, moderate flood stage is 24.0 feet and major flood stage is 26.0 feet. At 18.0 unprotected farmland begins to flood; at 19.2 State Highway J just east of County Road 206 beings to flood; 23.0 agricultural levee begins to be slightly overtopped; at 25.5 South 4th Street begins flooding near and south of Jefferson Street in Vandalia; at 25.8 Along South 4th Street, numerous homes begin flooding near the St. Clair Street intersections; at 26.0 The Dively and Vandalia Levees begin to be overtopped; at 27.5 the left bank levee just south of the US Hwy 51 bridge is overtopped; at 27.9 US Hwy 51 south of Vandalia begins to flood; at 30.5 flood waters reach the floor of the gage house; at 31.0 floodwaters will threaten the wastewater treatment facility; at 33.29 flood waters reach the instrument shelf of the manometer gage house

[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 Event Description column if available.

Table 8
General Flood Events Reported in Fayette County
1990 - 2019
(Sheet 4 of 7)

Date(s)	Start Time	Body of Water	Location(s) Impacted	Magnitude				Injuries	Fatalities	Property Damages	Crop Damages	Event Description
				Flood Crest Kaskaskia River at Vandalia[1]	Impacts							
					Home[2]	Business[2]	Infra-structure[2]					
3/19/2008 thru 3/23/2008	5:00 a.m.	Kaskaskia River, area creeks and streams	western portion of the county	26.17 feet 3/20/2008	X	n/a	X	n/a	n/a	$20,000	$20,000	- heavy rain in March caused the Kaskaskia River to flow over its banks - damage was limited to secondary homes and cabins along the river and to farmland
12/29/2008 thru 12/30/2008	12:30 a.m.	Kaskaskia River, area creeks and streams	countywide	25.50 feet 12/29/2008	n/a	n/a	X	n/a	n/a	n/a	n/a	
2/13/2009	2:15 a.m.	Kaskaskia River, area creeks and streams	countywide	25.88 feet 2/13/2009	X	n/a	X	n/a	n/a	n/a	n/a	
Subtotal:								**0**	**0**	**$20,000**	**$20,000**	

[1] Flood stage at the Kaskaskia River at Vandalia gauge location is 18.0 feet, moderate flood stage is 24.0 feet and major flood stage is 26.0 feet. At 18.0 unprotected farmland begins to flood; at 19.2 State Highway J just east of County Road 206 beings to flood; 23.0 agricultural levee begins to be slightly overtopped; at 25.5 South 4th Street begins flooding near and south of Jefferson Street in Vandalia; at 25.8 Along South 4th Street, numerous homes begin flooding near the St. Clair Street intersections; at 26.0 The Dively and Vandalia Levees begin to be overtopped; at 27.5 the left bank levee just south of the US Hwy 51 bridge is overtopped; at 27.9 US Hwy 51 south of Vandalia begins to flood; at 30.5 flood waters reach the floor of the gage house; at 31.0 floodwaters will threaten the wastewater treatment facility; at 33.29 flood waters reach the instrument shelf of the manometer gage house

[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 Event Description column if available.

Table 8
General Flood Events Reported in Fayette County
1990 - 2019
(Sheet 5 of 7)

Date(s)	Start Time	Body of Water	Location(s) Impacted	Magnitude				Injuries	Fatalities	Property Damages	Crop Damages	Event Description
				Flood Crest Kaskaskia River at Vandalia[1]	Impacts							
					Home[2]	Business[2]	Infra-structure[2]					
12/25/2009 thru 12/28/2009	9:45 a.m.	Kaskaskia River, area creeks and streams	countywide	25.91 feet 12/26/2009	X	n/a	X	n/a	n/a	n/a	n/a	
4/26/2011 thru 4/30/2011	7:45 a.m.	Kaskaskia River, area creeks and streams	countywide	27.45 feet 4/28/2011 6th highest crest on record	X	n/a	X	n/a	n/a	n/a	n/a	
6/19/2011 thru 6/22/2011	3:45 p.m.	Kaskaskia River, area creeks and streams	countywide	25.45 feet 6/20/2011	n/a	n/a	X	n/a	n/a	n/a	n/a	
4/18/2013 thru 4/30/2013	8:00 p.m.	Kaskaskia River, area creeks and streams	western portion of the county	27.88 feet 4/19/2013 2nd highest crest on record	X	n/a	X	n/a	n/a	$5,000	$20,000	agricultural low lands were damaged
Subtotal:								**0**	**0**	**$5,000**	**$20,000**	

[1] Flood stage at the Kaskaskia River at Vandalia gauge location is 18.0 feet, moderate flood stage is 24.0 feet and major flood stage is 26.0 feet. At 18.0 unprotected farmland begins to flood; at 19.2 State Highway J just east of County Road 206 beings to flood; 23.0 agricultural levee begins to be slightly overtopped; at 25.5 South 4th Street begins flooding near and south of Jefferson Street in Vandalia; at 25.8 Along South 4th Street, numerous homes begin flooding near the St. Clair Street intersections; at 26.0 The Dively and Vandalia Levees begin to be overtopped; at 27.5 the left bank levee just south of the US Hwy 51 bridge is overtopped; at 27.9 US Hwy 51 south of Vandalia begins to flood; at 30.5 flood waters reach the floor of the gage house; at 31.0 floodwaters will threaten the wastewater treatment facility; at 33.29 flood waters reach the instrument shelf of the manometer gage house

[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 Event Description column if available.

Table 8
General Flood Events Reported in Fayette County
1990 - 2019
(Sheet 6 of 7)

Date(s)	Start Time	Body of Water	Location(s) Impacted	Magnitude				Injuries	Fatalities	Property Damages	Crop Damages	Event Description
				Flood Crest Kaskaskia River at Vandalia[1]	Impacts							
					Home[2]	Business[2]	Infra-structure[2]					
6/20/2015 thru 6/22/2015	2:15 p.m.	Kaskaskia River, area creeks and streams	countywide	24.26 feet 6/21/2015	n/a	n/a	X	n/a	n/a	n/a	n/a	
12/27/2015 thru 1/2/2016	8:30 a.m.	Kaskaskia River, area creeks and streams	countywide	27.83 feet 12/28/2015 3rd highest crest on record	X	n/a	X	n/a	n/a	n/a	n/a	
4/30/2017 thru 5/25/2017	2:45 p.m.	Kaskaskia River, area creeks and streams	countywide	27.65 feet 5/1/2017 5th highest crest on record	X	n/a	X	n/a	n/a	n/a	n/a	
4/4/2018 thru 4/6/2018	11:45 a.m.	Kaskaskia River, area creeks and streams	countywide	24.81 feet 4/5/2018	n/a	n/a	X	n/a	n/a	n/a	n/a	
Subtotal:								**0**	**0**	**$0**	**$0**	

[1] Flood stage at the Kaskaskia River at Vandalia gauge location is 18.0 feet, moderate flood stage is 24.0 feet and major flood stage is 26.0 feet. At 18.0 unprotected farmland begins to flood; at 19.2 State Highway J just east of County Road 206 beings to flood; 23.0 agricultural levee begins to be slightly overtopped; at 25.5 South 4th Street begins flooding near and south of Jefferson Street in Vandalia; at 25.8 Along South 4th Street, numerous homes begin flooding near the St. Clair Street intersections; at 26.0 The Dively and Vandalia Levees begin to be overtopped; at 27.5 the left bank levee just south of the US Hwy 51 bridge is overtopped; at 27.9 US Hwy 51 south of Vandalia begins to flood; at 30.5 flood waters reach the floor of the gage house; at 31.0 floodwaters will threaten the wastewater treatment facility; at 33.29 flood waters reach the instrument shelf of the manometer gage house

[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 Event Description column if available.

Table 8
General Flood Events Reported in Fayette County
1990 - 2019
(Sheet 7 of 7)

Date(s)	Start Time	Body of Water	Location(s) Impacted	Magnitude				Injuries	Fatalities	Property Damages	Crop Damages	Event Description
				Flood Crest Kaskaskia River at Vandalia[1]	Impacts							
					Home[2]	Business[2]	Infra-structure[2]					
6/14/2018 thru 6/15/2018	2:00 a.m.	Kaskaskia River, area creeks and streams	countywide	24.07 feet 6/14/2018	n/a	n/a	X	n/a	n/a	n/a	n/a	
5/23/2019 thru 5/25/2019	1:30 p.m.	Kaskaskia River, area creeks and streams	countywide	25.53 feet 5/24/2019	n/a	n/a	X	n/a	n/a	n/a	n/a	
Subtotal:								**0**	**0**	**$0**	**$0**	
GRAND TOTAL:								**0**	**0**	**$25,000**	**$40,000**	

[1] Flood stage at the Kaskaskia River at Vandalia gauge location is 18.0 feet, moderate flood stage is 24.0 feet and major flood stage is 26.0 feet. At 18.0 unprotected farmland begins to flood; at 19.2 State Highway J just east of County Road 206 beings to flood; 23.0 agricultural levee begins to be slightly overtopped; at 25.5 South 4th Street begins flooding near and south of Jefferson Street in Vandalia; at 25.8 Along South 4th Street, numerous homes begin flooding near the St. Clair Street intersections; at 26.0 The Dively and Vandalia Levees begin to be overtopped; at 27.5 the left bank levee just south of the US Hwy 51 bridge is overtopped; at 27.9 US Hwy 51 south of Vandalia begins to flood; at 30.5 flood waters reach the floor of the gage house; at 31.0 floodwaters will threaten the wastewater treatment facility; at 33.29 flood waters reach the instrument shelf of the manometer gage house

[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 Event Description column if available.

Sources: National Weather Service, Weather Forecast Office – Central Illinois, Chris Miller, Warning Coordination Meteorologist.
NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database.
NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, COOP Data / Record of Climatological Observations.
NOAA, National Weather Service, River Observations, North Central River Forecast Center.
United States Army Corps of Engineers, RiverGages.com, Data Mining.

Table 9
Flash Flood Events Reported in Fayette County
1996 - 2019
(Sheet 1 of 5)

Date(s)	Start Time	Location(s) Impacted	Magnitude (Impacts)			Injuries	Fatalities	Property Damages	Crop Damages	Magnitude/Description
			Home[1]	Business[1]	Infra-structure[1]					
6/10/1996	1:00 p.m.	Farina	X	n/a	X	n/a	n/a	n/a	n/a	- 4 to 5 inches of rain fell during the afternoon and evening causing flash flooding in the Village - numerous streets and basements were flooded across the town - Sugar Creek also rose out of its banks
5/12/2002 thru 5/13/2002	6:00 p.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	***This event is part of a federally-declared disaster (Declaration #1416)*** several county roads were damaged by floodwater
5/27/2004	4:30 p.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	flooding was reported on roads near Vandalia
8/26/2004	3:30 a.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	IL Route 37 was reported flooded
6/6/2008	5:45 p.m.	countywide	n/a	n/a	X	n/a	n/a	$1,000	n/a	- 3 to 5 inches of rain fell over a short amount of time over the County - numerous secondary roads were flooded countywide - a man drove his truck onto a bridge that was flooded just north of St. Elmo; the truck was then swept off the road and he had to be rescued; he was not injured
5/27/2009	7:00 p.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	- up to 3 inches of rain fell in a short amount of time causing flash flooding - several roads were closed due to flooding - US Hwy 40 had several inches of flowing water over it after Camp Creek went out of its banks near Brownstown
Subtotal:						**0**	**0**	**$1,000**	**$0**	

[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 Event Description column if available.

Table 9
Flash Flood Events Reported in Fayette County
1996 - 2019
(Sheet 2 of 5)

Date(s)	Start Time	Location(s) Impacted	Magnitude (Impacts)			Injuries	Fatalities	Property Damages	Crop Damages	Magnitude/Description
			Home[1]	Business[1]	Infra-structure[1]					
6/20/2009	6:40 p.m.	southern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- several inches of rain fell in a short amount of time causing flash flooding - several feet of water was flowing over a couple of roads in the St. Peter area making them impassable
4/7/2010	4:48 p.m.	southeastern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- between 3 and 5 inches of rain fell in a 2-hour period onto already saturated soils causing flash flooding - numerous roads were flooded over the far southeastern portion of the County, including 2-feet of water over IL Rte. 37 in Farina
5/25/2010	3:00 a.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	- between 3 and 5 inches of rain fell in a short amount of time on already saturated soils causing flash flooding - numerous roads were flooded including US Hwy 40 east of Brownstown and US Hwy 51 just south of Shobonier
6/14/2010	3:22 p.m.	northern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- up to 2 inches of rain fell in a short amount of time on already saturated soils causing flash flooding - numerous roads were flooded including County Road 3200N about three quarters of a mile west of US Hwy 51; the water was 10-inches deep in this location
Subtotal:						**0**	**0**	**$0**	**$0**	

[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 Event Description column if available.

Table 9
Flash Flood Events Reported in Fayette County
1996 - 2019
(Sheet 3 of 5)

Date(s)	Start Time	Location(s) Impacted	Magnitude (Impacts)			Injuries	Fatalities	Property Damages	Crop Damages	Magnitude/Description
			Home[1]	Business[1]	Infra-structure[1]					
6/27/2010 thru 6/28/2010	8:23 p.m	countywide	X	X	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- up to 6 inches of rain fell in a short amount of time on already saturated soils causing flash flooding - numerous roads were flooded including US Hwy 51 both north and south of Vandalia - up to 100 homes and businesses sustained damage from the flooding in Vandalia, though most of the homes that sustained damage was due to water and sewer backup - some businesses did have substantial flooding, and the city garage had 18-inches of water inside; two squad cars parked outside the garage were damaged when they were submerged in the flood waters - several water rescues had to be done as people drove around barricades and attempted to drive through the flooded streets - some of the flooding in town was due to a 10-foot culvert under a railroad bed that was bent due to the large flow of water through it actually forcing the culvert up into the air, this stopped up the flow of water and backed the water up into properties - no injuries were reported										
7/24/2010 thru 7/25/2010	10:25 p.m.	northern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- up to 3-inches of rain fell in a short amount of time causing flash flooding - several roads were flooded including County Road 3200N about a half a mile west of intersection with US Hwy 51
4/25/2011 thru 4/26/2011	11:00 p.m.	eastern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- between 3 and 6 inches of rain fell causing flash flooding - numerous roads were flooded
6/10/2011 thru 6/11/2011	8:00 p.m.	southern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- up to three inches of rain fell in a short amount of time causing flash flooding - several roads were flooded including US Hwy 51 just south of Shobonier
Subtotal:						**0**	**0**	**$0**	**$0**	

[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 Event Description column if available.

Table 9
Flash Flood Events Reported in Fayette County
1996 - 2019
(Sheet 4 of 5)

Date(s)	Start Time	Location(s) Impacted	Magnitude (Impacts)			Injuries	Fatalities	Property Damages	Crop Damages	Magnitude/Description
			Home[1]	Business[1]	Infra-structure[1]					
6/23/2013	11:45 a.m.	southwestern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- up to 4 inches of rain fell in a short amount of time causing flash flooding - several roads in the Farina area were flooded
6/8/2015	12:00 a.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	- up to 5 inches of rain fell in a short amount of time causing flash flooding - numerous roads were flooded across the County
12/28/2015	8.30 a.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	- an additional 2 to 4 inches of rain fell on already saturated soils resulting in flash flooding across the County - numerous roads and creeks were flooded
5/11/2017	12:00 a.m.	southern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- up to 3 inches of rain fell in a short amount of time on already saturated soils causing flash flooding - a stream gauge on the Hurricane Creek indicated it rose to near flood stage during this event - the County Sheriff's office reported that several roads in the southern half of the county were closed due to flooding
Subtotal:						**0**	**0**	**$0**	**$0**	

[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 Event Description column if available.

Table 9
Flash Flood Events Reported in Fayette County
1996 - 2019
(Sheet 5 of 5)

Date(s)	Start Time	Location(s) Impacted	Magnitude (Impacts)			Injuries	Fatalities	Property Damages	Crop Damages	Magnitude/Description
			Home[1]	Business[1]	Infra-structure[1]					
6/19/2018 thru 6/20/2018	8 15 p.m.	southeastern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- up to 5 inches of rain fell in a short amount of time causing flash flooding - several roads were flooding including County Road 2125E between St. Elmo and St. James - US Hwy 40 was flooded in spots between St. Elmo and the county line - numerous rural roads in the southeastern portions of the County were flooded
5/29/2019	5:52 p.m.	central portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- up to 4 inches of rain fell in a short amount of time over the central portions of the County - numerous roads were flooded including US Hwy 40 near the intersection with IL Rte. 185
Subtotal:						**0**	**0**	**$0**	**$0**	
GRAND TOTAL:						**0**	**0**	**$1,000**	**$0**	

[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 Event Description column if available.

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

Table 10
Tornadoes Reported in Fayette County
1954 - 2019
(Sheet 1 of 7)

Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Deaths	Property Damage	Crop Damage	Description
7/21/1954	6:45 p.m.	Pittsburg Vandalia Dean Hills Nature Preserve^	F2	26.1	200	1	n/a	$250,000	n/a	
4/5/1958	2:20 p.m.	Pittsburg^ Hagarstown^ Vandalia	F3	11.0	100	n/a	n/a	n/a	n/a	*Touchdown/Liftoff - Multiple Counties* tornado touched down in St. Clair County and moved east northeast through Clinton and Bond Counties before crossing into Fayette County and lifting at Vandalia - total length: 60.5 miles
6/4/1960	12:18 p.m.	Bingham^	F0	0.1	10	n/a	n/a	n/a	n/a	
8/18/1974	1:54 p.m.	Vandalia	F1	0.1	10	n/a	n/a	$250	n/a	
5/1/1983	9:25 p.m.	Laclede	F1	0.3	33	n/a	n/a	$250,000	n/a	a car, a mobile home, a church and several homes were destroyed or badly damaged
11/9/1984	5:03 p.m.	Pittsburg^ Vandalia^ Bluff City Brownstown	F2	18.0	150	11	n/a	$2,500,000	n/a	*Event Description Provided Below*
Touchdown/Liftoff - Two Counties - a tornado touched down in Bond County south of Greenville and traveled northeast into Fayette county just west of Pittsburg, and continued northeast, passing about 3 miles south of Vandalia, then moving through Brownstown before lifting - total length: 30.0 miles - more than 175 homes were damaged by the tornado, with dollar estimates placed near $1 million - the heaviest damage occurred in Brownstown where 169 homes were damaged, 25 of which were destroyed - several mobile homes south of Vandalia were damaged - 11 people were injured in the County; only one was admitted to the hospital - the County ESDA coordinator spotted several funnel clouds cutting a path through the trees south of Vandalia around the same time									
Subtotal:						**12**	**0**	**$3,000,250**	**$0**	

[1] The length provided is only for the portion of the tornado that occurred in Fayette County.

^ Tornado touchdown verified in the vicinity of this location(s).

Table 10
Tornadoes Reported in Fayette County
1954 - 2019
(Sheet 2 of 7)

Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Deaths	Property Damage	Crop Damage	Description
4/15/1994	5:22 a.m.	Loogootee[A], St. Peter[A]	F1	2.5	60	n/a	n/a	$500,000	n/a	*Event Description Provided Below*
- the roofs of two relatively new mobile homes were completely uplifted and tossed several hundred yards downwind - a resident stated that several 6 x 6's anchored in cement were snapped off or pulled up - the nearby homes also experienced minor roof damage and broken windows - a large 20-foot grain bin was tossed several hundred yards downwind - before the tornado lifted, several farm houses and barns were heavily damaged										
4/19/1996	7:20 p.m.	Carlyle Lake State Wildlife Management Area[A], Shobonier[A]	F1	4.5	80	n/a	n/a	$150,000	n/a	*Touchdown/Liftoff - Two Counties* - tornado touchdown in extreme southwest Fayette County and traveled northeast crossing into Marion County before crossing back into Fayette County and lifting off southeast of Shobonier - total length: 11.5 miles - one home and barn were destroyed in the extreme southeast area of the County
6/29/1998	6 20 p m.	Farina[A]	F1	0 2	75	n/a	n/a	$80,000	n/a	- the roof was ripped off a large machine shed, a grain bin was destroyed, trees were uprooted, and large limbs were broken off other trees - a house suffered minor damage to the siding and a broken window
Subtotal:						**0**	**0**	**$730,000**	**$0**	

[1] The length provided is only for the portion of the tornado that occurred in Fayette County.

[A] Tornado touchdown verified in the vicinity of this location(s).

Table 10
Tornadoes Reported in Fayette County
1954 - 2019
(Sheet 3 of 7)

Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Deaths	Property Damage	Crop Damage	Description
6/1/1999	7:03 p.m.	Brownstown[^] St. Elmo[^] St. Elmo	F2	10.0	150	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Brownstown Area - 2 large machine sheds were damaged - a tractor-trailer was knocked over on IL Rte. 170 *St. Elmo Area* - several green houses were destroyed - a large warehouse was destroyed						*St. Elmo Area Continued...* - several large steel beams supporting the warehouse were severely twisted - a 300-foot radio tower was destroyed - a mobile home and 3 houses were destroyed - a few outbuildings were damaged, and trees were downed				
5/12/2000	6:10 p.m.	Shobonier[^]	F0	1.5	40	n/a	n/a	$15,000	n/a	- one mobile home was destroyed - a boat dock at a pond was destroyed - several trees and power lines were also downed
6/11/2002	4:00 p.m.	Shafter[^]	F0	2.5	50	n/a	n/a	n/a	n/a	- a couple of machine sheds were damaged - a two-story home suffered roof damage - several trees were downed along the path as well
6/11/2002	4:05 p.m.	Bluff City[^]	F0	0.7	40	n/a	n/a	n/a	n/a	several power poles and trees were downed
Subtotal:						**0**	**0**	**$15,000**	**$0**	

[1] The length provided is only for the portion of the tornado that occurred in Fayette County.

[^] Tornado touchdown verified in the vicinity of this location(s).

Table 10
Tornadoes Reported in Fayette County
1954 - 2019
(Sheet 4 of 7)

Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Deaths	Property Damage	Crop Damage	Description
5/30/2004	4:10 p.m	Carlyle Lake State Wildlife Management Area[A]	F0	0.1	40	n/a	n/a	n/a	n/a	
6/27/2008	2:58 p.m.	Shafter[A] Shafter	EF0	1.47	40	n/a	n/a	n/a	n/a	- 2 power poles and several large tree limbs were blown down - some corn crop was damaged along the path
2/28/2011	12:27 a.m.	Confidence	EF2	1.26	90	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Intersection of County Rd. 1750E and County Rd. 1275N - a residence, trees and outbuildings were damaged *County Road 1275N* - several residences and farm buildings were damaged						*County Road 1275N Continued..* - one residence was shifted 22-feet off the foundation, and another was shifted 6-feet off the foundation - lumber from the roof was driven into the siding and into the foundation at the 3rd residence				
2/28/2011	12:32 a.m.	St. Elmo[A]	EF1	0.15	10	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- touched down approx. 1 mile southeast of St. Elmo at a farm building located 1/10th of a mile south of I-70 and 2/10th of a mile north of County Rd. 1900N						- the south facing wall of a large metal farm storage building was blown out with debris scattered over one half mile into an adjacent field; several 2 x 4s were driven several feet into the ground				
Subtotal:						**0**	**0**	**$0**	**$0**	

[1] The length provided is only for the portion of the tornado that occurred in Fayette County.

[A] Tornado touchdown verified in the vicinity of this location(s).

Table 10
Tornadoes Reported in Fayette County
1954 - 2019
(Sheet 5 of 7)

Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Deaths	Property Damage	Crop Damage	Description
2/28/2011	12:33 a.m.	St. Elmo[^]	EF2	0.08	50	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- touched down near the Fayette and Effingham county line approx. 2/10th of a mile south of County Rd. 1800N - two large farm buildings were destroyed, and debris was thrown 1 mile to the east into Effingham County						- other farm buildings also sustained damage - there were 4 spots on the property with evidence that heavy debris, including a cinderblock, was thrown a substantial distance to the northwest - several 2x4s were driven several feet into the ground				
11/17/2013	12:22 p.m.	Brownstown[^] St. Elmo[^]	EF2	8.50	200	n/a	n/a	n/a	n/a	*Event Description Provided Below*
This event is part of a federally-declared disaster (Declaration #4157) *Touchdown/Liftoff - Two Counties* tornado touched down in Fayette County just east of Brownstown and traveled northeast crossing into Effingham County before lifting off 2.3 miles northwest of Altamont - total length: 11.4 miles *Brownstown Area* - touched down between US Hwy 40 and I-70 about 1.4 miles east of the Village on County Rd. 1750E where it destroyed a barn, depositing the debris downstream into the adjacent open field - continuing northeast across US Hwy 40 a few outbuildings and silos on a farmstead were damaged						*St. Elmo Area* - the tornado strengthened and grew in size as it moved just west of the City where it caused significant damage to 3 homes and severe damage/complete destruction to numerous outbuildings; 2 of the houses were moved from their foundations - continuing northeast toward the St. Elmo Golf Club destroying a garage and two outbuildings at a residence and causing significant tree damage - the tornado continued northeast crossing IL Rte. 128 into Effingham County			
Subtotal:						**0**	**0**	**$0**	**$0**	

[1] The length provided is only for the portion of the tornado that occurred in Fayette County

[^] Tornado touchdown verified in the vicinity of this location(s).

Table 10
Tornadoes Reported in Fayette County
1954 - 2019
(Sheet 6 of 7)

Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Deaths	Property Damage	Crop Damage	Description
2/20/2014	4:36 p.m.	Brownstown[A] Sefton[A]	EF1	4.80	50	n/a	n/a	n/a	n/a	*Event Description Provided Below*

Brownstown Area
- touched down 2.8 miles northwest of the Village or 0.3 miles north of the intersection of County Rds. 1900N and 1375E
- one large old tree was down while several large branches along a row of trees were snapped two-thirds up the trunk
- one large machine shed was damaged about 150 yards southwest of the intersection of County Rds. 2000N and 1450E, while the southern part of another barn southeast of the intersection was severely damaged, debris from both structures were tossed about one-third mile to the northeast

Brownstown Area Continued...
- at the intersection of County Rds. 2100N and 1600E, 3 tall wooden transmission line poles were snapped two-thirds up the pole, approx. 50 yards to the southeast of this intersection a medium size machine shed was severely damaged with the east and south sides of the shed shredded and tossed one-third mile to the northeast

Sefton Area
- the tornado continued northeast and destroyed a large machine shed storing farm equipment, the metal panels were totally shredded and tossed over one-third mile to the north
- a medium size machine shed approx. one-half mile to the northeast of the large machine shed lost a few metal roof panels

Subtotal:	0	0	$0	$0

[1] The length provided is only for the portion of the tornado that occurred in Fayette County.

[A] Tornado touchdown verified in the vicinity of this location(s).

Table 10
Tornadoes Reported in Fayette County
1954 - 2019
(Sheet 7 of 7)

Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Deaths	Property Damage	Crop Damage	Description
4/3/2018	3.20 p.m.	Gatch Lake[A] Confidence[A]	EF2	10.87	100	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Gatch Lake Area - the first damage observed was near the intersection of County Rds. 1050E and 1375N where a greenhouse lost portion of its roofing material and suffered other minor damage - continuing northeast toward Gatch Lake several outbuildings and one single family residence were damaged - further northeast at a farm along County Rds. 1200E and 1780N a barn and several silos were destroyed, along with an unoccupied single-wide mobile home *Confidence Area* - continuing its path northeast another outbuilding was destroyed with the debris being tossed downwind hundreds of yards into an open field - the greatest tornado damage occurred to a residence near the intersection of IL Rte. 185 and County Rd. 1250E: the garage was destroyed, and the roof and southeast walls of the home were ripped off - the tornado began to weaken as it moved further northeast only causing minor damage to an outbuilding and downing trees in a narrow path										
Subtotal:						**0**	**0**	**$0**	**$0**	
GRAND TOTAL:						**12**	**0**	**$3,745,250**	**$0**	

[1] The length provided is only for the portion of the tornado that occurred in Fayette County.

[A] Tornado touchdown verified in the vicinity of this location(s).

Sources: National Weather Service, Weather Forecast Office – Central Illinois, Chris Miller, Warning Coordination Meteorologist.
NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database.

Table 11
Drought Events Reported in Fayette County
1980 – 2019
(Sheet 1 of 2)

Year	Date Range	Magnitude (Drought Intensity Category)					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	n/a						74.3%	57.6%	No	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 1988 thru September 1989						46.4%	30.0%	No	n/a	Approximately half of all Illinois counties were impacted by drought conditions
2005	May 2005 thru November 2005	X	X				31.6%	17.0%	Yes	n/a	93 Illinois counties were designated as agricultural disaster areas due to drought
2007	July 2007 thru January 2008	X	X				---	27.5%	No	n/a	
2011	August 2011 thru October 2011	X	X				13.4%	17.7%	Yes	n/a	
Subtotal:										$0	

[1] An "X" in a Drought Intensity Category column indicates that level of drought was reached by at least a portion of the County during the event.

Acronyms:

US Drought Monitor – Drought Intensity Categories

D0	abnormally dry	D3	extreme drought
D1	moderate drought	D4	exceptional drought
D2	severe drought		

Table 11
Drought Events Reported in Fayette County
1980 – 2019
(Sheet 2 of 2)

Year	Date Range	Magnitude (Drought Intensity Category)					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			
2012	June 2012 thru November 2012	X	X	X	X		78.8%	13.0%	Yes	n/a	66 counties in Illinois were designated as primary natural disaster areas due to damage and losses caused by drought and extreme heat
Subtotal:										$0	
GRAND TOTAL:										**$0**	

[1] An "X" in a Drought Intensity Category column indicates that level of drought was reached by at least a portion of the County during the event.

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.

Acronyms:

US Drought Monitor – Drought Intensity Categories			
D0	abnormally dry	D3	extreme drought
D1	moderate drought	D4	exceptional drought
D2	severe drought		

Table 12
IEMA Recorded Pipeline Releases Involving Hazardous Substances - 2010 – 2019
Sheet 1 of 3

Date	Area	Location	Hazardous Substance Released	Evacuations	Injuries/ Fatalities
2/22/2010	St. Elmo[1]	5 Miles of St. Elmo	Crude oil/ salt water	N/A	N/A
2/26/2010	St. Elmo[1]	6 miles North and 1 mile East of St. Elmo	Crude oil	N/A	N/A
6/24/2010	St. Elmo[1]	7 miles North of St. Elmo at M.M. 2625N and 1200E	Crude oil	N/A	N/A
7/25/2010	St. Elmo[1]	2625N and 2100 E, Cynthia Hopper #2	Crude oil	N/A	N/A
12/27/2010	St. Elmo[1]	2625N, 0.1 mile West of 2100 E	Crude oil	N/A	N/A
1/28/2011	St. Elmo[1]	Section 33, Township 8, Range 3	Oil and salt water	N/A	N/A
3/22/2011	St. Elmo[1]	Section 27, Township 8N, Range 3E	Crude oil & salt water	N/A	N/A
4/11/2011	St. Elmo[1]	JT Wright #8	Oil	N/A	N/A
4/26/2011	St. Elmo[1]	Section 6, Township 7W, Range 3E	Crude oil	N/A	N/A
5/19/2011	Beecher City	Section 25, Township 9N, Range 3E	Crude oil	N/A	N/A
6/17/2011	St. Elmo[1]	Section 28, Township 8N, Range 3E	Oil	N/A	N/A
2/19/2012	St. Elmo[1]	Section 22, Township 8, Range 3 East	Gasoline	N/A	N/A
3/27/2012	St. Elmo[1]	Wolf Creek	Crude oil and salt water	N/A	N/A
4/23/2012	St. Elmo[1]	Section 33, Township 8N, Range 3E	Crude oil and salt water	N/A	N/A
5/12/2012	St. Elmo[1]	2625 North	Crude oil	N/A	N/A
5/15/2012	St. Elmo[1]	Section 21, Township 8 North, Range 3 East	Salt water and oil	N/A	N/A
12/11/2012	St. Elmo[1]	Section 5, Township 7 North, Range 3 East	Oil and salt water	N/A	N/A

[1] Accident verified in the vicinity of this area.

Table 12
IEMA Recorded Pipeline Releases Involving Hazardous Substances - 2010 – 2019
Sheet 2 of 3

Date	Area	Location	Hazardous Substance Released	Evacuations	Injuries/ Fatalities
2/4/2013	St. Elmo^	Section 22, Township 8N, Range 3E	Crude oil and salt water	N/A	N/A
4/23/2013	St. Elmo^	Section 29, Township 8N, Range 3E	Oil and salt water	N/A	N/A
2/28/2014	St. Elmo^	Section 7, Township 7N, Range 3E	Crude oil and salt water	N/A	N/A
4/20/2014	Beecher City^	Loudon township, Section 2	Crude oil and salt water	N/A	N/A
7/23/2014	St. Elmo^	Section 5, Township 7N, Range 3E	Crude oil and salt water mixture	N/A	N/A
8/12/2014	St. Elmo^	Section 22, Township 8N, Range 3E	Oil and salt water mixture	N/A	N/A
2/9/2015	St. Elmo^	Section 21, Township 8N, Range 3E	Crude oil and salt water	N/A	N/A
7/31/2015	Beecher City^	Section 11, Township 8N, Range 3E	Salt water	N/A	N/A
8/22/2015	Wright's Corner^	½ Mile from the intersection of County Rd. 2325E and 2950N	Salt water	N/A	N/A
9/13/2015	St. Elmo^	Rural Fayette County	5 barrels of crude oil and trace amounts of salt water	N/A	N/A
10/2/2015	Ramsey^	2.36 miles SSW of the intersection of County #15 and County Highway #26	Biodegradable hydraulic fluid (ECO-FLO Canola Oil)	N/A	N/A
2/5/2016	St. Elmo	¼ mile North of the intersection if 2450N & 2000E	Salt water	N/A	N/A
3/7/2016	Wright's Corner^	2 miles Southwest of Beecher City	Crude oil	N/A	N/A
4/21/2016	St. Elmo^	5 miles North of St. Elmo	Salt water/ crude oil	N/A	N/A

^ Accident verified in the vicinity of this area.

Table 12
IEMA Recorded Pipeline Releases Involving Hazardous Substances - 2010 – 2019
Sheet 3 of 3

Date	Area	Location	Hazardous Substance Released	Evacuations	Injuries/ Fatalities
8/8/2016	Wright's Corner[^]	¼ mile South of 2250E and 3050N in a ditch that is a tributary of Hog Creek	Salt water	N/A	N/A
2/12/2018	St. Elmo[^]	Field in Loudon Township	Crude oil and salt water	N/A	N/A

[^] Accident verified in the vicinity of this area.

Source: Illinois Emergency Management Agency, Hazardous Materials Incident Reports.

Table 13
Hazmat Incidents in Fayette County: 2010 – 2019
(Sheet 1 of 5)

Date	Location	Hazardous Substances Released
2010		
02/22	St. Elmo^	Crude oil/ salt water*
02/25	Vandalia^	Live stock waste†
02/26	St. Elmo^	Crude oil*
03/11	St. Elmo^	Salt water
03/17	St. Elmo^	Salt water
03/29	St. Elmo^	Salt water
04/01	St. Elmo^	Salt water
04/04	St. Elmo^	Salt water
04/12	St. Elmo^	Salt water
04/15	St. Elmo^	Crude oil
04/29	Brownstown^	Crude oil
05/20	St. Elmo^	Crude oil, processed water (salt water)
06/14	St. Elmo^	Petroleum product
06/24	St. Elmo^	Crude oil*
07/25	St. Elmo^	Crude oil*
09/07	St. Elmo^	Salt water
10/25	St. Elmo^	Salt water
11/29	St. Elmo^	Salt water
12/09	St. Elmo^	Salt water
12/27	St. Elmo^	Crude oil and salt water*
12/30	St. Elmo^	Crude oil
2011		
01/06	St. Elmo^	Salt water
01/28	St. Elmo^	Oil and salt water*
03/22	St. Elmo^	Crude oil and salt water*
04/11	St. Elmo^	Diesel fuel, gasoline, and kerosene
04/11	St. Elmo^	Oil*
04/26	St. Elmo^	Crude oil*
05/17	Vandalia	Gasoline
05/19	Beecher City	Crude oil*
05/25	St. Elmo^	Crude oil*
06/12	St. Elmo	Produced salt water
06/13	St. Elmo^	Salt water
06/17	St. Elmo^	Oil*
07/09	St. Elmo^	Salt water
09/28	St. Elmo^	Salt water
11/01	St. Elmo^	Salt water
11/04	Shobonier^	Liquid cattle waste
12/20	Farina	Ink oil

^ Incident verified in the vicinity of this location.
† Incident involved the transportation of a hazardous substance by roadway.
* Incident involved the transportation for a hazardous substance by pipeline.
§ Incident involved the transportation of a hazardous substance by rail.
+ Incident involved the transportation of a hazardous substance by waterway.

Table 13
Hazmat Incidents in Fayette County: 2010 – 2019
(Sheet 2 of 5)

Date	Location	Hazardous Substances Released
2012		
01/02	St. Elmo^	Salt water
01/27	St. Elmo^	Salt water
02/19	St. Elmo^	Gasoline*
03/27	St. Elmo^	Crude oil and salt water*
04/18	St. Elmo^	Crude oil & salt water
04/23	St. Elmo^	Crude oil and salt water*
05/08	Vandalia	Diesel fuel†
05/10	Shobonier^	Anhydrous ammonia†
05/12	St. Elmo^	Salt water and oil*
05/18	Farina^	Diesel fuel†
05/25	St. Elmo^	Salt water
05/31	St. Elmo^	Salt water
06/04	St. Elmo^	Salt water
07/11	Vandalia	Crude oil†
07/12	St. Elmo^	Salt water
08/08	St. Elmo^	Salt water
08/12	St. Elmo^	Salt water
09/10	St. Elmo^	Crude oil and salt water
11/21	St. Elmo^	Oil and salt water
12/11	St. Elmo^	Oil and salt water*
2013		
02/04	St. Elmo^	Crude oil and salt water*
03/13	St. Elmo^	Crude oil and salt water
03/30	St. Elmo^	Salt water
04/23	St. Elmo^	Oil and salt water*
05/03	St. Elmo	Crude oil
05/09	St. Elmo	Oil and salt water
05/12	Bluff City^	Diesel fuel†
05/17	St. Elmo^	Salt water
05/21	St. Peter	Anhydrous ammonia†
05/28	St. Elmo	Crude oil
08/20	St. Elmo	Salt water
08/28	St. Elmo^	Salt water
09/01	Beecher City^	Crude oil
12/31	St. Elmo^	Salt water

^ Incident verified in the vicinity of this location.
† Incident involved the transportation of a hazardous substance by roadway.
* Incident involved the transportation for a hazardous substance by pipeline.
§ Incident involved the transportation of a hazardous substance by rail.
+ Incident involved the transportation of a hazardous substance by waterway.

Table 13
Hazmat Incidents in Fayette County: 2010 – 2019
(Sheet 3 of 5)

Date	Location	Hazardous Substances Released
2014		
02/26	St. Elmo^	Crude oil
02/28	St. Elmo^	Crude oil and salt water*
04/20	Beecher City	Crude oil and salt water*
06/03	St. Peter^	Diesel fuel§
06/05	St. Elmo^	Salt water
06/28	St. Elmo^	Salt water mixed with crude oil
07/23	St. Elmo^	Crude oil and salt water mixture*
08/12	St. Elmo^	Oil and salt water mixture*
09/02	St. Elmo^	Crude oil and salt water
10/07	Ramsey	Gasoline and heating oil
10/24	Hagarstown^	Diesel fuel†
12/22	St. Elmo	Crude oil and salt water
2015		
02/09	St. Elmo^	Crude oil and salt water*
03/02	St. Elmo	Salt water
04/13	St. Elmo	Crude oil
05/12	St. Elmo	Unknown petroleum product, suspected crude oil
06/22	St. Elmo	Crude oil+
07/20	St. Elmo	Salt water
07/31	Beecher City^	Salt water*
08/22	Wrights Corner^	Salt water*
09/13	St. Elmo^	5 barrels of crude oil and trace amounts of salt water*
09/21	St. Elmo^	Salt water
09/29	Wrights Corner	Salt water
10/02	Ramsey^	Biodegradable Hydraulic Fluid (ECO-FLO Canola Oil) *
10/24	Farina	Diesel
10/26	Wrights Corner^	Salt water
11/15	St. Elmo^	Crude oil
2016		
01/06	Beecher City	Crude oil and salt water
02/05	St. Elmo	Salt water*
03/07	Wrights Corner^	Crude oil*
04/21	St. Elmo^	Salt water and crude oil*
05/08	St. Elmo	Crude oil and salt water mixture
06/21	St. Elmo^	Produced salt water
07/11	St. Elmo	Salt water

^ Incident verified in the vicinity of this location.
† Incident involved the transportation of a hazardous substance by roadway.
* Incident involved the transportation for a hazardous substance by pipeline.
§ Incident involved the transportation of a hazardous substance by rail.
+ Incident involved the transportation of a hazardous substance by waterway.

Table 13
Hazmat Incidents in Fayette County: 2010 – 2019
(Sheet 4 of 5)

Date	Location	Hazardous Substances Released
2016 Continued…		
08/05	St. Elmo	Salt water
08/05	St. Elmo^	Salt water
08/08	Wrights Corner^	Salt water*
08/16	St. Elmo	Crude oil and salt water
08/31	Wrights Corner^	Oil and salt water
09/07	St. Elmo^	Oil and salt water
09/09	Wrights Corner^	Crude oil and salt water
09/14	Wrights Corner^	Salt water
11/08	St. Elmo^	Salt water
11/14	Brownstown	Diesel fuel†
2017		
03/06	St. Elmo	Oil
04/13	Farina	Fuel oil
06/16	St. Elmo^	Salt water and oil
06/21	Wrights Corner^	Salt water
07/07	Vandalia	Gasoline
07/25	Wrights Corner^	Salt water
2018		
01/19	Wrights Corner^	Crude oil and salt water
02/12	St. Elmo^	Crude oil*
03/01	St. Elmo	Crude oil
03/19	St. Elmo^	Crude oil and produced salt water
03/23	Wrights Corner^	Salt water
04/12	St. Elmo^	Crude oil
05/22	Wrights Corner^	Salt water
06/19	Wrights Corner^	Salt water
09/12	Wrights Corner^	Salt water
09/21	St. Elmo^	Salt water
09/24	Farina	Monochloroacetic acid†

^ Incident verified in the vicinity of this location.
† Incident involved the transportation of a hazardous substance by roadway.
* Incident involved the transportation for a hazardous substance by pipeline.
§ Incident involved the transportation of a hazardous substance by rail.
+ Incident involved the transportation of a hazardous substance by waterway.

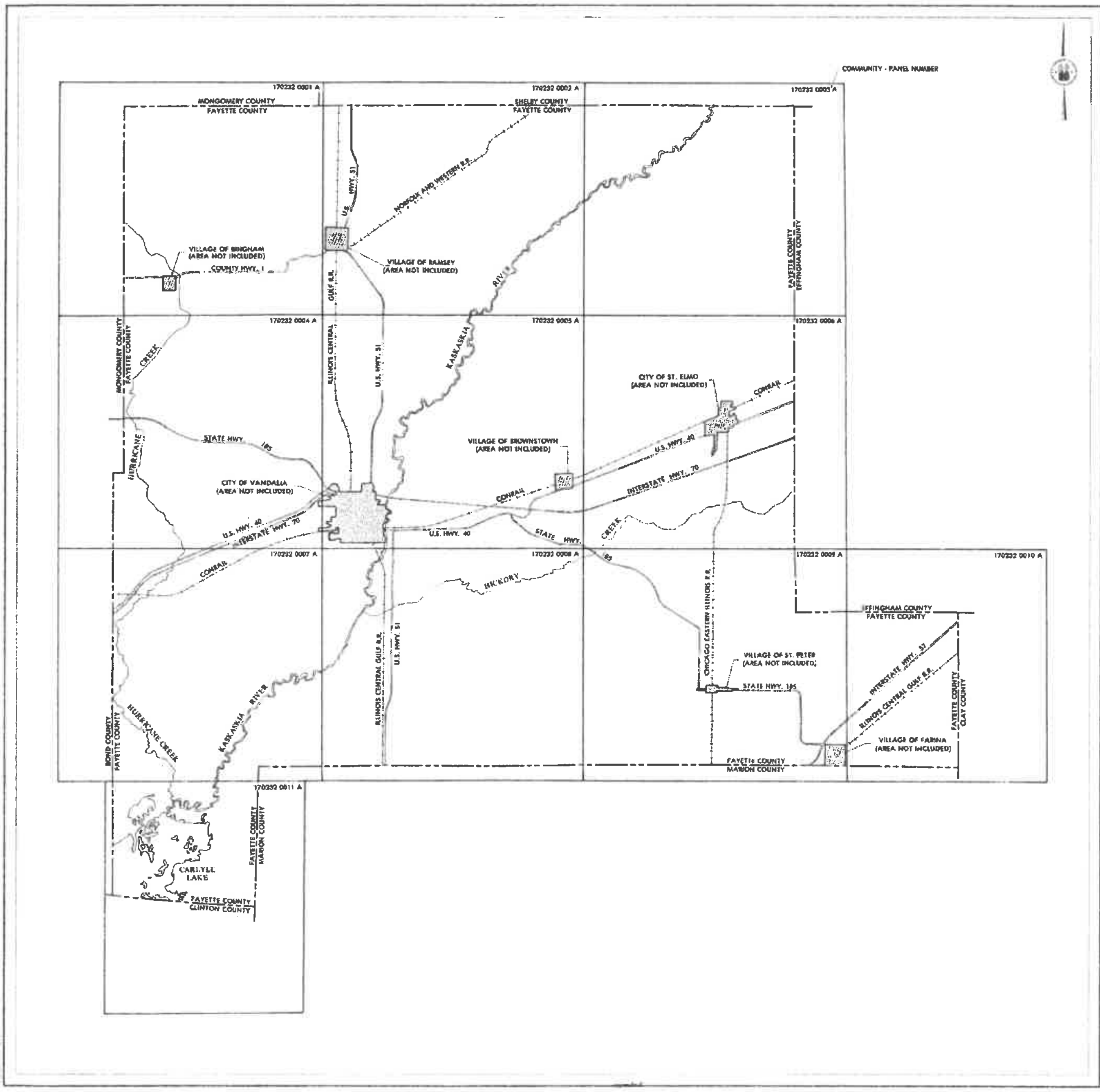
Table 13
Hazmat Incidents in Fayette County: 2010 – 2019
(Sheet 5 of 5)

Date	Location	Hazardous Substances Released
2019		
02/25	Wrights Corner^	Salt water
04/24	Farina^	Anhydrous ammonia†
05/06	St. Elmo^	Crude oil and salt water
07/10	St. Elmo^	Salt water
07/12	Vandalia^	Gasoline (presumed)
08/08	Wrights Corner ^	Salt water
11/08	St. Elmo^	Salt water
12/02	St. Elmo	Salt water
12/11	Wrights Corner^	Crude oil

^ Incident verified in the vicinity of this location.
† Incident involved the transportation of a hazardous substance by roadway.
* Incident involved the transportation for a hazardous substance by pipeline.
§ Incident involved the transportation of a hazardous substance by rail.
+ Incident involved the transportation of a hazardous substance by waterway.

FIRMs for Participating Jurisdictions

Appendix K



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170232 0002 A
170232 0003 A
170232 0004 A
170232 0005 A
170232 0006 A
170232 0007 A
170232 0008 A
170232 0009 A
170232 0010 A
170232 0011 A
MONGOMERY COUNTY
FAYETTE COUNTY
SHELBY COUNTY
FAYETTE COUNTY
NORFOLK AND WESTERN R.R.
U.S. HWY. 51
VILLAGE OF BINGHAM (AREA NOT INCLUDED)
COUNTY HWY. 1
VILLAGE OF RAMSEY (AREA NOT INCLUDED)
ILLINOIS CENTRAL GULF R.R.
KASKASKIA RIVER
FAYETTE COUNTY
EFFINGHAM COUNTY
MONTGOMERY COUNTY
FAYETTE COUNTY
CREEK
HURRICANE
STATE HWY. 185
CITY OF VANDALIA (AREA NOT INCLUDED)
CITY OF ST. ELMO (AREA NOT INCLUDED)
CONRAIL
VILLAGE OF BROWNSTOWN (AREA NOT INCLUDED)
U.S. HWY. 40
INTERSTATE HWY. 70
CREEK
HICKORY
EFFINGHAM COUNTY
FAYETTE COUNTY
CHICAGO EASTERN ILLINOIS R.R.
VILLAGE OF ST. PETER (AREA NOT INCLUDED)
INTERSTATE HWY. 57
ILLINOIS CENTRAL GULF R.R.
FAYETTE COUNTY
CLAY COUNTY
VILLAGE OF FARINA (AREA NOT INCLUDED)
FAYETTE COUNTY
MARION COUNTY
BOND COUNTY
FAYETTE COUNTY
HURRICANE CREEK
FAYETTE COUNTY
MARION COUNTY
CARLYLE LAKE
FAYETTE COUNTY
CLINTON COUNTY

KEY TO SYMBOLS

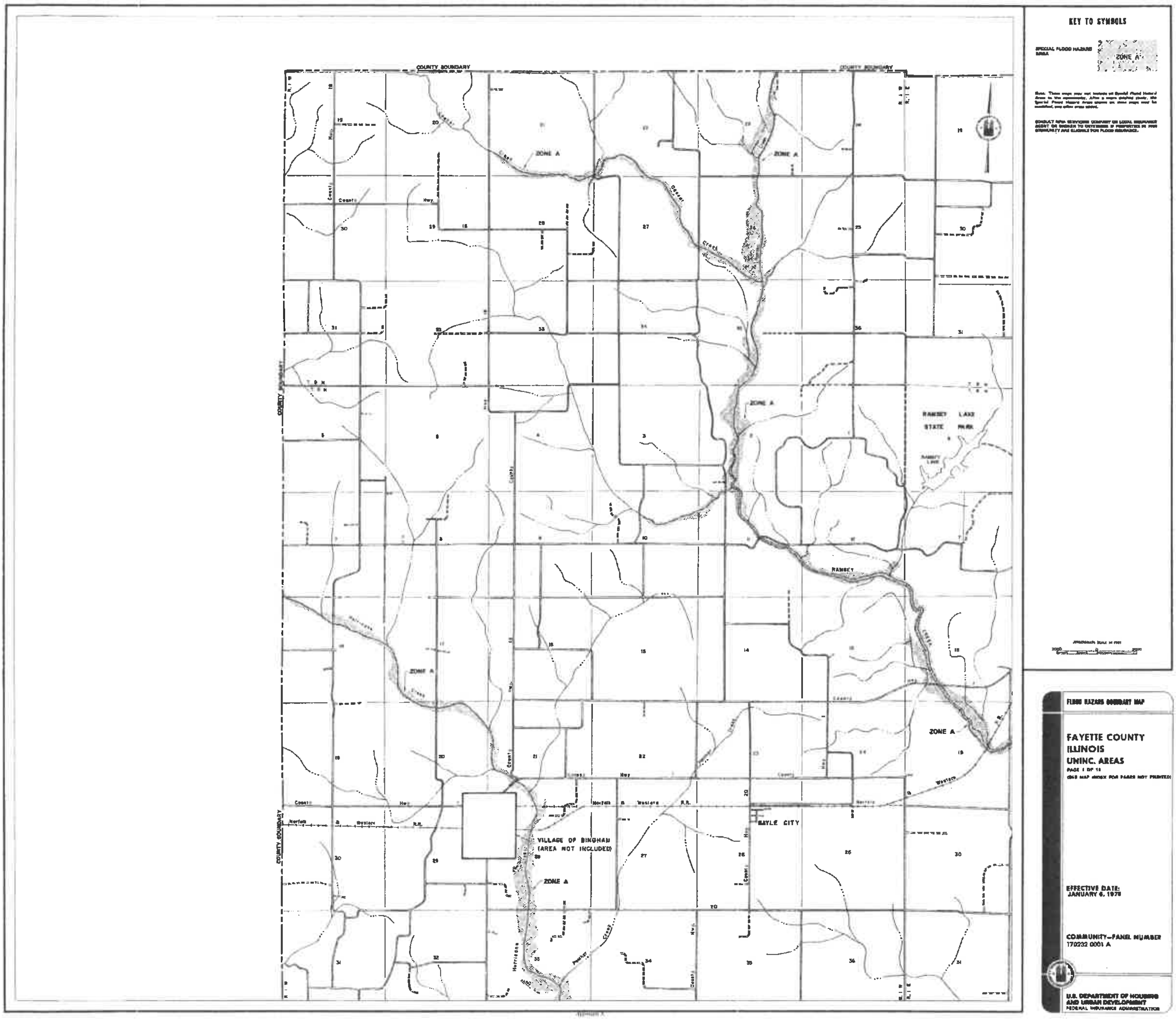
ZONE A

FAYETTE COUNTY
ILLINOIS
UNINC. AREAS

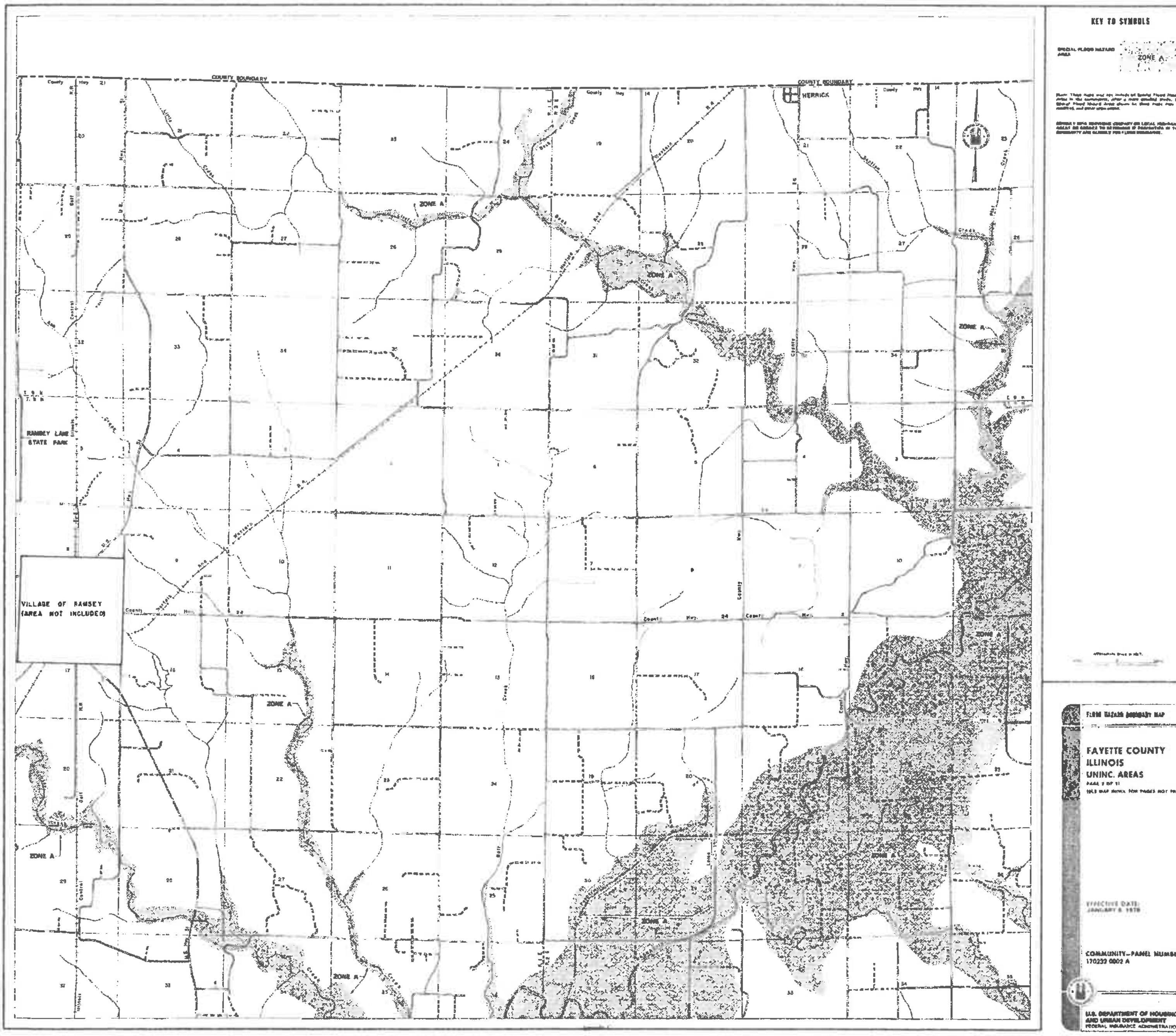
MAP INDEX

COMMUNITY-PANEL NUMBER
170232 0001 - 0011

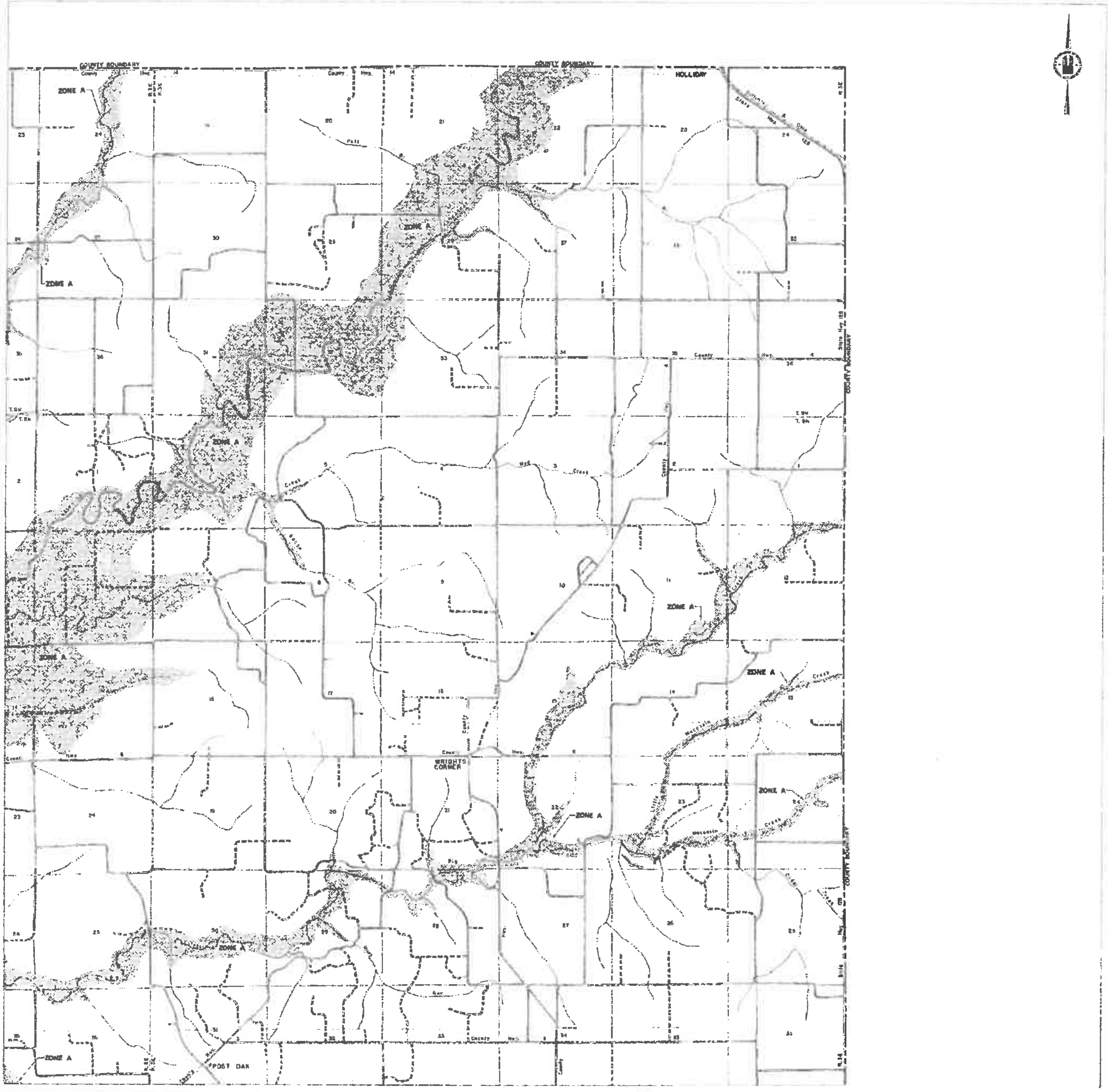
U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT



KEY TO SYMBOLS
SPECIAL FLOOD HAZARD AREA
ZONE A
COUNTY BOUNDARY
ZONE A
RAMSEY LAKE STATE PARK
VILLAGE OF BINGHAM (AREA NOT INCLUDED)
BAYLE CITY
FLOOD HAZARD BOUNDARY MAP
FAYETTE COUNTY
ILLINOIS
UNINC. AREAS
EFFECTIVE DATE:
JANUARY 6, 1978
COMMUNITY–PANEL NUMBER
170232 0001 A
U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION



KEY TO SYMBOLS
ZONE A
FLOOD HAZARD BOUNDARY MAP
FAYETTE COUNTY
ILLINOIS
UNINC. AREAS
COMMUNITY–PANEL NUMBER
170232 0002 A
U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION
COUNTY BOUNDARY
HERRICK
RAMSEY LAKE
STATE PARK
VILLAGE OF RAMSEY
(AREA NOT INCLUDED)
ZONE A
County Hwy. 24



KEY TO SYMBOLS

SPECIAL FLOOD HAZARD AREA — ZONE A

FLOOD HAZARD BOUNDARY MAP

FAYETTE COUNTY
ILLINOIS
UNINC. AREAS

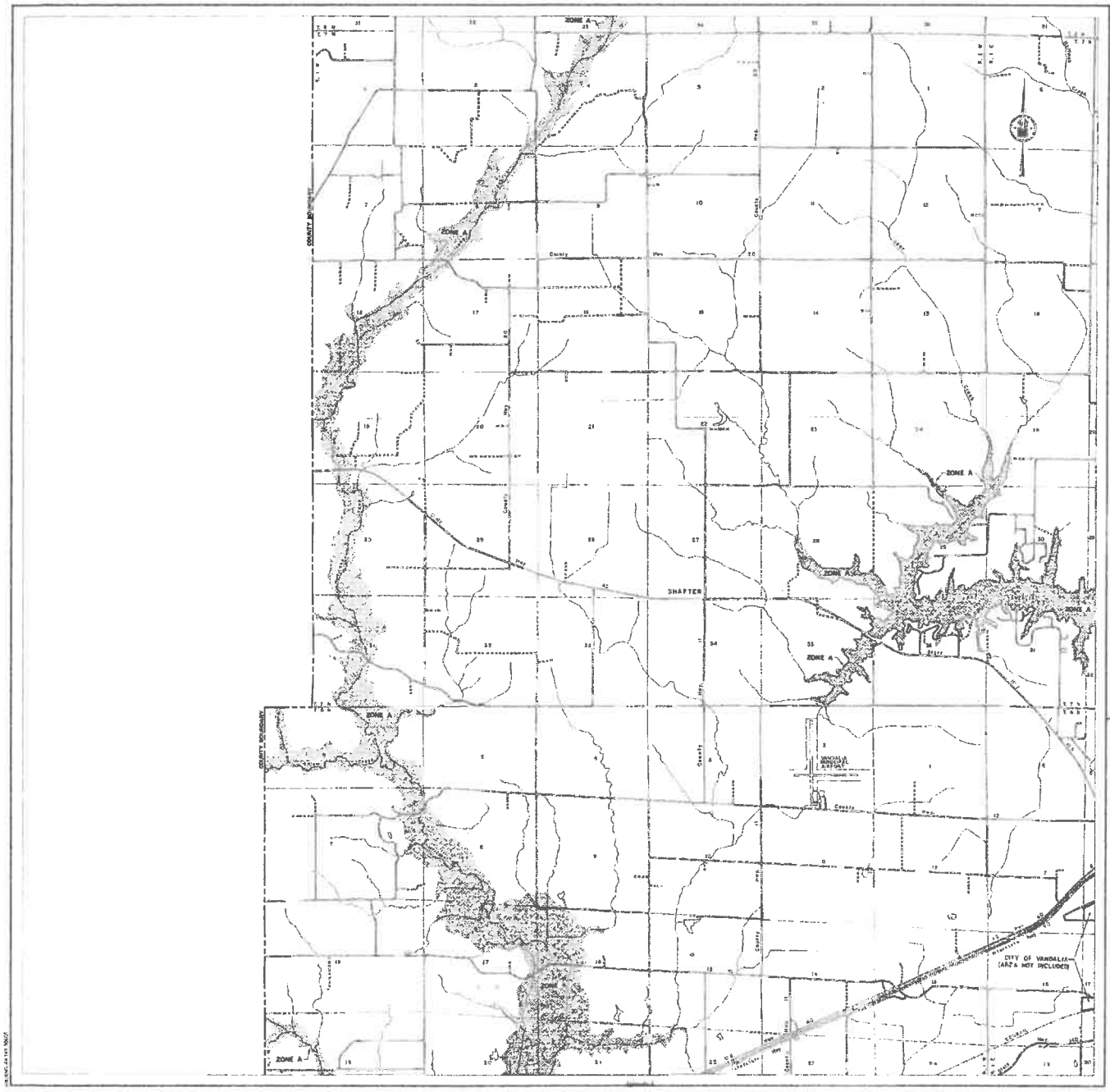
PAGE 2 OF 11

(SEE MAP INDEX FOR PAGES NOT PRINTED)

EFFECTIVE DATE:
JANUARY 6, 1978

COMMUNITY–PANEL NUMBER
170232 0002 A

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT



KEY TO SYMBOLS

SPECIAL FLOOD HAZARD AREA

ZONE A

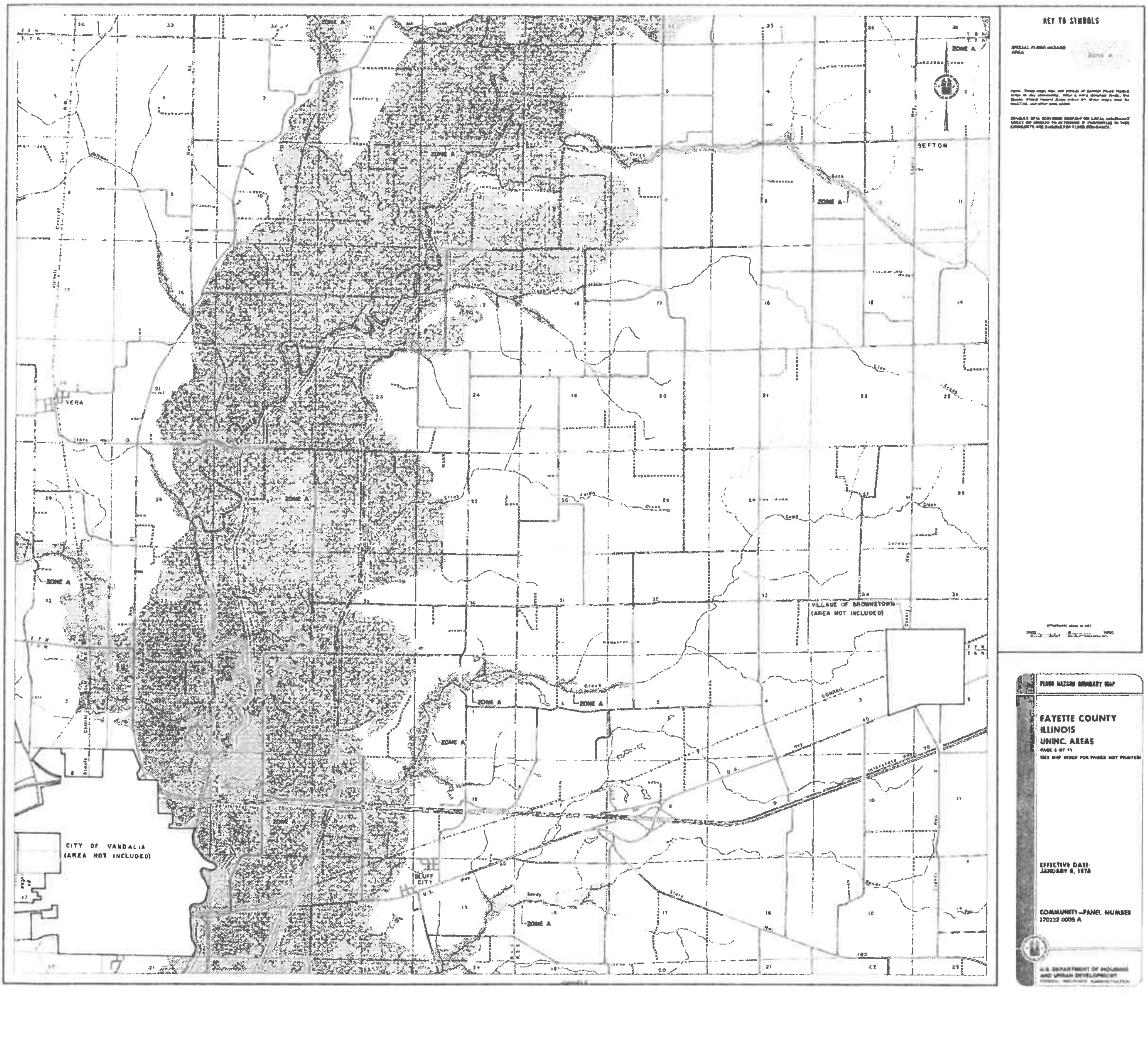
FLOOD INSURANCE RATE MAP

FAYETTE COUNTY ILLINOIS UNINC. AREAS

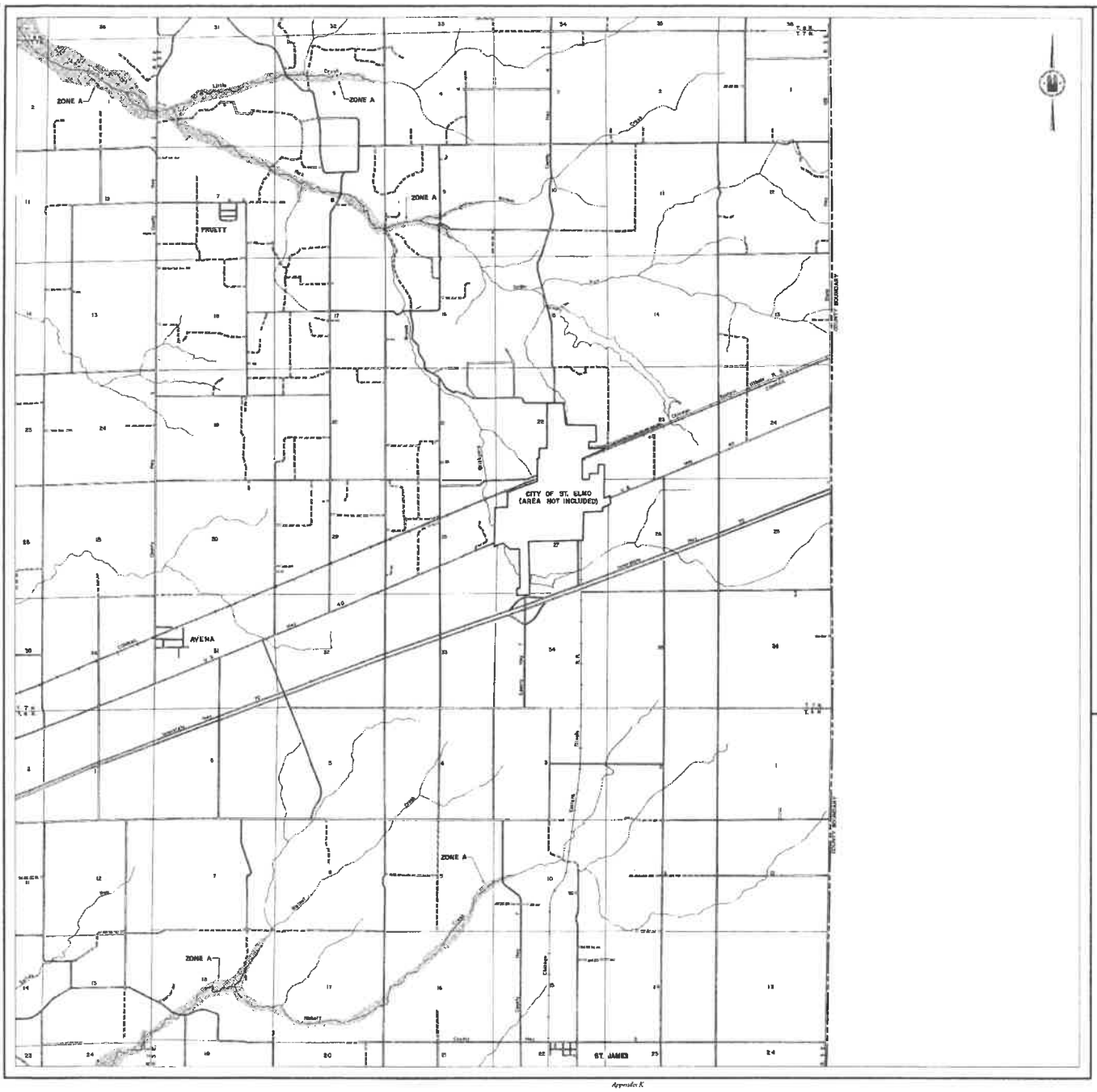
EFFECTIVE DATE: JANUARY 6, 1978

COMMUNITY - PANEL NUMBER 170222 0004 A

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION



KEY TO SYMBOLS
ZONE A
SEFTON
VERA
CITY OF VANDALIA
(AREA NOT INCLUDED)
VILLAGE OF BROWNSTOWN
(AREA NOT INCLUDED)
BLUFF CITY
CONRAIL
Interstate 70
FLOOD HAZARD BOUNDARY MAP
FAYETTE COUNTY
ILLINOIS
UNINC. AREAS
EFFECTIVE DATE:
JANUARY 6, 1978
COMMUNITY-PANEL NUMBER
170232 0005 A
U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT



KEY TO SYMBOLS

SPECIAL FLOOD HAZARD AREA — ZONE A

Note: These maps may not indicate all Special Flood Hazard Areas in the community. Only a map's printed areas, the Special Flood Hazard Areas shown on these maps may be modified, and other areas added.

FEDERAL FLOOD INSURANCE ASSISTANCE AGENT CAN ASSIST IN DETERMINE IF PROPERTIES IN THIS COMMUNITY ARE ELIGIBLE FOR FLOOD INSURANCE.

APPROXIMATE SCALE IN FEET

2000 0 2000

FLOOD HAZARD BOUNDARY MAP

FAYETTE COUNTY ILLINOIS UNINC. AREAS

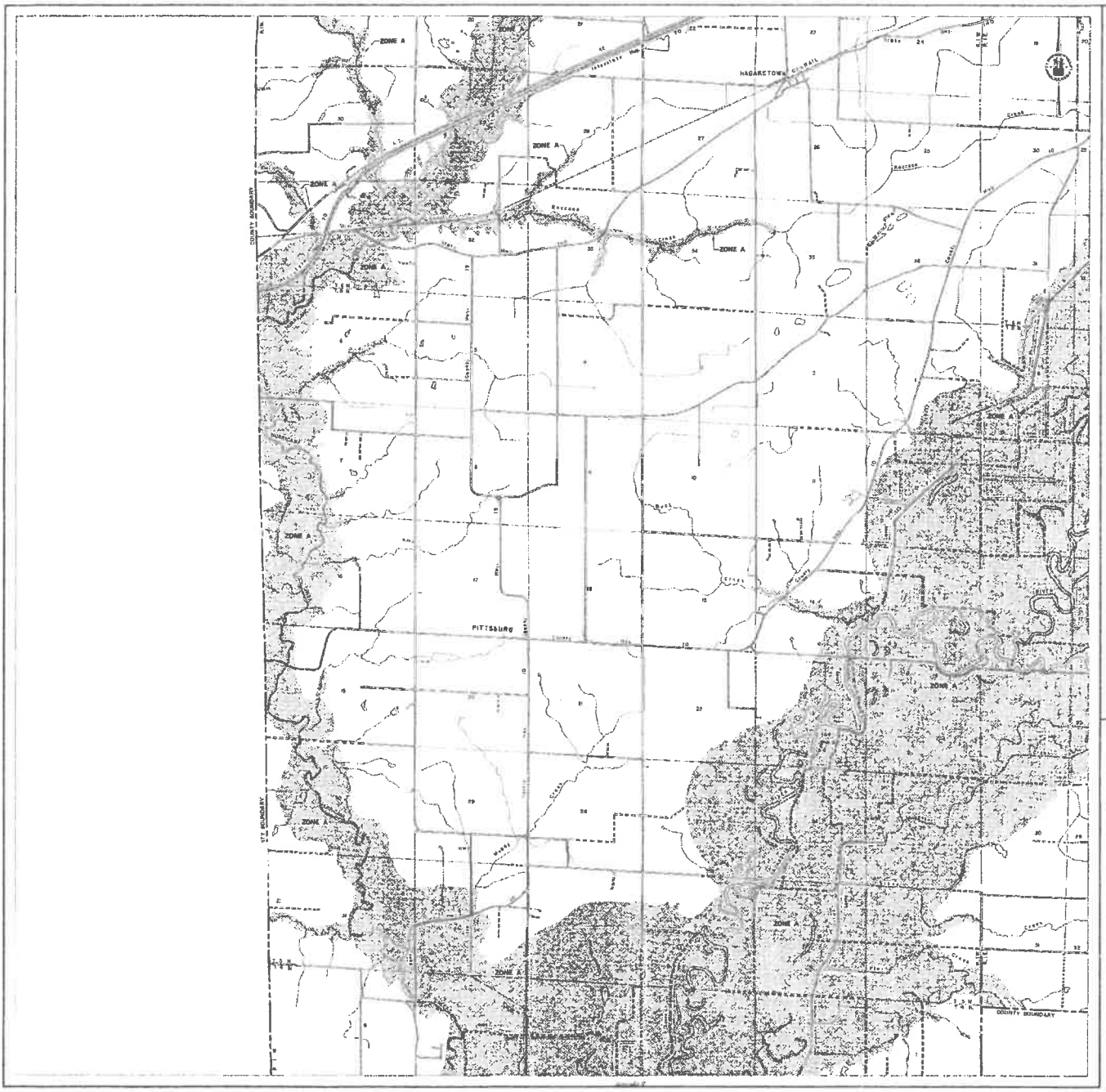
PANEL 6 OF 11

SEE MAP INDEX FOR PANELS NOT PRINTED

EFFECTIVE DATE: JANUARY 6, 1978

COMMUNITY–PANEL NUMBER 170222 0006 A

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION



KEY TO SYMBOLS

SPECIAL FLOOD HAZARD AREA — ZONE A

FLOOD HAZARD BOUNDARY MAP

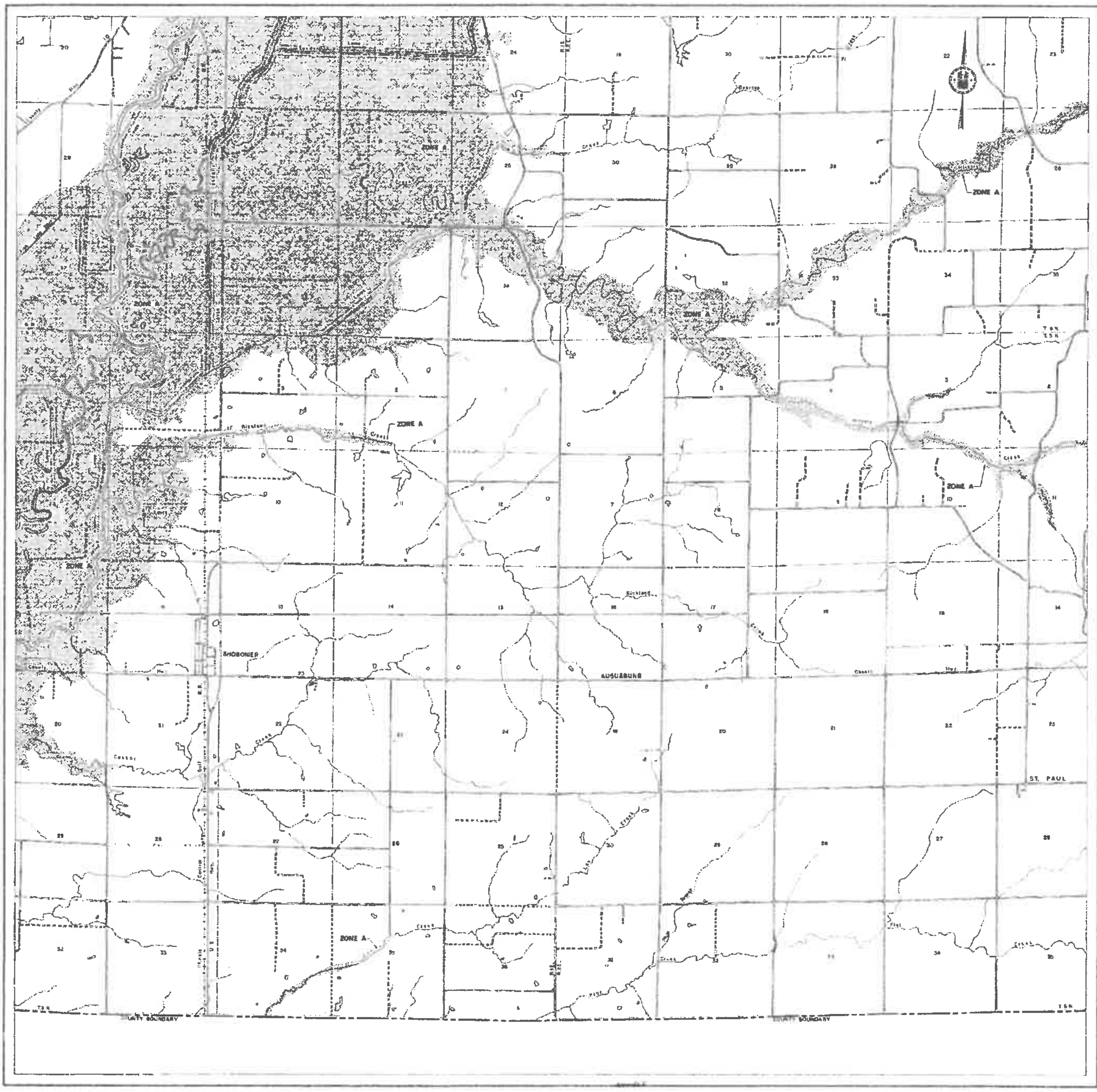
FAYETTE COUNTY
ILLINOIS
UNINC. AREAS

PANEL 7 OF 11
(SEE MAP INDEX FOR PANELS NOT PRINTED)

EFFECTIVE DATE:
JANUARY 6, 1978

COMMUNITY—PANEL NUMBER
170222 0007 A

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION



KEY TO SYMBOLS

ZONE A

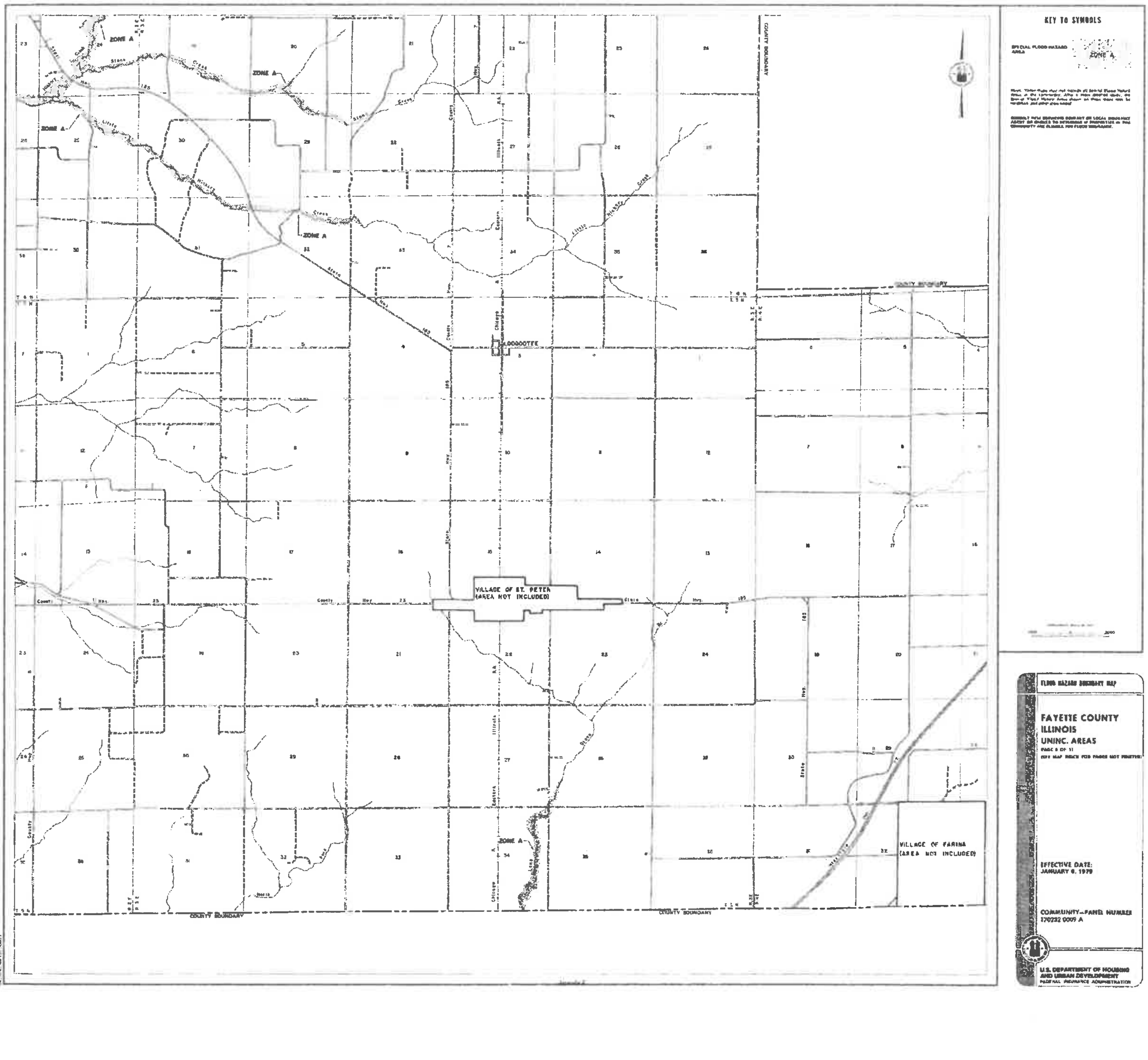
FLOOD HAZARD BOUNDARY MAP

FAYETTE COUNTY
ILLINOIS
UNINC. AREAS

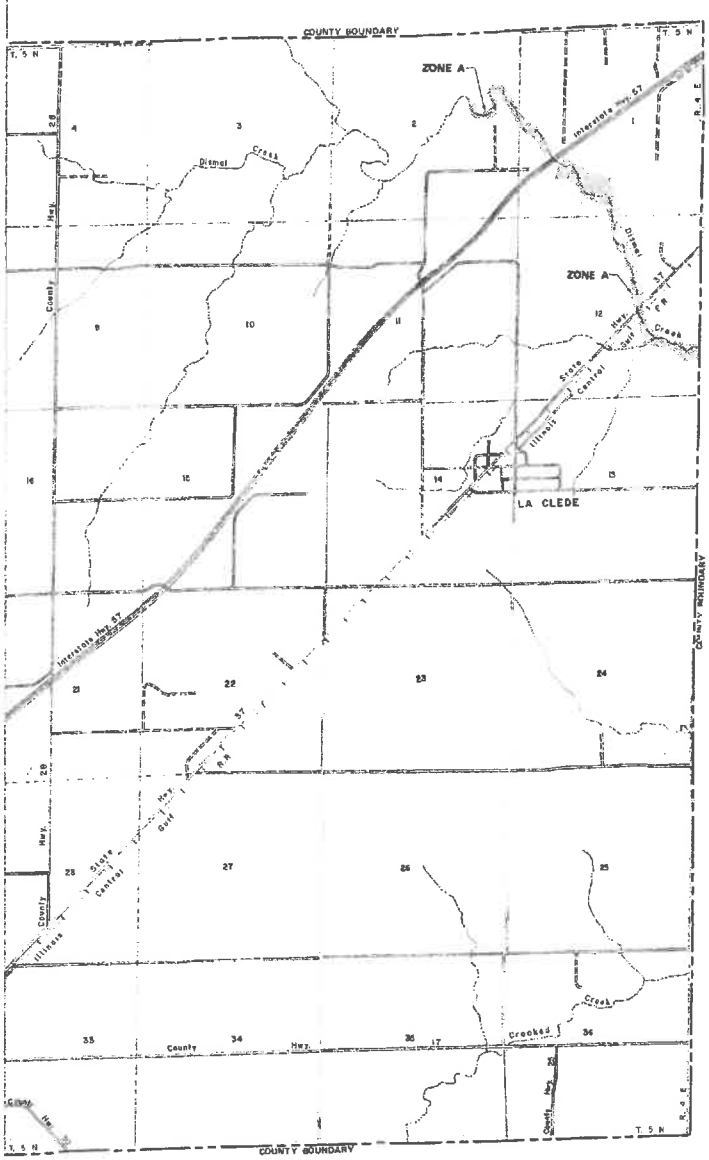
EFFECTIVE DATE:
JANUARY 6, 1978

COMMUNITY–PANEL NUMBER
170232 0008 A

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION



KEY TO SYMBOLS
SPECIAL FLOOD HAZARD AREA
ZONE A
ZONE A
LOGOOTEE
VILLAGE OF ST. PETER
(AREA NOT INCLUDED)
VILLAGE OF FARINA
(AREA NOT INCLUDED)
COUNTY BOUNDARY
FLOOD HAZARD BOUNDARY MAP
FAYETTE COUNTY
ILLINOIS
UNINC. AREAS
EFFECTIVE DATE:
JANUARY 6, 1979
COMMUNITY–PANEL NUMBER
170232 0009 A
U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION



KEY TO SYMBOLS

SPECIAL FLOOD HAZARD AREA — ZONE A

Note: These maps may not include all Special Flood Hazard Areas in the community. After a more detailed study, the Special Flood Hazard Areas shown on these maps may be modified, and other areas added.

CONSULT NFIA SERVICING COMPANY OR LOCAL INSURANCE AGENT OR BROKER TO DETERMINE IF PROPERTIES IN THIS COMMUNITY ARE ELIGIBLE FOR FLOOD INSURANCE.

APPROXIMATE SCALE IN FEET

2000

FLOOD HAZARD BOUNDARY MAP

FAYETTE COUNTY ILLINOIS UNINC. AREAS

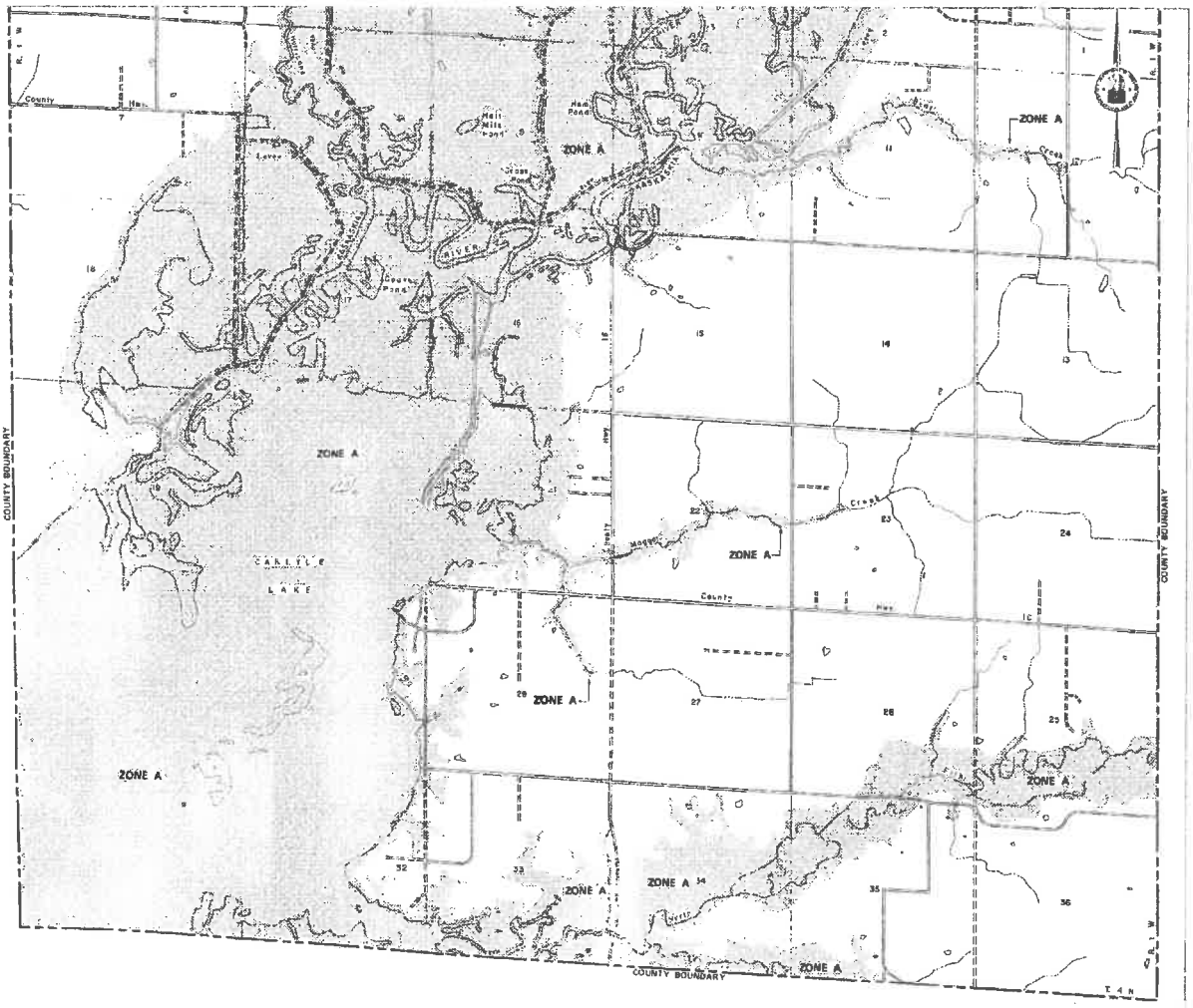
PAGE 10 OF 11

(SEE MAP INDEX FOR PAGES NOT PRINTED)

EFFECTIVE DATE: JANUARY 6, 1978

COMMUNITY - PANEL NUMBER 170232 0010 A

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION



KEY TO SYMBOLS

SPECIAL FLOOD HAZARD AREA — ZONE A

Note: These areas may not include all Special Flood Hazard Areas in the community. After a more detailed study, this Special Flood Hazard Areas shown on flood maps may be modified, and other areas added.

CONSULT YOUR SERVICING COMPANY OR LOCAL INSURANCE AGENT OR BROKER TO DETERMINE IF PROPERTIES IN THIS COMMUNITY ARE ELIGIBLE FOR FLOOD INSURANCE.

APPROXIMATE SCALE IN FEET: 2000

FLOOD HAZARD BOUNDARY MAP

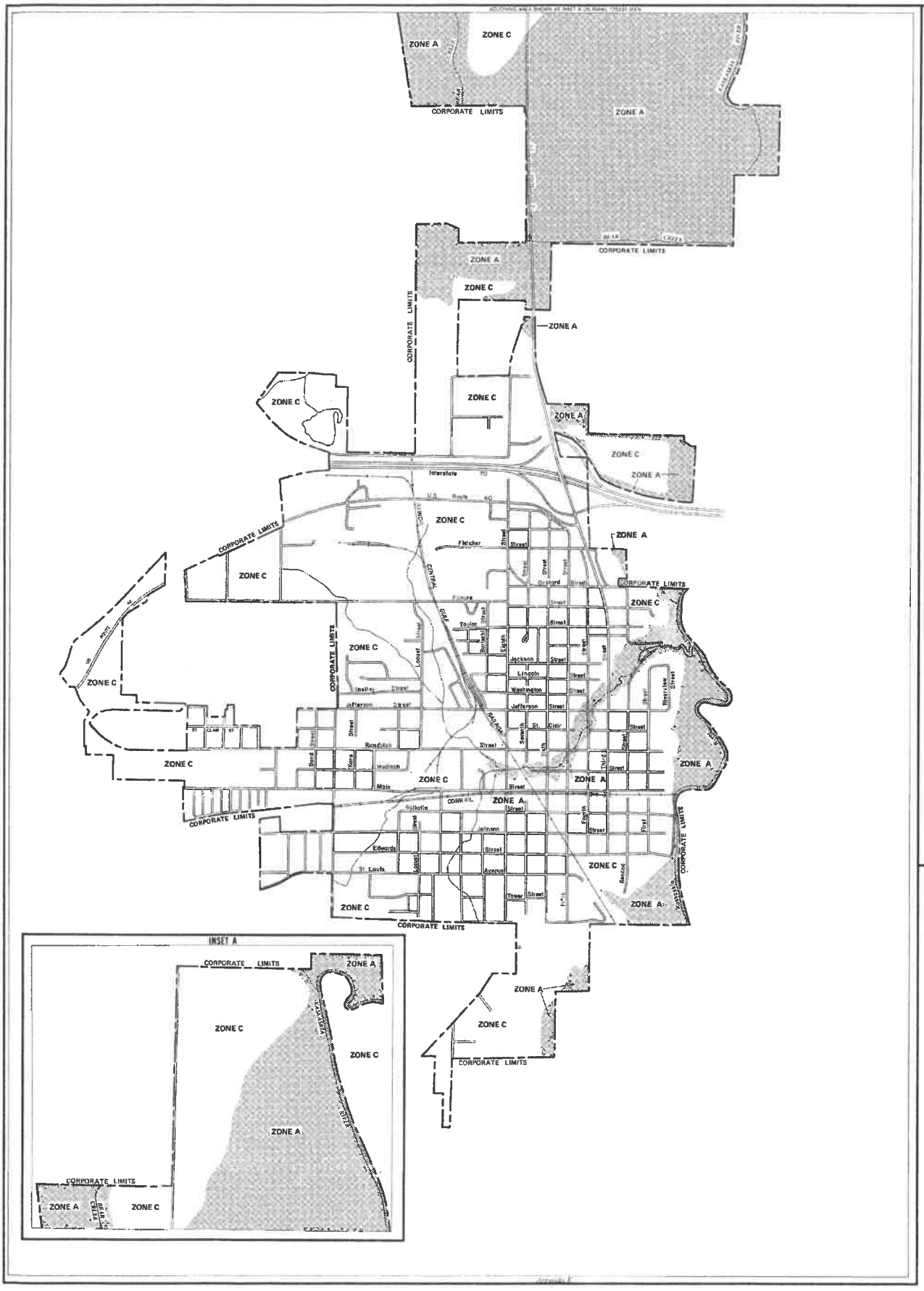
FAYETTE COUNTY ILLINOIS UNINC. AREAS

PAGE 11 OF 11
(SEE MAP INDEX FOR PAGES NOT PRINTED)

EFFECTIVE DATE:
JANUARY 6, 1978

COMMUNITY–PANEL NUMBER
170252 0011 A

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION



KEY TO MAP

Zone Designations*

ZONE C

ZONE A

ZONE C

Base Flood Elevation Line With Elevation In Feet** — 513

Base Flood Elevation In Feet Where Uniform Within Zone** — (EL 987)

Elevation Reference Mark — RM7×

Zone D Boundary

River Mile — •M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

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, or all planimetric features outside Special Flood Hazard Areas.

Certain areas not in the Special Flood Hazard Areas may be protected by flood control structures.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

INITIAL IDENTIFICATION:
MARCH 22, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
MARCH 19, 1976
FEBRUARY 24, 1978
JUNE 15, 1979

FLOOD INSURANCE RATE MAP EFFECTIVE:
JUNE 4, 1987

FLOOD INSURANCE RATE MAP REVISIONS:
Map revised August 16, 1988 to add special flood hazard areas, streets and roads, and to revise corporate limits.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

APPROXIMATE SCALE
1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
VANDALIA,
ILLINOIS
FAYETTE COUNTY

(ONLY PANEL PRINTED)

COMMUNITY-PANEL NUMBER
170233 0005 E

MAP REVISED:
AUGUST 16, 1988

Federal Emergency Management Agency

PLAN ADOPTION RESOLUTIONS

APPENDIX L