Christian County Multi-Jurisdictional All Hazards Mitigation Plan Update

Christian County, Illinois

Participants:

Christian County
Assumption , City of
Edinburg, Village of
Jeisyville, Village of
Kincaid, Village of
Morrisonville, Village of
Mount Auburn, Village of
Palmer, Village of
Pana, City of
Stonington, Village of
Taylorville, City of
Taylorville CUSD #3

October 2020

The five year update of this Plan must be completed on or before January 12, 2026.

CHRISTIAN COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

CHRISTIAN COUNTY, ILLINOIS

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

1.0 INTRODUCTION

Each year natural hazards (i.e., severe thunderstorms, tornadoes, severe winter storms, flooding, etc.) cause damage to property and threaten the lives and health of the residents of Christian County. Since 2002, Christian County has been included in three 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 Christian County is identified in bold.

Figure I-1
Federal Disaster Declarations: Christian 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***

In the last 10 years alone (2010 – 2019), there have been 80 heavy rain events, 38 thunderstorms with damaging winds, 20 excessive heat events, 19 tornadoes, 18 flash flood events, 16 severe winter storms, 10 severe storms with hail one inch in diameter or greater, 3 riverine flood events, 3 droughts, 2 extreme cold events, and 1 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 update an all hazards mitigation plan?

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

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

How is this plan different from other emergency plans?

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 Christian County has updated its hazard mitigation plan since the original plan was prepared in 2010. 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 having an all hazards mitigation plan, the Christian County Board authorized the update of the Christian County Multi-Jurisdictional All Hazards Mitigation Plan (hereto referred to as the Plan). The County then invited all the local government entities within Christian County to participate. **Figure I-2** identifies the participating jurisdictions that are represented in the Plan update.

Figure I-2 **Participating Jurisdictions Represented in the Plan**	
❖ Assumption, City of	❖ Palmer, Village of
❖ Edinburg, Village of	❖ Pana, City of
❖ Jeisyville, Village of	❖ Stonington, Village of
❖ Kincaid, Village of	❖ Taylorville, City of
❖ Morrisonville, Village of	❖ Taylorville CUSD #3
❖ Mount Auburn, Village of	

While a small portion of Moweaqua extends into Christian County, the Village proper is located in Shelby County. As a result, the Village chose to participate in the Shelby County Multi-Hazard Mitigation Plan. Therefore, Moweaqua's risk and/or vulnerability is not discussed in this Plan.

1.2 COUNTY PROFILE

Christian County is located in central Illinois and covers approximately 716 square miles. **Figure I-3** provides a location map of the County and the participating municipalities while **Figure I-4** identifies the Taylorville Community Unit School District #3 boundaries. The County is situated in the Central Lowland Province of the Till Plains Section and lies entirely within the Springfield Plain physiographic division. The Springfield Plain includes level portions of the Illinois drift sheet in central and southern Illinois and is characterized mainly by its flatness and by its relatively shallow entrenchment of drainage. The Sangamon River forms the northern boundary of the County.

The County bounded on the north by Sangamon and Macon counties, to the east by Shelby County, to the south by Shelby and Montgomery counties and to the west by Montgomery and Sangamon counties. The City of Taylorville is the county seat.

Figure I-3
Location Map

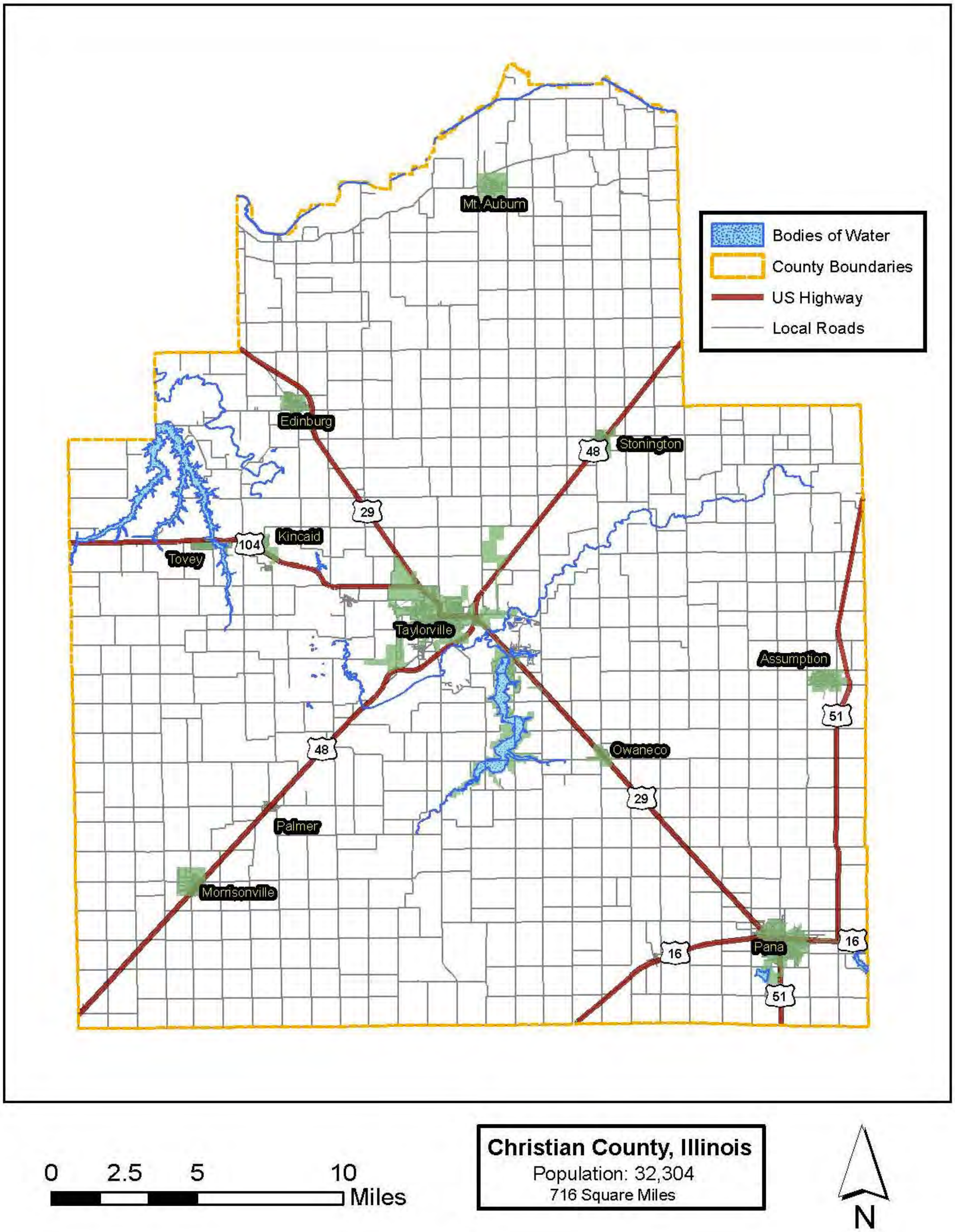
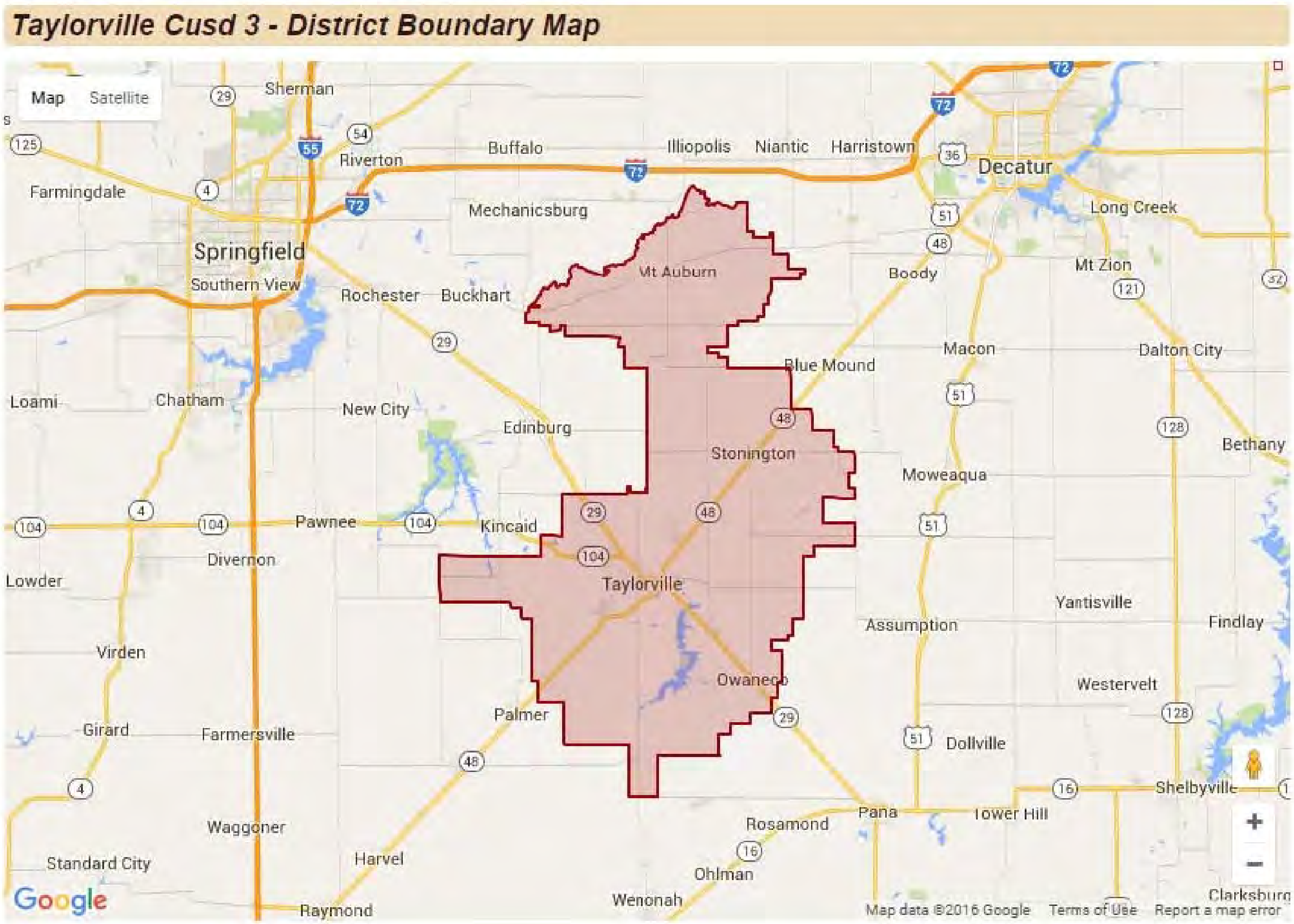


Figure I-4
Taylorville Community Unit School District #3 Boundary Map



Agriculture continues to be the predominant land use and industry in Christian County. According to the 2017 Census of Agriculture, there were 794 farms in Christian County occupying approximately 88.7% (402,703 acres) of the total land area in the County. The major crops still include corn and soybeans while the major livestock is still hogs and pigs. The County ranks 10th in the State for crop cash receipts and 42nd for livestock cash receipts.

Health care/social assistance and manufacturing remain the largest employment sectors by industry in Christian County according to the Illinois Department of Commerce and Economic Opportunity. These are followed by retail trade, construction and educational services. Based on information obtained from the Christian County Economic Development Corporation, 17 of the 19 major employers identified in the original Plan are still operating in Christian County at the time of this update.

Figure I-5 provides demographic data on the County and each of the participating municipalities along with information on housing units and assessed values. The assessed values are for all residential structures and associated buildings (including farm homes and buildings associated with the main residence.) The assessed value of a residence in Christian County is approximately one-third of the market value.

Figure I-5
Demographic Data by Participating Jurisdiction

Participating Jurisdiction	Population (2010)	Population (2014-2018 Estimate)	Projected Population (2025)	Total Area (Sq. Miles) (2010)	Number of Housing Units (2010)	Total Assessed Value of Housing Units (2019)
Christian County (unincorporated)	10,106	8,934	9,393	688.409	3,521	$156,242,740
Assumption	1,168	1,142	1,086	0.880	582	$14,890,175
Edinburg	1,078	1,186	1,002	0.625	514	$12,428,452
Jeisyville	107	72	99	0.123	49	$719,854
Kincaid	1,505	1,596	1,399	0.819	747	$12,729,613
Morrisonville	1,056	1,167	982	1.035	459	$11,625,988
Mount Auburn	480	562	446	0.997	220	$5,514,743
Palmer	229	207	213	0.995	99	$1,938,776
Pana	5,847	5,478	5,435	3.840	3,084	$41,326,089
Stonington	932	906	866	0.460	403	$12,839,268
Taylorville	11,246	10,964	10,453	9.864	5,422	$143,651,012

Sources: Chad Coady, Christian County Supervisor of Assessments.
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 Community Survey.
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. Christian County is almost entirely rural with a population that has seen a modest increase between 1900 and 2000 from 32,790 to 35,372. Between 2000 and 2010 the population decreased by 1.6% from 35,372 to 34,800. Two of the ten municipalities participating (Kincaid and Pana) experienced slight increases in their populations between 2000 and 2010. During the same time period Assumption, Edinburg, Jeisyville, Morrisonville, Mount Auburn, Palmer, Stonington and Taylorville all experienced modest decreases in their populations.

A review of the US Census Bureau's American Community Survey 2014-2018 Demographic and Housing Estimates indicates that Christian County has continued to experience a population decline over the last decade in the range of approximately 4.5%. Only three of the ten municipalities (Edinburg, Morrisonville and Mount Auburn) experienced modest increases during this same time period.

Land use in Christian County is still primarily agricultural. As discussed in the previous section, approximately 88.7% 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.

The only jurisdiction with a comprehensive plan is Taylorville and they have not updated their Plan since 2006. However, in the 2006 Plan one of the areas of development identified was the Northern Industrial Zone which was to include a new power plant and coal mines. The Teneska coal-based power plant project was no longer deemed viable in 2013 and never materialized. Construction is currently underway on the Taylorville Industrial Park in the Northwest Commercial zone along Illinois Route 29. A grant from the US Department of Economic Administration received in 2018 is being used along with funds raised by the Taylorville Development Association to develop the infrastructure needed to support business growth in the Industrial Park.

According to the Christian County Supervisor of Assessments, there were no other substantial changes in development within the County or any of the participating jurisdictions that have impacted their overall vulnerability since the original Plan was approved.

In terms of development and economic initiatives within the County and the participating jurisdictions, there are plans for the development of three potential solar farms in unincorporated Christian County and an industrial park along Illinois Route 29 on the north side of Taylorville.

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 Christian County Multi-Jurisdictional All Hazards Mitigation Plan (the Plan) was updated through the Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee (Planning Committee). The Plan was prepared to comply with the Disaster Mitigation Act of 2000 and incorporates the Federal Emergency Management Agency's (FEMA) 10-step planning process approach. **Figure 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 and man-made 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 update summarized the results of Tasks One through Six. In addition, it described the responsibilities to monitor, evaluate and update the Plan. The draft Plan update was reviewed by the participants and a public forum was held to give the public an additional opportunity to provide input. Comments received were incorporated into the draft Plan update and submitted to the Illinois Emergency Management Agency (IEMA) and FEMA for review and approval.
Task Eight: Final Plan	Comments received from IEMA and FEMA were incorporated in to the final Plan update. The final Plan update was then submitted to the County and participating jurisdictions for adoption. The Plan will be reviewed periodically and updated again in five years.

The Plan update and development was led at the staff level by Mike Crews, the former Christian County Emergency Management Agency (EMA) Coordinator, Nancy Martin, the former Christian County Public Health Administrator and Greg Nimmo, the current Chris-Mont 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 update. To ensure that all participating jurisdictions took part in the planning process, participation requirements were established. Each participating jurisdiction agreed to satisfy the following requirements in order to be included in the Plan update. All of the participating jurisdictions met the participation requirements.

- Attend at least one Planning Committee meeting.
- Identify/submit a list of documents (i.e., plans, studies, reports, maps, etc.) relevant to the (type) 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 update of the mitigation goals.
- Submit a list of mitigation actions started and/or completed since the adoption of the original Plan.
- Identify and submit a list of new mitigation actions.
- Review and comment on the draft Plan update.
- Formally adopt the Plan update.
- Where applicable, incorporate the Plan update into existing planning efforts.
- Participate in the Plan update maintenance.

2.1 PLANNING COMMITTEE

As previously mentioned, at the start of the planning process, the Christian County Multi-Jurisdictional All Mitigation Planning Committee was formed to update the hazard mitigation plan. The Planning Committee included representatives from each participating jurisdiction, as well as the education, emergency services (fire and law enforcement), GIS and healthcare.

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

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

Mission Statement

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

"The mission of the Christian 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."

Figure PP-2
Christian County Planning Committee Member Attendance Record

Representing	Name	Title	6/11/2019	9/10/2019	12/10/2019	3/3/2020	9/22/2020
American Environmental Corp.	Bostwick, Andrea	Senior Project Manager	X	X	X	X	X
American Environmental Corp.	Krug, Zachary	Environmental Specialist	X	X	X	X	X
American Environmental Corp.	McCarver, Dana	Environmental Analyst	X	X	X		
Assumption Fire Protection District	Miller, Mark	Captain	X				
Assumption, City of	Dust, Donald	Mayor	X	X	X	X	
Chris-Mont EMA	Nimmo, Greg	Director			X	X	X
Chris-Mont EMA	Gasparich, Joe	Volunteer Deputy Director					X
Christian County - 911	Ehrhardt, Mickie	Director		X	X		
Christian County - Clerk and Recorder	Gianasi, Michael	Clerk & Recorder	X	X	X		
Christian County - Emergency Management Agency	Crews, Mike	Manager	X	X			
Christian County - Health Department	Martin, Nancy	Public Health Administrator	X	X			
Christian County - Highway Department	Frye, Clifford	Highway Engineer	X				
Christian County - Solid Waste Management Department	Stepping, Joe	Department Head	X				
Christian County - Supervisor of Assessments Office	Coady, Chad	Supervisor of Assessments	X	X			X
Christian County - Zoning/Animal Control	Harris, Vince	Zoning Officer/Animal Control Director	X			X	X
Christian County Health Department	Larson, Denise	Administrator				X	
Christian County Medical Reserve Corps	Peters, Rich	Volunteer	X	X	X	X	
Edinburg, Village of	Luttrell, David	President	X				X
Heritage Health - Pana	Andersen, Danny	Environmental Manager	X				
Heritage Health - Pana	Green, Amber	Community Relations Coordinator	X				
IEMA	Smith, Glenn	Hazard Mitigation Planner	X				
Jeisyville, Village of	Drnjevic, Mike	President	X	X	X		
Kincaid, Village of	Oller, David	President	X	X			
Morrisonville, Village of	O'Connell, William	ESDA Coordinator		X	X		
Morrisonville, Village of	Tolliver, Larry	President	X	X			
Moweaqua, Village of	Maki, Roy	Chief of Police	X				
Mt. Auburn, Village of	Milburn, Brent	President	X				
Palmer, Village of	Aulabaugh, Tori	Trustee	X		X	X	X
Palmer, Village of	Bock, Raymond	Trustee		X			
Palmer, Village of	Hill, Jim	President	X				
Pana Community Hospital	Hager, Greg	Nurse Manager, Outpatient Services	X	X	X	X	X
Pana, City of	Bland, Daniel	Chief of Police		X			
Pana, City of	Bland, Rod	Fire Chief	X	X		X	
Piatt County - Emergency Management Agency	Holmes, Mike	Director		X			
Regional Office of Education #3	Huckstead, Sarah	Administrative Assistant	X	X	X	X	
Springfield Clinic - Taylorville	Willison, Dawn	Operations Manager	X	X	X		X
Stonington, Village of	Dowdy, Bruce	Alderman / Mayor			X	X	
Stonington, Village of	Marucco, Ryan	President	X	X	X		
Taylorville Care Center	Callebrusco, Tony	Maintenance Director		X			
Taylorville Care Center	Hancock, Rhonda	Manager		X			
Taylorville CUSD #3	Dougherty, Chris	Superintendent		X	X		
Taylorville CUSD #3	Hadley, Tammy	Clerk				X	X
Taylorville Estates	Grafton, Terra	Manager		X			
Taylorville Memorial Hospital	Polley, Lora	Director of Ancillary Services	X		X		
Taylorville, City of	Barry, Bruce	Mayor	X		X		
Taylorville, City of	Crews, Mike	Fire Chief	X	X			
Taylorville, City of	Goodall, Andy	Assistant Fire Chief	X	X			
Taylorville, City of	Lilly, Julie	City Clerk	X				
Taylorvillle, City of	Adermann, Matthew	Fire Chief			X	X	
Tovey, Village of	Wilbur, Brian	President	X				
WTIM / Miller Media	Kleimola, Leroy	News Director	X	X	X		

Planning Committee Meetings

The Planning Committee met five times between June 2019 and September 2020. **Figure 6** identifies the representatives present at each meeting. **Appendices A** and **B** contain copies of the attendance sheets and meeting minutes for each meeting. The purpose of each meeting, including the topics discussed, is provided below.

First Planning Committee Meeting – June 11, 2019

The purpose of this meeting was to explain the planning process to the Planning Committee members and give them a brief overview of what an all hazards mitigation plan is and why it needs to be updated. Drafts of the mission statement and updated mitigation goals were presented for review. Committee members were asked to identify any natural or man-made hazard events that have occurred within the County since the original Plan was completed. 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 the communities.

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 at the next meeting. Copies of a "Hazard Events Questionnaire," "Damages to Critical Facilities Damage Questionnaire" and "Citizen Questionnaire" were also distributed.

Second Planning Committee Meeting – September 10, 2019

At the second Planning Committee meeting portions of the updated natural hazard risk assessment section were presented for review. Following the review of the risk assessment, the Planning Committee members participated in an exercise to help update the Risk Priority Index (RPI) calculations for the County and municipalities. The RPI can assist participants in determining which hazards present the highest risks and therefore which ones to focus on when formulating mitigation projects and activities.

The Planning Committee then reviewed the draft mission statement and updated mitigation goals. After a discussion, the Planning Committee chose to finalize both with no revisions.

Finally, mitigation actions were defined, and examples were discussed. As part of the Plan update, individual mitigation action lists will be created for each participating jurisdiction. Committee members were asked to identify any mitigation projects and activities their jurisdictions had started and/or completed since the original Plan was adopted in 2010. Ideas for new potential mitigation projects and activities were presented. Representatives for the County and the participating jurisdictions were asked to complete the forms entitled "Existing Mitigation Project/Activity Status" and "New Hazard Mitigation Projects" and return them at the next meeting.

Third Planning Committee Meeting – December 10, 2019

The purpose of the third Planning Committee meeting was to discuss the vulnerability analysis for tornadoes and floods. 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 conducted at the previous meeting were presented. Based on the Planning Committee's responses, tornadoes scored the highest, followed by severe storms, floods and severe winter storms. A side-by-side comparison of how the hazards ranks between the original exercise conducted for the 2010 Plan and this exercise were provided for comparison. Three of the top four hazards remained the same with some change in order.

Next, an explanation of what a mitigation action prioritization methodology is was provided. The Planning Committee reviewed and approved the updated mitigation project prioritization methodology with no changes. A presentation on how mitigation projects and activities identified by the participating jurisdictions would be presented in the Plan update was also provided.

Fourth Planning Committee Meeting – March 3, 2020

At the fourth Planning Committee meeting, the updated man-made hazards risk assessment was presented for review. The Planning Committee members then reviewed the draft jurisdiction-specific mitigation action tables which identified and prioritized the new and existing mitigation projects and activities provided by the participants. Members were given the opportunity to add additional projects and activities to their tables.

The sections outlining the mitigation strategy, plan maintenance and adoption were also reviewed. The 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.

Fifth Planning Committee Meeting – September 22, 2020

At this Planning Committee meeting the public was provided an opportunity to ask questions and provide comments on the draft Plan update. Due to the Covid-19 outbreak and gathering size restrictions, the date of the fifth meeting was changed from June 4, 2020 to September 22, 2020.

2.2 PUBLIC INVOLVEMENT

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

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

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

Citizen Questionnaire

A citizen questionnaire was developed to gather facts and gauge public perceptions about natural hazards that affect Christian 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 43 questionnaires were completed and returned to the Planning Committee. Questionnaires were completed by residents in each participating jurisdiction, with the exception of Morrisonville. These responses provide useful information to decision makers as they determine how best to disseminate information on natural hazards and safeguard the public. Additionally, these responses identify the types of projects and activities the public is most likely to support. The following provides a summary of the results.

- Respondents felt that severe summer storms were the most frequently encountered natural hazard in Christian County followed by severe winter weather, and flooding. These results are consistent with the weather records compiled for the County and as described in this Plan update.
- The most effective means of communication identified by respondents to disseminate information about natural hazards was television followed closely by the Internet and social media. Information disseminated via radio, mail and Fire Departments/ Law Enforcement 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 (63%);
  - provide flood or drainage protection (58%) – the respondents who selected this category felt that culvert and drainage ditch maintenance was the most needed activity followed by hydraulic studies and dam and levee construction;
  - maintain power during storms by burying power lines, trimming trees and/or purchasing backup generators (58%); and
  - identify residents with special needs (51%).

FAQ Fact Sheet

A "Frequently Asked Questions" fact sheet was created and disseminated to help explain what an all 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 update'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 June 4, 2020 was cancelled. Following discussions with the Chris-Mont EMA Director regarding the continued pandemic outbreaks, it was decided that the public forum would be conducted via teleconference and the draft Plan update would be placed on the County's website for review and comment.

At the public forum teleconference, held on September 22, 2020 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 with 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 update. **Appendices G** and **H** contain copies of these materials.

Public Comment Period

The draft Plan update was made available for public review and comment on the County's website from September 22 through October 6, 2020. Those unable to access the Plan via the website were directed to contact the Chris-Mont 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 hail, lightning, extreme cold, floods and tornadoes 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.
- *Encouraged intergovernmental cooperation among those jurisdictions involved in the planning process.* The planning process encouraged the participating jurisdictions to collaborate in order to accomplish projects and activities that cross governmental boundaries.

2.3 PARTICIPATION OPPORTUNITIES FOR INTERESTED PARTIES

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

Schools

The Regional Office of Education # 3 and Taylorville CUSD #3 were represented on the Planning Committee. The Superintendent and Clerk from Taylorville CUSD #3, in addition to, the Administrative Assistant from the Regional Office of Education #3 worked with others in considering what types of mitigation projects and activities would be most beneficial for their district.

Healthcare

Input was sought from the healthcare community. Representatives from Christian County Medical Reserve Corps, Pana Community Hospital, Taylorville Memorial Hospital and Springfield Clinic-Taylorville attended the Planning Committee meetings and provided input into the planning process.

Not-For-Profit & Other Organizations

Members of the Christian County Local Emergency Planning Committee were invited to serve on the Planning Committee and provide input into the planning process.

Neighboring Counties

A memo was sent to EMA/OEM coordinators in the neighboring counties inviting them to participate in the mitigation planning process. The counties contacted included Sangamon, Macon and Shelby. Since the Chris-Mont EMA Director oversees emergency management services for both Christian and Montgomery counties, Montgomery County was already aware and participating in the planning process. **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 jurisdiction was asked to identify and provide existing documents (plans, studies, reports and technical information) relevant to the Plan update. **Figure PP-3** summarizes the availability of existing planning documents by participating jurisdiction. These documents were reviewed and incorporated into the Plan update whenever applicable.

Existing planning documents used in the development of the original Plan were only identified for Christian County, Pana and Taylorville. These three jurisdictions did not identify any new planning mechanisms since the original Plan was completed. While a comprehensive plan was identified for Pana in the original Plan, it was dated from 1980. It has not been updated in the intervening years and therefore was not included in the current summary of existing planning documents due to its age. Conversations with the Christian County Zoning Administrator and the Executive Director of the Christian County Economic Development Corporation indicates that contrary to the information included in the original Plan, a comprehensive plan has never been developed for the County.

Figure PP-3
Existing Planning Documents by Participating Jurisdiction

Existing Planning Documents	Participating Jurisdiction											
	Christian County	Assumption	Edinburg	Jeisyville	Kincaid	Morrisonville	Mt. Auburn	Palmer	Pana	Stonington	Taylorville	Taylorville CUSD #3
PLANS												
Municipal/County												
Comprehensive Plan											X	
Emergency Management Plan		X							X		X	
Land Use Plan											X	
School Districts												
Strategic Plan												X
Capital Improvement Plan												X
Crisis Plan												X
CODES & ORDINANCES												
Municipal/County												
Building Codes			X		X	X			X	X	X	
Drainage Ordinances		X	X			X			X	X	X	
Historic Preservation Ordinance									X		X	
Subdivision Ordinance(s)	X	X	X		X				X		X	
Zoning Ordinances	X	X			X		X	X	X	X	X	
MAPS												
Municipal/County												
Existing Land Use Map			X							X	X	
Infrastructure Map			X				X	X	X		X	
Zoning Map	X	X	X				X		X	X	X	
School Districts												
District Boundary Map												X
Floor Plan Map												X
OTHER TECHNICAL DOCUMENTS												
Municipal/County												
Flood Ordinance(s)	X		X							X	X	
Flood Insurance Rate Maps	X				X					X	X	
Repetitive Flood Loss List												
Elevation Certificates for Buildings	X											

Based on the conversations with Planning Committee members, none of the jurisdictions who participated in the original Plan have incorporated it into other planning mechanisms within their jurisdictions. Only Taylorville has a comprehensive/land use plan and it has not been updated since 2006. This is due in part to the size, fiscal and staffing situations and technical capacity of the participants. There is no indication that the County of any of the participating jurisdictions, with the exception of Taylorville, will be adopting, reviewing or strengthening current policies or programs in the near future.

Only Taylorville is fortunate enough to have the resources and abilities to potentially 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 capacity; fiscal situation; policies and programs; present legal authority; and political resolve.

The West Central Development Council is available to assist participating jurisdictions with planning and community development, as is the County's Zoning Department. As discussed previously, only Taylorville has a comprehensive/land use plan. Six of the ten participating municipalities have building codes in place while seven of the participating municipalities and the County have zoning ordinances. In terms of special districts, the Taylorville CUSD #3 has a wide array of plans in place.

There are several participants (Jeisyville, Morrisonville, Mount Auburn and Palmer) who have limited resources and abilities to expand on and improve the existing policies and programs identified in Figure PP-3. The lack of legal authority and policies/programs currently in place, especially with regards to building and zoning ordinances, hamper these participants' abilities to expand and strengthen existing policies and programs.

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

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

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 Christian 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 review the natural and man-made hazards detailed in the original Plan and decide if additional hazards should be included in the Plan update. Over the course of the first two meetings, the Planning Committee members discussed their experiences with natural and man-made hazard events and reviewed information on various hazards. After discussing the information provided, the Planning Committee chose to include mine subsidence in this Plan update. The following identifies the hazards included in the Plan update:

- severe storms (thunderstorms, hail, lighting & heavy rain)
- severe winter storms (snow, ice & extreme cold)
- floods
- tornadoes
- excessive heat
- drought
- mine subsidence
- earthquakes
- 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: levee failures, landslides, sinkholes and wildfires. According to the US Army Corps of Engineers' National Levee Database, there are five small, locally constructed, locally operated and maintained levees along the Sangamon River in Christian County. None of these levees protect a sizable amount of land or a considerable number of structures or individuals. Therefore, due to the limited impacts on the population, land use and infrastructure, the Planning Committee chose not to include them in the Plan update.

A review of the USGS Landslide Susceptibility Viewer indicates that the entire County has a low incidence of landslides. The Illinois State Geological Survey's *Landslide Inventory of Illinois* does not contain any instances of landslides in Christian County and discussions with the Planning Committee did not reveal any isolated problems.

In terms of man-made hazards, it was decided that for the Plan update wildfires would not be included due to their limited impact on the people and infrastructure within the County. Historical data indicates that wildfires have been virtually non-existent in the area. No documentation was found and none of the Planning Committee members could remember any events occurring.

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-1**, located at the end of this section, identifies the number of critical facilities and infrastructure located in each participating jurisdiction for select categories. Identifying these assets makes local leaders more aware of the critical facilities and infrastructure located within their jurisdictions and helps them make informed choices on how to better protect these key resources.

While considered a "local government entity" for planning purposes, the Taylorville Community Unit School District (CUSD) #3 does not have an extensive inventory of assets in which to consider when conducting the risk assessment. Since the critical facilities for the CUSD are located within Taylorville and are a subset of its critical facilities , their risk is considered to be the same or similar to the risk experienced by the City for those hazards that either impact the entire planning area or can occur at any location within the planning area (i.e., severe storms, severe winter storms, etc.). For those hazards where the risk to the CUSD varies from the risk facing the City, a separate narrative assessment will be provided under the appropriate hazard's vulnerability subsection.

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-2**, located at the end of this section, identifies the factors and point values associated with each category. Participants were asked to score the selected hazards based on the perspective of the entity they represented on the Planning Committee.

The Consultant took the point values assigned to each category and averaged the remaining results and came up with an overall value for each category. The values for each category were then added together to calculate an RPI score for each hazard. A ranking was then assigned to each hazard based on the RPI score. **Figure R-3**, located at the end of this section, provides the RPI scores and rankings for the County and participating municipalities and Taylorville CUSD#3. RPI scores were not generated for Edinburg.

Figure R-4 provides a side-by-side comparison of how the hazards ranked between the RPI exercise conducted for the original Plan in 2010 and the exercise conducted for the Plan update for each of the original participants. Jeisyville and the Taylorville CUSD #3 did not take part in the development of the original Plan and therefore are not included. The top three hazards for the County remained the same with some change in order.

Critical Facilities Vulnerability Survey

The participating jurisdictions were also asked to complete a Critical Facilities Vulnerability Survey at the third 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
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
Christian County	3	2	1	---	---	---	4	n/a	24	1	18
Assumption	3	2	---	1	3	3	1	---	6	---	2
Edinburg	4	3	---	1	1	1	---	---	2	---	---
Jeisyville	1	---	---	---	---	---	---	---	2	---	---
Kincaid	1	2	---	2	1	1	1	---	4	---	---
Morrisonville	2	4	---	2	3	2	1	---	4	---	---
Mount Auburn	1	1	---	---	2	---	---	n/a	n/a	---	---
Palmer	1	1	---	---	2	---	1	---	3	---	---
Pana	3	4	8	6	2	1	1	3	4	---	2
Stonington	3	2	---	---	2	5	1	---	1	---	---
Taylorville	3	4	9	6	3	16	1	1	5	---	1
Taylorville CUSD #3	---	---	---	5	---	---	---	---	---	---	---

[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 or none are located within the jurisdiction.

Figure R-2
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-3
Risk Priority Index Scores by Hazard by Participating Jurisdiction
(Sheet 1 of 2)

Hazard	**Participating Jurisdictions**											
	Christian County		Assumption		Jeiseyville		Kincaid		Morrisonville		Mount Auburn	
	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking
Dam Failures	3.8	12/13/14	3.0	12	3.0	7/8/9/10/11/12	4.0	7/8	4.5	8/9/10/11	3.0	8/9/10/11/12
Drought	5.0	10	5.0	9	3.0	7/8/9/10/11/12	4.0	7/8	4.5	8/9/10/11	7.0	7
Earthquakes	4.8	11	4.0	10/11	3.0	7/8/9/10/11/12	3.0	9/10/11/12	3.0	12	9.0	4/5
Excessive Heat	6.8	7	7.0	7	6.0	4/5/6	**6.0**	**2/3**	5.5	6	**10.0**	**1/2/3**
Floods	8.4	4	**11.0**	**1/2**	3.0	7/8/9/10/11/12	**6.0**	**2/3**	5.0	7	3.0	8/9/10/11/12
HazMat Incidents: Fixed Facility	6.0	8	8.0	6	3.0	7/8/9/10/11/12	3.0	9/10/11/12	**9.5**	**1/2**	8.0	6
HazMat Incidents: Transportation	7.2	5	9.0	5	6.0	4/5/6	3.0	9/10/11/12	9.0	3	3.0	8/9/10/11/12
Mine Subsidence	5.4	9	4.0	10/11	**12.0**	**1**	5.0	4/5/6	4.5	8/9/10/11	3.0	8/9/10/11/12
Terrorism	7.0	6	6.0	8	3.0	7/8/9/10/11/12	3.0	9/10/11/12	4.5	8/9/10/11	3.0	8/9/10/11/12
Thunderstorm/Hail/Lightning/Heavy Rain	**9.2**	**2**	10.0	3/4	7.0	3	5.0	4/5/6	6.5	4/5	**10.0**	**1/2/3**
Tornadoes	**10.2**	**1**	**11.0**	**1/2**	**9.0**	**2**	**7.0**	**1**	**9.5**	**1/2**	**10.0**	**1/2/3**
Winter Storms/Extreme Cold	8.6	3	10.0	3/4	6.0	4/5/6	5.0	4/5/6	6.5	4/5	9.0	4/5

Figure R-3
Risk Priority Index Scores by Hazard by Participating Jurisdiction
(Sheet 2 of 2)

Hazard	Participating Jurisdictions									
	Palmer		Pana		Stonington		Taylorville		Taylorville CUSD #3	
	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking	RPI Score	Hazard Ranking
Dam Failures	4.0	10/11	5.3	10/11	3.0	9/10/11/12	4.4	12	3.0	11/12
Drought	5.0	5/6/7/8/9	5.3	10/11	5.0	7	5.0	11	4.0	10
Earthquakes	3.0	12	7.0	4	3.0	9/10/11/12	6.6	8	3.0	11/12
Excessive Heat	6.0	4	6.3	6/7	6.0	4/5/6	5.6	9	8.0	4/5
Floods	5.0	5/6/7/8/9	6.0	8	**9.0**	**1/2**	**8.8**	**2**	8.0	4/5
HazMat Incidents: Fixed Facility	5.0	5/6/7/8/9	6.7	5	3.0	9/10/11/12	7.0	5/6	6.0	6/7/8/9
HazMat Incidents: Transportation	5.0	5/6/7/8/9	7.7	3	6.0	4/5/6	7.0	5/6	6.0	6/7/8/9
Mine Subsidence	4.0	10/11	5.0	12	3.0	9/10/11/12	5.4	10	6.0	6/7/8/9
Terrorism	5.0	5/6/7/8/9	6.3	6/7	6.0	4/5/6	6.8	7	11.0	3
Thunderstorm/Hail/Lightning/Heavy Rain	**11.0**	**1/2**	**8.0**	**2**	8.0	3	8.4	3	**12.0**	**1/2**
Tornadoes	10.0	3	**10.0**	**1**	**9.0**	**1/2**	**9.8**	**1**	**12.0**	**1/2**
Winter Storms/Extreme Cold	**11.0**	**1/2**	5.7	9	4.0	8	7.2	4	6.0	6/7/8/9

Figure R-4
Comparison of 2010 & 2019 RPI Exercise Results by Participating Jurisdiction
(Sheet 1 of 2)

Hazard	**Participating Jurisdictions**									
	Christian County		Assumption		Kincaid		Morrisonville		Mount Auburn	
	2010 RPI Ranking	2019 RPI Ranking	2010 RPI Ranking	2019 RPI Ranking	2010 RPI Ranking	2019 RPI Ranking	2010 RPI Ranking	2019 RPI Ranking	2010 RPI Ranking	2019 RPI Ranking
Dam Failures	10	12/13/14	10	12	10	7/8	10	8/9/10/11	10	8/9/10/11/12
Drought	4	10	4	9	4	7/8	4	8/9/10/11	4	7
Earthquakes	5	11	5	10/11	5	9/10/11/12	5	12	5	4/5
Excessive Heat	4	7	4	7	4	**2/3**	4	6	4	**1/2/3**
Floods	8	4	8	**1/2**	8	**2/3**	8	7	8	8/9/10/11/12
HazMat Incidents: Fixed Facility	7	8	7	6	7	9/10/11/12	7	**1/2**	7	6
HazMat Incidents: Transportation	6	5	6	5	6	9/10/11/12	6	3	6	8/9/10/11/12
Mine Subsidence	9	9	9	10/11	9	4/5/6	9	8/9/10/11	9	8/9/10/11/12
Terrorism	n/a	6	n/a	8	n/a	9/10/11/12	n/a	8/9/10/11	n/a	8/9/10/11/12
Thunderstorm/Hail/Lightning/Heavy Rain	**2**	**2**	**2**	3/4	**2**	4/5/6	**2**	4/5	**2**	**1/2/3**
Tornadoes	3	**1**	3	**1/2**	3	**1**	3	**1/2**	3	**1/2/3**
Winter Storms/Extreme Cold	**1**	3	**1**	3/4	**1**	4/5/6	**1**	4/5	**1**	4/5

Figure R-4
Comparison of 2010 & 2019 RPI Exercise Results by Participating Jurisdiction
(Sheet 2 of 2)

Hazard	Palmer 2010 RPI Ranking	Palmer 2019 RPI Ranking	Pana 2010 RPI Ranking	Pana 2019 RPI Ranking	Stonington 2010 RPI Ranking	Stonington 2019 RPI Ranking	Taylorville 2010 RPI Ranking	Taylorville 2019 RPI Ranking
Dam Failures	10	10/11	10	10/11	n/a	9/10/11/12	10	12
Drought	4	5/6/7/8/9	4	10/11	5	7	5	11
Earthquakes	5	12	5	4	6	9/10/11/12	4	8
Excessive Heat	4	4	4	6/7	5	4/5/6	5	9
Floods	8	5/6/7/8/9	8	8	8	**1/2**	8	**2**
HazMat Incidents: Fixed Facility	7	5/6/7/8/9	7	5	7	9/10/11/12	7	5/6
HazMat Incidents: Transportation	6	5/6/7/8/9	6	3	4	4/5/6	6	5/6
Mine Subsidence	9	10/11	9	12	9	9/10/11/12	9	10
Terrorism	n/a	5/6/7/8/9	n/a	6/7	n/a	4/5/6	n/a	7
Thunderstorm/Hail/Lightning/Heavy Rain	**2**	**1/2**	**2**	**2**	**2**	3	3	3
Tornadoes	3	3	3	**1**	3	**1/2**	**2**	**1**
Winter Storms/Extreme Cold	**1**	**1/2**	**1**	9	**1**	8	**1**	4

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

HAZARD IDENTIFICATION

What is the definition of a severe storm?

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

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

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

What is a thunderstorm?

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

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

Single-cell Thunderstorm

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

Multi-cell Thunderstorm

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

Squall Line

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

Supercell Thunderstorm

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

Despite their size, all thunderstorms are dangerous and capable of threatening life and property. Of the estimated 100,000 thunderstorms that occur each year in the United States, roughly 10% are classified as severe.

What kinds of damaging winds are produced by a thunderstorm?

Aside from tornadoes, thunderstorms can produce straight-line winds. A straight-line wind is defined as any wind produced by a thunderstorm that is not associated with rotation. There are several types of straight-line winds including downdrafts, downbursts, microbursts, gust fronts and derechos.

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

The NWS measures a storm's wind speed in knots or nautical miles. A wind speed of one knot is equal to approximately 1.15 miles per hour. **Figure SS-1** shows conversions from knots to miles per hour for various wind speeds.

Figure SS-1
Wind Speed Conversions

Knots (kts)	Miles Per Hour (mph)	Knots (kts)	Miles Per Hour (mph)
50 kts	58 mph	60 kts	69 mph
52 kts	60 mph	65 kts	75 mph
55 kts	63 mph	70 kts	81 mph
58 kts	67 mph	80 kts	92 mph

What is hail?

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

Hailstones grow by colliding with supercooled water drops. The supercooled water drops freeze on contact with ice crystals, frozen rain drops, dust, etc. Thunderstorms with strong updrafts continue lifting the hailstones to the top of the cloud where they encounter more supercooled water and continue to grow. Eventually the updraft can no longer support the weight of the hail or the updraft weakens, and the hail falls to the ground.

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

How is the severity of a hail event measured?

The severity or magnitude of a hail event is measured in terms of the size (diameter) of the hailstones. The hail size is estimated by comparing it to known objects. **Figure SS-2** provides descriptions for various hail sizes.

Figure SS-2
Hail Size Descriptions

Hail Diameter (inches)	Description	Hail Diameter (inches)	Description
0.25 in.	pea	1.75 in.	golf ball
0.50 in.	marble/mothball	2.50 in.	tennis ball
0.75 in.	penny	2.75 in.	baseball
0.88 in.	nickel	3.00 in.	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 millimeters (approx.)*	Typical Hail Diameter inches (approx.)*	Description	Typical Damage Impacts
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 Lincoln, Illinois is responsible for issuing ***severe thunderstorm watches*** and ***warnings*** for Christian County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Watch.** A severe thunderstorm watch is issued when severe thunderstorms are possible in or near the watch area. Individuals should stay alert for the latest weather information and be prepared to take shelter.
- **Warning.** A severe thunderstorm warning is issued when severe weather has been reported by spotters or indicated by radar. Warnings indicate imminent danger to life and property for those who are in the path of the storm and individuals should seek safe shelter.

HAZARD PROFILE

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

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

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

Thunderstorms with Damaging Winds

NOAA's Storm Events Database was used to document 154 reported occurrences of thunderstorms with damaging winds in Christian County between 1958 and 2019. Of the 154 occurrences, 107 had reported wind speeds of 50 knots or greater. There were 47 occurrences, however, where the wind speed was not recorded.

The highest wind speed recorded in Christian County occurred on four separate occasion (June 13, 1958, March 1, 2007, July 19, 2010 and August 19, 2012) when winds reached 70 knots (81 mph) during a thunderstorm event. Thunderstorms with damaging winds have been *recorded* in every participating jurisdiction within the County on multiple occasions.

Figure SS-4 charts the reported occurrences of thunderstorms with damaging winds in Christian County by month. Of the 154 events,

Severe Storms Fast Facts – Occurrences

Number of recorded Thunderstorms with Damaging Winds (1958 – 2019): ***154***

Number of recorded Severe Hail Events (1968 – 2019): ***35***

Number recorded of Lightning Strike Events (2008 - 2019): ***2***

Number of Heavy Rain Events (2000 – 2019): ***162***

Highest Recorded Wind Speed: ***90 knots (multiple dates)***

Largest Hail Recorded: ***2.75 inches (November 17, 2013)***

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

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

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

Most Likely Time for Thunderstorms with Damaging Winds to Occur: ***Late Afternoon/Early Evening***

Most Likely Time for Severe Hail to Occur: ***Afternoon***

Most Likely Time for Heavy Rain to Occur: ***Morning***

91 (59%) took place in May, June and July making this the peak period for thunderstorms with damaging winds in Christian County. Of those 91 events, 35 (23%) occurred during June, making this the peak month for thunderstorms with damaging winds.

Figure SS-4
Thunderstorms with Damaging Winds by Month
1958 – 2019

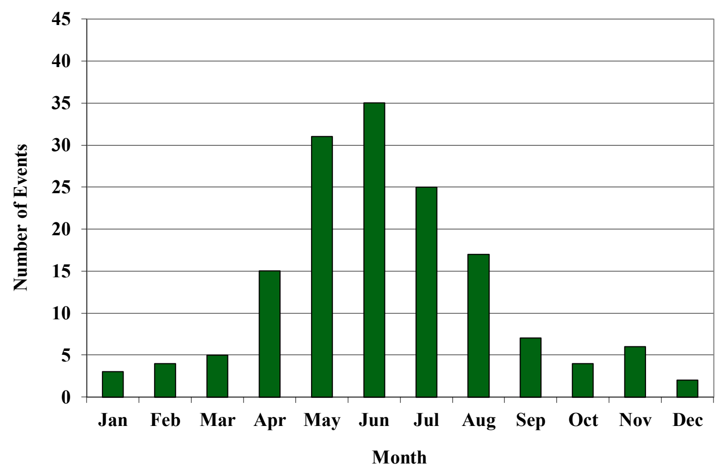
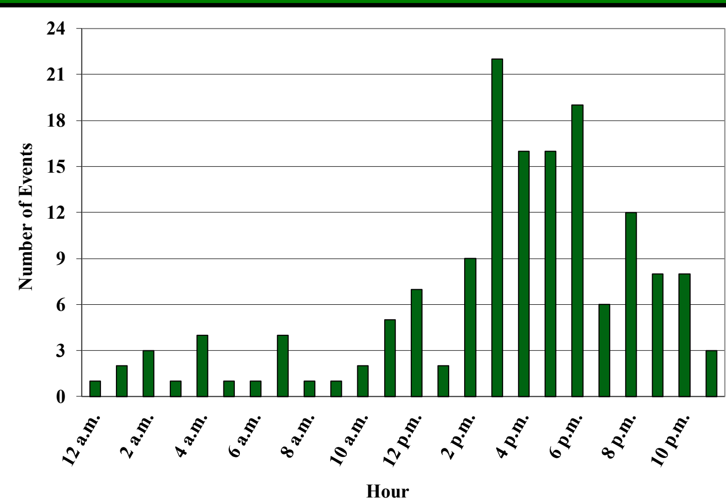


Figure SS-5 charts the reported occurrences of thunderstorms with damaging winds by hour. Of the 154 occurrences, approximately (83)% of all thunderstorms with damaging winds occurred during the p.m. hours, with 91 of the events (59%) taking place between 3 p.m. and 9 p.m.

Figure SS-5
Thunderstorms with Damaging Winds by Hour
1958 – 2019



Hail

NOAA's Storm Events Database was used to document 35 reported occurrences of severe storms with hail one (1) inch in diameter or greater in Christian County between 1968 and 2019. Of the 35 occurrences, 12 produced hailstones 1.50 inches or larger in diameter.

The largest hail stones documented in Christian County measured 2.75 inches in diameter (golf-ball sized) and fell on November 17, 2013 in Assumption. Hail one (1) inch in diameter or greater has been *recorded* in every participating jurisdiction, with the exception of Mount Auburn, on more than one occasion. This does not mean that hail one inch in diameter or greater has not fallen in Mount Auburn, it simply indicates that it wasn't recorded.

Figure SS-6 charts the reported occurrences of hail by month. Of the 35 occurrences, 23 (66%) took place in May and June making this the peak period for hail in Christian County. Of the 23 events, 12 (34%)occurred during May, making this the peak month for hail events.

Figure SS-6
Hail Events by Month
1968 – 2019

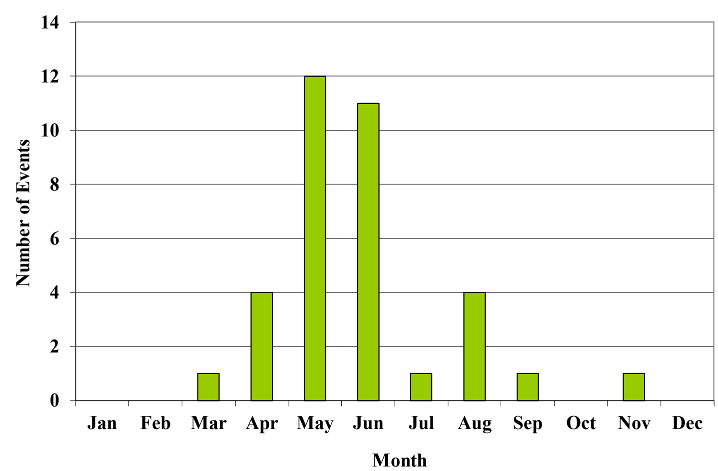
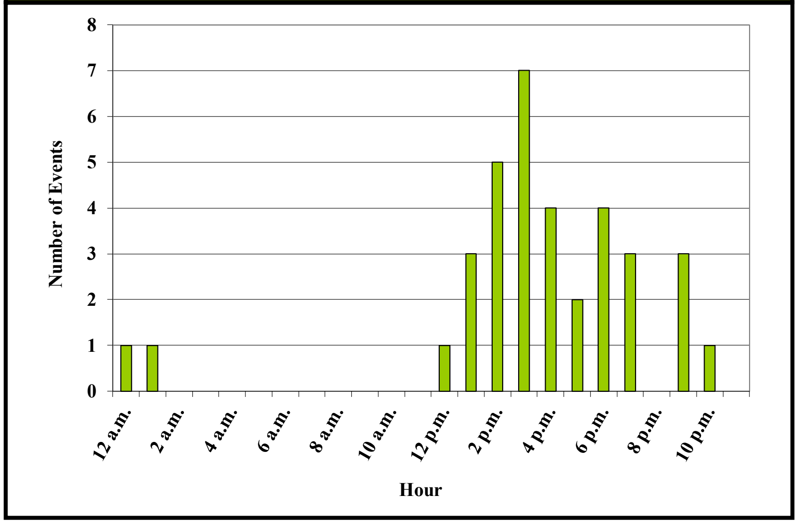


Figure SS-7 charts the reported occurrences of hail by hour. Approximately 94% of all the hail events occurred during the p.m. hours, with 25 of the events (71%) taking place between 1 p.m. and 7 p.m.

Lightning

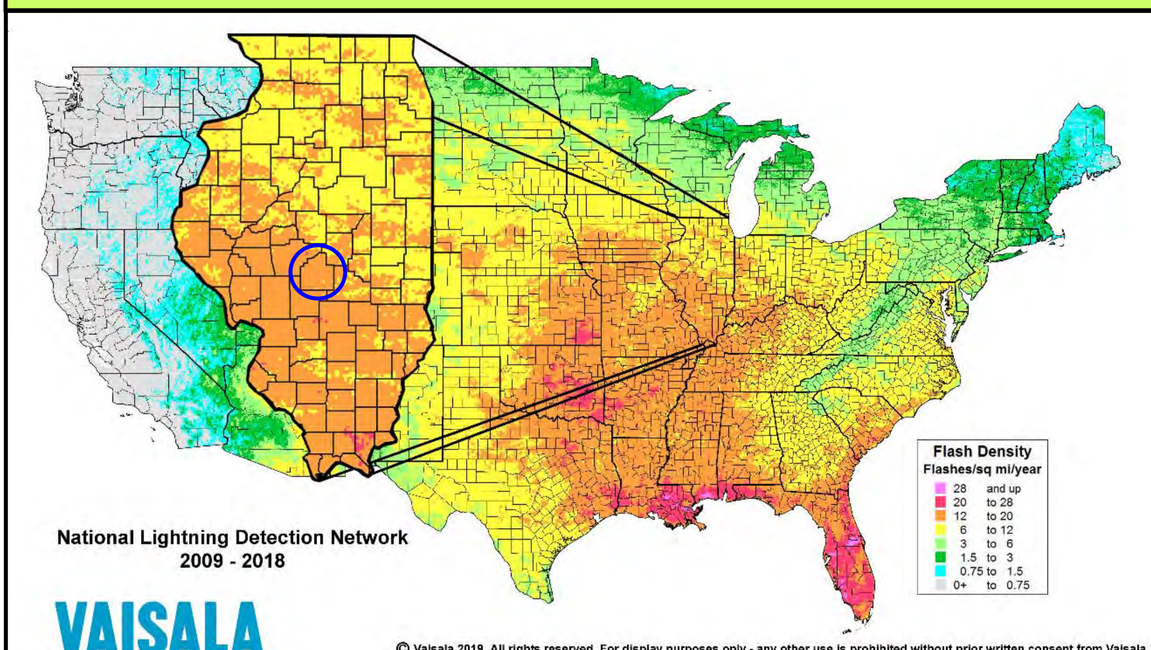
While lightning strike events occur regularly across central Illinois, NOAA's Storm Events Database and Planning Committee member records only identified two recorded occurrences of lightning strikes in Christian County between 2008 and 2019. This is almost certainly due to the rural nature of the County. One event took place during May while the other occurred in July.

Figure SS-7
Hail Events by Hour
1968 – 2019



According to data from Vaisala's National Lightning Detection Network, Christian 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



<u>*Heavy Rain*</u>

NOAA's Storm Events Database and the National Weather Service's COOP data records have documented 162 reported occurrences of heavy rain in Christian County between 2000 and 2019. Of the 162 occurrences, 33 events (20%) produced three inches or more of rain.

Figure SS-9 charts the reported occurrences of heavy rain by month. Of the 162 events, 67 (41%) took place in May, June and July making this the peak period for heavy rain in Christian County. Of the 162 events, 26 (16%) occurred during June, making this the peak month for heavy rains.

Figure SS-9
Heavy Rain Events by Month
2000 – 2019

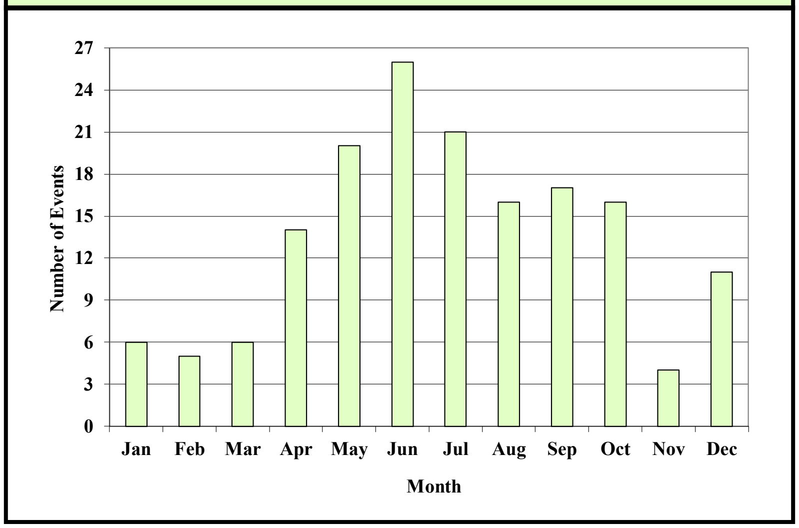


Figure SS-10 charts the reported occurrences of heavy rain by hour. Of the 162 occurrences, start times were unavailable for 74 events. Of the remaining 88 events with recorded times, approximately 51% occurred during the p.m. hours.

What locations are affected by severe storms?

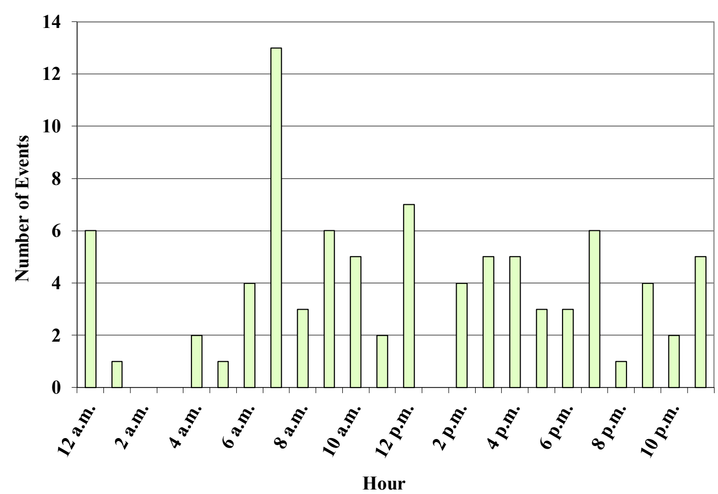
Severe storms affect the entire County. A single severe storm event will generally extend across the entire County and affect multiple locations. The *2018 Illinois Natural Hazard Mitigation Plan* prepared by the Illinois Emergency Management Agency (IEMA) classifies Christian County's hazard rating for severe storms as "severe." (IEMA's overall hazard rating system has five levels: very low, low, medium, high and severe.)

What is the probability of future severe storm events occurring?

<u>*Thunderstorms with Damaging Winds*</u>

Christian County has had 154 verified occurrences of thunderstorms with damaging winds between 1958 and 2019. With 154 occurrences over the past 62 years, Christian County should expect to experience at least two thunderstorms with damaging winds each year. There were 22 years over the last 68 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 32%.

Figure SS-10
Heavy Rain Events by Hour
2000 – 2019



Hail
There have been 35 verified occurrences of hail one (1) inch in diameter or greater between 1968 and 2019. With 35 occurrences over the past 52 years, the probability or likelihood that a severe storm with hail will occur in the County in any given year is 67%. There were 10 years over the last 52 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 19%.

Heavy Rain
Christian County has had 162 reported occurrences of heavy rain between 2000 and 2019. With 162 occurrences over the past 20 years, Christian County should expect to experience at least eight 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 Christian 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 central Illinois. Since 2010, Christian County has recorded 80 heavy rail events, 38 thunderstorms with damaging winds and 10 severe storms with hail one (1) inch in diameter or greater and one verified lightning strike.

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 Christian County. Of the two recorded lightning strikes, one occurred in Stonington and the other occurred near Taylorville.

Figure SS-11
Verified Severe Storm Events by Participating Municipality

Participating Municipality	Number of Events	
	Thunderstorm & High Wind	Severe Hail
Assumption	9	1
Edinburg	17	1
Jeisyville	23	5
Kincaid	22	5
Morrisonville	18	3
Mount Auburn	14	0
Palmer	19	5
Pana	13	3
Stonington	20	6
Taylorville[1]	60	11

[1] Includes Taylorville CUSD

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

Unincorporated Area	Number of Events	
	Thunderstorm & High Wind	Severe Hail
Clarksdale	3	2
Hewittsville	3	3
Langleyville	7	0
Millersville	7	0
Roby	6	0
Rosamond	9	2
Sharpsburg	7	0
Sicily	3	1
Willeys	7	1
Zenobia	4	0

Of the participating municipalities, Taylorville 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 an active, long-term NWS COOP Observation Station is located in the Taylorville area.

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

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

- *Assumption*: The Village lacks hardened structures that can withstand damaging winds and does not have generators for its shelters should damaging winds knock down overhead power lines.
- *Morrisonville*: Power outages caused by thunderstorms with damaging winds can impact the Village's drinking water wells and disrupt service to residents.
- *Palmer*: Heavy rains cause roadway flooding in the Village impeding travel.
- *Taylorville*: Heavy rains cause flooding along many roadways in the City, impeding travel. Of particular concern is Wilson Street, the main entrance to Taylorville Memorial Hospital.
- *County*: The County's 911 communication center is vulnerable to lightning strikes which can damage equipment and require vital services to be rerouted.

- *Taylorville CUSD*: Heavy rain events cause flooding of the main road into and away from the Jr. High and North Elementary School (Pawnee Street) adversely impacting travel and creating a safety hazard for students.

What impacts resulted from the recorded severe storms?

Severe storms as a whole have caused an estimated $1.2 million in recorded property damages. The following provides a breakdown of impacts by category.

Thunderstorms with Damaging Winds

Data obtained from NOAA's Storm Events Database indicates that between 1958 and 2019, 44 of the 154 thunderstorms with damaging winds caused $1,171,000 in property damages. Damage information was either unavailable or none was recorded for the remaining 110 reported occurrences.

NOAA's Storm Events Database documented one injury as the result of a July 19, 2010 thunderstorm with damaging wind event. One individual was injured when a tree fell on their vehicle in Taylorville.

Severe Storms Fast Facts – Impacts/Risk

Thunderstorms with Damaging Winds Impacts:
- Total Property Damage (44 events): ***$1,171,000***
- Total Crop Damage: ***n/a***
- Injuries (1 event): ***1***
- Fatalities: ***n/a***

Severe Hail Impacts:
- Total Property Damage 1 event): ***$1,800***
- Total Crop Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Lightning Strike Impacts:
- Total Property Damage (2 events): ***$50,075***
- 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***

Hail

Data obtained from NOAA's Storm Events Database and Planning Committee member records indicates that between 1968 and 2019, one of the 35 hail events caused $1,800 in property damages. Damage information was either unavailable or none was recorded for the remaining 38 reported occurrences.

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

Lightning

Data obtained from NOAA's Storm Events Database and Planning Committee member records indicates that between 2008 and 2019, the two lightning strike events caused $50,075 in property damage. No injuries or fatalities were reported as a result of any of the recorded lightning strike events.

Heavy Rain

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

What other impacts can result from severe storms?
In Christian 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 11.8% to 14.6% 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 Christian County

Year	Total # of Crashes	Presence of Wet Road Surface Conditions		
		# of Crashes	# of Injuries	# of Fatalities
2014	563	75	28	1
201	574	75	33	4
2016	527	62	16	0
2017	530	62	30	0
2018	547	71	24	0
Total:	**2,741**	**345**	**131**	**5**

Source: Illinois Department of Transportation.

What is the level of risk/vulnerability to public health and safety from severe storms?
For Christian 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, the Taylorville Memorial Hospital in Taylorville and the Pana Community Hospital in Pana as well as hospitals in Springfield (Sangamon County), Litchfield and Hillsboro (Montgomery County), Decatur (Macon County), and Shelbyville (Shelby County) as well as regional centers in the Peoria area are 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 Christian 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. Some of the participating jurisdictions acknowledged the need for emergency backup generators to allow continued operation of critical facilities such as municipal buildings, drinking and wastewater facilities including wells and lift stations, and storm shelter.

According to the Critical Facilities Vulnerability Survey completed by participants, half of the participants have backup generators at their drinking water and wastewater treatment facilities (Assumption, Morrisonville, Palmer, Stonington and Taylorville). In addition, several of the participants (the County, Assumption and Morrisonville) do not have generators to run emergency shelters.

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 Christian 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 six of the participating municipalities (Edinburg, Kincaid, Morrisonville, Pana, Stonington and Taylorville) 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 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 47 of the 353 recorded events listing property damage numbers for all categories of severe storms, there is no way to accurately estimate future potential dollar losses. However, according to the Christian County Supervisor of Assessments the total equalized assessed values of buildings in the planning area is $440,571,963. Since all of the structures in the planning area are vulnerable to damage, this total represents the countywide property exposure to severe storm events.

3.2 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

Temperature (°F)

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

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

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

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

Effective 11/01/01

Source: NOAA, National Weather Service.

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 Lincoln, Illinois is responsible for issuing ***winter storm watches*** and ***warnings*** for Christian County depending on the weather conditions. The following provides a brief description of each type of alert.

- **Watch.** The following watches are issued in advance of a storm and indicate the potential for significant winter weather within the next day or two.
  - **Winter Storm Watch**. A winter storm watch is issued when conditions are favorable for the development of a hazardous winter weather event which has the potential to threaten life or property.

- **Blizzard Watch**. A blizzard watch is issued when conditions are favorable for the development of blizzard conditions:
    - sustained winds or at least 35 mph and
    - reduced visibility of ¼ mile or less.

- **Advisories.** Winter advisories are issued for winter weather events that pose a significant inconvenience, especially to motorist, but should not be life-threatening if caution is exercised. The following advisories are generally issued 12 to 36 hours prior to an event.
    - **Freezing Rain Advisory.** A freezing rain advisory is issued when ice accumulations of up to ¼ inch are expected.
    - **Winter Weather Advisory.** A winter weather advisory is issued for one or more of the following:
        - snow accumulations of 3 to 5 inches in 12 hours or less;
        - sleet accumulations up to ¼ inch;
        - freezing rain in combination with sleet and/or snow; or
        - blowing and/or drifting snow.
    - **Wind Chill Advisory.** A wind chill advisory is issued when wind chill values are expected to be between -15°F and -24°F.

- **Warnings.** The following winter weather warnings are issued when severe winter weather conditions are expected to cause a significant impact to life or property and make travel difficult to impossible. Individuals are advised to avoid travel and stay indoors.
    - **Blizzard Warning.** A blizzard warning is issued when reduced visibility of less than ¼ mile due to falling and/or blowing snow and strong winds of at least 35 mph or greater are expected for at least three hours.
    - **Ice Storm Warning.** An ice storm warning is issued when ice accumulations of ¼ inch or greater are expected, resulting in hazardous travel conditions, tree damage and extended power outages.
    - **Winter Storm Warning.** A winter storm warning is issued when there is one or more of the following expected:
        - heavy snow accumulations of at least 6 inches in 12 hours or at least 8 inches in 24 hours; or
        - sleet accumulations of at least ½ inch.
    - **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 Christian County.

Severe Winter Storms

NOAA's Storm Events Database and NWS's COOP Data records were used to document 140 reported occurrences of severe winter storms (snow, ice and/or a combination of both) in Christian County between 1950 and 2019. Of the 140 recorded occurrences there were:

- ❖ 102 heavy snow storms or blizzards;
- ❖ 34 combination events (freezing rain, sleet, ice and/or snow); and
- ❖ 4 ice or sleet storms.

Severe Winter Storm Fast Facts – Occurrences

Number of Severe Winter Storm Events Reported (1950 -2019): ***140***
Number of Extreme Cold Events Reported (1996 - 2019): ***7***
Maximum 24-Hour Snow Accumulation: ***17.7 inches (March 24 & 25, 2013)***
Coldest Temperature Recorded in the County: ***-29°F (February 12, 1899)***
Most Likely Month for Severe Winter Storms to Occur: ***January***
Most Likely Time for Severe Winter Storms to Occur: ***Overnight***
Most Likely Months for Extreme Cold Events to Occur: ***January***

Figure SWS-2 charts the reported occurrences of severe winter storms by month. Of the 140 events, 107 (76%) took place in in December, January and February. Of these 107 events, 45 (32%) occurred during January, making this the peak month for severe winter storms. There was five event 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
1950 – 2019

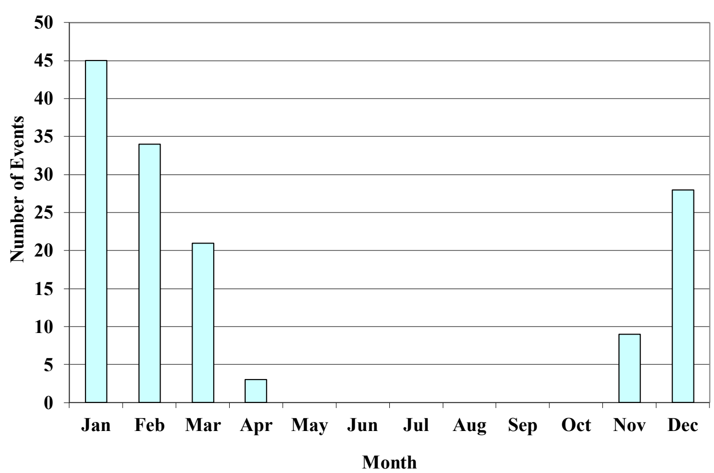
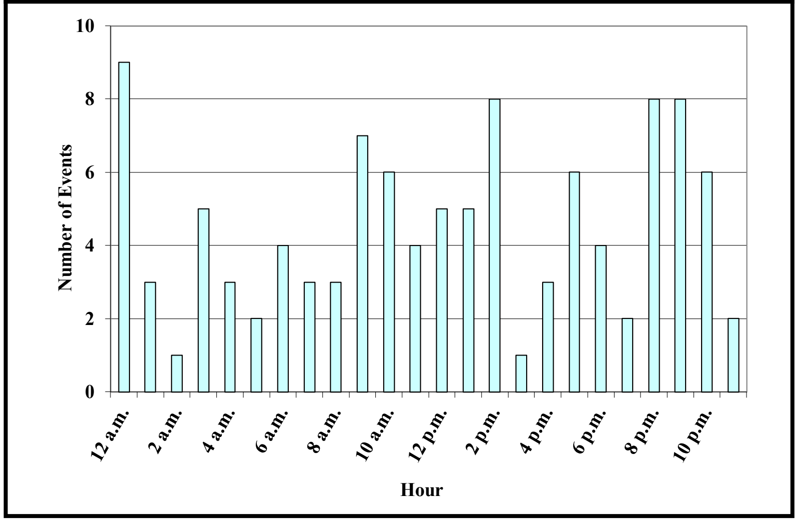


Figure SWS-3 charts the reported occurrences of severe winter storms by hour. Of the 140 occurrences, start times were unavailable for 32events. Of the remaining 108 severe winter storm events with recorded times, approximately 54% began during the p.m. hours, with 36 (33%) beginning between 8 p.m. and 2 a.m.

Figure SWS-3
Severe Winter Storms by Hour
1950 – 2019



According to the NWS's COOP data records, the maximum 24-hour snow accumulation in Christian County is 17.7 inches, which occurred on March 24 and 25, 2013 at the Taylorville NWS COOP observation station.

Extreme Cold

While extreme cold events occur on a fairly regular basis across central Illinois, NOAA's Storm Events Database has only seven *recorded* occurrences of extreme cold (dangerously low temperatures and wind chill values) in Christian County between 1996 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.

Six of the seven events (86%) took place in January, making this the peak month for extreme cold events. The remaining event took place in February. All the extreme cold events with recorded times began during the a.m. hours.

According to the Midwestern Regional Climate Center almost continuous temperature records for Christian County have been kept from 1899 to present by the NWS COOP observation station in Pana. Temperatures records have also been kept at the NWS COOP observation station four miles southeast of Morrisonville from 1895 to 1971 and at Morrisonville from 1979 to present. Based on the available records, the coldest temperature recorded in Christian County was -29°F on February 12, 1899. **Figure SWS-4** lists the coldest days recorded at the Pana COOP observation station.

Figure SWS-4
Coldest Days Recorded at Pana NWS COOP Observation Station

	Date	Temperature			Date	Temperature
1	1/7/1912	-25°F		7	1/19/1994	-21°F
2	2/13/1905	-24°F		8	2/12/1899	-20°F
3	1/18/1930	-24°F		9	1/17/1977	-20°F
4	1/12/1918	-22°F		10	12/22/1989	-20°F
5	1/20/1985	-21°F		11	2/9/1899	-19°F

Source: Midwest Regional Climate Center cli-MATE

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

Severe winter storms and extreme cold affect the entire County. All communities in Christian 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 Christian County's hazard rating for severe winter storms as "severe." (IEMA's overall hazard rating system has five levels: very low, low, medium, high and severe.)

Do any of the participating jurisdictions have designated warming centers?

Yes. Five of the eleven participating jurisdictions 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-5** identifies the location of each warming center by jurisdiction. At this time Jeisyville, Kincaid, Morrisonville, Mount Auburn, Palmer and Taylorville CUSD do not have any warming centers designated within their jurisdictions. In addition to those designated warming centers identified by the participants, the Illinois Department of Human Services office in Taylorville also serves as a warming center.

Figure SWS-5
Designated Warming Centers by Participating Jurisdiction

Name/Address	Name/Address
Assumption	*Stonington*
Tacusah Hall, 227 Chestnut St.	Village Hall, 118 E. Fourth St.
Edinburg	Stonington Fire Station, 1 Fire House Rd.
Edinburg Community Building, 103 W. Masonic St.	*Taylorville*
Pana	Taylorville Fire Station, 202 N. Main St.
Pana Fire Station, 400 E. First St.	Christian County Senior Citizens Center, 701 W. Adams St.
Pana Community Hospital, 101 E. 9th St.	

What is the probability of future severe winter storms occurring?

Severe Winter Storms

Christian County has had 140 verified occurrences of severe winter storms between 1950 and 2019. With 140 occurrences over the past 70 years, Christian County should expect at least two severe winter storm each year. There were 40 years over the past 70 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 57%.

Extreme Cold Events

Given the limited amount of data available for extreme cold events, it is difficult to establish a precise probability; however, Christian 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 Christian 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, Christian County has experienced 16 severe winter storms and two extreme cold events.

Severe winter storms have immobilized portions of the County, blocking roads; downing power lines, trees and branches; causing power outages and property damage; and contributing to vehicle accidents. In addition, the County and municipalities must budget for snow removal and de-icing of roads and bridges as well as for roadway repairs.

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

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

- *Jeisyville*: Poor drainage causes runoff to freeze on Village roads creating an ice hazard for residents.
- *Morrisonville*: Power outages caused by severe winter storms can impact the Village's drinking water wells and disrupt service to residents.

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 Christian County.

Severe Winter Storms

Data obtained from NOAA's Storm Events Database indicates that between 1950 and 2019, two of the 140 severe winter storms caused $1.76 million in property damages. Property damage information was either unavailable or none was recorded for the remaining 138 reported occurrences.

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.

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

Severe Winter Storm (Snow & Ice) Impacts:
- ❖ Total Property Damage (2 events): ***$1,760,000***
- ❖ Injuries (2events): ***4***
- ❖ Fatalities (2 events): ***3***

Extreme Cold Impacts:
- ❖ Total Property Damage: ***n/a***
- ❖ Injuries: ***n/a***
- ❖ Fatalities (1 event): ***1***

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

NOAA's Storm Events Database documented three fatalities and four injuries as a result of three separate severe winter storms. The following provides a brief description of each event.

- ❖ During the December 30, 1997 heavy snow event, an adult and a child were killed in a vehicle accident attributed to slippery roads.
- ❖ Three individuals were injured near Assumption in a vehicle accident during the March 11, 2000 heavy snow event.
- ❖ During the February5, 2010 winter storm a 26 year-old was killed when the vehicle he was riding in slid off an icy road east of Kincaid. An injury was also reported as a result of this event, but detailed information was unavailable.

Extreme Cold

Damage information was either unavailable or none was recorded for any of the seven reported extreme cold events between 1996 and 2019. NOAA's Storm Events Database documented one fatality as a result of the January 2014 extreme cold event. A 64 year-old man died of hypothermia after his vehicle became stuck in the snow about a block away from his rural Pana home.

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 Christian County, vehicle accidents are the largest risk to health and safety from severe winter storms. Hazardous driving conditions (i.e., reduced visibility, icy road conditions, strong winds, etc.) contribute to the increase in accidents that result in injuries and fatalities. A majority of all severe winter storm injuries result from vehicle accidents.

Traffic accident data assembled by the Illinois Department of Transportation from 2014 through 2018 indicates that treacherous road conditions caused by snow/slush and ice were present for 4.7% to 13.3% of all crashes recorded annually in the County. **Figure SWS-6** 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-6 Severe Winter Weather Crash Data for Christian County				
Year	**Total # of Crashes**	**Presence of Treacherous Road Conditions caused by Snow/slush and Ice**		
		# of Crashes	**# of Injuries**	**# of Fatalities**
2014	563	75	20	0
2015	574	40	9	2
2016	527	25	8	0
2017	530	28	16	1
2018	547	29	7	0
Total:	**2,741**	**197**	**60**	**3**

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 Christian 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 to medium***.

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 Christian 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 Christian 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 Christian 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. While six of the participating municipalities (Edinburg, Kincaid, Morrisonville, Pana, Stonington and Taylorville) 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 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 Christian 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 only two of the 147 recorded events listing property damage numbers for severe winter storms and extreme cold, there is no way to accurately estimate future potential dollar losses. However, since all existing structures within Christian County are vulnerable to damage, it is likely that there will be future dollar losses from severe winter storms and extreme cold.

3.3 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 Christian 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.

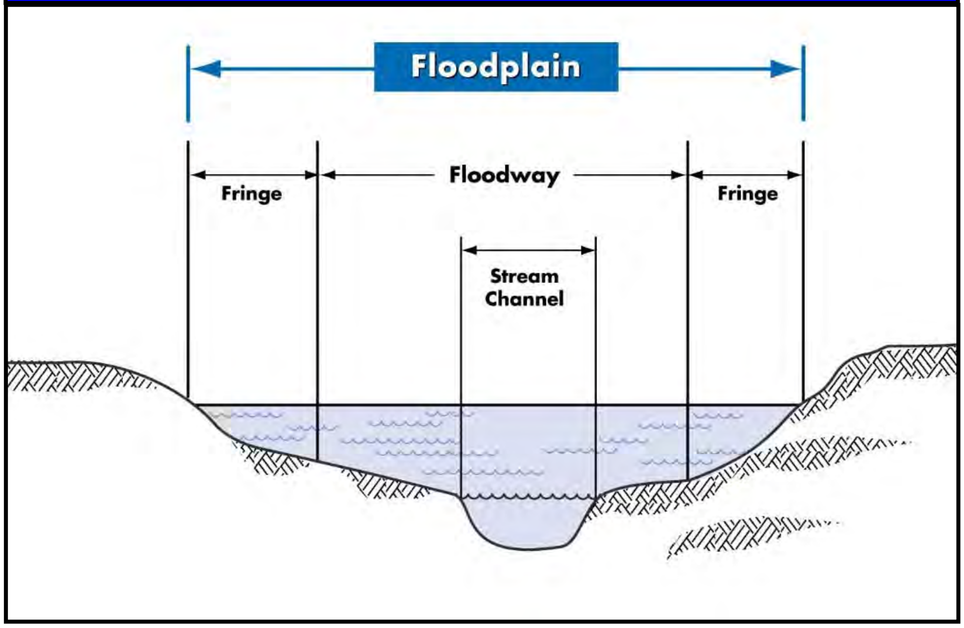
What is a floodplain?

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.

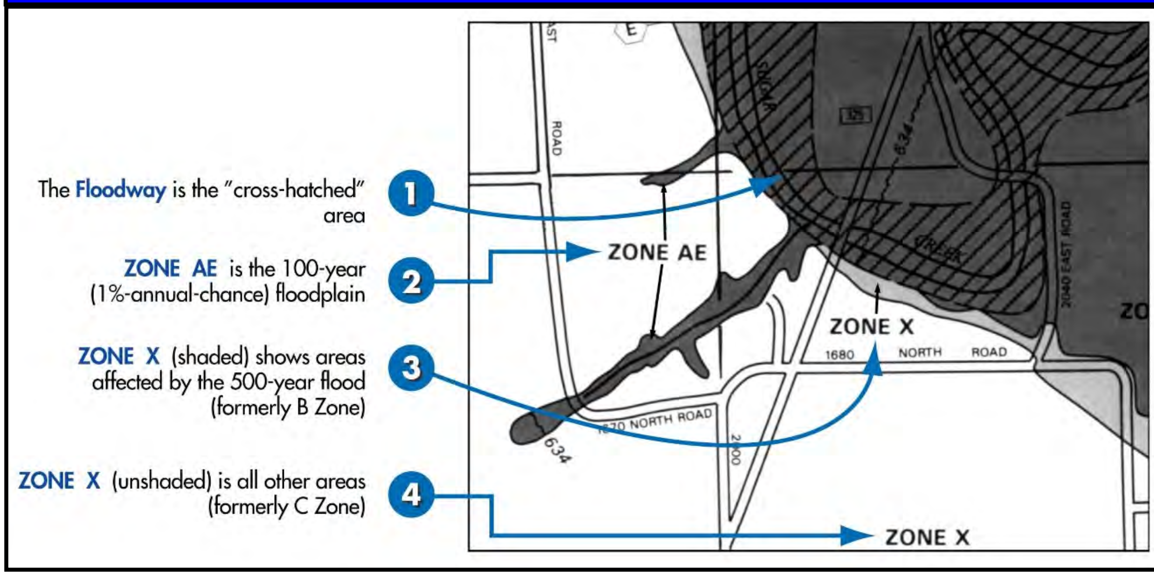
What is a Special Flood Hazard Area?

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

What are flood zones?

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

- **Zone A.** Zone A, also known as the Special Flood Hazard Area (SFHA) or base floodplain, is defined as the floodplain area that has a 1% chance of flooding in any given year. There are multiple Zone A designations, including Zones A, AO, AH, A1-30, AE, AR or A99. Land areas located within Zone A are considered high-risk flood areas.

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

- **Zone X (shaded).** Zone X (shaded), formerly known as Zone B, is defined as the floodplain area between the limits of the base flood (Zone A) and the 500-year flood. Land areas located within Zone X (shaded) are affected by the 500-year flood and are considered at a moderate risk for flooding.

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

What is a Repetitive Loss Structure or Property?

FEMA defines a "repetitive loss structure" as a National Flood Insurance Program-insured structure that has received two or more flood insurance claim payments of more than $1,000 each within any 10-year period since 1978. These structures/properties account for approximately one-fourth of all National Flood Insurance Program (NFIP) insurance claim payments since 1978.

Currently, repetitive loss properties make up about 2% of all NFIP policies, and account for approximately $9 billion in claims or approximately 16% of the total claims paid over the history of the Program. These structures not only increase the NFIP's annual losses, 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 Lincoln is responsible for issuing ***flood watches*** and ***warnings*** for Christian 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 7 and **8**, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of flood events recorded in Christian 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, and Committee member records have documented five occurrences of general flooding in Christian County between 2002 and 2019. Included in the five general flood events are two events that contributed to one federally-declared disaster for Christian County.

Flash Floods

NOAA's Storm Events Database documented 39 reported occurrences of flash flooding in Christian County between 2000 and 2019. Included in the 39 flash flood events are five events that contributed to one federally-declared disaster in Christian County. ***The declared disaster, Declaration #1416, included both flash flood and general flood events.***

Flood Fast Facts – Occurrences

Number of General Floods Reported (2002 – 2019): ***5***

Number of Flash Floods Reported (2000 – 2019): ***39***

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

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

Most Likely Time for Flash Floods to Occur: ***Late Afternoon/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 five general flood events, four (80%) began in April and May making this the peak period for general floods in Christian County. Of those four events, three (60%) began in May making these the peak month for general flooding. There was one event that spanned two or more months; however, for illustration purposes only the month the event started in is graphed.

In comparison, of the 23 flash flood events (59%) took place between May and June making this the peak period for flash floods. Of the 23 events, 16 (41%) occurred in May making this the peak month for flash flooding.

Figure F-3
Flood Events by Month

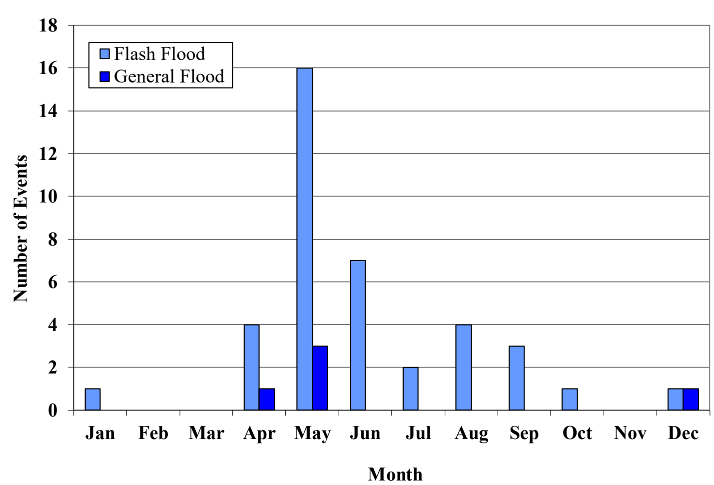
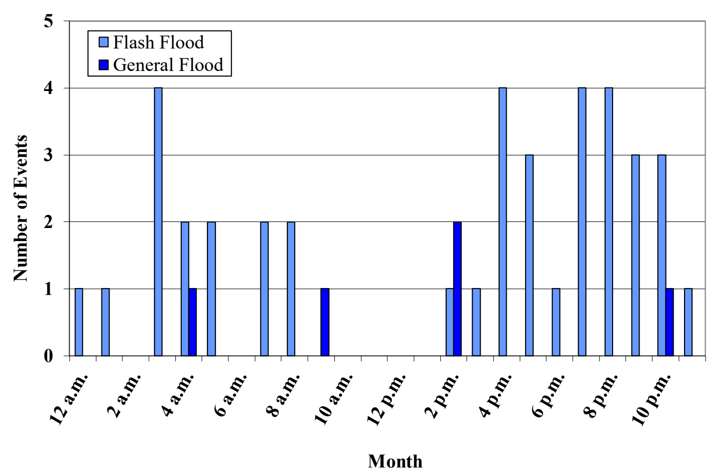


Figure F-4 charts the reported occurrences of flood events by hour. Approximately 64% of the 39 flash flood events began during the p.m. hours, with 19 of the events (49%) taking place between 4 p.m. and 10 p.m. In comparison 60% of general flood events began during the p.m. hours.

Figure F-4
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 Christian County approximately 5.5% 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 Christian County's hazard rating for floods as "medium." (IEMA's overall hazard rating system has five levels: very low, low, medium, high and severe.)

Figure F-5 identifies the floodplains in Christian County as well as the participating jurisdictions. This map is based on the Christian County DFIRMs that became effective in June 16, 2011. **Appendix K** contains maps identifying the floodplains located in the participating municipalities.

Figure F-6 identifies the bodies of water within or immediately adjacent to participating jurisdictions that are known to cause flooding or have the potential to flood. Water bodies with Special Flood Hazard Areas located within a participating jurisdiction (as identified on the DFIRMs) are identified in bold.

Municipal 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.

What jurisdictions within the County take part in the NFIP?

Christian County, Edinburg, Kincaid, Stonington and Taylorville all participate in the NFIP. **Figure F-7** ***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-5
Floodplain Areas in Christian County

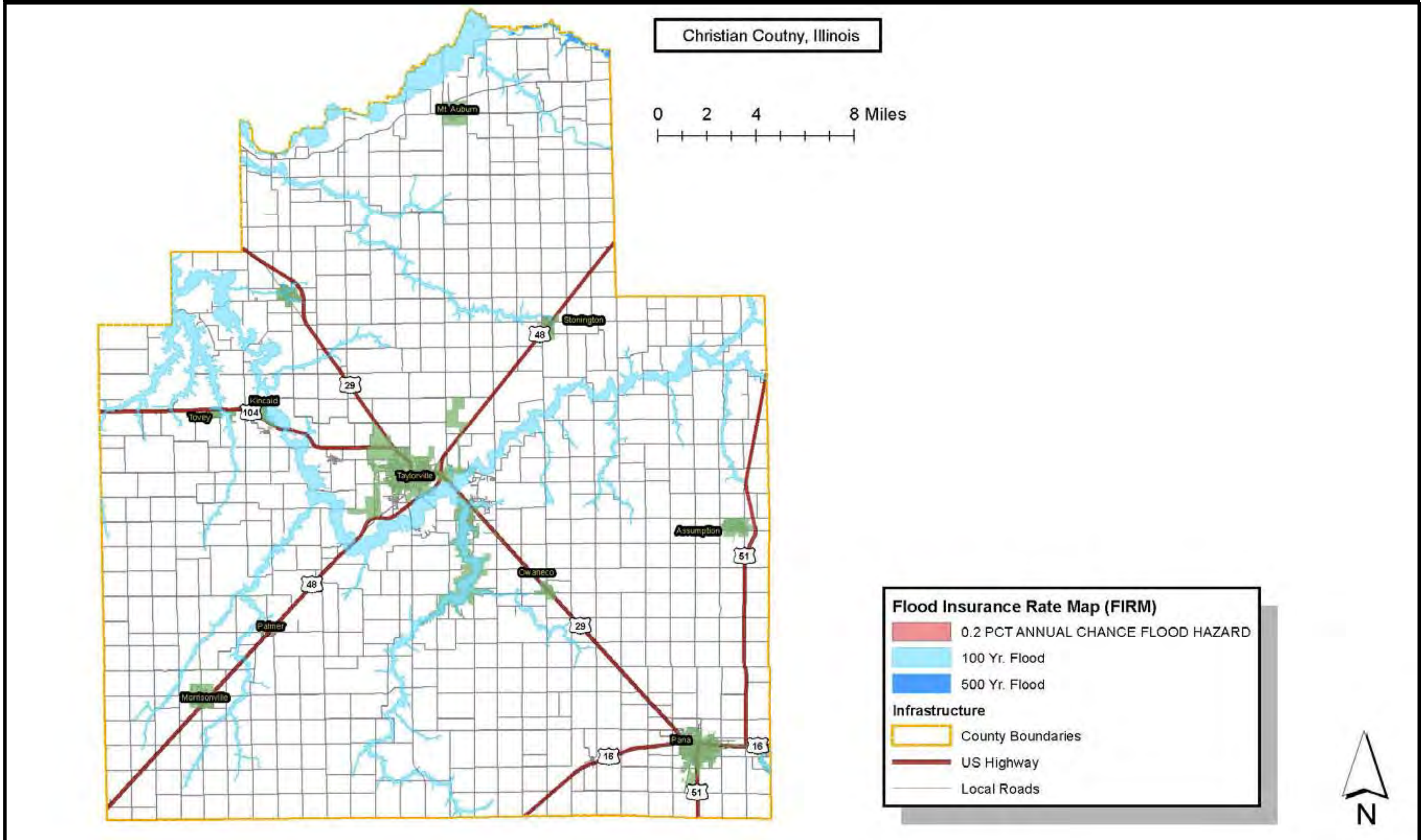


Figure F-6
Bodies of Water Subject to Flooding

Participating Jurisdiction	Water Bodies
Assumption	---
Edinburg	**Lick Branch**, **McCloskey Branch**
Jeisyville	---
Kincaid	**South Fork Sangamon River**
Morrisonville	---
Mount Auburn	---
Palmer	**Bear Creek**
Pana	---
Stonington	**Buckhart Creek**
Taylorville	**Flat Branch**, **Hopper Branch**, **Locust Creek**, **South Fork Sangamon River**, **Lake Taylorville**
Unincorporated Christian County	**Allen Branch**, **Barnstable Branch**, **Baughman Branch**, **Bear Creek**, **Beaty Branch**, Becks Creek, **Bertinetti Lake**, **Big George Branch**, **Bottrell Branch**, Bugg Branch, **Brown Branch**, **Brush Creek**, **Brushy Branch**, **Buckhart Creek**, **Butcher Branch**, **Carls Creek**, **Cate Creek**, **Cheney Branch**, **Clavin Creek**, **Clear Creek** (1), Clear Creek (2), Clear Creek (3), **Cloyd Creek**, **Condon Creek**, **Conway Creek**, Coon Creek, **Cotton Creek**, Cottonwood Creek, **Cross Branch**, **Crowl Creek**, **Cumberland Branch**, **Damery Branch**, **Dappert Branch**, **Davis Branch**, **Davis Creek**, **Delaney Branch**, **Deming Branch**, **Dixie Run**, **Dowdy Branch**, **Duval Branch**, **East Clear Creek**, **Fischer Branch**, **Flat Branch**, **Gebhart Branch**, **Goodrich Branch**, **Gordon Branch**, **Grove City Branch**, **Hall Branch**, **Hartel Branch**, **Henschen Branch**, **Herman Branch**, **Herman Scholes Branch**, **Holben Branch**, **Hunsley Branch**, **Jay Bird Creek**, **Johnson Branch**, **Jones Creek**, Kendall Creek, **Klein Creek**, **Klomm Creek**, **Koch Creek**, **Lake Kincaid**, **Lake Pana**, Lake Waddy, **Langley Branch**, **Leeper Branch**, **Lin Branch**, **Lick Branch**, **Livergood Branch**, **Locust Creek**, **Long Grove Creek**, **Lowis Branch**, **Main Ditch**, Main Drainage Ditch, **Mateer Branch**, **McCloskey Branch**, McCoy Creek, **Miller Branch**, **McKenzie Creek**, **Millburg Branch**, Montgomery Branch, **Mosquito Creek**, **Nina Creek**, **Noble Branch**, **Noland Branch**, **Noland Creek**, **Norville Branch**, **Oak Branch** (1), **Oak Branch** (2), **Olson Branch**, **Panther Creek**, Paragon Lake, **Pasfield Branch**, **Perrine Creek**, **Powers Branch**, **Prairie Fork**, **Reeter Branch**, **Rink Run**, **Robinson Branch**, Sacome Pond, **Sangamon River**, **Sangchris Lake**, **Sharp Creek**, **South Fork Sangamon River**, **Spring Branch**, **Spring Creek** (1), **Spring Creek** (2), **Truax Branch**, **Waterman Branch**, **Weitekamp Branch**, **West Clear Creek**, **Willow Branch**, **Willow Creek**, **Yeaman Branch**

Source: FEMA DFIRMs.

Figure F-7
NFIP Participating Jurisdictions

Participating Jurisdictions	Participation Date	Current Effective FIRM Date	CRS Participation	Most Recently Adopted Floodplain Zoning Ordinance
Christian County	6/16/2011	6/16/2011	No	4/19/2011
Edinburg	6/16/2011	6/16/2011	No	4/11/2011
Kincaid	4/1/1993	6/16/2011	No	5/9/2011
Stonington	9/28/1979	6/16/2011	No	5/2/2011
Taylorville	9/18/1995	6/16/2011	No	6/16/2011

Sources: FEMA, Community Status Book Report: Illinois.

Assumption, Jeisyville, Morrisonville, Mount Auburn and Pana have no identified flood hazard boundaries within their corporate limits and do not wish to participate in the NFIP. While the current effective DFIRM for Palmer (dated June 16, 2011) does identify a small SFHA within its corporate limits, the Village chose not to adopt floodplain regulations and participate in the NFIP. As a result, Palmer is listed as a community not in the NFIP with a sanction date of October 13, 1979 in FEMA's Community Status Book Report for Illinois. The current village administration does not see the need to participate area within the identified flood hazard boundaries is wooded or agricultural land northwest of the Village proper and does not include any residences.

Non-Participating Jurisdictions
Bulpitt, Harvel and Owaneco have no identified flood hazard boundaries within their corporate limits and have chosen not to participate in the Program. While the current effective DFIRMs for Moweaqua and Tovey (dated June 16, 2011) does identify SFHAs within its limits, the villages chose not to adopt floodplain regulations and participate in the NFIP. As a result, Moweaqua and Tovey are listed as communities not in the NFIP with sanction dates of August 17, 1980 and June 16, 2012 respectively in FEMA's Community Status Book Report for Illinois.

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

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

What is the probability of future flood events occurring?

General Floods
Christian County has had five verified occurrences of general flooding between 2002 and 2019. With five occurrences over the past 18 years, the probability or likelihood of a general flood event occurring in Christian County in any given year is 28%. There was two years over the past 18 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 11%.

Flash Floods
There have been 39 verified flash flood events between 2000 and 2019. With 29occurrences over the past 20 years, Christian County should approximately two flash flood event each year. There were 10 years over the past 20 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 50%.

HAZARD VULNERABILITY

The following describes the vulnerability to participating jurisdictions, identifies the impacts on public health and property (if known) and estimates the potential impacts on public health and safety as well as buildings, infrastructure and critical facilities from 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. Christian 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, Christian County has experienced 18 flash flood events and three general flood events.

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

Figure F-8
Verified Flash Flood Events by Participating Jurisdiction

Participating Municipality	Number	Year
Assumption	6	2002, 2004, 2004, 2010, 2010, 2018
Edinburg	6	2002, 2002, 2011, 2014, 2014, 2018
Jeisyville	6	2002, 2002, 2011, 2014, 2015, 2017
Kincaid	7	2001, 2002, 2002, 2011, 2014, 2015, 2017
Morrisonville	8	2002, 2002, 2002, 2004, 2004, 2011, 2015, 2017
Mount Auburn	6	2002, 2009, 2010, 2011, 2014, 2017)
Palmer	6	2002, 2004, 2004, 2011, 2015, 2017)
Pana	10	2002, 2002, 2004, 2004, 2010, 2010, 2010, 2015, 2017, 2018
Stonington	3	2002, 2002, 2005)
Taylorville[1]	14	2001, 2002, 2002, 2002, 2002, 2002, 2004, 2008, 2010, 2010, 2011, 2014, 2015, 2017
Langleyville	1	2011
countywide	11	2000, 2001, 2002, 2002, 2002, 2003, 2005, 2009, 2017, 2018, 2019
western portion of the County	2	2009, 2013

[1] Includes Taylorville CUSD

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.

- *Assumption*: Flooding has damaged the wastewater treatment plant in the past impacting service to residents.
- *Morrisonville*: Heavy rains cause flooding along Illinois Route 48 impeding travel for residents and emergency responders.
- *Palmer*: Several roads in the Village flood during heavy rain events impeding travel.
- *Pana*: Inadequate drainage systems within the City cause flooding of roads which impedes travel. With no drainage system in place behind the fire station, nearby properties experience repeated flooding problems.
- *Stonington*: Illinois Route 48 floods heavily on the south side of the Village during heavy rain events impeding travel for residents and emergency responders. Flooding also occurs along S. County Road and the area west of the Legacy grain elevator.
- *Taylorville*: Flooding occurs along many roadways in the City, impeding travel. Of particular concern is the flooding along Wilson Street into Taylorville Memorial Hospital floods during heavy rain events.
- *Taylorville CUSD*: The main road into and away from the Jr. High and North Elementary School (Pawnee Street) floods during heavy rain events adversely impacting travel and creating a safety hazard for students.

What impacts resulted from the recorded floods?

Floods as a whole have caused a *minimum* of $7.2 million in property damages. The following provides a breakdown by category.

In comparison, the State of Illinois has averaged an estimated $257 million annually in property damage losses, making flooding the single most financially damaging natural hazard in Illinois.

General Floods

Data obtained from NOAA's Storm Events Database indicates that between 2002 and 2019, one of the five general flood events caused $2.8 million in property damages. Damage information was either unavailable or none was recorded for the remaining four 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 2000 and 2019, one of the 39 flash flood events caused approximately $4.4 million in property damages. Damage information was either unavailable or none was recorded for the remaining 38 reported occurrences.

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

Flood Fast Facts – Impacts/Risk

General Flood Impacts:
- Total Property Damage(1 event): ***$2,800,000***
- Total Crop Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Flash Flood Impacts:
- Total Property Damage(1 event): ***$4,400,000***
- 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/High***

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 low. In terms of the risk or vulnerability to public health and safety from *general floods*, the risk is seen as ***low***. However, over half of the recorded flood events were the result of flash flooding. Since there is very little warning associated with flash flooding the risk to public health and safety from *flash floods* is elevated to ***medium***.

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

Yes. According to information obtained from FEMA, there are two repetitive loss structures located in Stonington and unincorporated Christian County. As described previously, FEMA defines a "repetitive loss structure" as an NFIP-insured structure that has received two or more flood insurance claim payments of more than $1,000 each within any 10-year period since 1978.

Figure F-9 identifies the repetitive flood loss structure by participating jurisdiction and provides the total flood insurance claim payments. The exact location and/or address of the insured structures are not included in this Plan to protect the owners' privacy. According to FEMA, there have been five flood insurance claim payments totaling $69,078.58 for the two repetitive flood loss structures.

Figure F-9
Repetitive Flood Loss Structures

Participating Jurisdiction	Structure Type	Number of Structures	Number of Claim Payments	Flood Insurance Claim Payments		Total Flood Insurance Claim Payments
				Structure	Content	
Stonington	single family	1	2	$58,040.45	$6,144.81	$64,185.26
Unincorporated Christian County	single family	1	3	$2,933.41	$1,959.91	$4,893.32
Total:		**2**	**5**	**$60,973.86**	**$8,104.72**	**$69,078.58**

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

Yes. **Figure F-10** identifies the number of existing residential structures by participating jurisdiction located within a base floodplain. These counts were prepared by the Consultant using the effective DFIRMs. It should be noted that while the identified residential structures are located in a floodplain, the actual number of structures impacted may differ during an actual event.

Aside from key roads and bridges and buried power and communication lines, Edinburg, Kincaid and Stonington have specific infrastructure/critical facilities located within or adjacent to a floodplain. The following provides a description of each.

Edinburg

- The Edinburg Elementary School is located adjacent to the base floodplain of McCloskey Branch while the Edinburg Police Department is located adjacent to the base floodplain of Lick Branch.

Kincaid

- The Kincaid wastewater treatment plant is located adjacent to the base floodplain of South Fork Sangamon River.

Stonington

- The Stonington wastewater treatment facility is located in the base floodplain of Buckhart Creek.

Figure F-10
Existing Residential Structures Located within a Base Floodplain by Participating Jurisdiction

Participating Jurisdiction	Number of Residential Structures
Assumption	---
Edinburg	14
Kincaid	5
Jeisyville	---
Morrisonville	---
Mount Auburn	---
Pana	---
Palmer	---
Stonington	3
Taylorville	30
Bertinettis Lake (Taylorville Township)	7
Lake Pana (Pana Township)	11
Sangchris Lake (South Fork Township)	7
Unincorporated Christian County	14

Source: FEMA DFIRMs

While 5.5% of the land area in Christian County lies within the base floodplain and is susceptible to riverine flooding, ***almost the entire County is vulnerable to flash flooding***. As a result, ***a majority of the buildings, infrastructure and critical facilities that may be impacted by flooding are located outside of the base floodplain and are not easily identifiable***.

The risk or vulnerability of existing buildings, infrastructure and critical facilities to all forms of flooding is considered to be ***medium*** to ***high*** based on: (a) the frequency and severity of recorded flood events within the County; (b) the County's proximity to the Sangamon River and the South Fork of the Sangamon River; (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 municipalities and the unincorporated areas around Sangchris Lake, Lake Pana, and Bertinettis Lake* can be calculated if several assumptions are made. These assumptions represent a probable scenario based on the reported occurrences of flooding in Christian 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 in each of the municipalities and the unincorporated areas around Sangchris Lake, Lake Pana, and Bertinettis Lake.

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.

Assumption #1

A riverine flood event will impact vulnerable residential structures within each municipality and specific unincorporated areas.

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 has occurred more frequently and has caused more recorded flood damages in the County than riverine flooding, identifying residential structures vulnerable to flash flooding is problematic because most are located outside of the floodplain and the number of structures impacted can change with each event depending on the amount of precipitation received, the topography and the land use of the area.

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

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

Assumption #2

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

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

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

This assumption results in the following conditions for each municipality/unincorporated area:

- ➢ Assumption, Jeisyville, Morrisonville, Mount Auburn, and Pana would not experience any residential flooding since there are no river, stream or creek ***base floodplains*** located within their municipal limits; and
- ➢ *Edinburg*: McCloskey Branch and Lick Branch would overflow their banks and flood portions of the Village;
- ➢ *Kincaid*: South Fork Sangamon River and its tributaries would overflow their banks and flood southeastern portions of the Village;
- ➢ *Palmer:* Bear Creek would overflow its banks and flood a small portion of the northwest corner of the Village;
- ➢ *Stonington*: Buckhart Creek would overflow its banks and flood a small portion of the Village;
- ➢ *Taylorville:* South Fork Sangamon River, Hopper Branch, Flat Branch, Lake Taylorville and Locust Branch would overflow their banks and flood eastern and southeastern portions of the City;
- ➢ *Sangchris Lake (unincorporated area)*: Sangchris Lake would overflow its banks and flood portions of the unincorporated area around the lake;
- ➢ *Lake Pana (unincorporated area)*: Lake Pana would overflow its banks and flood portions of the unincorporated area around the lake; and
- ➢ *Bertinettis Lake (unincorporated area)*: Bertinettis Lake would overflow its banks and flood portions of the unincorporated area around the lake.

Number of Potentially-Damaged Housing Units. Since this scenario assumes that all the base floodplains within a municipality/unincorporated area will experience the same degree of flooding, the number of existing residential structures located within the base floodplain(s) of each municipality/unincorporated area can be used to

Assumption #3

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

determine the number of potentially-damaged housing units. **Figure F-10** identifies the total number of existing residential structures located within the base floodplains(s) of each municipality/unincorporated area. These counts were prepared by the Consultant.

While base floodplains are present within Palmer, there are no residential structures located within those limits.

Assumption #4

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

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

While base floodplains are present within Palmer, there are no residential structures located within those limits.

To determine the average market value, the average assessed value must first be calculated. The average assessed value is determined by taking the total assessed value of residential buildings within a jurisdiction and dividing that number by the total number of housing units within the jurisdiction. The average market value is then determined by taking the averaged assessed value and multiplying that number by three (the assessed value of a structure in Christian County is approximately one-third of the market value). **Figure F-11** provides a sample calculation. The total assessed value is based on 2019 tax assessment information provided by the Christian County Supervisor of Assessments. **Figure F-12** provides the average assessed value and average market value for each participating municipality and the township of South Fork (Sangchris Lake), Pana Township (Lake Pana) and Taylorville Township (Bertinettis Lake).

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%

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-13** calculates the percent loss to a structure and its contents for different scenarios based on flood depth and structure type.

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%.

Figure F-11
Sample Calculation of Average Assessed Value & Average Market Value – Edinburg

Average Assessed Value

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

Edinburg: $12,428,452 ÷ 514 housing units = $24,179.86770

Average Market Value

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

Edinburg: $24,179.86770 x 3 = $72,539.60311
($72,540)

Figure F-12
Average Market Value of Housing Units by Participating Municipality/ Unincorporated Area

Participating Jurisdiction	Total Assessed Value of Residential Buildings 2019	Total Housing Units (2010)	Average Assessed Value (Raw)	Average Market Value (Raw)	Average Market Value (Rounded)
Assumption	$14,890,175	582	$25,584.49313	$76,753.47938	$76,753
Edinburg	$12,428,452	514	$24,179.86770	$72,539.60311	$72,540
Jeisyville	$719,854	49	$14,690.89796	$44,072.69388	$44,073
Kincaid	$12,729,613	747	$17,040.98126	$51,122.94378	$51,123
Morrisonville	$11,625,988	459	$25,328.94989	$75,986.84967	$75,987
Mount Auburn	$5,514,743	220	$25,067.01364	75,201.04091	$75,201
Palmer	$1,938,776	99	$19,583.59596	$58,750.78788	$58,751
Pana	$41,326,089	3,084	$13,400.15856	$40,200.47568	$40,200
Stonington	$12,839,268	403	$31,859.22581	$95,577.67742	$95,578
Tovey	$3,866,209	229	$16,883.00873	$50,649.02620	$50,649
Bertinettis Lake (Taylorville Township)	$159,607,834	5,924	$26,942.57833	$80,827.73498	$80,828
Lake Pana (Pana Township)	$56,515,664	3,213	$17,589.68690	$52,769.06069	$52,769
Sangchris Lake (South Fork Township)	$35,048,699	1,309	$26,775.17112	$80,325.51337	$80,326

Source: Christian County Supervisor of Assessments.

Figure F-13
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

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-14** provides a sample calculation.

Figure F-14
Structure: **Potential Dollar Loss Sample Calculation – Edinburg**

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

Edinburg: $72,540 x 20% = $14,508.00 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)

Edinburg: $14,508.00 per housing unit x 14 housing unit = $203,112.00
($203,112)

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-15** provides a sample calculation.

Figure F-15 ***Content:*** **Potential Dollar Loss Sample Calculation – Edinburg**
½ (Average Market Value of a Housing Unit with the Jurisdiction) x Percent Damage = Average Content Damage per Housing Unit
Edinburg: ½ ($72,540) x 30% = $10,881.00 per housing unit
Average Content Damage per Housing Unit x Number of Potentially-Damaged Housing Units within the Jurisdiction = *Content* Potential Dollar Losses (Rounded to the Nearest Dollar)
Edinburg: $10,881.00 per housing unit x 14 housing unit = $152,334.00 **($152,334)**

Finally, the ***total potential dollar losses*** may be calculated by adding together the potential dollar losses to the structure and the content. **Figure F-16** provides a breakdown of the total potential dollar losses by municipality/unincorporated area.

This assessment illustrates the <u>*potential residential dollar losses*</u> that should be considered when municipalities are deciding which mitigation projects to pursue. Potential dollar losses caused by riverine flooding to vulnerable residences within the participating municipalities would be expected to ***range from $89,446 in Kincaid to $834,561 in Taylorville***. There are six participating municipalities in this scenario who do not have any residences considered vulnerable to riverine flooding. Potential dollar losses to vulnerable structures in the unincorporated areas would be expected to ***range from $196,798 in the Sangchris Lake area to $203,161 in the Lake Pana area***.

<u>*Vulnerability of Infrastructure/Critical Facilities*</u>
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, Stonington's wastewater treatment plant is located in the base floodplain of Bear Creek. No other above-ground infrastructure within the participating jurisdictions, other than key roads and bridges, were identified as being vulnerable to riverine flooding.

Figure F-16
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Riverine Flood Event by Participating Municipality/Unincorporated Area

Participating Jurisdiction	Average Market Value (2019)	Potentially-Damaged Housing Units	Potential Dollar Losses		Total Potential Dollar Losses (Rounded to the Nearest Dollar)
			Structure	Content	
Assumption	$76,753	0	$0	$0	$0
Edinburg	$72,540	14	$203,112	$152,334	$355,446
Jeisyville	$44,073	0	$0	$0	$0
Kincaid	$51,123	5	$51,123	$38,343	$89,466
Morrisonville	$75,987	0	$0	$0	$0
Mount Auburn	$75,201	0	$0	$0	$0
Palmer	$58,751	0	$0	$0	$0
Pana	$40,200	0	$0	$0	$0
Stonington	$95,578	3	$57,347	$43,010	$100,357
Taylorville	$79,482	30	$476,892	$357,669	$834,561
Bertinettis Lake (Taylorville Township)	$80,828	7	$113,159	$84,869	$198,028
Lake Pana (Pana Township)	$52,769	11	$116,092	$87,069	$203,161
Sangchris Lake (South Fork Township)	$80,326	7	$112,456	$84,342	$196,798

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. Christian 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.

3.4 TORNADOES

HAZARD IDENTIFICATION

What is the definition of a tornado?

A tornado is a narrow violently rotating column of air, often visible as a funnel-shaped cloud that extends from the base of a thunderstorm cloud formation to the ground. The most violent tornadoes can have wind speeds of more than 300 miles per hour and can create damage paths in excess of one mile wide and 50 miles long.

Not all tornadoes have a visible funnel cloud. Some may appear nearly transparent until dust and debris are picked up or a cloud forms within the funnel. Generally, tornadoes move from southwest to northeast, but they have been known to travel in any direction, even backtracking. A typical tornado travels at around 10 to 20 mile per hour, but this may vary from almost stationary to 60 miles per hour. Tornadoes can occur at any time of the year and happen at any time of the day or night, although most occur between 4 p.m. and 9 p.m.

About 1,200 tornadoes hit the United States yearly, with an average 52 tornadoes occurring annually in Illinois. The destruction caused by a tornado may range from light to catastrophic depending on the intensity, size and duration of the storm. Tornadoes cause crop and property damage, power outages, environmental degradation, injuries and fatalities. Tornadoes are known to blow roofs off buildings, flip vehicles and demolish homes. Typically, tornadoes cause the greatest damage to structures of light construction, such as residential homes. On average, tornadoes cause 60 to 65 facilities and 1,500 injuries in the United States annually.

How are tornadoes rated?

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

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

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

Figure T-1 Fujita & Enhanced Fujita Tornado Measurement Scales				
F-Scale		EF-Scale		Description
Category	Wind Speed (mph)	Category	Wind Speed (mph)	
F0	40 – 72	EF0	65 – 85	Light damage – some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; damage to sign boards
F1	73 – 112	EF1	86 – 110	Moderate damage – peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
F2	113 – 157	EF2	111 – 135	Considerable damage – roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground
F3	158 – 207	EF3	136 – 165	Severe damage – roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown
F4	208 – 260	EF4	166 – 200	Devastating damage – well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated
F5	261 – 318	EF5	Over 200	Incredible damage – strong frame houses lifted off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 yards; trees debarked; incredible phenomena will occur

Source: NOAA, Storm Prediction Center.

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

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

Are alerts issued for tornadoes?

Yes. The National Weather Service Weather Forecast Office in Lincoln, Illinois is responsible for issuing ***tornado watches*** and ***warnings*** for Christian 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 9, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of tornado events recorded in Christian County. NOAA's Storm Events Database and the NWS Weather Forecast Office in Lincoln have documented 49 occurrences of tornadoes in Christian County between 1950 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 (1950 – 2019): ***49***

Highest F-Scale Rating Recorded: ***F3 (March 20, 1976) & EF3 (December 1, 2018)***

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

Most Likely Time for Tornadoes to Occur: ***Afternoon***

Average Length of a Tornado: ***2.1 miles***

Average Width of a Tornado: ***87 yards***

Average Damage Pathway of a Tornado: ***0.11sq. mi.***

Longest Tornado Path in the County: ***12.49 miles (December 1, 2018)***

Widest Tornado Path in the County: ***900 yards (December 1, 2018)***

During the process of collecting and verifying the tornado data used in this updated Plan, discrepancies were identified in the existing tornado information databases. Discussions were immediately conducted with Chris Miller, Warning Coordination Meteorologist with the NWS Weather Forecast Office in Lincoln to verify tornado coordinates so that these discrepancies could be corrected or clarified. Consequently, this NHMP has the most accurate information on tornadoes in Christian County. If the reader compares the tornado information in this Plan with other databases, they may encounter the same discrepancies until these databases are formally corrected.

Figure T-2 charts the reported occurrences of tornadoes by magnitude. Of the 49 reported occurrences there was: 1 – F3, 3 – F2s, 13 – F1s, 10 – F0s, 1 – EF3, 1 – EF2s, 6 – EF1s and 14 – EF0s.

Figure T-3 charts the reported tornadoes by month. Of the 49 events, 28 (57%) took place in April and May making this the peak period for tornadoes in Christian County. Of those 28 events, 17 (35%) occurred during April making this the peak month for tornadoes. In comparison, 1,584 of the 2,443 tornadoes (65%) recorded in Illinois from 1950 through 2017 took place in April, May and June.

Figure T-2
Tornadoes by Magnitude
1950 - 2019

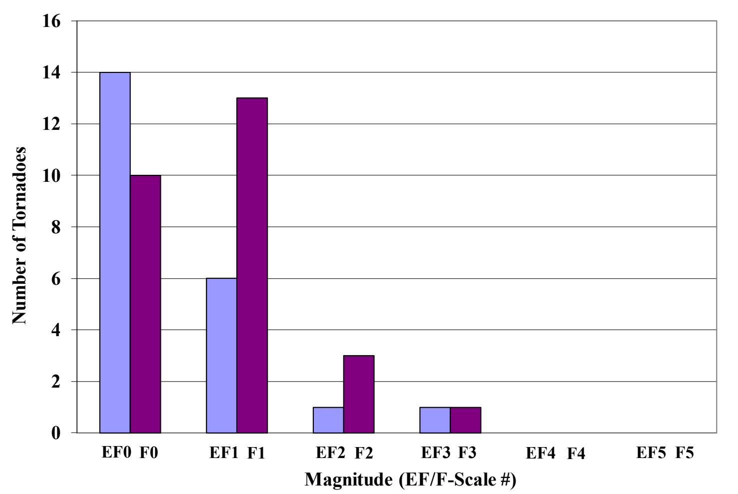


Figure T-3
Tornadoes by Month
1950 - 2019

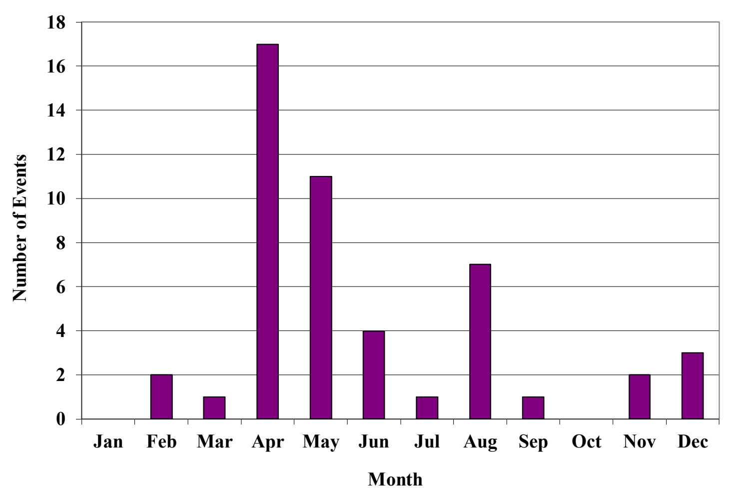
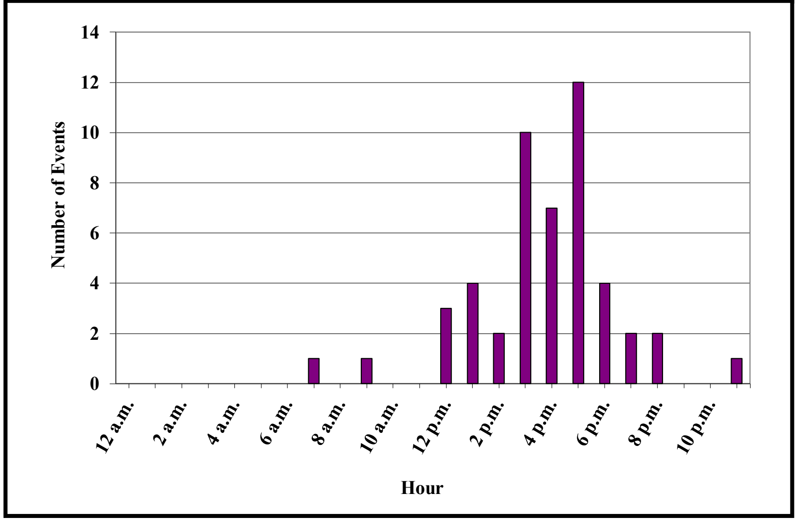


Figure T-4 charts the reported tornadoes by hour. Approximately 96% of all tornadoes occurred during the p.m. hours, with 39 of the p.m. events (80%) taking place between 1 p.m. and 7 p.m. In comparison, more than half of all Illinois tornadoes occur between 2 p.m. and 8 p.m.

The tornadoes that have impacted Christian County have varied from 0.1 miles to 12.49 miles in length and from 10 yards to 900 yards in width. The average length of a tornado in Christian County is 2.1 miles and the average width is 87 yards (0.05 miles).

Figure T-4
Tornadoes by Hour
1950 - 2019



Figures T-5 shows the pathway of each reported tornado. The numbers by each tornado correspond with the tornado description in **Table 9** in **Appendix J**. Records indicate that most of these tornadoes generally moved from southwest to northeast across the County. Unlike other natural hazards (i.e., severe winter storms, drought and excessive heat), tornadoes impact a relatively small area. Typically, the area impacted by a tornado is less than four square miles. In Christian County, the average damage pathway or area impacted by a tornado is 0.11 square miles.

The longest and widest tornado recorded in Christian County occurred on December 1, 2018. This EF3 tornado, measuring 12.49 miles in length and 900 yards (0.5 miles) in width, touched down in Christian County east-southeast of Morrisonville and traveled northeast passing through Hewittville and Taylorville before lifting off north of the City. The damage pathway of this tornado covered approximately 6.4 square miles.

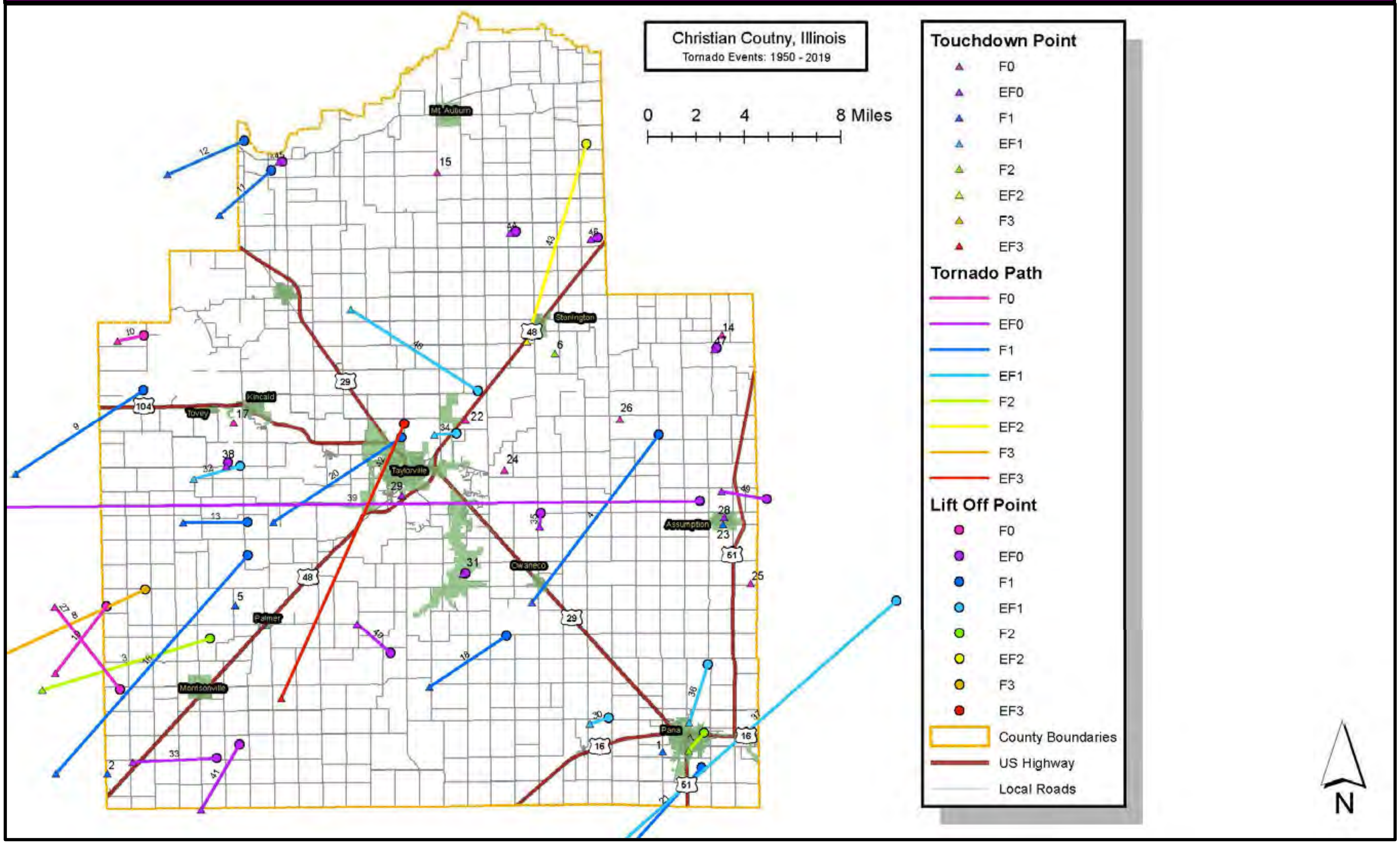
What locations are affected by tornadoes?

Tornadoes have the potential to affect the entire County. Of the ten participating municipalities, Assumption, Pana, Stonington and Taylorville have had reported occurrences of tornadoes within their corporate limits. The *2018 Illinois Natural Hazard Mitigation Plan* prepared by IEMA classifies Christian County's hazard rating for tornadoes as "medium." (IEMA's overall hazard rating system has five levels: very low, low, medium, high and severe.)

What is the probability of future tornadoes occurring?

Christian County has had 49 verified occurrences of tornadoes between 1950 and 2019. With 49 tornadoes over the past 70 years, the probability or likelihood that a tornado will touchdown somewhere in the County in any given year is 70%. There were nine years over the last 70 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 13%.

Figure T-5
Tornado Pathways in Christian County



HAZARD VULNERABILITY

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

Are the participating jurisdictions vulnerable to tornadoes?

Yes. All of Christian County is vulnerable to the dangers presented by tornadoes. According to NOAA's Storm Events Database and the NWS Weather Forecast Office in Lincoln, a majority of the tornadoes have touched down or passed through the central portion of the County. Since 2010, 19 tornadoes have been recorded in Christian County.

Of the participating municipalities, Assumption, Pana, Stonington and Taylorville 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
Assumption	6	2006, 2007	1974, 2006, 2017, 2019
Edinburg	1	---	2019
Jeisyville	2	---	2011, 2015
Kincaid	2	---	2003, 2015
Morrisonville	8	---	1964, 1976, 1999, 2006, 2006, 2011, 2018, 2018
Mount Auburn	2	---	1998, 2006
Palmer	4	---	1975, 1987, 1999, 2018
Pana	6	1976, 2006, 2013	1955, 2009, 2014
Stonington	5	2018	1975, 2006, 2019, 2019
Taylorville[1]	7	2006, 2018	2006, 2006, 2008, 2010, 2011

[1] Includes Taylorville CUSD

In terms of unincorporated areas vulnerable to tornadoes, Roby has had three tornadoes touch down near its vicinity while Clarksdale and the Kincaid Generating Station have each had two tornadoes touch near their vicinity. **Figure T-7** details the verified tornadoes that have touched down in or near unincorporated areas of Christian County.

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

Unincorporated Area	Number of Verified Tornadoes	Year	
		Touched Down/Passed ***Through*** Unincorporated Area	Touched Down/Passed ***Near*** Unincorporated Area
Clarksdale	2	---	1987, 2018
Kincaid Generating Station	2	---	1977, 1977
Roby	3	---	1977, 1977, 2019
Rosamond	1	---	2009
Willeys	1	---	2019

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

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

- *Assumption*: The City does not have a siren on the west side of town to warn residents of imminent danger. In addition, officials are concerned about the loss of government services/records should a tornado directly impact the City.
- *Morrisonville*: The Village is concerned about tornadic winds causing a power outage at their drinking water wells located outside of the Village which would impact service to residents.
- *Taylorville*: Given the City was recently hit by an EF3 tornado, officials feel are concerned about their vulnerability to future tornadoes.
- *Chris-Mont EMA*: The County has recently experienced an increase in tornadic activity and is concerned about their future vulnerability to tornadoes.

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 Lincoln and Planning Committee member records indicates that between 1950 and 2019, 18 of the 49 tornadoes caused $124.8 million in property damages and three of the 49 tornadoes caused $632,750 in crop damages. The property damage total includes $122.3 million sustained as a result of the three tornadoes that impacted the County on December 1, 2018. Property damage information was either unavailable or none was recorded for the remaining 31 reported occurrences.

Included in the property damage total is $25,000 in damages sustained as a result of the April 2, 1964 tornado event and represents losses incurred in two counties (including Christian County.) A breakdown by county was unavailable.

Tornado Fast Facts – Impacts/Risk

Tornado Impacts:

- Total Property Damage (18 events): ***$124,857,500***^
- Total Crop Damage (3 events): ***$632,750***
- Injuries (4 events): ***27***
- Fatalities: ***0***

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***

^ Included in the property damage total is $25,000 in damages sustained as the result of the April 2, 1964 tornado event and represents losses incurred in two counties (including Christian County). A breakdown by county was not available.

NOAA's Storm Events Database documented 27 injuries as a result of four tornado events. Detailed information on the injuries sustained was only available for one of the events. One individual was injured due to falling debris from the F1 tornado in the Taylorville area on April 2, 2006.

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, ***Christian County ranks in the top 20 counties in Illinois in terms of tornado frequency***. This fact alone suggests that the overall risk posed by tornadoes to public health and safety is relatively high. While frequency is important, other factors must be examined when assessing vulnerability including population distribution and density, the ratings and pathways of previously recorded tornadoes, the presence of high-risk living accommodations (such as high-rise buildings, mobile homes, etc.) and adequate access to health care for those injured following a tornado.

Christian County

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

In terms of adequate access to health care, the Taylorville Memorial Hospital in Taylorville and the Pana Community Hospital in Pana are equipped to provide continuous care to persons injured by a tornado assuming that it is not directly impacted. In addition, there are hospitals in Springfield (Sangamon County), Litchfield and Hillsboro (Montgomery County), Decatur (Macon County), and Shelbyville (Shelby County) as well as regional centers in the Peoria area that are equipped to provide care and have sufficient capacity for the influx of additional patients from one or more counties.

Participating Municipalities/Taylorville CUSD

In general, if a tornado were to touch down 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 the participating jurisdictions are very small in size (less than 1 square mile) and have relatively dense and evenly distributed populations within their municipal boundaries. As a result, if a tornado were to touch down anywhere within the corporate limits of these municipalities it will have a greater likelihood of causing injuries or even fatalities.

Do any participating jurisdictions have community safe rooms?

Yes. Taylorville identified its community shelter as community safe room. None of the other participating jurisdictions, including the Taylorville CUSD, have community safe rooms. As a result, if a tornado were to touch down or pass through any of the population centers in the County, then there would be a greater likelihood of injuries and fatalities due to the lack of structures specifically designed and constructed to provide life-safety protection. As discussed previously, the risk or vulnerability posed by tornadoes to public health and safety is considered to be high for the population centers in the County. Therefore, the participating municipalities and Taylorville CUSD should strongly consider the construction of community safe rooms as a mitigation strategy.

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

Yes. All existing buildings, infrastructure and critical facilities located within the County and participating jurisdictions 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 touchdown 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 = 0.11 sq. miles

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 Christian County will be used since it has a higher probability of recurring. In Christian County the area impacted by an average-sized tornado is 0.11 square miles. This average is based on over 70 years of data.

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

Assumption #2

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

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

Assumption #3: Method for Estimating Potentially-Damaged Housing Units. With the size of the tornado calculated 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 participating jurisdiction 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 – Christian County**
Total Housing Units in the Jurisdiction ÷ Land Area within the Jurisdiction = Average Housing Unit Density (Rounded Up to the Nearest Whole Number)
Christian County: 15,563 housing units ÷ 709.377 sq. miles = 21.93897 housing units/sq. miles **(22 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.

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)
Assumption	582	6	0.880	---
Edinburg	514	20	0.625	---
Jeisyville	49	9	0.123	---
Kincaid	747	33	0.819	---
Morrisonville	459	31	1.035	443.47826
Mount Auburn	220	33	0.997	---
Palmer	99	2	0.995	---
Pana	3,084	183	3.840	803.12500
Stonington	403	22	0.460	---
Taylorville	5,422	244	9.864	549.67559
Unincorp. County	3,521	91	688.409	5.11469
County	15,563	706	709.377	21.93897

* 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.

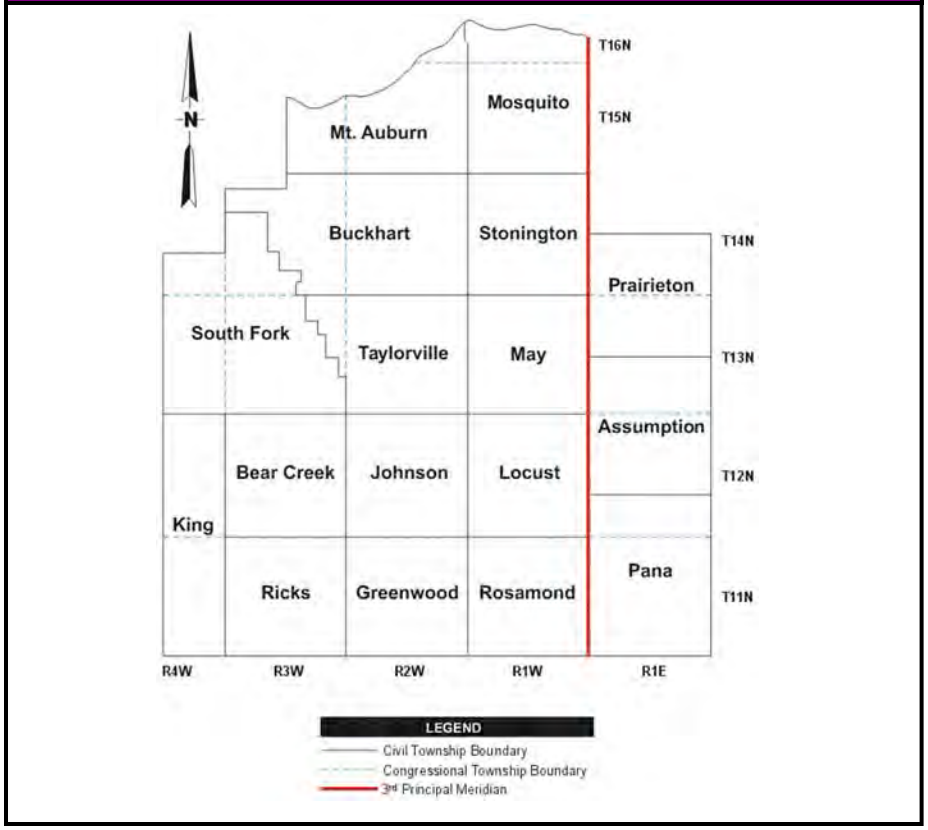
Source: U. S. Census Bureau.

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 Christian County.

In Christian County, as well as many other central Illinois counties, there are pronounced differences in housing unit densities within the County. Approximately 72% of all housing units are located in four of the County's seventeen townships (Buckhart, Pana, South Fork and Taylorville) while approximately 81% of all mobile homes are located in four of the County's seventeen townships (Mount Auburn, Pana, South Fork and Taylorville). **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. The three jurisdictions with the greatest number of mobile homes (Christian County, Pana and Taylorville) all have ordinances in place that require anchoring systems for mobile homes that should help limit the damage from lower rated tornadoes.

Figure T-10
Township Boundaries ChristianCounty



Source: Illinois Secretary of State

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

For fourteen of the seventeen 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 two of the four 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.

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)
Assumption	680	6	42.844	15.87153
Bear Creek	226	2	35.820	6.30932
Buckhart	822	29	58.718	13.99911
Greenwood	96	0	36.680	2.61723
Johnson	282	16	35.628	7.91512
King	104	0	36.657	2.83711
Locust	263	3	35.838	7.33858
May	668	4	36.336	18.38397
Mosquito	162	16	46.654	3.47237
Mount Auburn	458	48	45.741	10.01290
Pana	3,213	140	49.029	65.53264
Prairietown	176	5	36.567	4.81308
Ricks	537	31	35.973	14.92786
Rosamond	162	0	36.033	4.49588
South Fork	1,309	69	62.128	21.06941
Stonington	481	22	36.168	13.29905
Taylorville	5,924	315	42.563	139.18192
Townships - 4 most populated	11,268	553	212.438	53.04136
County - 13 least populated	4,295	153	496.939	8.64291

* 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.

Consequently, including these tracts of land in the calculations to determine the number of potentially-damaged housing units skews the results, especially for very small municipalities. Therefore, to provide a more realistic assessment of the number of potentially-damaged housing units, these areas need to be subtracted from the land area figures obtained from the U.S. Census Bureau.

In Christian County, all of the participating municipalities have large, undeveloped and commercial/industrial land areas within their municipal boundaries compared with their overall size. These areas account for approximately one-tenth to three-fourths 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. These refined land area figures will be used to update the average housing unit density calculations for these municipalities.

Figure F-12 **Refined Land Area Figures for Participating Municipalities with Large Tracts of Commercial/Industrial and Undeveloped Land Areas**			
Participating Jurisdiction	**Land Area (Sq. Miles) (2010)**	**Estimated Open Land Area & Commercial/ Industrial Tracts (Sq. Miles)**	**Refined Land Area (Sq. Miles)**
Assumption	0.880	0.390	0.490
Edinburg	0.625	0.070	0.555
Jeisyville	0.123	0.070	0.053
Kincaid	0.819	0.090	0.729
Morrisonville	1.035	0.350	0.685
Mount Auburn	0.997	0.660	0.337
Owaneco	0.458	0.290	0.168
Palmer	0.995	0.780	0.215
Pana	3.840	0.890	2.950
Stonington	0.460	0.080	0.380
Taylorville	9.864	3.610	6.254

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

Figure T-13 **Sample Calculation of Potentially-Damaged Housing Units – Christian County**
Average Housing Unit Density x Area Impacted by the Average-Sized Christian County Tornado = Potentially-Damaged Housing Units (Rounded Up to the Nearest Whole Number)
Christian County: 21.93897 housing units/sq. mile x 0.11 sq. miles = 199.44518 housing units **(200 housing units)**

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

To calculate the number of potentially-damaged housing units for these municipalities, the area impacted by the averaged-sized Christian 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 area in Jeisyville is less than or equal to the average area impacted, it is assumed that all of the housing units within the Village will be potentially damaged.

Figure T-14 **Sample Calculation of Potentially-Damaged Housing Units** **for Municipalities Covering Less Than One Square Mile – Assumption**
Area Impacted by the Average-Sized Christian County Tornado ÷ Land Area within the Jurisdiction = Impacted Land Area
Assumption: 0.11 sq. mile ÷ 0.490 sq. miles = 0.22449 sq. miles
Impacted Land Area x Total Housing Units in the Jurisdiction = Potentially-Damaged Housing Units (Rounded Up to the Nearest Whole Number)
Assumption: 0.22449 sq. miles x 582 housing units = 130.65306 **(131 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 four 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.)

Christian County

For Christian County the level of risk or vulnerability posed by tornadoes to existing buildings, infrastructure and critical facilities is considered to be ***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 touchdown or pass through any of the participating municipalities the risk to existing buildings, infrastructure and critical facilities would be considered ***high***. This assessment is based on the population and housing unit distribution 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.

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

Participating Jurisdiction	Total Housing Units (2010)	Land Area (Sq. Miles) (2010)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.11 Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.11 Sq. Mi.) (Rounded Up)
Assumption*	582	0.490	---	130.65306	131
Edinburg*	514	0.555	---	101.87387	102
Jeisyville*	49	0.053	---	49	49
Kincaid*	747	0.729	---	112.71605	113
Morrisonville*	459	0.685	---	73.70803	74
Mount Auburn*	220	0.337	---	71.81009	72
Palmer*	99	0.215	---	50.65116	51
Pana*	3,084	2.950	803.12500	88.34375	89
Stonington*	403	0.380	---	116.65789	117
Taylorville*	5,422	6.254	549.67559	60.46431	61
Unincorp. County	3,521	688.409	5.11469	0.56262	1
County	15,563	709.377	21.93897	2.41329	3

* All the municipalities contain large, undeveloped land areas and/or commercial/industrial tracts within their municipal boundaries. These areas account for between 1/10 and 3/4 of the land area in the municipalities and skew the potentially-damaged housing unit calculations. In order to provide a more realistic assessment of potentially-damage housing units, these undeveloped areas were subtracted from the land area figure obtained from the U.S. Census Bureau and the refined land area figures are used to calculate potentially-damaged housing units.

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

While six of the participating municipalities (Edinburg, Kincaid, Morrisonville, Pana, Stonington and Taylorville) 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 the remaining municipalities do not. The three participating jurisdictions with the greatest number of mobile homes do all have tie-down or anchoring ordinances that should lessen the damage sustained by these structures from lower rated tornadoes. However, new buildings, infrastructure and critical facilities still share the same risks as existing ones to higher-rated tornadoes.

In addition, 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.

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/0.11 Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.11 Sq. Mi.) (Rounded Up)
Assumption	680	42.844	15.87153	1.74587	2
Bear Creek	226	35.820	6.30932	0.69403	1
Buckhart	822	58.718	13.99911	1.53990	2
Greenwood	96	36.680	2.61723	0.28790	1
Johnson	282	35.628	7.91512	0.87066	1
King	104	36.657	2.83711	0.31208	1
Locust	263	35.838	7.33858	0.80724	1
May	668	36.336	18.38397	2.02224	3
Mosquito	162	46.654	3.47237	0.38196	1
Mount Auburn	458	45.741	10.01290	1.10142	2
Pana	3,213	49.029	65.53264	7.20859	8
Prairietown	176	36.567	4.81308	0.52944	1
Ricks	537	35.973	14.92786	1.64206	2
Rosamond	162	36.033	4.49588	0.49455	1
South Fork	1,309	62.128	21.06941	2.31763	3
Stonington	481	36.168	13.29905	1.46290	2
Taylorville	5,924	42.563	139.18192	15.31001	16
Townships - 4 most populated	11,268	212.438	53.04136	5.83455	6
County - 13 least populated	4,295	496.939	8.64291	0.95072	1

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 <u>*potentially-damaged housing units*</u> 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 Christian County. The purpose of providing a rough estimate is to help residents and local officials make informed decisions to better protect themselves and their communities. These estimates are meant to provide a ***general idea*** of the magnitude of the potential damage that could occur. The following provides a brief discussion of each decision/assumption.

Assumption #4

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

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

To determine the average market value, the average assessed value must first be calculated. The average assessed value is calculated by taking the total assessed value of residential buildings within a jurisdiction and dividing that number by the total number of housing units within the jurisdiction. The average market value is then determined by taking the average assessed value and multiplying that number by three (the assessed value of a structure in Christian County is approximately one-third of the market value). **Figure T-17** provides a sample calculation. The total assessed value is based on 2019 tax assessment information provided by the Christian County Supervisor of Assessments.

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

Average Assessed Value

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

Assumption: $14,890,175 ÷ 582 housing units = $25,584.49313

Average Market Value

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

Assumption: $25,584.49313 x 3 = $76,753.47938
($76,753)

Figures T-18 and **T-19** provides 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.

Assumption #5

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

Structural Damage = 100%
Content Damage = 100%

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 gets complex and provides an additional complication when updating the Plan.

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

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2019)	Total Housing Units (2010)	Average Assessed Values (Raw)	Average Market Value (Raw)	Average Market Value (Rounded)
Assumption	$14,890,175	582	$25,584.49313	$76,753.47938	$76,753
Edinburg	$12,428,452	514	$24,179.86770	$72,539.60311	$72,540
Jeisyville	$719,854	49	$14,690.89796	$44,072.69388	$44,073
Kincaid	$12,729,613	747	$17,040.98126	$51,122.94378	$51,123
Morrisonville	$11,625,988	459	$25,328.94989	$75,986.84967	$75,987
Mount Auburn	$5,514,743	220	$25,067.01364	$75,201.04091	$75,201
Palmer	$1,938,776	99	$19,583.59596	$58,750.78788	$58,751
Pana	$41,326,089	3,084	$13,400.15856	$40,200.47568	$40,200
Stonington	$12,839,268	403	$31,859.22581	$95,577.67742	$95,578
Taylorville	$143,651,012	5,422	$26,494.10033	$79,482.30100	$79,482
Unincorp. County	$156,242,740	3,521	$44,374.53564	$133,123.60693	$133,124
County	$422,156,166	15,563	$27,125.62912	$81,376.88736	$81,377

Source: Christian County Supervisor of Assessments.

Calculating Potential Dollar Losses

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

Figure T-20
Structure: **Potential Dollar Loss Sample Calculation – Assumption**

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

Assumption: $76,753 x 100% = $76,753.00 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)

Assumption: $76,753.00 per housing unit x 131 housing units = $10,054,643.00
($10,054,643)

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

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2019)	Total Housing Units (2010)	Average Assessed Values (Raw)	Average Market Value (Raw)	Average Market Value (Rounded)
Assumption	$17,729,350	680	$26,072.57353	$78,217.72059	$78,218
Bear Creek	$5,874,913	226	$25,995.19027	$77,985.57080	$77,986
Buckhart	$25,546,754	822	$31,078.77616	$93,236.32847	$93,236
Greenwood	$3,162,729	96	$32,945.09375	$98,835.28125	$98,835
Johnson	$13,257,684	282	$47,013.06383	$141,039.19149	$141,039
King	$2,720,866	104	$26,162.17308	$78,486.51923	$78,487
Locust	$8,715,104	263	$33,137.27757	$99,411.83270	$99,412
May	$30,690,525	668	$45,943.89970	$137,831.69910	$137,832
Mosquito	$5,720,566	162	$35,312.13580	$105,936.40741	$105,936
Mount Auburn	$13,515,066	458	$29,508.87773	$88,526.63319	$88,527
Pana	$56,515,664	3,213	$17,589.68690	$52,769.06069	$52,769
Prairietown	$7,980,878	176	$45,345.89773	$136,037.69318	$136,038
Ricks	$14,280,502	537	$26,593.11359	$79,779.34078	$79,779
Rosamond	$4,953,593	162	$30,577.73457	$91,733.20370	$91,733
South Fork	$35,048,699	1,309	$26,775.17112	$80,325.51337	$80,326
Stonington	$16,674,014	481	$34,665.30977	$103,995.92931	$103,996
Taylorville	$159,607,834	5,924	$26,942.57833	$80,827.73498	$80,828
Townships - 4 most populated	$276,718,951	11,268	$24,557.94737	$73,673.84212	$73,674
County - 13 least populated	$145,275,790	4,295	$33,824.39814	$101,473.19441	$101,473

Source: Christian County Supervisor of Assessments.

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.

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** gives a breakdown of the total potential dollar losses by municipality and township.

This assessment illustrates why potential residential dollar losses should be considered when jurisdictions are deciding which mitigation projects to pursue. ***Potential dollar losses caused by an average tornado in Christian County would be expected to exceed at least $5 million in any of the participating municipalities, with the exception of Jeisyville and Palmer.***

Figure T-21
Content: **Potential Dollar Loss Sample Calculation - Assumption**

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

Assumption: ½ ($76,753) x 100% = $38,376.50 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)

Assumption: $38,376.50 per housing unit x 131 housing units = $5,027,321.50
($5,027,321)

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

Participating Jurisdiction	Average Market Value (2019)	Potentially-Damaged Housing Units (Rounded Up)	Potential Dollar Losses		Total Potential Dollar Losses
			Structure	Content	
Assumption	$76,753	131	$10,054,643	$5,027,322	$15,081,965
Edinburg	$72,540	102	$7,399,080	$3,699,540	$11,098,620
Jeisyville	$44,073	49	$2,159,577	$1,079,789	$3,239,366
Kincaid	$51,123	113	$5,776,899	$2,888,450	$8,665,349
Morrisonville	$75,987	74	$5,623,038	$2,811,519	$8,434,557
Mount Auburn	$75,201	72	$5,414,472	$2,707,236	$8,121,708
Palmer	$58,751	51	$2,996,301	$1,498,151	$4,494,452
Pana	$40,200	89	$3,577,800	$1,788,900	$5,366,700
Stonington	$95,578	117	$11,182,626	$5,591,313	$16,773,939
Taylorville	$79,482	61	$4,848,402	$2,424,201	$7,272,603
Unincorp. County	$133,124	1	$133,124	$66,562	$199,686
County	$81,377	3	$244,131	$122,066	$366,197

For comparison, an estimate of potential dollar losses was calculated for the entire County, the unincorporated portions of the County, the four most populated townships and the thirteen 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.

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.

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

Participating Jurisdiction	Average Market Value (2019)	Potentially-Damaged Housing Units (Rounded Up)	Potential Dollar Losses		Total Potential Dollar Losses
			Structure	Content	
Assumption	$78,218	2	$156,436	$78,218	$234,654
Bear Creek	$77,986	1	$77,986	$38,993	$116,979
Buckhart	$93,236	2	$186,472	$93,236	$279,708
Greenwood	$98,835	1	$98,835	$49,418	$148,253
Johnson	$141,039	1	$141,039	$70,520	$211,559
King	$78,487	1	$78,487	$39,244	$117,731
Locust	$99,412	1	$99,412	$49,706	$149,118
May	$137,832	3	$413,496	$206,748	$620,244
Mosquito	$105,936	1	$105,936	$52,968	$158,904
Mount Auburn	$88,527	2	$177,054	$88,527	$265,581
Pana	$52,769	8	$422,152	$211,076	$633,228
Prairietown	$136,038	1	$136,038	$68,019	$204,057
Ricks	$79,779	2	$159,558	$79,779	$239,337
Rosamond	$91,733	1	$91,733	$45,867	$137,600
South Fork	$80,326	3	$240,978	$120,489	$361,467
Stonington	$103,996	2	$207,992	$103,996	$311,988
Taylorville	$80,828	16	$1,293,248	$646,624	$1,939,872
Townships - 4 most populated	$73,674	6	$442,044	$221,022	$663,066
County - 13 least populated	$101,473	1	$101,473	$50,737	$152,210

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.

3.5 Excessive Heat

Hazard Identification

What is the definition of excessive heat?

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

Excessive heat events are usually a result of both high temperatures and high relative humidity. (Relative humidity refers to the amount of moisture in the air.) The higher the relative humidity or the more moisture in the air, the less likely that evaporation will take place. This becomes significant when high relative humidity is coupled with soaring temperatures.

On hot days the human body relies on the evaporation of perspiration or sweat to cool and regulate the body's internal temperature. Sweating does nothing to cool the body unless the water is removed by evaporation. When the relative humidity is high, then the evaporation process is hindered, robbing the body of its ability to cool itself.

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

What is the Heat Index?

In an effort to raise the public's awareness of the hazards of excessive heat, the National Weather Service (NWS) devised the "Heat Index". The Heat Index, sometimes referred to as the "apparent temperature", is a measure of how hot it feels when relative humidity is added to the actual air temperature. **Figure EH-1** shows the Heat Index as it corresponds to various air temperatures and relative humidity.

As an example, if the air temperature is 96°F and the relative humidity is 65%, then the Heat Index would be 121°F. It should be noted that the Heat Index values were devised for shady, light wind conditions. Exposure to full sunshine can increase Heat Index values by up to 15°F. Also, strong winds, particularly with very hot, very dry air, can be extremely hazardous. When the Heat Index reaches 105°F or greater, there is an increased likelihood that continued exposure and/or physical activity will lead to individuals developing severe heat disorders.

What are heat disorders?

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

Figure EH-1
Heat Index

Temperature (°F)

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

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Source: NOAA, National Weather Service.

- **Heat Rash.** Heat rash is a skin irritation caused by excessive sweating during hot, humid weather and is characterized by red clusters of small blisters on the skin. It usually occurs on the neck, chest, groin or in elbow creases.
- **Sunburn.** Sunburn is characterized by redness and pain of skin exposed too long to the sun without proper protection. In severe cases it can cause swelling, blisters, fever and headaches and can significantly retard the skin's ability to shed excess heat.
- **Heat Cramps.** Heat cramps are characterized by heavy sweating and muscle pains or spasms, usually in the abdomen, arms or legs that during intense exercise. The loss of fluid through perspiration leaves the body dehydrated resulting in muscle cramps. This is usually the first sign that the body is experiencing trouble dealing with heat.
- **Heat Exhaustion.** Heat exhaustion is characterized by heavy sweating, muscle cramps, tiredness, weakness, dizziness, headache, nausea or vomiting and faintness. Breathing may become rapid and shallow and the pulse thready (weak). The skin may appear cool, moist and pale. If not treated, heat exhaustion may progress to heat stroke.
- **Heat Stroke (Sunstroke).** Heat stroke is a life-threatening condition characterized by a high body temperature (106°F or higher). The skin appears to be red, hot and dry with very little perspiration present. Other symptoms include a rapid and strong pulse, throbbing headache, dizziness, nausea and confusion. There is a possibility that the individual will become unconsciousness. If the body is not cooled quickly, then brain damage and death may result.

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

Figure EH-2 below indicates the heat index at which individuals, particularly those in higher risk groups, might experience heat-related disorders. Generally, when the heat index is expected to exceed 105°F, the NWS will initiate excessive heat alert procedures.

Figure EH-2
Relationship between Heat Index and Heat Disorders

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

Source: NOAA, Heat Wave: A Major Summer Killer.

What is an excessive heat alert?

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

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

HAZARD PROFILE

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

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

Excessive Heat Fast Facts – Occurrences

Number of Excessive Heat Events Reported (1997 – 2019): ***43***

Hottest Temperature Recorded in the County: ***115°F (July 14, 1954)***

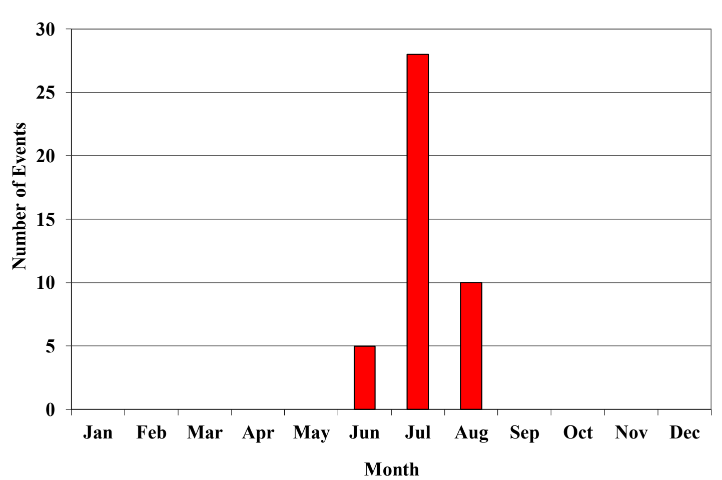
Most Likely Month for Excessive Heat Events to Occur: ***July***

Table 10, located in **Appendix J**, summarizes the previous occurrences as well as the extent or magnitude of excessive heat events recorded in Christian County. NOAA's Storm Events Database has documented 43 occurrences of excessive heat in Christian County between 1997 and 2019.

These represent the ***reported occurrences*** of excessive heat. The NWS acknowledges that excessive heat events are not well recorded. Only those events with impacts, such as injuries or fatalities, are reported. As a result, excessive heat events often go unreported and therefore, more events have almost certainly occurred than are documented in this section.

Figure EH-3 charts the reported occurrences of excessive heat events by month. Of the 43 events, 28 (65%) either began or took place in July making this the peak month for excessive heat events in Christian County. There were five events that spanned two months; however, for illustration purposes only the month the event started in is graphed. Approximately 90% of all excessive heat events with recorded times began during the a.m. hours.

Figure EH-3
Excessive Heat Events by Month
1997 – 2019



According to the Midwestern Regional Climate Center almost continuous temperature records for Christian County have been kept from 1899 to present by the NWS COOP observation station in Pana. Temperatures records have also been kept at the NWS COOP observation station four miles southeast of Morrisonville from 1895 to 1971 and at Morrisonville from 1979 to present. Based on the available records, the hottest temperature recorded in Christian County was 115°F at the on July 14 1954. **Figure EH-4** lists the hottest days recorded at the Pana COOP observation station.

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

	Date	Temperature		Date	Temperature
1	7/14/1954	115°F	6	8/5/1918	108°F
2	7/18/1954	111°F	7	7/12/1936	108°F
3	7/15/1936	110°F	8	7/16/2006	108°F
4	7/14/1936	110°F	9	8/4/1918	108°F
5	7/12/1954	110°F			

Source: Midwest Regional Climate Center cli-MATE

What locations are affected by excessive heat?

Excessive heat affects the entire County. Excessive heat events, like drought and severe winter storms, generally extend across an entire region and affecting multiple counties. The *2018 Illinois Natural Hazard Mitigation Plan* classifies Christian County's hazard rating for excessive heat as "medium." (IEMA's overall hazard rating system has five levels: very low, low, medium, high and severe.)

Do any of the participating jurisdictions have designated cooling centers?

Yes. Five of the eleven participating jurisdictions have designated cooling centers. A "designated" cooling center is identified as any facility that has been *formally* identified by the jurisdiction (through emergency planning, resolution, Memorandum of Agreement, etc.) as a location available for use by residents of the jurisdiction during excessive heat events.

Figure EH-5 identifies the location of each cooling center by jurisdiction. At this time Jeisyville, Kincaid, Morrisonville, Mount Auburn, Palmer and Taylorville CUSD do not have any cooling centers designated within their jurisdictions. In addition to those designated warming centers identified by the participants, the Illinois Department of Human Services office in Taylorville also serves as a warming center.

Figure EH-5
Designated Cooling Centers by Participating Jurisdiction

Name/Address	Name/Address
Assumption	*Stonington*
Tacusah Hall, 227 Chestnut St.	Village Hall, 118 E. Fourth St.
Edinburg	Stonington Fire Station, 1 Fire House Rd.
Edinburg Community Building, 103 W. Masonic St.	*Taylorville*
Pana	Taylorville Fire Station, 202 N. Main St.
Pana Fire Station, 400 E. First St.	Christian County Senior Citizens Center, 701 W. Adams St.
Pana Community Hospital, 101 E. 9th St.	

What is the probability of future excessive heat events occurring?

Christian County has experienced 43 verified occurrences of excessive heat between 1997 and 2019. With 43 occurrences over the past 23 years, Christian County should expect to experience at least one excessive heat event a year. There were ten years over the past 23 years where 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 43%.

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 Christian County, including the participating municipalities, is vulnerable to the dangers presented by excessive heat. Since 2010, Christian County has experienced 20 excessive heat events.

Do any of the participating jurisdictions consider excessive 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 (1 event): ***2***
- Injuries: ***n/a***

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

While no recorded injuries or fatalities were reported as a result of excessive heat in Christian 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 to produce heat cramps or heat exhaustion with the possibility of heat stroke in cases of prolonged exposure or physical activity for all the excessive heat events with recorded heat indices.

What other impacts can result from excessive heat events?

Other impacts of excessive heat include road buckling, power outages, stress on livestock, early school dismissals and school closings. In addition, excessive heat events can also lead to an increase in water usage and may result in municipalities imposing water use restrictions. In Christian County, excessive heat has the ability to impact Pana's drinking water supply. Pana relies solely on surface water sources for their drinking water supplies. However, according to the Illinois State Water Survey (ISWS) Pana's water supply is considered adequate for drought and excessive heat events.

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 Christian 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 for half of the participating municipalities tempered by the fact that Christian 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*** to ***high***. 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-6** identifies the percent of sensitive populations by participating jurisdiction based on 2010 census data.

Figure EH-6
Sensitive Populations by Participating Jurisdictions

Participating Jurisdiction	% of Population 70 year of age & Older	% of Population 5 years age & Younger	Total % of Sensitive Population
Assumption	12.6%	6.9%	19.5%
Edinburg	11.4%	6.2%	17.6%
Jeisyville	14.0%	5.6%	19.6%
Kincaid	11.9%	6.1%	18.0%
Morrisonville	13.4%	8.0%	21.4%
Mount Auburn	12.5%	8.3%	20.8%
Palmer	10.9%	5.7%	16.6%
Pana	15.4%	6.3%	21.7%
Stonington	12.3%	8.2%	20.5%
Taylorville	14.4%	6.6%	21.0%
Unincorp. Christian County	9.5%	4.5%	14.0%
Christian County	12.6%	6.0%	18.6%
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 Christian 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 Christian 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. Since excessive heat typically does not cause structure damage, it is unlikely that future dollar losses will be extreme. The primary concern associated with excessive heat is the health and safety of those living in the County and municipalities, especially sensitive populations such as the elderly, infants, young children and those with medical conditions. Based on U.S. Census Bureau statistics, almost 20% of the County's population is considered sensitive (those 70 years of age and old and those younger than 5 years of age.)

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.

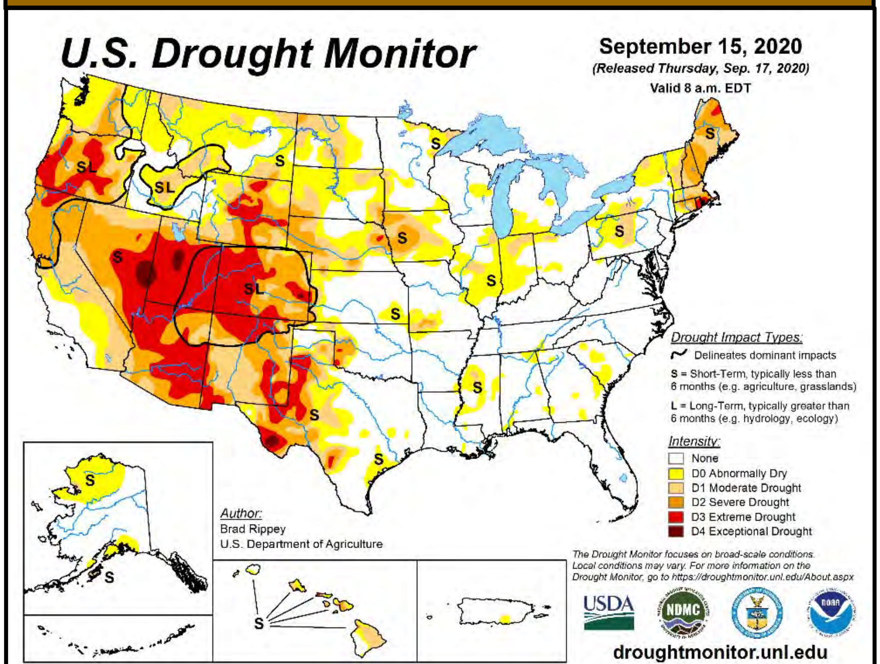
Because the ranges of the various indicators often don't coincide, the final drought category tends to be based on what a majority of the indictors show and on local observations. The authors also weight the indices according to how well they perform in various parts of the country and at different times 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 (1983 – 2017): ***6***

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

The five drought events with recorded time frames ranged in length from four to sixteen months with one event beginning in May, and two events a piece beginning in June August. Of the three drought events that were assigned drought intensity category ratings by the USDM, the 2012 drought reached D3, extreme drought.

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

What is the probability of future drought events occurring?

Christian County has experienced six droughts between 1980 and 2019. With six occurrences over 40 years, the probability or likelihood that the County may experience a drought in any given year is 15%. However, if earlier recorded droughts are factored in, then the probability that Christian County may experience a drought in any given year decreases to 11%.

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 Christian County 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, Christian County has experienced three droughts.

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

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

What impacts resulted from the recorded drought events?

Damage information was only available for one of the six drought events experienced between 1980 and 2019. According to NOAA's Storm Events Database, the 2012 drought caused an estimated $53.8 million in damages to the corn crop in Christian County. Damage information was either unavailable or none was recorded for the remaining four reported occurrences.

Drought Fast Facts – Impacts/Risk

Drought Impacts:
- Total Property Damage: ***n/a***
- Total Crop Damage: ***$53.8 million (corn crop damage only – 2012 drought)***

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

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

What other impacts can result from drought events?

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

Crop Yield Reductions

Agriculture is the major industry in Christian County. Farmland accounts for approximately 88.7% of all the land in the County. According to the 2017 Census of Agriculture, there were 794 farms in in the County occupying 402,703 acres. Of the land in farms, approximately 95% or 382,573 acres is in crop production. Less than 1% of the land in crop production is irrigated.

According to the 2017 Census of Agriculture, crop sales accounted for $252.8 million in revenue while livestock sales accounted for $25.8 million. Christian County ranks 10th in Illinois for crop cash receipts and 42nd for livestock cash receipts. A severe drought would have a major financial impact on the large agricultural community, particularly if it occurred during the growing season. Dry weather conditions, particularly when accompanied by excessive heat, can result in diminished crop yields and place stress on livestock.

A reduction in crop yields was seen as a result of the 1983, 1988, 2005, 2011 and 2012 droughts. **Figure DR-3** illustrates the reduction yields seen for corn and soybeans during the six recorded drought events. The USDA's National Agricultural Statistics Service records show that yield reductions for corn and soybeans were most severe for the 1982 drought when there was a 40.8% reduction in corn yields and a 28.2% reduction in soybeans yields.

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

Year	Corn		Soybeans	
	Yield (bushel)	% Reduction Previous Year	Yield (bushel)	% Reduction Previous Year
1982	147.0	--	42.5	--
1983	**87.0**	**40.8%**	**30.5**	**28.2%**
1984	128.0	--	34.5	--
1987	152.0	--	41.5	--
1988	**90.0**	**40.8%**	**30.5**	**26.5%**
1989	147.0	--	45.5	--
2004	188.0	--	52.0	--
2005	**181.0**	**3.7%**	53.0	--
2006	172.0	5.0%	54.0	--
2010	157.0		60.5	--
2011	**154.8**	**1.4%**	**52.4**	**13.4%**
2012	**129.2**	**16.5%**	55.8	--
2013	199.8	--	56.7	--
2014	217.8	--	58.0	--

Source: USDA, National Agricultural Statistics Service.

<u>*Drinking Water Shortages*</u>

Municipalities that rely on surface water sources for their drinking water supplies are more vulnerable to shortages as a result of drought. In Christian County only ***Pana relies solely on a surface water source*** for its drinking water supply. Taylor obtains approximately 25% of its drinking water supply from Lake Taylorville and the other 75% from three relatively deep wells located in a sand and gravel aquifer. Kincaid purchases its water from Taylorville and Jeisyville purchases its water from Kincaid.

According to the Illinois State Water Survey (ISWS) both the water supplies in Pana and Taylorville are considered adequate. The ISWS indicates in its drought vulnerability classifications that there is greater than a 90% probability that neither Pana nor Taylorville will not experience any water shortages or threat thereof during a severe drought similar to the drought of record.

The remaining participating municipalities all obtain their drinking water from sand and gravel aquifers, some shallow. Edinburg has the shallowest wells ranging in depth from 38feet to 49 feet which makes them potentially vulnerable to the effects of a prolonged drought as well.

While most of the participating municipalities are less vulnerable to drinking water shortages, 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 Christian 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. According to the 2017 Census of Agriculture, crop sales in Christian County accounted for $278.7 million. Since all of crops in the planning area are susceptible to drought impacts to varying degrees, this total represents the countywide crop exposure to drought events. 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 Mine Subsidence

Hazard Identification

What is a mine?

A mine is a pit or excavation made in the earth for the purpose of extracting minerals or ore. Mines were developed in Illinois to extract coal, clay, shale, limestone, dolomite, silica sand, tripoli, peat, ganister, lead, zinc and fluorite.

What is mining?

Mining is the process of extracting minerals or ore from a mine. There are two common mining methods: surface mining and sub-surface (underground) mining. This section focuses on underground mining practices conducted in Christian County.

Mining has long figured prominently into Illinois' history. According to the Illinois State Geological Survey (ISGS), Illinois has the third largest recoverable reserves of coal in the country, behind only Montana and Wyoming. Coal deposits can be found under 86 of the 102 counties in Illinois and underground mining operations have been conducted in at least 72 counties. **Figure MS-1** shows the extent of coal deposits (Pennsylvanian rocks) present in Illinois and the mined-out areas from surface and underground coal mining. In 2015, Illinois ranked fourth in the United States in coal production according to the National Mining Association.

The first commercial coal mine in Illinois is thought have started in Jackson County about 1810. Since that time, there have been more than 3,800 underground coal mines and 363 underground metal and industrial mineral mines operated in Illinois. Almost all of these mines have been abandoned over the years. According to ISGS, there were 12 active underground coal mines in Illinois in 2015. The United States Geological Survey identified 10 active metal and industrial mineral underground mines in Illinois.

What methods are used in underground mining?

Much of Illinois coal lies too deep for surface mining and requires extraction using underground mining methods. There are three main methods of underground mining that have been used in Illinois over the years: room-and-pillar, high-extraction retreat and longwall. The following provides a brief description of each.

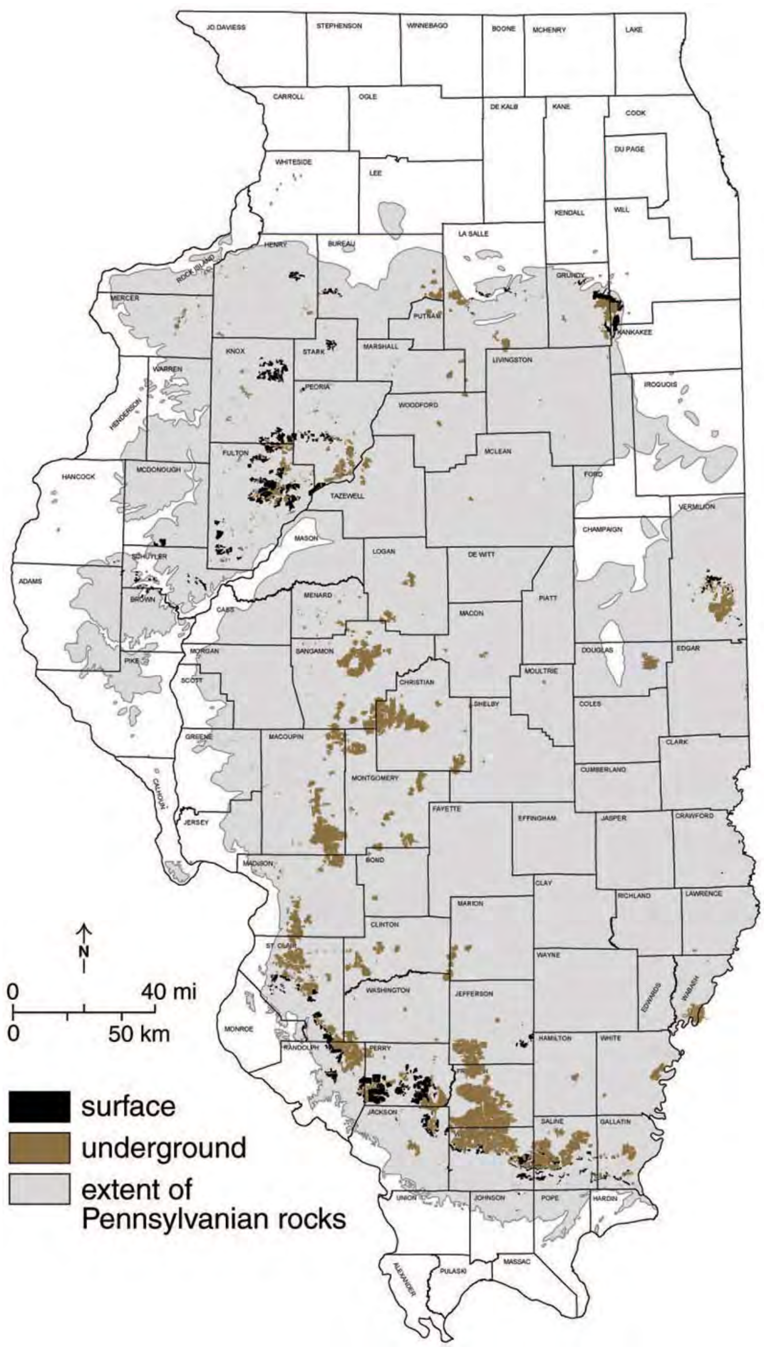
Room-and-Pillar

In the room-and-pillar system, the areas where coal is removed are referred to as "rooms" and the blocks of coal left in place to support the mine's roof and surface are referred to as "pillars". A "panel" refers to a group of rooms isolated from other room groups by surrounding pillars and generally accessed from only one entryway. The room-and-pillar method that was generally used before the early 1900s was characterized by rooms that varied considerably in length, width and sometimes direction, forming irregular mining patterns.

Modern room-and-pillar mines have a regular configuration of production areas (panels) and entryways, and the rooms and entries range from 18 to 24 feet, which is considerably narrower than in older mines. Generally modern room-and-pillar mining methods recover less than 50% to

60% of the coal in a panel. Most underground mines in Illinois have used a type of room-and-pillar pattern.

Figure MS-1
Coal Mine Deposits & Mined Areas in Illinois



Source: Illinois Department of Natural Resources & Illinois State Geological Survey.

High-Extraction Retreat
High-extraction retreat mining operations first develop a room-and-pillar production area (panel). The miners then systematically begin taking additional coal from the pillars that are left behind. The secondary extraction occurs in a retreating fashion, working from the outer edges of the panel to the main entries. Most of the coal pillars which support the roof are removed shortly after a few rows of rooms and pillars have been formed, leaving only small pillars.

The size and number of pillars left to maintain worker safety varies depending on underground geologic conditions. Roof collapses are controlled by the use of temporary roof supports and planned subsidence of the surface is initiated immediately. Since planned subsidence is part of this operation, this method requires the legal rights to the ground surface. High-extraction retreat methods recover up to 80% to 90% of the coal in a panel. No Illinois mines currently use high-extraction retreat mining, but from the 1940s to 2002, this method was used in the State.

Longwall
Modern longwall mining methods remove coal along a straight working face within defined panels (in this case a solid block of coal), up to 1 to 2 miles long and about 1,000 feet wide. Room-and-pillar methods must be used in conjunction with longwall mining. Like high-extraction retreat, longwall mining begins at the outer edges and works toward the main entries. This fully-mechanized method uses a rotating cutting drum or shearer that works back and forth across the coal face. The coal falls onto a conveyer below the cutting machine and is transported out of the mine.

All of this is performed under a canopy of steel supports that sustains the weight of the roof along the mining surface. As the coal is mined the steel supports advance. The mine roof immediately collapses behind the moving supports, causing 4 to 6 feet of maximum settling of the ground surface over the panel. Since planned subsidence is part of this operation, this method requires the legal rights to the ground surface. Longwall mining methods recover 100% of the coal in a panel.

What is mine subsidence?

Mine subsidence is the sinking or shifting of the ground surface resulting from the collapse of an underground mine. Subsidence is possible in any area where minerals or ore have been undermined. Most of the mine subsidence in Illinois is related to coal mining, which represents the largest volume extracted and area undermined of any solid commodity in the State.

Mine subsidence can be planned, as with modern high-extraction retreat and longwall mining techniques, or it can occur as the result of age and instability. For many years, underground mining was not tightly regulated and not much thought was given to the long-term stability of the mines since most of the land over the mine was sparsely populated. Once mining operations were complete, the mine was abandoned. As cities and towns grew up around the mines, many urban and residential areas were built over or near undermined areas.

ISGS estimates that approximately 333,000 housing units are located in close proximity to underground mines and may potentially be exposed to mine subsidence while approximately 201,000 acres of urban and developed land overlie or are immediately adjacent to underground mines. Most experts agree that room-and-pillar mines will eventually experience some degree of subsidence, but currently there is no way to know when or exactly where it will occur.

What types of mine subsidence can occur in Illinois?

In Illinois mine subsidence typically takes one of two forms: pit subsidence or sag (trough) subsidence. The following provides a brief description of each.

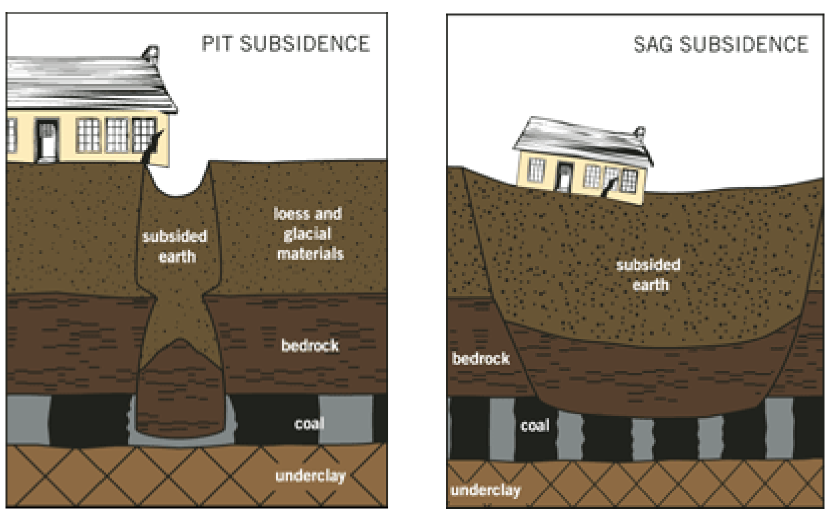
Pit Subsidence

Pit subsidence generally occurs when the roof of a shallow mine (less than 100 feet deep) collapses and forms a bell-shaped hole at the ground's surface, 6 to 8 feet deep and 2 to 40 feet across. **Figure MS-2** provides an illustration of pit subsidence. This type of subsidence forms very quickly causing sudden and swift ground movement. While the probability of a structure being damaged by pit subsidence is generally low since most pits are relatively small, structural damage can occur if pit subsidence develops under the corner of a building, the support posts of a foundation or another critical spot.

Sag (Trough) Subsidence

Sag or trough subsidence generally forms a gentle depression in the ground's surface that can spread over an entire mine panel and affect several acres of land. A major sag can develop suddenly within a few hours or days, or gradually over years. This type of subsidence may originate over places in the mine where pillars have disintegrated and collapsed or where pillars are being pushed into the relatively soft underclay that forms the floor of most mines. **Figure MS-2** illustrates sag subsidence. This is the most common type of mine subsidence and can develop over mines of any depth. Given the relatively large area covered by sag subsidence, buildings, roads, driveways, sidewalks, sewer and water pipes and other utilities may experience damage.

Figure MS-2
Types of Mine Subsidence



Source: Illinois Mine Subsidence Insurance Fund.

What is the Illinois Mine Subsidence Insurance Fund?

Prior to 1979, traditional property owner's insurance did not cover mine subsidence nor was mine subsidence coverage available for purchase in Illinois. Since many mining companies in Illinois ceased operations long before mine subsidence occurred and insurance did not cover such damage, property owner who experienced subsidence damage had no recourse. Several high-profile incidents in the Metro East St. Louis area ultimately led to the passage of the Mine Subsidence Insurance Act in 1979. The Statute required insurers to make mine subsidence insurance available to Illinois homeowners and established the Illinois Mine Subsidence Insurance Fund (IMSIF). Later amendments to the Act gave the Fund the authority, with approval from the Director of Insurance, to set the maximum limits for mine subsidence coverage.

The IMSIF is a taxable enterprise created by Statute to operate as a private solution to a public problem. The purpose of the Fund is to assure financial resources are available to owners of property damaged by mine subsidence. The Fund fills a gap in the insurance market for the benefit of Illinois property owners at risk of experiencing mine subsidence damage.

All insurance companies authorized to write basic property insurance in Illinois are required to enter into a Reinsurance Agreement with the Fund and offer mine subsidence insurance coverage. Mine subsidence insurance covers damage caused by underground mining of any solid mineral resource. In the 34 counties where, underground mining has been most prevalent, the Statute requires mine subsidence coverage be automatically included in both residential and commercial property policies. Coverage may be rejected in writing by the insured. **Figure MS-3** identifies the 34 counties where mine subsidence insurance is automatically included in property insurance policies.

In addition to providing reinsurance to insurers, the Fund also is responsible for conducting geotechnical investigations to determine if mine subsidence caused the damage, establishing rates and rating schedules, providing underwriting guidance to insurers, supporting and sponsoring mine subsidence related research and initiatives consistent with the public interest and educating the public about mine subsidence issues.

HAZARD PROFILE

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

Are there any underground mines located in the County?

Yes. According to the Illinois State Geological Survey's Directory of Coal Mines for Christian County, there are 18 documented underground mines located in the County. A copy of the Directory for Christian County is included in **Appendix L**. **Figure MS-4** illustrates the locations of these mines. To view detailed maps of the studied quadrangles, see **Appendix M**.

Mine Subsidence Fast Facts – Occurrences

Number of Underground Mines Located within the County: ***18***

Number of Mine Subsidence Events Reported ***3+***

Probability of Future Mine Subsidence Events: ***Medium***

Figure MS-3
Counties Required to include Mine Subsidence Coverage in Property Insurance

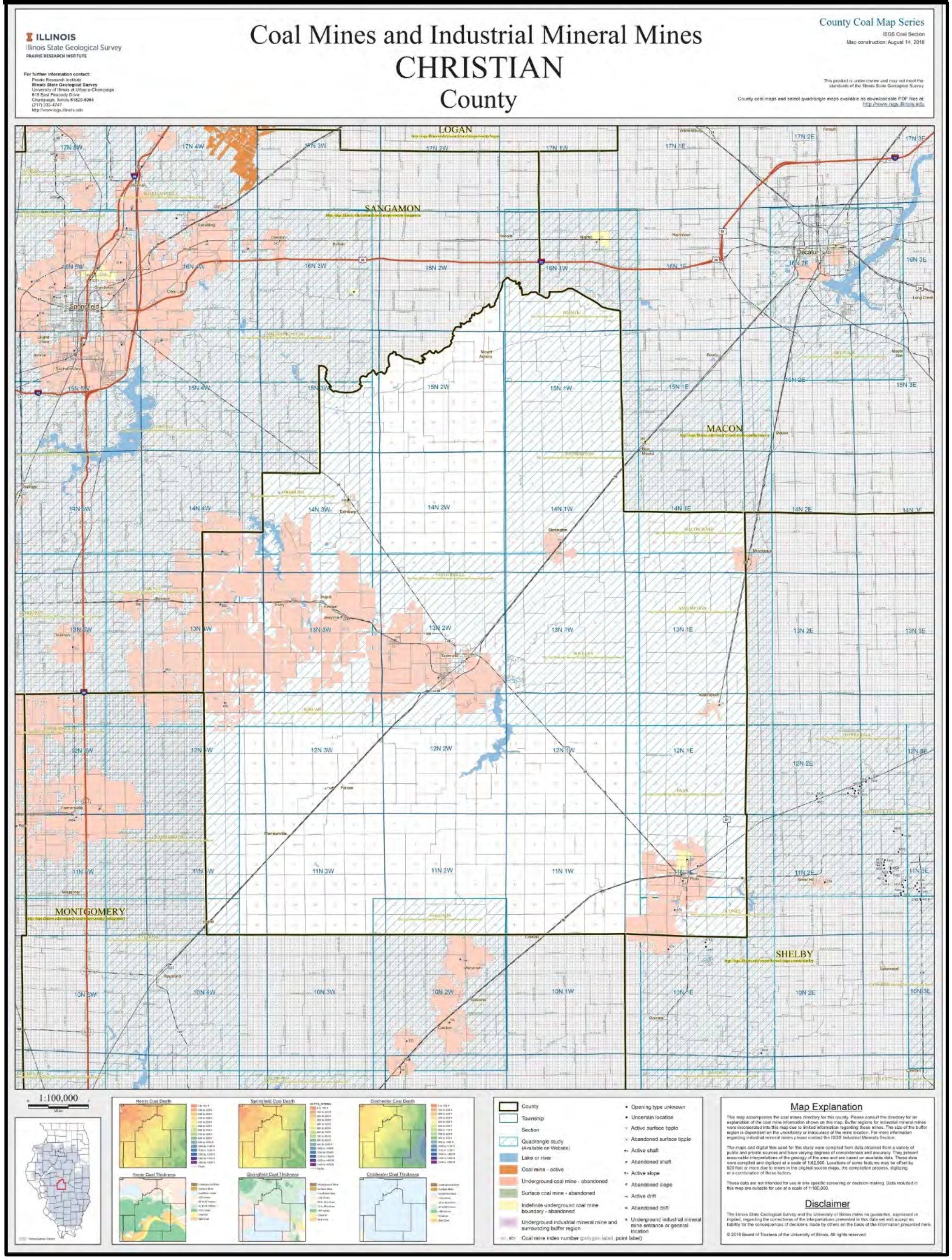
Source: Illinois Mine Subsidence Insurance Fund.

When has mine subsidence occurred previously? What is the extent of these previous occurrences?

No comprehensive, publicly-accessible database detailing mine subsidence occurrences currently exists in Illinois. According to a review of local new articles and discussions with Planning Committee members, there have been at least three mine subsidence events reported in Christian County. The following provides a brief summary of these previous occurrences as well as the extent or severity of each event.

- Records provided by the Village of Palmer indicate that in 1969 an old mine shaft drilled in 1872 caved in along Illinois Route 48 at the southwest edge of the Village just north of the railroad tracks. The cave in was 400 feet deep and approximately 190 truckloads of rock, dirt, etc. were used to fill in the shaft.
- Beginning in 1989 the northwest side of Taylorville has experienced gradual mine subsidence that covers a three-block area with reported damages to four homes.
- In mid-March 1991 the southwest side of Taylorville experienced catastrophic mine subsidence affecting at least 64 homes in an 18-block area.

Figure MS-4
Underground Mines Located in Christian County



Source: Illinois State Geological Survey.

- While no specific dates or names were given, Planning Committee members noted at the first meeting that county road shave suffered damage due to mine subsidence.

According to the Illinois Mine Subsidence Insurance Fund (IMSIF), there were 87 confirmed mine subsidence claims submitted to the IMSIF for Christian County between 2000 and 2018. However, detailed information about the locations and damages sustained by claim were not made available. **Figure MS-5** provides a breakdown by year of the claims confirmed to have damage caused by mine subsidence.

Figure MS-5
Illinois Mine Subsidence Insurance Fund Claims with Confirmed Damage in Christian County

Year	No. of Claims	Year	No. of Claims	Year	No. of Claims
2000	4	2007	5	2013	3
2001	6	2008	2	2014	2
2002	4	2009	7	2015	2
2003	5	2010	2	2016	4
2004	10	2011	4	2017	8
2005	4	2012	2	2018	5
2006	8				

What locations are affected by mine subsidence?

According to the Illinois State Geological Survey's (ISGS) *Proximity of Underground Mines to Urban and Developed Lands in Illinois* study published in 2009, there are:

- Approximately 58,767 acres (13.1% of the land area) and 7,567 housing units (50.7% of the total housing units) in Christian County are located in Zone 1, land over or adjacent to mapped mines.
- An additional 15,651 acres (3.5% of the land area) and 2,960 housing units (19.8% of the total housing units) in the County are located in Zone 2, land surrounding Zone 1 that could be affected if the mine boundaries are inaccurate or uncertain.

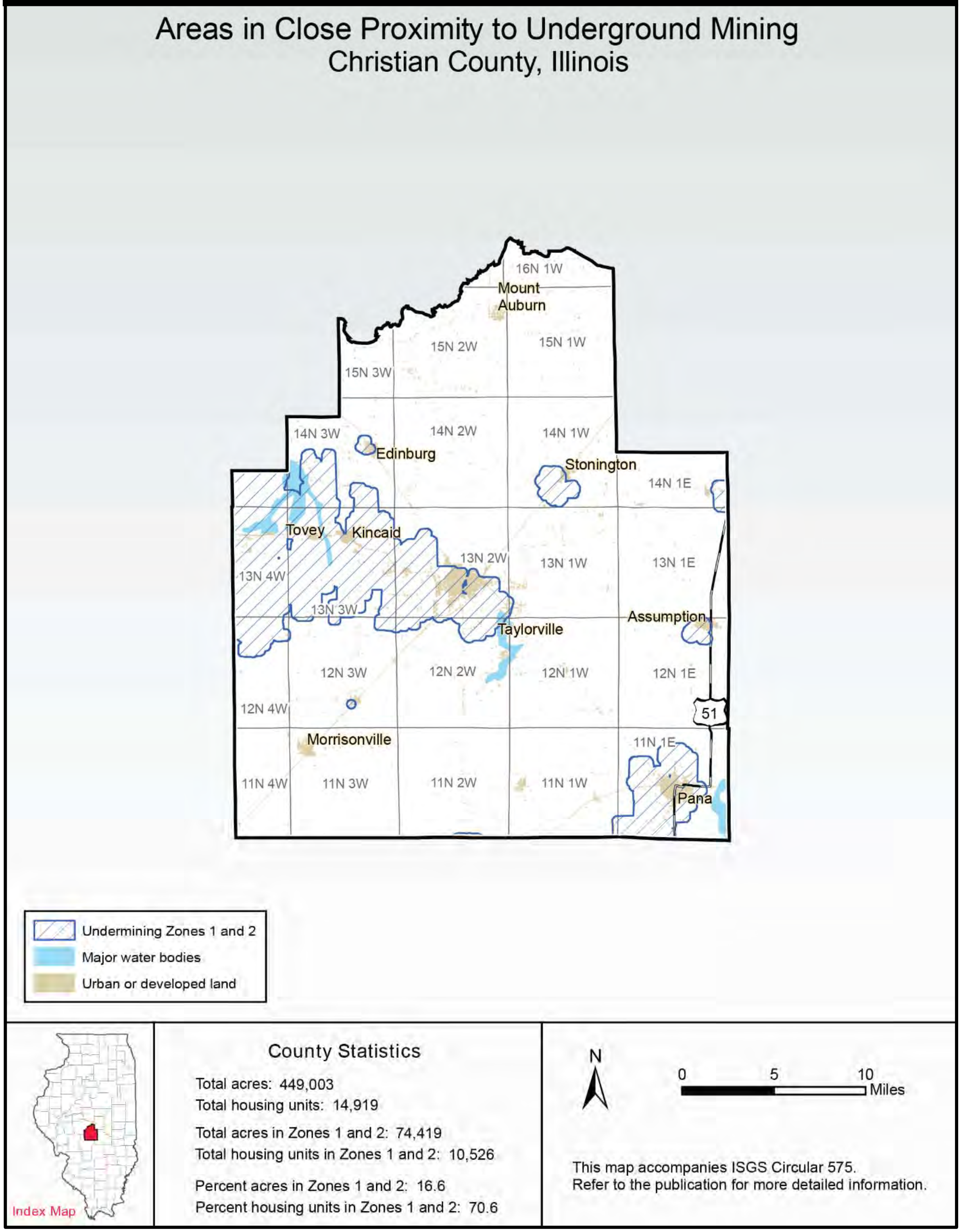
Figure MS-6 identifies the location of the Zone 1 and 2 areas in Christian County. Based on this mapping, mine subsidence has the potential to impact parts of unincorporated Christian County as well as Assumption, Edinburg, Jeisyville, Kincaid, Palmer, Pana, Stonington and Taylorville.

The extent of future potential mine subsidence events is a function of where current development is located relative to areas of past and present underground mining. According to the IMSIF, most experts agree that room and pillar mines will eventually experience some degree of collapse, but currently there is no way to know when or exactly where mine subsidence will occur.

What is the probability of future mine subsidence events occurring?

There are many variables that must be considered when calculating the probability of future mine subsidence events including whether subsidence has occurred previously in an area, the size, depth and age of the mine, the magnitude or extent of the failure as well as soil and weather conditions.

Figure MS-6
Areas Potentially Impacted by Mine Subsidence in Christian County



Source: Illinois State Geological Survey

Given the unpredictability of mine subsidence events, the variables involved and the lack of data available for Christian County, it is difficult to specifically establish the probability of future mine subsidence events without extensive research.

However, given the mining methods used, the age and location of the mines and the number of housing units located over or adjacent to undermined areas in the County, the probability that Assumption, Edinburg, Jeisyville, Kincaid, Palmer, Pana, Stonington and Taylorville will experience future mine subsidence events is estimated to ***low*** to ***medium*** and ***unlikely*** for the remaining participating jurisdictions and most of unincorporated Christian County. For the purposes of this analysis "unlikely" is defined as having a less than 2% chance of occurring in any given year, "low" is defined as having a less than a 10% chance of occurring in any given year and "medium" is defined as having up to a 50% 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 mine subsidence.

Are the participating jurisdictions vulnerable to mine subsidence?

Yes. Assumption, Edinburg, Jeisyville, Kincaid, Palmer, Pana, Stonington and Taylorville as well as parts of unincorporated Christian County are vulnerable to mine subsidence. In addition, all of the schools in the Taylorville CUSD have the potential to be impacted by mine subsidence in Taylorville. None of the other participating municipalities or the remainder of the County are considered vulnerable. According to ISGS, approximately 58,767 acres (13.1% of the land area) of Christian County are over or adjacent to mapped mines and vulnerable to mine subsidence while an additional 15,651 acres (3.5% of the land area) could be affected by mine subsidence if the mine boundaries are inaccurate or uncertain.

Do any of the participating jurisdictions consider mine subsidence 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 mine subsidence to be among their jurisdiction's greatest vulnerabilities.

- *Jeisyville*: Mine subsidence has caused ground sagging which has led to leaking water mains and road sinking.
- *Taylorville*: A large portion of the community is undermined, and support members are deteriorating.

Mine Subsidence Fast Facts – Impacts/Risk

Mine Subsidence Impacts:
- Total Property Damage (1 event): ***$211,000***
- Total Crop Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Mine Subsidence Risk/Vulnerability:
- Public Health & Safety – Zones 1 & 2: ***Low***
- Public Health & Safety – Areas Outside Zones 1 & 2: ***Low***
- Buildings/Infrastructure/Critical Facilities – Zones 1 & 2: ***Medium***
- Buildings/Infrastructure/Critical Facilities – Areas Outside Zones 1 & 2: ***Low***

What impacts resulted from the recorded mine subsidence events?

Property damage information was only available for one of the three recorded mine subsidence events experienced in the County. According to records provided by the Palmer Planning Committee members, the 1969 mine shaft cave-in on the southwest edge of the Village cost $30,000 to stabilize the cave-in (approximately $211,000 in 2019 based on Bureau of Labor Statistics Consumer Price Index Inflation Calculator.)

According to the IMSIF, $10,151,828 in claims for confirmed damages were reimbursed in Christian County between 2000 and 2018. However, detailed breakdowns by claim and location were unavailable. **Figure MS-7** provides a breakdown by year of the reimbursements paid for mine subsidence damage in Christian County.

Figure MS-7
Illinois Mine Subsidence Insurance Fund Reimbursements in Christian County

Year	Amount	Year	Amount	Year	Amount
2000	$283,321	2007	$567,514	2013	$381,721
2001	$682,653	2008	$883,241	2014	$942,216
2002	$433,832	2009	$661,804	2015	$769,534
2003	$203,721	2010	$571,275	2016	$85,988
2004	$401,020	2011	$280,663	2017	$389,558
2005	$689,852	2012	$378,670	2018	$939,549
2006	$605,693				

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

What other impacts can result from mine subsidence events?

The initial damage to a property from mine subsidence may appear suddenly or occur gradually over many years. Damage to structures can include:

- cracked, broken or damaged foundations
- cracks in the basement walls, ceilings, garage floors, driveways, sidewalks or roadways
- jammed or broken doors and windows
- unlevel or tilted walls or floors
- doors that swing open or closed
- chimney, porch or steps that separate from the rest of the structure
- in extreme cases, ruptured water, sewer or gas lines

A structure need not lie directly over a mine to be affected by mine subsidence. It is extremely difficult to accurately gauge how far a property must be from a mine to ensure that it will be unaffected by mine subsidence. Each subsidence is unique and influenced by multiple factors.

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

In terms of the risk or vulnerability to public health and safety from a mine subsidence event, there are several factors that must be taken into consideration including the age, size and depth of the mine; the mining method employed; the extent of the development and infrastructure in the vicinity of the mine; and soil and weather conditions. When all of the factors are taken into consideration, the overall risk to public health and safety posed by a mine subsidence event in Christian County is considered to be ***low*** for both Zones 1 and 2 and all other portions of the County.

Are existing buildings, infrastructure and critical facilities vulnerable to mine subsidence?

Yes. Buildings, infrastructure and critical facilities located within Zones 1 and 2 are vulnerable to mine subsidence. According to ISGS, approximately 7,567 housing units (50.7% of the total housing units in the County) are located over or adjacent to mapped mines and vulnerable to mine subsidence while an additional 2,960 housing units (19.8% of the total housing units) could be affected by mine subsidence if the mine boundaries are inaccurate or uncertain. **Figure MS-8** identifies the number critical facilities located within Zones 1 and 2 by participating jurisdiction for select categories. Additional critical infrastructure located over Zones 1 and 2 include the Kincaid Generating Station, the Lake Taylorville Dam and the RLF/Pawnee Mine/Slurry Impoundment 2 Dam.

In addition to impacting structures, mine subsidence can damage roads, bridges and utilities. Roadways, culverts and bridges can be weakened by mine subsidence and even destroyed if the subsidence occurs directly underneath of them. Water, sewer, power and communication lines, both above and below ground, are also vulnerable to mine subsidence. Depending on the location of the subsidence, water, sewer and power lines can experience ruptures causing major disruptions to vital services.

As with public health and safety, the risk or vulnerability to buildings, infrastructure and critical facilities is dependent on several factors including the age, size and depth of the mine; the mining method employed; the extent of the development and infrastructure in the vicinity of the mine; and soil and weather conditions. When these factors are taken into consideration, the overall risk posed by mine subsidence to vulnerability to buildings, infrastructure and critical facilities in Christian County is considered to be ***medium*** for Zone 1 and ***low*** for Zone 2 and all other portions of the County.

Are future buildings, infrastructure and critical facilities vulnerable to mine subsidence?

Yes. Any future buildings, infrastructure and critical facilities located within Zones 1 and 2 are vulnerable to mine subsidence. As a result, future buildings, infrastructure and critical facilities face the same vulnerabilities as those of existing buildings, infrastructure and critical facilities described previously.

What are the potential dollar losses to vulnerable structures from mine subsidence?

Unlike other hazards, there are no standard loss estimation models or methodologies for mine subsidence. Given the lack of recorded events and unpredictability of mine subsidence, sufficient information was not available to prepare a reasonable estimate of future potential dollar losses to vulnerable structure from mine subsidence. However, those housing units that reside in Zones 1 have the potential to experience future dollar losses from mine subsidence.

Figure MS-8
Critical Facilities Located in Zones 1 and 2 by Vulnerable Participating Jurisdictions

Participating Jurisdiction	Government[1]	Law Enforcement	Fire Stations	Ambulance Service	Schools	Drinking Water	Wastewater Treatment	Medical[2]	Healthcare Facilities[3]
Christian County	3	1	0	0	0	0	0	0	0
Assumption	1	1	1	1	1	3	2	0	0
Edinburg	1	1	1	0	0	1	1	0	0
Jeiseyville	1	0	0	0	0	0	0	0	0
Kincaid	1	1	1	0	2	1	1	0	0
Palmer	0	0	0	0	0	0	0	0	0
Pana	1	1	1	1	6	1	1	2	5
Stonington	0	0	0	0	0	0	4	0	0
Taylorville	2	0	0	1	6	3	16	3	2
Taylorville CUSD	0	0	0	0	5	0	0	0	0

[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.

3.8 EARTHQUAKES

HAZARD IDENTIFICATION

What is the definition of an earthquake?

An earthquake is a sudden shaking of the ground caused when rocks forming the earth's crust slip or move past each other along a fault (a fracture in the rocks). Most earthquakes occur along the boundaries of the earth's tectonic plates. These slow-moving plates are being pulled and dragged in different directions, sliding over, under and past each other. Occasionally, as the plates move past each other, their jagged edges will catch or stick causing a gradual buildup of pressure (energy).

Eventually, the force exerted by the moving plates overcomes the resistance at the edges and the plates snap into a new position. This abrupt shift releases the pent-up energy, producing vibrations or seismic waves that travel outward from the earthquake's point of origin. The location below the earth's surface where the earthquake starts is known as the hypocenter or focus. The point on the earth's surface directly above the focus is the epicenter.

The destruction caused by an earthquake may range from light to catastrophic depending on a number of factors including the magnitude of the earthquake, the distance from the epicenter, the local geologic conditions as well as construction standards and time of day (i.e., rush hour). Earthquake damage may include power outages, general property damage, road and bridge failure, collapsed buildings and utility damage (ruptured gas lines, broken water mains, etc.).

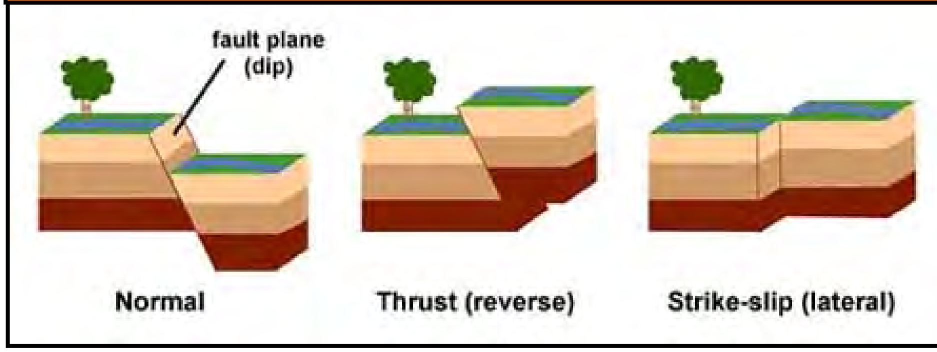
Most of the damage done by an earthquake is caused by its secondary or indirect effects. These secondary effects result from the seismic waves released by the earthquake and include ground shaking, surface faulting, liquefaction, landslides and, in rare cases, tsunamis.

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

What is a fault?

A fault is a fracture or zone of fractures in the earth's crust between two blocks of rock. They may range in length from a few millimeters to thousands of kilometers. Many faults form along tectonic plate boundaries. Faults are classified based on the angle of the fault with respect to the surface (known as the dip) and the direction of slip or movement along the fault. There are three main groups of faults: normal, thrust (reverse) and strike-slip (lateral). **Figure EQ-1** provides an illustration of each type of fault.

Figure EQ-1
Fault Illustration



Source: U. S. Geological Survey.

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

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

What are tectonic plates?

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

How are earthquakes measured?

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

Magnitude

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

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

Once an earthquake's magnitude has been confirmed, it can be classified. **Figure EQ-2** categorizes earthquakes by class based on their magnitude (i.e., Richter Scale value). Any earthquake with a magnitude less than 3.0 on the Richter Scale is classified as a micro earthquake while any earthquake with a magnitude of 8.0 or greater on the Richter Scale is considered a "great" earthquake. Earthquakes with a magnitude of 2.0 or less are not commonly felt by individuals. The largest earthquake to occur in the United States since 1900 took place off the coast of Alaska in Prince William Sound on March 28, 1964 and registered a 9.2 on the Richter Scale.

Figure EQ-2
Earthquake Magnitude Classes

Class	Magnitude (Richter Scale)
micro	smaller than 3.0
minor	3.0 – 3.9
light	4.0 – 4.9
moderate	5.0 – 5.9
strong	6.0 – 6.9
major	7.0 – 7.9
great	8.0 or larger

Source: Michigan Technological University, Department of Geological and Mining Engineering and Sciences, UPSeis

Intensity

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

Although numerous intensity scales have been developed over the years, the one currently used in the 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.

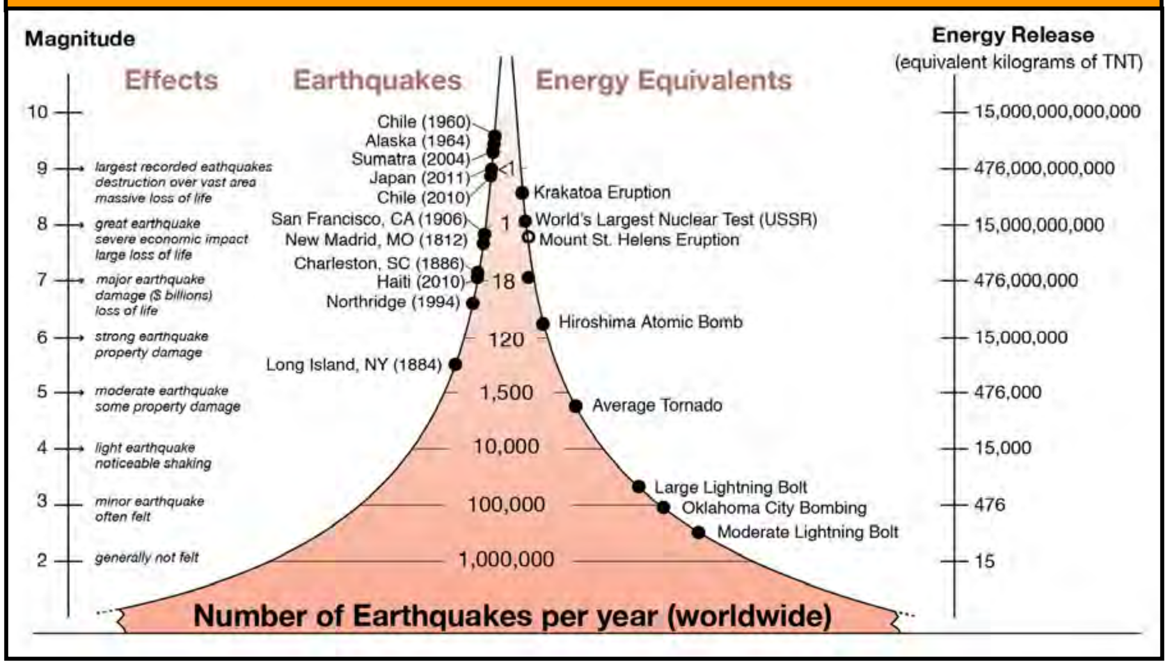
The second prominent belt is the Alpide, which extends from Java to Sumatra and through the Himalayan Mountains, the Mediterranean Sea and out into the Atlantic Ocean. It accounts for about 17 percent of the world's largest earthquakes, including those in Iran, Turkey and Pakistan. The third belt follows 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

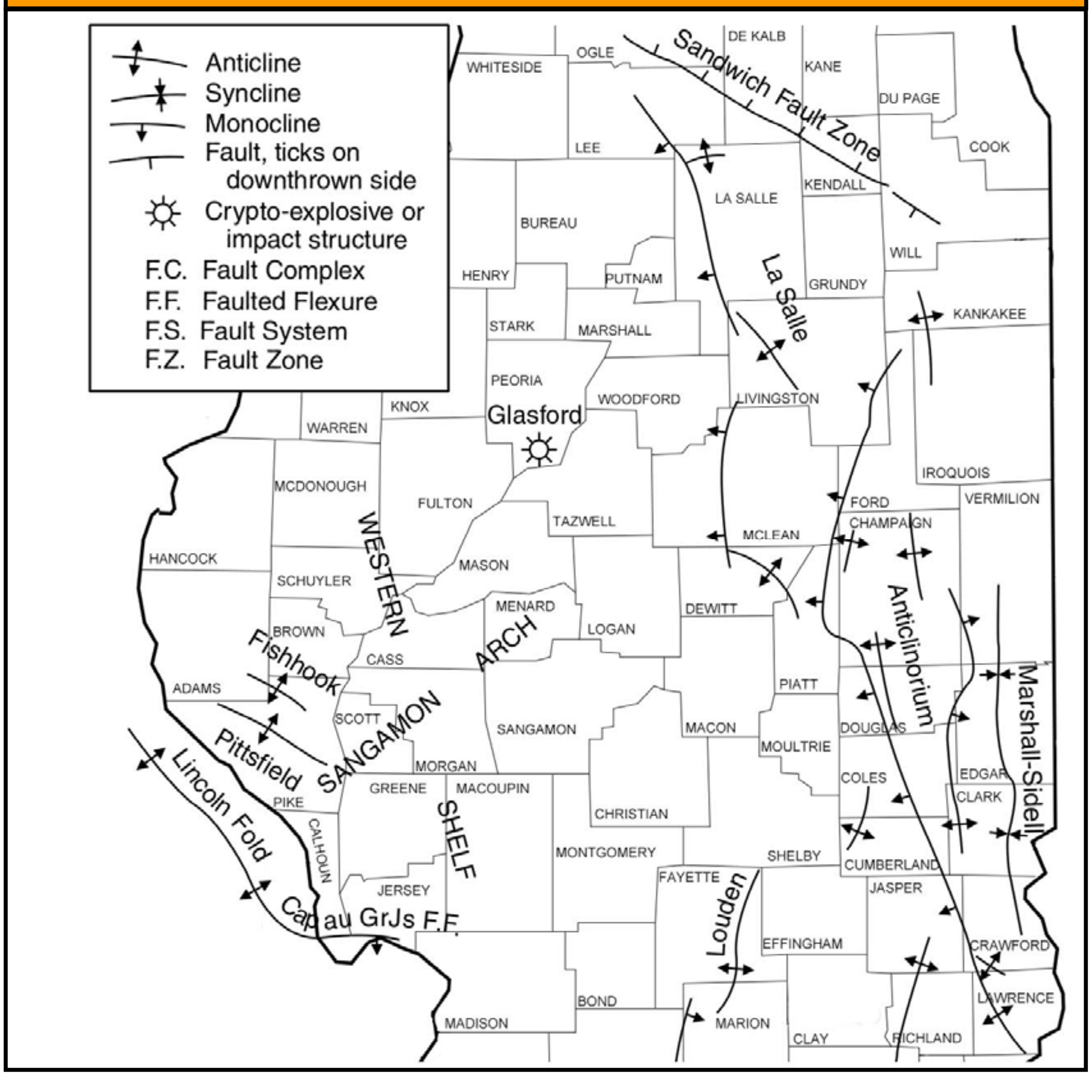
The following details the location of known fault zones and geologic structures, identifies past occurrences of earthquakes, details the severity or extent of future potential events (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

Are there any faults located within the County?

No. There are no known faults or other geologic structures located in Christian County. However, there are two known geological structure in the immediate region, the Loden Anticline and the La Salle Anticlinorium. The following provides a brief description of each while **Figure EQ-5** illustrates the location of these geologic structures.

- The Louden Anticline is located in the northern Marion County and eastern Fayette County. The Louden Anticline is slightly sinuous with about 200 feet of closure and the west limb is considerably steeper than the east limb. This part of the structure has the potential for normal faults at depth.
- The La Salle Anticlinorium is composed of a group or zone of closely related anticlines, domes, monoclines and synclines, several of which are individually named. In 2004 an earthquake was recorded along one of the Anticlinorium's monoclines in LaSalle County. .

Figure EQ-5
Geological Structures in Central Illinois



Source: Illinois State Geological Survey.

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

Earthquake Fast Facts – Occurrences

Earthquakes Originating in the County (1795 – 2015): ***3***

Fault Zones Located within the County: ***None***

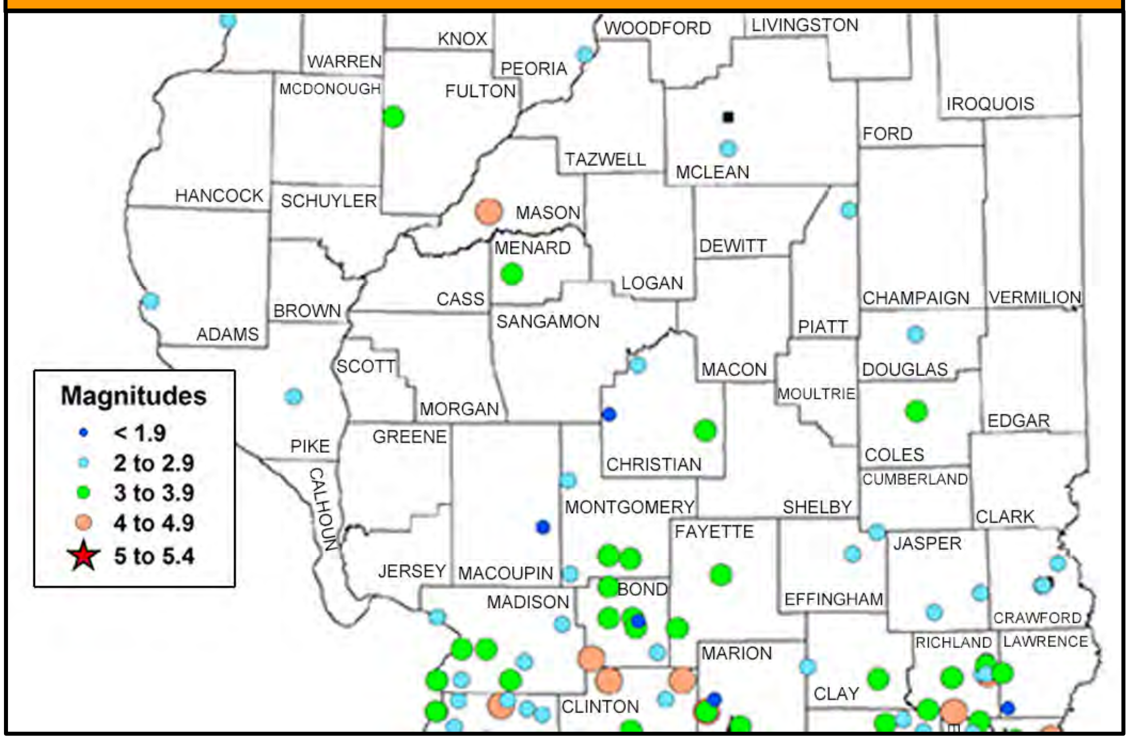
Earthquakes Originating in adjacent Counties (1795-2015): ***3***

Fault Zones Located in Nearby Counties: ***4***

According to the Illinois State Geological Survey, the U.S. Geological Survey and the Center for Earthquake Research and Information (CERI) at the University of Memphis three earthquakes have originated in Christian County during the last 200 years. **Figure EQ-6** illustrates the epicenters of these earthquakes. A brief description of each event is provided below. Damage information was unavailable for any of these events.

- ❖ On November 8, 1928 a 3.1 magnitude earthquake originated in unincorporated Christian County approximately 2.5 miles southwest of Assumption.
- ❖ A magnitude 2.2 earthquake originated in unincorporated Christian County approximately 2 miles southeast of Roby on July 11, 1977.
- ❖ On December 9, 1983 a magnitude 1.7 earthquake originated in unincorporated Christian County approximately 3.5 southwest of Tovey.

Figure EQ-6
Earthquakes Originating in Central Illinois



Source: Illinois State Geological Survey.

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

- On April 18, 2008, a magnitude 5.2 earthquake was reported in southeastern Illinois near Bellmont in Wabash County. The earthquake was located along the Wabash Valley seismic zone. Minor structural damage was reported in several towns in Illinois and Kentucky. Ground shaking was felt over all or parts of 18 states in the central United States and southern Ontario, Canada.
- A magnitude 5.2 earthquake took place on June 10, 1987 in southeastern Illinois near Olney in Richland County. This earthquake was also located along the Wabash Valley seismic zone. Only minor structural damage was reported in several towns in Illinois and Indiana. Ground shaking was felt over all or parts of 17 states in the central and eastern United States and southern Ontario, Canada.
- The strongest earthquake in the central 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 magnitudes 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.

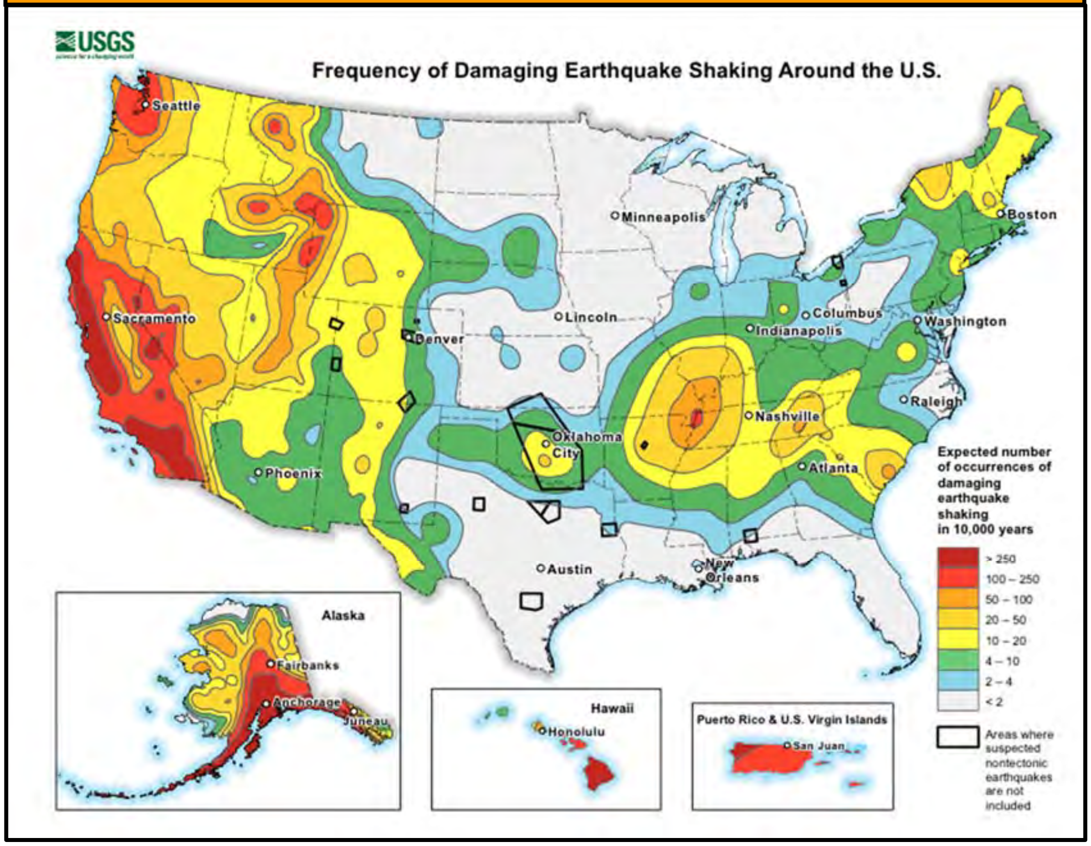
The quakes locally changed the course of the Mississippi River creating Reelfoot Lake in northwestern Tennessee. These earthquakes were not an isolated incident. The New Madrid Seismic Zone is one of the most seismically active areas of the United States east of the Rockies. Since 1974 more than 4,000 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. Christian County's proximity to the La Salle Anticlinorium, makes the entire area likely to be affected by an earthquake if these structures become seismically active. The *2018 Illinois Natural Hazard Mitigation Plan* classifies Christian County's hazard rating for earthquakes as "medium". IEMA's overall hazard rating system has five levels: very low, low, medium, high and severe.)

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

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



Source: United State Geological Survey.

What is the probability of future earthquake events occurring?

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

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

The general consensus among scientists is that earthquakes similar to the 1811-1812 earthquakes are expected to recur on average every 500 years. The U.S. Geological Survey and the Center for Earthquake Research and Information (CERI) at the University of Memphis estimates that for a 50-year period the probability of a repeat of the 1811-1812 earthquakes is between 7% and 10% and the probability of an earthquake with a magnitude of 6.0 or larger is between 25% and 40%.

HAZARD VULNERABILITY

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

Are the participating jurisdictions vulnerable to earthquakes?

Yes. All of Christian 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 Christian 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.

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

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 Christian 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 Christian County is not vulnerable to damaging earthquakes. This perception has allowed the County and participating jurisdictions to develop largely without regard to earthquake safety.

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

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

What impacts resulted from the recorded earthquake events?

While Christian County residents felt the earthquakes that occurred in the County and across 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

Christian 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 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 (especially if the quake originates along the New Madrid seismic zone) to treat individuals injured closer to the epicenter • Emergency services (ambulance, fire, law enforcement) may be needed to provide aid in areas where damage was greater *Other* • Disruptions in land line telephone service throughout an entire region (i.e., central and southern Illinois) • Depending on the seasonal conditions present, more displacements may be expected as those who may not have enough water and food supplies seek alternate shelter due to temperature extremes that make their current housing uninhabitable

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

The risk or vulnerability to public health and safety from an earthquake is dependent on the intensity and location of the event. Since there are no known faults in Christian 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***. For a major earthquake originating along the Wabash Valley or New Madrid seismic zones, the risk is considered to be ***low*** to ***medium***.

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

Yes. All existing buildings, infrastructure and critical facilities located in Christian County and the participating jurisdictions are vulnerable to damage from earthquakes. However, given the County's size (less than 35,000 individuals), its population density, the fact that there are not many buildings higher than two stories (with the exception of grain elevators and several multi-story buildings in Taylorville including the hospital and Pana) and no earthquakes above a magnitude 5.0 have occurred in the immediate region damage is anticipated to be negligible.

While unlikely, if a strong earthquake (6.0 to 6.9 magnitude) were to occur in the region then unreinforced masonry buildings would be most at risk because the walls are prone to collapse outward. Steel and wood buildings have more ability to absorb the energy from an earthquake while wood buildings with proper foundation ties have rarely collapsed in earthquakes. In this scenario building damage in Christian County could range from moderate to considerable in well-built structures to severe in poorly-built structures.

A listing of the unreinforced masonry buildings that serve as critical infrastructure within the participating jurisdictions is not currently available. As a result, a data deficiency exists in terms of comprehensively identifying the risk by jurisdiction to infrastructure and critical facilities to a strong earthquake.

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 Christian County would be a VI resulting in slight damage 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-1** lists the number and 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 ***low*** to ***medium*** for a strong earthquake originating in the region.

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

Yes. All future buildings, infrastructure and critical facilities located in Christian County and the participating jurisdictions are vulnerable to damage from earthquakes. While six of the participating municipalities (Edinburg, Kincaid, Morrisonville, Pana, Stonington and Taylorville) 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 Christian County, there is no way to accurately estimate future potential dollar losses to vulnerable structures. However, according to the Christian County Supervisor of Assessments the total equalized assessed values of buildings in the planning area is $440,571,963. 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.

3.9 Dam Failures

Hazard Identification

What is the definition of a dam?

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

According to the U.S. Army Corps of Engineers' National Inventory of Dams (NID), there are approximately 90,580 dams in the United States and Puerto Rico, with 1,607 dams located in Illinois. (The NID is maintained by the U.S. Army Corps of Engineers and is updated approximately every two years.) Of the 1,607 dams in Illinois, approximately 92% are constructed of earth.

What is the definition of a dam failure?

A dam failure is the partial or total collapse, breach or other failure of a dam that causes flooding downstream. In the event of a dam failure, the people, property and infrastructure downstream could be subject to devastating damages. The potential severity of a full or partial dam failure is influenced by two factors:

- the capacity of the reservoir and
- the density, type and value of development/infrastructure located downstream.

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

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

No one knows precisely how many dam failures have occurred in the United States; however, it's estimated that hundreds have taken place over the last century. Some of the worst failures have caused catastrophic property and environmental damage and have taken hundreds of lives. The worst dam failure in the last 50 years occurred on February 26, 1972 in Buffalo Creek, West Virginia. A tailings dam owned by the Buffalo Mining Company failed, taking 125 lives, injuring 1,000 individuals, destroying 507 homes and causing property damage in excess of $50 million (approximately $298.6 million in 2017 based on the Bureau of Labor Statistics Consumer Price Index Inflation Calculator.)

Dam failures have been documented in every state, including Illinois. According to the Dam Incident Database compiled by the National Performance of Dams Program, there have been 10 reported dam failures with uncontrolled releases of the reservoir in Illinois since 1950.

What causes a dam failure?

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

- ***prolonged periods of rainfall and flooding*** (the cause of most failures);
- ***inadequate spillway capacity*** resulting in excess flow overtopping the dam;
- ***internal erosion*** caused by embankment or foundation leakage;
- ***improper maintenance*** (including failure to remove trees, repair internal seepage problems, maintain gates, valves and other operational components, etc.);
- ***improper design*** (including use of improper construction materials and practices);
- ***negligent operation*** (including failure to remove or open gates or valves during high flow periods);
- ***failure of an upstream dam on the same waterway***;
- ***landslides into reservoirs*** which cause surges that result in overtopping of the dam;
- ***high winds*** which can cause significant wave action and result in substantial erosion; and
- ***earthquakes*** which can cause longitudinal cracks at the tops of embankments that can weaken entire structures.

How are dams classified?

Each dam listed on the National Inventory of Dams is assigned a hazard potential classification rating per the "Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams." The classification system is based on the potential for loss of life and damage to property in the event of a dam failure. There are three classifications: High, Significant and Low. **Figure DF-1** provides a brief description of each hazard potential classification. It is important to note that the hazard potential classification assigned is not an indicator of the adequacy of the dam or its physical integrity and in no way reflects the current condition of the dam.

Figure DF-1
Dam Hazard Classification System

Hazard Potential Classification	Description
High	Those dams where failure or mis-operation result in probable loss of human life, regardless of the magnitude of other losses. The probable loss of human life is defined to signify one or more lives lost.
Significant	Those dams where failure or mis-operation result in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities or can impact other concerns. Significant hazard potential classification dams are often located in predominately rural or agricultural areas but could be located in areas with population and significant infrastructure.
Low	Those dams where failure or mis-operation results in no probable loss of human life and low economic and/or or environmental losses. Losses are principally limited to the dam owner's property.

Sources: Federal Emergency Management Agency
U.S. Army Corps of Engineers

HAZARD PROFILE

According to the USACE National Inventory of Dams, there are 15 classified dams located in Christian County. Of those 15 dams, only three have a hazard potential classification of "High". The remaining 12 dams all have a hazard potential classification of "Significant" or "Low", do not have reservoirs with immense storage capacities and are not located in densely populated areas. Due to the limited impacts on the population, land use and infrastructure associated with a majority of the classified dams, only those dams that have "High" hazard potential classification will be analyzed as part of this Plan update.

The following details the location of "High" hazard classified dams, identifies past occurrences of dam failures, details the severity or extent of future potential failures (if known); identifies the locations potentially affected and estimates the likelihood of future occurrences.

Do any of the participating jurisdictions own "High" hazard classified dams?

Yes. There is one "High" hazard classified dam owned by Taylorville. **Figure DF-2** provides a brief description of the dam.

Are there any other publicly or privately-owned "High" hazard classified dams within the County?

Yes. There are two privately-owned "High" hazard classified dams owned by RLE Pawnee Properties in Christian County. **Figure DF-2** provides a brief description of each dam.

Dam Failure Fast Facts – Occurrences

Number of "High" Hazard Classified Dams Located in the County: ***3***

Number of Classified Dams owned by Participating Jurisdictions: ***1***

Number of "High" Hazard Classified Dam Failures Reported: ***None***

Probability of Future "High" Hazard Classified Dam Failure Events: ***Low***

The RLP/Pawnee Mine/Slurry Impoundment 1 Dam reservoir is currently dry and not in use as a slurry impoundment based on visual observations. As a result, it was not analyzed in detail was part of this Plan update.

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

According to data from Stanford University's National Performance of Dams Incident Database and discussions with Planning Committee members, there are no known recorded dam failures associated with the "High" hazard classified dams studied in Christian 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 developed for both of the "High" hazard classified dams studied. However, neither EAP was made available to the Chris-Mont Emergency Management Agency. As a result, a data deficiency exists in terms of defining the extent or magnitude of future potential dam failures.

Figure DF-2
High Hazard Classified Dams Located in Christian County

Dam Name	Hazard Classification	Associated Waterway	Owner	Type	Primary Purpose	Completion Year / Year Modified	Height (feet)	Length (feet)	Storage (acre-feet)	Impoundment Surface Area (acres)	Drainage Area (square miles)	Emergency Action Plan
Publicly-Owned												
Lake Taylorville Dam	High	South Fork Sangamon River	City of Taylorville	Earth	Recreation	1961	27 ft.	1,400 ft.	28,500 ac.-ft.	1,287 ac.	125 sq. mi.	Yes
Privately-Owned												
RLF/Pawnee Mine/Slurry Impoundment 1 Dam	High	Clear Creek Off Stream	RLE Pawnee Properties, LLC	Earth	Other	1976	30	9,397 ft.	3,018 ac.-ft.	n/a	n/a	Yes
RLF/Pawnee Mine/Slurry Impoundment 2 Dam	High	Tributary Sangchris Lake	RLE Pawnee Properties, LLC	Earth	Other	1998	37	9,200 ft.	3,700 ac.-ft.	n/a	n/a	Yes

Sources: Stanford University, National Performance of Dams Program, NPDP Dams Database.
U.S. Army Corps of Engineers, National Inventory of Dams Interactive Report.

What locations are affected by dam failure?

Figure DF-3 shows the locations of the ***"High" hazard classified dams studied*** in Christian County. Dam failures have the potential to impact the following municipalities/unincorporated areas:

- ❖ Taylorville (west of Illinois Route 29 and south of Illinois Route 48); and
- ❖ undeveloped/agricultural land southwest of the Kincaid Generating Station (south of Illinois Route 104 and west of County Road 175 East.)

What is the probability of future dam failure events occurring?

Since neither of the "High" hazard dams studied have experienced a dam failure, it is difficult to specifically establish the probability of a future failure. However, based on the capacity of the reservoir and the scope and type of development and infrastructure located downstream, the probability is estimated to be ***low***. For the purposes of this analysis "low" is defined as having a less than 10% chance of occurring in any given year.

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. Taylorville and portions of unincorporated Christian County southwest of the Kincaid Generating Station are vulnerable to the dangers presented by dam failures. While these areas are vulnerable, most residents would not be impacted by a dam failure. None of the other participating municipalities or the remainder of the County are considered vulnerable.

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

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

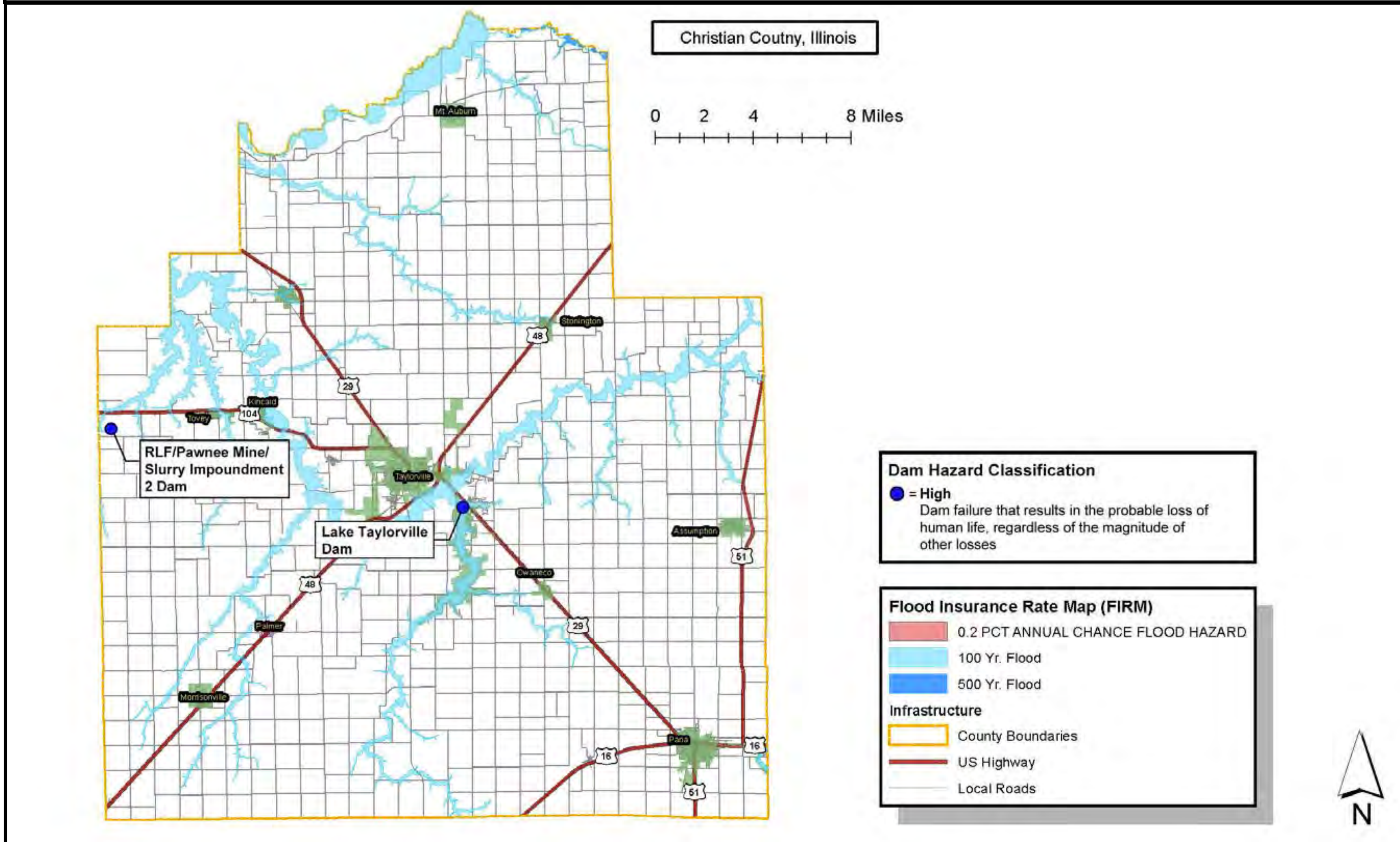
What impacts resulted from the recorded dam failures?

Since there have been no *recorded* dam failures associated with the "High" hazard classified dams studied in Christian County, there are no recorded impacts to report.

What other impacts can result from dam failures?

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

Figure DF-3
Location of High Hazard Classified Dams Studied in Christian County



Dam Failure Fast Facts – Risk

Dam Failure Risk/Vulnerability:
- Public Health & Safety: "High" Hazard Classification Dams Studied – ***Low/Medium***
- Buildings/Infrastructure/Critical Facilities: "High" Hazard Classification Dams Studied – ***Low/Medium***

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 is considered to be ***low to medium*** for a dam failure at either of the "High" hazard classified dam studied in Christian County.

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

As discussed previously, EAPs detailing the existing building, infrastructure and critical facilities vulnerable to a dam failure were not available for review for either of the "High" hazard classified dams studied. 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 "High" hazard classified dams studied indicates that there are buildings, infrastructure and critical facilities that are vulnerable to dam failures. **Figure DF-4**, located at the end of this section, provides a ***rough estimate*** by dam of the buildings, infrastructure and critical facilities vulnerable to dam failures.

Depending on whether there is a full or partial dam failure, all of the vulnerable buildings, infrastructure and critical facilities may be inundated by water and structural damage may result. Because none of the reservoirs 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.

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**
Lake Taylorville Dam	Taylorville (IL Route 29 & W. Lake Shore Drive)	5-10	---	- W. Lake Shore Drive - Lincoln Prairie Trail - Illinois Route 29 - CR 1350 E - S. Shumway St. - Lincoln Trail	- utility substation
RLF/Pawnee Mine/Slurry Impoundment 2 Dam	Unincorp. Christian County (approx. 1 ¼ mile southwest of Kincaid Generating Station – CR 1550 N / CR 100 E)	3-5	---	- CR 6 E - CR 1550 N	---

In addition to impacting structures, a dam failure can damage roads and utilities. Roadways, culverts and bridges can be weakened by dam failure floodwaters and may collapse under the weight of a vehicle. Power and communication lines, both above and below ground, are also vulnerable to dam failure flooding. Depending on their location and the velocity of the water as it escapes the dam, power poles may be snapped causing disruptions to power and communication. Water may also get into any buried lines causing damage and disruptions.

As with public health and safety, the risk or vulnerability to buildings, infrastructure and critical facilities is dependent on several factors including the severity of the event, the capacity of the reservoir and the extent and type of development and infrastructure located downstream. When these factors are taken into consideration, the overall risk posed by a dam failure in Christian County is considered to be ***low to medium*** for the "High" hazard classified dams studied.

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 either of the "High" hazard classified dam studied are vulnerable to damage from a dam failure. As a result, future buildings, infrastructure and critical facilities face the same vulnerabilities as those of existing buildings, infrastructure and critical facilities described previously.

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

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

3.10 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 Christian County. The man-made hazards profiled in this Plan update include:

- Hazardous Substances
  - Generation
  - Transportation
  - Storage/Handling
- Waste Disposal
- 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 regard 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 Christian County that generate and use hazardous substances, the population size, transportation patterns, and land use, the probability of a release occurring in Christian 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 Christian County.

3.10.1.1 Generation

Christian County has four 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. **Table 12**, located in **Appendix J**, identifies the hazardous substance generators located in Christian County and summarizes the substances generated.

Hazardous Substances Fast Facts - Occurrences

Generation
Number of Facilities that Generate Reportable Quantities of Hazardous Substances (2017): ***4***

Transportation
Number of Roadway Incidents Involving Hazardous Substance Shipments (2009 – 2018): ***9***

Number of Railway Accidents/Incidents Involving Hazardous Substance Shipments (2009 – 2018): ***9***

Number of Pipeline Incidents Involving Hazardous Substances (2009 – 2018): ***8***

Storage/Handling
Number of Facilities that Store/Handle Hazardous Substances (2019): ***41***

Number of Facilities that Store/Handle Extremely Hazardous Substances (2019): ***17***

3.10.1.2 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 over 147,000 miles of highways and streets in Illinois in 2017. Most of the truck traffic in Christian County is carried on U.S. Route 51, Illinois Route 29 and Illinois Route 48. Other major roadways that carry truck traffic include Illinois Route 16, and Illinois Route 104. 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 multi-year Commodity Flow Study to gauge chemical transport has been conducted for Christian 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 nine recorded roadway incidents involving the shipment of hazardous waste and/or products in Christian County from 2009 through 2018. **Figure MMH-1** provides information on these incidents.

Figure MMH-1
Roadway Incidents* Involving Shipments of Hazardous Substances
2009 – 2018

Date	Area	Location	Hazardous Product Released	Quantity Released
10/26/2010	Morrisonville^	IL Rte. 48 at Christian County 500 N.	Diesel fuel	150 gallons
10/29/2010	Zenobia^	3 miles south of IL Rte. 104 at the Christian/Sangamon County line	Anhydrous ammonia	850 gallons
11/01/2010	Morrisonville	Sarpy St and IL Rte. 48	Diesel fuel	Approx. 100 gallons
12/28/2010	Sharpsburg	1805 Sharpsburg Rd.	Diesel fuel	25 gallons
05/28/2015	Stonington^	County Rd. 2300N	Diesel fuel	100 gallons (estimate)
08/26/2016	Assumption	County Hwy. 6 at College Rd.	Diesel fuel	300 gallons
09/15/2017	Taylorville	1800 E. Main Cross St.	Diesel fuel	10 gallons
05/16/2018	Pana	202 S. Poplar St.	Diesel	65 gallons
12/02/2018	Stonington^	South of 1700E on IL Rte. 48	Bisulfites aqueous, ferric chloride solution, sodium hydroxide	700 gallons (estimate)

* 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 Christian County there are four rail lines operated by Norfolk Southern (NS), Union Pacific (UP), Illinois Midland (IM) and Decatur Junction (DT). The NS rail line bisects the County running southwest to northeast, generally paralleling Illinois Route 48. The UP rail line runs across the southeastern corner of the County. The IM rail line runs from Taylorville west to the County line while the DT rail line runs from Assumption northeast to the County line.

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 Category C rail accident involving hazardous substances in Christian County according to the ICC. In comparison, ICC records indicate that since 2009 the annual number of railway accidents in Illinois in all categories involving hazardous substances has ranged between 35 and 122. **Table 13**, located in **Appendix J**, 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 Christian County to those in Cook and the Collar Counties as well as the rest of Illinois.

According IEMA's hazardous materials incident records for the same time period, there were an additional eight rail accidents/incidents involving the release of hazardous substances. **Figure MMH-3** provides information on these incidents by rail line. One derailment was associated with one of these accidents/incidents.

Figure MMH-3 IEMA Recorded Railway Accidents/Incidents Involving Hazardous Substances 2009 – 2018				
Date	**Area**	**Location**	**Hazardous Substance Released**	**Quantity Released**
Norfolk Southern				
05/27/2009	Morrisonville^	County Rd 500 E	Engine lube oil	Approx. 100 gallons
06/05/2010	Stonington		Sand	10 pounds
11/30/2010	Clarksdale^	MP D 408.6	Soy bean meal	2 bushels
06/01/2014	Palmer		Corn meal	75 pounds
09/04/2014	Morrisonville	MP 423.6	Plastic pellets	2 pounds
11/01/2014	Palmer^	MP 412.4	Crushed limestone	1 pound
07/09/2015	Taylorville	MP D400-D500	Corn hull pellets	Unknown
03/02/2016	Morrisonville	2/10ths of a mile south of the 4^{th} St. crossing	Limestone	100 pounds

^ Accident/incident verified in the vicinity of this area.

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

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 five interstate hazardous liquids pipelines and five natural gas pipeline systems in Christian County. Two of the hazardous liquids pipelines are owned by Buckeye Partners, LP., one is owned by Explorer Pipeline Company, one is owned by Marathon Pipeline LLC. and one is owned by Illinois Extension Pipeline Company LLC. Ameren Illinois Company owns three of the natural gas pipelines while Rockies Express Pipeline LLC and Panhandle Eastern Pipeline Co. both own two natural gas pipelines each.

Seven pipeline releases occurred in Christian County during a ten year period from 2009 through 2018. **Figure MMH-4** details the location, commodity released, number/type of evacuations and any injuries or fatalities.

Figure MMH-4
IEMA Recorded Pipeline Releases Involving Hazardous Substances
2009 – 2018

Date	Area	Location	Hazardous Substance Released	Evacuations	Injuries/ Fatalities
08/16/2011	Sharpsburg[^]	1770 N and 1000 E	Gasoline	n/a	n/a
06/21/2013	Lake Sangchris State Park[^]	2080 N and 475 E	Crude oil	n/a	n/a
11/05/2014	Moweaqua	1723 N 2400 E Rd.	Crude oil / salt water	n/a	n/a
02/27/2015	Mount Auburn	Armstrong Lease	Oil	n/a	n/a
09/14/2015	Pana[^]	2 miles south of Pana at 2500 E & 600 N	Crude oil	n/a	n/a
10/16/2015	Willeys[^]	Intersection of E 1700 N Rd. and County Rd. 1600 E	Transmix (diesel, gasoline and jet fuel)	n/a	n/a
09/19/2017	Edinburg[^]	1920 North 600 East Rd.	Crude oil	n/a	n/a

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

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

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.

3.10.1.3 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 Christian County. The Tier II information was then compared with USEPA's Toxic Release Inventory (TRI) and information from IEPA's databases. This review identified 41 facilities within Christian County in 2017 that store and handle hazardous substances.

Of these 41 facilities, 17 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.

3.10.2 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 Christian County.

3.10.2.1 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.

Waste Disposal Fast Facts - Occurrences

Solid Waste
Number of Solid Waste Landfills Operating in Christian County (2018): ***1***

Number of Landfills Serving Christian 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***

According IEPA's Annual Landfill Capacity Report issued in September 2019 there is one commercial landfill currently operating in Christian County. The Five Oaks Disposal and Recycling Facility is located west-northwest of Taylorville and is projected to have 24 years of capacity remaining based on current disposal rates.

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

- Litchfield-Hillsboro Landfill, Montgomery Co.; and
- Advanced Disposal Services Valley View Landfill Inc., Macon County; and
- Sangamon Valley Landfill Inc., Sangamon County

3.10.2.2 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 Christian County.

3.10.2.3 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 Christian County.

3.10.3 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

From 2009 through 2018, there were 69 hazmat incidents recorded in Christian County. **Table 14**, located in **Appendix J**, provides information on the hazmat incidents recorded in Christian County. Of these incidents, ***44 (64%) involved transportation incidents/accidents while 25 (36%) occurred at fixed facilities***. Fourteen of the 44 transportation incidents/accidents (32%) involved methamphetamine by-products.

Hazmat Incident Fast Facts - Occurrences

Number of Hazardous Material Incidents in Christian County (2009 – 2018): ***69***

Number of Transportation-Related Incidents/Accidents: ***25***

Number of Fixed Facility-Related Incidents/Accidents: ***44***

Average Number of Hazardous Material Incidents Experienced Annually: Approximately ***7***

Based on the recorded incidents, ***Christian County experienced an average of approximately seven hazmat incidents annually between 2009 through 2018***. 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.

3.10.4 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 its 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.

Waste Remediation Fast Facts - Occurrences

Superfund
Number of Superfund Sites in the County: ***1***

Illinois Site Response Action Program
Number of SRAP Sites in the County: ***8***

Illinois Site Remediation Program
Number of SRP Sites in the County: ***9***

Number of SRP Sites with NFR Letters: ***6***

Illinois Leaking Underground Storage Tanks Program
Number of LUST Sites in County: ***114***

Number of LUST Sites with NFR/Non-Lust/4Y Letters: ***84 (74%)***

According to NPL database, there are 45 Superfund sites in Illinois. There is ***one site*** in Christian County being ***managed through the Superfund program***, the Central Illinois Public Service Company (Ameren CIPS) site in Taylorville.

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 ***eight (8) SRAP sites*** in Christian County. Three of the eight 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 ***nine (9) SRP sites*** in Christian County. Six of the nine 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 Christian County there are ***114 sites involving the remediation of petroleum product releases*** from underground storage tanks. Of the 114 LUST sites, 84 (approximately 74%) have received NFR, Non-Lust or 4Y Letters or remediation is virtually complete.

3.10.5 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 Christian 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 or eliminate the potential loss of life and property damage that results from the natural and man-made hazards identified in the Risk Assessment section of this Plan. The strategy includes:

- Reviewing and updating the mitigation goals. Mitigation goals describe the objective(s) or desired outcome(s) that the participants would like to accomplish in term of hazard and loss prevention. These goals are intended to reduce or eliminate long-term vulnerabilities to and man-made natural hazards.
- Evaluating the status of the existing mitigation actions and identifying a comprehensive range of jurisdiction-specific mitigation actions including those related to continued compliance with the National Flood Insurance Program (NFIP). Mitigation actions are projects, plans, activities or programs that achieve at least one of the mitigation goals identified.
- Analyzing the existing and new mitigation actions identified for each jurisdiction. This analysis ensures each action will reduce or eliminate future losses associated with the hazards identified in the Risk Assessment section.
- Reviewing and updating the mitigation actions prioritization methodology. The prioritization methodology outlines the approach used to prioritize the implementation of each identified mitigation action.
- Identifying the entity(s) responsible for implementation and administration. For each mitigation action, the entity(s) responsible for implementing and administering that action is identified as well as the timeframes for completing the actions and potential funding sources.
- Conducting a preliminary cost/benefit analysis of each mitigation action. The qualitative cost/benefit analysis provides participants a general idea which actions are likely to provide the greatest benefit based on the financial cost and staffing efforts needed.

As part of the Plan update, the mitigation strategy was reviewed and revised. A detailed discussion of each aspect of the mitigation strategy and any updates made is provided below.

4.1 MITIGATION GOALS REVIEW

As part of the Plan update process, the mitigation goals developed in the original Plan were reviewed and re-evaluated. The Planning Committee chose to replace the three primary goals and list of objectives in order to simplify the mitigation strategy and address a more comprehensive range of mitigation activities and projects.

The original list of mitigation goals as well as potential updates to the list were distributed to the Planning Committee members at the first meeting on June 11, 2019. Members were asked to review the potential updates before the second meeting and consider whether any changes needed to be made or if additional goals should be included. At the Planning Committee's September 10, 2019 meeting the group discussed the updated 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 natural and man-made hazards they face and the ways they can protect themselves, their homes, and their businesses and plan 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 community plans and regulations.
Goal 5	Place a priority on protecting public services, including critical facilities, utilities, roads and schools.
Goal 6	Preserve and protect the rivers and floodplains in our County.
Goal 7	Ensure that new developments do not create new exposures to damage from natural and man-made hazards.
Goal 8	Protect historic, cultural, and natural resources from the effects of natural and man-made hazards.

4.2 EXISTING MITIGATION ACTIONS REVIEW

The Plan update process included a review and evaluation of the ***existing hazard mitigation actions*** listed in the original Plan. A copy of these original actions is included in **Appendix N**. A review of the existing hazard mitigation actions revealed the following shortcoming:

- ❖ Actions were not jurisdiction-specific. Many of the actions were applied to every participant no matter their level of interest, ability to implement or relevance to their jurisdiction.

As a result of this finding, the Planning Committee agreed to the creation of individual, jurisdiction-specific mitigation action lists for each participating jurisdiction. In addition, those actions listed for fire were also eliminated as the Planning Committee concluded that it was a minimal risk and chose not to include it in the Plan update. Those projects already identified as "Completed" were also eliminated.

The remaining existing mitigation actions were evaluated, assigned to the appropriate participating jurisdiction(s) and presented to the Planning Committee members for their review and evaluation at the second meeting held on September 10, 2019. Each participating jurisdiction was asked to identify those actions that were either in progress or that had been completed since the original Plan was completed in 2010. They were also given the opportunity to eliminate any action on their specific list that they did not deem viable and/or practical for implementation.

Figures MIT-2 through **MIT-10** located at the end of this section, summarize the results of this evaluation by jurisdiction. Each action listed includes a reference number to the original mitigation action list found in **Appendix N**. Edinburg, Jeisyville and the Taylorville CUSD #3 did not participate in the development of the original Plan and therefore are not included in the summary.

4.3 New Mitigation Action Identification

Given the existing mitigation actions were not jurisdiction-specific, it was essential that a comprehensive range of ***new, jurisdiction-specific mitigation actions*** be identified for each participating jurisdiction as part of the Plan update process. Instead of focusing on all-inclusive actions covering multiple jurisdictions, participants were asked to identify mitigation actions that met the specific needs and risks associated with their jurisdiction.

Representatives of the following jurisdictions were also asked to identify mitigation actions that would ensure their continued compliance with the National Flood Insurance Program.

- Christian County
- Edinburg
- Kincaid
- Stonington
- Taylorville

The compiled lists of new mitigation actions were then reviewed to assure the appropriateness and suitability of each action. Those actions that were not deemed appropriate and/or suitable were either reworded or eliminated.

4.4 Mitigation Action Analysis

Next, those existing mitigation actions retained and the new mitigation actions identified were assigned to one of four broad mitigation activity categories which allowed Planning Committee members to compare and consolidate similar actions. **Figure MIT-11** identifies each mitigation activity 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.

4.5 Mitigation Action Prioritization Methodology Review

The methodology developed to prioritize mitigation actions in the original Plan was reviewed by the Planning Committee as part of the Plan update process. The original prioritization methodology was based on the STAPLE+E planning factors (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) and applied a rating of high, medium or low to each mitigation action. Taking into account the number and types of factors assessed and the complexity associated with the STAPLE+E analysis, the Planning Committee decided to replace the original prioritization methodology with one focused on just two key factors: 1) the frequency of the hazard and 2) the degree of mitigation attained. This updated prioritization methodology was presented to the Planning Committee members at the third meeting held on December 10, 2019. The group reviewed and discussed the updated methodology and chose to approve it with no changes.

Figure MIT-11 **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.)

Figure MIT-12 identifies and describes the four-tiered prioritization methodology adopted by the Planning Committee. The methodology developed provides a means of objectively determining which actions have a greater likelihood of eliminating or reducing the long-term vulnerabilities associated with the most frequently-occurring natural hazards.

While prioritizing the actions is useful and provides participants with additional information, it is important to keep in mind that implementing any the mitigation actions is desirable regardless of which prioritization category an action falls under.

4.6 MITIGATION ACTION IMPLEMENTATION, ADMINISTRATION & COST/BENEFIT ANALYSIS

Finally, each participating jurisdiction was asked to identify how the mitigation actions will be implemented and administered. This included:

- Identifying the party or parties responsible for oversight and administration.
- Determining what funding source(s) are available or will be pursued.
- Describing the time frame for completion.
- Conducting a preliminary cost/benefit analysis.

<table>
<tr><th colspan="4">Figure MIT-12
Mitigation Action Prioritization Methodology</th></tr>
<tr><td colspan="2" rowspan="2"></td><th colspan="2">Hazard</th></tr>
<tr><td>Most Significant Hazard
(M)
(i.e., severe storms, severe winter storms/extreme cold, floods, tornadoes)</td><td>Less Significant Hazard
(L)
(i.e., excessive heat, drought, mine subsidence, earthquakes, dam failures)</td></tr>
<tr><td rowspan="2">Mitigation Action</td><td>Mitigation Action with the Potential to Virtually Eliminate or Significantly Reduce Impacts
(H)</td><td>HM
mitigation action will virtually eliminate damages and/or significantly reduce the probability of fatalities and injuries from the most significant hazards</td><td>HL
mitigation action will virtually eliminate damages and/or significantly reduce the probability of fatalities and injuries from less significant hazards</td></tr>
<tr><td>Mitigation Action with the Potential to Reduce Impacts
(L)</td><td>LM
mitigation action has the potential to reduce damages, fatalities and/or injuries from the most significant hazards</td><td>LL
mitigation action has the potential to reduce damages, fatalities and/or injuries from less significant hazards</td></tr>
</table>

Oversight & Administration

It is important to keep in mind that many of the participating jurisdictions have extremely limited capabilities related to organization and staffing for oversight and administration of the identified mitigation actions. Six of the ten participating municipalities are very small in size, with populations of less than 1,100 individuals and only two of the municipalities (Pana and Taylorville) have over 5,000 individuals. In most cases these jurisdictions have minimal staff who are only employed part-time. Their organizational structure is such that most have very few offices and/or departments, generally limited to public works and water/sewer. Those in charge of the offices/departments often lack the technical expertise needed to individually oversee and administer the identified mitigation actions. As a result, most of the participating jurisdictions identified their governing body (i.e., village board, city council or board) as the entity responsible for oversight and administration simply because it is the only practical option given their organizational constraints. Other participants felt that oversight and administration falls under the purview of the entity's governing body (board/council) and not individual departments.

Funding Sources

While the West Central Development Council has the ability to provide grant writing services to Christian County, many of the participating jurisdictions do not have city/village 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 most, if not all, of the participants due to their size, projected population growth and limited revenue streams. It is important to remember that the population for the entire County is just under 35,000 individuals. Six of the ten municipalities have populations of less than 1,100 individuals and only two municipalities (Pana and Taylorville) have over 5,000 individuals. Many of the jurisdictions struggle to maintain and provide the most critical of services to their residents. Additional funding is necessary if implementation is to be achieved.

Time Frame for Completion

The time frame for completion identified for each action is the timespan in which participants would like to see the action successfully completed. In many cases, however, the time frame identified is dependent on obtaining the necessary funding. As a result, a time range has been identified for many of the mitigation actions to allow for unpredictability in securing funds.

Cost/Benefit Analysis

A preliminary qualitative cost/benefit analysis was conducted on each mitigation action. The costs and benefits were analyzed in terms of the general overall cost to complete an action as well as the action's likelihood of permanently eliminating or reducing the risk associated with a specific hazard. The general descriptors of high, medium and low were used. These terms are not meant to translate into a specific dollar amount, but rather to provide a relative comparison between the actions identified by each jurisdiction.

This analysis is only meant to give the participants a starting point to compare which actions are likely to provide the greatest benefit based on the financial cost and staffing effort needed. It was repeatedly communicated to the Planning Committee members that when a grant application is submitted to IEMA/FEMA for a specific action, a detailed cost/benefit analysis will be required to receive funding.

4.7 Results of Mitigation Strategy

Figures MIT-13 through **MIT-21**, located at the end of this section, summarize the results of the mitigation strategy. The mitigation actions are arranged alphabetically by participating jurisdiction following the County and include both existing and new actions.

Figure MIT-2
Christian County – Status of Existing Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Develop a debris management plan that includes roles and responsibilities of the LEPC and other county departments. (Mitigation Item 1)		✓			
Develop ordinances to bury new power lines in subdivisions. (Mitigation Item 2)	✓				
Work with local radio stations to establish a protocol for issuing weather warnings to the public. (Mitigation Item 3)	✓				
Implement Nixle for mass media release via e-mail and text messages; advertise to the public for participation. (Mitigation Item 4)	✓				
Institute Reverse 911 or similar system. (Mitigation Item 5)	✓				
Strengthen mutual aid response agreements. (Mitigation Item 6)	✓				
Conduct a new flood study (DFIRM). (Mitigation Item 7)	✓				
Harden critical facilities and older public buildings. (Mitigation Item 8)	✓				
Purchase generators and/or transfer switches to provide back-up power to critical facilities and sewer systems in Kinkaid and Tovey. (Mitigation Item 9)	✓				
Distribute brochures related to hazard mitigation and preparedness at public events such as the county fair. (Mitigation Item 10)	✓				
Establish shelters/warming centers. (Mitigation Item 11)		✓			
Establish and enforce drainage ordinances. (Mitigation Item 13)	✓				
Establish ordinances to restrict development in undermined areas in the county. (Mitigation Item 14)	✓				

(Mitigation Item "No.") refers to the original action by number detailed in Appendix N.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Christian County several projects and administrative activities in progress that have the potential to decrease the vulnerability of hazard prone areas within the County. It is still too early to tell the degree of reduction that will be experienced from the implementation of these projects and activities.

Figure MIT-2
Christian County – Status of Existing Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Conduct an engineering study to identify and map areas of subsidence. (Mitigation Item 15)	✓				
Conduct a study to determine shelter capacity in the county, especially mobile home parks. (Mitigation Item 16)	✓				
Trim trees to minimize the amount/duration of power outages. (Mitigation Item 18)		✓			
Install inertial valves at critical facilities. (Mitigation Item 19)	✓				
Repair culverts in all communities. (Mitigation Item 20)	✓				
Enforce codes requiring mobile homes to have tie-downs. (Mitigation Item 21)	✓				
Implement natural snow fences/tree barriers. (Mitigation Item 23)	✓				

(Mitigation Item "No.") refers to the original action by number detailed in Appendix N.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Christian County several projects and administrative activities in progress that have the potential to decrease the vulnerability of hazard prone areas within the County. It is still too early to tell the degree of reduction that will be experienced from the implementation of these projects and activities.

Figure MIT-3
Assumption – Status of Existing Mitigation Actions

Activity/Project Description	Status: No Progress (✓)	Status: In Progress (✓)	Status: Completed (✓)	Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
Harden critical facilities and older public buildings. (Mitigation Item 8)	✓				
Purchase generators and/or transfer switches to provide back-up power to critical facilities. (Mitigation Item 9)		✓			
Distribute brochures related to hazard mitigation and preparedness at public events such as the county fair. (Mitigation Item 10)	✓				
Establish ordinances to restrict development in undermined areas. (Mitigation Item 14)	✓				
Install inertial valves at critical facilities. (Mitigation Item 19)	✓				
Repair culverts in the City. (Mitigation Item 20)		✓			
Enforce codes requiring mobile homes to have tie-downs. (Mitigation Item 21)	✓				

(Mitigation Item "No.") refers to the original action by number detailed in Appendix N.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Assumption has two infrastructure projects in progress that have the potential to decrease the vulnerability of hazard prone areas within the City. It is still too early to tell the degree of reduction that will be experienced from the implementation of these projects.

Figure MIT-4
Kincaid – Status of Existing Mitigation Actions

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Harden critical facilities and older public buildings. (Mitigation Item 8)	✓				
Purchase generators and/or transfer switches to provide back-up power to critical facilities and sewer systems in the Village. (Mitigation Item 9)	✓				
Distribute brochures related to hazard mitigation and preparedness at public events such as the county fair. (Mitigation Item 10)	✓				
Establish ordinances to restrict development in undermined areas. (Mitigation Item 14)	✓				
Install inertial valves at critical facilities. (Mitigation Item 19)	✓				
Repair culverts in the Village. (Mitigation Item 20)	✓				
Enforce codes requiring mobile homes to have tie-downs. (Mitigation Item 21)	✓				

(Mitigation Item "No.") refers to the original action by number detailed in Appendix N.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Kincaid was not able to complete any of the identified mitigation actions due to the budgetary and personnel constraints experienced by the Village. The Village struggles to maintain the most critical of services to its residents. As a result, there has been no changes in the vulnerability of hazard prone areas within the Village.

Figure MIT-5
Morrisonville – Status of Existing Mitigation Actions

Activity/Project Description	Status: No Progress (✓)	Status: In Progress (✓)	Status: Completed (✓)	Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
Harden critical facilities and older public buildings. (Mitigation Item 8)	✓				
Purchase generators and/or transfer switches to provide back-up power to critical facilities. (Mitigation Item 9)			✓	2013	Sewage treatment Plant & portable units for wells & cooling/heating center
Distribute brochures related to hazard mitigation and preparedness at public events such as the county fair. (Mitigation Item 10)	✓				
Establish ordinances to restrict development in undermined areas. (Mitigation Item 14)					no undermined areas
Install inertial valves at critical facilities. (Mitigation Item 19)	✓				
Repair culverts in the Village. (Mitigation Item 20)		✓			constant repair/replacement
Enforce codes requiring mobile homes to have tie-downs. (Mitigation Item 21)					follow the County codes

(Mitigation Item "No.") refers to the original action by number detailed in Appendix N.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Morrisonville has two infrastructure projects completed or in progress that have the potential to decrease the vulnerability of hazard prone areas within the Village. It is still too early to tell the degree of reduction that will be experienced from the implementation of these projects. .

Figure MIT-6
Mount Auburn – Status of Existing Mitigation Actions

Activity/Project Description	Status: No Progress (✓)	Status: In Progress (✓)	Status: Completed (✓)	Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
Harden critical facilities and older public buildings. (Mitigation Item 8)		✓			
Purchase generators and/or transfer switches to provide back-up power to critical facilities. (Mitigation Item 9)		✓			
Distribute brochures related to hazard mitigation and preparedness at public events such as the county fair. (Mitigation Item 10)	✓				
Establish shelters/warming centers. (Mitigation Item 11)			✓		local fire station provides shelter & warming center
Establish ordinances to restrict development in undermined areas. (Mitigation Item 14)					no undermined areas
Install inertial valves at critical facilities. (Mitigation Item 19)		✓			
Repair culverts in the Village. (Mitigation Item 20)		✓			
Enforce codes requiring mobile homes to have tie-downs. (Mitigation Item 21)			✓		

(Mitigation Item "No.") refers to the original action by number detailed in Appendix N.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Mount Auburn has five infrastructure projects and administrative activities in progress that have the potential to decrease the vulnerability of hazard prone areas within the Village. It is still too early to tell the degree of reduction that will be experienced from the implementation of these projects. The Village also has one administrative activity completed that will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-7 Palmer – Status of Existing Mitigation Actions					
Activity/Project Description	**Status**			**Year Completed**	**Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)**
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**		
Harden critical facilities and older public buildings. (Mitigation Item 8)	✓				
Purchase generators and/or transfer switches to provide back-up power to critical facilities. (Mitigation Item 9)		✓			
Distribute brochures related to hazard mitigation and preparedness at public events such as the county fair. (Mitigation Item 10)	✓				
Establish ordinances to restrict development in undermined areas. (Mitigation Item 14)	✓				
Install inertial valves at critical facilities. (Mitigation Item 19)		✓			
Repair culverts in the Village. (Mitigation Item 20)		✓			
Enforce codes requiring mobile homes to have tie-downs. (Mitigation Item 21)	✓				

(Mitigation Item "No.") refers to the original action by number detailed in Appendix N.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Palmer has three infrastructure projects in progress that have the potential to decrease the vulnerability of hazard prone areas within the Village. It is still too early to tell the degree of reduction that will be experienced from the implementation of these projects.

Figure MIT-8 Pana – Status of Existing Mitigation Actions					
Activity/Project Description	**Status**			**Year Completed**	**Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)**
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**		
Harden critical facilities and older public buildings. (Mitigation Item 8)	✓				
Purchase generators and/or transfer switches to provide back-up power to critical facilities. (Mitigation Item 9)	✓				
Distribute brochures related to hazard mitigation and preparedness at public events such as the county fair. (Mitigation Item 10)	✓				
Establish ordinances to restrict development in undermined areas. (Mitigation Item 14)	✓				
Install inertial valves at critical facilities. (Mitigation Item 19)	✓				
Repair culverts in the Village. (Mitigation Item 20)		✓			
Enforce codes requiring mobile homes to have tie-downs. (Mitigation Item 21)	✓				

(Mitigation Item "No.") refers to the original action by number detailed in Appendix N.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Pana has one infrastructure project in progress that has the potential to decrease the vulnerability of hazard prone areas within the City. It is still too early to tell the degree of reduction that will be experienced from the implementation of this project.

Figure MIT-9 **Stonington – Status of Existing Mitigation Actions**					
Activity/Project Description	**Status**			**Year Completed**	**Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)**
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**		
Harden critical facilities and older public buildings. (Mitigation Item 8)			✓	2011 2016	new gas plant constructed new village hall constructed
Purchase generators and/or transfer switches to provide back-up power to critical facilities. (Mitigation Item 9)	✓				
Distribute brochures related to hazard mitigation and preparedness at public events such as the county fair. (Mitigation Item 10)	✓				
Establish ordinances to restrict development in undermined areas. (Mitigation Item 14)	✓				
Install inertial valves at critical facilities. (Mitigation Item 19)	✓				
Repair culverts in the Village. (Mitigation Item 20)		✓			
Enforce codes requiring mobile homes to have tie-downs. (Mitigation Item 21)			✓	2010	ordinance passed

(Mitigation Item "No.") refers to the original action by number detailed in Appendix N.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Stonington has three infrastructure projects and administrative activities completed or in progress that have the potential to decrease the vulnerability of hazard prone areas within the Village. It is still too early to tell the degree of reduction that will be experienced from the implementation of this project.

Figure MIT-10
Taylorville – Status of Existing Mitigation Actions

Activity/Project Description	Status			Year Completed	Summary/Details of Completed Activity/Project (i.e., location, scope, etc.)
	No Progress (✓)	In Progress (✓)	Completed (✓)		
Harden critical facilities and older public buildings. (Mitigation Item 8)	✓				
Purchase generators and/or transfer switches to provide back-up power to critical facilities. (Mitigation Item 9)		✓		2020	replace generator at City Hall
Distribute brochures related to hazard mitigation and preparedness at public events such as the county fair. (Mitigation Item 10)	✓				
Increase water capacity by dredging Lake Taylorville. (Mitigation Item 12)	✓				
Establish ordinances to restrict development in undermined areas. (Mitigation Item 14)	✓				
Repair drainage around the viaduct rail underpass. (Mitigation Item 17)	✓				
Install inertial valves at critical facilities. (Mitigation Item 19)	✓				
Repair culverts in the Village. (Mitigation Item 20)	✓				
Enforce codes requiring mobile homes to have tie-downs. (Mitigation Item 21)	✓				
Conduct a study to potentially re-engineer intersections with frequent vehicle accidents and complete pre-stage evacuation exercises. (Mitigation Item 22)	✓				

(Mitigation Item "No.") refers to the original action by number detailed in Appendix N.

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the original Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Taylorville has one infrastructure project in progress that has the potential to decrease the vulnerability of hazard prone areas within the City. It is still too early to tell the degree of reduction that will be experienced from the implementation of this project.

Figure MIT-13
Christian County Hazard Mitigation Actions
(Sheet 1 of 5)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
LM	Update debris management plan as needed, including roles and responsibilities of the LEPC and other County departments.	F, SS	LP&R	Medium	6, 8	Yes	Yes	Chairman / County Board	1-5 years	County	Low/Medium	Existing (2010)
LM	Develop ordinances to bury new power lines to new subdivisions.	EQ, SS, SWS, T	LP&R	Small	3, 4, 5	Yes	Yes	Chairman / County Board	2-5 years	County	Low/Medium	Existing (2010)
HM	Implement Nixle to notify residents/ responders of natural and man-made hazard information via text and e-mail and advertise service to ensure public participation.	DF, EC, EH, EQ, F, MMH, MS , SS, SWS, T	E&A	Large	2	n/a	n/a	EMA Director	1-3 years	County / FEMA Emergency Management Performance Grant	Low/High	Existing (2010)
HM	Purchase/subscribe to an automated emergency notification system (i.e., reverse 911) to notify residents/responders of natural and man-made hazard event information.	DF, EC, EH, EQ, F, MMH, MS , SS, SWS, T	E&A	Large	2	n/a	n/a	EMA Director	1-3 years	County / FEMA Emergency Management Performance Grant	Low/High	Existing (2010)
LM	Conduct a new flood insurance study.	F	E&A	Medium	2,3, 5	Yes	Yes	Chairman / County Board	5 years	County / FEMA Flood Mitigation Assistance	Medium/Medium	Existing (2010)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the County's size (approx. 34,800 individuals), projected population growth and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-13
Christian County Hazard Mitigation Actions
(Sheet 2 of 5)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
HM	Harden critical facilities and older public buildings to improve their resilience to natural hazard events.	EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	County Engineer	5-10 years	County / FEMA BRIC	High/High	Existing (2010)
LM	Secure Memorandums of Agreement with designated critical facilities (i.e., nursing homes, American Red Cross-designated shelters, etc.) to install electrical hookups (pigtails) for use with portable emergency backup generators to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	LP&R	Small	2, 3, 5	n/a	Yes	Chairman / County Board	1 year	County	Low/Medium	New
HM	Purchase and install electrical hookups (pigtails) at designated critical facilities (i.e., nursing homes, American Red Cross-designated shelters, etc.) for use with portable emergency backup generators to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Small	2, 3, 5	n/a	Yes	Chairman / County Board	1-3 years	County / Illinois DCEO	Medium/High	New
HM	Purchase portable emergency backup generators for use at designated critical facilities (i.e., nursing homes, American Red Cross-designated shelters, etc.) to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Small	2, 3, 5	n/a	Yes	Chairman / County Board	1-3 years	County / Illinois DCEO	Medium/High	Existing (2010)
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the County.	EQ	E&A	Small	1, 2	n/a	Yes	Zoning Administrator	5 years	County	Low/Low	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the County's size (approx. 34,800 individuals), projected population growth and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-13
Christian County Hazard Mitigation Actions
(Sheet 3 of 5)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure: New	Reduce Effects of Hazard(s) on Buildings & Infrastructure: Existing	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
LM	Distribute brochures and public information materials at public events such as the county fair that inform residents about the risks to life and property associated with natural and man-made hazards and the proactive actions they can take to reduce their risk	DF, DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	2	n/a	n/a	EMA Director	1-3 years	County	Low/High	Existing (2010)
LL	Obtain and review the Emergency Action Plans (EAPs) for the "High" hazard classified dams in the County that identify the extent (water depth, speed of onset, warning times, etc.) and location (inundation areas) of potential dam failures to address data deficiencies.	DF	E&A	Small	2, 3, 5	Yes	Yes	EMA Director / Classified Dam Owners	5 years	County / Classified Dam Owners	Low/Low	New
LM	Establish and enforce drainage ordinances.	F, SS	LP&R	Medium	3, 4, 5, 6, 7	Yes	Yes	County Engineer / Chairman County Board	3 years	County / West Central Development Council	Low/Medium	Existing (2010)
LL	Establish ordinances to restrict development in undermined areas in the County.	MS	LP&R	Small	2, 3, 4, 5, 7	Yes	n/a	EMA Director / Chairman County Board	3 years	County / West Central Development Council	Low/High	Existing (2010)
LL	Conduct an engineering study to identify areas of subsidence.	MS	E&A	Medium	2, 3, 5	Yes	Yes	County Engineer / Chairman County Board	3 years	County	Medium/High	Existing (2010)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the County's size (approx. 34,800 individuals), projected population growth and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-13
Christian County Hazard Mitigation Actions
(Sheet 4 of 5)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
LL	Create digital data sets (maps) of undermined areas for incorporation into the County's GIS system. This information will assist the public and local government officials in considering where to construct new buildings and identify structures vulnerable to subsidence.	MS	E&A	Medium	2, 3, 5, 8	Yes	Yes	County Engineer / Chairman County Board	3 years	County	Low/High	New
LM	In conjunction with the American Red Cross, conduct a study to determine shelter capacity in the County, especially for mobile home parks.	EC, EH, EQ, F, MMH, MS , SS, SWS, T	E&A	Large	2	n/a	n/a	EMA Director	1-3 years	County	Low/Medium	Existing (2010)
HM	Trim trees to minimize the amount/duration of power outages.	SS, SWS, T	S&IP	Medium	2, 3, 5	Yes	Yes	EMA Director	1-5 years	County / Utilities	Low/High	Existing (2010)
HL	Install earthquake/inertial valves at critical facilities to automatically shut off natural gas/liquefied petroleum gas in order to protect structures if a gas leak or line break occurs during an earthquake.	EQ	S&IP	Small	2, 3, 5	n/a	Yes	EMA Director	5 years	County / FEMA BRIC	Low/Medium	Existing (2010)
HM	Repair/replace culverts as needed to increase carrying capacity and alleviate flood problems.	F, SS	S&IP	Small	2, 3, 5	Yes	Yes	County Engineer	5 years	County / Township / IDOT Local Roads	Low/Medium	Existing (2010)
HM	Enforce codes requiring mobile homes to have tie-downs.	SS, T	LP&R	Small	1, 2, 7	Yes	Yes	EMA Director	5 years	County	Low/High	Existing (2010)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the County's size (approx. 34,800 individuals), projected population growth and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-13
Christian County Hazard Mitigation Actions
(Sheet 5 of 5)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure: New	Reduce Effects of Hazard(s) on Buildings & Infrastructure: Existing	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
HM	Install living snow fences to limit blowing and drifting of snow, maintain access and ease hazardous driving conditions.	SWS	NSP	Small	2, 3, 5	n/a	Yes	County Engineer	5 years	County / IDOT Local Roads / FEMA BRIC	Medium/Medium	Existing (2010)
HM	Elevate sections of key county roads to address recurring flooding/roadway overtopping which causes traffic disruptions and adversely impacts emergency response times.	F, SS	S&IP	Small	2, 3, 5	n/a	Yes	County Engineer	5-10 years	County / Township / IDOT Local Roads / USDA – RD Critical Facilities Programs	High/High	New
HM	Review the revised 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	Chairman / County Board	1-5 years	County	Low/Medium	New
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	Chairman / County Board	1-5 years	County	Low/Medium	New
LM	Make County officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	LP&R	Small	1, 2, 6, 7	Yes	Yes	Chairman / County Board	1-5 years	County	Low/Medium	New

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the County's size (approx. 34,800 individuals), projected population growth and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-14
Assumption 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	Status
						New	Existing					
HM	Purchase and install a storm warning siren on the west side of the City.	SS, T	E&A	Medium	2	n/a	n/a	Mayor / City Council	2 years	City / USDA – RD Critical Facilities Programs	Medium/High	New
Hm	Construct a dike around the existing wastewater treatment plant and lift station to address recurring flood/drainage problems resulting from heavy rain events.	F, SS	S&IP	Medium	2 ,3, 5	n/a	Yes	Mayor / City Council	2-4 years	City / FEMA BRIC / USDA – RD Water & Waste Disposal Program	High/High	New
LM	Secure Memorandums of Agreement with designated shelters to install electrical hookups (pigtails) for use with portable emergency backup generators to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	LP&R	Small	2, 3, 5	n/a	Yes	Mayor / City Council	1-3 years	City	Low/Medium	New
HM	Purchase and install electrical hookups (pigtails) at designated shelters for use with portable emergency backup generators to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Small	2, 3, 5	n/a	Yes	Mayor / City Council	1-5 years	City / USDA – RD Critical Facilities Programs	Medium/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (less than 1,200 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-14
Assumption 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: New	Reduce Effects of Hazard(s) on Buildings & Infrastructure: Existing	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
HM	Purchase portable emergency backup generators for use at designated shelters to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Small	2, 3, 5	n/a	Yes	Mayor / City Council	1-5 years	City / USDA – RD Critical Facilities Programs	Medium/High	New
LM	Develop a Memorandum of Agreement with Kemmerer Village designating center as a shelter for use by City residents.	EQ, F, SS, SWS, T	LP&R	Medium	2	n/a	n/a	Mayor / City Council	1-2 years	City	Low/Medium	New
LM	Develop Memorandums of Agreement with area churches designating them as warming/cooling center & shelters for us by City residents.	EC, EH, EQ, F, SS, SWS, T	LP&R	Medium	2	n/a	n/a	Mayor / City Council	1-2 years	City	Low/Medium	New
LL	Educated residents on the areas within the City that are undermined, the impacts associated with mine subsidence and what is covered by mine subsidence insurance.	MS	E&A	Medium	1	Yes	Yes	Mayor / City Council	1-5 years	City	Low/Low	New
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the City.	EQ	E&A	Small	1, 2	n/a	Yes	Mayor / City Council	5 years	City	Low/Low	New
HM	Harden critical facilities and older public buildings to improve their resilience to natural hazard events.	EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor / City Council	5-10 years	City / FEMA BRIC	High/High	Existing (2010)
HM	Repair/replace culverts as needed to increase carrying capacity and alleviate flood problems.	F, SS	S&IP	Small	2, 3, 5	Yes	Yes	Mayor / City Council	5 years	City / IDOT Local Roads	Low/Medium	Existing (2010)

† 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 (less than 1,200 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-14
Assumption 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	Status
						New	Existing					
LM	Distribute brochures and public information materials that inform residents about the risks to life and property associated with natural and man-made hazards and the proactive actions they can take to reduce their risk	DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	2	n/a	n/a	Mayor / City Council	1-3 years	City	Low/High	Existing (2010)

† 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 (less than 1,200 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-15
Edinburg 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	Status
						New	Existing					
LM	Conduct a hydrologic/hydraulic analysis to determine the cause of and identify design solutions to address recurring drainage problems experienced at the wastewater treatment facility.	F, SS	E&A	Large	2, 3, 5	n/a	Yes	President / Village Board	2-4 years	Village	Low/Medium	New
HM	Construct the identified design solutions to address recurring drainage problems experienced at the wastewater treatment facility.	F, SS	S&IP	Large	2, 3, 5	n/a	Yes	President / Village Board	3-5 years	Village / USDA – RD Water & Waste Disposal Program	Medium/High	New
HM	Construct the identified design solutions to address reduce stormwater infiltration into residential basements and crawl spaces within the Village.	F, SS	S&IP	Large	2, 3, 5	Yes	Yes	President / Village Board	2-5 years	Village / USDA – RD Water & Waste Disposal Program	Medium/High	New
HM	Insulate raw drinking water line as it enters the drinking water treatment facility to minimize service disruptions and improve system resilience. The line has experienced multiple breaks as a result of severe winter temperatures.	EC, SWS	S&IP	Large	2, 3, 5	Yes	Yes	President / Village Board	2-5 years	Village / FEMA BRIC / USDA – RD Water & Waste Disposal Program	Medium/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 1,100 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 significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-15
Edinburg 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	Status
						New	Existing					
LL	Monitor drinking water capacity to determine whether mitigation measures need to be enacted in the future to ensure resiliency of the City's drinking water supply to drought.	DR	E&A	Large	2, 3, 5	n/a	Yes	President / Village Board	5-10 years	Village	Low/Medium	New
LL	Educate residents about water conservation measures they can take to reduce the impacts of drought.	DR	E&A	Large	1, 3	Yes	Yes	President / Village Board	1-5 years	Village	Low/Low	New
LL	Educated residents on the areas within the Village that are undermined, the impacts associated with mine subsidence and what is covered by mine subsidence insurance.	MS	E&A	Large	1	Yes	Yes	President / Village Board	1-5 years	Village	Low/Low	New
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the Village.	EQ	E&A	Small	1, 2	n/a	Yes	President / Village Board	5 years	Village	Low/Low	New
LM	Distribute brochures and public information materials that inform residents about the risks to life and property associated with natural and man-made hazards and the proactive actions they can take to reduce their risk	DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	2	n/a	n/a	President / Village Board	1-5 years	Village	Low/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 1,100 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 significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-15
Edinburg 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	Status
						New	Existing					
HM	Review the revised 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	President / Village Board	1-5 years	Village	Low/Medium	New
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	President / Village Board	1-5 years	Village	Low/Medium	New
LM	Make Village 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	President / Village Board	1-5 years	Village	Low/Medium	New

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 1,100 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 significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:			
DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:			
E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-16
Jeisyville Hazard Mitigation Actions
(Sheet 1 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
LM	Conduct a hydrologic/hydraulic analysis to determine the cause and identify design solutions to address drainage problems experienced in the Village.	F, SS	E&A	Small	2, 3, 5	Yes	Yes	President / Village Board	5 years	Village	Medium/Medium	New
HM	Remove brush and debris from drainage ditches and culverts to increase carrying capacity and alleviate recurring drainage problems.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	1-5 years	Village	Low/High	New
HM	Upgrade/retrofit drinking water system (lines, mains, hydrants, etc.) to ensure a constant supply of water for residents and to aid in suppressing fires caused by natural hazard events.	DR, EC, EH, EQ, F, MS, SS, SWS, T	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	5-10 years	Village / USDA – RD Water & Waste Disposal Program	High/Medium	New
HM	Install living snow fences within the village to limit blowing and drifting of snow, maintain access and ease hazardous driving conditions.	SWS	NSP	Medium	2, 3, 5	n/a	Yes	President / Village Board	5 years	Village / IDOT Local Roads / FEMA BRIC	Medium/Medium	New
HM	Repair/replace culverts as needed to increase carrying capacity and alleviate recurring drainage problems.	F, SS	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	5 years	Village / IDOT Local Roads	Medium/Medium	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 100 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-16
Jeisyville Hazard Mitigation Actions
(Sheet 2 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
LM	Purchase portable trash pumps to remove excess water from critical infrastructure during heavy rain/flood events.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	5 years	Village	Low/High	New
HM	Trim trees to minimize the amount/duration of power outages.	SS, SWS, T	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	1-5 years	Village / Utilities	Low/High	New
LM	Improve coordination between the Village, township and County to help implement hazard prevention projects and cleanup activities.	DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	2, 3, 5	Yes	Yes	President / Village Board	1-5 years	Village	Low/High	New
LL	Educated residents on the areas on mine subsidence, the impacts associated with mine subsidence and what is covered by mine subsidence insurance.	MS	E&A	Large	1	Yes	Yes	President / Village Board	1-5 years	Village	Low/Low	New
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the Village.	EQ	E&A	Small	1, 2	n/a	Yes	President / Village Board	5 years	Village	Low/Low	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 100 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-17
Kincaid Hazard Mitigation Actions
(Sheet 1 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
LM	Conduct a hydrologic/hydraulic analysis to determine the cause and identify design solutions to address recurring flooding problems experienced by approximately 20 homes on the east end of the Village near the South Fork of the Sangamon River.	F, SS	E&A	Small	2, 3, 5	n/a	Yes	President / Village Board	3-5 years	Village	Medium/Medium	New
HM	Construct the identified design solutions to address recurring flooding problems experienced by approximately 20 homes on the east end of the Village near the South Fork of the Sangamon River.	F, SS	S&IP	Large	2, 3, 5	n/a	Yes	President / Village Board	5 years	Village / FEMA BRIC / USDA – RD Water & Waste Disposal Program	Medium/High	New
HM	Purchase and install an emergency backup generator at the Village Hall to provide uninterrupted power and maintain continuity of government and operations during power outages.	EH, F, MMH, MS, SS, SWS, T	S&IP	Small	2, 3, 5	n/a	Yes	President / Village Board	1-5 years	City / USDA – RD Critical Facilities Programs	Medium/High	New
LM	Distribute brochures and public information materials that inform residents about the risks to life and property associated with natural and man-made hazards and the proactive actions they can take to reduce their risk	DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	2	n/a	n/a	President / Village Board	1-5 years	Village	Low/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 1,500 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 significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-17
Kincaid Hazard Mitigation Actions
(Sheet 2 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
LL	Educated residents on the areas on mine subsidence, the impacts associated with mine subsidence and what is covered by mine subsidence insurance.	MS	E&A	Medium	1	Yes	Yes	President / Village Board	1-5 years	City	Low/Low	New
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the Village.	EQ	E&A	Small	1, 2	n/a	Yes	President / Village Board	5 years	Village	Low/Low	New
HM	Review the revised 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	President / Village Board	1-5 years	Village	Low/Medium	New
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	President / Village Board	1-5 years	Village	Low/Medium	New
LM	Make Village 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	President / Village Board	1-5 years	Village	Low/Medium	New

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 1,500 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 significant hazards
- LM Mitigation action with the potential to reduce impacts from the most significant hazards
- HL Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
- LL Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

- DF Dam Failure
- DR Drought
- EC Extreme Cold
- EH Excessive Heat
- EQ Earthquake
- F Flood
- MMH Man-made Hazard
- MS Mine Subsidence
- SS Severe Storm
- SWS Severe Winter Storm
- T Tornado

Type of Mitigation Activity:

- E&A Education & Awareness
- LP&R Local Plans & Regulations
- NSP Natural Systems Protection
- S&IP Structure & Infrastructure Projects

Figure MIT-18
Morrisonville Hazard Mitigation Actions

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
HM	Purchase and install automatic propane emergency backup generators at the Village's three drinking water wells to increase system resilience and maintain operations during extended power outages.	EH, F, MMH, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	1-3 years	Village / USDA – RD Community Facilities Programs	Medium/High	New
LM	Secure a Memorandum of Agreement with the American Legion, a designated warming/cooling center, to install an automatic emergency backup generator at the their Hall.	EC, EH	LP&R	Small	2, 3, 5	n/a	Yes	President / Village Board	3-5 years	Village	Low/Medium	New
HM	Purchase and install an emergency backup generator at the American Legion Hall, a designated warming/cooling center, to provide uninterrupted power during power outages.	EC, EH	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	3-5 years	Village / USDA – RD Community Facilities Programs	Medium/High	New
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the Village.	EQ	E&A	Small	1, 2	n/a	Yes	President / Village Board	5 years	Village	Low/Low	New
HM	Repair/replace culverts as needed to increase carrying capacity and alleviate flood problems.	F, SS	S&IP	Small	2, 3, 5	Yes	Yes	President / Village Board	5 years	Village / IDOT Local Roads	Medium/Medium	Existing (2010)
LM	Distribute brochures and public information materials that inform residents about the risks to life and property associated with natural and man-made hazards and the proactive actions they can take to reduce their risk	DR, EC, EH, EQ, F, MMH, SS, SWS, T	E&A	Large	2	n/a	n/a	President / Village Board	1-5 years	Village	Low/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 1,050 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 significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
LL	Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-19
Mount Auburn Hazard Mitigation Actions
(Sheet 1 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the Village.	EQ	E&A	Small	1, 2	n/a	Yes	President / Village Board	5 years	Village	Low/Low	New
HM	Harden critical facilities and older public buildings to improve their resilience to natural hazard events.	EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	5-10 years	Village / FEMA BRIC	High/High	Existing (2010)
HM	Purchase a portable backup generator(s) for use at critical facilities to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	3-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2010)
HM	Purchase and install electrical hookups (pigtails) at designated critical facilities within the Village for use with portable emergency backup generators to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	3-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2010)
LM	Distribute educational materials that inform residents about risks to life and property associated with natural hazards and the proactive actions that at they can take to reduce their risk	DR, EC, EH, EQ, F, MMH, SS, SWS, T	E&A	Large	1, 2	n/a	n/a	President / Village Board	3-5 years	Village	Low/High	Existing (2010)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 500 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
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Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-19
Mount Auburn Hazard Mitigation Actions
(Sheet 2 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure: New	Reduce Effects of Hazard(s) on Buildings & Infrastructure: Existing	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
HL	Install earthquake/inertial valves at critical facilities to automatically shut off natural gas/liquefied petroleum gas in order to protect structures if a gas leak or line break occurs during an earthquake.	EQ	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	5 years	Village / FEMA BRIC	Medium/Medium	Existing (2010)
HM	Repair/replace culverts as needed to increase carrying capacity and alleviate flood problems.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	5 years	Village / IDOT Local Roads	Medium/Medium	Existing (2010)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 500 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

- HM Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
- LM Mitigation action with the potential to reduce impacts from the most significant hazards
- HL Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
- LL Mitigation action with the potential to reduce impacts from the less significant hazards

Hazard(s) to be Mitigated:

- DF Dam Failure
- DR Drought
- EC Extreme Cold
- EH Excessive Heat
- EQ Earthquake
- F Flood
- MMH Man-made Hazard
- MS Mine Subsidence
- SS Severe Storm
- SWS Severe Winter Storm
- T Tornado

Type of Mitigation Activity:

- E&A Education & Awareness
- LP&R Local Plans & Regulations
- NSP Natural Systems Protection
- S&IP Structure & Infrastructure Projects

Figure MIT-20
Palmer 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: New	Reduce Effects of Hazard(s) on Buildings & Infrastructure: Existing	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
HM	Purchase and install a storm warning sirens.	SS, T	E&A	Large	2	n/a	n/a	President / Village Board	2-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	New
HM	Implement Nixle to notify residents/ responders of natural and man-made hazard information via text and e-mail.	DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	2	n/a	n/a	President / Village Board	2-5 years	Village / FEMA Emergency Management Performance Grant	Medium/High	New
HM	Design and a construct community safe room equipped with emergency backup generators and HVAC units that can also serve as a warming/cooling center for area residents.	EC, EH, SS, T	S&IP	Medium	2	Yes	n/a	President / Village Board	5 years	Village / FEMA BRIC / USDA – RD Community Facilities Programs	High/High	New
HM	Trim trees to minimize the number and duration of power outages.	SS, SWS, T	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	1-5 years	Village / Utilities	Low/High	New
LL	Educated residents on the areas within the Village that are undermined, the impacts associated with mine subsidence and what is covered by mine subsidence insurance.	MS	E&A	Small	1	Yes	Yes	President / Village Board	1-5 years	Village	Low/Low	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 200 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-20
Palmer 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	Status
						New	Existing					
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the Village.	EQ	E&A	Small	1, 2	n/a	Yes	President / Village Board	5 years	Village	Low/Low	New
HM	Harden critical facilities and older public buildings to improve their resilience to natural hazard events.	EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	5-10 years	Village / FEMA BRIC	High/High	Existing (2010)
HM	Purchase a portable backup generator(s) for use at critical facilities to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	3-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2010)
HM	Purchase and install electrical hookups (pigtails) at designated critical facilities within the Village for use with portable emergency backup generators to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	3-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2010)
LM	Distribute educational materials that inform residents about risks to life and property associated with natural hazards and the proactive actions that at they can take to reduce their risk	DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	1, 2	n/a	n/a	President / Village Board	3-5 years	Village	Low/High	Existing (2010)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 200 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

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Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-20
Palmer 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	Status
						New	Existing					
HL	Install earthquake/inertial valves at critical facilities to automatically shut off natural gas/liquefied petroleum gas in order to protect structures if a gas leak or line break occurs during an earthquake.	EQ	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	5 years	Village / FEMA BRIC	Medium/Medium	Existing (2010)
HM	Repair/replace culverts as needed to increase carrying capacity and alleviate flood problems.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	5 years	Village / IDOT Local Roads	Medium/Medium	Existing (2010)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 200 individuals). The Village struggles to provide even the most critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

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Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-21
Pana Hazard Mitigation Actions
(Sheet 1 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
HM	Purchase and install new storm warning sirens to replace aging sirens.	SS, T	E&A	Large	2	n/a	n/a	Mayor / City Council	2-5 years	City / USDA – RD Critical Facilities Programs	Medium/High	New
HM	Retrofit/add on to fire station or construct new standalone structure to serve as a community safe room equipped with emergency backup generator and HVAC units that can also serve as a warming/cooling center for City residents.	EC, EH, SS, T	S&IP	Small	2	Yes	Yes	Mayor / City Council	5 years	City / FEMA BRIC / USDA – RD Community Facilities Programs	High/High	New
LL	Monitor drinking water capacity to determine whether mitigation measures need to be enacted in the future to ensure resiliency of the City's drinking water supply to drought.	DR	E&A	Large	2, 3, 5	n/a	Yes	Mayor / City Council	5-10 years	City	Low/Medium	New
LL	Educate residents about the City's vulnerability to drought and the conservation measures they can take to reduce impacts.	DR	E&A	Large	1, 3	Yes	Yes	Mayor / City Council	1-5 years	City	Low/Low	New
LL	Educated residents on the areas on mine subsidence, the impacts associated with mine subsidence and what is covered by mine subsidence insurance.	MS	E&A	Large	1	Yes	Yes	Mayor / City Council	1-5 years	City	Low/Low	New
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the City.	EQ	E&A	Small	1, 2	n/a	Yes	Mayor / City Council	5 years	City	Low/Low	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 5,700 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
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Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-21
Pana Hazard Mitigation Actions
(Sheet 2 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
HM	Repair/replace culverts as needed to increase carrying capacity and alleviate flood problems.	F, SS	S&IP	Small	2, 3, 5	Yes	Yes	Mayor / City Council	2-5 years	City / IDOT Local Roads	Medium/Medium	Existing (2010)
LM	Distribute educational materials that inform residents about risks to life and property associated with natural hazards and the proactive actions that at they can take to reduce their risk	DF, DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	1, 2	n/a	n/a	Mayor / City Council	1-5 years	City	Low/High	Existing (2010)

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 5,700 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

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Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-22
Stonington 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: New	Reduce Effects of Hazard(s) on Buildings & Infrastructure: Existing	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
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	5 years	Village	Medium/High	New
HM	Repair/reline sewer line sections/mains where storm water infiltration is occurring to prevent sewage backups.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	6-10 years	Village / USDA – RD Water & Waste Disposal Program	High/High	New
HM	Upgrade/retrofit the Village's storm sewer system to better manage stormwater runoff to alleviate flooding/drainage problems.	F, SS	S&IP	Medium	2, 3, 5	Yes	Yes	President / Village Board	5 years	Village / USDA – RD Water & Waste Disposal Program	High/Medium	New
HM	Purchase portable emergency backup generators for use at the sewer lift stations to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	3 years	Village / USDA – RD Community Facilities Programs	Medium/High	New
LL	Educated residents on the areas within the Village that are undermined, the impacts associated with mine subsidence and what is covered by mine subsidence insurance.	MS	E&A	Medium	1	Yes	Yes	President / Village Board	1-5 years	Village	Low/Low	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (less than 950 individuals). The Village works hard to maintain critical services to its residents but it can be a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-22
Stonington 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	Status
						New	Existing					
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the Village.	EQ	E&A	Small	1, 2	n/a	Yes	President / Village Board	5 years	Village	Low/Low	New
HM	Purchase a portable backup generator(s) for use at critical facilities to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	3-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2010)
HM	Purchase and install electrical hookups (pigtails) at designated critical facilities within the Village for use with portable emergency backup generators to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	President / Village Board	3-5 years	Village / USDA – RD Critical Facilities Programs	Medium/High	Existing (2010)
HM	Repair/replace culverts as needed to increase carrying capacity and alleviate flood problems.	F, SS	S&IP	Small	2, 3, 5	Yes	Yes	President / Village Board	2-5 years	Village / IDOT Local Roads	Medium/Medium	Existing (2010)
LM	Distribute educational materials that inform residents about risks to life and property associated with natural hazards and the proactive actions that at they can take to reduce their risk	DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	1, 2	n/a	n/a	Mayor / City Council	1-5 years	City	Low/High	Existing (2010)

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Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-22
Stonington 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	Status
						New	Existing					
HM	Review the revised 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	President / Village Board	1-5 years	Village	Low/Medium	New
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	President / Village Board	1-5 years	Village	Low/Medium	New
LM	Make Village 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	President / Village Board	1-5 years	Village	Low/Medium	New

* Mitigation action to ensure continued compliance with NFIP.

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Hazard(s) to be Mitigated:

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DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Taylorville 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: New	Reduce Effects of Hazard(s) on Buildings & Infrastructure: Existing	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
LL	Educate residents about the potential impacts and emergency protective measures to be taken in the event of a dam failure at Lake Taylorville.	DF	E&A	Small	1, 2	Yes	Yes	Mayor / City Council	1-5 years	City	Low/Low	New
LL	Educated residents on the areas on mine subsidence, the impacts associated with mine subsidence and what is covered by mine subsidence insurance.	MS	E&A	Large	1	Yes	Yes	Mayor / City Council	1-5 years	City	Low/Low	New
LL	Identify unreinforced masonry buildings that serve as critical infrastructure/facilities within the City.	EQ	E&A	Small	1, 2	n/a	Yes	Mayor / City Council	5 years	City	Low/Low	New
HM	Harden critical facilities and older public buildings to improve their resilience to natural hazard events.	EQ, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor / City Council	5-10 years	City / FEMA BRIC	High/High	Existing (2010)
HM	Purchase a portable backup generator(s) for use at critical facilities to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor / City Council	3-5 years	City / USDA – RD Critical Facilities Programs	Medium/High	Existing (2010)
HM	Purchase and install electrical hookups (pigtails) at designated critical facilities within the Village for use with portable emergency backup generators to maintain operations during prolonged power outages.	EH, F, SS, SWS, T	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor / City Council	3-5 years	City / USDA – RD Critical Facilities Programs	Medium/High	Existing (2010)

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EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Taylorville 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	Status
						New	Existing					
LM	Distribute educational materials that inform residents about risks to life and property associated with natural hazards and the proactive actions that at they can take to reduce their risk	DF, DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	1, 2	n/a	n/a	Mayor / City Council	1-5 years	City	Low/High	Existing (2010)
LL	Monitor drinking water capacity to determine whether mitigation measures need to be enacted in the future to ensure resiliency of the City's drinking water supply to drought.	DR	E&A	Large	2, 3, 5	n/a	Yes	Mayor / City Council	5-10 years	City	Low/Medium	New
HM	Dredge Lake Taylorville to remove built-up sediment and debris, increase capacity and improve resilience to drought. The Lake provides a portion of the drinking water used by the City.	DR	S&IP	Large	2, 3, 5, 6	n/a	Yes	Mayor / City Council	3-5 years	City / Illinois DNR / US Army Corps of Engineers	High/High	Existing (2010)
LL	Establish an ordinance to restrict development in undermined area in the City.	MS	LP&R	Medium	2, 4, 7	Yes	n/a	Mayor / City Council	3 years	City	Low/High	Existing (2010)
HM	Repair drainage around the viaduct rail underpass.	F, SS	S&IP	Medium	2, 3, 5	n/a	Yes	Mayor / City Council	3 years	City / IDOT Local Roads	Medium/Medium	Existing (2010)
HL	Install earthquake/inertial valves at critical facilities to automatically shut off natural gas/liquefied petroleum gas in order to protect structures if a gas leak or line break occurs during an earthquake.	EQ	S&IP	Small	2, 3, 5	n/a	Yes	Mayor / City Council	5 years	City / FEMA BRIC	Medium/Medium	Existing (2010)

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DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
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F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-23
Taylorville 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: New	Reduce Effects of Hazard(s) on Buildings & Infrastructure: Existing	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
HM	Repair/replace culverts as needed to increase carrying capacity and alleviate flood problems.	F, SS	S&IP	Small	2, 3, 5	Yes	Yes	Mayor / City Council	5 years	City / IDOT Local Roads	Medium/Medium	Existing (2010)
HM	Enforce codes requiring mobile homes to have tie-downs.	SS, T	LP&R	Small	1, 2, 7	Yes	Yes	Mayor / City Council	5 years	City	Low/High	Existing (2010)
LL	Conduct a study to determine whether intersections with high crash incidents should be re-engineered.	MMH	E&A	Medium	2, 3, 5	n/a	Yes	Mayor / City Council	5 years	City / IDOT Local Roads	Low/Medium	Existing (2010)
HM	Review the revised 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/Medium	New
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	New
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	New

* Mitigation action to ensure continued compliance with NFIP.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 11,200 individuals). The City works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-24
Taylorville Community Unit School District #3 Hazard Mitigation Actions
(Sheet 1 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
HM	Identify and install "hardening" materials (i.e., shatter-proof glass, hail resistant shingles/doors, etc.) at each District school to increase infrastructure resilience to natural and man-made hazards.	EC, EQ, MMH, MS, SS, SWS, T	S&IP	Large	2, 3, 5	n/a	Yes	Superintendent / Board of Education	2-5 years	School District / FEMA BRIC / Illinois State Board of Education	Medium/High	New
HM	Improve stormwater drainage capacity (i.e., increase detention/retention basin capacity, upsize stormwater drainage system, etc.) at District schools to better manage stormwater runoff and alleviate flood/drainage problems.	F, SS	S&IP	Medium	2, 3, 5	n/a	Yes	Superintendent / Board of Education	1-5 years	School District / FEMA BRIC / USDA – RD Community Facilities Programs	Medium/Medium	New
HM	Retrofit a current space within each school building and/or design and construct a new structure on school grounds to serve as a community safe room for use by faculty and students.	SS, T	S&IP	Large	2	Yes	Yes	Superintendent / Board of Education	5 years	School District / FEMA BRIC / USDA – RD Community Facilities Programs	High/High	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural school districts. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
LM	Mitigation action with the potential to reduce impacts from the most significant hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less significant hazards
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Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
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LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

Figure MIT-24
Taylorville Community Unit School District #3 Hazard Mitigation Actions
(Sheet 2 of 2)

Priority	Activity/Project Description	Hazard(s) to be Mitigated	Type of Mitigation Activity	Size of Population Affected	Goal(s) Met	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Cost/Benefit Analysis	Status
						New	Existing					
LL	Educate staff and students about the natural and man-made hazards that have the potential to impact their community and the proactive actions they can take to reduce their risk.	DR, DR, EC, EH, EQ, F, MMH, MS, SS, SWS, T	E&A	Large	1, 5	Yes	Yes	Superintendent / Board of Education	1-5 years	School District	Low/Low	New

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by small, rural school districts. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

HM	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the most significant hazards
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Hazard(s) to be Mitigated:

DF	Dam Failure	MMH	Man-made Hazard
DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storm
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood		

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
LP&R	Local Plans & Regulations	S&IP	Structure & Infrastructure Projects

5.0 PLAN MAINTENANCE

This section focuses on the Federal Emergency Management Agency (FEMA) requirements for maintaining and updating the Plan once it has been approved by FEMA and adopted by the participating jurisdictions. These requirements include:

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

These requirements ensure that the Plan remains an effective and relevant document. The following provides a detailed discussion of each requirement.

5.1 MONITORING, EVALUATING & UPDATING THE PLAN

Outlined below is a method and schedule for monitoring, evaluating and updating the Plan. This method allows the participating jurisdictions to review and adjust the planning process as needed, make necessary changes and updates to the Plan and track the implementation and results of the mitigation actions that have been undertaken.

5.1.1 Monitoring and Evaluating the Plan

The Plan update will be monitored and evaluated by a Plan Maintenance Subcommittee on an annual basis. The Plan Maintenance Subcommittee will be composed of key members from the Planning Committee, including representatives from all of the participating jurisdictions. The Subcommittee will be chaired by the Chris-Mont 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.

<u>Monitoring & Evaluating</u>

- A Plan Maintenance Subcommittee will be formed to monitor and evaluate the Plan update.
- The ***Plan update will be monitored and evaluated*** on an ***annual basis***.
- Each 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 Chris-Mont EMA will be responsible for monitoring the status of the mitigation actions identified in the Plan update 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.

The Plan Maintenance Subcommittee will also evaluate the Plan update 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 update; and review any new hazard data that may affect the Risk Assessment portion of the Plan update. 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 update 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 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 Christian 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 Chris-Mont EMA, with assistance from the Plan Maintenance Subcommittee, will be responsible for updating the Plan.
- The Plan ***must be updated within 5 years*** of the date 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 and during the subsequent comment period 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 update into the planning mechanisms identified for their jurisdiction.

Adoption of this Plan update will trigger each participating jurisdiction to review and, where appropriate, integrate the Plan into other available planning mechanisms. The Plan Maintenance Subcommittee's annual review will help maintain awareness of the Plan among the participating jurisdictions and encourage them to actively integrate it into their day-to-day operations and planning mechanisms. Any time a mitigation action is slated for implementation by a participating jurisdiction, it will be integrated into their capital improvement plan/budget.

Based on the conversations with Planning Committee members, none of the jurisdictions who participated in the original Plan have incorporated it into other planning mechanisms within their jurisdictions. Only Taylorville has a comprehensive/land use plan and it has not been updated since 2006. This is due in part to the size, fiscal and staffing situations and technical capacity of the participants. There is no indication that the County of any of the participating jurisdictions, with the exception of Taylorville, will be adopting, reviewing or strengthening current policies or programs in the near future.

Several of the participating jurisdictions have limited capabilities to integrate the mitigation strategy and other information contained in the Plan update into existing planning mechanisms. Six of the ten participating municipalities are very small in size (less than 1,100 residents) and do not have the financial resources or trained personnel to develop planning mechanisms such as comprehensive plans. While the West Central Development Council 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 updated Plan throughout the plan maintenance process. A copy of the approved Plan will be maintained and available for review at the Christian County EMA Office. Individuals will be encouraged to provide feedback and submit comments for the next Plan update to the Christian 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 next Plan update submittal to provide the public an opportunity to comment on the proposed revision to the Plan update.

6.0 PLAN ADOPTION

The final step in the planning process is the adoption of the approved Plan update by each participating jurisdiction. Each jurisdiction must formally re-adopt the Plan to remain eligible for federal grant monies to implement mitigation actions identified in this Plan.

6.1 PLAN ADOPTION PROCESS

Before the Plan update could be adopted by the participating jurisdictions, it was made available for public review and comment through a public forum and comment period. Comments received were incorporated into the Plan update and the Plan was then submitted to the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA) for their review and approval.

Upon review and approval by IEMA and FEMA, the Plan update was presented to the County and participating jurisdictions for adoption. ***Each participating jurisdiction was required to formally adopt*** the Plan to remain eligible to receive federal grant monies to implement the mitigation actions identified in this Plan. Any jurisdiction that chose not to adopt the Plan update did not affect the eligibility of those who did.

Figure PA-1 identifies the participating jurisdictions and the date each formally adopted the Plan update. Signed copies of the adoption resolutions are located in **Appendix O**. FEMA signed the final approval letter on January 12, 2021 which began the five-year approval period and set the expiration date of January 12, 2026 for the Plan.

Figure PA-1
Plan Adoption Dates

Participating Jurisdiction	Plan Adoption Date
Christian County	02/16/2021
Assumption, City of	04/07/2021
Edinburg, Village of	01/11/2021
Jeisyville, Village of	03/10/2021
Kincaid, Village of	02/08/2021
Morrisonville, Village of	01/20/2021
Mount Auburn, Village of	02/02/2021
Palmer, Village of	01/11/2021
Pana, City of	02/09/2021
Stonington, Village of	01/04/2021
Taylorville, City of	04/19/2021
Taylorville CUSD #3	01/11/2021

7.0 REFERENCES

Provided below is a listing, by section, of the resources utilized to create this document.

1.0 INTRODUCTION

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4.0 MITIGATION STRATEGY

1. Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee. Existing Mitigation Project/Activity Status. Form. 11 September 2019.
2. Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee. New Hazard Mitigation Projects. Form. 11 September 2019.

PLANNING COMMITTEE MEETING ATTENDANCE SHEETS

APPENDIX A

Attendance Sheet

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

June 11, 2019

	Name (Please Print)	***Representing (Jurisdiction/Organization)***	***Title***
1.	Zachary Krug	American Environmental	Environmental specialist
2.	MARK Miller	Mark Miller	AFPD
3.	Mike Crews	Taylorville / Christian Co	Fire Chief / EMA
4.	Jim Hill	PAlmer	MAYOR
5.	Tori Aulabaugh	Palmer	Trustee
6.	Dave McCann	American Environmental	Environmental specialist
7.	Roy Mais	MOWEAQUA	Chief of Police
8.	RYAN MARUCCO	STONINGTON	Mayor
9.	SARAH HUCKSTEAD	Regional Office of Ed #3	Admin Asst
10.	Glenn Smith	IEMA	HM Planner
11.	ROD Bland	Pana FIRE	Chief
12.	DANNY ANDERSEN	HERITAGE HEALTH - PANA	Environmental Manager
13.	Joe Stepping	Christian County Solid Waste	Department Head
14.	Brian Wilbur	Village of Tovey	MAYOR
15.	Andy Goodall	Taylorville Fire	Asst Chief
16.	Clifford D. Frye	Christian County Highway	Co. Engineer

Attendance Sheet

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

June 11, 2019

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Nancy J. Martin	Christian County Health Department	Public Health Administrator
2.	Donald Dust	Assumption	MAYOR
3.	David M. Luttrell	Edinburg	Mayor
4.	David Oller	KINCAID	MAYOR
5.	[illegible]	TMH	Administrator
6.	Chad Coady	Christian County	Supervisor of Assessments
7.	Larry E Tolliver	Morrisonville Village	Mayor Morrisonville
8.	Amber Green	Heritage Health Pana	[illegible]
9.	Vinee Harris	CCAC	Director
10.	Rich Peters	C. Co. Medical Reserve Corps	Volunteer
11.	Julie Lilly	City of Taylorville	City Clerk
12.	Dawn Willison	Springfield Clinic Taylorville	Operations Mgr.
13.	Michael Gianasi	Christian County Clerk and Recorder	Clerk & Recorder
14.	Mike Drnjevic	Jeisyville Mayor	MAYOR
15.	[illegible] Hager	Pana Community Hospital	[illegible]
16.	Andrea Bostwick	American Environmental	Sr. Project Manager

Attendance Sheet

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

June 11, 2019

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Leroy Klemola	WTIM / Miller Media	News Director
2.	Brent Milburn	Mt. Auburn	Mayor
3.	Bruce Barry	Taylorville	Mayor
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Attendance Sheet

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

September 10, 2019

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Andrea Bostwick	American Environmental	Sr. Project Manager
2.	MIKE DRNJEVIC	JEISYVILLE	MAYOR
3.	Chris Dougherty	Taylorville CUSD #3	Superintendent
4.	W R O'Connell	Morrisonville ESDA	ESDA Coordinator
5.	Nancy J. Martin	Christian County Health Department	Public Health Administrator
6.	Ryan Marucci	Village of Stonington	Village President
7.	Rich Peters	CC. Med. Reserve corps & Damage Assessment	
8.	Chad Coady	Christian County Supervisor of Mapping Assmnts	Supervisor Of Assessments
9.	DAVID OLLER	KINCAID	VILLAGE PRESIDENT
10.	Michael Gianesi	County Clerk - Christian County	County Clerk & Recorder
11.	Rod Bland	City of PANA FIRE/EMS	FIRE Chief
12.	RAYMOND R. BOCK	PALMER	BOARD MEMBER
13.	SARAH HUCKSTEAD	ROE #3	ADMIN ASST
14.	DAWN WILLISON	Springfield Clinic	Operations Mgr
15.	DANIEL BLAND	PANA PD.	CHIEF OF POLICE
16.	Greg Hagen	Pana Community Hospital	Nurse manager

Appendix A

Attendance Sheet

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

September 10, 2019

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Zachary Krug	American Environmental Corp.	Environmental specialist
2.	Dana McCarver	American Environmental Corp.	Environmental Specialist
3.	DONALD DUST	CITY OF ASSUMPTION	MAYOR
4.	Rhonda Hancock	Taylorville Care Center	Manager
5.	Terra Grafton	Taylorville Estates	Manager
6.	TONY COLLEBRUSCO	TAYLORVILLE CARE CENTER	MAINTENANCE Director
7.	Mike Crews	Taylorville FD	Fire Chief
8.	Andy Goodall	Taylorville Fire	Asst. Fire Chief
9.	LARRY E Tolliver	Morrisonville Village	MAYOR
10.	Leroy M Klemsla		
11.	Mike Holmes	Piatt County Emer Director	Director
12.	Mickie Ehrhardt	Christian Co. 911 Director / SO.	Dir. / Comm Supv.
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Attendance Sheet

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

December 10, 2019

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Dana McCarver	American Environmental	Environmental Specialist
2.	Greg Nimmo	Christ-Mont EMA	Director
3.	Rich Peters	Christ-Mont EMA Damage Assessment	Volunteer
4.	[illegible] O'Connell	Morrisonville ESDA	Esda Coordinator
5.	Michael Gianasi	Christian County Clerk & Recorder	Clerk and Recorder
6.	Ryan Marucco	villageofstonington@gmail.com	Mayor
7.	Matthew Adermann	Taylorville Fire ~~Chief~~	Chief
8.	Chris Doughetry	Taylorvill CUSD3	Superintendent
9.	Tori Aulabaugh	Palmer	Trustee
10.	Greg Yager	Pana Community Hospital	[illegible] Manager
11.	Nora Polley	Taylorville Memorial	Director Ancillary
12.	Sarah Buckstead	Reg Ofc of Ed #3	Admin Asst
13.	[illegible] Allison	Springfield Clinic	Operations Manager
14.	Dan Dust	City of Assumption	Mayor
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Attendance Sheet

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

December 10, 2019

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Zachary Krug	American Environmental	specialist
2.	Andrea Bostwick	American Environmental	Engr Mngmt Svcs Manager
3.	MIKE DRNJEVIC	VILLAGE OF JEISEYVILLE	MAYOR
4.	Leroy Klamolh	WTIM/Miller Media	News Director
5.	Bruce Dowdy	Stonington	Board
6.	Mickie Ehrhardt	Christian Co 911/SO	911 Director
7.	[illegible] Baum	Tovey	Mayor
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Attendance Sheet

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

March 3, 2020

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Carol Hagger	Pana Community Hospital	RN
2.	Denise Larson	Christian Cty HD	Administrator
3.	Rich Peters	Christian Co Medical Reserve Corp	Volunteer
4.	Sarah Huckstead	Reg Off of Ed #3	Admin Asst
5.	Tom Aulabaugh	Village of Palmer	Board Trustee
6.	Vince Harris	KCAC	Driector
7.	Andrea Bostwick	American Environmental	EMS Manager
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Attendance Sheet

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

March 3, 2020

	Name (Please Print)	*Representing (Jurisdiction/Organization)*	*Title*
1.	Zachary King	American Environmental Corp	Specialist
2.	Tammy Hadley	Taylorville CUSD #3	Clerk
3.	[illegible]	Stonington	Mayor
4.	Rod Bland	Pana Fire	Chief
5.	Greg Nimmo	Christ-Mont EMA	Director
6.	Don Rust	Assumption	Mayor
7.	Matthew Ahrman	Taylorville Fire Dept.	Fire Chief
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Attendance Sheet

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee Meeting

September 22, 2020

	Name	***Representing (Jurisdiction/Organization)***	***Title***
1.	Aulabaugh, Tori	Village of Palmer	Trustee
2.	Bostwick, Andrea	American Environmental Corporation	Senior Project Manager
3.	Coady, Chad	Christian County - Supervisor of Assessments Office	Supervisor of Assessments
4.	Gasparich, Joe	Chris-Mont EMA	Volunteer Deputy Director
5.	Hadley, Tammy	Taylorville CUSD #3	Clerk
6.	Hager, Greg	Pana Community Hospital	Nurse Manager, Outpatient Services
7.	Harris, Vince	Christian County – Zoning / Animal Control	Zoning Officer / Animal Control Director
8.	Krug, Zachary	American Environmental Corporation	Environmental Specialist
9.	Luttrell, David	Village of Edinburg	President
10.	Nimmo, Greg	Chris-Mont EMA	Director
11.	Willison, Dawn	Springfield Clinic – Taylorville	Operations Manager
12.			

Planning Committee Meeting Minutes

Appendix B

Meeting Minutes

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee

June 11, 2019
2:00 p.m.
Taylorville Memorial Hospital Auditorium
201 East Pleasant Street, Taylorville

Committee Members

American Environmental Corporation
Assumption Fire Protection District
Assumption, City of
Christian County Offices:
- Administrator
- Assessors
- Clerk/ Recorder
- Emergency Management Agency
- Health Department
- Highway Department
- Solid Waste Department

Christian County Medical reserve Corp.
Edinburg, Village of
Heritage Health
Illinois Emergency Management Agency
Kincaid, Village of
Jeisyville, Village of
Morrisonville, Village of
Mount Auburn, Village of
Moweaqua, City of
Palmer, Village of
Pana Community Hospital
Pana Fire Department
Regional Office of Superintendents #3
Springfield Clinic - Taylorville
Stonington, Village of
Taylorville, City of
Taylorville Fire Department
Taylorville Memorial Hospital
Tovey, Village of
WTIM/ Miller Media

Welcome and Introductions

Mike Crews, Chairman of the Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee, welcomed attendees. He indicated that the purpose of this Committee is to update the Christian 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.

Why Should We Update Our Natural Hazards Mitigation Plan?

Andrea Bostwick, American Environmental Corporation (AEC), described why mitigation planning is needed and how participating jurisdictions can benefit. In addition, Andrea described the NHMP update 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, 2012, and 2005. Consequently, the Federal Emergency Management Agency (FEMA) continues to encourage counties throughout the United States to prepare and update natural hazard mitigation plans. The natural hazards we are discussing include floods, tornadoes, severe summer storms (including thunderstorms, hail and lightning events), severe winter storms (including ice and snow storms), extreme heat, drought, earthquakes, and dam failures.

From the damages caused by natural disasters, FEMA has calculated that for every dollar spent on mitigation, $6 dollars can be reaped in savings.

Updating this plan provides three major benefits:

1.) When the next federally-declared natural disaster occurs, Christian County and all impacted municipalities who participate in the planning process will receive the full amount of money that they are eligible for from FEMA. Christian County has been a part of three (3) federal disaster declarations since 2002.

2.) 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 update, the participating jurisdictions will have an opportunity to receive state and federal funds to complete the projects.

3.) Verifiable information about the natural hazards that occur in Christian 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 update the 2013 Plan to meet state and federal criteria so that it can be approved by the Illinois Emergency Management Agency (IEMA) and FEMA. A five meeting process has been developed to achieve this goal. Specific activities for the Committee meetings include:

1st Committee meeting	Orientation to the Planning Process Review Critical Facilities & Existing Planning Documents Complete the Severe Weather Shelter Survey
2nd Committee meeting	Discuss the Risk Assessment Approve Mission Statement & Goals Committee returns the Critical Facilities List, the Existing Planning Documents List and Shelter Survey
3rd Committee meeting	Identify completed Mitigation Projects Begin discussing additional Mitigation Projects and Activities Review and update Mitigation Strategy Committee returns list of Mitigation Projects and Activities
4th Committee meeting	Finish discussing Mitigation Projects and Activities Committee discusses approval/adoption of the Plan update

5th Committee meeting (Public Forum)	Present the Plan update for public review Committee helps answer questions from the public

<u>Severe Weather Events</u>

Committee members were asked to share their memories of severe weather events that have occurred in the County since 2009 including any damages to critical infrastructure and facilities. Flooding, tornadoes, and severe thunderstorms were mentioned. Other hazard events related include:

- The Christian County Sheriff's office has been struck by lightning in recent years, destroying equipment and causing outages.
- Lightning strikes have been noted frequently in Assumption.
- Numerous Committee Members noted that county roads have suffered damage due to mine subsidence.
- During flooding in 2015, there was damage to county roads. In addition, Committee Members confirmed that water overtopped a levee, flooding the southeast part of Kincaid for the first time in its history.
- In March of 2013, 18 inches of snow covered the County, knocking out power and downing limbs.
- An ice storm in 2006 downed a substantial amount of tree limbs and power lines, ultimately causing power to be lost for 7-10 days.

Andrea, asked participants to identify any hazard events that have impacted their jurisdiction by completing the form titled "***Hazard Event Questionnaire.***" The information provided will help supplement the information included in the risk assessment. Participants were also asked see if they have any photographs of storm damage they would be willing to provide for inclusion in the updated Plan.

<u>Information Needed from the Committee</u>

Forms

Zachary Krug and Dana McCarver, AEC, distributed the following forms to each participating jurisdiction to review and update or 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) that 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 by the next meeting and to let her know if anyone would like electronic copies of the forms.

Mission Statement & Goals

Drafts of the original mission statement and goals were distributed. Committee Members were asked to review and discuss these drafts at the next meeting. Every project included in the Plan should be aimed at one or more of the goals developed by this Committee. Specific goals related to where you live can be added to this list as well.

Community Participation

Andrea stressed the importance of attending each committee meeting and indicated that member participation helps the County meet its 25% match for this grant in addition to assuring that member jurisdictions are eligible for IEMA/FEMA funds. She indicated that tag-teaming and designating substitute representatives is permissible when other obligations arise. Andrea pointed out that a designated substitute representative does not have be an official or employee of the jurisdiction.

Providing the public with opportunities to have input is an important part of the planning process. Andrea 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 risk assessment will be the main topic of the next committee meeting.

The second meeting of the Committee was scheduled for:

> **Tuesday, September 10th**
> **Taylorville Fire Department**
> **202 North Main Street, Taylorville**
> **2 p.m.**

With no further questions the meeting was adjourned.

Meeting Minutes

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee

September 10, 2019
2:00 p.m.
Taylorville Fire Department
202 North Main Street, Taylorville

Committee Members

Assumption, City of
Christian County Offices:
- 911
- Assessor
- Clerk/Recorder
- Emergency Management Agency
- Health Department

Christian County Medical Reserve Corp.
Jeisyville, Village of
Kincaid, Village of
Morrisonville, Village of
Palmer, Village of
Pana, City of
Pana Community Hospital
Piatt County EMA
Regional Office of Superintendents #3
Springfield Clinic - Taylorville
Stonington, Village of
Taylorville Care Center
Taylorville, City of
Taylorville CUSD #3
Taylorville Estates
WTIM/Miller Media
American Environmental Corporation

<u>Welcome and Introductions</u>

Mike Crews, Chairman of the Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee, welcomed attendees.

Handout materials were distributed to each member.

<u>Information Needed for the Plan</u>

Before beginning the risk assessment presentation, Andrea Bostwick (AEC) asked the participating jurisdictions to submit their completed "**Critical Facilities,**" **"List of Existing Planning Documents,"** and **"Identification of Severe Weather Shelters"** forms passed out at the previous meeting. This information will be used to prepare the vulnerability assessment.

<u>Risk Assessment</u>

Andrea began the presentation by noting that there have been three (3) federally-declared disasters in Christian County. A minimum of $134.9 million in damages have resulted from approximately 65 documented natural hazard events verified in Christian County over approximately 50 years. Since 2010, there have been 109 verified natural hazard events. The actual damage amounts are actually much higher based on several facts:

1.) damage descriptions for floods and several thunderstorms events did not include dollar amounts;
2.) damages to roads from heat and freeze/thaws conditions were not included; and
3.) crop damage figures were unavailable for a majority of the events

The frequency, magnitude and property damages for each category of natural hazard were described.

Severe Storms

Severe storms are the most frequently occurring natural hazard in Christian County with 206 events verified. Over $1.2 million in damages has resulted from 45 thunderstorms with damaging winds and lightning. At least 7 fatalities and 99 injuries can be attributed to severe storms. Almost all the injuries and fatalities are attributed crashes associated with wet pavement conditions.

The highest recorded wind speed in the County, not associated with a tornado, is 70 knots (81 mph) and occurred on four separate occasions. The largest hail recorded in the county is 2.75 inches in Assumption on November 17, 2013.

Severe Winter Storms

There were at least 141 verified events involving severe winter storms (snow, ice, or extreme cold) since 1950. Two of the three federal disaster declaration for Christian County are related to severe winter storms. Approximately $1.8 million dollars in damages resulted from two events. At least 5 fatalities and 48 injuries can be attributed to crashes involving ice and snow-covered roadways.

At least 17 major storms have occurred in every decade since 1960. Between 2000 and 2009 at least 23 severe winter storms took place. There have only been 14 storms during the current decade.

The record maximum 24-hour snowfall in the County is 17.7 inches at the Taylorville COOP station on March 24 – 25, 2013. The coldest recorded temperature is -29°F at the Morrisonville COOP Station on February 2, 1899.

Floods

One of the three federal disaster declarations for Christian County is related to flooding. There have been a least 43 verified flood events in Christian County, 5 riverine/shallow flood events since 2002 and 38 flash food events since 2000. At least $7.2 million in damages has resulted from two of the flood events. Four fatalities were recorded for the December 2015 general flood event.

Tornadoes

Since 1950, 43 tornadoes have been verified in Christian County. A minimum of $124 million in property damages has occurred from 15 tornadoes. Seven of the tornadoes have recorded property damages of at least $250,000 per events. A majority of the property damage total, $122.2 million, comes from the December 2018 tornadoes.

Twenty-seven injuries can be attributed to four separate tornado events.

The average tornado in Christian County is approximately 2.2 miles long and 92 yards wide. The average area covered by a tornado in Christian County is 0.11 square miles.

The highest recorded F-Scale rating for a tornado in the County was an F3 that occurred on April 3, 1974 and an EF3 that occurred on December 1, 2018. The longest and widest tornado recorded in the County occurred on December 1, 2018 and was 12.49 miles long and 900 yards wide.

Excessive Heat

There have been nine (9) *recorded* excessive heat events reported in Christian County since 1997. These are the only recorded events. No damage and injury information was available for either event. However, contrary to generally held conceptions, excessive heat causes more deaths than tornadoes, floods and severe storms.

The hottest temperature recorded in Christian County was 115°F at the Pana COOP Station on July 14, 1954.

Drought

Six major droughts have occurred during the last four decade – 1983, 1988, 2005, 2011, 2012 and 2013. The 2012 drought caused an estimated $53.8 million in corn crop damages. Corn and soybean yield reductions were most severe for the 1983 drought when there was a 40.8% reduction in corn yields and a 28.2% reduction in soybean yields.

Year	Corn	Soybeans
1983	40.8%	28.2%
1988	40.8%	26.5%
2005	3.7%	----
2011	1.4%	13.4%
2012	16.5%	----
2013	----	----

Mine Subsidence

There are eighteen (18) underground documented coal mines in Christian County according to the Illinois State Geological Survey's Directory of Coal Mines. Three mine subsidence events in Christian County were documented through member records and news articles. The Illinois Mine Subsidence Insurance Fund had eighty-seven (87) confirmed claims from 2000-2018 in Christian County. According to the Mine Subsidence Insurance Fund, $10 million in reimbursement in the insurance companies was paid between 2000 and 2018. No injuries or fatalities were reported for any of these events.

According to the Illinois State Geological Survey, 74,419 acres and 10,526 housing units in Christian County are located in land over or adjacent to mapped mines and land that could be effected if the mine boundaries are inaccurate or uncertain.

Earthquakes

In the previous 200 years, three earthquakes have originated in Christian County. All of these earthquakes measured less than 4.0 in magnitude. There are no geologic faults in Christian County. There is one geologic structure in the immediate region, the Louden Anticline, which is located in Fayette County.

Dams

There are 15 classified (permitted) dams located in Christian County. Three of these dams, the Lake Taylorville Dam, and Slurry Impoundments 2 & 3 associated with the former Peabody Mine, have a "High" hazard classification. There are 4 dams with a hazard classification of "Significant".

Risk Priority Index Exercise

Following the risk assessment, Andrea led the Committee through a Risk Priority Index exercise that will help calculate the Risk Priority Index for the hazards that have the potential to impact the County. 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 findings will be presented at the next meeting.

Mission Statement & Goals

Zachary Krug, AEC, asked Committee members to review the draft mission statement and goals provided in the meeting materials. Both of these are required elements of the Plan. As part of the Plan update process both items need to be reviewed to determine if they are still relevant, if any revisions need to be made or if new goals need to be added.

The draft mission statement was reviewed and no revisions were proposed.

He indicated that the mitigation goals are intended to reduce or eliminate long-term vulnerabilities to natural and man-made hazards and that each project included in the updated Plan should be aimed at one or more of the goals developed by the committee. The updated goals were drafted in such a way that they should cover the mitigation projects and activities anticipated to be submitted. He indicated that specific goals can be added to the list.

The updated goals were reviewed and no revisions were proposed.

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

Mitigation

Developing Project Lists

Andrea explained that mitigation actions include activities and projects that reduce or eliminate 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.

Status of Existing Projects

Andrea distributed a form to each of the previously participating jurisdictions detailing the mitigation projects and activities included in the original Plan. She explained that as part of the update process the status of these projects needs to be determined. She described how the form should be completed so that this information can be included in the Plan update.

New Projects

The form titled **"New Hazard Mitigation Project Form"** was distributed and Andrea indicated this form should be used to submit new projects and activities for the Plan update. To help the jurisdictions think about and assemble their lists a 2-page list of potential mitigation projects was included in the handout material along with mitigation project lists from jurisdictions in two other counties. These examples can be used to help Committee members when they prepare their list. Finally, Andrea provided excerpts from a FEMA publication on mitigation ideas as another resource.

She indicated individual mitigation project lists will be developed for each participating jurisdiction and that this is a list of projects each jurisdiction would like to see accomplished if funding becomes available. FEMA is trying to stimulate mitigation to reduce the extraordinary amount of money being expended on storm damages.

Mitigation projects can include studies, structural and infrastructure projects, and information/education activities. She provided advice for completing the mitigation project list including providing a detailed description of the project, the jurisdiction responsible for the project and the time frame to complete the project.

Committee members were encouraged to contact Andrea and Zak if questions arise before they return to the next Committee meeting.

What Happens Next?

The vulnerability assessment and mitigation project prioritization will be the main topics of the next committee meeting.

The third meeting of the Committee was set for Tuesday, December 10th at 2:00 p.m. at the Taylorville Fire Department.

Public Comment

With no additional questions or comments, Mike Crews adjourned the meeting.

Meeting Minutes

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee

December 10, 2019
2:00 p.m.
Taylorville Fire Department
202 North Main Street, Taylorville

Committee Members

Assumption, City of	Pana Community Hospital
Christian County Offices:	Regional Office of Superintendents #3
911	Springfield Clinic - Taylorville
Clerk/Recorder	Stonington, Village of
Chris-Mont EMA	Taylorville, City of
Christian County Medical Reserve Corp.	Taylorville CUSD #3
Jeisyville, Village of	Taylorville Memorial Hospital
Morrisonville, Village of	WTIM/Miller Media
Palmer, Village of	American Environmental Corporation

Welcome

Greg Nimmo, the new Director of the recently formed Chris-Mont Emergency Management Agency and new Chairman of the Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee, opened the meeting and welcomed attendees.

Handout materials were distributed to each Committee member.

Andrea Bostwick, American Environment Corp. (AEC), provided a brief recap to reorient Committee Members as to what has been accomplished. She noted that the Committee has accomplished all of its objectives up to this point and is on schedule.

Vulnerability Assessment

Andrea began the vulnerability assessment discussion by noting that the focus of this meeting is the vulnerability posed by tornadoes and floods. The analysis estimates future potential damages in terms of dollar loss to residences, including contents, for each participating jurisdictions based on FEMA acceptable formulas. The potential damages were calculated on the magnitude most likely to be encountered, not on a worst-case event.

Before presenting the analysis she thanked Chad Coady for providing the tax assessment figures used in these assessments.

Tornadoes

Since 1950, 43 tornadoes have been verified in Christian County. While tornadoes are one of the less frequently occurring natural disasters, they have caused $124 million in property damages and 27 injuries.

Using information from the 43 verified tornadoes, damages were calculated based on an “average” tornado. The average tornado in Christian County would impact approximately 0.11 square miles. Housing densities were calculated from U.S. Census Bureau information for each of the participating jurisdictions. This information, along with a set of assumptions were used to estimate the number of vulnerable residential structures.

Potential dollar losses were then calculated for these vulnerable residential structures using the provided tax assessment values and an additional assumption about the degree of damage sustained by the structures and their contents.

Potential dollar losses caused by an average-sized tornado to residences and their contents would be expected to exceed at least $5 million in any of the participating municipalities, with the exception of Jeisyville and Palmer. Losses ranged from $3 million in Jeisyville to $16 million in Stonington. Potential dollar losses by township would be expected to range from $117,731 in King Township to $1.9 million in Taylorville Township. Andrea noted that the damage figures for the most populated townships would only be reached if the tornado’s path included the major municipality in the township.

Floods

In Christian County, 43 flood events have been verified since 2000. One of the three federal disaster declarations for the county are related to flooding.

While only 5.5% of the land in Christian County is in the floodplain and thus susceptible to flooding from rivers and streams, almost the entire County is vulnerable to flash flooding. As with tornadoes, a set of assumptions were used along with the assessed values to calculate the potential dollar losses to vulnerable residential structures. The damage estimate prepared is based on a riverine flood event. While flash flooding occurs more frequently and has caused more recorded flood damages, identifying residential structures vulnerable to flash flooding is problematic because most are located outside of the base floodplain and the number of structures impacted can change with each event depending on the amount of precipitation received, topography and the land use of the area. Also, there is no standard loss estimation model for flash flooding.

Based on these assumptions, Assumption, Jeisyville, Morrisonville, Mt. Auburn, Pana, and Tovey would not experience any potential dollar losses since there are no rivers, streams or creeks with floodplains located within their municipal limits. While Palmer has creeks with base floodplains located within their municipal limits, no residential structures are located in the floodplains. Edinburg, Kincaid, Stonington, and Taylorville have a combined 42 residential structures located in the base floodplains. Potential dollar losses to vulnerable residential housing units (including contents) caused by riverine flooding would be expected to range from $89,466 in Kincaid to $834,561 in Taylorville.

Potential dollar losses were also estimated for several unincorporated areas, including Lake Pana, Bertinettis Lake, and Sangchris Lake. Potential dollar losses to vulnerable residential housing units (including contents) caused by flooding would be expected to range from $196,789 for seven structures around Sangchris Lake to $203,161 for eleven structures around Lake Pana.

Stonington's wastewater treatment facility is the only critical facility located in a floodplain.

These calculations don't include the physical and/or monetary impacts to businesses or other infrastructure and critical facilities. Cumulative monetary impacts to businesses and infrastructure can be extensive in nature and expensive to repair and will likely exceed the cumulative monetary impacts to residences.

Critical Facilities Vulnerability Survey

Following the vulnerability analysis, Andrea discussed vulnerable community assets. She asked Committee members to complete a 2-page survey to help identify each community's most vulnerable assets, as well as, identify a list of key issues that clearly describe each community's greatest vulnerabilities. This information will be used in the vulnerability analysis.

Risk Priority Index Exercise Results

Andrea then presented the results of the Risk Priority Index Exercise which was conducted at the September 10, 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 severe storms, floods and severe winter storms. The highest scoring man-made hazard was transportation hazardous materials incidents. A side-by-side comparison of how the hazards ranks between the original exercise conducted for the 2010 Plan and this exercise were provided for comparison. Three of the top four hazards remained the same with some change in order.

Mitigation Actions Prioritization Methodology

The Mitigation Actions Prioritization Methodology outlines the approach used to classify each mitigation action identified by the participating jurisdictions, and is a FEMA-required element of the Plan.

Mitigation actions can be prioritized in a number of ways. Andrea explained that the updated methodology is based on two key factors:

1) Frequency of hazard—severe storms occur more frequently than earthquakes.

2) Degree of mitigation—some projects will *significantly reduce* damages while other projects only have the potential to reduce damages.

This methodology helps objectively identify which projects and activities have a greater likelihood to significantly reduce the long-term vulnerabilities associated with the most frequently-occurring natural hazards. After reviewing the updated methodology, the Committee determined that no changes needed to be made.

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

Committee Members were asked to submit their existing and new Mitigation Projects forms. Andrea then described how the Mitigation Actions Prioritization Methodology, the lists of Mitigation Projects, finalized goals and other information will be presented for Committee review at the next Committee meeting in Mitigation Actions Tables.

Andrea chose a frequently needed mitigation project, a community safe room (tornado-safe shelter), as an example to show how a typical project is prioritized and entered into the Plan on a Mitigation Table. She described how each column in the Mitigation Action Table would be completed for this example project.

Andrea explained that the information in the Mitigation Project Table would be prepared by AEC, but that the Tables cannot be completed until all of the participants submit their lists of projects. All mitigation projects submitted will be organized by participating jurisdiction and Committee Members will have the opportunity at the next meeting to review all of the mitigation projects submitted so that they can make adjustments to their lists.

It was noted that each jurisdiction will have their own list of mitigation projects and they do not need approval from the County. Participants were also 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.

This is a mitigation plan and there are some projects that IEMA/FEMA do not consider mitigation. Projects associated with emergency preparedness / disaster response and maintenance will not be included in the Plan. Andrea noted that as you put your list together, if you are unsure about whether a project would be considered mitigation, go ahead and include it on your list. AEC will review the lists and make the appropriate determinations.

What Happens Next?

It is anticipated that participants will need additional time to assemble their mitigation project lists. Consequently, the Committee agreed to schedule the next meeting on:

Tuesday, March 3rd
Taylorville Fire Department
202 North Main Street, Taylorville
2 p.m.

Public Comment

No additional questions or comments were raised. Greg Nimmo adjourned the meeting.

Meeting Minutes

Christian County Multi-Jurisdictional
All Hazards Mitigation Planning Committee

March 3, 2020
2:00 p.m.
Taylorville Fire Department
202 North Main Street, Taylorville

Committee Members

Assumption, City of
Christian County Offices:
  Health Dept.
  Zoning/Animal Control
Chris-Mont EMA
Christian County Medical Reserve Corp.
Palmer, Village of
Pana Community Hospital
Pana, City of
Regional Office of Superintendents #3
Stonington, Village of
Taylorville, City of
Taylorville CUSD #3
American Environmental Corporation

Welcome

Greg Nimmo, Chairman of the Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee, opened the meeting and welcomed attendees.

Information packets about the Mitigation Projects and related items were distributed to Committee Members.

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. She then turned the floor over to Zachary Krug, American Environmental Corp. (AEC), for a presentation of Man-Made Hazards in Christian County.

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 Christian 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 selected 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 Study focused on the following categories of man-made hazards:

- generation, storage/handling and transportation of hazardous substances;
- waste disposal;
- hazardous materials (hazmat) incidents; 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, Storage/Handling & Transportation

In 2017 there were ***four (4) facilities*** in Christian County who generated reportable quantities of hazardous substances according to the USEPA.

Based on records obtained from IEMA's Tier II database, there were forty-one (41) stationary facilities within Christian County that stored and/or handled hazardous substances. Seventeen (17) of these facilities stored and/or handled chemicals identified as "Extremely Hazardous Substances".

Between 2009 and 2018, there were ten (10) roadway incidents involving hazardous substances, nine (9) pipeline releases and nine (9) rail incidents.

Waste Disposal

There is one (1) active commercial solid (household) waste landfill operating in Christian County, the Five Oaks Recycling and Disposal Facility near Taylorville. 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 accident involving the release of hazardous substances. Incidents can take place at fixed facilities or as they are being transported. Between 2009 and 2019 there were seventy-seven (77) hazmat incidents recorded in Christian County. Of the 77 incidents, 49 occurred at fixed facilities, while the remaining 28 occurred during transport.

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 is one active Superfund site in Christian County. The Central Illinois Public Service Co. near Taylorville.

Illinois SRP: There are nine (9) sites located Christian County. Six (6) of the sites have received "No Further Remediation" (NFR) letters.

Illinois LUST: There are 114 LUST sites located in Christian County. Approximately 74% of these sites have received NFR, Non-Lust Determination or Section 4(y) letters or remediation is virtually complete.

Mitigation Project Submittal & Action Tables

Andrea thanked the Committee Members for assembling their lists of mitigation projects and activities. She explained that the information provided by the participants, was used by AEC to prepare the Mitigation Action Tables handout. Committee members were asked to review the Action Tables containing the descriptions of the mitigation projects and activities. Andrea and Zak moved throughout the room to discuss questions with each member. Some additional mitigation projects were provided and will be added to these tables. Andrea advised Committee Members who wished to add additional projects to provide them to her as soon as possible.

Participants were reminded that this is a list of projects and activities they would like to see accomplished if the money becomes available. Also, for a jurisdiction to be eligible for a project, it must be included on its list.

Since this is a mitigation plan, some projects were either removed or not included if they were consider mitigation. Projects associated emergency preparedness/response, recovery, and maintenance will not be included in the Plan.

Plan Maintenance and Update

Andrea 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 Chris-Mont EMA to report on the progress of their projects and make any additions or edits to their list of projects. There is no penalty for not completing any project. The intent of the planning process is to encourage mitigation, not to penalize municipalities or counties. 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 is formally updated and resubmitted to IEMA/FEMA. At the five year update, any jurisdiction who wants to become part of the Plan may do so. Any new jurisdictions must supply the same information that all of the current jurisdictions supplied. Any jurisdiction that is not already part of this Plan update has to wait until the five year update before they can join.

The final Committee meeting will be conducted as an open-house style public forum to present the draft Plan update for review and comment. A paper copy of the draft Plan update will be available for review at the meeting and posted online on the County's website. There will be a two-week public comment period following the public forum.

Unless otherwise specified, Committee members will receive an electronic copy of the draft plan to make available for public comment.

Once the comment period is over any comments received will be incorporated into the Plan update 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 update by resolution and provide a copy of the signed resolution to Andrea.

What Happens Next?

<u>Public Forum</u>

The final Committee meeting will be conducted in the early evening as an open-house style public forum where the draft Plan update will be presented for review and comment. Contrary to conventional public meetings, at an open-house style public forum the public can come and go at their convenience.

The Committee chose to hold the public forum on:

> **Thursday, June 4th**
> **Taylorville Fire Department**
> **202 North Main Street, Taylorville**
> **5 p.m. to 7 p.m.**

Public Comment

With no other questions, the meeting was adjourned by Greg Nimmo.

After conversations between AEC and the Christian County ESDA, the public forum scheduled for Tuesday, June 4th was cancelled due to the COVID-19 outbreak and group meeting restrictions. The Public Forum will be held virtually on September 22nd at 2:00 P.M. via teleconference. The Plan will be made available on the County's website from September 22 through October 6.The Committee members and public were notified of the change.

CITIZEN QUESTIONNAIRE

APPENDIX C

QUESTIONNAIRE

Christian County Multi-Jurisdictional All Hazards Mitigation Plan Update

You can help protect lives and property from storm damage in Christian County by taking a few moments to complete this questionnaire.

1. Please indicate where you live in the County:

   ☐ Assumption
   ☐ Bulpitt
   ☐ Edinburg
   ☐ Harvel
   ☐ Jeisyville
   ☐ Kincaid
   ☐ Langleyville
   ☐ Morrisonville
   ☐ Mount Auburn
   ☐ Moweaqua
   ☐ Owaneco
   ☐ Palmer
   ☐ Pana
   ☐ Stonington
   ☐ Taylorville
   ☐ Tovey
   ☐ Unincorporated Christian County
   ☐ Other (please specify): ______________________

2. Please place a check mark next to each of the natural hazards listed below that you have experienced in Christian 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
   ☐ Mine and Land Subsidence
   ☐ 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 9 based on which hazard ***you feel*** poses the greatest threat. (1 = greatest threat and 9 = least threat).
   Each number should only be used once.

   ______ Severe Summer Storms
   ______ Floods
   ______ Severe Winter Storms
   ______ Excessive Heat
   ______ Tornadoes
   ______ Mine and Land Subsidence
   ______ Drought
   ______ Earthquakes

5. What types of mitigation projects or activities are most needed in Christian 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 update of the County's All Hazards Mitigation Plan.

Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee

FREQUENTLY ASKED QUESTIONS FACT SHEET

APPENDIX D

Frequently Asked Questions

Christian County Multi-Jurisdictional
All Hazards Mitigation Plan Update

1) **What is the Christian County All Hazard Mitigation Plan?**
The Christian 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 entities who want to participate.

2) **What is hazard mitigation?**
Hazard mitigation is any action taken to ***reduce*** or ***eliminate*** long-term risk to life and property from a natural or man-made hazard.

3) **Why is this Plan being updated?**
Updating the 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 and man-made hazards and closer cooperation among the various organizations and political jurisdictions involved in emergency planning and response.

4) **Who is updating this Plan?**
The Christian County Multi-Jurisdiction All Hazards Mitigation Planning Committee is updating the Plan with assistance from technical experts in emergency planning, environmental matters, and infrastructure. The Committee includes members from emergency services, municipal, county and state government, health care, and law enforcement.

5) **How can I participate?**
You are invited to attend public meetings of the Christian 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 Christian County. Surveys will be available at participating municipalities and through Christian County to help gather specific information from residents. All of this information will be used to update the Plan. A draft of the updated Plan will be presented at a public forum for further public input.

More information can be obtained by contacting:

Mike Crews, Manager
Christian County Emergency Management Agency
301 West Franklin Street
Taylorville, Illinois 62568
(217) 824-5421

MEDIA OUTLETS SERVING THE COUNTY

APPENDIX E

Media Outlets Serving Christian County

Breeze-Courier (daily)
212 South Main Street
Taylorville, Illinois 62568
217-824-2233
www.breeze-courier.com

Pana News-Palladium (weekly)
205 S. Locust St.
Pana, Illinois 62557
217-562-2111

Taylorville Daily News (daily)
918 E. Park St., P.O. Box 169
Taylorville, Illinois
217-824-3395
taylorvilledailynews.com

WTIM (Radio)
918 E. Park St., P.O. Box 169
Taylorville, Illinois
217-824-3395
taylorvilledailynews.com

PRESS RELEASES AND NEWS ARTICLES PUBLISHED

APPENDIX F

Christian County Emergency Management Agency
Christian County Emergency Operations Center
202 N. Main
"Planning, to stay one step ahead"

Contact: Mike Crews
(217) 820-0912

County Prepares For Natural Disasters

Taylorville, IL (5/24/19)—Christian County will update its plan to reduce the damages caused by natural hazards such as floods, tornadoes, snow storms, thunderstorms, and ice storms among others. The plan is called a Natural Hazard Mitigation Plan and the process to update it will be funded through a grant from the Federal Emergency Management Agency (FEMA).

"Updating this plan will help us be better prepared before severe weather strikes. The goal is to reduce the harm to property and residents", said Mike Crews, Christian County Emergency Management Agency Manager. "When a federally declared disaster occurs, having an updated plan will help us receive federal funds", he added. Natural Hazard Mitigation Plans must be updated every five years.

The Christian County Hazard Mitigation Planning Committee will hold the first meeting to update the plan on Tuesday, June 11 at the Taylorville Memorial Hospital Auditorium, 201 East Pleasant Street, in Taylorville. The meeting will begin at 2 p.m. The committee will meet periodically over the next several months to update this plan.

The Christian County Hazard Mitigation Planning Committee has been created with representatives from each participating municipality along with technical partners and other stakeholders. Meetings of this committee will be conducted as working sessions so that any interested resident can attend and ask questions. The purpose of these working sessions is to gather and discuss information that will be used to update the plan.

"We already have an emergency response plan, but this mitigation plan is different because it focuses on ways to reduce and prevent damages before they occur," added Crews.

The primary responsibility of the Christian County Emergency Management Agency is to better prepare Christian County for natural, manmade or technological disasters. Our goal is a better-prepared County through planning, training and education.

Christian County Updates Plan For Emergency Disasters

Read All (/local-news/) (/local-news/feed.xml)

(http://taylorvilledailynews.com/local-news/443130)

Posted About Three Weeks Ago by Leroy Kleimola

With record breaking rainfalls over the past 12 months, Christian County is doing their best to help themselves by securing a Natural Hazard Mitigation Plan . A natural hazard mitigation plan will help reduce damages caused by natural disasters and the funding for updating it comes from the Federal Emergency Management Agency (FEMA). Emergency Management Director Mike Crews says that having an updated plan is what helps us receive federal funds.

0:00 / 0:53

The Christian County Hazard Mitigation Planning Committee will hold the first meeting to look and work on the new plan Tuesday June 11th at Taylorville Memorial Hospital Auditorium at 2 PM at 201 East Pleasant Street. The committee will meet five times.

0:00 / 0:17

The purpose of the meetings will be to gather and discuss information that will be used to update the natural hazard mitigation plan. Residents that are interested can attend and ask questions.

Read All (/local-news/)

Hide Comments

0 Comments

Sort by **Oldest**

Add a comment...

Facebook Comments Plugin

(http://www.accuweather.com/en/us/taylorville-il/62568/weather-forecast/332746)

TAYLORVILLE DAILY NEWS

› HOME (/)

Appendix F

TAYLORVILLE
FIRE DEPARTMENT

MIKE CREWS
Fire Chief

202 N. Main St. Taylorville, IL 62568
Phone: (217) 824-2295
Fax: (217) 824-3851

BRUCE BARRY
Mayor

ANDY GOODALL
Assistant Fire Chief

Contact: Mike Crews
(217)-820-0912

Reducing Damages Caused By Severe Weather

Taylorville, IL (08/26/2019)—The frequency and damages caused by severe storms and other natural hazards in Christian County will be discussed when the Christian County Hazards Mitigation Planning Committee meets Tuesday, September 10th at the Taylorville Fire Department, 202 N. Main Street in Taylorville, beginning at 2 p.m. This Committee, comprised of County and municipal representatives as well as technical partners and stakeholders, will meet over the next several months to update the Christian County All Hazards Mitigation Plan to reduce damages caused by natural and man-made hazards. All Committee Meetings are open to the public.

"The goal of this Committee Meeting is to identify how often severe weather events occur within the County and what kinds of damages have resulted. Based on this information we will begin to update lists of activities and projects to reduce damages caused by these events," said Mike Crews, Christian County Emergency Management Agency Manager.

The focus of this effort is on natural hazards— severe thunderstorms with damaging winds or hail, tornadoes, snow and ice storms, floods, drought, excessive heat, earthquakes, dam failures, and mine subsidence.

Interested persons can provide input at these Christian County Hazards Mitigation Planning Committee meetings, or submit their comments and questions to their municipal or county representatives.

Participants include: Assumption, Bulpitt, Edinburg, Jeisyville, Kincaid, Morrisonville, Mt. Auburn, Owaneco, Palmer, Pana, Stonington, Taylorville, and Tovey.

"This Plan will be our best resource for determining how to prepare for storms and other natural hazards. After the Plan update is completed, comprehensive information will be available in one document to help guide those who are making decisions about how to better protect Christian County residents," added Crews.

CHRIS-MONT EMA

301 W Franklin St, Taylorville, IL 62568

"Serving Christian & Montgomery Counties"

EMA Director,
Greg Nimmo

217-273-3911
gnimmo@christiancountysheriff.com

12/5/19

<u>FOR IMMEDIATE RELEASE</u>

To: Breeze-Courier
Fr: Greg Nimmo, EMA Director
Re: News Release

Projects to Reduce Damages Caused By Natural Disasters

Taylorville, IL (12/5/2019)—Projects to prevent injuries and deaths while maintaining vital services for Christian County residents when severe storms hit will be discussed when the Christian County All Hazards Mitigation Planning Committee meets at 2:00 p.m. on Tuesday, December 10th at the Taylorville Fire Department, 202 North Main Street in Taylorville. Committee meetings are open to the public.

This Committee began work in June 2019 to update their Plan that will identify projects and activities to protect Christian County residents and property from storms and other natural disasters. This Plan, unlike all other emergency plans, is aimed at identifying projects and activities that can be taken before these disasters occur.

"Other emergency plans are directed at responding after a storm or natural disaster hits. While updating this Plan, we will identify new actions that can reduce or eliminate damages caused by specific types of storms and other natural disasters for each participating municipality and unincorporated areas of the County before they occur," said Greg Nimmo, Christian County Emergency Management Agency Director.

The municipalities of Assumption, Edinburg, Jeisyville, Kinkaid, Morrisonville, Mt. Auburn, Palmer, Pana, Stonington, Taylorville, Tovey, and the County 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.

"Updating this Plan will help assure each participating municipality receives all of the money for which they are due when a catastrophic storm—such as a tornado or flood occurs. In addition, obtaining FEMA's approval of our updated Plan will make all of the participants eligible to receive federal grant money for mitigation projects" added Nimmo.

###

EMA Director,
Greg Nimmo

Vol. Dep. Director,
Joe Gasparich

Deputy Director,
Kevin Schott

Vol. Dep. Director,
Andy Goodall

CHRIS-MONT EMA

301 W Franklin St
Taylorville, IL 62568

E.O.C. Phone Mon-Fri 8 am to 4 pm: 217-532-9560

2/17/20

To: Media
Fr: Director Nimmo
Re: Media Release

Protecting Public Health and Property In Christian County

Taylorville, IL (February 17, 2020)—Projects to prevent injuries and fatalities while maintaining vital services for Christian County residents during severe weather will be the main topic of discussion at the Christian County All Hazards Mitigation Planning Committee meeting on March 3rd, 2020 at the Taylorville Fire Department, 202 North Main Street in Taylorville. The meeting begins at 2 p.m. and is open to the public.

"Severe storms frequently damage buildings, crops, roads, and other critical infrastructure in this area. At least $134.9 million in verified property damages and $53.8 million in crop damages were caused by 67 severe weather and natural hazard events. It's highly likely that there were additional damages that weren't documented. Therefore 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 Greg Nimmo, Chris-Mont Emergency Management Agency Director.

Projects identified at this meeting by County and municipal representatives as well as other participants will become part of the Christian County All Hazards Mitigation Plan update. While the public has provided input on portions of the Plan, the entire Plan will be presented for public review and comment before it is submitted to the state and federal government for approval.

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

Interested persons can submit questions and comments to the Committee members or directly to the Chris-Mont Emergency Management Agency.

Chris-Mont EMA Director,

Greg Nimmo

CHRIS-MONT EMA
301 W Franklin St
Taylorville, IL 62568

EMA Director,
Greg Nimmo

Deputy Director,
Kevin Schott

Vol. Dep. Director,
Joe Gasparich

Vol. Dep. Director,
Andy Goodall

Phone Mon-Fri 8 am to 4 pm: 217-532-9560

9-16-20

To: Media
From: Greg Nimmo
Re: Press Release

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

September 16, 2020—The Christian County Multi-Jurisdictional All Hazards Mitigation Plan outlining projects and activities to reduce damages caused by severe weather and other natural and man-made hazards will be available for public review and comment from September 22 through October 6, 2020. The Plan, along with a summary sheet and a comment survey, can be viewed on the Christian County Website. If you are unable to access the Plan via the website, please contact Greg Nimmo, Chris-Mont Emergency Management Agency (EMA) Director at (217)-273-3911 to view a paper copy of the Plan. The comment period will remain open through Tuesday, October 6, 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 September 22 at 2:00 P.M. Due to the COVID-19 Pandemic, the public forum will be conducted via teleconference. Persons interested in participating in the public forum should contact Zachary Krug, American Environmental Corporation at (217)-585-9517, ext. 8 or zkrug@aecspfld.com. 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 and man-made 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 Greg Nimmo, Christian County EMA Assistant Coordinator

The Christian 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 Assumption, Edinburg, Jeisyville, Kinkaid, Morrisonville, Mount Auburn, Palmer, Pana, Stonington and Taylorville, in addition to, various County departments, the Christian County Medical Reserve Corps, the Regional Officer of Education #3, Taylorville CUSD #3, Springfield Clinic, Taylorville Memorial Hospital and Pana Community Hospital. The Committee has been conducting working meetings open to the public since June 2019. Federal law requires that these Plans be updated every five years.

Mont Co EMA/911 Director,

Greg Nimmo

PUBLIC FORUM – PLANNING PROCESS SUMMARY HANDOUT

APPENDIX G

CHRISTIAN COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN PUBLIC FORUM – TELECONFERENCE

SEPTEMBER 22, 2020 2:00 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 Livingston County residents. Since 2002, Christian County has been a part of three federally-declared disasters and experienced at least $135 million in recorded property damages and $54.4 million in recorded crop damages within the County.

In the last 10 years alone (2010 – 2019), there have been 80 heavy rain events, 38 thunderstorms with damaging winds, 20 excessive heat events, 19 tornadoes, 18 flash flood events, 16 severe winter storms, 10 severe storms with hail one inch in diameter or greater, three riverine flood events, three 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 updated natural hazards mitigation plan?
By preparing and adopting an updated 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 Christian County Multi-Jurisdiction All Hazards Mitigation Plan update?
Recognizing the benefits that could be gained from preparing an updated all hazards mitigation plan, Livingston County invited all the local government entities within the County to participate. The following jurisdictions chose to participate in the Plan update and development:

- Assumption, City of
- Edinburg, Village of
- Jeisyville, Village of
- Kincaid, Village of
- Morrisonville, Village of
- Mount Auburn, Village of
- Palmer, Village of
- Pana, City of
- Stonington, Village of
- Taylorville, City of
- Taylorville CUSD #3

CHRISTIAN COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

How was the Plan update developed?
The Christian County Multi-Jurisdictional All Hazards Mitigation Plan update was developed through the Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee. The Planning Committee included representatives from each participating jurisdiction, as well as education, emergency services, GIS and healthcare. The Planning Committee met five times between June 2019 and September 2020.

Which natural and man-made hazards are included in the Plan update?
After reviewing the risk assessment, the Planning Committee chose to include the following natural and man-made hazards in this updated Plan:

Natural Hazards:
- severe storms (thunderstorms, hail, etc.)
- severe winter storms (snow, ice, etc.)
- floods (flash & general)
- tornadoes
- excessive heat
- drought
- mine subsidence
- earthquakes
- 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 update?
The Plan update 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. The majority of the Plan update is devoted to the risk assessment and mitigation strategy.

The 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 Christian 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 at today's public forum and during the public comment period will be incorporated into the draft Plan update before it is submitted to the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA) for review. Once IEMA and FEMA have reviewed and approved the Plan, it will be presented to the County and each participating jurisdiction for formal adoption. After adopting the Plan update, each participating jurisdiction can apply for federal mitigation funds and begin implementation of the mitigation actions identified in the Plan.

PUBLIC FORUM – PLAN COMMENT SURVEY

APPENDIX H

Christian County All Hazards Mitigation Plans Comment Survey

The Christian County Multi-Jurisdictional All Hazards Mitigation Plan evaluates damage to life and property from natural and man-made hazards that occur in the County. The 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

1 of 2 answered

CHRISTIAN COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

PLAN COMMENT PERIOD
SEPTEMBER 22, 2020 THRU OCTOBER 6, 2020
COMMENT SHEET

The County's 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 sheet should be used to provide feedback on the draft Plan update.

What comments, concerns or questions do you have regarding the draft Plan update? (Use additional sheets if necessary.)

Please Print Your Name, Address, and Phone Number Below (Optional):

Name: ______________________ Phone: ______________

Address: ______________________

______________________ Zip Code: ______________

Comments will be accepted through September 6, 2020.

Place
Stamp
Here

Mr. Greg Nimmo, Director
Chris-Mont EMA
301 W. Franklin St.
Taylorville, IL 62568

HAZARD MITIGATION PLANNING MEMO SENT ADJACENT COUNTIES

APPENDIX I

Bostwick, Andrea

From: Krug. Zak
Sent: Wednesday, September 16, 2020 10:42 AM
To: bill.lee@co.sangamon.il.us; tesposito@maconcountyema.org; shelbyema@shelbycounty-il.com
Cc: Greg Nimmo; Bostwick, Andrea
Subject: Christian County Hazard Mitigation Plan Public Forum - 09222020
Attachments: Christian County Hazard Mitigation Plan Adjacent County Memo.pdf

Good morning,

The purpose of this memorandum is to let you know that Christian County is updating its countywide All Hazards Mitigation Plan. Since you share common boundaries, you are invited to review this draft Plan and provide comments during the public comment period which runs from September 22nd through October 6th, 2020. The Plan along with a summary sheet and a comment survey can be viewed on the Christian County Website.

The public forum has been scheduled for Tuesday, September 22nd at 2 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.

You can reach Mr. Greg Nimmo at 217-273-3911 or gnimmo@christiancountysheriff.com

American Environmental Corp., an emergency management and environmental consulting firm experienced in preparing these plans is leading the planning process. If you have specific questions about the Plan update, please contact me, at (217) 585-9822 Ext. 8 or zkrug@aecspfld.com

Thank you,
Zachary Krug
American Environmental Corp
3700 W. Grand Ave, Suite A
Springfield, IL 62711
217-585-9517, Ext 8

To: Sangamon County OEM, William D. Lee III (Bill.lee@co.sangamon.il.us)
Macon County EMA, Tammy Esposito (tesposito@maconcountyema.org)
Shelby County EMA, Jared Rowcliffe (Shelbyema@shelbycounty-il.com)

From: Greg Nimmo, Chris-Mont Emergency Management Agency Director

Subject: Hazard Mitigation Planning

Date: 9/16/2020

The purpose of this memorandum is to let you know that Christian County is updating 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 September 22nd through October 6th, 2020. The Plan along with a summary sheet and a comment survey can be viewed on the Christian County Website.

The public forum has been scheduled for Tuesday, September 22nd at 2 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.

You can reach my office at 217-273-3911 or gnimmo@christiancountysheriff.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) 585-9822 Ext. 8 or zkrug@aecspfld.com

HAZARD EVENT RISK ASSESSMENT TABLES

APPENDIX J

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Christian County
1958 – 2019
(Sheet 1 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/10/1958	6:30 p.m.	Stonington^	n/a	n/a	n/a	n/a	n/a	
6/10/1958	6:48 p.m.	Taylorville^	50 kts	n/a	n/a	n/a	n/a	
6/13/1958	3:42 p.m.	Stonington^	70 kts	n/a	n/a	n/a	n/a	
6/13/1958	4:15 p.m.	Mt. Auburn^	n/a	n/a	n/a	n/a	n/a	
6/13/1958	5:00 p.m.	Stonington^	n/a	n/a	n/a	n/a	n/a	
9/28/1959	6:05 p.m.	Palmer^	n/a	n/a	n/a	n/a	n/a	
9/30/1961	2:10 p.m.	Taylorville^	n/a	n/a	n/a	n/a	n/a	
11/15/1973	4:45 a.m.	Edinburg	n/a	n/a	n/a	n/a	n/a	
3/4/1974	4:45 p.m.	Stonington	n/a	n/a	n/a	n/a	n/a	
5/30/1974	3:00 p.m.	Taylorville	n/a	n/a	n/a	n/a	n/a	
11/9/1975	10:28 p.m.	Taylorville	n/a	n/a	n/a	n/a	n/a	
11/30/1975	12:10 a.m.	Langleyville^ Taylorville^	n/a	n/a	n/a	n/a	n/a	
2/16/1976	3:15 p.m.	Taylorville Taylorville^	n/a	n/a	n/a	n/a	n/a	*Event Description Provided Below*
<u>*Taylorville Area*</u> - A roof was partially ripped from a barn on old IL Route 29 - Trees were down across railroad tracks along IL Route 29 - Portions of several metal sheds were blown into fields in the Bertinetti Lake area southest of Taylorville - Branches and limbs were scattered around the area								
2/16/1976	3:30 p.m.	Taylorville	n/a	n/a	n/a	n/a	n/a	
2/23/1977	10:50 a.m.	Owaneco	n/a	n/a	n/a	n/a	n/a	
5/16/1977	9:00 p.m.	Palmer^	n/a	n/a	n/a	n/a	n/a	
8/6/1977	3:30 p.m.	Roby	58 kts	n/a	n/a	n/a	n/a	The roof of Roby Community Church crashed to the floor severely damaging the building.
5/1/1983	7:00 p.m.	Edinburg	45 kts	n/a	n/a	n/a	n/a	A mobile home overturned
4/29/1984	8:17 p.m.	Taylorville	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 Christian County
1958 – 2019
(Sheet 2 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
7/29/1986	2:55 a.m.	Morrisonville	n/a	n/a	n/a	n/a	n/a	
7/31/1986	3:45 a.m.	Taylorville	56 kts	n/a	n/a	n/a	n/a	
7/31/1986	4:00 a.m.	Bulpitt Kincaid Jeisyville	56 kts	n/a	n/a	n/a	n/a	
7/31/1986	4:25 a.m.	Stonington	56 kts	n/a	n/a	n/a	n/a	
3/24/1988	10:49 p.m.	Moweaqua	n/a	n/a	n/a	n/a	n/a	
4/5/1988	7:36 p.m.	Taylorville	61 kts	n/a	n/a	n/a	n/a	
5/25/1989	10:17 a.m.	Taylorville	n/a	n/a	n/a	n/a	n/a	
6/1/1989	2:45 p.m.	Rosamond Pana^	n/a	n/a	n/a	n/a	n/a	
10/17/1990	6:00 p.m.	Taylorville^	n/a	n/a	n/a	n/a	n/a	
10/4/1991	6:29 p.m.	Taylorville Bulpitt Kincaid Jeisyville	n/a	n/a	n/a	n/a	n/a	Trees and tree limbs were blown down
6/17/1992	3:50 p.m.	Taylorville Taylorville^	n/a	n/a	n/a	n/a	n/a	
Taylorville Area - Numerous power lines were blown down and large trees were uprooted 1 mile east of the city						- Debris was blown onto IL Route 29 - A grain bin was blown off its foundation and a grain elevator door was blown off		
6/17/1992	3:55 p.m.	Owaneco Assumption Millersville	n/a	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Assumption and Millersville - Several large trees and power lines were blown down - Strong winds and pea-sized hail damaged soybean and corn crops						*Assumption Area* - Window screens were blown off a house and a shed was damaged 2 miles south of the city		
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 Christian County
1958 – 2019
(Sheet 3 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
4/26/1994	6:30 p.m.	Taylorville	n/a	n/a	n/a	n/a	n/a	Winds blew down several sections of an 8-foot-tall wooden fence
7/2/1994	3:10 p.m.	Morrisonville	n/a	n/a	n/a	n/a	n/a	Several power lines and tree limbs were blown down
5/27/1995	6:28 p.m.	Mt. Auburn	n/a	n/a	n/a	n/a	n/a	The doors on a shed were damaged
5/27/1995	6:55 p.m.	Stonington	n/a	n/a	n/a	n/a	n/a	A large maple tree was blown over onto County Rd 4
6/8/1995	7:45 a.m.	Owaneco	n/a	n/a	n/a	n/a	n/a	Several large trees were blown down
6/20/1995	5:56 p.m.	Bulpitt Kincaid Jeisyville Palmer Taylorville	n/a	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Numerous trees and power lines were blown down *Taylorville* - A business had three walls of its building blown down causing extensive damage. *Taylorville Area* - One grain bin was blown one-half mile to the northwest, damaging 10 vehicles at the Taylorville Correctional Center.								
6/20/1995	6:22 p.m.	Morrisonville	n/a	n/a	n/a	n/a	n/a	Four or five trees were blown down
2/26/1996	6:58 p.m.	Taylorville	50 kts	n/a	n/a	n/a	n/a	
5/8/1996	11:40 a.m.	Morrisonville Morrisonville^	n/a	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Morrisonville - Winds blew down several trees *Morrisonville Area* - 2 miles north of city, 5 grain bins were destroyed, as well as, a couple of storage sheds and a roof on one barn was torn off								
5/8/1996	11:55 a.m.	Taylorville	n/a	n/a	n/a	n/a	n/a	Winds damaged several roofs and barns and blew down several trees
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 Christian County
1958 – 2019
(Sheet 4 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/2/1996	9:40 p.m.	Taylorville	n/a	n/a	n/a	n/a	n/a	Winds blew down a large tree and numerous tree limbs
10/29/1996	5:30 p.m.	Taylorville	n/a	n/a	n/a	n/a	n/a	Winds blew down several trees and power lines
4/30/1997	2:19 p.m.	Morrisonville^ Bulpitt Kincaid Jeisyville Edinburg^	n/a	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Morrisonville Area Winds blew down several power lines 2 miles north of the city *Kincaid Area* Winds blew down several power lines at the Commonwealth Edison Plant 4 miles west of the city				*Edinburg Area* - Winds blew down 2 grain bins onto some power lines - Several roof tops were damaged - A hog building 1 mile northeast of the city was destroyed				
8/24/1997	3:34 p.m.	Mt. Auburn	n/a	n/a	n/a	n/a	n/a	Winds blew down several trees and power lines
6/12/1998	3:35 p.m.	Stonington Stonington^	n/a	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Stonington Area Winds blew down two trees onto a mobile home 3 miles south of the city				*Stonington* Several power poles were blown down in the city				
6/18/1998	7:51 p.m.	Bulpitt Kincaid Jeisyville Taylorville Owaneco Millersville Pana	52 kts	n/a	n/a	n/a	n/a	Numerous trees, tree limbs and power lines were blown down in an area extending from Kincaid to Pana *Pana* one of the fallen trees damaged a car
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 Christian County
1958 – 2019
(Sheet 5 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/29/1998	4:34 p.m.	Countywide	52 kts	n/a	n/a	n/a	n/a	- blew down or uprooted trees, tree limbs, power poles and power lines - considerable crop damage was sustained
7/22/1998	2:27 p.m.	Bulpitt Kincaid Jeisyville Palmer^ Morrisonville	n/a	n/a	n/a	n/a	n/a	Several trees and power lines were blown over in Kincaid and Morrisonville
11/10/1998	5:15 a.m.	Taylorville Taylorville^ Assumption	n/a	n/a	n/a	$40,000	n/a	*Event Description Provided Below*
Numerous trees and power lines were blown down *Taylorville Area* A cinder block building was blown over onto IL Rte. 29 three miles southeast of the city *Assumption* A couple of buildings sustained moderate damage. One of the buildings lost its roof resulting in $40,000 in damages								
4/5/1999	5:20 p.m.	Harvel Morrisonville Palmer Taylorville Mt. Auburn	52 kts	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Harvel, Morrisonville and Edinburg winds blew down numerous power poles and power lines *Kincaid* A large tree limb punctured the roof of a house causing minor damage *Mt. Auburn* - The winds caused moderate damage to the roof of a business - A tree was blown over causing minor damage to the roof of a porch								
Subtotal:				**0**	**0**	**$40,000**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

<table>
<tr><th colspan="10">Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Christian County
1958 – 2019
(Sheet 6 of 16)</th></tr>
<tr><th>Date(s)</th><th>Start Time</th><th>Location(s)</th><th>Maximum Magnitude (Knots)</th><th>Injuries</th><th>Fatalities</th><th>Property Damage</th><th>Crop Damage</th><th colspan="2">Description</th></tr>
<tr><td>4/8/1999</td><td>8:53 p.m.</td><td>Zenobia^
Tovey^
Kincaid^
Jeisyville^
Taylorville^</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">Event Description Provided Below</td></tr>
<tr><td colspan="5"><u>Zenobia Area</u>
3 grain bins were damaged
<u>Tovey Area</u>
4 homes sustained minor damage</td><td colspan="5"><u>Kincaid Area</u>
Several trees and power lines were blown down
<u>Taylorville Area</u>
3 homes sustained minor damage</td></tr>
<tr><td>4/8/1999</td><td>9:28 p.m.</td><td>Pana</td><td>63 kts</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">Event Description Provided Below</td></tr>
<tr><td colspan="5">- Several trees were blown down
- Minor damage to the high school football field box
- A couple of outbuildings on the east side of town were destroyed</td><td colspan="5">- A dugout on the high school baseball field was destroyed
- Several buildings downtown sustained minor damage</td></tr>
<tr><td>6/1/1999</td><td>6:15 p.m.</td><td>Countywide</td><td>61 kts</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">Winds blew down numerous trees, tree branches, and power lines</td></tr>
<tr><td>6/11/1999</td><td>2:00 p.m.</td><td>Pana</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">- Several trees were blown down in the city, one of which feel onto an unoccupied car
- On the north side of the city 10 power poles were snapped off at their bases</td></tr>
<tr><td>8/12/1999</td><td>9:35 p.m.</td><td>Edinburg^
Sharpsburg^</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">Tree blown down across the road</td></tr>
<tr><td>5/26/2000</td><td>11:34 p.m.</td><td>Stonington</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">Several large tree limbs were blown down</td></tr>
<tr><td colspan="4">Subtotal:</td><td>0</td><td>0</td><td>$0</td><td>$0</td><td colspan="2"></td></tr>
</table>

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Christian County
1958 – 2019
(Sheet 7 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/14/2000	11:25 a.m.	Edinburg Mt. Auburn	n/a	n/a	n/a	n/a	n/a	Several large trees and large tree limbs were blown down *Edinburg* A roof of a shed was damaged
6/23/2000	6:20 p.m.	Taylorville^	n/a	n/a	n/a	n/a	n/a	Several power lines were blown down
7/5/2000	5:05 p.m.	Stonington	n/a	n/a	n/a	n/a	n/a	Several large tree limbs and power lines were blown down
8/2/2000	6:45 p.m.	Stonington Moweaqua	n/a	n/a	n/a	n/a	n/a	A large tree was blown down onto County Hwy 4 *Stonington* A tree was blown over onto a car
9/2/2000	9:00 a.m.	Palmer	50 kts	n/a	n/a	n/a	n/a	Trees were blown down
5/17/2001	6:30 p.m.	Taylorville	50 kts	n/a	n/a	n/a	n/a	Several power lines and trees were blown down
5/22/2001	12:15 p.m.	Taylorville	50 kts	n/a	n/a	n/a	n/a	A large tree was blown down onto a house in the city causing minor damage
5/23/2001	12:45 p.m.	Pana	50 kts	n/a	n/a	n/a	n/a	Numerous trees and tree limbs were blown down
5/23/2001	1:54 p.m.	Bulpitt Kincaid Jeisyville	50 kts	n/a	n/a	n/a	n/a	A large tree was blown over onto a front porch, causing minor damage
7/4/2001	9:57 p.m.	Grove City	50 kts	n/a	n/a	n/a	n/a	A large tree was blown down
7/4/2001	10:40 p.m.	Owaneco	50 kts	n/a	n/a	n/a	n/a	2 large trees were blown over
7/17/2001	4:57 p.m.	Taylorville	50 kts	n/a	n/a	n/a	n/a	Several power lines 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 Christian County
1958 – 2019
(Sheet 8 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
7/23/2001	5:15 p.m.	Taylorville	50 kts	n/a	n/a	n/a	n/a	- Numerous power lines were blown down - Several large trees at a local park and cemetery were blown down
8/30/2001	4:30 p.m.	Morrisonville	50 kts	n/a	n/a	n/a	n/a	Several power lines and power poles were reported down on the east and south sides of town
10/24/2001	12:35 p.m.	Pana^	50 kts	n/a	n/a	n/a	n/a	Several large trees were blown down
5/6/2003	7:16 p.m.	Bulpitt Kincaid Jeisyville Sharpsburg	50 kts	n/a	n/a	n/a	n/a	Several trees were blown down
5/10/2003	7:08 a.m.	Edinburg Bulpitt Kincaid Jeisyville Taylorville Stonington	65 kts	n/a	n/a	n/a	n/a	Numerous trees were blown down
7/18/2003	4:20 a.m.	Taylorville Owaneco Millersville Pana	62 kts	n/a	n/a	n/a	n/a	Numerous trees, power poles and power lines were blown down *Taylorville* Several trees fell onto houses
5/23/2004	6:05 p.m.	Taylorville	53 kts	n/a	n/a	n/a	n/a	Several power lines and a large tree 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 Christian County
1958 – 2019
(Sheet 9 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/24/2004	11:25 p.m.	Countywide	55 kts	n/a	n/a	n/a	n/a	*Event Description Provided Below*
Numerous trees, tree limbs, power lines and power poles were blown down *Edinburg Area* Several trees landed on homes causing moderate roof damage *Taylorville Area* A large machine shed was destroyed 1 mile northwest of the city off IL Rte. 29 *Pana* A porch was demolished by a blown down tree								
5/27/2004	4:02 p.m.	Pana Millersville Owaneco Taylorville Bulpitt Kincaid Jeisyville	50 kts	n/a	n/a	n/a	n/a	Several trees and tree limbs were blown down
5/31/2004	7:36 p.m.	Morrisville Palmer Taylorville	50 kts	n/a	n/a	n/a	n/a	Several trees and power lines were blown down
7/11/2004	3:10 p.m.	Mt. Auburn	55 kts	n/a	n/a	n/a	n/a	Several trees were uprooted, and a couple of power lines were blown down
7/22/2004	1:30 p.m.	Taylorville	50 kts	n/a	n/a	n/a	n/a	Several power lines were blown down
1/12/2005	11:00 p.m.	Assumption	50 kts	n/a	n/a	n/a	n/a	A power line and a large tree down
5/19/2005	5:54 p.m.	Stonington	50 kts	n/a	n/a	n/a	n/a	Power lines down
6/8/2005	3:00 p.m.	Edinburg	50 kts	n/a	n/a	n/a	n/a	Numerous power lines down
6/8/2005	3:15 p.m.	Taylorville	50 kts	n/a	n/a	n/a	n/a	A few power lines down
6/8/2005	3:45 p.m.	Rosamond	65 kts	n/a	n/a	n/a	n/a	- Numerous trees and power lines down - Playground equipment destroyed
6/13/2005	5:47 p.m.	Mt. Auburn^	50 kts	n/a	n/a	n/a	n/a	Power lines 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 Christian County 1958 – 2019 (Sheet 10 of 16)								
Date(s)	**Start Time**	**Location(s)**	**Maximum Magnitude (Knots)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
6/13/2005	5:55 p.m.	Edinburg^ Stonington	50 kts	n/a	n/a	n/a	n/a	Several trees and power lines were blown down
8/13/2005	5:00 p.m.	Rosamond^ Pana^	50 kts	n/a	n/a	n/a	n/a	- A metal swing and playhouse were blown apart - A 100 pound bench swing was blown over and destroyed
8/18/2005	10:00 p.m.	Mt. Auburn	50 kts	n/a	n/a	n/a	n/a	A few trees were blown down
9/8/2005	5:50 p.m.	Bulpitt Kincaid Jeisyville	50 kts	n/a	n/a	n/a	n/a	Three trees were blown down
9/19/2005	6:17 p.m.	Stonington	50 kts	n/a	n/a	n/a	n/a	Several trees and power lines were blown down
11/5/2005	10:07 p.m.	Morrisonville Palmer Taylorville Stonington	52 kts	n/a	n/a	n/a	n/a	*Stonington* Several power lines were blown down
4/2/2006	5:00 p.m.	Rosamond	56 kts	n/a	n/a	n/a	n/a	- Roof damage to several homes - Grain silos were blown over
4/30/2006	2:50 p.m.	Taylorville	58 kts	n/a	n/a	n/a	n/a	Numerous large trees were blown over
5/24/2006	3:23 p.m.	Palmer	50 kts	n/a	n/a	n/a	n/a	A few power lines were blown down
5/24/2006	3:27 p.m.	Edinburg	50 kts	n/a	n/a	n/a	n/a	Numerous power lines were blown down
5/24/2006	3:27 p.m.	Morrisonville Rosamond^ Pana^	52 kts	n/a	n/a	n/a	n/a	Numerous trees and power lines 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 Christian County
1958 – 2019
(Sheet 11 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
7/19/2006	5:11 p.m.	Stonington Bulpitt Kincaid Jeisyville	56 kts	n/a	n/a	n/a	n/a	Numerous trees and power lines were blown down
3/1/2007	12:19 p.m.	Taylorville	70 kts	n/a	n/a	n/a	n/a	- An empty semi-trailer was blown over - A roof was partially torn off a house
3/31/2007	6:08 p.m.	Bulpitt Kincaid Jeisyville	61 kts	n/a	n/a	n/a	n/a	Power lines were blown down
5/2/2008	8:45 a.m.	Taylorville^ Assumption	55 kts	n/a	n/a	$20,000	n/a	A few trees and power lines were blown down between the Taylorville Area and Assumption
5/11/2008	1:00 a.m.	Edinburg	61 kts	n/a	n/a	$25,000	n/a	- A roof was blown off a 10-unit rental storage building - A few trees were blown down
5/30/2008	7:15 p.m.	Taylorville^	52 kts	n/a	n/a	n/a	n/a	
6/3/2008	1:35 a.m.	Edinburg	61 kts	n/a	n/a	$15,000	n/a	- A barn was damaged - A house was damaged primarily by falling trees
6/3/2008	8:00 p.m.	Taylorville	52 kts	n/a	n/a	$2,000	n/a	A tree was blown down onto a power line
7/8/2008	4:03 p.m.	Roby^	52 kts	n/a	n/a	$8,000	n/a	Multiple trees were blown down at the junction of county roads 2700 N and 800 E
7/8/2008	4:41 p.m.	Pana	52 kts	n/a	n/a	$5,000	n/a	Power lines were blown down
Subtotal:				**0**	**0**	**$75,000**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Christian County
1958 – 2019
(Sheet 12 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
8/5/2008	6:17 p.m.	Taylorville Taylorville Municipal Airport	52 kts	n/a	n/a	$2,000 $8,000	n/a	- A tree was blown down - Numerous tree limbs were blown down
12/27/2008	12:55 p.m.	Bulpitt Kincaid Jeisyville	52 kts	n/a	n/a	$55,000	n/a	Multiple buildings sustained wind damage
12/27/2008	2:05 p.m.	Sharpsburg^	52 kts	n/a	n/a	$15,000	n/a	The roof of an attached garage was blown off a well-built home
3/8/2009	11:10 a.m.	Owaneco^	52 kts	n/a	n/a	$40,000	n/a	- Several machine sheds and outbuilding roofs were damaged - A farm gasoline barrel was blown off its stand
5/13/2009	10:58 p.m.	Morrisonville^	65 kts	n/a	n/a	$25,000	n/a	- Wind gusts did extensive damage to a barn roof - The siding and shingles were peeled back on an adjacent house
8/4/2009	7:52 a.m.	Morrisonville	61 kts	n/a	n/a	$10,000	n/a	Power lines were blown down
8/4/2009	7:55 a.m.	Taylorville^	61 kts	n/a	n/a	$40,000	n/a	20 power poles were blown down
8/19/2009	3:05 p.m.	Taylorville	52 kts	n/a	n/a	$30,000	n/a	- Numerous trees and power lines were blown down - A residence sustained damage to a garage as a tree fell onto it
6/13/2010	3:11 p.m.	Bulpitt Kincaid Jeisyville	52 kts	n/a	n/a	$25,000	n/a	Numerous trees and power lines were blown down
Subtotal:				**0**	**0**	**$250,000**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Christian County
1958 – 2019
(Sheet 13 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/13/2010	4:44 p.m.	Bulpitt Kincaid Jeisyville	52 kts	n/a	n/a	$4,000	n/a	Two trees were blown down
6/23/2010	8:00 p.m.	Roby^ Mt. Auburn^	52 kts	n/a	n/a	$2,000 $20,000	n/a	*Roby Area* A 70-foot tree was uprooted *Mt. Auburn* A barn and machine shed were damaged
7/19/2010	12:05 p.m.	Taylorville	70 kts	1	n/a	$110,000	n/a	*Event Description Provided Below*
- A brick outbuilding was blown down - An equipment storage shed lost part of its roof - A house lost a portion of its roof - An aluminum shed was blown into another house - Numerous trees were blown down or snapped off with several homes sustaining damage from falling trees - One person was injured when a tree fell on their vehicle								
7/19/2010	12:25 p.m.	Pana	61 kts	n/a	n/a	$60,000	n/a	- The R.P. Lumber storage facility sustained significant damage - Numerous trees and powerlines were blown down - A large tree branch fell on a home on Franklin Street
7/24/2010	4:15 p.m.	Pana	52 kts	n/a	n/a	$18,000	n/a	- A tree and numerous branches were blown down
9/2/2010	6:15 p.m.	Bulpitt Kincaid Jeisyville	52 kts	n/a	n/a	$8,000	n/a	A tree was blown onto a house at the 300 block of West Elm St.
4/19/2011	5:21 p.m.	Taylorville	61 kts	n/a	n/a	$50,000	n/a	Numerous trees and power lines were blown down causing widespread power outages
Subtotal:				**1**	**0**	**$272,000**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Christian County
1958 – 2019
(Sheet 14 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
4/19/2011	5:30 p.m.	Taylorville	61 kts.	n/a	n/a	$75,000	n/a	The siding was ripped off buildings on Cherokee St.
9/3/2011	5:30 p.m.	Taylorville^	52 kts	n/a	n/a	n/a	n/a	Minor damage to tree limbs
1/17/2012	2:15 a.m.	Mt. Auburn	52 kts	n/a	n/a	$20,000	n/a	Numerous trees were blown down
1/17/2012	2:25 a.m.	Assumption	52 kts	n/a	n/a	$35,000	n/a	Numerous tree limbs were blown down and a shed was damaged
8/19/2012	2:32 p.m.	Pana	70 kts	n/a	n/a	$30,000	n/a	Numerous 12 to 18-inch diameter trees and power lines were knocked down
5/27/2013	2:00 p.m.	Edinburg	61 kts	n/a	n/a	$6,000	n/a	3 large trees were blown down
5/31/2013	8:00 p.m.	Morrisonville	52 kts	n/a	n/a	$12,000	n/a	A large limb was blown onto a vehicle
5/31/2013	8:07 p.m.	Jeisyville Kincaid Edinburg	61 kts	n/a	n/a	$10,000 $8,000	n/a	*Jeisyville* A tree was blown onto a house *Edinburg* A large tree was blown onto a trailer
5/31/2013	8:15 p.m.	Taylorville	61 kts	n/a	n/a	$25,000	n/a	A small machine shed was destroyed
11/17/2013	11:50 a.m.	Taylorville^	61 kts	n/a	n/a	$12,000	n/a	Power lines were blown down just south of the city
8/26/2014	8:00 p.m.	Taylorville Taylorville^	52 kts	n/a	n/a	$15,000	n/a	- Several tree branches were blown down - Downed branches temporarily blocked IL Route 29
4/8/2015	6:00 a.m.	Tovey^	52 kts	n/a	n/a	$100,000	n/a	Several large tree branches were blown down, a few caused minor roof damage to homes
6/20/2015	9:35 p.m.	Morrisonville	52 kts	n/a	n/a	$4,000	n/a	Several small tree limbs were blown down across the town
Subtotal:				**0**	**0**	**$352,000**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Christian County
1958 – 2019
(Sheet 15 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
7/13/2016	3:40 p.m.	Edinburg	61 kts	n/a	n/a	$25,000	n/a	Numerous large tree branches were blown down
4/29/2017	4:10 p.m.	Taylorville^	52 kts	n/a	n/a	$15,000	n/a	Power lines were blown down along IL Rte. 48 south
4/29/2017	4:15 p.m.	Palmer	52 kts	n/a	n/a	$25,000	n/a	Several trees and power lines were blown down
4/29/2017	4:22 p.m.	Taylorville^	61 kts	n/a	n/a	$50,000	n/a	- Several mature trees were uprooted - 2 houses were damaged
7/10/2017	9:30 p.m.	Stonington	52 kts	n/a	n/a	$15,000	n/a	- Numerous large tree branches were blown down - A branch fell on a garage
7/10/2017	9:40 p.m.	Rosamond	52 kts	n/a	n/a	$10,000	n/a	- Trees were blown down on several properties - An awning was blown down
6/28/2018	4:27 p.m.	Assumption	52 kts	n/a	n/a	n/a	n/a	A large tree was broken off at the base
6/28/2018	4:35 p.m.	Pana	52 kts	n/a	n/a	n/a	n/a	Several tree limbs were blown down in Kitchell Park
7/19/2018	10:15 p.m.	Taylorville	52 kts	n/a	n/a	n/a	n/a	A large tree was blown down at Memorial School
7/19/2018	10:30 p.m.	Mt. Auburn^	52 kts	n/a	n/a	$32,000	n/a	A tree was blown onto a house
6/5/2019	3:11 p.m.	Jeisyville^	52 kts	n/a	n/a	$20,000	n/a	The roof and siding were ripped off a barn
6/5/2019	3:35 p.m.	Taylorville	52 kts	n/a	n/a	$30,000	n/a	Roof damaged occurred at Hickory Estates
6/5/2019	4:01 p.m.	Pana	52 kts	n/a	n/a	n/a	n/a	A large tree branch was blown down in Kitchell Park
Subtotal:				**0**	**0**	**$222,000**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms – Thunderstorms with Damaging Winds Reported in Christian County
1958 – 2019
(Sheet 16 of 16)

Date(s)	Start Time	Location(s)	Maximum Magnitude (Knots)	Injuries	Fatalities	Property Damage	Crop Damage	Description
8/12/2019	8:24 p.m.	Willeys^ Sharpsburg^	52 kts	n/a	n/a	n/a	n/a	*Willeys Area* A tree was blown over *Sharpsburg Area* Several large tree branches were broken
8/12/2019	8:26 p.m.	Willeys	52 kts	n/a	n/a	n/a	n/a	Several large tree branches were broken
8/12/2019	8:30 p.m.	Willeys^	52 kts	n/a	n/a	n/a	n/a	Power lines were blown down at N 1800 East & E 1685 North
8/12/2019	8:33 p.m.	Willeys^	52 kts	n/a	n/a	n/a	n/a	A power pole was pushed over
Subtotal:				**0**	**0**	**$0**	**$0**	
GRAND TOTAL:				**1**	**0**	**$1,171,000**	**$0**	

^ Thunderstorm with damaging winds verified in the vicinity of this location(s).

Source: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database

Figure 2
Severe Storms – Hail Events Reported in Christian County
1968 – 2019
(Sheet 1 of 3)

Date(s)	Start Time	Location(s)	Magnitude (Diameter)	Injuries	Fatalities	Property Damage	Crop Damage	Description
3/29/1968	2:00 p.m.	Taylorville^	1.50 in.	n/a	n/a	n/a	n/a	
6/14/1974	3:00 p.m.	Stonington	1.00 in.	n/a	n/a	n/a	n/a	
5/30/1975	2:56 p.m.	Taylorville	1.50 in.	n/a	n/a	n/a	n/a	
5/5/1977	10:10 p.m.	Edinburg	1.75 in.	n/a	n/a	n/a	n/a	
9/30/1977	6:30 p.m.	Pana	1.75 in.	n/a	n/a	n/a	n/a	Smashed windows, dented car roofs, down-spouts and screens ripped off
5/26/1982	1:50 p.m.	Stonington^	1.00 in.	n/a	n/a	n/a	n/a	
8/28/1984	9:35 p.m.	Stonington	1.75 in.	n/a	n/a	n/a	n/a	
6/20/1990	1:25 a.m.	Taylorville	1.75 in.	n/a	n/a	n/a	n/a	
4/26/1994	9:00 p.m.	Taylorville^	1.00 in.	n/a	n/a	n/a	n/a	
4/7/1998	4:00 p.m.	Sicily^ Tovey^ Kincaid^ Jeisyville^ Taylorville^ Willeys	2.00 in.	n/a	n/a	n/a	n/a	
5/22/1998	9:27 p.m.	Bulpitt Kincaid Jeisyville	1.00 in.	n/a	n/a	n/a	n/a	
6/1/1999	6:20 p.m.	Palmer^	1.00 in.	n/a	n/a	n/a	n/a	
6/8/1999	4:08 p.m.	Tovey	1.00 in.	n/a	n/a	n/a	n/a	
5/12/2000	6:45 p.m.	Pana	1.00 in.	n/a	n/a	n/a	n/a	
6/4/2000	7:55 p.m.	Stonington	1.00 in.	n/a	n/a	n/a	n/a	
8/18/2001	3:14 p.m.	Morrisonville	1.25 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

^ Hail event verified in the vicinity of this location(s).

Figure 2
Severe Storms – Hail Events Reported in Christian County
1968 – 2019
(Sheet 2 of 3)

Date(s)	Start Time	Location(s)	Magnitude (Diameter)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/1/2002	2:20 p.m.	Morrisonville Palmer Clarksdale Hewittsville Taylorville	2.00 in.	n/a	n/a	n/a	n/a	
5/27/2002	3:35 p.m.	Palmer Clarksdale Hewittsville Taylorville	1.00 in.	n/a	n/a	n/a	n/a	Roof damage in Palmer
7/18/2003	3:10 p.m.	Rosamond	1.00 in.	n/a	n/a	n/a	n/a	
6/3/2006	2:41 p.m.	Stonington	1.75 in.	n/a	n/a	n/a	n/a	
6/3/2006	3:27 p.m.	Pana	1.00 in.	n/a	n/a	n/a	n/a	
6/26/2006	1:58 p.m.	Owaneco	1.00 in.	n/a	n/a	n/a	n/a	
5/26/2007	4:22 p.m.	Taylorville^ Hewittsville^	1.00 in.	n/a	n/a	n/a	n/a	
5/7/2009	5:32 p.m.	Palmer	1.00 in.	n/a	n/a	n/a	n/a	
5/7/2009	5:43 p.m.	Palmer^	1.00 in.	n/a	n/a	n/a	n/a	
6/13/2010	3:16 p.m.	Bulpitt Kincaid Jeisyville	1.00 in.	n/a	n/a	n/a	n/a	
6/13/2010	3:39 p.m.	Taylorville	1.00 in.	n/a	n/a	n/a	n/a	
5/29/2012	12:25 a.m.	Rosamond	1.50 in.	n/a	n/a	n/a	n/a	
8/16/2012	2:00 p.m.	Taylorville^	1.00 in.	n/a	n/a	n/a	n/a	
11/17/2013	12:15 p.m.	Assumption	2.75 in.	n/a	n/a	$1,800	n/a	residential roofs, siding and windows were damaged
8/26/2014	7:11 p.m.	Stonington	1.00 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$1,800**	**$0**	

^ Hail event verified in the vicinity of this location(s).

Figure 2
Severe Storms – Hail Events Reported in Christian County
1968 – 2019
(Sheet 3 of 3)

Date(s)	Start Time	Location(s)	Magnitude (Diameter)	Injuries	Fatalities	Property Damage	Crop Damage	Description
4/9/2015	7:18 p.m.	Taylorville	1.00 in.	n/a	n/a	n/a	n/a	
6/28/2015	6:42 p.m.	Bulpitt Kincaid Jeisyville	1.50 in.	n/a	n/a	n/a	n/a	
4/29/2017	4:08 p.m.	Bulpitt Kincaid Jeisyville	1.00 in.	n/a	n/a	n/a	n/a	
5/27/2018	1:00 p.m.	Morrisonville	1.00 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	
GRAND TOTAL:				**0**	**0**	**$1,800**	**$0**	

^ Hail event verified in the vicinity of this location(s).

Sources: Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee Member responses to Natural Hazard Events Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database

Table 3 Severe Storms – Lightning Events Reported in Christian County 2008 – 2019							
Date(s)	**Start Time**	**Location(s)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
7/11/2008	4:45 p.m.	Taylorville^	0	0	$35,000	n/a	Lightning struck an oil storage facility destroying 3 oil tanks and their contents
5/13/2017	n/a	Stonington	n/a	n/a	$15,075	n/a	Lightning struck a tree and caused a large limb to fall on a lift station control box at West & Division streets according to the Mayor
GRAND TOTAL:			**0**	**0**	**$50,075**	**$0**	

^ Lightning strike event verified in the vicinity of this location(s).

Sources: Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee Member responses to Critical Facilities Damage Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 1 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/27/2000	n/a	Morrisonville Pana	1.88 in.	n/a	n/a	n/a	n/a	
6/21/2000	n/a	Kincaid Pana Taylorville	3.63 in.	n/a	n/a	n/a	n/a	
8/24/2000	n/a	Morrisonville	1.62 in.	n/a	n/a	n/a	n/a	
9/11/2000	n/a	Pana	2.05 in.	n/a	n/a	n/a	n/a	
10/5/2000	n/a	Kincaid Pana	4.68 in.	n/a	n/a	n/a	n/a	
2/25/2001	n/a	Kincaid Morrisonville Taylorville	2.40 in.	n/a	n/a	n/a	n/a	
4/11/2001	n/a	Kincaid	2.22 in.	n/a	n/a	n/a	n/a	
6/6/2001	n/a	Pana	3.40 in.	n/a	n/a	n/a	n/a	
7/24/2001	n/a	Morrisonville	1.60 in.	n/a	n/a	n/a	n/a	
10/11/2001 thru 10/12/2001	1:00 a.m.	Taylorville	3.25 in.	n/a	n/a	n/a	n/a	
1/29/2002 thru 1/30/2002	12:30 p.m.	Kincaid Morrisonville Taylorville	2.61 in.	n/a	n/a	n/a	n/a	
4/28/2002	n/a	Kincaid Pana	1.97 in.	n/a	n/a	n/a	n/a	
4/19/2002 thru 4/20/2002	9:00 p.m.	Taylorville	2.55 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 2 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/6/2002 thru 5/7/2002	n/a	Morrisonville Pana	4.07 in.	n/a	n/a	n/a	n/a	
5/9/2002	12:00 a.m.	Taylorville	1.55 in.	n/a	n/a	n/a	n/a	
5/11/2002 thru 5/12/2002	12:00 p.m.	Kincaid Morrisonville Pana Taylorville	4.08 in.	n/a	n/a	n/a	n/a	
5/27/2002	2:00 p.m.	Taylorville	2.19 in.	n/a	n/a	n/a	n/a	
6/11/2002	10:00 a.m.	Kincaid Taylorville	2.72 in.	n/a	n/a	n/a	n/a	
6/13/2002	4:00 a.m.	Kincaid Morrisonville Pana Taylorville	3.33 in.	n/a	n/a	n/a	n/a	
8/16/2002	9:00 a.m.	Taylorville	2.80 in.	n/a	n/a	n/a	n/a	
9/17/2002 thru 9/18/2002	4:30 p.m.	Pana Taylorville	1.95 in.	n/a	n/a	n/a	n/a	
12/17/2002	11:00 a.m.	Taylorville	2.03 in.	n/a	n/a	n/a	n/a	
12/19/2002	n/a	Morrisonville	1.54 in.	n/a	n/a	n/a	n/a	
3/20/2003	n/a	Pana	1.50 in.	n/a	n/a	n/a	n/a	
4/5/2003	n/a	Taylorville	1.80 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 3 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/11/2003	n/a	Kincaid Morrisonville Pana	2.10 in.	n/a	n/a	n/a	n/a	
5/20/2003	n/a	Pana	1.52 in.	n/a	n/a	n/a	n/a	
6/26/2003	n/a	Morrisonville	1.53 in.	n/a	n/a	n/a	n/a	
7/10/2003	n/a	Kincaid Taylorville	1.83 in.	n/a	n/a	n/a	n/a	
7/19/2003	n/a	Kincaid Pana	1.74 in.	n/a	n/a	n/a	n/a	
7/28/2003	n/a	Morrisonville	1.74 in.	n/a	n/a	n/a	n/a	
8/2/2003	3:00 p.m.	Kincaid Morrisonville Pana Taylorville	3.77 in.	n/a	n/a	n/a	n/a	
9/1/2003	7:00 a.m.	Kincaid Morrisonville Pana Taylorville	5.08 in.	n/a	n/a	n/a	n/a	
9/27/2003	n/a	Pana	1.66 in.	n/a	n/a	n/a	n/a	
11/17/2003 thru 11/18/2003	3:30 p.m.	Kincaid Morrisonville Pana Taylorville	4.52 in.	n/a	n/a	n/a	n/a	
3/5/2004	9:00 p.m.	Kincaid Morrisonville Taylorville	1.82 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 4 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/13/2004 thru 5/14/2004	4:00 p.m.	Morrisonville Pana Taylorville	3.80 in.	n/a	n/a	n/a	n/a	
5/23/2004	6:00 p.m.	Kincaid Taylorville	1.88 in.	n/a	n/a	n/a	n/a	
8/26/2004	n/a	Kincaid Morrisonville Pana	2.06 in.	n/a	n/a	n/a	n/a	
10/18/2004	4:30 a.m.	Kincaid Morrisonville Pana Taylorville	2.90 in.	n/a	n/a	n/a	n/a	
12/6/2004 thru 12/7/2004	9:00 p.m.	Pana Taylorville	1.90 in.	n/a	n/a	n/a	n/a	
1/4/2005 thru 1/5/2005	5:00 a.m.	Morrisonville Pana Taylorville	3.24 in.	n/a	n/a	n/a	n/a	
1/12/2005 thru 1/13/2005	2:00 p.m.	Kincaid Morrisonville Pana Taylorville	3.13 in.	n/a	n/a	n/a	n/a	
6/14/2005	n/a	Kincaid	1.95 in.	n/a	n/a	n/a	n/a	
7/5/2005	n/a	Taylorville	2.50 in.	n/a	n/a	n/a	n/a	
7/19/2005	n/a	Taylorville	2.00 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 5 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
9/20/2005	n/a	Morrisonville	1.58 in.	n/a	n/a	n/a	n/a	
9/26/2005	n/a	Pana	1.63 in.	n/a	n/a	n/a	n/a	
12/29/2005	n/a	Pana	1.58 in.	n/a	n/a	n/a	n/a	
3/12/2006	n/a	Pana	2.08 in.	n/a	n/a	n/a	n/a	
6/2/2006	n/a	Morrisonville	1.71 in.	n/a	n/a	n/a	n/a	
8/7/2006 thru 8/8/2006	11:00 p.m.	Taylorville	5.24 in.	n/a	n/a	n/a	n/a	
8/28/2006	n/a	Pana	1.70 in.	n/a	n/a	n/a	n/a	
10/16/2006	6:30 a.m.	Morrisonville Pana Taylorville	2.20 in.	n/a	n/a	n/a	n/a	
12/1/2006 thru 12/2/2006	7:00 a.m.	Morrisonville Pana Taylorville	2.50 in.	n/a	n/a	n/a	n/a	
1/15/2007	n/a	Pana	2.00 in.	n/a	n/a	n/a	n/a	
9/8/2007	12:00 p.m.	Taylorville	3.16 in.	n/a	n/a	n/a	n/a	
10/3/2007	n/a	Morrisonville	1.56 in.	n/a	n/a	n/a	n/a	
10/16/2007	n/a	Pana	1.60 in.	n/a	n/a	n/a	n/a	
11/22/2007	n/a	Kincaid	1.53 in.	n/a	n/a	n/a	n/a	
1/8/2008	n/a	Morrisonville Taylorville	2.15 in.	n/a	n/a	n/a	n/a	
2/6/2008	n/a	Kincaid Morrisonville Taylorville	2.74 in.	n/a	n/a	n/a	n/a	
4/11/2008	n/a	Pana	2.02 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 6 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/11/2008	n/a	Pana	1.60 in.	n/a	n/a	n/a	n/a	
5/30/2008	n/a	Kincaid Taylorville	2.99 in.	n/a	n/a	n/a	n/a	
6/4/2008	n/a	Kincaid Pana	2.02 in.	n/a	n/a	n/a	n/a	
6/7/2008	n/a	Kincaid	1.59 in.	n/a	n/a	n/a	n/a	
6/28/2008	n/a	Kincaid	1.56 in.	n/a	n/a	n/a	n/a	
7/9/2008	n/a	Pana	1.64 in.	n/a	n/a	n/a	n/a	
9/5/2008	n/a	Kincaid Morrisonville Pana Taylorville	2.41 in.	n/a	n/a	n/a	n/a	
9/12/2008 thru 9/15/2008	n/a	Kincaid Morrisonville Pana Taylorville	8.43 in.	n/a	n/a	n/a	n/a	
12/19/2008	n/a	Taylorville	1.53 in.	n/a	n/a	n/a	n/a	
12/24/2008	n/a	Taylorville	1.50 in.	n/a	n/a	n/a	n/a	
12/28/2008	n/a	Kincaid Morrisonville Taylorville	1.90 in.	n/a	n/a	n/a	n/a	
5/13/2009 thru 5/14/2009	7:00 a.m.	Kincaid Morrisonville	3.53 in.	n/a	n/a	n/a	n/a	
9/5/2009	10:00 a.m.	Taylorville	3.70 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 7 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
10/8/2009	7:00 a.m.	Kincaid Morrisonville Pana Taylorville	2.04 in.	n/a	n/a	n/a	n/a	
10/22/2009	7:00 a.m.	Kincaid Morrisonville Taylorville	2.36 in.	n/a	n/a	n/a	n/a	
10/29/2009	7:00 a.m.	Kincaid Morrisonville	1.84 in.	n/a	n/a	n/a	n/a	
10/30/2009	n/a	Pana	2.37 in.	n/a	n/a	n/a	n/a	
11/15/2009	12:00 p.m.	Kincaid Morrisonville Taylorville	2.25 in.	n/a	n/a	n/a	n/a	
12/25/2009	n/a	Pana	1.63 in.	n/a	n/a	n/a	n/a	
4/24/2010 thru 4/25/2010	6:00 p.m.	Kincaid	1.96 in.	n/a	n/a	n/a	n/a	
6/14/2010	n/a	Morrisonville Pana	2.00 in.	n/a	n/a	n/a	n/a	
6/21/2010	7:00 a.m.	Kincaid Pana	2.20 in.	n/a	n/a	n/a	n/a	
7/19/2010	12:00 p.m.	Kincaid Morrisonville Pana Taylorville	2.80 in.	n/a	n/a	n/a	n/a	
7/20/2010	9:00 a.m.	Taylorville	1.60 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 8 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
7/24/2010	n/a	Pana	2.00 in.	n/a	n/a	n/a	n/a	
8/13/2010 thru 8/14/2010	8:00 p.m.	Kincaid Taylorville	1.68 in.	n/a	n/a	n/a	n/a	
8/20/2010 thru 8/21/2010	9:00 a.m.	Kincaid Morrisonville Taylorville	3.01 in.	n/a	n/a	n/a	n/a	
9/1/2010	7:00 a.m.	Pana	1.63 in.	n/a	n/a	n/a	n/a	
9/2/2010 thru 9/3/2010	7:00 p.m.	Kincaid Morrisonville Pana Taylorville	3.38 in.	n/a	n/a	n/a	n/a	
11/24/2010	7:00 a.m.	Kincaid Morrisonville Pana Taylorville	2.97 in.	n/a	n/a	n/a	n/a	
2/1/2011	12:00 p.m.	Pana	2.03 in.	n/a	n/a	n/a	n/a	
4/19/2011 thru 4/20/2011	6:00 p.m.	Morrisonville Pana Taylorville	2.15 in.	n/a	n/a	n/a	n/a	
5/25/2011	4:00 p.m.	Kincaid Morrisonville Pana Taylorville	2.73 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 9 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/10/2011 thru 6/11/2011	n/a	Morrisonville	1.61 in.	n/a	n/a	n/a	n/a	
6/14/2011 thru 6/15/2011	7:00 a.m.	Kincaid	2.02 in.	n/a	n/a	n/a	n/a	
6/17/2011	n/a	Morrisonville	1.74 in.	n/a	n/a	n/a	n/a	
6/18/2011	n/a	Morrisonville	1.50 in.	n/a	n/a	n/a	n/a	
6/25/2011	5:00 p.m.	Morrisonville Taylorville	1.65 in.	n/a	n/a	n/a	n/a	
7/7/2011	4:00 p.m.	Pana Taylorville	3.60 in.	n/a	n/a	n/a	n/a	COOP observer for Taylorville indicated there was very heavy rainfall with some flash flooding and approx. 2 ½ inches of rain fell in less than an hour.
7/24/2011	n/a	Morrisonville	1.52 in	n/a	n/a	n/a	n/a	
4/14/2012	n/a	Pana	1.63 in.	n/a	n/a	n/a	n/a	
4/29/2012	7:00 a.m.	Kincaid Pana	1.89 in.	n/a	n/a	n/a	n/a	
6/11/2012	n/a	Morrisonville	1.80 in.	n/a	n/a	n/a	n/a	
8/2/2012	2:00 p.m.	Kincaid Morrisonville Pana Taylorville	4.31 in.	n/a	n/a	n/a	n/a	
8/31/2012	3:00 p.m.	Kincaid Morrisonville Pana Taylorville	4.90 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 10 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
10/23/2012	12:00 a.m.	Kincaid	1.97 in.	n/a	n/a	n/a	n/a	
1/29/2013 thru 1/30/2013	5:00 p.m.	Kincaid	1.64 in.	n/a	n/a	n/a	n/a	
3/24/2013 thru 3/25/2013	12:00 p.m.	Taylorville	1.70 in.	n/a	n/a	n/a	n/a	
4/10/2013 thru 4/11/2013	2:00 p.m.	Kincaid Pana Taylorville	1.72 in.	n/a	n/a	n/a	n/a	
4/18/2013	6:00 a.m.	Kincaid Morrisonville Pana Taylorville	3.50 in.	n/a	n/a	n/a	n/a	
5/9/2013	n/a	Pana	2.08 in.	n/a	n/a	n/a	n/a	
5/20/2013 thru 5/21/2013	9:00 p.m.	Kincaid Morrisonville Taylorville	2.23 in.	n/a	n/a	n/a	n/a	
5/31/2013 thru 6/1/2013	10:00 a.m.	Kincaid Morrisonville	2.15 in.	n/a	n/a	n/a	n/a	
6/15/2013 thru 6/16/2013	10:00 p.m.	Taylorville	1.78 in.	n/a	n/a	n/a	n/a	
10/30/2013 thru 10/31/2013	3:00 p.m.	Morrisonville Taylorville	2.44 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 11 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
5/10/2014 thru 5/11/2014	11:00 p.m.	Kincaid	1.52 in.	n/a	n/a	n/a	n/a	
6/23/2014 thru 6/24/2014	7:00 p.m.	Kincaid Taylorville	2.87 in.	n/a	n/a	n/a	n/a	
8/20/2014	9:00 a.m.	Kincaid	1.68 in.	n/a	n/a	n/a	n/a	
8/26/2014	7:00 p.m.	Kincaid	3.96 in.	n/a	n/a	n/a	n/a	
9/10/2014	9:00 a.m.	Taylorville	1.80 in.	n/a	n/a	n/a	n/a	
9/15/2014	9:00 a.m.	Kincaid	1.71 in.	n/a	n/a	n/a	n/a	
10/1/2014 thru 10/2/2014	7:00 p.m.	Kincaid Morrisonville Pana Taylorville	5.44 in.	n/a	n/a	n/a	n/a	
6/7/2015 thru 6/8/2015	10:00 p.m.	Kincaid Pana Taylorville	2.18 in.	n/a	n/a	n/a	n/a	
7/8/2015	8:00 a.m.	Taylorville	1.50 in.	n/a	n/a	n/a	n/a	
8/5/2015 thru 8/6/2015	n/a	Pana	1.72 in.	n/a	n/a	n/a	n/a	
9/8/2015	3:00 p.m.	Taylorville	1.74 in.	n/a	n/a	n/a	n/a	
12/23/2015	n/a	Pana	1.55 in.	n/a	n/a	n/a	n/a	
12/26/2015 thru 12/28/2015	7:00 a.m.	Kincaid Pana Taylorville	7.31 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 12 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/4/2016	n/a	Pana	1.82 in.	n/a	n/a	n/a	n/a	
7/2/2016 thru 7/3/2016	11:00 a.m.	Taylorville	1.52 in.	n/a	n/a	n/a	n/a	
7/13/2016 thru 7/14/2016	4:00 p.m.	Taylorville	1.82 in.	n/a	n/a	n/a	n/a	
8/12/2016	n/a	Pana	2.81 in.	n/a	n/a	n/a	n/a	
8/15/2016 thru 8/16/2016	12:00 a.m.	Kincaid Pana Taylorville	3.41 in.	n/a	n/a	n/a	n/a	
9/8/2016 thru 9/9/2016	n/a	Pana	2.19 in.	n/a	n/a	n/a	n/a	
4/4/2017 thru 4/5/2017	11:00 p.m.	Kincaid	2.55 in.	n/a	n/a	n/a	n/a	
4/29/2017 thru 4/30/2017	12:00 a.m.	Kincaid Pana	3.40 in.	n/a	n/a	n/a	n/a	
5/3/2017 thru 5/4/2017	n/a	Pana	2.76 in.	n/a	n/a	n/a	n/a	
5/19/2017 thru 5/20/2017	6:00 a.m.	Kincaid	2.18 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4
Severe Storms – Heavy Rain Events Reported in Christian County
2000 – 2019
(Sheet 13 of 15)

Date(s)	Start Time	COOP Location(s)	Maximum Magnitude (inches)	Injuries	Fatalities	Property Damage	Crop Damage	Description
6/14/2017 thru 6/15/2017	n/a	Pana	1.56 in.	n/a	n/a	n/a	n/a	
7/27/2017	n/a	Morrisonville Pana	2.92 in.	n/a	n/a	n/a	n/a	
10/4/2017 thru 10/5/2017	n/a	Pana	2.75 in.	n/a	n/a	n/a	n/a	
10/10/2017	n/a	Pana	1.52 in.	n/a	n/a	n/a	n/a	
2/19/2018	n/a	Morrisonville	2.00 in.	n/a	n/a	n/a	n/a	
2/20/2018 thru 2/21/2018	n/a	Morrisonville Pana	2.60 in.	n/a	n/a	n/a	n/a	
3/23/2018 thru 3/24/2018	11:00 p.m.	Kincaid	3.22 in.	n/a	n/a	n/a	n/a	
6/10/2018 thru 6/11/2018	10:00 a.m.	Kincaid Pana	7.36 in.	n/a	n/a	n/a	n/a	
7/3/2018	5:00 p.m.	Kincaid	1.52 in.	n/a	n/a	n/a	n/a	
7/29/2018 thru 7/30/2018	7:00 a.m.	Kincaid	3.87 in.	n/a	n/a	n/a	n/a	
8/16/2018 thru 8/17/2018	11:00 p.m.	Kincaid	1.81 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4 Severe Storms – Heavy Rain Events Reported in Christian County 2000 – 2019 (Sheet 14 of 15)								
Date(s)	**Start Time**	**COOP Location(s)**	**Maximum Magnitude (inches)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
9/7/2018 thru 9/8/2018	n/a	Pana	2.46 in.	n/a	n/a	n/a	n/a	
3/9/2019	8:00 a.m.	Pana Taylorville	1.72 in.	n/a	n/a	n/a	n/a	
4/30/2019 thru 5/1/2019	7:00 p.m.	Taylorville	1.59 in.	n/a	n/a	n/a	n/a	
5/8/2019 thru 5/9/2019	7:00 p.m.	Taylorville	1.56 in.	n/a	n/a	n/a	n/a	
6/15/2019 thru 6/16/2019	12:00 a.m.	Pana Taylorville	3.39 in.	n/a	n/a	n/a	n/a	
6/21/2019 thru 6/22/2019	12:00 p.m.	Pana Taylorville	3.30 in.	n/a	n/a	n/a	n/a	
7/4/2019	n/a	Pana	1.67 in.	n/a	n/a	n/a	n/a	
8/21/2019 thru 8/22/2019	10:00 a.m.	Taylorville	1.68 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

Table 4 **Severe Storms – Heavy Rain Events Reported in Christian County** **2000 – 2019** **(Sheet 15 of 15)**								
Date(s)	**Start Time**	**COOP Location(s)**	**Maximum Magnitude (inches)**	**Injuries**	**Fatalities**	**Property Damage**	**Crop Damage**	**Description**
8/31/2019 thru 9/1/2019	8:00 a.m.	Taylorville	2.27 in.	n/a	n/a	n/a	n/a	
10/26/2019 thru 10/27/2019	6:00 a.m.	Pana Taylorville	2.64 in.	n/a	n/a	n/a	n/a	
Subtotal:				**0**	**0**	**$0**	**$0**	

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 5
Severe Winter Storm Events Reported in Christian County
1950 – 2019
(Sheet 1 of 20)

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]					
12/6/1950	n/a	Heavy Snow	6.5 in.					COOP (Pana)	n/a	n/a	n/a	
11/5/1951 thru 11/6/1951	8:00 p.m.	Winter Storm	12.0 in.			X		COOP (Pana)	n/a	n/a	n/a	
2/29/1952	2:00 p.m.	Heavy Snow	4.0 in.					COOP (Pana)	n/a	n/a	n/a	
12/1/1952	3:00 p.m.	Heavy Snow	4.1 in.					COOP (Taylorville)	n/a	n/a	n/a	
3/1/1953	1:00 p.m.	Heavy Snow	9.0 in.					COOP (Pana) (Morrisonville)	n/a	n/a	n/a	*Event Description Provided Below*
- Pana COOP observer noted drifting snow up to 28 inches; - Morrisonville COOP observer noted that some roads were closed												
1/29/1956 thru 1/30/1956	6:30 p.m.	Heavy Snow	5.0 in.					COOP (Pana)	n/a	n/a	n/a	
2/10/1956 thru 2/11/1956	9:30 p.m.	Heavy Snow	8.0 in.					COOP (Taylorville) (Pana)	n/a	n/a	n/a	
11/26/1958	1:00 a.m.	Heavy Snow	4.4 in.					COOP (Morrisonville)	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 Christian County
1950 – 2019
(Sheet 2 of 20)

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]					
2/25/1960	12:00 a.m.	Heavy Snow	7.5 in.					COOP (Pana)	n/a	n/a	n/a	Pana COOP observer noted drifting snow up to 2 feet
3/2/1960 thru 3/3/1960	6:00 a.m.	Heavy Snow	6.5 in.					COOP (Pana)	n/a	n/a	n/a	Pana COOP observer noted drifting snow up to 4 feet and slick highways
3/8/1960 thru 3/9/1960	7:00 p.m.	Heavy Snow	7.0 in.					COOP (Pana)	n/a	n/a	n/a	
12/11/1960	12:00 a.m.	Winter Storm	4.5 in.	0.5 in		X		COOP (Pana)	n/a	n/a	n/a	Pana COOP observer noted drifting snow
2/3/1961	n/a	Heavy Snow	7.0 in.					COOP (Taylorville)	n/a	n/a	n/a	
1/15/1962	n/a	Winter Storm	5.0 in.	1.21 in.				COOP (Taylorville)	n/a	n/a	n/a	
2/23/1962	11:00 a.m.	Winter Storm	5.0 in.	X		X		COOP (Pana)	n/a	n/a	n/a	Pana COOP observer noted drifting snow
3/8/1962 thru 3/9/1962	10:00 a.m.	Heavy Snow	4.0 in.					COOP (Pana)	n/a	n/a	n/a	
12/11/1963	11:00 a.m.	Heavy Snow	4.0 in.					COOP (Taylorville)	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 Christian County
1950 – 2019
(Sheet 3 of 20)

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]					
1/11/1964 thru 1/12/1964	2:30 p.m.	Heavy Snow	12.0 in.					COOP (Pana) (Taylorville)	n/a	n/a	n/a	Pana COOP observer noted drifting snow up to 4 feet
2/15/1964	10:00 a.m.	Heavy Snow	9.1 in.					COOP (Pana)	n/a	n/a	n/a	
1/14/1965	n/a	Heavy Snow	5.0 in.					COOP (Taylorville)	n/a	n/a	n/a	
3/3/1965 thru 3/4/1965	8:00 p.m.	Heavy Snow	5.5 in.					COOP (Pana)	n/a	n/a	n/a	
2/1/1966	n/a	Heavy Snow	8.0 in.					COOP (Taylorville)	n/a	n/a	n/a	
11/5/1966	n/a	Heavy Snow	4.0 in.					COOP (Taylorville)	n/a	n/a	n/a	
2/28/1969	12:30 a.m.	Heavy Snow	4.3 in.					COOP (Morrisonville)	n/a	n/a	n/a	
3/8/1969	12:30 a.m.	Heavy Snow	5.0 in.					COOP (Pana)	n/a	n/a	n/a	
1/23/1970	n/a	Heavy Snow	4.0 in.					COOP (Taylorville)	n/a	n/a	n/a	
2/13/1970 thru 2/14/1970	11:00 p.m.	Heavy Snow	4.0 in.					COOP (Pana)	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 Christian County
1950 – 2019
(Sheet 4 of 20)

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]					
4/5/1971	9:00 a.m.	Heavy Snow	6.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
12/18/1973 thru 12/20/1973	2:00 p.m.	Heavy Snow	13.5 in.					COOP (Pana) (Kincaid)	n/a	n/a	n/a	
12/30/1973 thru 12/31/1973	8:10 a.m.	Heavy Snow	9.5 in.					COOP (Pana) (Kincaid)	n/a	n/a	n/a	
1/10/1974	n/a	Heavy Snow	5.0 in.					COOP (Kincaid)	n/a	n/a	n/a	
2/23/1974 thru 2/24/1974	8:30 p.m.	Heavy Snow	8.0 in.					COOP (Pana)	n/a	n/a	n/a	Pana COOP observer noted drifting snow
2/25/1975	n/a	Heavy Snow	4.0 in.					COOP (Kincaid)	n/a	n/a	n/a	
11/26/1975	n/a	Heavy Snow	7.5 in.					COOP (Pana)	n/a	n/a	n/a	
12/25/1975 thru 12/26/1975	9:00 p.m.	Heavy Snow	5.5 in.					COOP (Pana)	n/a	n/a	n/a	
3/15/1976 thru 3/16/1976	5:00 p.m.	Heavy Snow	6.5 in.					COOP (Pana)	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 Christian County
1950 – 2019
(Sheet 5 of 20)

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]					
1/4/1977 thru 1/5/1977	9:30 a.m.	Heavy Snow	5.5 in.					COOP (Kincaid) (Pana)	n/a	n/a	n/a	
1/9/1977	8:00 a.m.	Heavy Snow	5.0 in.					COOP (Pana)	n/a	n/a	n/a	
1/28/1977	12:00 a.m.	Blizzard	1.5 in.				50 mph gusts	COOP (Kincaid) (Pana)	n/a	n/a	n/a	*Event Description Provided Below*
- Kincaid COOP observer noted 4 – 8 ft. of drifting snow and that all roads in the area were closed from 2 a.m. on the 28th to 10 p.m. on the 28th - Pana COOP observer noted 6 – 8 ft. of drifting snow and blocked roads												
11/26/1977 thru 11/27/1977	9:00 p.m.	Heavy Snow	5.0 in.					COOP (Kincaid)	n/a	n/a	n/a	
12/5/1977 thru 12/6/1977	12:30 p.m.	Heavy Snow	10.5 in.					COOP (Pana)	n/a	n/a	n/a	
1/16/1978 thru 1/17/1978	3:00 a.m.	Heavy Snow	7.0 in.					COOP (Pana)	n/a	n/a	n/a	
3/6/1978 thru 3/8/1978	4:00 p.m.	Heavy Snow	14.6 in.					COOP (Pana) (Kincaid)	n/a	n/a	n/a	Pana COOP observer noted drifting snow and that all roads were closed
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 Christian County
1950 – 2019
(Sheet 6 of 20)

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]					
3/24/1978 thru 3/26/1978	3:30 a.m.	Ice Storm		X	0.9 in.			COOP (Pana) (Kincaid)	n/a	n/a	n/a	*Event Description Provided Below*
A committee representative from Palmer reported no power for a week with many trees, branches and power lines down *Kincaid COOP Observer* - Approx. 9:30 a.m. on the 24th power was out in the area - Approx. 3:00 p.m. on the 24th water was out in the area - Tree limbs and power lines were downed by ice - Approx. 1:30 p.m. the 27th water was restored to the area - Approx. 6:00 p.m. on the 27th power was restored to 50% of the area - On 28th power was restored to 80%												
1/6/1979 thru 1/7/1979	10:30 p.m.	Heavy Snow	4.0 in.					COOP (Kincaid)	n/a	n/a	n/a	
1/13/1979	6:30 a.m.	Winter Storm	5.0 in.	X				COOP (Pana)	n/a	n/a	n/a	
1/23/1979 thru 1/24/1979	9:00 a.m.	Winter Storm	5.5 in.	X	X	X	X	COOP (Pana) (Kincaid)	n/a	n/a	n/a	Pana COOP observer noted drifting snow, road closures, and power lines down
1/27/1979	1:00 a.m.	Heavy Snow	6.0 in.					COOP (Kincaid) (Pana)	n/a	n/a	n/a	
1/30/1980 thru 1/31/1980	n/a	Heavy Snow	7.5 in.					COOP (Morrisonville)	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 Christian County
1950 – 2019
(Sheet 7 of 20)

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]					
2/5/1980	n/a	Heavy Snow	4.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
2/29/1980 thru 3/1/1980	4:30 p.m.	Heavy Snow	7.0 in.					COOP (Morrisonville) (Kincaid)	n/a	n/a	n/a	
4/13/1980 thru 4/15/1980	8:30 p.m.	Winter Storm	8.0 in.		X		20 – 30 mph gusts	COOP (Pana)	n/a	n/a	n/a	Pana COOP observer noted power outages at approx. 1 a.m. on the 15th
11/26/1980 thru 11/27/1980	11:00 p.m.	Heavy Snow	10.5 in.					COOP (Pana)	n/a	n/a	n/a	
2/9/1981 thru 2/11/1981	9:30 p.m.	Blizzard	9.0 in.				20-30 mph gusts	COOP (Morrisonville) (Pana)	n/a	n/a	n/a	COOP observers in Morrisonville and Pana noted drifting snow and road closures
12/16/1981 thru 12/17/1981	11:00 a.m.	Heavy Snow	8.0 in.					COOP (Morrisonville) (Kincaid)	n/a	n/a	n/a	
12/22/1981	1:00 p.m.	Winter Storm	7.0 in.		X			COOP (Morrisonville) (Kincaid)	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 Christian County
1950 – 2019
(Sheet 8 of 20)

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]					
12/27/1981 thru 12/28/1981	10:00 p.m.	Heavy Snow	5.0 in.					COOP (Morrisonville) (Kincaid)	n/a	n/a	n/a	
1/30/1982 thru 2/1/1982	9:30 a.m.	Winter Storm	14.0 in.	X	X			COOP (Pana) (Kincaid) (Morrisonville)	n/a	n/a	n/a	Morrisonville COOP observer noted drifting snow
2/8/1982 thru 2/9/1982	5:00 p.m.	Heavy Snow	5.0 in.					COOP (Morrisonville) (Pana)	n/a	n/a	n/a	
3/19/1982 thru 3/20/1982	10:00 p.m.	Heavy Snow	5.0 in.					COOP (Pana)	n/a	n/a	n/a	
12/21/1982 thru 12/22/1982	8:30 p.m.	Winter Storm	9.0 in.	X				COOP (Morrisonville) (Kincaid)	n/a	n/a	n/a	
12/27/1983 thru 12/28/1983	10:00 p.m.	Heavy Snow	4.0 in.					COOP (Morrisonville) (Pana)	n/a	n/a	n/a	
2/27/1984 thru 2/28/1984	12:00 a.m.	Blizzard	13.0 in.					COOP (Pana)	n/a	n/a	n/a	Pana COOP observer noted drifting snow
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 Event Database

Table 5
Severe Winter Storm Events Reported in Christian County
1950 – 2019
(Sheet 9 of 20)

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]					
3/12/1984	10:00 a.m.	Winter Storm	5.0 in.	X	X			COOP (Pana)	n/a	n/a	n/a	
2/13/1986 thru 2/14/1986	10:30 p.m.	Heavy Snow	5.0 in.					COOP (Kincaid)	n/a	n/a	n/a	
1/9/1987 thru 1/10/1987	7:00 a.m.	Heavy Snow	9.0 in.					COOP (Morrisonville) (Pana)	n/a	n/a	n/a	
1/17/1987 thru 1/18/1987	6:00 p.m.	Heavy Snow	4.0 in.					COOP (Morrisonville) (Kincaid)	n/a	n/a	n/a	
1/18/1987 thru 1/19/1987	7:00 p.m.	Winter Storm	7.5 in.		X			COOP (Morrisonville) (Pana)	n/a	n/a	n/a	
12/14/1987 thru 12/15/1987	9:30 a.m.	Winter Storm	6.5 in.		X		X	COOP (Pana) (Morrisonville) (Kincaid)	n/a	n/a	n/a	Morrisonville COOP observer noted blowing snow
2/3/1988	11:00 a.m.	Winter Storm	4.5 in.	X	X			COOP (Pana) (Morrisonville)	n/a	n/a	n/a	
2/10/1988 thru 2/11/1988	12:00 p.m.	Heavy Snow	7.0 in.					COOP (Kincaid) (Pana)	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 Christian County
1950 – 2019
(Sheet 10 of 20)

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]					
3/2/1988	12:30 a.m.	Winter Storm	5.0 in.	X	X			COOP (Kincaid)	n/a	n/a	n/a	
12/27/1988 thru 12/28/1988	n/a	Winter Storm	6.0 in.	X				COOP (Morrisonville)	n/a	n/a	n/a	
2/5/1989	n/a	Heavy Snow	4.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
3/5/1989 thru 3/6/1989	2:30 p.m.	Winter Storm	10.6 in.	X	X			COOP (Pana) (Kincaid)	n/a	n/a	n/a	
2/4/1990	n/a	Heavy Snow	7.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
3/23/1990 thru 3/34/1990	12:00 p.m.	Heavy Snow	6.0 in.					COOP (Pana) (Morrisonville)	n/a	n/a	n/a	
12/22/1990	2:00 p.m.	Winter Storm	5.5 in.		X			COOP (Pana) (Morrisonville)	n/a	n/a	n/a	
1/25/1991	5:30 p.m.	Winter Storm	4.0 in.	X				COOP (Pana)	n/a	n/a	n/a	
1/14/1992	n/a	Heavy Snow	4.0 in.				X	COOP (Morrisonville)	n/a	n/a	n/a	Morrisonville COOP observer note blowing snow
1/9/1993	1:00 p.m.	Heavy Snow	7.5 in.					COOP (Pana)	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 Christian County
1950 – 2019
(Sheet 11 of 20)

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]					
2/15/1993 thru 2/16/1993	2:00 p.m.	Heavy Snow	6.0 in.					COOP (Morrisonville) (Pana)	n/a	n/a	n/a	
1/16/1994 thru 1/17/1994	12:00 p.m.	Winter Storm	9.3 in.		X			COOP (Pana) (Kincaid)	n/a	n/a	n/a	
3/1/1994	n/a	Heavy Snow	4.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
4/5/1994 thru 4/6/1994	8:00 p.m.	Heavy Snow	6.0 in.					COOP (Pana)	n/a	n/a	n/a	
12/19/1995 thru 12/20/1995	n/a	Heavy Snow	6.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
1/2/1996 thru 1/3/1996	2:00 a.m.	Winter Storm	3.4 in.				30 – 40 mph gusts	COOP (Kincaid) SED	n/a	n/a	n/a	*Event Description Provided Below*
- gusty northwest winds accompanied the storm creating near whiteout conditions, making travel hazardous, and closing numerous roads; - numerous minor accidents were reported												
1/4/1996	3:00 a.m.	Winter Storm	5.0 in.					COOP (Kincaid) SED	n/a	n/a	n/a	numerous minor accidents were reported across the area
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 Christian County
1950 – 2019
(Sheet 12 of 20)

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]					
1/18/1996 thru 1/19/1996	10:00 a.m.	Winter Storm	X	X	X		25 – 35 mph gusts	SED	n/a	n/a	n/a	numerous power outages and minor accidents were reported across the area
11/25/1996	10:00 a.m.	Winter Storm	X	X		X	15 – 30 mph gusts	SED	n/a	n/a	n/a	numerous accidents and power outages were reported
1/8/1997 thru 1/9/1997	9:00 p.m.	Heavy Snow	8.0 in.					COOP (Morrisonville) SED	n/a	n/a	n/a	*Event Description Provided Below*
- Morrisonville COOP Observer noted blowing and drifting snow - numerous accidents were reported throughout central Illinois												
1/15/1997 thru 1/17/1997	3:00 a.m.	Winter Storm	6.0 in.				20 – 30 mph gusts	SED	n/a	n/a	n/a	numerous accidents were reported
1/24/1997	7:00 a.m.	Winter Storm	2.0 in.	X	X	X		SED	n/a	n/a	n/a	
1/26/1997 thru 1/27/1997	5:00 a.m.	Winter Storm	9.0 in.	X		X		SED	n/a	n/a	n/a	numerous accidents were reported, especially in the morning hours of the 27th
12/30/1997	8:00 p.m.	Heavy Snow	4.0 in.					COOP (Morrisonville) SED	n/a	2	n/a	An adult and a child were killed in an automobile accident attributed to slippery roads
Subtotal:									**0**	**2**	**$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 Event Database

Table 5
Severe Winter Storm Events Reported in Christian County
1950 – 2019
(Sheet 13 of 20)

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]					
1/14/1998	6:00 a.m.	Winter Storm	X	X		X		SED	n/a	n/a	n/a	several traffic accidents occurred across the area
3/8/1998 thru 3/9/1998	10:00 p.m.	Winter Storm	6.0 in.	X			X	SED	n/a	n/a	n/a	- numerous vehicle accidents were reported - wind gusts created near whiteout conditions
1/1/1999 thru 1/3/1999	12:00 a.m.	Winter Storm	12.0 in.	X	X		25 mph gusts	SED COOP (Kincaid) (Morrisonville)	n/a	n/a	n/a	winds caused treacherous driving conditions with extensive blowing & drifting snow
1/13/1999	4:00 a.m.	Ice Storm			0.5 in.			SED	n/a	n/a	n/a	widespread power outages and numerous car accidents were reported
2/24/1999	n/a	Heavy Snow	4.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
12/24/1999 thru 12/25/1999	n/a	Heavy Snow	6.0 in.					COOP (Pana)	n/a	n/a	n/a	
1/30/2000	n/a	Heavy Snow	4.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
2/4/2000	n/a	Heavy Snow	4.0 in.					COOP (Pana)	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.

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Table 5
Severe Winter Storm Events Reported in Christian County
1950 – 2019
(Sheet 14 of 20)

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]					
3/11/2000	5:00 a.m.	Heavy Snow	4.5 in.					COOP (Pana) (Morrisonville) SED	3	n/a	n/a	Blowing and drifting snow occurred across central Illinois *Assumption Area* 3 people were injured in a traffic accident
12/13/2000	5:00 p.m.	Winter Storm	7.0 in.	X	X	X		COOP (Pana) SED	n/a	n/a	n/a	
1/19/2002	n/a	Heavy Snow	5.0 in.					COOP (Pana)	n/a	n/a	n/a	
2/26/2002	1:00 a.m.	Winter Storm	5.5 in.	X		X	30 – 40 mph gusts	SED COOP (Pana)	n/a	n/a	n/a	wind gusts created considerable blowing & drifting snow restricting visibilities to less than ¼ mile at times
3/25/2002 thru 3/26/2002	9:00 p.m.	Winter Storm	7.0 in.	X	0.5 in.	X		SED	n/a	n/a	n/a	*Event Description Provided Below*
- the combination of snow & ice resulted in downed power lines and tree limbs along with dozens of traffic accidents the morning of the 26th - significant blowing and drifting snow												
12/25/2002	n/a	Heavy Snow	6.0 in.					COOP (Morrisonville) (Pana)	n/a	n/a	n/a	
Subtotal:									**3**	**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:
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Table 5
Severe Winter Storm Events Reported in Christian County
1950 – 2019
(Sheet 15 of 20)

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]					
2/15/2003 thru 2/16/2003	6:00 a.m.	Winter Storm	5.0 in.		X		30 – 50 mph gusts	COOP (Kincaid) SED	n/a	n/a	n/a	winds caused major blowing and drifting snow
1/26/2004 thru 1/27/2004	n/a	Heavy Snow	6.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
11/24/2004	n/a	Heavy Snow	4.0 in.					COOP (Kincaid)	n/a	n/a	n/a	
1/16/2005	n/a	Heavy Snow	5.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
12/9/2005	n/a	Heavy Snow	4.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
3/21/2006	4:30 a.m.	Blizzard	9.0 in.				45 mph gusts	COOP (Pana) SED	n/a	n/a	n/a	
11/30/2006 thru 12/1/2006	9:00 a.m.	Winter Storm	3.0 in.	X	2.0 in.	X		SED	n/a	n/a	$1,500,000	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #1681) - considerable tree and power line damage was caused by the ice and heavy snow - power was not restored across some locales for several days - snow & ice covered roads also resulted in numerous vehicle accidents - 22 counties in the Central Illinois NWS Forecast Area (including Christian) were designated a state disaster area & 18 counties (including Christian) were designated a federal disaster area												
Subtotal:									**0**	**0**	**$1,500,000**	

[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 Christian County
1950 – 2019
(Sheet 16 of 20)

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]					
1/12/2007 thru 1/13/2007	9:00 p.m.	Ice Storm		X	0.50 in.			SED	n/a	n/a	n/a	ice caused modest tree limb and power line damage and numerous vehicular accidents
1/21/2007	n/a	Heavy Snow	4.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
2/12/2007 thru 2/13/2007	6:00 p.m.	Blizzard	7.0 in.				35 – 40 mph gusts	COOP (Taylorville) (Morrisonville) SED	n/a	n/a	n/a	
- many locations reported snow drifts ranging from 3 to 6 feet, prompting the closure of several area roadways - Morrisonville COOP observer reported blowing and drifting snow												
12/8/2007 thru 12/9/2007	1:00 p.m.	Ice Storm		X	0.25 in.			SED	n/a	n/a	n/a	many vehicle accidents were reported on the icy roads
12/15/2007 thru 12/16/2007	3:00 a.m.	Heavy Snow	6.7 in.					COOP (Taylorville) SED	n/a	n/a	n/a	
1/31/2008 thru 2/1/2008	1:00 p.m.	Heavy Snow	9.8 in.					COOP (Kincaid) SED	n/a	n/a	n/a	
3/5/2008	n/a	Heavy Snow	6.0 in.					COOP (Kincaid)	n/a	n/a	n/a	Kincaid COOP observer noted that snow was heavily drifted
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 Christian County
1950 – 2019
(Sheet 17 of 20)

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]					
1/27/2009	10:00 a.m.	Heavy Snow	5.6 in.					COOP (Taylorville) (Kincaid)	n/a	n/a	n/a	
1/6/2010 thru 1/7/2010	8:00 p.m.	Heavy Snow	4.0 in.				X	COOP (Pana) SED	n/a	n/a	n/a	gusty northwesterly winds created considerable blowing & drifting snow across the area through the night of the 7th
2/5/2010	12:00 a.m.	Winter Storm	2.0 in.	X				COOP (Kincaid) SED	1	1	n/a	A 26-year old was killed when the vehicle he was riding in slid off an icy road east of Kincaid
2/8/2010	5:00 p.m.	Heavy Snow	4.7 in.					COOP (Taylorville)	n/a	n/a	n/a	Taylorville COOP observer noted blowing and drifting snow
12/24/2010	7:00 a.m.	Heavy Snow	4.7 in.					COOP (Taylorville)	n/a	n/a	n/a	
1/11/2011	n/a	Heavy Snow	6.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
Subtotal:									**1**	**1**	**$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.

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COOP NWS COOP Observation Station Records SED NOAA's Storm Events Database

Table 5
Severe Winter Storm Events Reported in Christian County
1950 – 2019
(Sheet 18 of 20)

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]					
2/1/2011 thru 2/2/2001	9:30 a.m.	Blizzard	8.4 in.	X	0.25 in.	4 in.	40 – 50 mph gusts	COOP (Kincaid) (Taylorville) SED	n/a	n/a	$260,000	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #1960) - winds accompanying the snow reduced visibility to near zero - travel became nearly impossible across the area - due to the ice and strong winds numerous tree branches and power lines were downed, causing power outages across the County												
12/20/2012	2:30 p.m.	Blizzard	1.0 in.				50 – 62 mph gusts	SED	n/a	n/a	n/a	*Event Description Provided Below*
- Pana COOP observer measured a peak wind gust of 62 mph and reported widespread power outages in the City - blizzard conditions caused numerous traffic accidents across the County												
2/22/2013	n/a	Heavy Snow	5.0 in.					COOP (Morrisonville)	n/a	n/a	n/a	
3/24/2013 thru 3/25/2013	4:00 a.m.	Heavy Snow	18.5 in.					COOP (Taylorville) SED	n/a	n/a	n/a	- many schools and business closed - numerous traffic accidents occurred across the area
12/13/2013 thru 12/14/2013	5:00 p.m.	Heavy Snow	7.0 in.					COOP (Morrisonville) SED	n/a	n/a	n/a	numerous traffic accidents were reported
Subtotal:									**0**	**0**	**$260,000**	

[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 Christian County
1950 – 2019
(Sheet 19 of 20)

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]					
1/5/2014	8:00 a.m.	Heavy Snow	9.8 in.					COOP (Pana) (Taylorville) SED	n/a	n/a	n/a	heavy snowfall along with significant blowing and drifting snow caused numerous road closures and traffic accidents across the County
2/4/2014 thru 2/5/2014	12:00 p.m.	Heavy Snow	7.5 in.					COOP (Kincaid) SED	n/a	n/a	n/a	numerous traffic accidents occurred due to snow-covered roads
2/20/2015 thru 2/21/2015	9:00 p.m.	Heavy Snow	8.0 in.					COOP (Taylorville)	n/a	n/a	n/a	numerous traffic accidents occurred due to snow-covered and hazardous roadways
2/28/2015 thru 3/1/2015	4:00 p.m.	Heavy Snow	5.9 in.					COOP (Pana) SED	n/a	n/a	n/a	numerous traffic accidents occurred due to snow-covered and hazardous roadways
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 Christian County
1950 – 2019
(Sheet 20 of 20)

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]					
1/11/2019 thru 1/13/2019	6:30 p.m.	Heavy Snow	11.2 in.					COOP (Taylorville) SED	n/a	n/a	n/a	- numerous traffic accidents occurred due to snow-covered roads - the heavy/wet snow made plowing difficult
12/18/2019 thru 12/16/2019	2:00 p.m.	Heavy Snow	7.0 in.					SED	n/a	n/a	n/a	numerous traffic accidents occurred due to snow-covered and slick roads
Subtotal:									**0**	**0**	**$0**	
GRAND TOTAL:									**4**	**3**	**$1,760,000**	

[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

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 Data.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

Table 6
Extreme Cold Events Reported in Christian County
1996 – 2019
(Sheet 1 of 2)

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)					
1/19/1996	n/a	Extreme Cold/ Wind Chill	0°F	14°F	-40°F	COOP (Morrisonville) SED	n/a	n/a	n/a	*Event Description Provided Below*
- A major winter storm moved through on the 18th causing temperatures to drop quickly. Many locations recorded a 60 degree drop over a 12-hour period. - The Morrisonville COOP observer measured a 58 degree drop in temperatures on the 18th. - Gusty winds of 25 to 35 mph created wind chills near -40°F across most of central Illinois.										
2/2/1996 thru 2/4/1995	12:00 a.m.	Extreme Cold/ Wind Chill	-18°F	10°F	n/a	COOP (Morrisonville) SED	n/a	n/a	n/a	
1/10/1997 thru 1/13/1997	n/a	Extreme Cold/ Wind Chill	-10°F	9°F	n/a	COOP (Morrisonville)	n/a	n/a	n/a	
1/16/1997 thru 1/18/1997	n/a	Extreme Cold/ Wind Chill	15°F	19°F	-40°F	COOP (Morrisonville) SED	n/a	n/a	n/a	
1/4/1999	5:00 a.m.	Extreme Cold/ Wind Chill	-17°F	6°F	n/a	COOP (Morrisonville) (Pana) SED	n/a	n/a	n/a	
Subtotal:							**0**	**0**	**$0**	

[1] 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 and the Midwestern Regional Climate Center.

Acronyms:

COOP	NWS COOP Observation Station Records	SED	NOAA's Storm Events Database
MRCC	Midwestern Regional Climate Center		

Table 6
Extreme Cold Events Reported in Christian County
1996 – 2019
(Sheet 2 of 2)

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)					
1/6/2014 thru 1/7/2014	12:00 a.m.	Extreme Cold/ Wind Chill	-18°F	-3°F	-45°F	COOP (Morrisonville) (Pana) SED	n/a	1	n/a	A 64 year old man died of hypothermia after his vehicle became stuck in the snow about a block away from his rural Pana home
1/29/2019 thru 1/30/2019	n/a	Extreme Cold/ Wind Chill	-12°F	22°F	-30°F	COOP (Morrisonville) (Pana)				The Regional Office of Education #3 representative indicated that windchill values reached -30°F
Subtotal							**0**	**1**	**$0**	
GRAND TOTAL:							**0**	**1**	**$0**	

[1] 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 and the Midwestern Regional Climate Center.

Acronyms:
COOP NWS COOP Observation Station Records
SED NOAA's Storm Events Database
MRCC Midwestern Regional Climate Center

Sources: Christian County Multi-Jurisdictional All Hazards Mitigation Planning Committee Member responses to Natural Hazard Events Questionnaire.
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
General Flood Events Reported in Christian County
2002 - 2019
(Sheet 1 of 2)

Date(s)	Start Time	Body of Water	Location(s) Impacted	Magnitude - Impacts			Injuries	Fatalities	Property Damages	Crop Damages	Event Description
				Home[1]	Business[1]	Infra-structure[1]					
5/6/2002	2:40 p.m.	Area rivers, streams, and creeks	countywide	X	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #1416)							*Pana* Several basements were flooded in the City				
5/12/2002	9:00 a.m.	Area rivers, streams, and creeks	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #1416) - Several roads were washed out.							*Taylorville* - Two mudslides occurred at Oak Hill Cemetery covering the road with mud.				
12/27/2015 thru 12/31/2015	4:00 a.m.	Area rivers, streams, and creeks	countywide	n/a	n/a	n/a	n/a	4	$2,800,000	n/a	*Event Description Provided Below*
- Heavy rains, up to 4.75 inches, fell on already saturated ground. - Every road in the county was flooded. *Kincaid* - South Fork of the Sangamon River overtopped levees and flooded the southeast part of town for the first time in its history. - People had to be rescued by boat as all roads in and out of the town were flooded. - Three houses were destroyed and 41 damaged							- Two 18 year old males died as their pickup truck was swept away in flood waters near the South Fork of the Sangamon River and IL Rte. 104 one mile southeast of the Village *Edinburg* - Two people died as their van was swept into the Buckhart Creek five miles east-northeast of the Village.				
Subtotal:							**0**	**4**	**$2,800,000**	**$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 7
General Flood Events Reported in Christian County
2002 - 2019
(Sheet 2of 2)

Date(s)	Start Time	Body of Water	Location(s) Impacted	Magnitude - Impacts			Injuries	Fatalities	Property Damages	Crop Damages	Event Description
				Home[1]	Business[1]	Infra-structure[1]					
4/29/2017 thru 5/2/2017	10:15 p.m.	Area rivers, streams, and creeks	central to southern portion of the county	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rains, up to 4 inches, fell in about a two hour period on already saturated ground. - Numerous streets in Taylorville and Pana were impassable due to flooding. - Numerous rural roads and highways were impassable in the County - IL Rte. 48 was closed due to flowing water.											
5/4/2017 thru 5/5/2017	2:45 p.m.	Area river, streams, and creeks	western portion of the county	n/a	n/a	n/a	n/a	n/a	n/a	n/a	- Heavy rainfall of up to 3 inches fell on already saturated ground. - Most roads were impassable due to flooding. - Numerous creeks flooded.
Subtotal:							**0**	**0**	**$0**	**$0**	
GRAND TOTAL:							**0**	**4**	**$2,800,000**	**$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 Data.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

Table 8
Flash Flood Events Reported in Christian County
2000 - 2019
(Sheet 1 of 7)

Date(s)	Start Time	Location(s) Impacted	Magnitude (Impacts) Home[1]	Business[1]	Infra-structure[1]	Injuries	Fatalities	Property Damages	Crop Damages	Magnitude/Description
10/5/2000	1:20 a.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	- 2 to 6 inches of rain fell during the evening and overnight hours. - Numerous roads were reported to have either ponding of water on them or were completely covered in water for a period of time.
4/10/2001	10:00 p.m.	Kincaid Taylorville	n/a	n/a	X	n/a	n/a	n/a	n/a	- 1.5 to 3 inches of rain caused flash flooding across the area. - IL Rte. 104 was covered in spots by flowing water.
6/6/2001	3:30 a.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Flooding was reported on most of the roads across the County. - A motorist was rescued around 5:15 a.m. after driving through flood waters up to the floorboard of the vehicle.										- Road closures were reported on County Road 4, two miles west of Mowequa (near the Christian/Shelbyville county line) and County Road 23 two miles north of Edinberg. - Langleyville Road and Jim Daley Road were closed during the overnight hours.
4/19/2002	9:00 p.m.	northern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
The Edinburg – Mt.Auburn blacktop was down to one lane for a while due to water over the road.										<u>*Kincaid area*</u> - IL Rte. 104 near Kincaid had water over it <u>*Stonington area*</u> - IL Rte. 48 near Stonington had water over it.
4/21/2002	8:00 a.m.	Taylorville	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
This event was part of a federally-declared disaster (Declaration #1416)										Several roads on the west side of the City became flooded for a brief time, including an underpass.
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.

^ Flash flood event verified in the vicinity of this location(s).

<table>
<tr><th colspan="12">Table 8
Flash Flood Events Reported in Christian County
2000 - 2019
(Sheet 2 of 7)</th></tr>
<tr><th rowspan="2">Date(s)</th><th rowspan="2">Start Time</th><th rowspan="2">Location(s) Impacted</th><th colspan="3">Magnitude (Impacts)</th><th rowspan="2">Injuries</th><th rowspan="2">Fatalities</th><th rowspan="2">Property Damages</th><th rowspan="2">Crop Damages</th><th rowspan="2" colspan="2">Magnitude/Description</th></tr>
<tr><th>Home[1]</th><th>Business[1]</th><th>Infra-structure[1]</th></tr>
<tr><td>5/1/2002</td><td>2:15 p.m.</td><td>Morrisonville Taylorville</td><td>n/a</td><td>n/a</td><td>X</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">Event Description Provided Below</td></tr>
<tr><td colspan="7">This event was part of a federally-declared disaster (Declaration #1416)</td><td colspan="5">Numerous roads between Morrisonville and Taylorville were briefly flooded due to heavy rains.</td></tr>
<tr><td>5/6/2002</td><td>5:00 a.m.</td><td>southern portion of the county</td><td>X</td><td>n/a</td><td>X</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">Event Description Provided Below</td></tr>
<tr><td colspan="7">This event was part of a federally-declared disaster (Declaration #1416)</td><td colspan="5">A man had to be rescued after driving into a flooded section of IL Rte. 48 four miles southwest of Morrisonville.</td></tr>
<tr><td>5/7/2002</td><td>3:00 a.m.</td><td>countywide</td><td>n/a</td><td>n/a</td><td>X</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">This event was part of a federally-declared disaster (Declaration #1416)
Several roads were flooded briefly due to heavy rains.</td></tr>
<tr><td>5/12/2002</td><td>7:00 a.m.</td><td>countywide</td><td>X</td><td>n/a</td><td>X</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">Event Description Provided Below</td></tr>
<tr><td colspan="7">This event was part of a federally-declared disaster (Declaration #1416)
<u>Taylorville</u>
- Several basements were flooded.</td><td colspan="5"><u>Taylorville area</u>
- Numerous roads were flooded including IL Rte. 48 north of Taylorville and IL Rte. 29 between Springfield and Taylorville.</td></tr>
<tr><td>5/27/2002</td><td>4:10 p.m.</td><td>southern portion of the county</td><td>X</td><td>n/a</td><td>X</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td colspan="2">Event Description Provided Below</td></tr>
<tr><td colspan="7">- 3 to 4 inches of rain fell over the southern half of Christian county in a short amount of time.
- 3 cars had to be towed after being driven into flooded areas.</td><td colspan="5"><u>Palmer area</u>
- IL Rte. 48 just north of Palmer was closed for about an hour due to flooding.
<u>Taylorville</u>
- A few homes sustained basement flooding.</td></tr>
<tr><td colspan="6">Subtotal:</td><td>0</td><td>0</td><td>$0</td><td>$0</td><td colspan="2"></td></tr>
</table>

[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.

^ Flash flood event verified in the vicinity of this location(s).

Table 8
Flash Flood Events Reported in Christian County
2000 - 2019
(Sheet 3 of 7)

Date(s)	Start Time	Location(s) Impacted	Magnitude (Impacts)			Injuries	Fatalities	Property Damages	Crop Damages	Magnitude/Description
			Home[1]	Business[1]	Infra-structure[1]					
6/11/2002	4:00 p.m.	northern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	Several roads were flooded due to heavy rains, including County Road 24 northwest of Edinburg, IL Rte. 48 near Taylorville, and IL Rte. 29 south of Lake Taylorville.
6/13/2002	5:00 a.m.	countywide	X	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rains caused flooding of numerous roads countywide, including IL Rte. 16 near Pana, IL Rte. 48, and IL Rte. 29. *Pana area* Numerous basements were flooded.										
8/2/2003	3:45 p.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	Numerous county roads were briefly flooded due to heavy rains.
5/13/2004	7:15 p.m.	southern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	Numerous roads in southern Christian county were flooded due to heavy rainfall, including IL Rte. 48 between Morrisonville, Palmer and Clarksdale.
5/23/2004	8:15 p.m.	southern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	Water covered several roadways for a time over the southern half of the county.
1/13/2005	12:30 a.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	Many roads were flooded in the County, including US Rte. 51.
5/11/2005	6:55 p.m.	northeastern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	IL Rte. 48 was under 3 feet of water near the Christian/Macon county line.
5/30/2008	8:13 p.m.	Taylorville	n/a	n/a	X	n/a	n/a	n/a	n/a	Heavy rains caused flooding across many roads in northeastern part of the City.
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.

^ Flash flood event verified in the vicinity of this location(s).

Table 8
Flash Flood Events Reported in Christian County
2000 - 2019
(Sheet 4 of 7)

Date(s)	Start Time	Location(s) Impacted	Magnitude (Impacts) Home[1]	Business[1]	Infra-structure[1]	Injuries	Fatalities	Property Damages	Crop Damages	Magnitude/Description
5/13/2009 thru 5/14/2009	11:45 p.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rains up to 3 inches within two hours fell on top of very saturated ground. - Flashed flooding of most roads occurred in nearly all of Christian County.										
5/15/2009 thru 5/16/2009	7:15 p.m.	western portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rain of 1 to 2 inches fell within two hours on already saturated ground. - Extensive flash flooding was experienced, particularly on rural roads.										
9/6/2009	4:30 p.m.	northern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- Heavy rain of up to 5 inches was reported. - Numerous rural roads were flooded.
6/22/2010	8:30 a.m.	southeastern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- Rain fall amounts of 2 to 3 inches were reported from Taylorville to the Shelby county line in a two hour period. - Numerous roads were impassable.
7/24/2010 thru 7/25/2010	5:30 p.m.	southeastern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rainfall with rates of 2 inches per hour was reported. *Pana* - Significant street flooding was experienced with a one foot depth in spots.										
9/2/2010	5:30 p.m.	northern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rainfall rates of 2 to 2.5 inches per hour caused flash flooding. *Mt. Auburn area* - Most rural roads were impassable due to the rain.										
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.

^ Flash flood event verified in the vicinity of this location(s).

<table>
<tr><th colspan="11">Table 8
Flash Flood Events Reported in Christian County
2000 - 2019
(Sheet 5 of 7)</th></tr>
<tr><th rowspan="2">Date(s)</th><th rowspan="2">Start Time</th><th rowspan="2">Location(s) Impacted</th><th colspan="3">Magnitude (Impacts)</th><th rowspan="2">Injuries</th><th rowspan="2">Fatalities</th><th rowspan="2">Property Damages</th><th rowspan="2">Crop Damages</th><th rowspan="2">Magnitude/Description</th></tr>
<tr><th>Home[1]</th><th>Business[1]</th><th>Infra-structure[1]</th></tr>
<tr><td>9/2/2010 thru 9/3/2010</td><td>8:30 p.m.</td><td>southeastern portion of the county</td><td>n/a</td><td>n/a</td><td>X</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="7">- Heavy rainfall rates of 2 to 2.5 inches per hour fell for two hours.</td><td colspan="4">- Most roads were impassable due to heavy rainfall.</td></tr>
<tr><td>5/13/2011 thru 5/14/2011</td><td>7:50 p.m.</td><td>southern portion of the county</td><td>n/a</td><td>n/a</td><td>X</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="7">- Heavy rains producing up to 3 inches per hour were reported.</td><td colspan="4">- Most rural roads south and east of IL Rte. 48 from Morrisonville to Owaneco to the Montgomery County line were impassable for the evening.</td></tr>
<tr><td>5/25/2011</td><td>4:30 p.m.</td><td>northwestern portion of the county</td><td>n/a</td><td>n/a</td><td>X</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>- Heavy rains producing up to 2 inches in 30 minutes fell causing flash flooding
- Road and creek flooding were reported.</td></tr>
<tr><td>7/7/2011</td><td>5:45 p.m.</td><td>Langleyville
Taylorville</td><td>n/a</td><td>n/a</td><td>X</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="7">Heavy rainfall of up to 5 inches within a two hour period were reported.
<u>Taylorville</u>
- Some streets on the west side of the City had two feet of standing water.</td><td colspan="4"><u>Taylorville area</u>
- IL Rte. 104 northwest of City was impassable.</td></tr>
<tr><td>5/31/2013 thru 6/1/2013</td><td>10:45 p.m.</td><td>western portion of the county</td><td>n/a</td><td>n/a</td><td>X</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="7">- Heavy rains produced up to 2 inches of rain on already saturated ground within a two hour period causing flash flooding.</td><td colspan="4">- Many roads were impassable due to flooding.</td></tr>
<tr><td colspan="6">Subtotal:</td><td>0</td><td>0</td><td>$0</td><td>$0</td><td></td></tr>
</table>

[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.

^ Flash flood event verified in the vicinity of this location(s).

Table 8
Flash Flood Events Reported in Christian County
2000 - 2019
(Sheet 6 of 7)

Date(s)	Start Time	Location(s) Impacted	Magnitude (Impacts)			Injuries	Fatalities	Property Damages	Crop Damages	Magnitude/Description
			Home[1]	Business[1]	Infra-structure[1]					
8/26/2014 thru 8/27/2014	8:30 p.m.	northwestern to the central portion of the county	X	n/a	X	n/a	n/a	$4,400,000	n/a	*Event Description Provided Below*
- Heavy rains produced up to 4 inches within 90 minutes. - Most rural roads from Taylorville to Edinburg and Kincaid were impassable, including IL Rte. 29 and IL Rte. 104. _Taylorville_ - Some city streets and basements were flooded in the northwestern part of the County.										
8/28/2014 thru 8/29/2014	9:30 p.m.	northwestern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rains produced up to 4 inches of rain within two hours. - Most rural roads between Edinburg and Mt. Auburn were impassable due to flooding.										
12/26/2015 thru 12/27/2015	9:15 p.m.	central to southern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rain on already saturated ground produced up to 4.5 inches within six hours. - Most rural roads and state highways were flooded and impassable. - City streets in Taylorville and Pana were also flooded.										
4/29/2017	7:00 p.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rain amounts of up to 4 inch in a two hour period fell on already saturated ground. - Numerous rural roads and highways were closed countywide. - IL Rte. 48 was closed due to flowing water. - Numerous streets in Taylorville and Pana were impassable due to flooding.										
5/4/2017	7:00 a.m.	southern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- Heavy rainfall of up to 3 inches fell on already saturated ground. - Most roads were impassable. - Numerous creeks rapidly flooded.
Subtotal:						**0**	**0**	**$4,400,000**	**$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.

[^] Flash flood event verified in the vicinity of this location(s).

Table 8
Flash Flood Events Reported in Christian County
2000 - 2019
(Sheet 7 of 7)

Date(s)	Start Time	Location(s) Impacted	Magnitude (Impacts)			Injuries	Fatalities	Property Damages	Crop Damages	Magnitude/Description
			Home[1]	Business[1]	Infra-structure[1]					
5/19/2017	3:30 a.m.	northern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- Heavy rain up to 4 inches was reported. - Numerous rural roads were closed from Mt. Auburn to the Macon county line.
6/11/2018	3:30 a.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rainfall rates of up to 2 inches per hour for three hours were reported. - Many rural roads were impassable due to flooding - Extensive street flooding was reported in Pana and parts of Taylorville.										
6/12/2018	4:00 a.m.	southeastern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	- Heavy rainfall of up to 3.5 inches fell on already saturated ground. - Flooding of creeks, streams, and roads from Rosamond towards Assumption.
8/16/2018 thru 8/17/2018	10:00 p.m.	northwestern portion of the county	n/a	n/a	X	n/a	n/a	n/a	n/a	Water covered most roads in Edinburg, some were impassable.
6/22/2019	4:30 a.m.	countywide	n/a	n/a	X	n/a	n/a	n/a	n/a	*Event Description Provided Below*
- Heavy rainfall rates of 2 to 4.5 inches fell on saturated ground resulting in flash flooding across a large portion of the County - Many roads were impassable due to flooding, with water flowing over IL Rte. 16 near Rosamond, IL Rte. 104 near Kincaid and US Rte. 51 north-northwest of Pana - Several cars were reported submerged in water on IL Rte. 48 near Willeys and Stonington.										
Subtotal:						**0**	**0**	**$0**	**$0**	
GRAND TOTAL:						**0**	**0**	**$4,400,000**	**$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.

^ Flash flood event verified in the vicinity of this location(s).

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

Table 9
Tornadoes Reported in Christian County
1955 – 2019
(Sheet 1 of 10)

Map No.	Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Fatalities	Property Damage	Crop Damage	Description
1	11/15/1955	4:45 p.m.	Pana^	F1	0.10	33	n/a	n/a	n/a	n/a	Demolished several farm buildings near the City
2	9/30/1961	1:45 p.m.	Harvel^	F1	0.10	150	n/a	n/a	$25,000	$2,500	- Destroyed several farm buildings - Cut a path through a corn field
3	4/2/1964	7:49 p.m.	Morrisonville^	F2	3.00	20	n/a	n/a	$25,000†	n/a	*Touchdown/Liftoff – Two Counties* Tornado touched down in Montgomery County 4 miles southeast of Farmersville and traveled northeast before lifting off 2 miles northwest of Morrisonville in Christian County – total length: 5.5 miles
4	4/3/1974	1:45 p.m.	Owaneco Assumption^	F1	8.50	70	n/a	n/a	$250,000	n/a	*Event Description Provided Below*
Owaneco - A few roofs were damaged - One building was destroyed - The leg of an elevator bin was destroyed											
5	5/11/1975	5:00 p.m.	Palmer^	F1	0.20	50	2	n/a	$2,500	n/a	*Event Description Provided Below*
- Trees and roofs were damaged - A camping trailer was overturned - A house trailer was twisted on its foundation											
6	7/8/1975	6:30 p.m.	Stonington^	F2	0.10	10	n/a	n/a	n/a	$250	
Subtotal:							**2**	**0**	**$302,500†**	**$2,750**	

[1] The length provided is only for the portion(s) of the tornado that occurred in Christian County.

^ Tornado touchdown verified in the vicinity of this location(s).

† The $25,000 in property damages sustained as a result of the April 2, 1964 tornado represent losses sustained in two counties (including Christian County). A detailed breakdown by county was not available.

Table 9
Tornadoes Reported in Christian County
1955 – 2017
(Sheet 2 of 10)

Map No.	Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Fatalities	Property Damage	Crop Damage	Description
7	2/16/1976	3:45 p.m.	Pana	F2	1.00	80	n/a	n/a	$250,000	n/a	*Event Description Provided Below*
- Destroyed a home and damaged 30 to 50 others - Most damaged occurred in a ten-block area from southwest to northeast in the City - One of the first houses to receive damage was knocked 6 in. off its foundation. - Major damage occurred as the living room roof and utility room of a home were dismantled - Other damage to homes ranged from broken windows to destroyed carports - Trees were broken or uprooted - Television and power lines were downed											
8	3/20/1976	12:12 p.m.	Morrisonville^	F3	1.92	27	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Two Counties* Tornado touched down in Montgomery County 1 ½ miles southwest of Farmersville and traveled northeast before lifting off 5 miles northwest of Morrisonville in Christian County – total length: 10.01 miles
9	8/6/1977	3:45 p.m.	Kincaid Power Plant^	F1	2.20	30	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Two Counties* Tornado touched down in Sangamon County approx. 2 ½ miles southwest of Pawnee and traveled northeast before lifting off ¾ mile northwest of Sicily in Christian County – total length: 6.35 miles
10	8/6/1977	3:55 p.m.	Kincaid Power Plant^	F0	1.10	17	n/a	n/a	n/a	n/a	
Subtotal:							**0**	**0**	**$250,000**	**$0**	

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^ Tornado touchdown verified in the vicinity of this location(s).

Table 9
Tornadoes Reported in Christian County
1955 – 2017
(Sheet 3 of 10)

Map No.	Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Fatalities	Property Damage	Crop Damage	Description
11	8/6/1977	4:00 p.m.	Roby^	F1	1.85	40	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Two Counties* Tornado touched down in Sangamon County near Breckenridge and traveled northeast before lifting off ½ mile south of Roby in Christian County – total length: 2.70 miles the roof of a church was damaged
12	8/6/1977	4:10 p.m.	Roby^	F1	0.35	90	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Two Counties* Tornado touched down in Sangamon County approx. 2 ¼ miles southwest of Buckhart and traveled northeast before lifting off 1 ½ miles northwest of Roby in Christian County – total length: 3.48 miles
13	4/13/1987	9:30 a.m.	Palmer^ Clarksdale^	F1	3.00	23	2	n/a	$25,000	n/a	5 farms had damaged or destroyed structures
14	4/7/1988	5:14 p.m.	Moweaqua^	F0	0.10	10	n/a	n/a	n/a	n/a	
15	6/14/1998	6:52 p.m.	Mt. Auburn^	F0	0.10	10	n/a	n/a	n/a	n/a	
Subtotal:							**2**	**0**	**$25,000**	**$0**	

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^ Tornado touchdown verified in the vicinity of this location(s).

<table>
<tr><th colspan="12">Table 9
Tornadoes Reported in Christian County
1955 – 2017
(Sheet 4 of 10)</th></tr>
<tr><th>Map No.</th><th>Date(s)</th><th>Start Time</th><th>Location(s)</th><th>Magnitude (Fujita Scale)</th><th>Length[1] (Miles)</th><th>Width (Yards)</th><th>Injuries</th><th>Fatalities</th><th>Property Damage</th><th>Crop Damage</th><th>Description</th></tr>
<tr><td>16</td><td>6/1/1999</td><td>6:13 p.m.</td><td>Harvel[^]
Morrisonville[^]
Palmer[^]</td><td>F1</td><td>11.10</td><td>200</td><td>n/a</td><td>n/a</td><td>$750,000</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="12"><u>Touchdown/Liftoff – Two Counties</u>
Tornado touched down in Montgomery County 4 miles southeast of Wagoner and traveled northeast before lifting off 2 ½ miles north of Palmer in Christian County – total length: 12.60 miles
<u>Harvel Area</u>
- The tornado took a roof off of a shed and smashed it into the southwest corner of a house at the second level bedroom
- A camper was tipped over on its side
- A visible tornado track could be seen in the cornfield surrounding the house
<u>Morrisonville Area</u>
- A 16-foot-wide garage door and the west wall of the garage were completely removed
- A carport on a nearby house was destroyed
- A house was blown 3 inches to the west on its foundation
- Another home sustained moderate damage from a fallen tree on one end and the attached garage frame was pushed 6 inches inward on the other end Numerous power poles were blown down
- 2 inch diameter tree branches were pierced at least a foot into the ground in this area
<u>Palmer Area</u>
- A garage was destroyed and wrapped around some farm equipment
- More debris and missiles were projected several inches into the ground
- A house was shifted a foot north from its foundation
- Several outbuildings, grain bins, and two semis were destroyed
- A grain bin was wrapped around a combine and a huge grain wagon
- Numerous trees and power poles were half-knocked down</td></tr>
<tr><td>17</td><td>5/10/2003</td><td>7:08 a.m.</td><td>Kincaid[^]</td><td>F0</td><td>0.30</td><td>20</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>- A grain silo was destroyed
- Several trees were blown down</td></tr>
<tr><td>18</td><td>8/31/2003</td><td>3:14 p.m.</td><td>Owaneco[^]</td><td>F1</td><td>5.00</td><td>100</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>A barn roof was damaged</td></tr>
<tr><td colspan="7">Subtotal:</td><td>0</td><td>0</td><td>$750,000</td><td>$0</td><td></td></tr>
</table>

[1] The length provided is only for the portion(s) of the tornado that occurred in Christian County.

[^] Tornado touchdown verified in the vicinity of this location(s).

Table 9
Tornadoes Reported in Christian County
1955 – 2017
(Sheet 5 of 10)

Map No.	Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Fatalities	Property Damage	Crop Damage	Description
19	4/2/2006	4:58 p.m.	Morrisonville^	F0	0.50	30	n/a	n/a	n/a	n/a	<u>*Touchdown/Liftoff – Two Counties*</u> Tornado touched down in Montgomery County 4 ½ miles southeast of Farmersville and traveled northeast before lifting off 5 miles northwest of Morrisonville in Christian County – total length: 2.20 miles
20	4/2/2006	5:08 p.m.	Taylorville^ Taylorville	F1	6.30	300	1	n/a	n/a	n/a	*Event Description Provided Below*
- An individual was injured due to falling debris - Several homes and businesses in the City reported roof and structural damage - Tornado damaged sheds and downed numerous trees along its path											
21	4/2/2006	5:15 p.m.	Pana^ Pana	F1	4.00	150	n/a	n/a	n/a	n/a	*Event Description Provided Below*
<u>*Pana*</u> - Minor roof damage was sustained - Numerous trees were blown down <u>*Pana Area*</u> - Ripped the roof off a shed - Blew a shed across a field											
22	4/2/2006	5:17 p.m.	Taylorville^	F0	0.10	50	n/a	n/a	n/a	n/a	
23	4/2/2006	5:20 p.m.	Assumption	F1	0.10	100	n/a	n/a	n/a	n/a	minor roof and tree damage sustained
24	4/16/2006	1:53 p.m.	Taylorville^	F0	0.10	30	n/a	n/a	n/a	n/a	
25	4/16/2006	2:05 p.m.	Assumption^	F0	0.10	30	n/a	n/a	n/a	n/a	
26	4/16/2006	2:07 p.m.	Stonington^	F0	0.10	30	n/a	n/a	n/a	n/a	
Subtotal:							**1**	**0**	**$0**	**$0**	

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^ Tornado touchdown verified in the vicinity of this location(s).

<table>
<tr><th colspan="11">Table 9
Tornadoes Reported in Christian County
1955 – 2017
(Sheet 6 of 10)</th></tr>
<tr><th>Map No.</th><th>Date(s)</th><th>Start Time</th><th>Location(s)</th><th>Magnitude (Fujita Scale)</th><th>Length[1] (Miles)</th><th>Width (Yards)</th><th>Injuries</th><th>Fatalities</th><th>Property Damage</th><th>Crop Damage</th><th>Description</th></tr>
<tr><td>27</td><td>5/24/2006</td><td>3:10 p.m.</td><td>Morrisonville^</td><td>F0</td><td>1.00</td><td>100</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="7"><u>Touchdown/Liftoff – Two Counties</u>
Tornado touched down in Montgomery County 4 ½ miles northeast of Farmersville and traveled southeast before lifting off 3 miles northwest of Morrisonville in Christian County – total length: 3.80 miles</td><td colspan="5">- A corn crib was destroyed and significant roof damage to an outbuilding occurred at a farm
- A few trees were snapped off</td></tr>
<tr><td>28</td><td>4/25/2007</td><td>1:40 p.m.</td><td>Assumption</td><td>EF0</td><td>0.10</td><td>10</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>29</td><td>5/30/2008</td><td>7:20 p.m.</td><td>Taylorville^</td><td>EF0</td><td>0.01</td><td>10</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>30</td><td>5/13/2009</td><td>11:04 p.m.</td><td>Rosamond^
Pana^</td><td>EF1</td><td>0.81</td><td>60</td><td>n/a</td><td>n/a</td><td>$50,000</td><td>n/a</td><td>- A pole barn was severely damaged
- Minor roof damage occurred to a house
- Several tree tops were sheared off</td></tr>
<tr><td>31</td><td>6/3/2010</td><td>12:06 p.m.</td><td>Lake Taylorville^
Owaneco^</td><td>EF0</td><td>0.10</td><td>15</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>32</td><td>4/19/2011</td><td>5:20 p.m.</td><td>Tovey^
Jeisyville^</td><td>EF1</td><td>1.99</td><td>100</td><td>n/a</td><td>n/a</td><td>$90,000</td><td>n/a</td><td>several grain bins and a large farm storage building were destroyed</td></tr>
<tr><td>33</td><td>4/19/2011</td><td>5:30 p.m.</td><td>Harvel^
Morrisonville^</td><td>EF0</td><td>3.48</td><td>100</td><td>n/a</td><td>n/a</td><td>$95,000</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="7"><u>Morrisonville Area</u>
- A roof was torn off a hog pen
- The north doors of a large metal farm building collapsed
- A small barn was destroyed</td><td colspan="5"><u>Harvel Area</u>
- Several power poles were knocked down along IL Rte. 48</td></tr>
<tr><td>34</td><td>4/19/2011</td><td>5:32 p.m.</td><td>Taylorville^</td><td>EF1</td><td>0.91</td><td>100</td><td>n/a</td><td>n/a</td><td>$60,000</td><td>n/a</td><td>8 empty rail cars were knocked over</td></tr>
<tr><td>35</td><td>5/9/2013</td><td>4:41 p.m.</td><td>Owaneco^</td><td>EF0</td><td>0.55</td><td>20</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td colspan="7">Subtotal:</td><td>0</td><td>0</td><td>$295,000</td><td>$0</td><td></td></tr>
</table>

[1] The length provided is only for the portion(s) of the tornado that occurred in Christian County.

^ Tornado touchdown verified in the vicinity of this location(s).

<table>
<tr><th colspan="12">Table 9
Tornadoes Reported in Christian County
1955 – 2017
(Sheet 7 of 10)</th></tr>
<tr><th>Map No.</th><th>Date(s)</th><th>Start Time</th><th>Location(s)</th><th>Magnitude (Fujita Scale)</th><th>Length[1] (Miles)</th><th>Width (Yards)</th><th>Injuries</th><th>Fatalities</th><th>Property Damage</th><th>Crop Damage</th><th>Description</th></tr>
<tr><td>36</td><td>11/17/2013</td><td>12:15 p.m.</td><td>Pana
Pana^</td><td>EF1</td><td>2.25</td><td>100</td><td>n/a</td><td>n/a</td><td>$300,000</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="8"><u>Pana</u>
- Several homes suffered roof damage near the intersection of Almond and Elm Streets
- Trees were blown down damaging 3 cars
- Numerous power lines were knocked down</td><td colspan="4"><u>Pana Area</u>
- A house was damaged
- An outbuilding was destroyed</td></tr>
<tr><td>37</td><td>2/20/2014</td><td>4:25 p.m.</td><td>Pana^</td><td>EF1</td><td>4.77</td><td>100</td><td>n/a</td><td>n/a</td><td>$500,000</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="8"><u>Touchdown/Liftoff – Two Counties</u>
Tornado touched down in Montgomery 3 1/5 miles southeast of Nokomis and traveled northeast through the northwest corner of Shelby County and into Christian County before lifting off in Shelby County 4 miles southeast of Westervelt – total length: 22.88 miles</td><td colspan="4">- A garage, several outbuildings, and trees were damaged</td></tr>
<tr><td>38</td><td>4/9/2015</td><td>6:47 p.m.</td><td>Jeisyville^
Kincaid^</td><td>EF0</td><td>0.14</td><td>10</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>39</td><td>5/23/2017</td><td>3:30 p.m.</td><td>Assumption^</td><td>EF0</td><td>0.10</td><td>10</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>40</td><td>5/15/2018</td><td>3:37 p.m.</td><td>Clarksdale^</td><td>EF0</td><td>1.84</td><td>25</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>41</td><td>12/1/2018</td><td>4:48 p.m.</td><td>Harvel^
Morrisonville^</td><td>EF0</td><td>3.05</td><td>200</td><td>n/a</td><td>n/a</td><td>$140,000</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="8"><u>Touchdown/Liftoff – Two Counties</u>
Tornado touched down in Montgomery near the Montgomery/Christian county line near the intersection of E 000 Rd. & N 400 Rd. and traveled northeast before lifting off 2 ½ miles southeast of Morrisonville in Christian County – total length: 3.11 miles</td><td colspan="4">- Damaged an outbuilding by knocking out a wall and pushing it off its foundation near the Christian County line
- Caused roof and wall damage to additional outbuildings
- Damage some trees</td></tr>
<tr><td colspan="7">Subtotal:</td><td>0</td><td>0</td><td>$940,000</td><td>$0</td><td></td></tr>
</table>

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^ Tornado touchdown verified in the vicinity of this location(s).

Table 9
Tornadoes Reported in Christian County
1955 – 2017
(Sheet 8 of 10)

Map No.	Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Fatalities	Property Damage	Crop Damage	Description
42	12/1/2018	5:01 p.m.	Morrisonville^ Palmer^ Taylorville	EF3	12.49	900	22	0	$118,900,000	n/a	*Event Description Provided Below*
Subtotal:							**22**	**0**	**$118,900,000**	**$0**	

- In total the tornado impacted 506 structures, including completely destroying 28 homes and causing major damage to 61 homes and 7 businesses

Morrisonville area (3.2 miles east-southeast)
- Destroyed 3 barns and severely damaged 4 other outbuildings at a farmstead east-southeast of Morrisonville
- Moving northeast the tornado hit several other outbuildings and snapped trees
- As it continued northeast it snapped more large trees before hitting a log home, removing 25 to 50% of the roof material. It also snapped many other trees on the log home property and destroyed a couple of small outbuildings
- The tornado continued northeastward moving into a wooded area, snapping & uprooting hundreds of trees along its path

Hewittville area
- It then curved north-northeastward and moved into Hewittville where it destroyed or severely damaged multiple houses
- The first house hit lost most exterior walls and the entire roof with the exception of the roof over the attached garage. The tornado destroyed a second garage on the same property
- Across the street a mobile home was completely destroyed
- The tornado continued north-northeastward, destroying a barn, pushing an unanchored home off its foundation and completely destroying another mobile home. The mobile home was partially anchored by wood posts set in slots on a concrete foundation over a basement and crawl space. The resident of this home was badly injured and found unconscious, trapped under debris in the crawl space.
- The tornado continued to snap and uproot many more trees and took down power lines and power poles
- Many more home were damaged, to a lesser extent than the first few, with some damage to homes coming from trees or tree branches falling on the homes
- As the tornado moved into the northern part of Hewittville the wind speeds seemed to increase and another home was completely destroyed as was a large old building that had been part of the old railyard. The tornado damaged other homes and garages in this area.

Taylorville
- As the tornado tracked north-northeast it moved into Taylorville, taking down more trees, power lines & poles and damaging multiple houses
- Several homes lost roofs and garages
- As the tornado continued through the City it damaged other homes and several businesses on W. Spresser St.
- As the tornado crossed IL Rte. 29 into the northern part of the City, it weakened considerably, with the damage becoming less severe and more sporadic

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<table>
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Tornadoes Reported in Christian County
1955 – 2017
(Sheet 9 of 10)</th></tr>
<tr><th>Map No.</th><th>Date(s)</th><th>Start Time</th><th>Location(s)</th><th>Magnitude (Fujita Scale)</th><th>Length[1] (Miles)</th><th>Width (Yards)</th><th>Injuries</th><th>Fatalities</th><th>Property Damage</th><th>Crop Damage</th><th>Description</th></tr>
<tr><td>43</td><td>12/1/2018</td><td>5:34 p.m.</td><td>Stonington
Mt. Auburn^</td><td>EF2</td><td>8.39</td><td>400</td><td>n/a</td><td>n/a</td><td>$3,300,000</td><td>n/a</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="7"><u>Stonington</u>
- much of the damage in the Village was on the northwest side where house roofs were impacted, and several garages and sheds were destroyed
- The Mayor indicated that the Village</td><td colspan="5"><u>Stonington area (4 miles north)</u>
- As the tornado tracked to the north it did significant damage to outbuildings at a farm
- The tornado then curved toward the northeast damaging several more outbuildings and sheds</td></tr>
<tr><td>44</td><td>5/29/2019</td><td>3:28 p.m.</td><td>Stonington^</td><td>EF0</td><td>0.23</td><td>20</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>45</td><td>5/29/2019</td><td>3:30 p.m.</td><td>Roby^</td><td>EF0</td><td>0.23</td><td>20</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>46</td><td>5/29/2019</td><td>3:35 p.m.</td><td>Stonington^</td><td>EF0</td><td>0.29</td><td>20</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></tr>
<tr><td>47</td><td>6/19/2019</td><td>5:40 p.m.</td><td>Moweaqua^</td><td>EF0</td><td>0.10</td><td>10</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>crops were damaged</td></tr>
<tr><td>48</td><td>8/12/2019</td><td>8:08 p.m.</td><td>Edinburg^
Willeys^</td><td>EF1</td><td>6.25</td><td>200</td><td>n/a</td><td>n/a</td><td>$75,000</td><td>$630,000</td><td>Event Description Provided Below</td></tr>
<tr><td colspan="7"><u>Along CR 1100 East north of CR 2000 North</u>
- flattened an extensive area of corn, stripped half the roof off a machine and snapped several large trees along</td><td colspan="5"><u>Southeast along CH 22 north of CR 1900 North</u>
- Numerous trees were damaged, and two semi-trailers were tipped over
<u>Along CR 1400 East north of CR 1800 North</u>
- A large tree was snapped, and the roof of a house was damaged</td></tr>
<tr><td colspan="7">Subtotal:</td><td>0</td><td>0</td><td>$3,375,000</td><td>$630,000</td><td></td></tr>
</table>

[1] The length provided is only for the portion(s) of the tornado that occurred in Christian County.

^ Tornado touchdown verified in the vicinity of this location(s).

Map No.	Date(s)	Start Time	Location(s)	Magnitude (Fujita Scale)	Length[1] (Miles)	Width (Yards)	Injuries	Fatalities	Property Damage	Crop Damage	Description
49	8/12/2019	8:40 p.m.	Assumption^	EF0	1.50	75	n/a	n/a	$20,000	n/a	*Event Description Provided Below*
<u>*Touchdown/Liftoff – Two Counties*</u> Tornado touched down in Christian County approx. 1 mile north of Assumption and traveled east-southeast into Shelby County before lifting off in Shelby County lifting off just west of CR 700 East (1.5 miles northeast of Assumption) – total length: 1.91 miles							- Several large tree limbs were broken at a home, one of which punched a hole in the roof of the house - A trailer was overturned and pushed into an outbuilding along CR 2650 East				
Subtotal:							**0**	**0**	**$20,000**	**$0**	
GRAND TOTAL:							**27**	**0**	**$124,857,500†**	**$632,750**	

Table 9
Tornadoes Reported in Christian County
1955 – 2017
(Sheet 10 of 10)

[1] The length provided is only for the portion(s) of the tornado that occurred in Christian County.

^ Tornado touchdown verified in the vicinity of this location(s).

† Included in the property damage total is $25,000 sustained as a result of the April 2, 1964 tornado represent and losses sustained in two counties (including Christian County). A detailed breakdown by county was not available.

Sources: Christian County Multi-Jurisdictional All Hazard Mitigation Planning Committee Member responses to the Natural Hazard Events Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.
NOAA, National Weather Service, Weather Forecast Office Lincoln, Illinois, Tornado Climatology for Central and Southeast Illinois, Christian County.
NOAA, National Weather Service, Storm Prediction Center, SVRGIS, Tornadoes (1950-2017) Database.

During the process of collecting and verifying the tornado data used in this updated Plan, discrepancies were identified in the existing tornado information databases. Discussions were immediately conducted with Chris Miller, Warning Coordination Meteorologist with the NWS Weather Forecast Office in Lincoln to verify tornado coordinates so that these discrepancies could be corrected or clarified. Consequently, this AHMP has the most accurate information on tornadoes in Christian County. If the reader compares the tornado information in this Plan with other databases, they may encounter the same discrepancies until these databases are formally corrected.

Table 10
Excessive Heat Events Reported in Christian County
1997 - 2019
(Sheet 1 of 7)

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)						
6/13/1994 thru 6/22/1994	n/a	99°F	68°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	-
7/11/1995 thru 7/16/1995	n/a	102°F	68°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	-
7/28/1995 thru 7/31/1995	n/a	98°F	65°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	-
8/7/1995 thru 8/19/1995	n/a	99°F	65°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	-
7/26/1997 thru 7/27/1997	9:00 a.m.	98°F	70°F	115°F	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	- Numerous reports of heat-related injuries in most area hospitals. - Numerous reports of roads buckling.
6/26/1998 thru 6/28/1998	3:00 a.m.	94°F	72°F	110°F	COOP (Pana) (Morrisonville SED	n/a	n/a	n/a	n/a	- Numerous reports of heat-related injuries in most area hospitals. - Numerous reports of highways buckling.
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 10
Excessive Heat Events Reported in Christian County
1997 - 2019
(Sheet 2 of 7)

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)						
7/20/1999 thru 7/26/1999	10:00 a.m.	97°F	66°F	110°F	COOP (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/28/1999 thru 7/31/1999	10:00 a.m.	93°F	66°F	110°F	COOP (Pana) SED	n/a	n/a	n/a	n/a	
7/7/2001 thru 7/8/2001	n/a	94°F	66°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/20/2001 thru 7/22/2001	n/a	100°F	71°F	n/a	COOP (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/29/2001 thru 8/1/2001	n/a	93°F	70°F	n/a	COOP (Morrisonville) SED	n/a	n/a	n/a	n/a	
8/7/2001 thru 8/9/2001	n/a	93°F	68°F	n/a	COOP (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/8/2002 thru 7/9/2002	n/a	95°F	71°F	n/a	COOP (Pana) (Morrisonville) 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 10
Excessive Heat Events Reported in Christian County
1997 - 2019
(Sheet 3 of 7)

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)						
7/20/2002 thru 7/22/2002	n/a	97°F	69°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/27/2002 thru 8/5/2002	n/a	97°F	67°F	n/a	COOP (Pana) SED	n/a	n/a	n/a	n/a	
8/15/2003 thru 8/21/2003	n/a	95°F	61°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
8/25/2003 thru 8/28/2003	n/a	97°F	64°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/21/2004 thru 7/22/2004	n/a	93°F	70°F	n/a	COOP (Pana) SED	n/a	n/a	n/a	n/a	
7/22/2005 thru 7/25/2005	12:00 a.m.	97°F	68°F	115°F	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/15/2006 thru 7/19/2006	n/a	108°F	67°F	n/a	COOP (Pana) (Morrisonville) 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 10
Excessive Heat Events Reported in Christian County
1997 - 2019
(Sheet 4 of 7)

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)						
7/30/2006 thru 8/2/2006/	11:00 a.m.	100°F	58°F	110°F	COOP (Pana) (Morrisonville SED	n/a	n/a	n/a	n/a	
8/4/2007 thru 8/15/2007	n/a	100°F	65°F	n/a	COOP (Morrisonville) SED	n/a	n/a	n/a	n/a	
6/21/2009 thru 6/27/2009	n/a	95°F	66°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/13/2010 thru 7/17/2010	n/a	94°F	68°F	n/a	COOP (Pana) SED	n/a	n/a	n/a	n/a	
7/21/2010 thru 7/24/2010	n/a	93°F	70°F	n/a	COOP (Pana) SED	n/a	n/a	n/a	n/a	
8/3/2010 thru 8/4/2010	12:00 a.m.	99°F	72°F	105°F	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
8/9/2010 thru 8/14/2010	12:00 a.m.	98°F	69°F	110°F	COOP (Pana) (Morrisonville 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 10 Excessive Heat Events Reported in Christian County 1997 - 2019 (Sheet 5 of 7)										
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)**						
7/1/2011 thru 7/2/2011	n/a	95°F	70°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/10/2011 thru 7/12/2011	n/a	96°F	70°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/16/2011 thru 8/3/2011	n/a	100°F	68°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
8/31/2011 thru 9/3/2011	n/a	101°F	68°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
6/29/2012 thru 7/7/2012	1:45 p.m.	105°F	68°F	110°F	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/15/2012 thru 7/19/2012	n/a	102°F	70°F	n/a	COOP (Pana) (Morrisonville) 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 10
Excessive Heat Events Reported in Christian County
1997 - 2019
(Sheet 6 of 7)

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)						
7/21/2012 thru 7/26/2012	n/a	104°F	66°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
8/26/2013 thru 8/31/2013	n/a	99°F	66°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
8/23/2014 thru 8/26/2014	n/a	94°F	67°F	n/a	COOP (Pana) (Morrisonville) SED	n/a	n/a	n/a	n/a	
7/12/2015 thru 7/14/2015	n/a	93°F	63°F	n/a	COOP (Pana) SED	n/a	n/a	n/a	n/a	
7/17/2015 thru 7/18/2015	n/a	92°F	71°F	n/a	COOP (Pana) SED	n/a	n/a	n/a	n/a	
7/27/2015 thru 7/28/2015	n/a	95°F	73°F	n/a	COOP (Pana) SED	n/a	n/a	n/a	n/a	
7/18/2016 thru 7/24/2016	n/a	93°F	68°F	n/a	COOP (Pana) 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 10
Excessive Heat Events Reported in Christian County
1997 - 2019
(Sheet 7 of 7)

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)						
7/19/2017 thru 7/23/2017	n/a	99°F	68°F	n/a	COOP (Pana) SED	n/a	n/a	n/a	n/a	
6/28/2018 thru 7/5/2018	n/a	94°F	67°F	n/a	COOP (Pana) SED	n/a	n/a	n/a	n/a	
7/17/2019 thru 7/21/2019	n/a	93°F	67°F	n/a	COOP (Pana) 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 11
Drought Events Reported in Christian 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						40.8%	28.2%	n/a	n/a	All 102 counties in Illinois were proclaimed state disaster areas because of high temperatures and insufficient precipitation beginning in mid-June
1988	June 1988 thru September 1989						40.8%	26.5%	n/a	n/a	Approximately half of all Illinois counties were impacted by drought conditions
2005	May 2005 thru April 2006	X	X	X			3.7%	-----	No	n/a	
2011	August 2011 thru November 2011	X	X	X			1.4%	13.4%	Yes	n/a	
2012	June 2012 thru January 2013	X	X	X	X		16.5%	-----	Yes	$53,800,000	
Subtotal:										**$53,800,000**	

[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 Christian 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			
2013	August 2013 thru April 2014	X	X				-----	-----	No	n/a	A "flash drought" hit parts of Illinois at the end of August/ beginning of September but because of its timing had very little impact on crop yields
Subtotal:										**$0**	
GRAND TOTAL:										**$53,800,000**	

[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		

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.

Table 12 **Generators of Solid & Liquid Hazardous Substances – 2017**		
Name	**Hazardous Substances Generated**	**Amount Generated (Pounds)**
Assumption		
GSI Group LLC.	Chromium	5
	Manganese	5
	Nickel	5
	Total:	*15*
Kincaid		
Kincaid Power Station	Ammonia	20,694
	Barium Compounds	628,769
	Benzo(G,H,I)Perylene	0
	Chromium Compounds (except chromite ore mined in the Transvaal region)	9,721
	Copper Compounds	25,120
	Dioxin and Dioxin-like Compounds	*
	Hydrochloric Acid (1995 and after "acid aerosols" only)	28,680
	Hydrogen Fluoride	47,281
	Lead Compounds	6,846
	Manganese Compounds	25,010
	Mercury Compounds	181
	Polycyclic Aromatic Compounds	3
	Sulfuric Acid (1994 and after 'acid aerosols" only)	0
	Vanadium Compounds	22,739
	Xylene (mixed isomers)	26
	Zinc Compounds	18,746
	Total:	*833,815*
Taylorville		
Ahlstrom Filtration LLC.	Antimony Compounds	-
	Formaldehyde	3.439
	Methanol	407,973
	Phenol	7,541
	Total:	*418,953*
Taylorville		
GSI Group	Manganese	5
	Nickel	5
	Total:	*10*

* The total Dioxin and Dioxin-like compounds for on-site and off-site reported disposed of or otherwise released was less than one (1) gram.

Source: U.S. Environmental Protection Agency, TRI Explorer, Releases: Facility Report.

Table 13
ICC Recorded Railway Accidents/Incidents Involving Hazardous Substances
2009 – 2018

Year	Category	Accident/Incident Location			
		Illinois	Christian 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	0	40	44
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
2017	A	2	0	1	1
	B	14	0	9	5
	C	69	1	34	35
2018	A	1	0	0	1
	B	8	0	4	4
	C	55	0	24	31

Source: Illinois Commerce Commission.

Table 14 Hazmat Incidents in Christian County: 2009 – 2018 (Sheet 1 of 2)		
Date	**Location**	**Hazardous Substances Released**
2009		
02/23	Rosamond⮝	Methamphetamine
04/23	Assumption⮝	Methamphetamine
05/04	Taylorville	Gasoline
05/24	Stonington	Anhydrous ammonia
05/27	Morrisonville⮝	Engine lube oil§
07/02	Pana	Gasoline
08/17	Pana⮝	Methamphetamine
10/13	Stonington⮝	Methamphetamine
12/01	Pana⮝	Methamphetamine
2010		
01/21	Pana⮝	Unknown material from meth lab
06/05	Stonington⮝	Sand §
08/07	Assumption⮝	Crude oil
09/15	Pana	Diesel
10/19	Taylorville	Unknown meth lab material
10/26	Morrisonville⮝	Diesel fuel†
10/29	Zenobia⮝	Anhydrous ammonia †
11/01	Morrisonville	Diesel fuel†
11/30	Clarksdale⮝	Soy bean meal §
11/30	Taylorville	Avgas (110LL)
12/28	Sharpsburg	Diesel fuel†
2011		
03/21	Taylorville⮝	Abandoned meth lab materials
05/31	Taylorville	Unknown material
08/16	Sharpsburg⮝	Gasoline*
09/17	Taylorville⮝	Hydraulic fluid
2012		
02/20	Assumption	Gasoline
03/13	Taylorville	Gasoline and diesel
04/30	Taylorville	Abandoned meth lab
05/23	Taylorville	Diesel fuel
07/20	Morrisonville	Gasoline
08/07	Morrisonville	Gasoline
2013		
02/14	Taylorville	Gasoline
02/19	Taylorville	Meth by-products
05/25	Taylorville⮝	Sodium hypochlorite 15%
06/04	Stonington	Gasoline
06/21	Lake Sangchris State Park⮝	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.

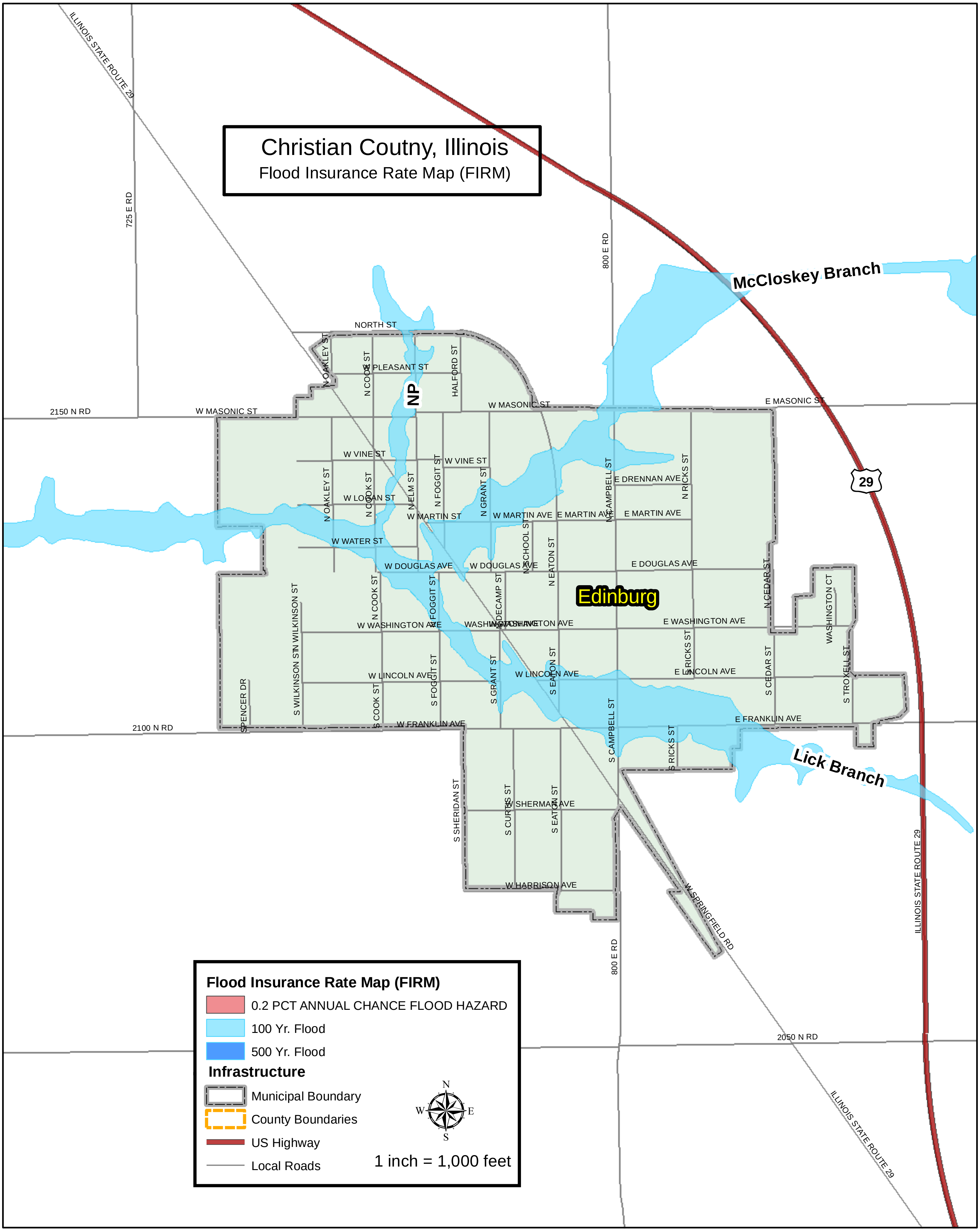
Table 14
Hazmat Incidents in Christian County: 2009 – 2018
(Sheet 2 of 2)

Date	Location	Hazardous Substances Released
2014		
01/09	Stonington^	Unleaded gasoline
01/27	Pana^	Abandoned meth lab
03/17	Taylorville^	Plastic bottles contaminated with meth lab residue
04/03	Pana	Gasoline
05/26	Mount Auburn^	Crude oil
06/01	Palmer	Corn meal§
09/04	Morrisonville	Plastic pellets§
09/24	Edinburg	Crude oil/saltwater mixture
11/01	Palmer^	Crushed limestone§
11/03	Morrisonville	Gasoline and diesel
11/05	Moweaqua	Crude oil/salt water*
2015		
01/13	Assumption	Gasoline and diesel
02/17	Taylorville^	Sewage sludge
02/27	Mount Auburn	Oil*
05/28	Stonington^	Diesel fuel†
06/15	Taylorville	Meth by-products
07/09	Taylorville	Corn hull pellets§
08/03	Taylorville^	Meth making materials / unknown
09/14	Pana^	Crude oil*
10/16	Willeys^	Transmix (Diesel, gasoline & jet fuel) *
12/29	Edinburg	Crude oil
2016		
03/02	Morrisonville^	Limestone§
04/01	Edinburg^	Crude oil
04/15	Taylorville	Unknown
04/22	Taylorville^	Unknown
08/18	Taylorville^	Sewage sludge
08/26	Assumption	Diesel fuel†
2017		
01/21	Stonington	Gasoline
09/07	Taylorville	Diesel fuel§
09/15	Taylorville	Diesel fuel†
09/19	Edinburg^	Crude oil*
2018		
05/01	Owaneco^	#2 red diesel fuel
05/16	Pana	Diesel†
12/02	Stonington^	Bisulfites aqueous, ferric chloride & sodium hydroxide†

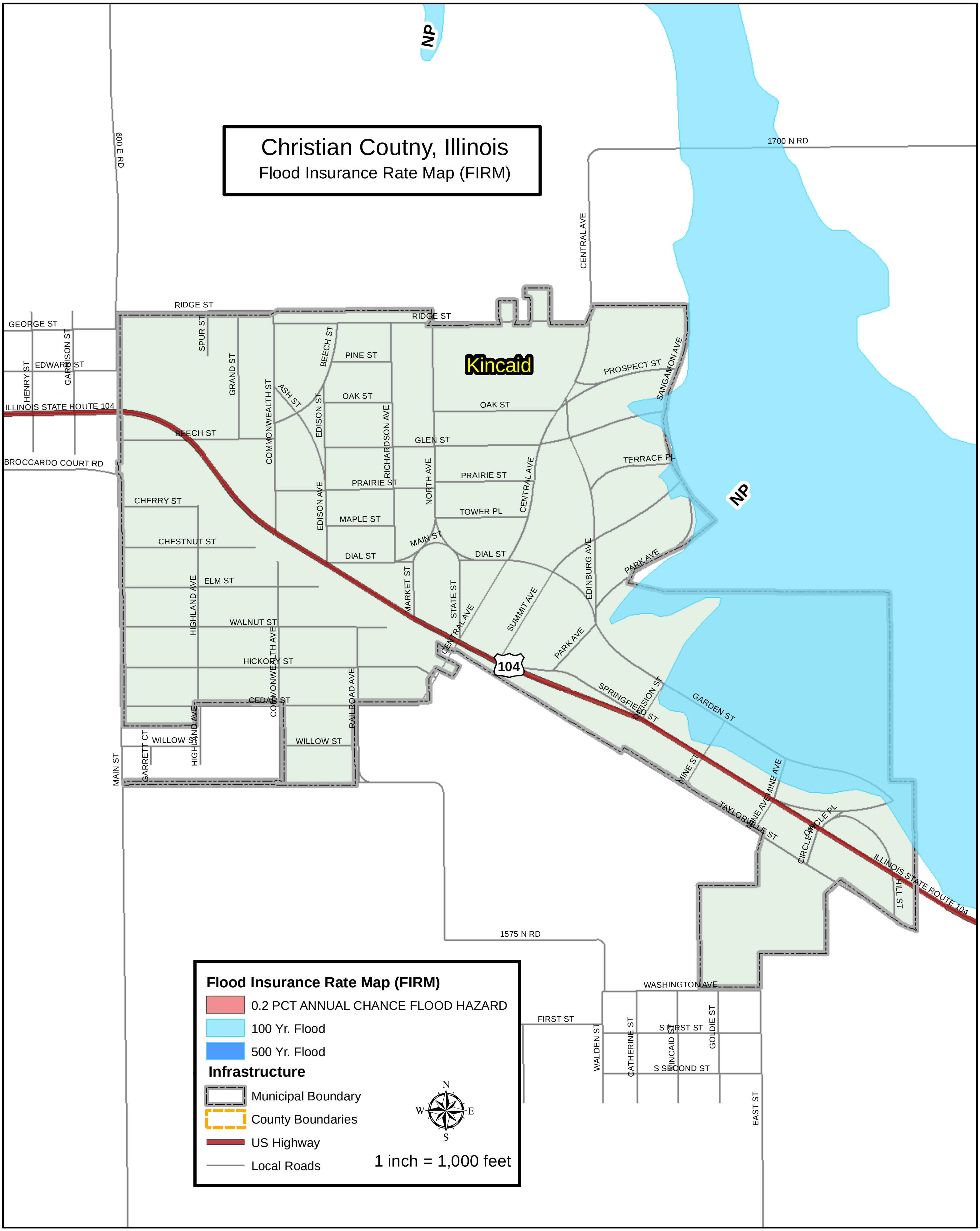
^ Incident verified in the vicinity of this location.
† Incident involved the transportation of a hazardous substance by roadway.
* Incident involved the transportation for a hazardous substance by pipeline.
§ Incident involved the transportation of a hazardous substance by rail.

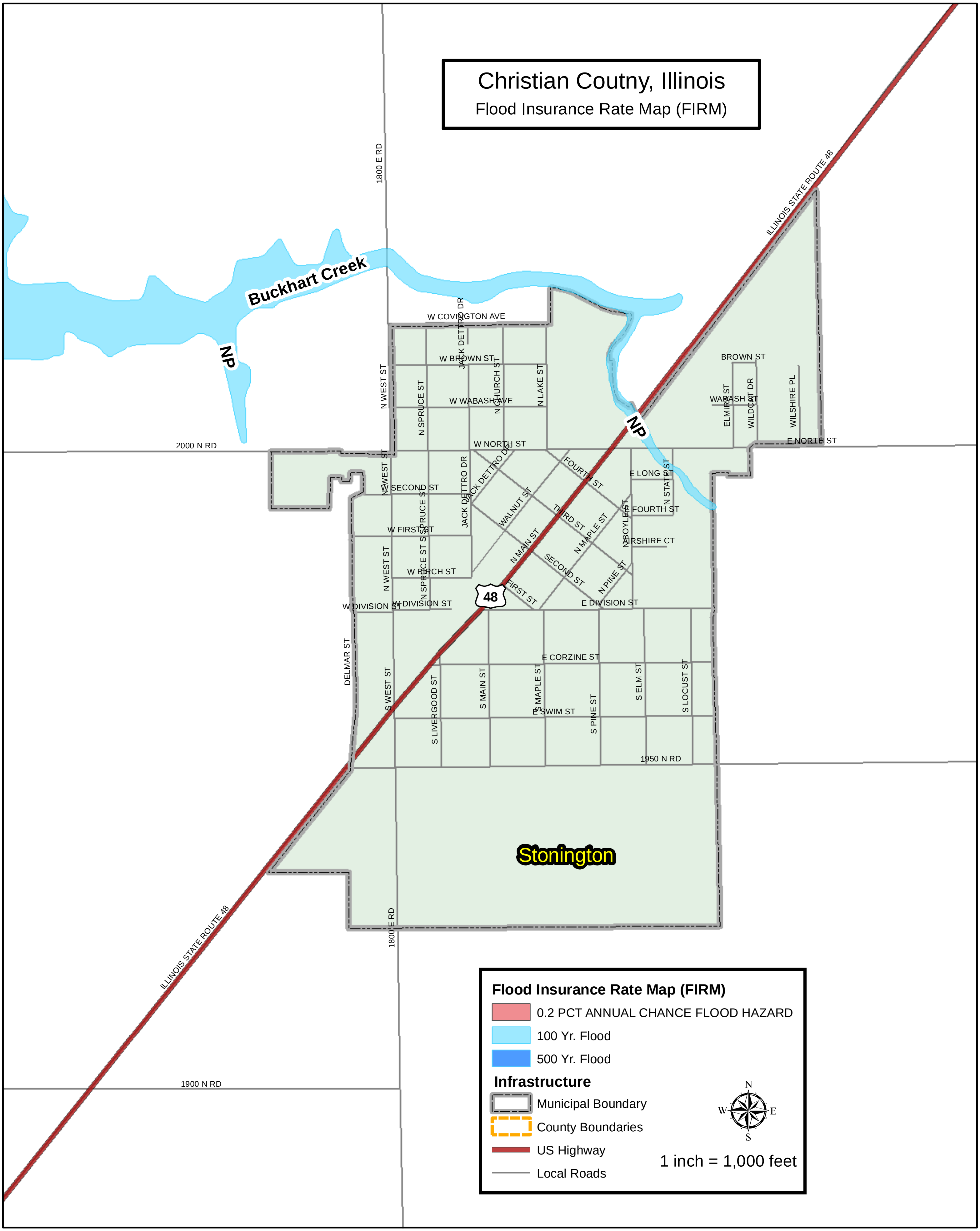
FIRMs for Participating Jurisdictions

Appendix K

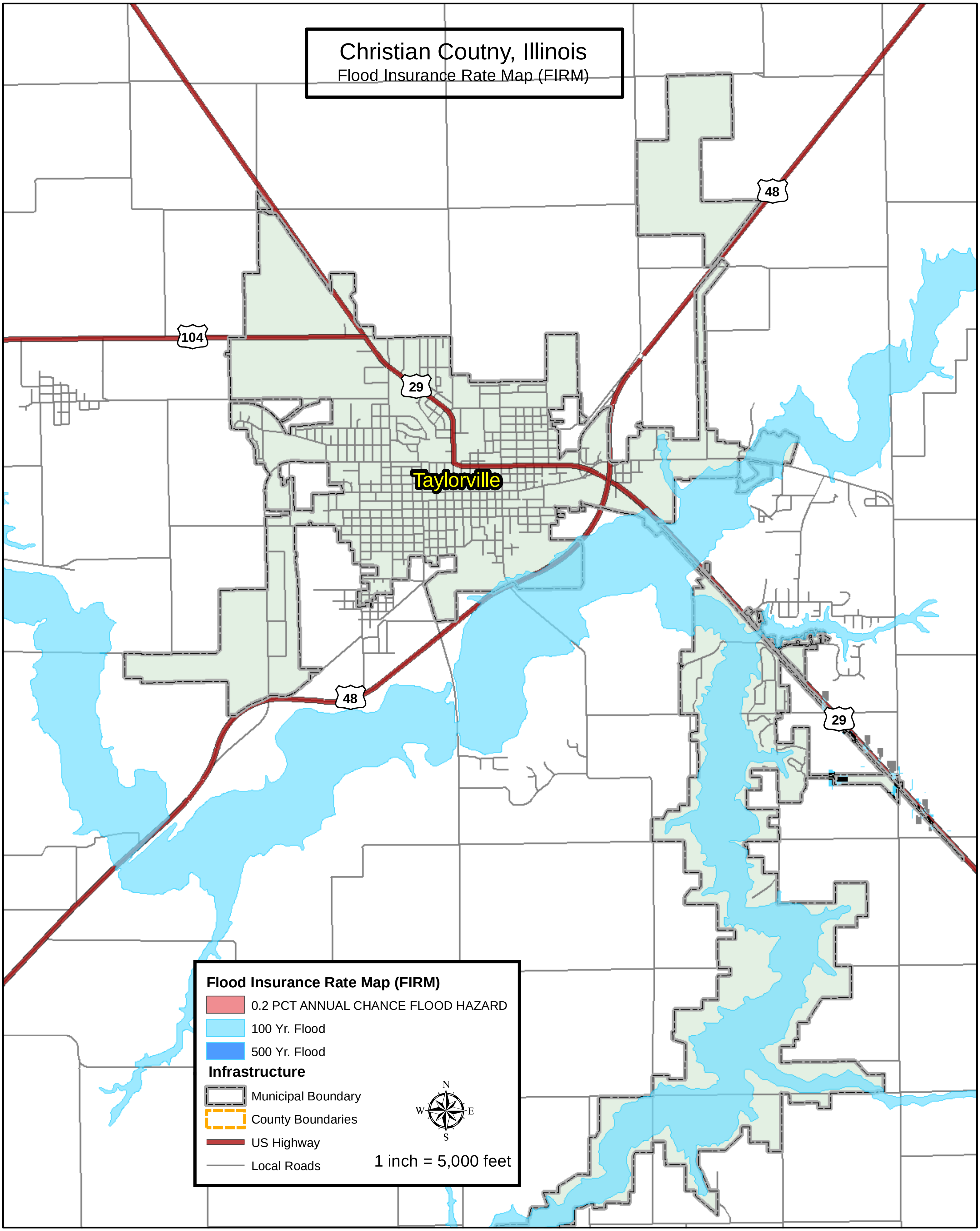


Christian Coutny, Illinois
Flood Insurance Rate Map (FIRM)
McCloskey Branch
Lick Branch
Edinburg
NP
29
ILLINOIS STATE ROUTE 29
725 E RD
800 E RD
2150 N RD
2100 N RD
2050 N RD
NORTH ST
W PLEASANT ST
W MASONIC ST
E MASONIC ST
W VINE ST
W LOGAN ST
W MARTIN AVE
E MARTIN AVE
E DRENNAN AVE
W WATER ST
W DOUGLAS AVE
E DOUGLAS AVE
W WASHINGTON AVE
E WASHINGTON AVE
W LINCOLN AVE
E LINCOLN AVE
W FRANKLIN AVE
E FRANKLIN AVE
W SHERMAN AVE
W HARRISON AVE
W SPRINGFIELD RD
N OAKLEY ST
N COOK ST
HALFORD ST
N ELM ST
N FOGGIT ST
N GRANT ST
N SCHOOL ST
N EATON ST
N CAMPBELL ST
N RICKS ST
N CEDAR ST
WASHINGTON CT
S TROXELL ST
S CEDAR ST
S RICKS ST
S CAMPBELL ST
S EATON ST
S GRANT ST
S FOGGIT ST
S COOK ST
S WILKINSON ST
N WILKINSON ST
SPENCER DR
DECAMP ST
S SHERIDAN ST
S CURTIS ST
Flood Insurance Rate Map (FIRM)
0.2 PCT ANNUAL CHANCE FLOOD HAZARD
100 Yr. Flood
500 Yr. Flood
Infrastructure
Municipal Boundary
County Boundaries
US Highway
Local Roads
N
S
E
W
1 inch = 1,000 feet


Christian Coutny, Illinois
Flood Insurance Rate Map (FIRM)
Kincaid
NP
NP
104
1700 N RD
600 E RD
CENTRAL AVE
RIDGE ST
GEORGE ST
EDWARD ST
GARRISON ST
HENRY ST
ILLINOIS STATE ROUTE 104
BROCCARDO COURT RD
SPUR ST
GRAND ST
COMMONWEALTH ST
ASH ST
BEECH ST
PINE ST
OAK ST
EDISON ST
RICHARDSON AVE
GLEN ST
PROSPECT ST
SANGAMON AVE
TERRACE PL
PRAIRIE ST
NORTH AVE
TOWER PL
MAPLE ST
EDISON AVE
MAIN ST
DIAL ST
CHERRY ST
CHESTNUT ST
ELM ST
HIGHLAND AVE
WALNUT ST
HICKORY ST
COMMONWEALTH AVE
CEDAR ST
RAILROAD AVE
WILLOW ST
GARRETT CT
MARKET ST
STATE ST
SUMMIT AVE
PARK AVE
EDINBURG AVE
SPRINGFIELD ST
DIVISION ST
GARDEN ST
MINE ST
MINE AVE
TAYLORVILLE ST
CIRCLE PL
HILL ST
1575 N RD
WASHINGTON AVE
FIRST ST
S FIRST ST
S SECOND ST
WALDEN ST
CATHERINE ST
KINCAID ST
GOLDIE ST
EAST ST
Flood Insurance Rate Map (FIRM)
0.2 PCT ANNUAL CHANCE FLOOD HAZARD
100 Yr. Flood
500 Yr. Flood
Infrastructure
Municipal Boundary
County Boundaries
US Highway
Local Roads
N
W
E
S
1 inch = 1,000 feet



Christian Coutny, Illinois
Flood Insurance Rate Map (FIRM)
Buckhart Creek
NP
NP
Stonington
48
ILLINOIS STATE ROUTE 48
ILLINOIS STATE ROUTE 48
1800 E RD
2000 N RD
1950 N RD
1900 N RD
W COVINGTON AVE
W BROWN ST
W WABASH AVE
W NORTH ST
W SECOND ST
W FIRST ST
W BIRCH ST
W DIVISION ST
E DIVISION ST
E CORZINE ST
E SWIM ST
E LONG ST
E FOURTH ST
E NORTH ST
BROWN ST
WABASH ST
N WEST ST
N SPRUCE ST
N CHURCH ST
N LAKE ST
JACK DETTRO DR
WALNUT ST
N MAIN ST
N MAPLE ST
N PINE ST
N BOYLE ST
N STATE ST
FOURTH ST
THIRD ST
SECOND ST
FIRST ST
DELMAR ST
S WEST ST
S LIVERGOOD ST
S MAIN ST
S MAPLE ST
S PINE ST
S ELM ST
S LOCUST ST
ELMIRA ST
WILDCAT DR
WILSHIRE PL
Flood Insurance Rate Map (FIRM)
0.2 PCT ANNUAL CHANCE FLOOD HAZARD
100 Yr. Flood
500 Yr. Flood
Infrastructure
Municipal Boundary
County Boundaries
US Highway
Local Roads
N
W
E
S
1 inch = 1,000 feet


Christian Coutny, Illinois
Flood Insurance Rate Map (FIRM)
48
104
29
Taylorville
48
29
Flood Insurance Rate Map (FIRM)
0.2 PCT ANNUAL CHANCE FLOOD HAZARD
100 Yr. Flood
500 Yr. Flood
Infrastructure
Municipal Boundary
County Boundaries
US Highway
Local Roads
N
W
E
S
1 inch = 5,000 feet

Directory of Coal Mines for the County

Appendix L

DIRECTORY OF COAL MINES IN ILLINOIS

Christian
County

This directory accompanies the Illinois Coal
Mines map or maps for this County.

August 2018

ILLINOIS
Illinois State Geological Survey
PRAIRIE RESEARCH INSTITUTE

Prairie Research Institute
Illinois State Geological Survey
615 East Peabody Drive
Champaign, Illinois 61820
(217) 333-4747
http//:www.isgs.illinois.edu

INTRODUCTION

Coal has been mined in 76 counties. More than 7,400 coal mines have operated since commercial mining began in Illinois circa 1810. Our maps of known mines for each county may help the public to identify mined areas. This accompanying coal mine directory provides basic information about the coal mines. Please note, however, that the accuracy and completeness of the maps and directories vary depending on the availability and quality of source material. Little or no information is available for many mines, especially the older ones, because mining activity was not regulated or documented until the late 1800's. Even then, reporting requirements were minimal.

The coal mine maps are maps compiled by the Illinois State Geological Survey (ISGS) of known mines: underground and surface coal mines as well as underground industrial mineral mines. Buffer regions for industrial mineral underground mines were incorporated into the maps due to limited information regarding these mines. The size of the buffer region is dependent on the uncertainty or inaccuracy of the mine location based on the quality of the source material. For more information regarding industrial mineral mines please contact the ISGS Industrial Minerals Section.

In cooperation with the Illinois State Geological Survey, the Office of Mines and Minerals (a division of the Department of Natural Resources) is in search of old underground mine maps of Illinois. Many of the undocumented maps are believed to be in libraries, historical societies and personal files of old mine employees. The Department asks that anyone who knows of one of these maps, please contact the Department at (618) 650-3197 or by emailing rgibson@siue.edu. A map specialist will come to your location, if you wish. Otherwise maps can be mailed, or you may stop by one of our offices in Edwardsville, Springfield, Ottawa, or Benton. These maps will be checked against existing inventory. If they are found to be a new discovery, they will be electronically imaged and returned to the owner (if requested).

MINE MAPS

The mined areas are shown on county base maps at a scale of 1:100,000.

Three types of mine information are shown on the maps: an index number that identifies the mine in the directory, a symbol that marks the 'location' of the mine, and an outline of the mined area if that is known. The location is almost always the site of the main mine opening or, in the case of surface mines, the location of the tipple (coal washing and storage facility). The type of symbol indicates whether the opening is a shaft, drift, or slope and whether the mine is active or abandoned. Another symbol represents a mine with an uncertain type of portal and/or uncertain location. When the exact location is unknown, the symbol is placed in the center of the section or quarter section in which the mine was reported to exist. If a mine cannot be located within a section, it is not shown on the map, but is listed in the directory.

The boundaries of the mined areas are also shown for most of the mines; however, for some mines the only information available is the location of the main opening. There are three types of coal-mined areas: underground, surface, and indefinite--which are shaded with different patterns. The underground mines also show large blocks of unmined coal within the mine, when that information is available. The indefinite areas, which have been plotted from sketchy or incomplete information, usually are underground workings, although the directory should be consulted to determine the specific mine type.

For most counties, one map shows all known mines. However, in Gallatin, Saline, Vermilion, and Williamson Counties, several seams have been extensively mined. For the sake of readability, separate maps have been produced for the mines in each seam. Mines in the Herrin Coal are shown on one map, those in the Springfield Coal are shown on another, and the mines in all other coals are shown on a third map. In Vermilion County, the mines that operated in the Herrin and the Danville Coals are presented on separate maps.

Quadrangle maps at 1:24,000 scale have been completed for select areas and contain more detailed outlines with directories that contain more detailed coal mine information. The maps and directories are available as downloadable PDF files or can be purchased. Please visit the ISGS web site for more information.

MINE DIRECTORIES

Each county directory is keyed to the mine map by the mine index number; the directory provides basic information about the coal mines shown on the map. The data have been compiled from a variety of sources such as the annual Coal Report of the Illinois Office of Mines and Minerals and field notes taken by ISGS geologists. The information presented in the table is described below. A blank in any column indicates that information is not available for that item. Again, we welcome any additional information that you may have.

<u>ISGS Index</u> Each mine in the state is identified with a unique number; this number is shown on the map and is the link between the map and the directory. The number is permanently assigned to a mine regardless of changes in the mine name, ownership, or operator.

<u>Company Name</u> A mine may have been operated by more than one company or the operating company may have changed its name. Separate entries in the directory show each name and the years of operation under the name. In many instances, names have been abbreviated to fit within the space available.

<u>Mine Name and Mine Number</u> An entry is included for each name and/or number the mine operated under, even if the company name remained the same. Many companies use the same name for all their mines, but differentiate them by number. Again, abbreviations have been used where necessary.

Mine Type   Underground mines are either "shaft," "slope," or "drift" which refers to the type of opening used to remove the coal from the mine. In shaft mines the coal is removed through a vertical shaft. Slope designates mines in which the coal is removed via a sloping incline from the ground surface to the mining level. In slope mines, miners and equipment may use either the slope or a vertical shaft to get into the mine. A drift mine is an underground mine that is excavated where the coal outcrops in the side of a bluff or the highwall of a surface mine. The mine type for surface mines is "strip" because these mines are more commonly called "strip mines."

Method   This refers to the pattern by which the coal was removed. Most underground mines in Illinois have used a type of room and pillar pattern, the areas where the coal is removed are the 'rooms' with 'pillars' of coal left in place to support the roof. In some mines, the pillars were later pulled to extract additional coal. The abbreviations are listed below and most are illustrated in Figure 1.

RP	Room & Pillar; specific type unknown
RPB	Room & Pillar Basic; irregular panels, typical of old mines
MRP	Modified Room & Pillar; a somewhat more regular pattern than Room & Pillar Basic
RPP	Room and Pillar Panel; similar to Modified Room & Pillar
BRP	Blind Room and Pillar; every 6th or 7th room is left unmined to provide additional support
CRP	Checkerboard Room and Pillar; evenly spaced large pillars
LW	Longwall; all coal is removed
	Old longwall mines were backfilled with rock to provide support
	Modern longwall mines allow roof to collapse behind as mining progresses
HER	High Extraction Retreat; a form of Room & Pillar mining that extracts most of the coal

Years Operated   Years that the mine operated; these dates may include periods when the mine was idle or not in full operation. Dates of mining from different sources are sometimes contradictory. The conventions that we have used to indicate where we were uncertain of dates are as follows. If we know the full range of dates that a mine operated under a specific name, those are given (1928-1934). If we know when a mine last operated, but not when it began, we use a dash and end date (-1934). If we know that a mine operated in a particular year, but not when it opened or closed, we just give the year we know (1920). To avoid confusion with the previous case, if a mine opened and closed in the same year, the year is repeated (1926-1926). In cases where a mine operated under different names, but we don't know when the name change occurred, the full range of dates is given for all names (John Smith Sr. Mine 1913-1944, Bill Smith Mine 1913-1944). A blank indicates that we have no information on the dates that the mine operated.

Coal Seam Mined The seam name is that used by the Illinois State Geological Survey. Figure 2 shows these coal seams in a stratigraphic column and provides a cross-reference to other names commonly used for these coals. If a mine has operated in more than one seam, there are separate entries in the table for each seam mined.

Location The location given is the site of the main portal or, for surface mines, the tipple. For small surface mines, the pit and the tipple are assumed to be the same. The location is based on the Public Land Survey System of townships and sections. Townships are identified by a township (north-south) and range (east-west) designation such as T14N-R6E. Townships are subdivided into approximately 36 one-square-mile sections, which are numbered from 1 to 36.

ORDERING INFORMATION

A 1:100,000 scale color plot with the directory is available at a cost of $12.50. This can be ordered by contacting the Information Office at (217) 244-2414 or sales@prairie.illinois.edu.

ACCURACY OF MAP

The maps and digital files used for this study were compiled from data obtained from a variety of sources and have varying degrees of completeness and accuracy. They present reasonable interpretations of the geology of the area and are based on available data. These data were compiled and digitized at a scale of 1:62,500, except for areas where quadrangle studies have been completed and the data was compiled at 1:24,000 or better. Locations of some features may be offset by 500 feet or more due to errors in the original source maps, the compilation process, digitizing, or a combination of these factors. These data are not intended for use in site-specific screening or decision-making. Data included in this map are suitable for use at a scale of 1:100,000.

DISCLAIMER

The Illinois State Geological Survey and the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this data set and accept no liability for the consequences of decisions made by others on the basis of the information presented here.

DIRECTORY OF COAL MINES FOR CHRISTIAN COUNTY, ILLINOIS (August 2018)

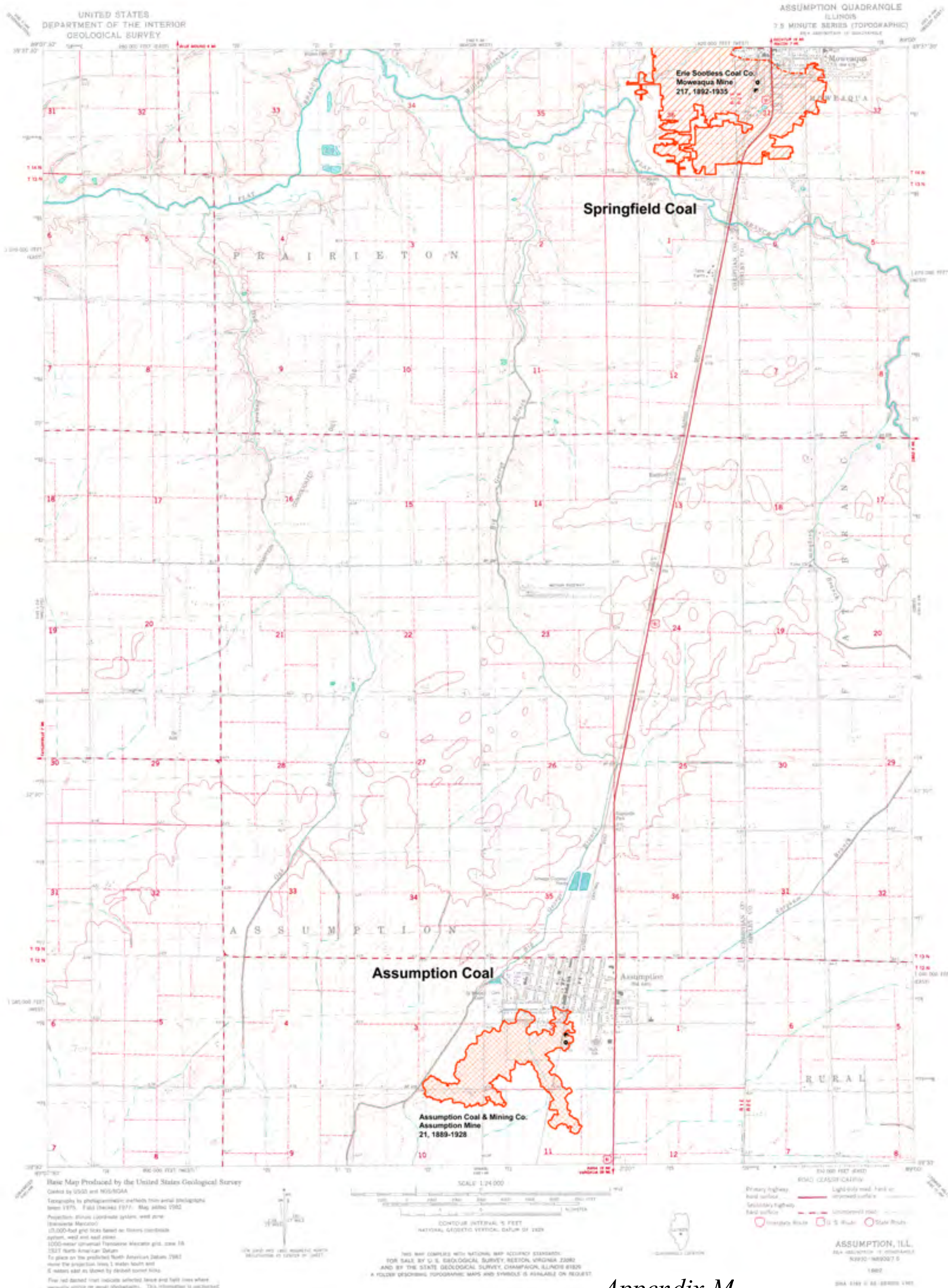
ISGS INDEX	COMPANY NAME	MINE NAME	MINE NO.	MINE TYPE	METHOD	YEARS OPERATED	SEAM MINED	COUNTY	LOCATION TWP	RGE	SEC
21	ASSUMPTION COAL & MNG. CO.	ASSUMPTION	1	SHAFT	LW	1889-1928	ASSUMPTION	CHRISTIAN	12N	1E	2
217	MOWEAQUA COAL MNG & MFG CO.	MOWEAQUA		SHAFT	RPP	1892-1920	SPRINGFIELD	SHELBY	14N	2E	31
217	MOWEAQUA COAL MINING CO.	MOWEAQUA	1	SHAFT	RPP	1920-1930	SPRINGFIELD	SHELBY	14N	2E	31
217	MOWEAQUA COAL CORP.	MOWEAQUA	1	SHAFT	RPP	1931-1933	SPRINGFIELD	SHELBY	14N	2E	31
217	ERIE SOOTLESS COAL CO.	MOWEAQUA		SHAFT	RPP	1934-1935	SPRINGFIELD	SHELBY	14N	2E	31
219	PEABODY COAL CO.	PEABODY	9	SHAFT	RPP	1918-1951	HERRIN	CHRISTIAN	13N	2W	19
220	PEABODY COAL CO.	PEABODY	8	SHAFT	RPP	1914-1954	HERRIN	CHRISTIAN	13N	3W	8
221	SPRINGSIDE C C	SPRINGSIDE		SHAFT	RPP	1890-1904	HERRIN	CHRISTIAN	11N	1E	15
221	MANUFACTURERS FUEL CO	SPRINGSIDE		SHAFT	RPP	1904-1906	HERRIN	CHRISTIAN	11N	1E	15
221	SMITH-LOHR C C	SPRINGSIDE		SHAFT	RPP	1906-1923	HERRIN	CHRISTIAN	11N	1E	15
221	SPRINGSIDE C C	SPRINGSIDE	3	SHAFT	RPP	1923-1925	HERRIN	CHRISTIAN	11N	1E	15
222	PANA COAL CO.	PANA	2	SHAFT	MRP	1887-1902	HERRIN	CHRISTIAN	11N	1E	15
222	NEWBENT COAL CO.	NORTH	2	SHAFT	MRP	1902-1905	HERRIN	CHRISTIAN	11N	1E	15
222	PANA COAL CO.	NORTH	2	SHAFT	MRP	1905-1928	HERRIN	CHRISTIAN	11N	1E	15
245	EDINBURG COAL MNG. CO.	EDINBURG		SHAFT	RPP	1888-1894	HERRIN	CHRISTIAN	14N	3W	14
245	SMITH & WILLIAMS	EDINBURG		SHAFT	RPP	1894-1895	HERRIN	CHRISTIAN	14N	3W	14
245	EDINBURG COOP. COAL CO.	EDINBURG		SHAFT	RPP	1895-1907	HERRIN	CHRISTIAN	14N	3W	14
245	HANOVER COAL CO.	EDINBURG		SHAFT	RPP	1907-1908	HERRIN	CHRISTIAN	14N	3W	14
245	VANDEVEER (C. W.)	GREENWOOD		SHAFT	RPP	1908-1913	HERRIN	CHRISTIAN	14N	3W	14
245	GREENWOOD COAL CO.	GREENWOOD		SHAFT	RPP	1913-1917	HERRIN	CHRISTIAN	14N	3W	14
245	VANDEVEER (CHARLES W.)	GREENWOOD		SHAFT	RPP	1917-1918	HERRIN	CHRISTIAN	14N	3W	14
245	CHRISTIAN COUNTY MNG. CO.	EDINBURG		SHAFT	RPP	1918-1926	HERRIN	CHRISTIAN	14N	3W	14
245	QUALITY COAL CO.	EDINBURG		SHAFT	RPP	1927-1927	HERRIN	CHRISTIAN	14N	3W	14
245	YOUNG (H. F.) COAL CO.	EDINBURG		SHAFT	RPP	1928-1929	HERRIN	CHRISTIAN	14N	3W	14
245	YOUNG & TEX	EDINBURG		SHAFT	RPP	1930-1930	HERRIN	CHRISTIAN	14N	3W	14
245	YOUNG (H. F.)	EDINBURG		SHAFT	RPP	1931-1932	HERRIN	CHRISTIAN	14N	3W	14
245	GREENWOOD COAL MNG. CO.	EDINBURG		SHAFT	RPP	1933-1935	HERRIN	CHRISTIAN	14N	3W	14
245	EDINBURG COAL CO.	EDINBURG		SHAFT	RPP	1935-1945	HERRIN	CHRISTIAN	14N	3W	14
245	WENNEBORG COAL CO.	WENNEBORG	3	SHAFT	RPP	1945-1948	HERRIN	CHRISTIAN	14N	3W	14
246	CHRISTIAN COUNTY COAL CO.	CHRISTIAN COUNTY	1	SHAFT		1902-1916	HERRIN	CHRISTIAN	13N	2W	33

DIRECTORY OF COAL MINES FOR CHRISTIAN COUNTY, ILLINOIS (August 2018)

ISGS INDEX	COMPANY NAME	MINE NAME	MINE NO.	MINE TYPE	METHOD	YEARS OPERATED	SEAM MINED	COUNTY	LOCATION TWP	RGE	SEC
246	C C C C (MERGD W PEABODY#58)	CHRISTIAN COUNTY		SHAFT		1902-1916	HERRIN	CHRISTIAN	13N	2W	33
371	PENWELL COAL MNG. CO.	PENWELL	1	SHAFT	RPP	1888-1941	HERRIN	CHRISTIAN	11N	1E	21
371	VICTORY COAL MNG. CO.	PENWELL		SHAFT	RPP	1942-1944	HERRIN	CHRISTIAN	11N	1E	21
371	OLDROYD COAL CO.	PENWELL		SHAFT	RPP	1944-1945	HERRIN	CHRISTIAN	11N	1E	21
661	CHRISTIAN COUNTY COAL CO.	TAYLORVILLE	1	SHAFT	BRP	1901-1915	HERRIN	CHRISTIAN	13N	2W	33
661	SPRINGFIELD DISTRICT COAL CO	SPRINGFIELD DISTRICT	8	SHAFT	BRP	1916-1918	HERRIN	CHRISTIAN	13N	2W	33
661	SPRINGFIELD DIST COAL MNG CO	SPRINGFIELD DISTRICT	58	SHAFT	BRP	1918-1924	HERRIN	CHRISTIAN	13N	2W	33
661	PEABODY COAL CO.	PEABODY	58	SHAFT	BRP	1924-1952	HERRIN	CHRISTIAN	13N	2W	33
679	PEABODY COAL CO.	PEABODY	17	SHAFT	RPP	1949-1957	HERRIN	CHRISTIAN	11N	1E	28
693	PEABODY COAL CO.	PEABODY	10	SLOPE	BRP	1951-1994	HERRIN	CHRISTIAN	13N	4W	10
729	PANA COAL & MNG. CO.	PANA	1	SHAFT	MRP	1884-1941	HERRIN	CHRISTIAN	11N	1E	16
729	PANA MINES CORP.	PANA	1	SHAFT	MRP	1942-1945	HERRIN	CHRISTIAN	11N	1E	16
729	OLD MINE COAL CO.	PANA	1	SHAFT	MRP	1946-1948	HERRIN	CHRISTIAN	11N	1E	16
730	STONINGTON COAL CO.	STONINGTON		SHAFT	MRP	1905-1915	HERRIN	CHRISTIAN	14N	1W	28
730	PEABODY COAL CO.	PEABODY	21	SHAFT	MRP	1915-1924	HERRIN	CHRISTIAN	14N	1W	28
731	TAYLORVILLE COAL CO.	TAYLORVILLE	1	SHAFT	RPP	1889-1902	HERRIN	CHRISTIAN	13N	2W	26
731	SPRINGFIELD COAL & MNG. CO.	SPRINGFIELD	6	SHAFT	RPP	1902-1916	HERRIN	CHRISTIAN	13N	2W	26
731	SPRINGFIELD DIST COAL MNG CO	SPRINGFIELD DISTRICT	56	SHAFT	RPP	1916-1918	HERRIN	CHRISTIAN	13N	2W	26
731	PEABODY COAL CO.	PEABODY	56	SHAFT	RPP	1924-1925	HERRIN	CHRISTIAN	13N	2W	26
2040	ILLINOIS MIDLAND COAL CO.	ILLINOIS MIDLAND	7	SHAFT	RPP	1912-1913	HERRIN	CHRISTIAN	13N	3W	14
2040	PEABODY COAL CO.	PEABODY	7	SHAFT	RPP	1913-1952	HERRIN	CHRISTIAN	13N	3W	14
4779	LATE 1800'S			SHAFT			HERRIN	CHRISTIAN	12N	3W	27

7.5-MINUTE QUADRANGLE SERIES MAPS & DIRECTORIES OF COAL MINES IN THE COUNTY

APPENDIX M



Coal Mines in Illinois
Assumption Quadrangle

Christian & Shelby Counties, Illinois

Springfield & Assumption Coals

This map accompanies the Coal Mines Directory for the Assumption Quadrangle. Consult the directory for a complete explanation of the information shown on this map.

Mining Method

- Room & Pillar (RP)
- Room & Pillar Basic (RPB)
- Modified Room & Pillar (MRP)
- Room & Pillar Panel (RPP)
- Blind Room & Pillar (BRP)
- Checkerboard Room & Pillar (CRP)
- High Extraction Retreat (HER)
- Longwall (LW)
- Underground, Method Unknown
- Strip Mine
- Auger Mine
- General Area of Mining

Source of Mine Outline

- Final Mine Map
- Not Final Mine Map
- Undated Mine Map
- Incomplete Mine Map
- Secondary Source Map

Tipple, Shaft, Slope, Drift Locations

- Strip Mine Tipple - Active
- Strip Mine Tipple - Abandoned
- Mine Shaft - Active
- Mine Shaft - Abandoned
- Mine Slope - Active
- Mine Slope - Abandoned
- Mine Drift - Active
- Mine Drift - Abandoned
- Air Shaft
- Uncertain Location
- Uncertain Type of Opening

Location

Mine Annotation
(space permiting)
Company
Mine Name
ISGS Index No., Years of Operation

Disclaimer

Please check the Coal Section at the Illinois State Geological Survey's web site at http://www.isgs.illinois.edu for the most up-to-date version of these products.

Note that each quadrangle scale mined-out area map requires the use of the associated text directory for full explanation of map features and mine attributes. Also note that some quadrangles have multiple seams of mining and therefore more than one map may be available for a particular quadrangle. Please take care to check for multiple maps, as extensive mining may exist in the other seams.

The maps and digital files used for these studies were compiled from data obtained from a variety of public and private sources and have varying degrees of completeness and accuracy. This compilation map presents reasonable interpretation of the geology of the area and is based on available data. Locations of some mine features may be offset by 500 feet or more due to errors in the original source maps, the compilation process, digitizing, or a combination of these factors. These data are not intended for use in site-specific screening or decision-making. Use of these documents does not eliminate the need for detailed studies to fully understand the geology of a specific site. The Illinois State Geological Survey, Institute of Natural Resource Sustainability, or the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this data set and accept no liability for the consequences of decisions made by others on the basis of the information presented here.

These maps were designed for use at 1:24,000. Enlarging the map may reduce accuracy, as the original scale of the source maps used to compile the outlines shown varies from 1:400 to 1:150,000, and some mine locations are known only from text descriptions. See the accompanying mine directory for the original scale of the source map used for a specific mine to check accuracy of a given portion of the map. Areas with no mines shown may still be undermined; see the unlocated mines list at the back of each mine directory.

The image of the U.S.G.S. topographic base map was projected from the original UTM to Lambert Conformal Conic.

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Prairie Research Institute
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Mine Outlines Compiled by
Jennifer M. Obrad

February 11, 2011

Appendix M

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
ASSUMPTION QUADRANGLE
CHRISTIAN & SHELBY COUNTIES

Jennifer M. Obrad & C. Chenoweth

2011

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This material is based upon work supported by the Illinois Department of Transportation. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the Illinois Department of Transportation.

Cover photo Track-mounted duckbill loading machine at a Peabody Coal Company mine, ca. 1915.

DISCLAIMER: The accuracy and completeness of mine maps and directories vary with the availability of reliable information. Maps and other information used to compile this mine map and directory were obtained from a variety of sources and the accuracy of some of the original information cannot be verified. Consequently, the Illinois State Geological Survey (ISGS) cannot guarantee the mine maps are free of errors and disclaims any responsibility for damages that may result from actions or decisions based on them.

The ISGS updates the maps and directories periodically, and welcomes any new information or corrections. Please contact the Coal Section of the ISGS at the address shown on the title page of this directory, or telephone (217) 244-4610.

CONTENTS

INTRODUCTION

Coal has been mined in 76 counties of Illinois. More than 7,400 coal mines have operated since commercial mining began in Illinois about 1810; fewer than 30 are currently active. To detail the extent and location of coal mining in Illinois, the Illinois State Geological Survey (ISGS) has compiled maps and directories of known coal mines. The ISGS offers maps at a scale of 1:100,000 and accompanying directories for each county in which coal mining is known to have occurred. Maps at a scale of 1:24,000 and accompanying directories, such as this, are available for selected quadrangles. Contact the ISGS for a list of these quadrangles.

These larger scale maps show the approximate positions of mines in relation to surface features such as roads and water bodies, and indicate the mining method used and the accuracy of the mine boundaries. The maps are useful for locating mine boundaries relative to specific properties and for assessing the potential for subsidence in an area. Mine boundaries compiled from final mine surveys are generally shown within 200 feet of their true position. As a result of poor cartographic quality and inaccuracies in the original mine surveys, boundaries of some older mines may be mislocated on the map by 500 feet or more. Original mine maps should be consulted in situations that require precise delineation of mine boundaries or internal workings of mined areas.

This directory serves as a key to the accompanying mine map and provides basic information on the coal mines in the quadrangle. The directory is composed of two parts. Part I explains the symbols and patterns used on the accompanying map and the summary data presented for each mine. Part II numerically lists the mines in the quadrangle and summarizes the geology and production history of each mine. Total production for the mine, not the portion in the quadrangle, is given.

MINING IN THE ASSUMPTION QUADRANGLE

Two mines operated in the Assumption Quadrangle. In the southern part, the Assumption Mine (mine index 21) worked coal that may have been two benches of the same coal. The interval between the two layers varied from 2 to 25 feet. In parts of the mine, both layers were mined, and in other parts only one layer was mined. Both layers were worked on the longwall system.

The Moweaqua Mine (mine index 217) operated from 1892 to 1935. The Springfield Coal was mined, at over 600 feet deep. On December 24, 1932, the barometric pressure dropped. The drop was sufficient to drive methane gas out of the old workings. Seals had been weakened imperceptibly by normal degradation of the roof in abandoned rooms, and nodules that may have fallen against the seals. Between the time when the certified Mine Examiner checked the mine and when the miners arrived at the workplace, the barometric low passed through, driving methane gas from the abandoned workings into the active portion of the mine. Some gas had traveled along the entries, with a great pocket collected further back. When the men stood up, with their open-flame lamps, the gas exploded and acted as a fuse leading the flame back to the large pocket of methane, resulting in a terrible explosion. Those that survived the explosion were unable to survive the bad air that resulted. A large roof fall, over 800 feet long in one direction and 1500 feet long in another direction, blocked access and escape from the carbon monoxide. The roof fall may have prevented the further explosion of coal dust by dispersing rock dust from the shale roof, according to the state mine inspectors who investigated the explosion and directed rescue efforts. The disaster killed 54 men.

PART I EXPLANATION OF MAP AND MINE SUMMARY SHEET

INTERPRETING THE MAP

The map accompanying this directory shows the location of coal mines known to be present in the quadrangle. The map, corresponding to a U.S. Geological Survey (USGS) 7.5-minute quadrangle, covers an area bounded by lines of latitude and longitude 7.5-minutes apart. In Illinois, a quadrangle is approximately 6.5 miles east to west and 8.5 miles north to south, an area of about 56 square miles. The ISGS generally offers one map of mines per quadrangle. In some areas where extensive mining occurred in two or more overlapping seams, separate maps are compiled for mines in each seam to maintain readability of the map.

Mine Type and Mining Method
The mine type is indicated on the map by pattern color: green represents surface mines; red and yellow represent underground mines. The red patterns are used for areas of underground mining that are documented by a primary or secondary source map. A yellow pattern is used for cases where no map of the mine workings is available, but a general area of mining can be inferred from property maps or production figures. The patterns indicate the main mining methods used in underground mines. The methods are (1) room and pillar and (2) high extraction. The method used gives some indication of the amount and pattern of coal extraction within each mined area, and has some influence on the timing and type of subsidence that can occur over a mine.

The following discussion and illustrations of mining methods are based on Guither et al. (1984).

In room-and-pillar mines, coal is removed from haulage-ways (entries) and selected areas called rooms. Pillars of unmined coal are left between the rooms to support the roof. Depending on the size of rooms and pillars, the amount of coal removed from the production areas will range from 40% to 70%.

Room and Pillar - mining is divided into six categories:

- room-and-pillar basic (RPB, fig. 1A), an early method that did not follow a preset mining plan and therefore resulted in very irregular designs;
- modified room and pillar (MRP, fig. 1B);
- room-and-pillar panel (RPP, fig. 1C);
- blind room and pillar (BRP, fig. 1D);
- checkerboard room and pillar (CRP, fig. 1E);
- room and pillar (RP), a classification used when the specific type of room-and-pillar mining is unknown.

Blind and checkerboard are the most common types of room-and-pillar mining used in Illinois today. The knowledge of room-and-pillar mining methods gives a trained engineer information on the nature of subsidence that may occur. A more extensive discussion of subsidence can be found in Bauer et al. (1993).

High-extraction These mining methods are subdivided into high-extraction retreat (HER, Fig 1F) and longwall (LW, Fig 1G, 1H). In these methods, much of the coal is removed within well defined areas of the mine. Subsidence of the surface above these areas occurs within weeks. Once the subsidence activity ceases, the potential for further movement over these areas is low; however, subsidence may continue for several years after mining.

High-extraction retreat mining is a form of room-and-pillar mining that extracts most of the coal. Rooms and pillars are developed in the panels, and the pillars are then systematically removed (fig. 1F).

In early (pre-1960) longwall mines, mining advanced in multiple directions from a central shaft (fig. 1G). Large pillars of coal were left around the shaft, but all coal was removed beyond these pillars. Miners placed rock and wooden props and cribs in the mined-out areas to support the mine roof. The overlying rock gradually settled onto these supports, thus producing subsidence at the surface. In post-1959 longwall mines, room-and-pillar methods have been used to develop the main entries of the mine and panel areas. Modern longwall methods extract 100 percent of the coal in the panel areas (fig. 1H).

SOURCE MAPS

Mine outlines depicted on the map are, whenever possible, based on maps made from original mine surveys. The process of compiling and digitizing the quadrangle map may produce errors of less than 200 feet in the location of mine boundaries. Larger errors of 500 feet or more are possible for mines that have incomplete or inaccurate source maps.

Because of the extreme complexity of some mine maps, detailed features of mined areas have been omitted. The digitized mine boundary includes the exterior boundary of all rooms or entries that were at least 80 feet wide or protruded 500 feet from the main mining area. Unmined areas between mines are shown if they are at least 80 feet wide; unmined blocks of coal within mines are shown if they are at least 400 feet on each side. Original source maps should be consulted when precise information on mine boundaries or interior features is needed.

The mine summary sheet lists the source maps used to determine each mine outline. The completeness of map sources is indicated on the map by a line symbol at the mine boundary. Source maps are organized in five categories.

Final mine map The mine outline was digitized from an original map made from mine surveys conducted within a few months after production ceased. The date of the map and the last reported production are listed on the summary sheet.

Not a final map The mine is currently active or the mine outline was made from a map based on mine surveys conducted more than few months before production ceased. This implies the actual mined-out area is probably larger than the outline on the map. The mine summary sheet indicated the dates of source maps and the last reported production, as well as the approximate tonnage mined between these two dates (if the mine is abandoned). The summary sheet also lists the approximate acreage mined since the date of the map and, in some cases, indicates the area where additional mining may have taken place. This latter information is determined by locating on the map the active faces relative to probable boundaries of the mine property.

Undated map The source map was undated, so it may or may not be based on a final mine survey. When sufficient data are available, the probable acreage of the mined area is estimated from reported production, average seam thickness and a recovery rate comparable to other mines in the area. This information is listed in the summary sheet for the mine.

Incomplete map The source map did not show the entire mine. The summary sheet indicates the missing part of the mine map and the acreage of the unmapped area, which is estimated from the amount of coal known to have been produced from the mine.

Secondary source map The original mine map was not found so the outline shown was determined from secondary sources (e.g., outlines from small-scale regional maps published in other reports). The summary sheet describes the secondary sources.

POINTS AND LABELS

The locations of all known mine openings (shafts, slopes, and drifts) and surface mine tipples are plotted on the map. Tipples are areas where coal was cleaned, stockpiled, and loaded for shipping.

Only openings or tipples are plotted for mines without source maps. If the precise locations of these features are unknown, a special symbol is used to indicate the approximate location of the mine.

Each mine on the map is labeled with the names of the mine and operating company, ISGS mine index number, and years of operation (if known) if space permits. A seam designation is given on maps where more than one seam was mined. For a mine that operated under more than one name, only the most recent name is generally given. When a mine changed names or ownership shortly before closing, an earlier name is listed. All company and mine names are listed on the mine summary sheet in the directory, under the production history segment.

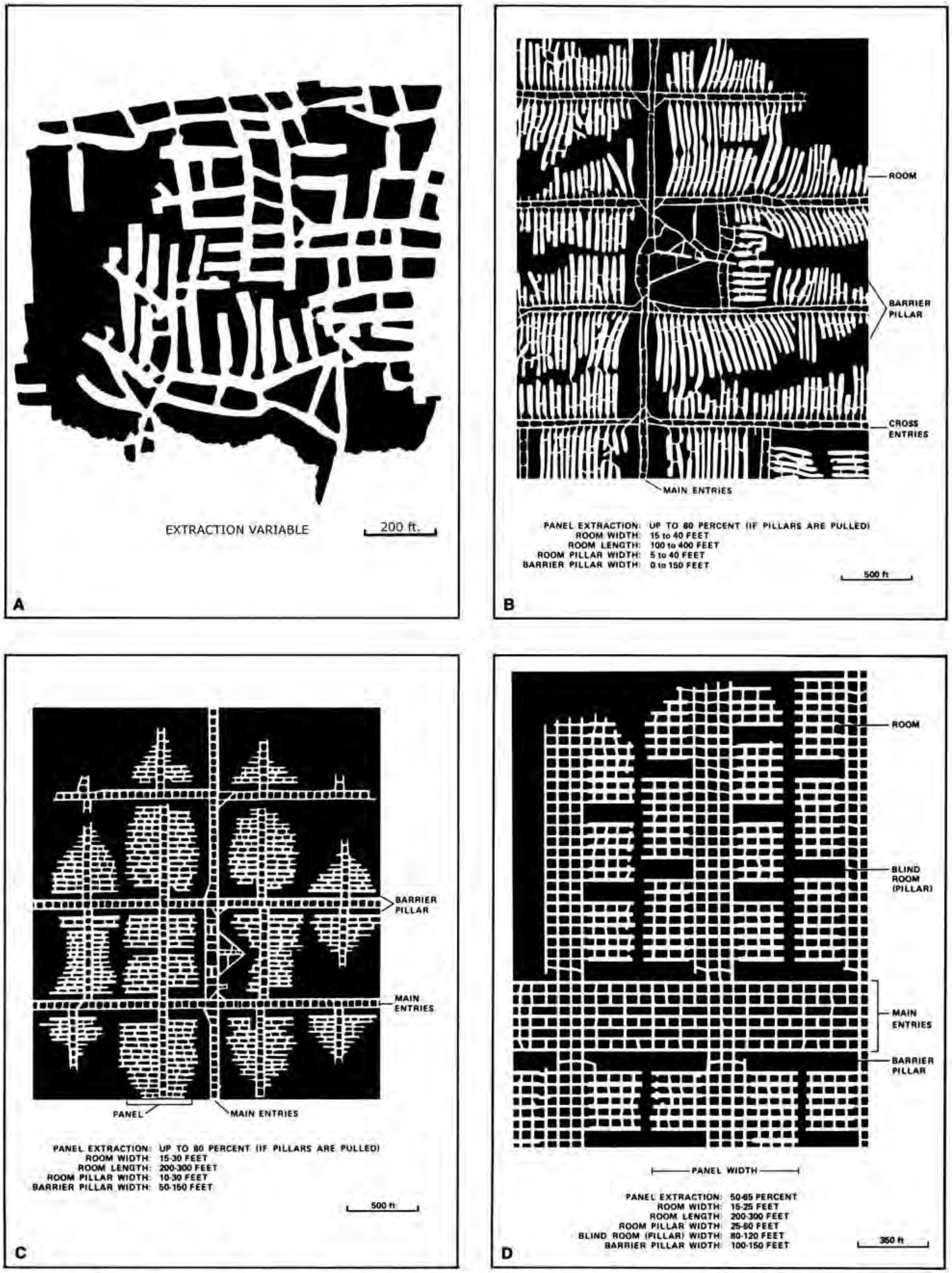


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

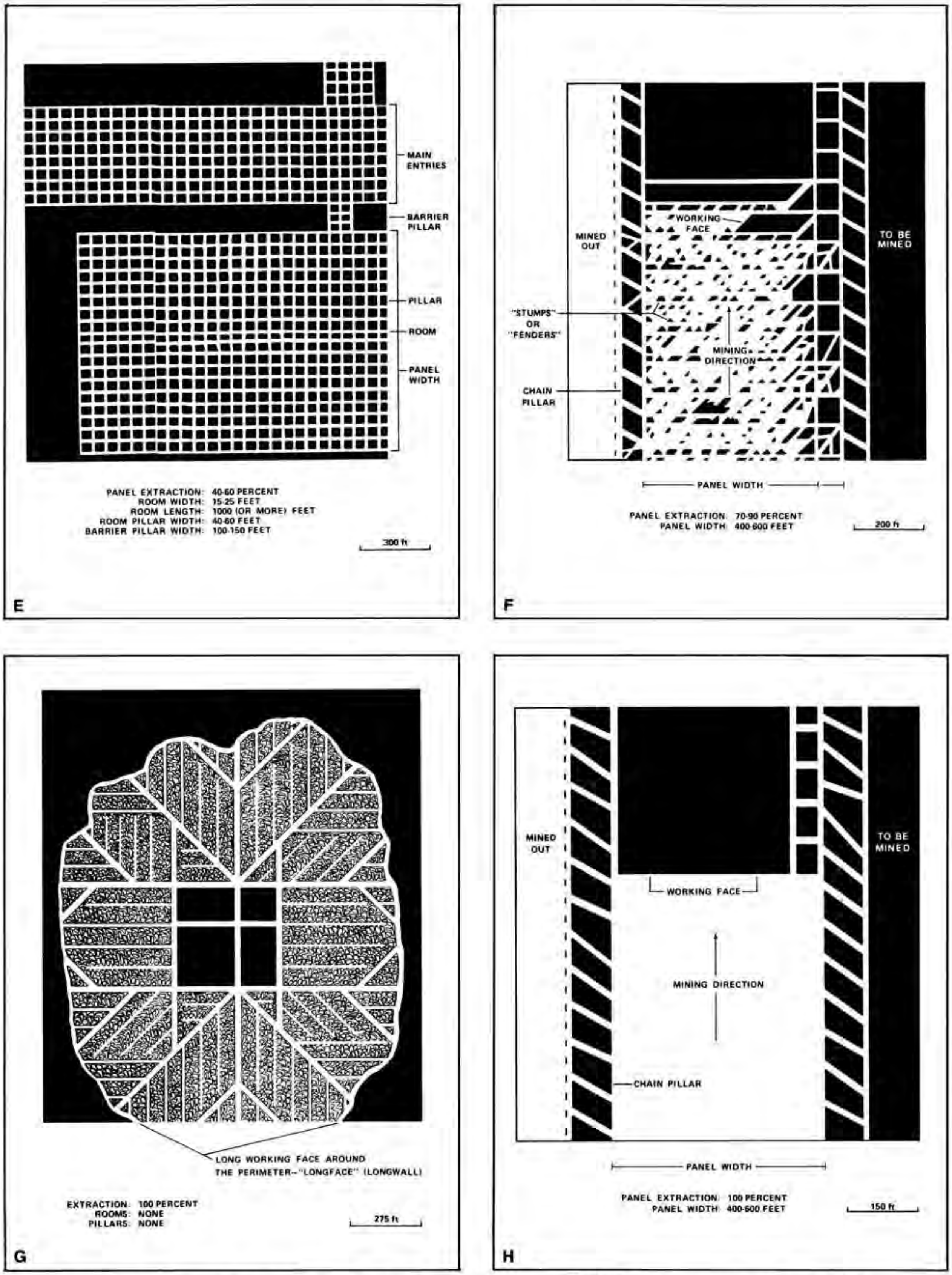


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

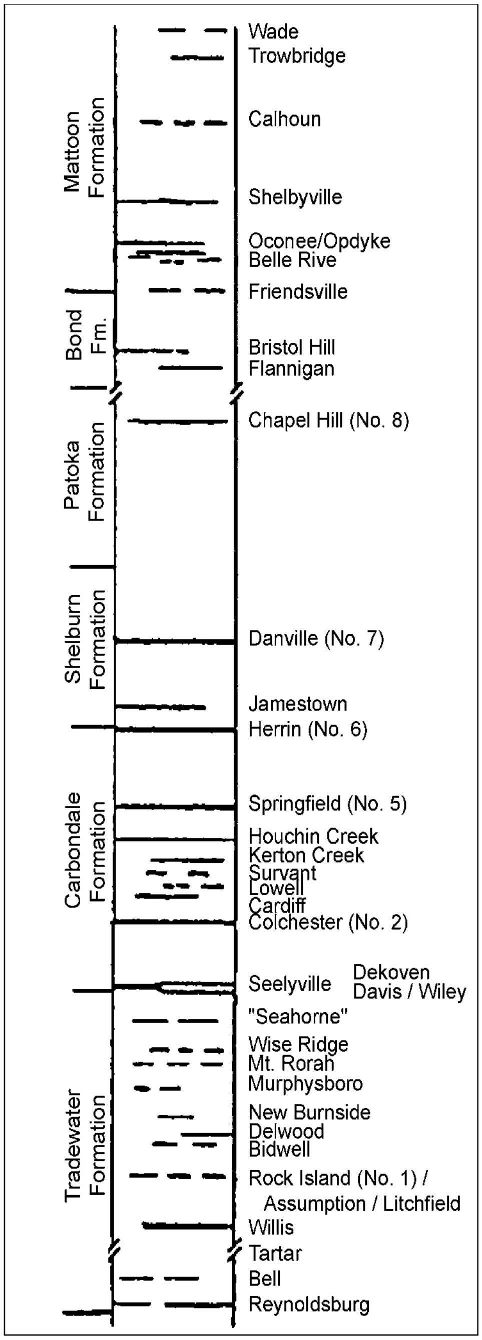


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

INTERPRETING A MINE SUMMARY SHEET

The mine summary sheet is arranged numerically by mine index number. Index numbers are shown on the map and in the mine listing. The mine summary sheet provides the following information (if available).

Company and mine name The last company or owner of the mine is used, unless no production was recorded for the last owner. In that case, the penultimate owner is listed. Mines often have no specific name; in these cases, the company name is also used as the mine name.

Type *Underground* denotes a subsurface mine in which the coal was reached through a shaft, slope, or a drift entry. *Surface* denotes a surface, open pit or strip mine.

Total mined-out acreage shown The total acreage of the mined area mapped, including any acreage mined on adjacent quadrangles, is calculated from the digitized outline of the mine. The acreage of large barrier pillars depicted on the map is excluded from the mined-out acreage. Small pillars not digitized are included in the acreage calculation. If the mine outline is not based on a final mine map, the acreage is followed by an estimate of additional acres that may have been mined. The estimate is determined from reported mine production, approximate thickness of the coal, and recovery rates calculated from nearby mines that used similar mining methods.

SHAFT, SLOPE, DRIFT OR TIPPLE LOCATIONS

Shaft, slope, drift, or tipple locations Locations of all known former entry points to underground mines or the location of coal cleaning, tipple, and shipping equipment used by the mine's facility are listed. The location is described in terms of county, township and range (Twp-Rge), section, and location within the section by quarters. NE SW NW, for instance, would describe the location in the northeast quarter of the southwest quarter of the northwest quarter. When sections are irregular in size, the quarters remain the same size and are oriented (or "registered") from the southeast corner of the section. Approximate footage from the section lines (FEL = from east line, FNL = from north line, for example) is given when that information is known; this indicates a surveyed location and is not derived from maps. Entry points are also plotted on the map and coded for the type of entry or tipple. A mine opening may have had many purposes during the life of the mine. Old hoist shafts are often later used for air and escape shafts; this information is included in the directory when known. The tipple for underground mines was generally located near the main shaft or slope. At surface mines, coal was sometimes hauled to a central tipple several miles from the mine pit.

GEOLOGY

Seam(s) mined The name of the coal seam(s) mined is listed, if known. If multiple seams were mined, they are all listed, although the mined-out area for each seam may be shown on separate maps. Figure 2 shows the stratigraphic section of the coal-bearing interval in Illinois, and the vertical relations among the coals.

Depth The depth to the top of the seam in the vicinity of the shaft is listed, if known. The depth is determined from notes made by geologists who visited the mine during its operation or from drill hole data in ISGS files. Depth generally varies little over the extent of a mine; however, reported depths for an individual mine may vary. Depth for surface-mined coals varies, and is usually represented as a range.

Thickness The approximate thickness of the mined seam is shown, if known. Thickness also comes from notes of geologists who visited the mine during its operation or from borehole data in ISGS files. Minimum, maximum, and average thicknesses are given when this information is available.

Mining method The principal mining method used at the mine (figs. 1A-H) is listed. See the mining methods section at the beginning of this directory for a discussion of this parameter.

Geologic problems reported Any known geologic problems, such as faults, water seepage, floor heaving, and unstable roof, encountered in the mine are reported. This information is from notes made by ISGS geologists who visited the mine, or from reports by mine inspectors published by the Illinois Department of Mines and Minerals, or from the source map(s). Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Production history Tons of coal produced from the mine by each mine owner are totaled. When the source map used for the mine outline is not a final mine map, the tonnage produced since the date of the map is identified. For mines that extend into adjacent quadrangles, the tonnage reported includes areas mined in adjacent quadrangles.

SOURCE OF DATA

Source map This section lists information about the map(s) used to compile the mine outline and the locations of tipples and mine openings. In some cases more than one source map was used. For example, a map drawn before the mine closed may provide better information on original areas of the mine than a later map. When more than one map was used, the bibliography section explains what information was taken from each source.

Date The date of the most recent mine survey listed on the source map is reported.

Original scale The original scale of the source map is listed. Many maps are photo-reductions and are no longer at their original scale. The original scale gives some indication of the level of detail of the mine outline and the accuracy of the mine boundary relative to surface features. Generally, the larger the scale, the greater the accuracy and detail of the mine map. Mine outlines taken from source maps at scales smaller than 1:24,000 may be highly generalized and may well be inaccurately located with respect to surface features.

Digitized scale The scale of the digitized map is reported. The scale may be different from that of the original source map. In many cases the digitized map was made from a photo-reduction of the original source map, or the source map was not in a condition suitable for digitizing and the mine boundaries were transferred to another base map.

Map type Source maps are classified into five categories to indicate the probable completeness of the map. See discussion of source maps in the previous section.

Annotated bibliography Sources that provide information about the mine are listed, with the data taken from each source. Some commonly used sources are described below. Full bibliographic references are given for all other sources. Unless otherwise noted, all sources are available for public inspection at the ISGS.

Coal Reports Published since 1881, these reports contain tabular data on mine ownership, production, employment, and accidents. Some volumes include short descriptions made by mine inspectors of physical features and conditions in selected mines.

Directory of Illinois Coal Mines This source is a compilation of basic data about Illinois coal mines, originally gathered by ISGS staff in the early 1950s. Sources used for this directory are undocumented, but they are primarily Illinois Department of Mines and Minerals annual reports, ISGS mine notes, and coal company officials.

ENR Document 85/01, Guither, H. D., J. K. Hines, and R. A. Bauer, 1985 The Economic Effect of Underground Mining Upon Land Used for Illinois Agriculture: Illinois Department of Energy and Natural Resources Document 85/01, 185 p.

Microfilm map The U.S. Bureau of Mines maintains a microfilm archive of mine maps. A microfilm file for Illinois is available for public viewing at the ISGS.

Mine notes ISGS geologists have visited mines or contacted mine officials throughout the state since the early 1900s. Notes made during these visits range from brief descriptions of the mine location to long narratives (including sketches) of mining conditions and geology.

Federal Land Bank of St. Louis, Preliminary Reports on Subsidence Investigations Mining engineers working for the Federal Land Bank of St. Louis mapped areas of subsidence due to coal mining in the early 1930s. These reports often include county maps of mine properties with mined-out areas including shaft locations, as well as subsidence areas.

REFERENCES

Bauer, R. A., B. A. Trent, and P. B. Dumontelle, 1993, Mine Subsidence in Illinois: Facts for the Homeowner Considering Insurance, Illinois State Geological Survey, Environmental Geology Note 144, 16p.

Guither, H. D., J. K. Hines, and R. A. Bauer, 1985, The Economic Effects of Underground Mining Upon Land Used for Illinois Agriculture, Illinois Department of Energy and Natural Resources Document 85/01, 185p.

PART II DIRECTORY OF MINES IN THE ASSUMPTION QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Assumption Quadrangle is provided. These summary sheets are arranged numerically by mine index number. Consult Part I for a complete explanation of the data listed in the summary sheet.

Mine Index 21
Assumption Coal & Mining Company, Assumption Mine

Type: Underground   Total mined-out acreage shown: 279   Production indicates approximately 12 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	12N 1E	2	NE NW SE
Air shaft	Christian	12N 1E	2	SE NW SE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Assumption *	890-1004	2.0	5.25	3.0	LW

* At times an upper vein was mined. The interval between the two seams varied from 2 to 25 feet. The upper seam was often too thin to mine.

Geologic Problems Reported: Gas explosions caused two deaths in 1928. Mine notes from 1908 indicate that the mine had some gas from the coal, but most originated in the roof. One large fault trended northeast-southwest, and many minor faults were present. The roof was considered bad, made up of 12 inches of limestone directly over the upper coal and over the lower coal, a lenticular black shale or a carbonaceous sandy shale with an overlying sandstone made up the roof. One of the source maps indicated rolls and faults in the south-central portion of the mine. The coal was “dirtier”, of lower quality, under areas where the sandstone was directly on top of the coal. Unconformities, rolls and faults were noted in the coal. The seam contained considerable tarry coal in thick and thin bands (generally thin), and characteristic partings of mother coal. The upper coal generally had very little pyrite, usually in the lower half of the bed and only occasionally in the top half. The pyrite was present as lenses 1 to 2 inches thick and 1 to 2 feet long. Calcite facings on the cleavage planes were very thin. The lower coal was called a “splint block coal” because of its tendency to fracture easily along the cleavage planes and come out in blocks. This lower coal was uniform quality from top to bottom.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Assumption Coal & Mining Company	Assumption	1889-1923	2,075,813
Assumption Coal & Mining Company	Assumption	1923-1928	82,115 **
			2,157,928

** Production after map date
Last reported production: December 1928

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company	3-1922	1:1200	1:4025	Not final
Company, 4103.C4 i5.1-4, sheet 1	4-1923	1:2400	1:2400	Not final
Company, 4103.C4 i5.1-4, sheet 2	12-1923	1:2000	1:2000	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, geologic problems.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Company map, state archive, il_632_03_geo.img - Shaft locations, mine outline, mining method.
Company map, ISGS map library, 4103.C4 i5.1-4, sheet 1 - Mine outline (western portion).
Company map, ISGS map library, 4103.C4 i5.1-4, sheet 2 - Mine outline (central portions, south and northwest).

Mine Index 217
Erie Sootless Coal Company, Moweaqua Mine

Type: Underground Total mined-out acreage shown: 676 Production indicates approximately 5 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Shelby	14N 2E	31	NW SW NE
Air shaft	Shelby	14N 2E	31	NE SW NE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Springfield	618-625	5.0	5.83	5.33	RPP

Geologic Problems Reported: On Christmas Eve in 1932, the barometric pressure dropped dramatically, which forced methane gas into voids in the abandoned works. Some roof falls had weakened the seals between the abandoned and active areas, and open flame lights used by the miners ignited the methane. The resulting explosion killed 54 men, everyone who was in the mine at the time. The roof was 2 feet of black shale overlain by 4 inches of limestone and over 6 feet of gray shale. The shale contained many slips and slickenslides, and required timbering. Horsebacks were common. The top 33 inches of coal was brittle and had the greatest amount of pyrite.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Moweaqua Coal Mining & Manufact. Co.	Moweaqua	1892-1920	1,850,320
Moweaqua Coal Mining Company	Moweaqua	1920-1930	527,633
Moweaqua Coal Corporation	Moweaqua	1931-1933 *	60,840
Erie Sootless Coal Company	Moweaqua	1934-1935	17,541 **
			2,456,334

* Idle 1933
** Production after map date

Last reported production: March 1935

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4102 i5.1-17	12-1932	1:2400	1:2400	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, seam, geologic problems.
Directory of Illinois Coal Mines (Shelby County) - Mine names, mine index, ownership, years of operation.
Mine notes (Shelby County) - Mine type, shaft location, depth, thickness, geologic problems.
Company map, ISGS map library, 4102 i5.1-17 - Shaft locations, mine outline, mining method.

MINES WHOSE LOCATIONS ARE NOT KNOWN, ASSUMPTION QUADRANGLE

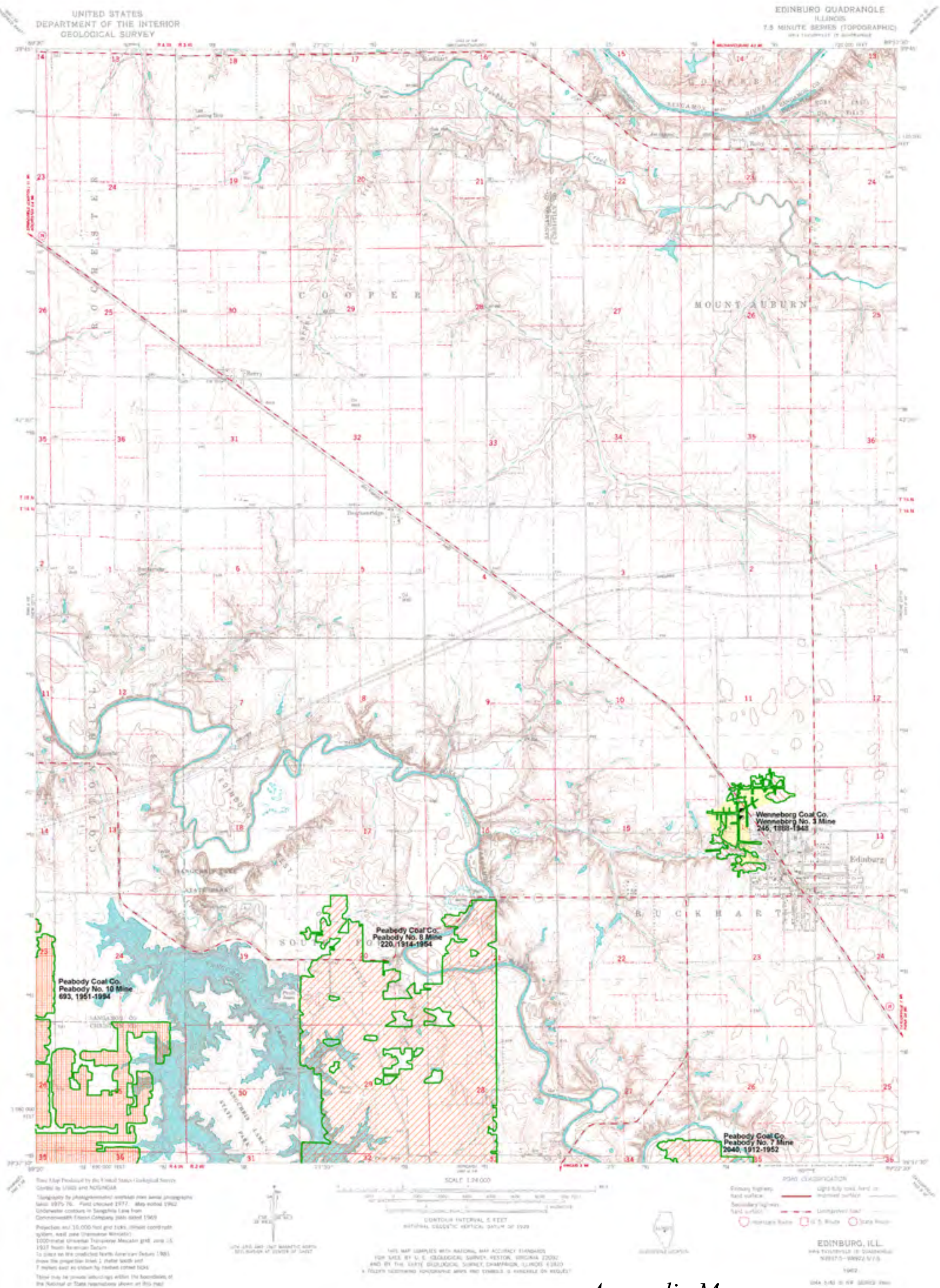
The locations of the following mines are unknown, but the production tonnage, operating names, and nearest town were reported in the Annual Coal Reports. The operators listed below mined in or near the Assumption Quadrangle. The information shown is similar to that presented on the summary sheets in the previous pages of this directory. The first item is the name the mine operated under as listed in the Coal Report, then the years the mine reported. If no physical data are available, the next item listed is the total tons produced by the mine. If physical data are available, the order of presentation is as follows: type of opening for the mine (drift, slope or shaft), depth of coal in feet, and thickness of coal in feet.

No production was mined by the unlocated mine near Moweaqua. The shaft may not have been completed.

MOWEAQUA

American Coal Company, 1892-1893, shaft	none

INDEX OF MINES IN THE ASSUMPTION QUADRANGLE



Coal Mines in Illinois
Edinburg Quadrangle

Christian & Sangamon Counties, Illinois

This map accompanies the Coal Mines Directory for the Edinburg Quadrangle. Consult the directory for a complete explanation of the information shown on this map.

Mining Method

- Room & Pillar (RP)
- Room & Pillar Basic (RPB)
- Modified Room & Pillar (MRP)
- Room & Pillar Panel (RPP)
- Blind Room & Pillar (BRP)
- Checkerboard Room & Pillar (CRP)
- High Extraction Retreat (HER)
- Longwall (LW)
- Underground, Method Unknown
- Strip Mine
- Auger Mine
- General Area of Mining

Source of Mine Outline

- Final Mine Map
- Not Final Mine Map
- Undated Mine Map
- Incomplete Mine Map
- Secondary Source Map

Tipple, Shaft, Slope, Drift Locations

- Strip Mine Tipple - Active
- Strip Mine Tipple - Abandoned
- Mine Shaft - Active
- Mine Shaft - Abandoned
- Mine Slope - Active
- Mine Slope - Abandoned
- Mine Drift - Active
- Mine Drift - Abandoned
- Air Shaft
- Uncertain Location
- Uncertain Type of Opening

Mine Annotation

(space permiting)
Company
Mine Name
ISGS Index No., Years of Operation

Location

DISCLAIMER

These data were compiled and digitized from the best source maps available. Locations of some features may be offset by 500 feet of more due to errors in the original source maps, the compilation process, digitizing or a combination of these factors. Documentation of the source materials used is contained in the directory that accompanies this map. It is the user's responsibility to read this documentation and understand the limitations of the data. Though efforts have been made to compile these data accurately, the Illinois State Geological Survey does not guarantee the validity or the accuracy of these data.

The image of the U.S.G.S. Edinburg Quadrangle used as a basemap was projected from the original UTM to Lambert Conformal Conic.

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

ISGS Illinois State Geological Survey Coal Section

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Mine Outlines Compiled by
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Appendix M

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7.5-MINUTE QUADRANGLE SERIES
EDINBURG QUADRANGLE
CHRISTIAN & SANGAMON COUNTIES

Alan R. Myers

Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
2007

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2007

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Cover photo Track-mounted duckbill loading machine at a Peabody Coal Company mine, ca. 1915.

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CONTENTS

INTRODUCTION

Coal has been mined in 76 counties of Illinois. More than 7,400 coal mines have operated since commercial mining began in Illinois about 1810; fewer than 30 are currently active. To detail the extent and location of coal mining in Illinois, the Illinois State Geological Survey (ISGS) has compiled maps and directories of known coal mines. The ISGS offers maps at a scale of 1:100,000 and accompanying directories for each county in which coal mining is known to have occurred. Maps at a scale of 1:24,000 and accompanying directories, such as this, are available for selected quadrangles. Contact the ISGS for a list of these quadrangles.

These larger scale maps show the approximate positions of mines in relation to surface features such as roads and water bodies, and indicate the mining method used and the accuracy of the mine boundaries. The maps are useful for locating mine boundaries relative to specific properties and for assessing the potential for subsidence in an area. Mine boundaries compiled from final mine surveys are generally shown within 200 feet of their true position. As a result of poor cartographic quality and inaccuracies in the original mine surveys, boundaries of some older mines may be mislocated on the map by 500 feet or more. Original mine maps should be consulted in situations that require precise delineation of mine boundaries or internal workings of mined areas.

This directory serves as a key to the accompanying mine map and provides basic information on the coal mines in the quadrangle. The directory is composed of two parts. Part I explains the symbols and patterns used on the accompanying map and the summary data presented for each mine. Part II numerically lists the mines in the quadrangle and summarizes the geology and production history of each mine. Total production for the mine, not the portion in the quadrangle, is given.

MINING IN THE EDINBURG QUADRANGLE

Mining began in this quadrangle in 1888, with the opening of the Edinburg Coal Mining Company, mine index 245, near Edinburg. This mine operated for 60 years, and was idled for only six years during that time. Although the mine had a very long life (most mines operate 20 to 30 years), the production ranged from less than 1,500 tons up to a high of 31,881 tons in the 1892-1893 fiscal year, and so the area mined is not commensurate with the time span operated. The other mines shown in the Edinburg Quadrangle extended from adjacent areas south and west, but these three mines all operated 40 years or more. Although the Herrin Coal was over 300 feet deep in this part of Christian County, the seam was thick (usually over 6 feet), and was not plagued by horsebacks and rolls as the Springfield Coal was in Sangamon County. This made mining in Christian County very competitive with nearby coal fields, since adequate rail transport was available to market the coal.

PART I EXPLANATION OF MAP AND MINE SUMMARY SHEET

INTERPRETING THE MAP

The map accompanying this directory shows the location of coal mines known to be present in the quadrangle. The map, corresponding to a U.S. Geological Survey (USGS) 7.5-minute quadrangle, covers an area bounded by lines of latitude and longitude 7.5-minutes apart. In Illinois, a quadrangle is approximately 6.5 miles east to west and 8.5 miles north to south, an area of about 56 square miles. The ISGS generally offers one map of mines per quadrangle. In some areas where extensive mining occurred in two or more overlapping seams, separate maps are compiled for mines in each seam to maintain readability of the map.

Mine Type and Mining Method
The mine type is indicated on the map by pattern color: green represents surface mines; red and yellow represent underground mines. The red patterns are used for areas of underground mining that are documented by a primary or secondary source map. A yellow pattern is used for cases where no map of the mine workings is available, but a general area of mining can be inferred from property maps or production figures. The patterns indicate the main mining methods used in underground mines. The methods are (1) room and pillar and (2) high extraction. The method used gives some indication of the amount and pattern of coal extraction within each mined area, and has some influence on the timing and type of subsidence that can occur over a mine.

The following discussion and illustrations of mining methods are based on Guither et al. (1984).

In room-and-pillar mines, coal is removed from haulage-ways (entries) and selected areas called rooms. Pillars of unmined coal are left between the rooms to support the roof. Depending on the size of rooms and pillars, the amount of coal removed from the production areas will range from 40% to 70%.

Room and Pillar - mining is divided into six categories:
- room-and-pillar basic (RPB, fig. 1A), an early method that did not follow a preset mining plan and therefore resulted in very irregular designs;
- modified room and pillar (MRP, fig. 1B);
- room-and-pillar panel (RPP, fig. 1C);
- blind room and pillar (BRP, fig. 1D);
- checkerboard room and pillar (CRP, fig. 1E);
- room and pillar (RP), a classification used when the specific type of room-and-pillar mining is unknown.

Blind and checkerboard are the most common types of room-and-pillar mining used in Illinois today. The knowledge of room-and-pillar mining methods gives a trained engineer information on the nature of subsidence that may occur. A more extensive discussion of subsidence can be found in Bauer et al. (1993).

High-extraction These mining methods are subdivided into high-extraction retreat (HER, Fig 1F) and longwall (LW, Fig 1G, 1H). In these methods, much of the coal is removed within well defined areas of the mine. Subsidence of the surface above these areas occurs within weeks. Once the subsidence activity ceases, the potential for further movement over these areas is low; however, subsidence may continue for several years after mining.

High-extraction retreat mining is a form of room-and-pillar mining that extracts most of the coal. Rooms and pillars are developed in the panels, and the pillars are then systematically removed (fig. 1F).

In early (pre-1960) longwall mines, mining advanced in multiple directions from a central shaft (fig. 1G). Large pillars of coal were left around the shaft, but all coal was removed beyond these pillars. Miners placed rock and wooden props and cribs in the mined-out areas to support the mine roof. The overlying rock gradually settled onto these supports, thus producing subsidence at the surface. In post-1959 longwall mines, room-and-pillar methods have been used to develop the main entries of the mine and panel areas. Modern longwall methods extract 100 percent of the coal in the panel areas (fig. 1H).

SOURCE MAPS

Mine outlines depicted on the map are, whenever possible, based on maps made from original mine surveys. The process of compiling and digitizing the quadrangle map may produce errors of less than 200 feet in the location of mine boundaries. Larger errors of 500 feet or more are possible for mines that have incomplete or inaccurate source maps.

Because of the extreme complexity of some mine maps, detailed features of mined areas have been omitted. The digitized mine boundary includes the exterior boundary of all rooms or entries that were at least 80 feet wide or protruded 500 feet from the main mining area. Unmined areas between mines are shown if they are at least 80 feet wide; unmined blocks of coal within mines are shown if they are at least 400 feet on each side. Original source maps should be consulted when precise information on mine boundaries or interior features is needed.

The mine summary sheet lists the source maps used to determine each mine outline. The completeness of map sources is indicated on the map by a line symbol at the mine boundary. Source maps are organized in five categories.

Final mine map The mine outline was digitized from an original map made from mine surveys conducted within a few months after production ceased. The date of the map and the last reported production are listed on the summary sheet.

Not a final map The mine is currently active or the mine outline was made from a map based on mine surveys conducted more than few months before production ceased. This implies the actual mined-out area is probably larger than the outline on the map. The mine summary sheet indicated the dates of source maps and the last reported production, as well as the approximate tonnage mined between these two dates (if the mine is abandoned). The summary sheet also lists the approximate acreage mined since the date of the map and, in some cases, indicates the area where additional mining may have taken place. This latter information is determined by locating on the map the active faces relative to probable boundaries of the mine property.

Undated map The source map was undated, so it may or may not be based on a final mine survey. When sufficient data are available, the probable acreage of the mined area is estimated from reported production, average seam thickness and a recovery rate comparable to other mines in the area. This information is listed in the summary sheet for the mine.

Incomplete map The source map did not show the entire mine. The summary sheet indicates the missing part of the mine map and the acreage of the unmapped area, which is estimated from the amount of coal known to have been produced from the mine.

Secondary source map The original mine map was not found so the outline shown was determined from secondary sources (e.g., outlines from small-scale regional maps published in other reports). The summary sheet describes the secondary sources.

POINTS AND LABELS

The locations of all known mine openings (shafts, slopes, and drifts) and surface mine tipples are plotted on the map. Tipples are areas where coal was cleaned, stockpiled, and loaded for shipping.

Only openings or tipples are plotted for mines without source maps. If the precise locations of these features are unknown, a special symbol is used to indicate the approximate location of the mine.

Each mine on the map is labeled with the names of the mine and operating company, ISGS mine index number, and years of operation (if known) if space permits. A seam designation is given on maps where more than one seam was mined. For a mine that operated under more than one name, only the most recent name is generally given. When a mine changed names or ownership shortly before closing, an earlier name is listed. All company and mine names are listed on the mine summary sheet in the directory, under the production history segment.

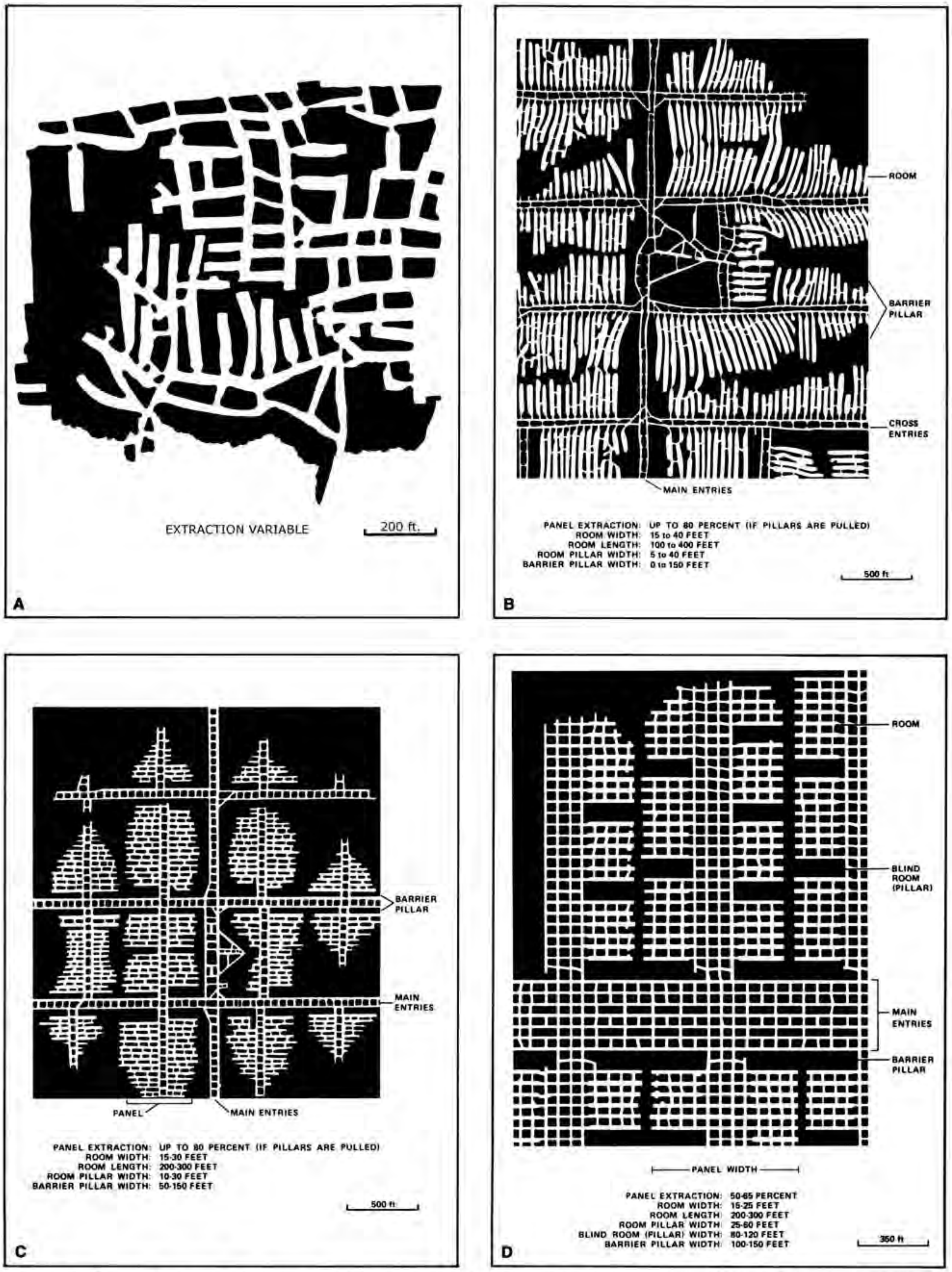


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

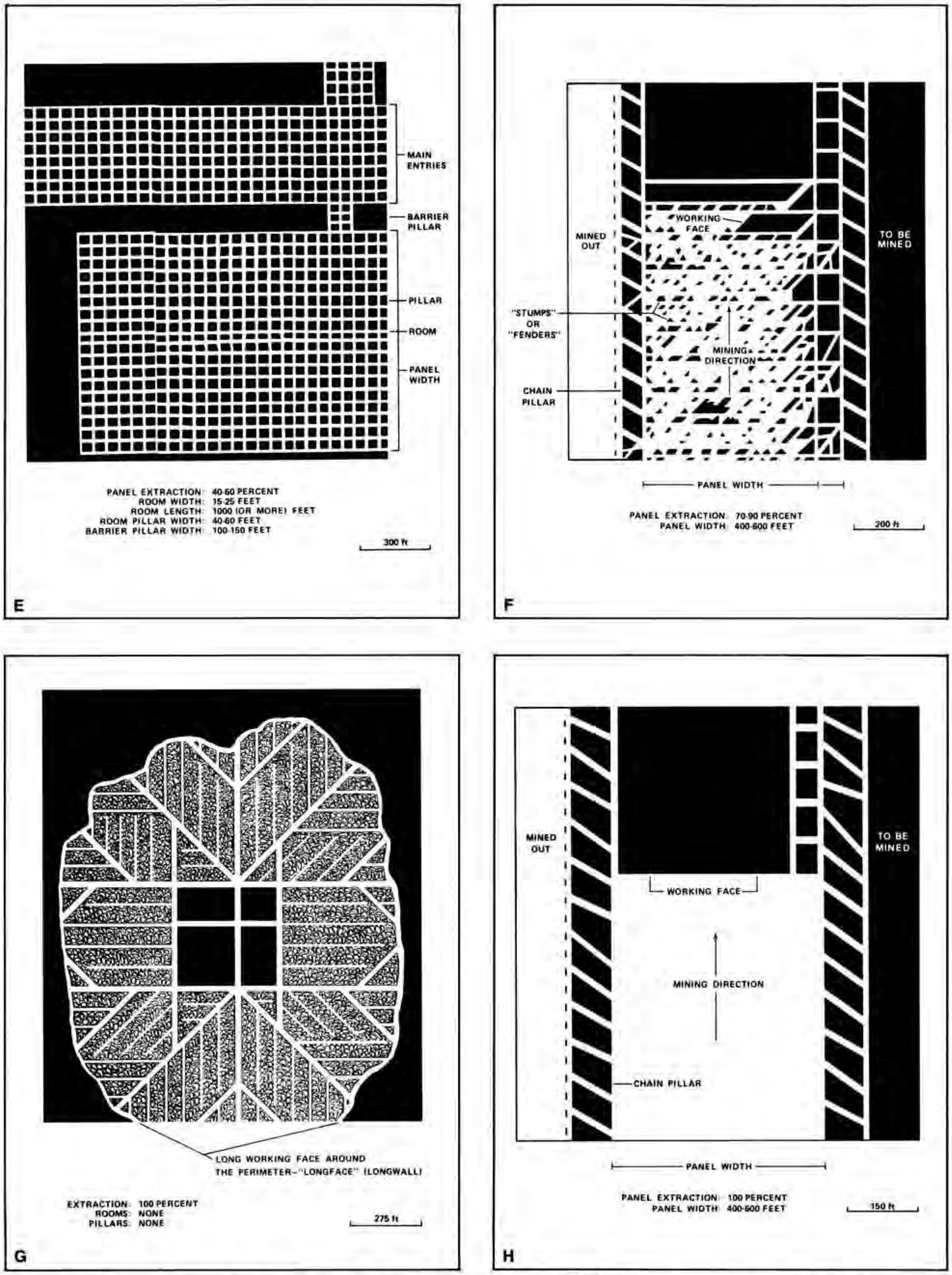


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

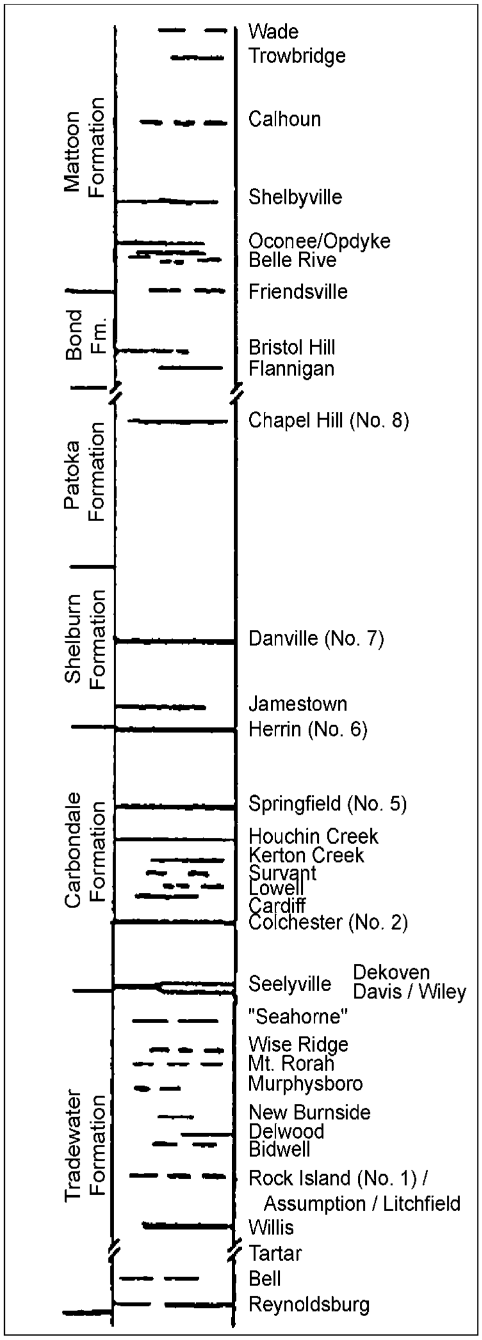


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

INTERPRETING A MINE SUMMARY SHEET

The mine summary sheet is arranged numerically by mine index number. Index numbers are shown on the map and in the mine listing. The mine summary sheet provides the following information (if available).

Company and mine name The last company or owner of the mine is used, unless no production was recorded for the last owner. In that case, the penultimate owner is listed. Mines often have no specific name; in these cases, the company name is also used as the mine name.

Type *Underground* denotes a subsurface mine in which the coal was reached through a shaft, slope, or a drift entry. *Surface* denotes a surface, open pit or strip mine.

Total mined-out acreage shown The total acreage of the mined area mapped, including any acreage mined on adjacent quadrangles, is calculated from the digitized outline of the mine. The acreage of large barrier pillars depicted on the map is excluded from the mined-out acreage. Small pillars not digitized are included in the acreage calculation. If the mine outline is not based on a final mine map, the acreage is followed by an estimate of additional acres that may have been mined. The estimate is determined from reported mine production, approximate thickness of the coal, and recovery rates calculated from nearby mines that used similar mining methods.

SHAFT, SLOPE, DRIFT OR TIPPLE LOCATIONS

Shaft, slope, drift, or tipple locations Locations of all known former entry points to underground mines or the location of coal cleaning, tipple, and shipping equipment used by the mine's facility are listed. The location is described in terms of county, township and range (Twp-Rge), section, and location within the section by quarters. NE SW NW, for instance, would describe the location in the northeast quarter of the southwest quarter of the northwest quarter. When sections are irregular in size, the quarters remain the same size and are oriented (or "registered") from the southeast corner of the section. Approximate footage from the section lines (FEL = from east line, FNL = from north line, for example) is given when that information is known; this indicates a surveyed location and is not derived from maps. Entry points are also plotted on the map and coded for the type of entry or tipple. A mine opening may have had many purposes during the life of the mine. Old hoist shafts are often later used for air and escape shafts; this information is included in the directory when known. The tipple for underground mines was generally located near the main shaft or slope. At surface mines, coal was sometimes hauled to a central tipple several miles from the mine pit.

GEOLOGY

Seam(s) mined The name of the coal seam(s) mined is listed, if known. If multiple seams were mined, they are all listed, although the mined-out area for each seam may be shown on separate maps. Figure 2 shows the stratigraphic section of the coal-bearing interval in Illinois, and the vertical relations among the coals.

Depth The depth to the top of the seam in the vicinity of the shaft is listed, if known. The depth is determined from notes made by geologists who visited the mine during its operation or from drill hole data in ISGS files. Depth generally varies little over the extent of a mine; however, reported depths for an individual mine may vary. Depth for surface-mined coals varies, and is usually represented as a range.

Thickness The approximate thickness of the mined seam is shown, if known. Thickness also comes from notes of geologists who visited the mine during its operation or from borehole data in ISGS files. Minimum, maximum, and average thicknesses are given when this information is available.

Mining method The principal mining method used at the mine (figs. 1A-H) is listed. See the mining methods section at the beginning of this directory for a discussion of this parameter.

Geologic problems reported Any known geologic problems, such as faults, water seepage, floor heaving, and unstable roof, encountered in the mine are reported. This information is from notes made by ISGS geologists who visited the mine, or from reports by mine inspectors published by the Illinois Department of Mines and Minerals, or from the source map(s). Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Production history Tons of coal produced from the mine by each mine owner are totaled. When the source map used for the mine outline is not a final mine map, the tonnage produced since the date of the map is identified. For mines that extend into adjacent quadrangles, the tonnage reported includes areas mined in adjacent quadrangles.

SOURCE OF DATA

Source map This section lists information about the map(s) used to compile the mine outline and the locations of tipples and mine openings. In some cases more than one source map was used. For example, a map drawn before the mine closed may provide better information on original areas of the mine than a later map. When more than one map was used, the bibliography section explains what information was taken from each source.

Date The date of the most recent mine survey listed on the source map is reported.

Original scale The original scale of the source map is listed. Many maps are photo-reductions and are no longer at their original scale. The original scale gives some indication of the level of detail of the mine outline and the accuracy of the mine boundary relative to surface features. Generally, the larger the scale, the greater the accuracy and detail of the mine map. Mine outlines taken from source maps at scales smaller than 1:24,000 may be highly generalized and may well be inaccurately located with respect to surface features.

Digitized scale The scale of the digitized map is reported. The scale may be different from that of the original source map. In many cases the digitized map was made from a photo-reduction of the original source map, or the source map was not in a condition suitable for digitizing and the mine boundaries were transferred to another base map.

Map type Source maps are classified into five categories to indicate the probable completeness of the map. See discussion of source maps in the previous section.

Annotated bibliography Sources that provide information about the mine are listed, with the data taken from each source. Some commonly used sources are described below. Full bibliographic references are given for all other sources. Unless otherwise noted, all sources are available for public inspection at the ISGS.

Coal Reports Published since 1881, these reports contain tabular data on mine ownership, production, employment, and accidents. Some volumes include short descriptions made by mine inspectors of physical features and conditions in selected mines.

Directory of Illinois Coal Mines This source is a compilation of basic data about Illinois coal mines, originally gathered by ISGS staff in the early 1950s. Sources used for this directory are undocumented, but they are primarily Illinois Department of Mines and Minerals annual reports, ISGS mine notes, and coal company officials.

ENR Document 85/01, Guither, H. D., J. K. Hines, and R. A. Bauer, 1985 The Economic Effect of Underground Mining Upon Land Used for Illinois Agriculture: Illinois Department of Energy and Natural Resources Document 85/01, 185 p.

Microfilm map The U.S. Bureau of Mines maintains a microfilm archive of mine maps. A microfilm file for Illinois is available for public viewing at the ISGS.

Mine notes   ISGS geologists have visited mines or contacted mine officials throughout the state since the early 1900s. Notes made during these visits range from brief descriptions of the mine location to long narratives (including sketches) of mining conditions and geology.

Federal Land Bank of St. Louis, Preliminary Reports on Subsidence Investigations Mining engineers working for the Federal Land Bank of St. Louis mapped areas of subsidence due to coal mining in the early 1930s. These reports often include county maps of mine properties with mined-out areas including shaft locations, as well as subsidence areas.

REFERENCES

Bauer, R. A., B. A. Trent, and P. B. Dumontelle, 1993, Mine Subsidence in Illinois: Facts for the Homeowner Considering Insurance, Illinois State Geological Survey, Environmental Geology Note 144, 16p.

Guither, H. D., J. K. Hines, and R. A. Bauer, 1985, The Economic Effects of Underground Mining Upon Land Used for Illinois Agriculture, Illinois Department of Energy and Natural Resources Document 85/01, 185p.

PART II DIRECTORY OF MINES IN THE EDINBURG QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Edinburg Quadrangle is provided. These summary sheets are arranged numerically by mine index number. Consult Part I for a complete explanation of the data listed in the summary sheet.

Mine Index 220
Peabody Coal Company, Peabody No. 8 Mine

Type: Underground   Total mined-out acreage shown: 8,571

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	13N 3W	8	SW SW NW
Air shaft	Christian	13N 3W	8	SW SW NW

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	370	7.0	8.0	7.5	RPP

Geologic Problems Reported: The source map shows a mining pattern indicating a fault that interfered with mining in NW SENE 17-T13N-R3W. This normal fault extended southeast into Peabody No. 10 Mine (mine index 693), where the coal was downthrown 7 to 15 feet to the northeast. The immediate roof over the coal was a black shale that varied from 0 to 5 feet thick.   Above the shale was a limestone that also ranged from 0 to 5 feet thick. Timbering was required where the roof was shale over 30 inches thick. When the shale was less than 30 inches, it was taken down when the coal was removed. The limestone made a very good roof. Slips and sandstone rolls were observed in the mine. Rolls were more common in the western part of the mine, and had the effect of lowering the top of the coal 3 to 4 feet. Impurities in the coal were pyrite in lenses and bands, and calcite in fracture fillings. The soft underclay floor heaved, and several bad squeezes had occurred at the mine.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Peabody Coal Company	Peabody No. 8	1914-1954	47,406,627
			47,406,627

Last reported production: July 1954

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4103.C4 i5.1-10	7-29-1954	1:12000	1:12000	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam, thickness, geologic problems.
Company map, ISGS map library, 4103.C4 i5.1-10 - Shaft locations, mine outline, mining method.

Mine Index 245
Wenneborg Coal Company, Wenneborg No. 3 Mine

Type: Underground Total mined-out acreage shown: 62 The area shown on the accompanying map is too small for the reported production. A general area of mining has been added to show the approximate size of the mine. (The source maps show only the major haulage routes of the older parts of the mine.)

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft * (7x12)	Christian	14N 3W	14	SE SE NW
Air / escape shaft *	Christian	14N 3W	14	NE SE NW

* The main shaft caved in circa 1894-1896, and coal was hoisted out of the escapement shaft until 1905. The mine was shut down because of the lack of an escapement shaft in 1906 and 1907. The northern shaft on the accompanying map was labeled on the source map as the hoist shaft and the southern shaft was the escape shaft. There may be another shaft location not shown on the source map that was the original hoist shaft that collapsed.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	333	6.0	7.0	6.5	RPP

Geologic Problems Reported:

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Edinburg Coal Mining Company	Edinburg	1888-1894	127,380
Smith & Williams	Edinburg	1894-1895	13,303
Edinburg Co-operative Coal Company	Edinburg	1895-1907 **	66,973
Hanover Coal Company	Edinburg	1907-1908	2,800
C. W. Vandeveer	Greenwood	1908-1913	56,186
Greenwood Coal Company	Greenwood	1913-1917	37,084
Charles W. Vandeveer	Greenwood	1917-1918	8,625
Christian County Mining Company	Edinburg	1918-1926 ***	85,462
Quality Coal Company	Edinburg	1927-1927	25,882
H. F. Young Coal Company	Edinburg	1928-1929	21,571
Young & Tex	Edinburg	1930-1930	7,100
H. F. Young	Edinburg	1931-1932	15,827
Greenwood Coal Mining Company	Edinburg	1933-1935	13,592
Edinburg Coal Company	Edinburg	1935-1945	114,799
Wenneborg Coal Company	Wenneborg No. 3	1945-1948	32,070
			628,654

** Idle 1902, 1906 & 1907
*** Idle 1924-1926

Last reported production: February 18, 1948

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4103.C4 i5.1-11	8-12-1949	1:2400	1:2400	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Christian County) - Mine type, shaft location, seam, depth, thickness, shaft size, abandonment date.
Company map, ISGS map library, 4103.C4 i5.1-11 - Shaft locations, mine outline, mining method.

Mine Index 693
Peabody Coal Company, Peabody No. 10 Mine

Type: Underground Total mined-out acreage shown: 24,808 Workings extend into Sangamon and Montgomery Counties.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main slope	Christian	13N 4W	10	NE NE SE
Air shaft	Christian	13N 4W	11	SE NW SW
19th North air shaft	Sangamon	13N 4W	30	SW NW SW
South man / air shaft	Sangamon	13N 4W	29	SW SW SW
Air shaft	Christian	13N 4W	26	SW SW SW
Main South air shaft #2	Christian	13N 4W	34	SE SE NE
Zenobia man shaft	Christian	12N 4W	2	NW NW SW
Air shaft	Christian	12N 4W	2	NE NW SW
North air shaft	Christian	14N 4W	27	SE SE SE
North man shaft	Christian	14N 4W	27	SE SE SE
4th East air shaft	Christian	14N 4W	35	NE NW NE
4th West air shaft	Sangamon	14N 4W	32	NE NE NW

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	300-380		13.0	6.5-7.5 *	BRP

* The coal was averaged 6.5 feet thick under limestone roof and 7.5 feet thick under Anna Shale. Generally, 2 to 3 feet of top coal was left to support the roof.

Geologic Problems Reported: This mine extended about 11 miles in the north-south direction and 7 miles in the east-west direction, and geologic conditions were diverse. A large normal fault was encountered that halted expansion in the northeastern part of the mine. Displacement was 7 to 15 feet downthrown to the northeast. This fault, or set of parallel faults, extended over 2 miles N-NW and southward into NW SE NW 17-T13N-R3W, in Peabody No. 8 Mine (mine index 220). In 1967, seven entries were driven through a NE-SW trending channel sandstone in NE SW 17-T13N-R4W, Sangamon County. The sandstone was water-bearing, and consequently the mine was wet in that area. The top of the coal was eroded, but 4 to 5 feet of coal remained. These channels of Anvil Rock Sandstone channels are evident in the mining patterns shown on the accompanying map. Most channels were 200 to 400 feet wide with wider flanking zones of wet conditions and/or unstable roof. The black shale roof tended to slab off along prominent jointing breaks. The 3 to 4 feet of black Anna Shale was overlain by 1.5 feet of Brereton Limestone, then 2 to 10 feet of thin-bedded Anvil Rock Sandstone that sometimes had shale interlaminations, another 1.5 feet of limestone, and 2 feet of shale. In some roof falls this entire sequence was exposed. In NW 34-T13N-R4W and SW 27-T13N-R4W, a peat trough resulted in coal up to 13 feet thick, in a north-south trending linear depression. The grades were too steep for the equipment and the feature was difficult to cope with. Roof failures also made this feature difficult to mine, although only the usual 6 to 7 feet of coal was actually removed. A pattern of slips initiated a roof fall of 35 feet of silty shale and gray shale within this area of thick coal. The coal in the northern part of the mine was exceptionally hard but relatively clean of impurities, and the underclay was rather soft. In the southern part of the mine, the coal was softer but had more impurities, and the underclay was much firmer.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Peabody Coal Company	Peabody No. 10	1951-1994	147,281,150
			147,281,150

Last reported production: 1994

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company	8-1-1994	1:7200	1:7200	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam, thickness, geologic problems.
Company map, state archives - Slope & shaft locations, mine outline, mining method.
Company map, Coal Section files, 2-1-11L - Geologic problems.

Mine Index 2040
Peabody Coal Company, Peabody No. 7 Mine

Type: Underground Total mined-out acreage shown: 7,127

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	13N 3W	14	SW NW NW
Air shaft	Christian	13N 3W	14	SW NW NW
Air shaft	Christian	13N 3W	27	SE SE SW

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	349-365			6.5-7.5	RPP

Geologic Problems Reported: The source map shows a probable sandstone channel that limited mine expansion in the southeastern part of the mine. Only three pairs of entries were driven across the channel to access the coal on the other side, implying that almost no coal was minable there. The coal was either eroded or never deposited. Another channel was between the Peabody No. 7 and Peabody No. 9 Mines (mine index 219). The source map showed unmined areas in 36-T14N-R3W (SE NW, S ½ NE and SE SW), some marked by the same symbol used to denote channels elsewhere on the same map.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Illinois Midland Coal Company	Illinois Midland No. 7	1912-1913	74,824
Peabody Coal Company	Peabody No. 7	1913-1952	44,886,555
			44,961,379

Last reported production: May 1952

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351393	5-29-1952	1:4800	1:9600	Final

Annotated Bibliography (data source, brief description of information)

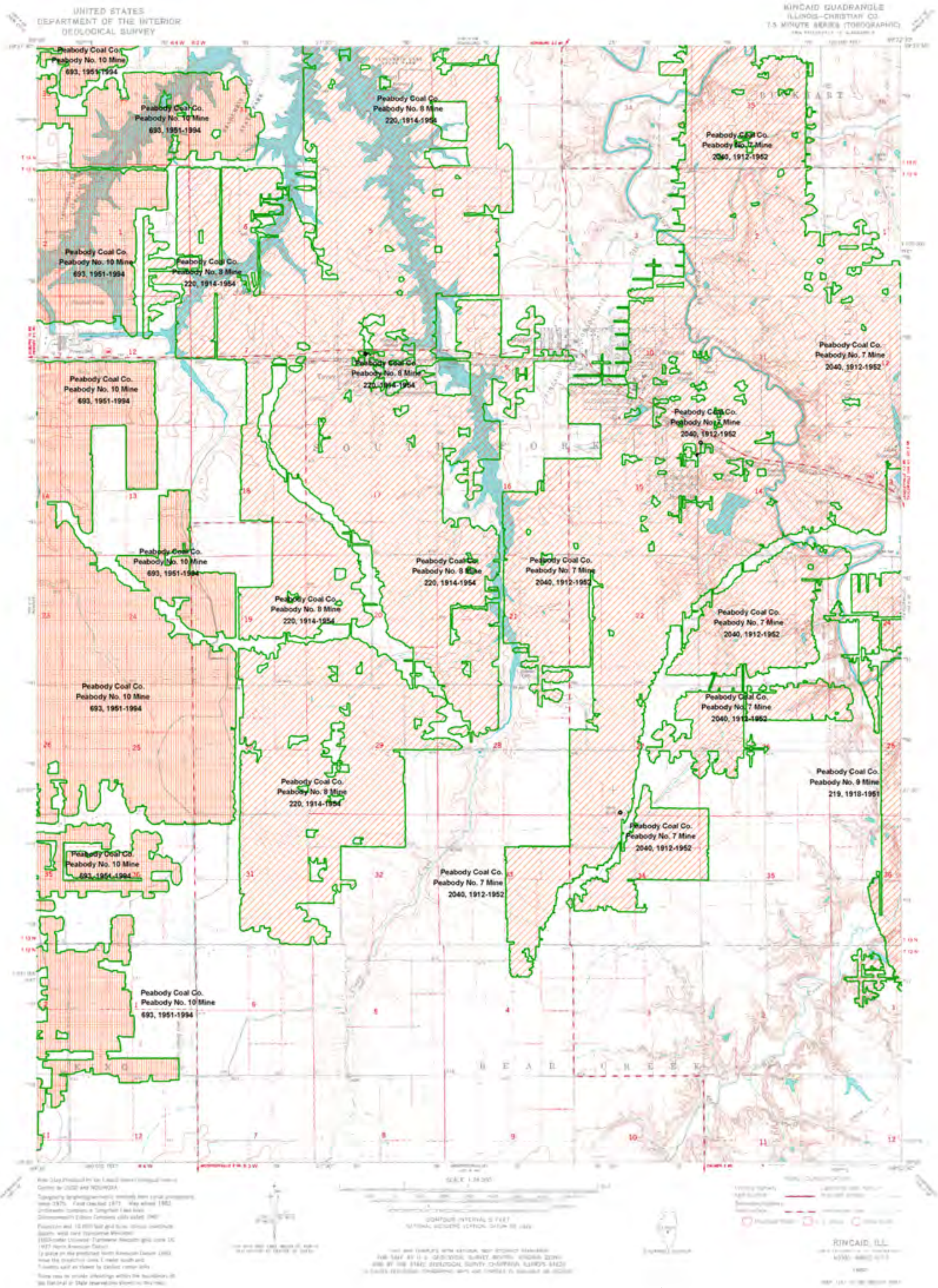
Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam.
Microfilm map, document 351393, reel 03135, frames 470-475 - Shaft locations, mine outline, mining method.

INDEX OF MINES IN THE EDINBURG QUADRANGLE

Funding for this project was supplied by the Illinois Mine Subsidence Insurance Fund.

Coal Mines in Illinois
Kincaid Quadrangle
Christian County, Illinois

This map accompanies the Coal Mines Directory for the Kincaid Quadrangle. Consult the directory for a complete explanation of the information shown on this map.



Mining Method

- Room & Pillar (RP)
- Room & Pillar Basic (RPB)
- Modified Room & Pillar (MRP)
- Room & Pillar Panel (RPP)
- Blind Room & Pillar (BRP)
- Checkerboard Room & Pillar (CRP)
- High Extraction Retreat (HER)
- Longwall (LW)
- Underground, Method Unknown
- Strip Mine
- Auger Mine
- General Area of Mining

Source of Mine Outline

- Final Mine Map
- Not Final Mine Map
- Undated Mine Map
- Incomplete Mine Map
- Secondary Source Map

Tipple, Shaft, Slope, Drift Locations

- Strip Mine Tipple - Active
- Strip Mine Tipple - Abandoned
- Mine Shaft - Active
- Mine Shaft - Abandoned
- Mine Slope - Active
- Mine Slope - Abandoned
- Mine Drift - Active
- Mine Drift - Abandoned
- Air Shaft
- Uncertain Location
- Uncertain Type of Opening

Mine Annotation

(space permiting)
Company
Mine Name
ISGS Index No., Years of Operation

Location

DISCLAIMER

These data were compiled and digitized from the best source maps available. Locations of some features may be offset by 500 feet of more due to errors in the original source maps, the compilation process, digitizing or a combination of these factors. Documentation of the source materials used is contained in the directory that accompanies this map. It is the user's responsibility to read this documentation and understand the limitations of the data. Though efforts have been made to compile these data accurately, the Illinois State Geological Survey does not guarantee the validity or the accuracy of these data.

The image of the U.S.G.S. Kincaid Quadrangle used as a basemap was projected from the original UTM to Lambert Conformal Conic.

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

ISGS Illinois State Geological Survey Coal Section

Illinois State Geological Survey
615 E. Peabody Dr.
Champaign, IL 61820

Mine Outlines Compiled by
Alan R. Myers

September 21, 2007

Appendix M

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
KINCAID QUADRANGLE
CHRISTIAN COUNTY

Alan R. Myers

Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
2007

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
KINCAID QUADRANGLE
CHRISTIAN COUNTY

2007

ILLINOIS STATE GEOLOGICAL SURVEY
William Shilts, Chief

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Cover photo Track-mounted duckbill loading machine at a Peabody Coal Company mine, ca. 1915.

The ISGS updates the maps and directories periodically, and welcomes any new information or corrections. Please contact the Coal Section of the ISGS at the address shown on the title page of this directory, or telephone (217) 244-4610.

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CONTENTS

INTRODUCTION

Coal has been mined in 76 counties of Illinois. More than 7,400 coal mines have operated since commercial mining began in Illinois about 1810; fewer than 30 are currently active. To detail the extent and location of coal mining in Illinois, the Illinois State Geological Survey (ISGS) has compiled maps and directories of known coal mines. The ISGS offers maps at a scale of 1:100,000 and accompanying directories for each county in which coal mining is known to have occurred. Maps at a scale of 1:24,000 and accompanying directories, such as this, are available for selected quadrangles. Contact the ISGS for a list of these quadrangles.

These larger scale maps show the approximate positions of mines in relation to surface features such as roads and water bodies, and indicate the mining method used and the accuracy of the mine boundaries. The maps are useful for locating mine boundaries relative to specific properties and for assessing the potential for subsidence in an area. Mine boundaries compiled from final mine surveys are generally shown within 200 feet of their true position. As a result of poor cartographic quality and inaccuracies in the original mine surveys, boundaries of some older mines may be mislocated on the map by 500 feet or more. Original mine maps should be consulted in situations that require precise delineation of mine boundaries or internal workings of mined areas.

This directory serves as a key to the accompanying mine map and provides basic information on the coal mines in the quadrangle. The directory is composed of two parts. Part I explains the symbols and patterns used on the accompanying map and the summary data presented for each mine. Part II numerically lists the mines in the quadrangle and summarizes the geology and production history of each mine. Total production for the mine, not the portion in the quadrangle, is given.

MINING IN THE KINCAID QUADRANGLE

Mining in this quadrangle took place in the Herrin Coal. Since the seam ranged from 300 to over 400 feet deep, development here began a little later than at nearby towns. The earliest mine was Peabody No. 7 Mine (mine index 2040), which opened in 1912. Mining was continuous until Peabody No. 10 Mine (mine index 693) closed in 1994. The accompanying map shows what may have been the largest obstacle to mining for the planning engineers – the sandstone channels that eroded the coal and made nearby roof conditions troublesome.

PART I EXPLANATION OF MAP AND MINE SUMMARY SHEET

INTERPRETING THE MAP

The map accompanying this directory shows the location of coal mines known to be present in the quadrangle. The map, corresponding to a U.S. Geological Survey (USGS) 7.5-minute quadrangle, covers an area bounded by lines of latitude and longitude 7.5-minutes apart. In Illinois, a quadrangle is approximately 6.5 miles east to west and 8.5 miles north to south, an area of about 56 square miles. The ISGS generally offers one map of mines per quadrangle. In some areas where extensive mining occurred in two or more overlapping seams, separate maps are compiled for mines in each seam to maintain readability of the map.

Mine Type and Mining Method
The mine type is indicated on the map by pattern color: green represents surface mines; red and yellow represent underground mines. The red patterns are used for areas of underground mining that are documented by a primary or secondary source map. A yellow pattern is used for cases where no map of the mine workings is available, but a general area of mining can be inferred from property maps or production figures. The patterns indicate the main mining methods used in underground mines. The methods are (1) room and pillar and (2) high extraction. The method used gives some indication of the amount and pattern of coal extraction within each mined area, and has some influence on the timing and type of subsidence that can occur over a mine.

The following discussion and illustrations of mining methods are based on Guither et al. (1984).

In room-and-pillar mines, coal is removed from haulage-ways (entries) and selected areas called rooms. Pillars of unmined coal are left between the rooms to support the roof. Depending on the size of rooms and pillars, the amount of coal removed from the production areas will range from 40% to 70%.

Room and Pillar - mining is divided into six categories:
- room-and-pillar basic (RPB, fig. 1A), an early method that did not follow a preset mining plan and therefore resulted in very irregular designs;
- modified room and pillar (MRP, fig. 1B);
- room-and-pillar panel (RPP, fig. 1C);
- blind room and pillar (BRP, fig. 1D);
- checkerboard room and pillar (CRP, fig. 1E);
- room and pillar (RP), a classification used when the specific type of room-and-pillar mining is unknown.

Blind and checkerboard are the most common types of room-and-pillar mining used in Illinois today. The knowledge of room-and-pillar mining methods gives a trained engineer information on the nature of subsidence that may occur. A more extensive discussion of subsidence can be found in Bauer et al. (1993).

High-extraction These mining methods are subdivided into high-extraction retreat (HER, Fig 1F) and longwall (LW, Fig 1G, 1H). In these methods, much of the coal is removed within well defined areas of the mine. Subsidence of the surface above these areas occurs within weeks. Once the subsidence activity ceases, the potential for further movement over these areas is low; however, subsidence may continue for several years after mining.

High-extraction retreat mining is a form of room-and-pillar mining that extracts most of the coal. Rooms and pillars are developed in the panels, and the pillars are then systematically removed (fig. 1F).

In early (pre-1960) longwall mines, mining advanced in multiple directions from a central shaft (fig. 1G). Large pillars of coal were left around the shaft, but all coal was removed beyond these pillars. Miners placed rock and wooden props and cribs in the mined-out areas to support the mine roof. The overlying rock gradually settled onto these supports, thus producing subsidence at the surface. In post-1959 longwall mines, room-and-pillar methods have been used to develop the main entries of the mine and panel areas. Modern longwall methods extract 100 percent of the coal in the panel areas (fig. 1H).

SOURCE MAPS

Mine outlines depicted on the map are, whenever possible, based on maps made from original mine surveys. The process of compiling and digitizing the quadrangle map may produce errors of less than 200 feet in the location of mine boundaries. Larger errors of 500 feet or more are possible for mines that have incomplete or inaccurate source maps.

Because of the extreme complexity of some mine maps, detailed features of mined areas have been omitted. The digitized mine boundary includes the exterior boundary of all rooms or entries that were at least 80 feet wide or protruded 500 feet from the main mining area. Unmined areas between mines are shown if they are at least 80 feet wide; unmined blocks of coal within mines are shown if they are at least 400 feet on each side. Original source maps should be consulted when precise information on mine boundaries or interior features is needed.

The mine summary sheet lists the source maps used to determine each mine outline. The completeness of map sources is indicated on the map by a line symbol at the mine boundary. Source maps are organized in five categories.

Final mine map The mine outline was digitized from an original map made from mine surveys conducted within a few months after production ceased. The date of the map and the last reported production are listed on the summary sheet.

Not a final map The mine is currently active or the mine outline was made from a map based on mine surveys conducted more than few months before production ceased. This implies the actual mined-out area is probably larger than the outline on the map. The mine summary sheet indicated the dates of source maps and the last reported production, as well as the approximate tonnage mined between these two dates (if the mine is abandoned). The summary sheet also lists the approximate acreage mined since the date of the map and, in some cases, indicates the area where additional mining may have taken place. This latter information is determined by locating on the map the active faces relative to probable boundaries of the mine property.

Undated map The source map was undated, so it may or may not be based on a final mine survey. When sufficient data are available, the probable acreage of the mined area is estimated from reported production, average seam thickness and a recovery rate comparable to other mines in the area. This information is listed in the summary sheet for the mine.

Incomplete map The source map did not show the entire mine. The summary sheet indicates the missing part of the mine map and the acreage of the unmapped area, which is estimated from the amount of coal known to have been produced from the mine.

Secondary source map The original mine map was not found so the outline shown was determined from secondary sources (e.g., outlines from small-scale regional maps published in other reports). The summary sheet describes the secondary sources.

POINTS AND LABELS

The locations of all known mine openings (shafts, slopes, and drifts) and surface mine tipples are plotted on the map. Tipples are areas where coal was cleaned, stockpiled, and loaded for shipping.

Only openings or tipples are plotted for mines without source maps. If the precise locations of these features are unknown, a special symbol is used to indicate the approximate location of the mine.

Each mine on the map is labeled with the names of the mine and operating company, ISGS mine index number, and years of operation (if known) if space permits. A seam designation is given on maps where more than one seam was mined. For a mine that operated under more than one name, only the most recent name is generally given. When a mine changed names or ownership shortly before closing, an earlier name is listed. All company and mine names are listed on the mine summary sheet in the directory, under the production history segment.

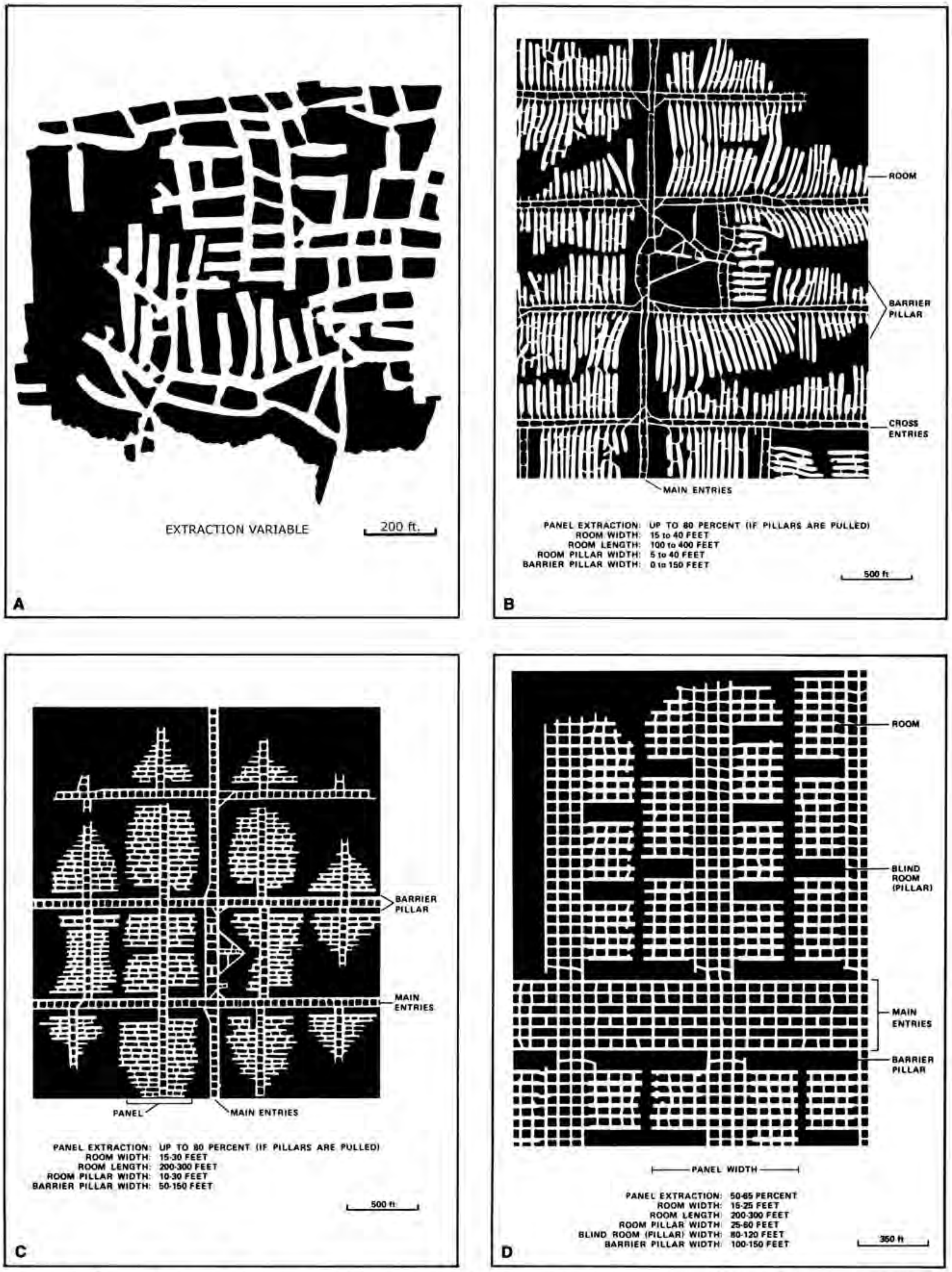


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

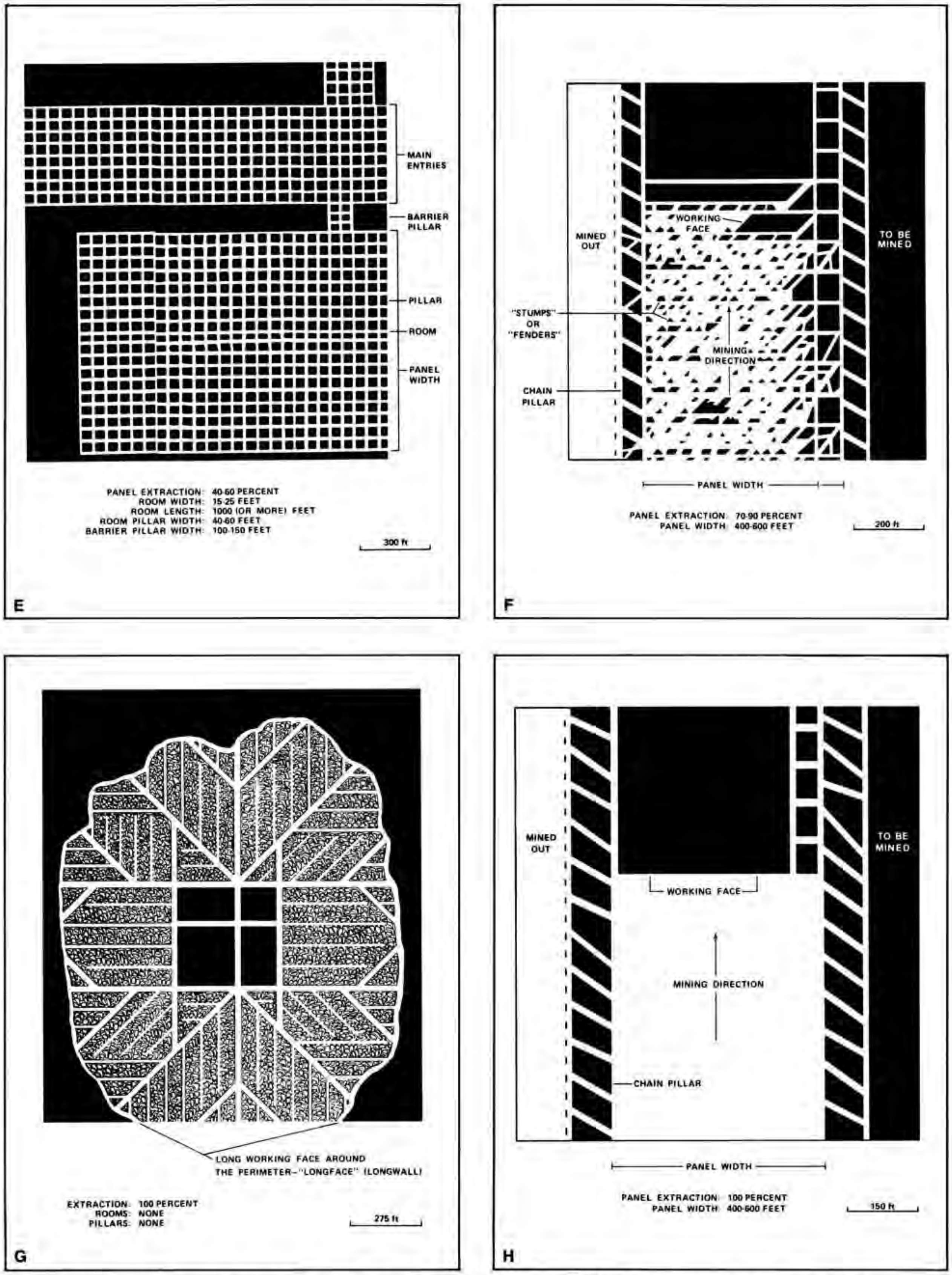


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

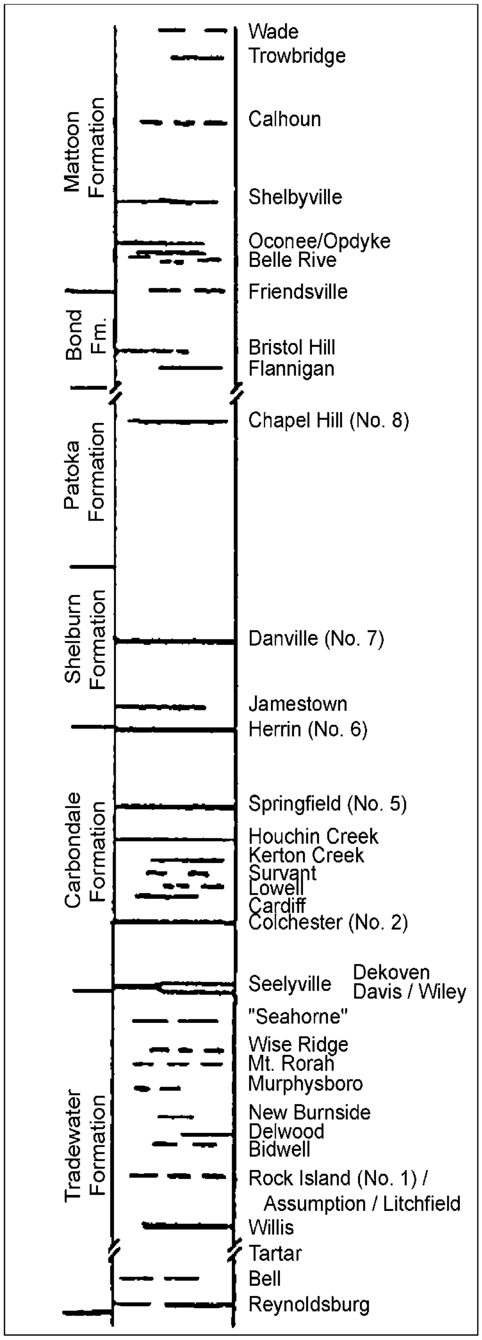


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

INTERPRETING A MINE SUMMARY SHEET

The mine summary sheet is arranged numerically by mine index number. Index numbers are shown on the map and in the mine listing. The mine summary sheet provides the following information (if available).

Company and mine name The last company or owner of the mine is used, unless no production was recorded for the last owner. In that case, the penultimate owner is listed. Mines often have no specific name; in these cases, the company name is also used as the mine name.

Type *Underground* denotes a subsurface mine in which the coal was reached through a shaft, slope, or a drift entry. *Surface* denotes a surface, open pit or strip mine.

Total mined-out acreage shown The total acreage of the mined area mapped, including any acreage mined on adjacent quadrangles, is calculated from the digitized outline of the mine. The acreage of large barrier pillars depicted on the map is excluded from the mined-out acreage. Small pillars not digitized are included in the acreage calculation. If the mine outline is not based on a final mine map, the acreage is followed by an estimate of additional acres that may have been mined. The estimate is determined from reported mine production, approximate thickness of the coal, and recovery rates calculated from nearby mines that used similar mining methods.

SHAFT, SLOPE, DRIFT OR TIPPLE LOCATIONS

Shaft, slope, drift, or tipple locations Locations of all known former entry points to underground mines or the location of coal cleaning, tipple, and shipping equipment used by the mine's facility are listed. The location is described in terms of county, township and range (Twp-Rge), section, and location within the section by quarters. NE SW NW, for instance, would describe the location in the northeast quarter of the southwest quarter of the northwest quarter. When sections are irregular in size, the quarters remain the same size and are oriented (or "registered") from the southeast corner of the section. Approximate footage from the section lines (FEL = from east line, FNL = from north line, for example) is given when that information is known; this indicates a surveyed location and is not derived from maps. Entry points are also plotted on the map and coded for the type of entry or tipple. A mine opening may have had many purposes during the life of the mine. Old hoist shafts are often later used for air and escape shafts; this information is included in the directory when known. The tipple for underground mines was generally located near the main shaft or slope. At surface mines, coal was sometimes hauled to a central tipple several miles from the mine pit.

GEOLOGY

Seam(s) mined The name of the coal seam(s) mined is listed, if known. If multiple seams were mined, they are all listed, although the mined-out area for each seam may be shown on separate maps. Figure 2 shows the stratigraphic section of the coal-bearing interval in Illinois, and the vertical relations among the coals.

Depth The depth to the top of the seam in the vicinity of the shaft is listed, if known. The depth is determined from notes made by geologists who visited the mine during its operation or from drill hole data in ISGS files. Depth generally varies little over the extent of a mine; however, reported depths for an individual mine may vary. Depth for surface-mined coals varies, and is usually represented as a range.

Thickness The approximate thickness of the mined seam is shown, if known. Thickness also comes from notes of geologists who visited the mine during its operation or from borehole data in ISGS files. Minimum, maximum, and average thicknesses are given when this information is available.

Mining method The principal mining method used at the mine (figs. 1A-H) is listed. See the mining methods section at the beginning of this directory for a discussion of this parameter.

Geologic problems reported Any known geologic problems, such as faults, water seepage, floor heaving, and unstable roof, encountered in the mine are reported. This information is from notes made by ISGS geologists who visited the mine, or from reports by mine inspectors published by the Illinois Department of Mines and Minerals, or from the source map(s). Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Production history Tons of coal produced from the mine by each mine owner are totaled. When the source map used for the mine outline is not a final mine map, the tonnage produced since the date of the map is identified. For mines that extend into adjacent quadrangles, the tonnage reported includes areas mined in adjacent quadrangles.

SOURCE OF DATA

Source map This section lists information about the map(s) used to compile the mine outline and the locations of tipples and mine openings. In some cases more than one source map was used. For example, a map drawn before the mine closed may provide better information on original areas of the mine than a later map. When more than one map was used, the bibliography section explains what information was taken from each source.

Date The date of the most recent mine survey listed on the source map is reported.

Original scale The original scale of the source map is listed. Many maps are photo-reductions and are no longer at their original scale. The original scale gives some indication of the level of detail of the mine outline and the accuracy of the mine boundary relative to surface features. Generally, the larger the scale, the greater the accuracy and detail of the mine map. Mine outlines taken from source maps at scales smaller than 1:24,000 may be highly generalized and may well be inaccurately located with respect to surface features.

Digitized scale The scale of the digitized map is reported. The scale may be different from that of the original source map. In many cases the digitized map was made from a photo-reduction of the original source map, or the source map was not in a condition suitable for digitizing and the mine boundaries were transferred to another base map.

Map type Source maps are classified into five categories to indicate the probable completeness of the map. See discussion of source maps in the previous section.

Annotated bibliography Sources that provide information about the mine are listed, with the data taken from each source. Some commonly used sources are described below. Full bibliographic references are given for all other sources. Unless otherwise noted, all sources are available for public inspection at the ISGS.

Coal Reports Published since 1881, these reports contain tabular data on mine ownership, production, employment, and accidents. Some volumes include short descriptions made by mine inspectors of physical features and conditions in selected mines.

Directory of Illinois Coal Mines This source is a compilation of basic data about Illinois coal mines, originally gathered by ISGS staff in the early 1950s. Sources used for this directory are undocumented, but they are primarily Illinois Department of Mines and Minerals annual reports, ISGS mine notes, and coal company officials.

ENR Document 85/01, Guither, H. D., J. K. Hines, and R. A. Bauer, 1985 The Economic Effect of Underground Mining Upon Land Used for Illinois Agriculture: Illinois Department of Energy and Natural Resources Document 85/01, 185 p.

Microfilm map The U.S. Bureau of Mines maintains a microfilm archive of mine maps. A microfilm file for Illinois is available for public viewing at the ISGS.

Mine notes   ISGS geologists have visited mines or contacted mine officials throughout the state since the early 1900s. Notes made during these visits range from brief descriptions of the mine location to long narratives (including sketches) of mining conditions and geology.

Federal Land Bank of St. Louis, Preliminary Reports on Subsidence Investigations Mining engineers working for the Federal Land Bank of St. Louis mapped areas of subsidence due to coal mining in the early 1930s. These reports often include county maps of mine properties with mined-out areas including shaft locations, as well as subsidence areas.

REFERENCES

Bauer, R. A., B. A. Trent, and P. B. Dumontelle, 1993, Mine Subsidence in Illinois: Facts for the Homeowner Considering Insurance, Illinois State Geological Survey, Environmental Geology Note 144, 16p.

Guither, H. D., J. K. Hines, and R. A. Bauer, 1985, The Economic Effects of Underground Mining Upon Land Used for Illinois Agriculture, Illinois Department of Energy and Natural Resources Document 85/01, 185p.

PART II DIRECTORY OF MINES IN THE KINCAID QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Kincaid Quadrangle is provided. These summary sheets are arranged numerically by mine index number. Consult Part I for a complete explanation of the data listed in the summary sheet.

Mine Index 219
Peabody Coal Company, Peabody No. 9 Mine

Type: Underground Total mined-out acreage shown: 5,769

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	13N 2W	19	NE SE NW
Air shaft	Christian	13N 2W	19	SW SW NE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	407-417	4.0	9.0	7.5	RPP

Geologic Problems Reported: The source map shows problem areas designated along the southwestern edge and all along the north and northwestern side of the mine. The symbol is thought to denote sandstone channels. Channels or associated wet areas (from the water seeping from the sandstone) may have also caused some of the problems that resulted in the larger interior un-mined areas. The roof in the eastern and western parts of the mine was black shale, while gray shale predominated in the southeastern part of the mine. The sandy shale in the northeastern part was very dangerous and gave much trouble, because micaceous layers separating the bedding planes parted readily and allowed large parts of the roof to come down. This sandy shale was either directly on the coal or separated from it by 4 to 36 inches of black shale. A persistent pyrite layer in the coal ranged up to 1.5 inches thick. Pyrite lenses up to 1 inch thick were common. The source map shows faulty areas along the northern and southern borders of the mine.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Peabody Coal Company	Peabody No. 9	1918-1951 *	36,290,433
			36,290,433

* Idle 1928

Last reported production: March 1951

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company	5-29-1952	1:4800	1:4800	Final
Microfilm, document 351393	5-29-1952	1:4800	1:9600	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Christian County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Company map, ISGS map library, 4103.C4 i5.1-6, copy 1 - Shaft locations, mine outline, mining method, geologic problems.
Microfilm map, document 351393, reel 03135, frames 470-475, map of Peabody #7 (mine index 2040) - Mine outline (far NW part of mine).

Mine Index 220
Peabody Coal Company, Peabody No. 8 Mine

Type: Underground Total mined-out acreage shown: 8,571

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	13N 3W	8	SW SW NW
Air shaft	Christian	13N 3W	8	SW SW NW

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	370	7.0	8.0	7.5	RPP

Geologic Problems Reported: The source map shows a mining pattern indicating a fault that interfered with mining in NW SENE 17-T13N-R3W. This normal fault extended southeast into Peabody No. 10 Mine (mine index 693), where the coal was downthrown 7 to 15 feet to the northeast. The immediate roof over the coal was a black shale that varied from 0 to 5 feet thick. Above the shale was a limestone that also ranged from 0 to 5 feet thick. Timbering was required where the roof was shale over 30 inches thick. When the shale was less than 30 inches, it was taken down when the coal was removed. The limestone made a very good roof. Slips and sandstone rolls were observed in the mine. Rolls were more common in the western part of the mine, and had the effect of lowering the top of the coal 3 to 4 feet. Impurities in the coal were pyrite in lenses and bands, and calcite in fracture fillings. The soft underclay floor heaved, and several bad squeezes had occurred at the mine.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Peabody Coal Company	Peabody No. 8	1914-1954	47,406,627
			47,406,627

Last reported production: July 1954

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4103.C4 i5.1-10	7-29-1954	1:12000	1:12000	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam, thickness, geologic problems.
Company map, ISGS map library, 4103.C4 i5.1-10 - Shaft locations, mine outline, mining method.

Mine Index 693
Peabody Coal Company, Peabody No. 10 Mine

Type: Underground   Total mined-out acreage shown: 24,808 Workings extend into Sangamon and Montgomery Counties.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main slope	Christian	13N 4W	10	NE NE SE
Air shaft	Christian	13N 4W	11	SE NW SW
19th North air shaft	Sangamon	13N 4W	30	SW NW SW
South man / air shaft	Sangamon	13N 4W	29	SW SW SW
Air shaft	Christian	13N 4W	26	SW SW SW
Main South air shaft #2	Christian	13N 4W	34	SE SE NE
Zenobia man shaft	Christian	12N 4W	2	NW NW SW
Air shaft	Christian	12N 4W	2	NE NW SW
North air shaft	Christian	14N 4W	27	SE SE SE
North man shaft	Christian	14N 4W	27	SE SE SE
4th East air shaft	Christian	14N 4W	35	NE NW NE
4th West air shaft	Sangamon	14N 4W	32	NE NE NW

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	300-380		13.0	6.5-7.5 *	BRP

* The coal was averaged 6.5 feet thick under limestone roof and 7.5 feet thick under Anna Shale. Generally, 2 to 3 feet of top coal was left to support the roof.

Geologic Problems Reported: This mine extended about 11 miles in the north-south direction and 7 miles in the east-west direction, and geologic conditions were diverse. A large normal fault was encountered that halted expansion in the northeastern part of the mine. Displacement was 7 to 15 feet downthrown to the northeast. This fault, or set of parallel faults, extended over 2 miles N-NW and southward into NW SE NW 17-T13N-R3W, in Peabody No. 8 Mine (mine index 220). In 1967, seven entries were driven through a NE-SW trending channel sandstone in NE SW 17-T13N-R4W, Sangamon County. The sandstone was water-bearing, and consequently the mine was wet in that area. The top of the coal was eroded, but 4 to 5 feet of coal remained. These channels of Anvil Rock Sandstone channels are evident in the mining patterns shown on the accompanying map. Most channels were 200 to 400 feet wide with wider flanking zones of wet conditions and/or unstable roof. The black shale roof tended to slab off along prominent jointing breaks. The 3 to 4 feet of black Anna Shale was overlain by 1.5 feet of Brereton Limestone, then 2 to 10 feet of thin-bedded Anvil Rock Sandstone that sometimes had shale interlaminations, another 1.5 feet of limestone, and 2 feet of shale. In some roof falls this entire sequence was exposed. In NW 34-T13N-R4W and SW 27-T13N-R4W, a peat trough resulted in coal up to 13 feet thick, in a north-south trending linear depression. The grades were too steep for the equipment and the feature was difficult to cope with. Roof failures also made this feature difficult to mine, although only the usual 6 to 7 feet of coal was actually removed. A pattern of slips initiated a roof fall of 35 feet of silty shale and gray shale within this area of thick coal. The coal in the northern part of the mine was exceptionally hard but relatively clean of impurities, and the underclay was rather soft. In the southern part of the mine, the coal was softer but had more impurities, and the underclay was much firmer.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Peabody Coal Company	Peabody No. 10	1951-1994	147,281,150
			147,281,150

Last reported production: 1994

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company	8-1-1994	1:7200	1:7200	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam, thickness, geologic problems.
Company map, state archives - Slope & shaft locations, mine outline, mining method.
Company map, Coal Section files, 2-1-11L - Geologic problems.

Mine Index 2040
Peabody Coal Company, Peabody No. 7 Mine

Type: Underground   Total mined-out acreage shown: 7,127

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	13N 3W	14	SW NW NW
Air shaft	Christian	13N 3W	14	SW NW NW
Air shaft	Christian	13N 3W	27	SE SE SW

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	349-365			6.5-7.5	RPP

Geologic Problems Reported: The source map shows a probable sandstone channel that limited mine expansion in the southeastern part of the mine. Only three pairs of entries were driven across the channel to access the coal on the other side, implying that almost no coal was minable there. The coal was either eroded or never deposited. Another channel was between the Peabody No. 7 and Peabody No. 9 Mines (mine index 219). The source map showed unmined areas in 36-T14N-R3W (SE NW, S ½ NE and SE SW), some marked by the same symbol used to denote channels elsewhere on the same map.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Illinois Midland Coal Company	Illinois Midland No. 7	1912-1913	74,824
Peabody Coal Company	Peabody No. 7	1913-1952	44,886,555
			44,961,379

Last reported production: May 1952

SOURCES OF DATA

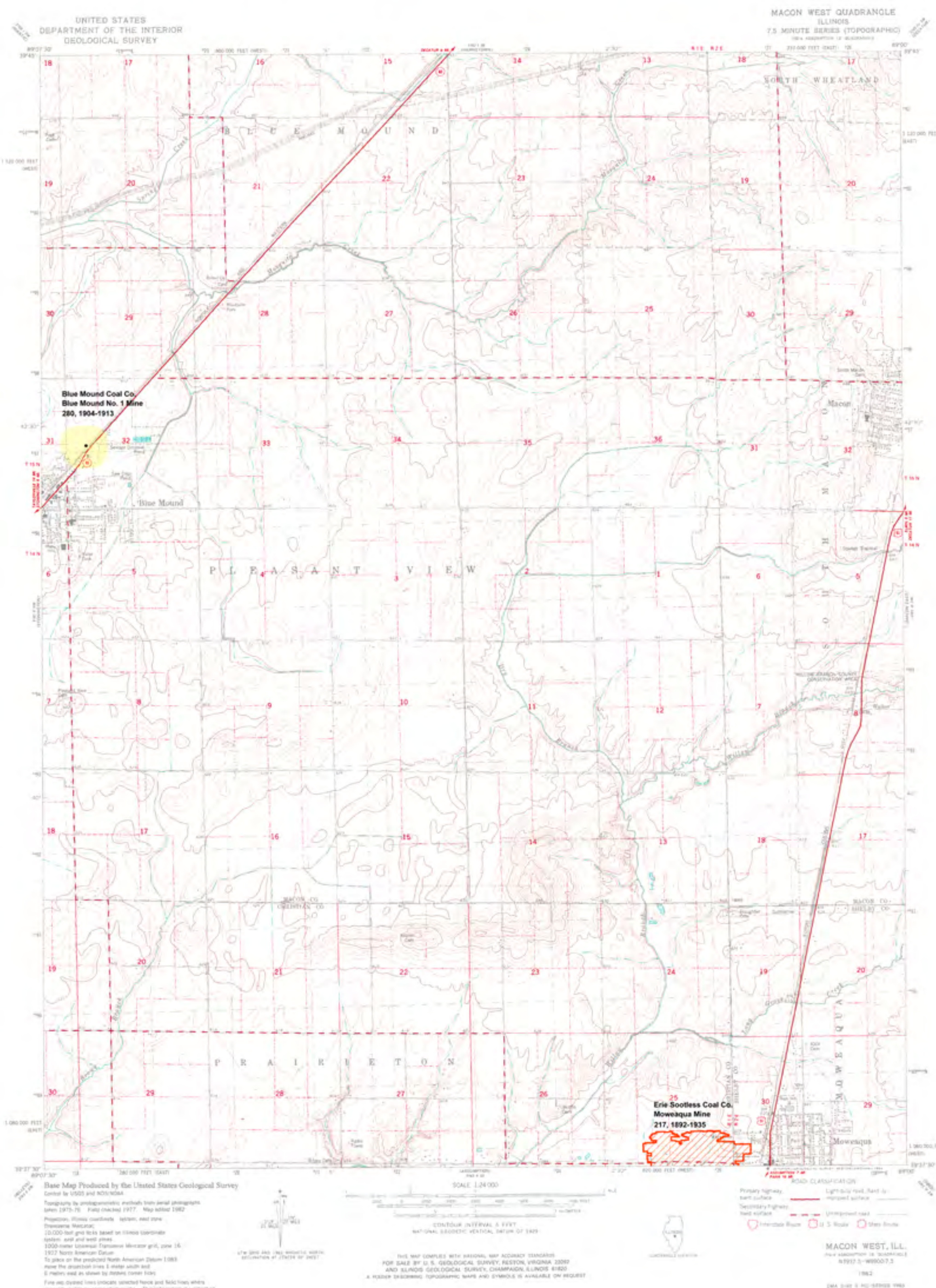
Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351393	5-29-1952	1:4800	1:9600	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam.
Microfilm map, document 351393, reel 03135, frames 470-475 - Shaft locations, mine outline, mining method.

INDEX OF MINES IN THE KINCAID QUADRANGLE

Funding for this project was supplied by the Illinois Mine Subsidence Insurance Fund.



Appendix M

Coal Mines in Illinois
Macon West Quadrangle

Macon, Shelby & Christian Counties, Illinois

This map accompanies the Coal Mines Directory for the Macon West Quadrangle. Consult the directory for a complete explanation of the information shown on this map.

Mining Method

- Room & Pillar (RP)
- Room & Pillar Basic (RPB)
- Modified Room & Pillar (MRP)
- Room & Pillar Panel (RPP)
- Blind Room & Pillar (BRP)
- Checkerboard Room & Pillar (CRP)
- High Extraction Retreat (HER)
- Longwall (LW)
- Underground, Method Unknown
- Strip Mine
- Auger Mine
- General Area of Mining

Source of Mine Outline

- Final Mine Map
- Not Final Mine Map
- Undated Mine Map
- Incomplete Mine Map
- Secondary Source Map

Tipple, Shaft, Slope, Drift Locations

- Strip Mine Tipple - Active
- Strip Mine Tipple - Abandoned
- Mine Shaft - Active
- Mine Shaft - Abandoned
- Mine Slope - Active
- Mine Slope - Abandoned
- Mine Drift - Active
- Mine Drift - Abandoned
- Air Shaft
- Uncertain Location
- Uncertain Type of Opening

Location

Mine Annotation
(space permiting)
Company
Mine Name
ISGS Index No., Years of Operation

Disclaimer

Please check the Coal Section at the Illinois State Geological Survey's web site at http://www.isgs.illinois.edu for the most up-to-date version of these products.

Note that each quadrangle scale mined-out area map requires the use of the associated text directory for full explanation of map features and mine attributes. Also note that some quadrangles have multiple seams of mining and therefore more than one map may be available for a particular quadrangle. Please take care to check for multiple maps, as extensive mining may exist in the other seams.

The maps and digital files used for these studies were compiled from data obtained from a variety of public and private sources and have varying degrees of completeness and accuracy. This compilation map presents reasonable interpretation of the geology of the area and is based on available data. Locations of some mine features may be offset by 500 feet or more due to errors in the original source maps, the compilation process, digitizing, or a combination of these factors. These data are not intended for use in site-specific screening or decision-making. Use of these documents does not eliminate the need for detailed studies to fully understand the geology of a specific site. The Illinois State Geological Survey, Institute of Natural Resource Sustainability, or the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this data set and accept no liability for the consequences of decisions made by others on the basis of the information presented here.

These maps were designed for use at 1:24,000. Enlarging the map may reduce accuracy, as the original scale of the source maps used to compile the outlines shown varies from 1:400 to 1:150,000, and some mine locations are known only from text descriptions. See the accompanying mine directory for the original scale of the source map used for a specific mine to check accuracy of a given portion of the map. Areas with no mines shown may still be undermined; see the unlocated mines list at the back of each mine directory.

The image of the U.S.G.S. topographic base map was projected from the original UTM to Lambert Conformal Conic.

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Mine Outlines Compiled by
Jennifer M. Obrad

February 4, 2011

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
MACON WEST QUADRANGLE
MACON, SHELBY & CHRISTIAN COUNTIES

Jennifer M. Obrad & C. Chenoweth

2011

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This material is based upon work supported by the Illinois Department of Transportation. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the Illinois Department of Transportation.

Cover photo Track-mounted duckbill loading machine at a Peabody Coal Company mine, ca. 1915.

DISCLAIMER: The accuracy and completeness of mine maps and directories vary with the availability of reliable information. Maps and other information used to compile this mine map and directory were obtained from a variety of sources and the accuracy of some of the original information cannot be verified. Consequently, the Illinois State Geological Survey (ISGS) cannot guarantee the mine maps are free of errors and disclaims any responsibility for damages that may result from actions or decisions based on them.

The ISGS updates the maps and directories periodically, and welcomes any new information or corrections. Please contact the Coal Section of the ISGS at the address shown on the title page of this directory, or telephone (217) 244-4610.

CONTENTS

INTRODUCTION

Coal has been mined in 76 counties of Illinois. More than 7,400 coal mines have operated since commercial mining began in Illinois about 1810; fewer than 30 are currently active. To detail the extent and location of coal mining in Illinois, the Illinois State Geological Survey (ISGS) has compiled maps and directories of known coal mines. The ISGS offers maps at a scale of 1:100,000 and accompanying directories for each county in which coal mining is known to have occurred. Maps at a scale of 1:24,000 and accompanying directories, such as this, are available for selected quadrangles. Contact the ISGS for a list of these quadrangles.

These larger scale maps show the approximate positions of mines in relation to surface features such as roads and water bodies, and indicate the mining method used and the accuracy of the mine boundaries. The maps are useful for locating mine boundaries relative to specific properties and for assessing the potential for subsidence in an area. Mine boundaries compiled from final mine surveys are generally shown within 200 feet of their true position. As a result of poor cartographic quality and inaccuracies in the original mine surveys, boundaries of some older mines may be mislocated on the map by 500 feet or more. Original mine maps should be consulted in situations that require precise delineation of mine boundaries or internal workings of mined areas.

This directory serves as a key to the accompanying mine map and provides basic information on the coal mines in the quadrangle. The directory is composed of two parts. Part I explains the symbols and patterns used on the accompanying map and the summary data presented for each mine. Part II numerically lists the mines in the quadrangle and summarizes the geology and production history of each mine. Total production for the mine, not the portion in the quadrangle, is given.

MINING IN THE MACON WEST QUADRANGLE

The Moweaqua Mine (mine index 217) operated from 1892 to 1935. The Springfield Coal was mined, at over 600 feet deep. On December 24, 1932, the barometric pressure dropped. The drop was sufficient to drive methane gas out of the old workings. Seals had been weakened imperceptibly by normal degradation of the roof in abandoned rooms, and nodules that may have fallen against the seals. Between the time when the certified Mine Examiner checked the mine and when the miners arrived at the workplace, the barometric low passed through, driving methane gas from the abandoned workings into the active portion of the mine. Some gas had traveled along the entries, with a great pocket collected further back. When the men stood up, with their open-flame lamps, the gas exploded and acted as a fuse leading the flame back to the large pocket of methane, resulting in a terrible explosion. Those that survived the explosion were unable to survive the bad air that resulted. A large roof fall, over 800 feet long in one direction and 1500 feet long in another direction, blocked access and escape from the carbon monoxide. The roof fall may have prevented the further explosion of coal dust by dispersing rock dust from the shale roof, according to the state mine inspectors who investigated the explosion and directed rescue efforts. The disaster killed 54 men.

The Blue Mound Mine No. 1 Mine (mine index 280) operated from 1904 to 1913. The shaft was about 500 feet deep. No map has been found for the mine.

PART I EXPLANATION OF MAP AND MINE SUMMARY SHEET

INTERPRETING THE MAP

The map accompanying this directory shows the location of coal mines known to be present in the quadrangle. The map, corresponding to a U.S. Geological Survey (USGS) 7.5-minute quadrangle, covers an area bounded by lines of latitude and longitude 7.5-minutes apart. In Illinois, a quadrangle is approximately 6.5 miles east to west and 8.5 miles north to south, an area of about 56 square miles. The ISGS generally offers one map of mines per quadrangle. In some areas where extensive mining occurred in two or more overlapping seams, separate maps are compiled for mines in each seam to maintain readability of the map.

Mine Type and Mining Method
The mine type is indicated on the map by pattern color: green represents surface mines; red and yellow represent underground mines. The red patterns are used for areas of underground mining that are documented by a primary or secondary source map. A yellow pattern is used for cases where no map of the mine workings is available, but a general area of mining can be inferred from property maps or production figures. The patterns indicate the main mining methods used in underground mines. The methods are (1) room and pillar and (2) high extraction. The method used gives some indication of the amount and pattern of coal extraction within each mined area, and has some influence on the timing and type of subsidence that can occur over a mine.

The following discussion and illustrations of mining methods are based on Guither et al. (1984).

In room-and-pillar mines, coal is removed from haulage-ways (entries) and selected areas called rooms. Pillars of unmined coal are left between the rooms to support the roof. Depending on the size of rooms and pillars, the amount of coal removed from the production areas will range from 40% to 70%.

Room and Pillar - mining is divided into six categories:

- room-and-pillar basic (RPB, fig. 1A), an early method that did not follow a preset mining plan and therefore resulted in very irregular designs;
- modified room and pillar (MRP, fig. 1B);
- room-and-pillar panel (RPP, fig. 1C);
- blind room and pillar (BRP, fig. 1D);
- checkerboard room and pillar (CRP, fig. 1E);
- room and pillar (RP), a classification used when the specific type of room-and-pillar mining is unknown.

Blind and checkerboard are the most common types of room-and-pillar mining used in Illinois today. The knowledge of room-and-pillar mining methods gives a trained engineer information on the nature of subsidence that may occur. A more extensive discussion of subsidence can be found in Bauer et al. (1993).

High-extraction These mining methods are subdivided into high-extraction retreat (HER, Fig 1F) and longwall (LW, Fig 1G, 1H). In these methods, much of the coal is removed within well defined areas of the mine. Subsidence of the surface above these areas occurs within weeks. Once the subsidence activity ceases, the potential for further movement over these areas is low; however, subsidence may continue for several years after mining.

High-extraction retreat mining is a form of room-and-pillar mining that extracts most of the coal. Rooms and pillars are developed in the panels, and the pillars are then systematically removed (fig. 1F).

In early (pre-1960) longwall mines, mining advanced in multiple directions from a central shaft (fig. 1G). Large pillars of coal were left around the shaft, but all coal was removed beyond these pillars. Miners placed rock and wooden props and cribs in the mined-out areas to support the mine roof. The overlying rock gradually settled onto these supports, thus producing subsidence at the surface. In post-1959 longwall mines, room-and-pillar methods have been used to develop the main entries of the mine and panel areas. Modern longwall methods extract 100 percent of the coal in the panel areas (fig. 1H).

SOURCE MAPS

Mine outlines depicted on the map are, whenever possible, based on maps made from original mine surveys. The process of compiling and digitizing the quadrangle map may produce errors of less than 200 feet in the location of mine boundaries. Larger errors of 500 feet or more are possible for mines that have incomplete or inaccurate source maps.

Because of the extreme complexity of some mine maps, detailed features of mined areas have been omitted. The digitized mine boundary includes the exterior boundary of all rooms or entries that were at least 80 feet wide or protruded 500 feet from the main mining area. Unmined areas between mines are shown if they are at least 80 feet wide; unmined blocks of coal within mines are shown if they are at least 400 feet on each side. Original source maps should be consulted when precise information on mine boundaries or interior features is needed.

The mine summary sheet lists the source maps used to determine each mine outline. The completeness of map sources is indicated on the map by a line symbol at the mine boundary. Source maps are organized in five categories.

Final mine map The mine outline was digitized from an original map made from mine surveys conducted within a few months after production ceased. The date of the map and the last reported production are listed on the summary sheet.

Not a final map The mine is currently active or the mine outline was made from a map based on mine surveys conducted more than few months before production ceased. This implies the actual mined-out area is probably larger than the outline on the map. The mine summary sheet indicated the dates of source maps and the last reported production, as well as the approximate tonnage mined between these two dates (if the mine is abandoned). The summary sheet also lists the approximate acreage mined since the date of the map and, in some cases, indicates the area where additional mining may have taken place. This latter information is determined by locating on the map the active faces relative to probable boundaries of the mine property.

Undated map The source map was undated, so it may or may not be based on a final mine survey. When sufficient data are available, the probable acreage of the mined area is estimated from reported production, average seam thickness and a recovery rate comparable to other mines in the area. This information is listed in the summary sheet for the mine.

Incomplete map The source map did not show the entire mine. The summary sheet indicates the missing part of the mine map and the acreage of the unmapped area, which is estimated from the amount of coal known to have been produced from the mine.

Secondary source map The original mine map was not found so the outline shown was determined from secondary sources (e.g., outlines from small-scale regional maps published in other reports). The summary sheet describes the secondary sources.

POINTS AND LABELS

The locations of all known mine openings (shafts, slopes, and drifts) and surface mine tipples are plotted on the map. Tipples are areas where coal was cleaned, stockpiled, and loaded for shipping.

Only openings or tipples are plotted for mines without source maps. If the precise locations of these features are unknown, a special symbol is used to indicate the approximate location of the mine.

Each mine on the map is labeled with the names of the mine and operating company, ISGS mine index number, and years of operation (if known) if space permits. A seam designation is given on maps where more than one seam was mined. For a mine that operated under more than one name, only the most recent name is generally given. When a mine changed names or ownership shortly before closing, an earlier name is listed. All company and mine names are listed on the mine summary sheet in the directory, under the production history segment.

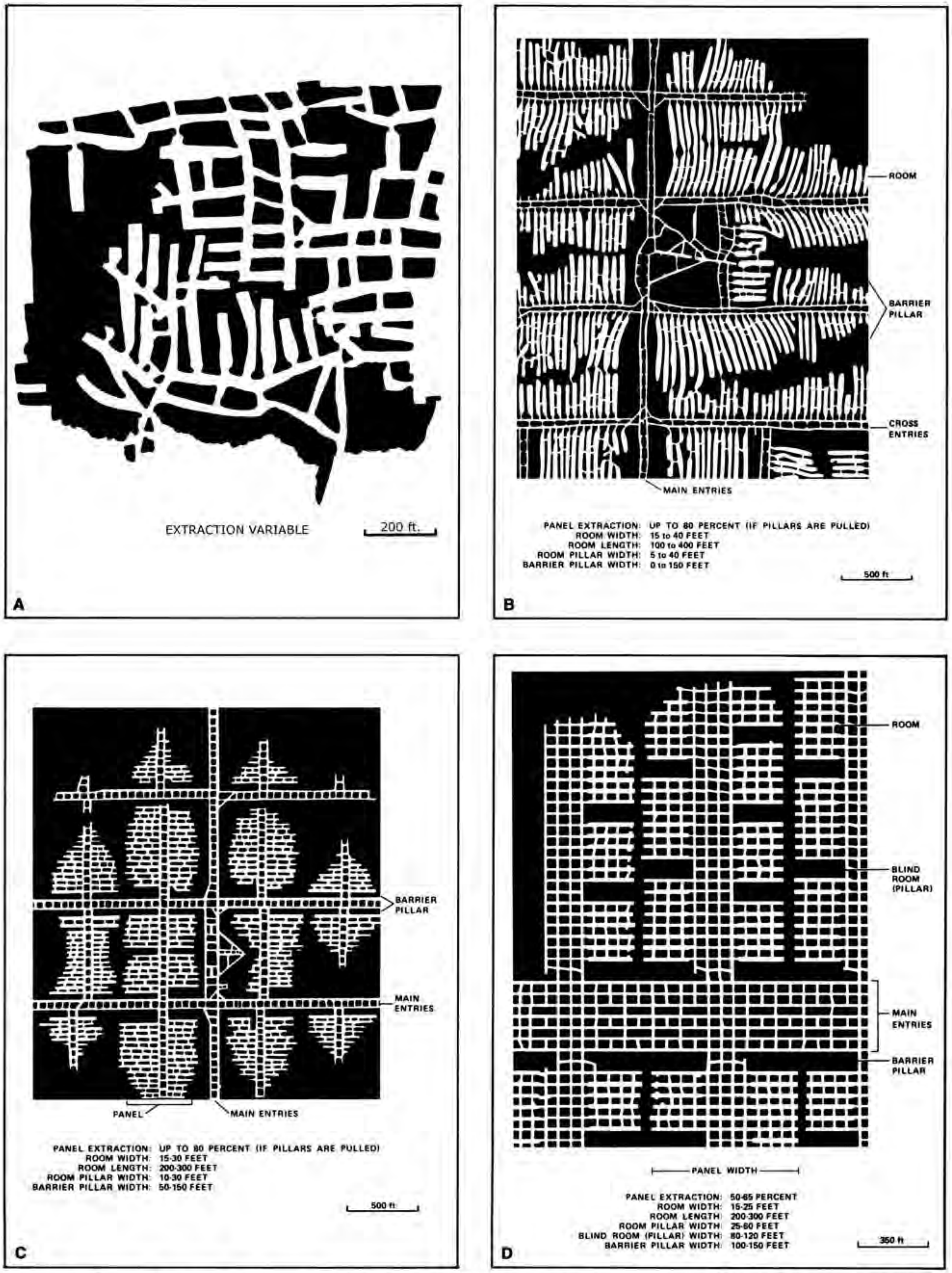


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

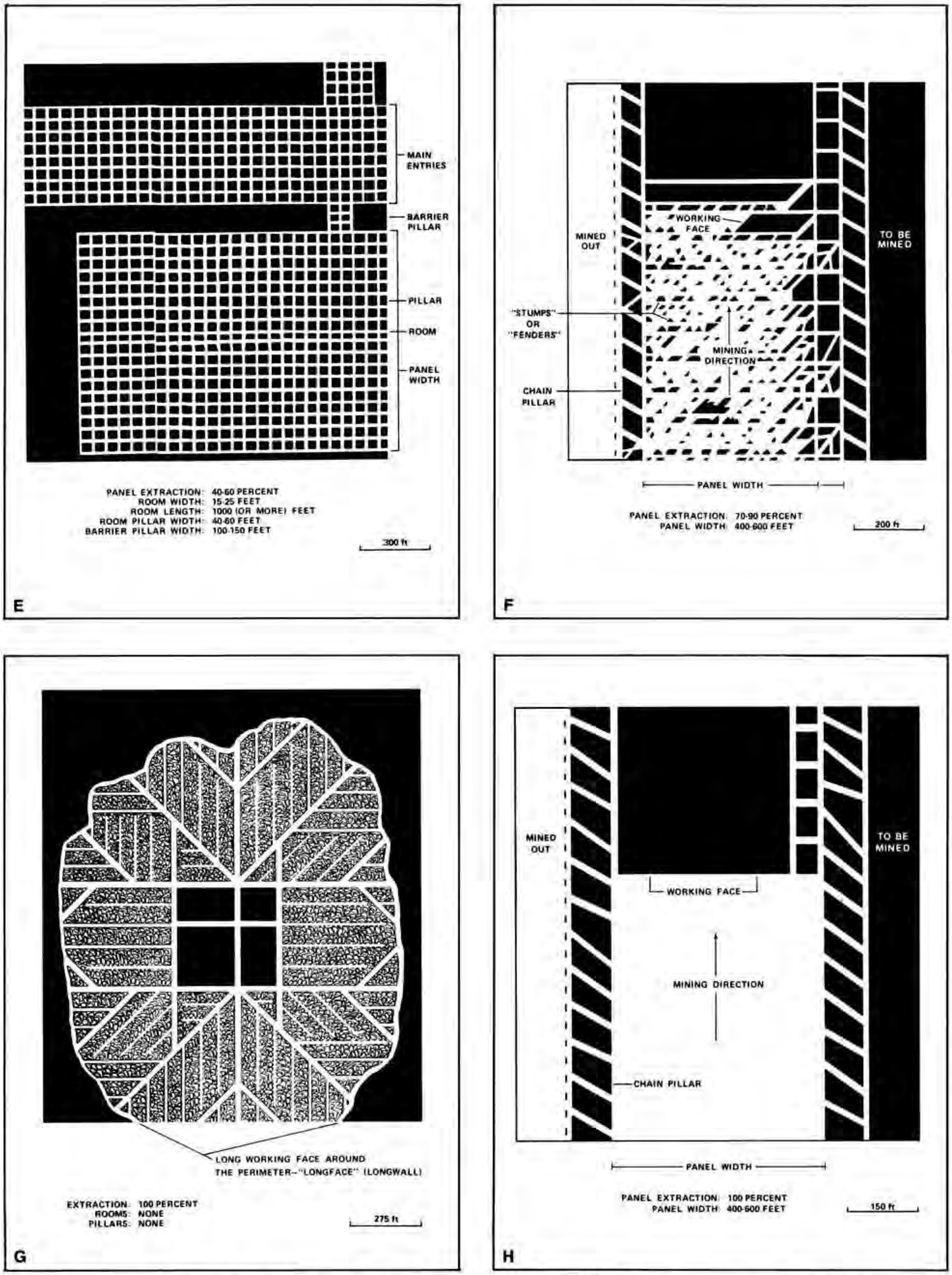


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

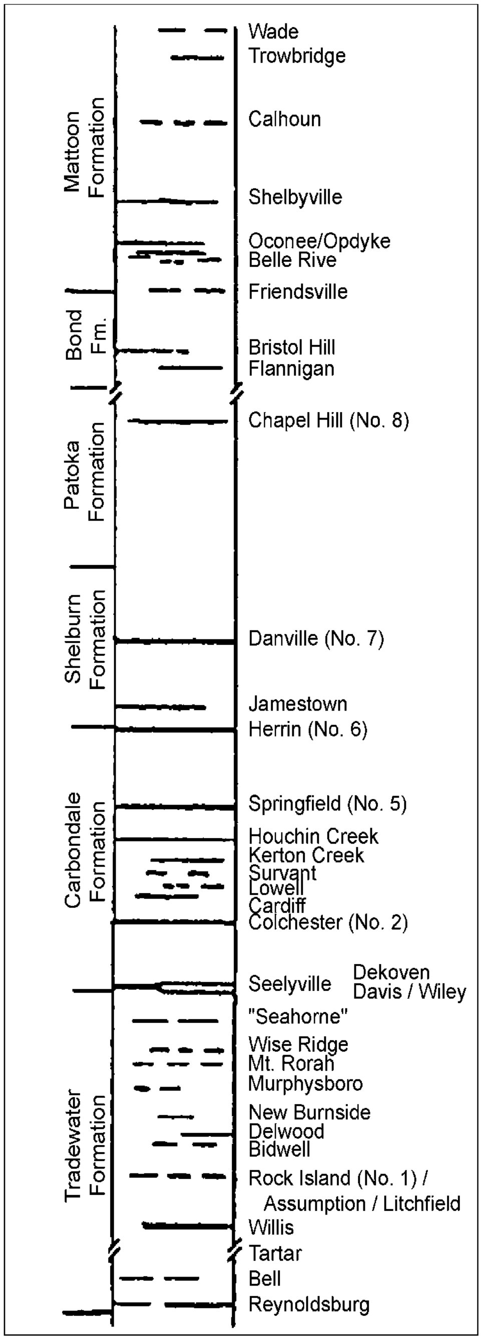


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

INTERPRETING A MINE SUMMARY SHEET

The mine summary sheet is arranged numerically by mine index number. Index numbers are shown on the map and in the mine listing. The mine summary sheet provides the following information (if available).

Company and mine name The last company or owner of the mine is used, unless no production was recorded for the last owner. In that case, the penultimate owner is listed. Mines often have no specific name; in these cases, the company name is also used as the mine name.

Type *Underground* denotes a subsurface mine in which the coal was reached through a shaft, slope, or a drift entry. *Surface* denotes a surface, open pit or strip mine.

Total mined-out acreage shown The total acreage of the mined area mapped, including any acreage mined on adjacent quadrangles, is calculated from the digitized outline of the mine. The acreage of large barrier pillars depicted on the map is excluded from the mined-out acreage. Small pillars not digitized are included in the acreage calculation. If the mine outline is not based on a final mine map, the acreage is followed by an estimate of additional acres that may have been mined. The estimate is determined from reported mine production, approximate thickness of the coal, and recovery rates calculated from nearby mines that used similar mining methods.

SHAFT, SLOPE, DRIFT OR TIPPLE LOCATIONS

Shaft, slope, drift, or tipple locations Locations of all known former entry points to underground mines or the location of coal cleaning, tipple, and shipping equipment used by the mine's facility are listed. The location is described in terms of county, township and range (Twp-Rge), section, and location within the section by quarters. NE SW NW, for instance, would describe the location in the northeast quarter of the southwest quarter of the northwest quarter. When sections are irregular in size, the quarters remain the same size and are oriented (or "registered") from the southeast corner of the section. Approximate footage from the section lines (FEL = from east line, FNL = from north line, for example) is given when that information is known; this indicates a surveyed location and is not derived from maps. Entry points are also plotted on the map and coded for the type of entry or tipple. A mine opening may have had many purposes during the life of the mine. Old hoist shafts are often later used for air and escape shafts; this information is included in the directory when known. The tipple for underground mines was generally located near the main shaft or slope. At surface mines, coal was sometimes hauled to a central tipple several miles from the mine pit.

GEOLOGY

Seam(s) mined The name of the coal seam(s) mined is listed, if known. If multiple seams were mined, they are all listed, although the mined-out area for each seam may be shown on separate maps. Figure 2 shows the stratigraphic section of the coal-bearing interval in Illinois, and the vertical relations among the coals.

Depth The depth to the top of the seam in the vicinity of the shaft is listed, if known. The depth is determined from notes made by geologists who visited the mine during its operation or from drill hole data in ISGS files. Depth generally varies little over the extent of a mine; however, reported depths for an individual mine may vary. Depth for surface-mined coals varies, and is usually represented as a range.

Thickness The approximate thickness of the mined seam is shown, if known. Thickness also comes from notes of geologists who visited the mine during its operation or from borehole data in ISGS files. Minimum, maximum, and average thicknesses are given when this information is available.

Mining method The principal mining method used at the mine (figs. 1A-H) is listed. See the mining methods section at the beginning of this directory for a discussion of this parameter.

Geologic problems reported Any known geologic problems, such as faults, water seepage, floor heaving, and unstable roof, encountered in the mine are reported. This information is from notes made by ISGS geologists who visited the mine, or from reports by mine inspectors published by the Illinois Department of Mines and Minerals, or from the source map(s). Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Production history Tons of coal produced from the mine by each mine owner are totaled. When the source map used for the mine outline is not a final mine map, the tonnage produced since the date of the map is identified. For mines that extend into adjacent quadrangles, the tonnage reported includes areas mined in adjacent quadrangles.

SOURCE OF DATA

Source map This section lists information about the map(s) used to compile the mine outline and the locations of tipples and mine openings. In some cases more than one source map was used. For example, a map drawn before the mine closed may provide better information on original areas of the mine than a later map. When more than one map was used, the bibliography section explains what information was taken from each source.

Date The date of the most recent mine survey listed on the source map is reported.

Original scale The original scale of the source map is listed. Many maps are photo-reductions and are no longer at their original scale. The original scale gives some indication of the level of detail of the mine outline and the accuracy of the mine boundary relative to surface features. Generally, the larger the scale, the greater the accuracy and detail of the mine map. Mine outlines taken from source maps at scales smaller than 1:24,000 may be highly generalized and may well be inaccurately located with respect to surface features.

Digitized scale The scale of the digitized map is reported. The scale may be different from that of the original source map. In many cases the digitized map was made from a photo-reduction of the original source map, or the source map was not in a condition suitable for digitizing and the mine boundaries were transferred to another base map.

Map type Source maps are classified into five categories to indicate the probable completeness of the map. See discussion of source maps in the previous section.

Annotated bibliography Sources that provide information about the mine are listed, with the data taken from each source. Some commonly used sources are described below. Full bibliographic references are given for all other sources. Unless otherwise noted, all sources are available for public inspection at the ISGS.

Coal Reports Published since 1881, these reports contain tabular data on mine ownership, production, employment, and accidents. Some volumes include short descriptions made by mine inspectors of physical features and conditions in selected mines.

Directory of Illinois Coal Mines This source is a compilation of basic data about Illinois coal mines, originally gathered by ISGS staff in the early 1950s. Sources used for this directory are undocumented, but they are primarily Illinois Department of Mines and Minerals annual reports, ISGS mine notes, and coal company officials.

ENR Document 85/01, Guither, H. D., J. K. Hines, and R. A. Bauer, 1985 The Economic Effect of Underground Mining Upon Land Used for Illinois Agriculture: Illinois Department of Energy and Natural Resources Document 85/01, 185 p.

Microfilm map The U.S. Bureau of Mines maintains a microfilm archive of mine maps. A microfilm file for Illinois is available for public viewing at the ISGS.

Mine notes ISGS geologists have visited mines or contacted mine officials throughout the state since the early 1900s. Notes made during these visits range from brief descriptions of the mine location to long narratives (including sketches) of mining conditions and geology.

Federal Land Bank of St. Louis, Preliminary Reports on Subsidence Investigations Mining engineers working for the Federal Land Bank of St. Louis mapped areas of subsidence due to coal mining in the early 1930s. These reports often include county maps of mine properties with mined-out areas including shaft locations, as well as subsidence areas.

REFERENCES

Bauer, R. A., B. A. Trent, and P. B. Dumontelle, 1993, Mine Subsidence in Illinois: Facts for the Homeowner Considering Insurance, Illinois State Geological Survey, Environmental Geology Note 144, 16p.

Guither, H. D., J. K. Hines, and R. A. Bauer, 1985, The Economic Effects of Underground Mining Upon Land Used for Illinois Agriculture, Illinois Department of Energy and Natural Resources Document 85/01, 185p.

PART II DIRECTORY OF MINES IN THE MACON WEST QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Macon West Quadrangle is provided. These summary sheets are arranged numerically by mine index number. Consult Part I for a complete explanation of the data listed in the summary sheet.

Mine Index 217
Erie Sootless Coal Company, Moweaqua Mine

Type: Underground Total mined-out acreage shown: 676 Production indicates approximately 5 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Shelby	14N 2E	31	NW SW NE
Air shaft	Shelby	14N 2E	31	NE SW NE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Springfield	618-625	5.0	5.83	5.33	RPP

Geologic Problems Reported: On Christmas Eve in 1932, the barometric pressure dropped dramatically, which forced methane gas into voids in the abandoned works. Some roof falls had weakened the seals between the abandoned and active areas, and open flame lights used by the miners ignited the methane. The resulting explosion killed 54 men, everyone who was in the mine at the time. The roof was 2 feet of black shale overlain by 4 inches of limestone and over 6 feet of gray shale. The shale contained many slips and slickenslides, and required timbering. Horsebacks were common. The top 33 inches of coal was brittle and had the greatest amount of pyrite.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Moweaqua Coal Mining & Manufact. Co.	Moweaqua	1892-1920	1,850,320
Moweaqua Coal Mining Company	Moweaqua	1920-1930	527,633
Moweaqua Coal Corporation	Moweaqua	1931-1933 *	60,840
Erie Sootless Coal Company	Moweaqua	1934-1935	17,541 **
			2,456,334

* Idle 1933
** Production after map date

Last reported production: March 1935

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4102 i5.1-17	12-1932	1:2400	1:2400	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, seam, geologic problems.
Directory of Illinois Coal Mines (Shelby County) - Mine names, mine index, ownership, years of operation.
Mine notes (Shelby County) - Mine type, shaft location, depth, thickness, geologic problems.
Company map, ISGS map library, 4102 i5.1-17 - Shaft locations, mine outline, mining method.

Mine Index 280
Blue Mound Coal Company, Blue Mound No. 1 Mine

Type: Underground   Total mined-out acreage shown: None; production indicates approximately 65 acres were mined. A general area of mining on the accompanying map indicates the approximate size of the area mined.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (7 x 15 ft)	Macon	15N 1E	32	NE NW SW
Air shaft (8 x 12 ft)	Macon	15N 1E	32	NW SW *

* According to the 1904 Coal Report, the air / escape shaft construction was 150 feet deep. The location of the air shaft is not known, but is assumed to be near the hoist shaft.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Springfield	467	3.5	6.5	5.0	RP

Geologic Problems Reported: Some gas was reported at the active face of the workings.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Blue Mound Coal Company	Blue Mound No. 1	1904-1913 **	290,161
			290,161

** Idle 1908 & 1909

Last reported production: 1913

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Mine notes	Undated	(text only)	1:24000 ***	Secondary source
Sanborn Map Company	5-1910	Unknown	1:24000 ***	Secondary source

*** The mine location was plotted on a 1:24000 USGS topographic map from the mine location description and digitized.

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, seam, air shaft size.
Directory of Illinois Coal Mines (Macon County) - Mine names, mine index, ownership, years of operation.
Mine notes (Macon County) - Mine type, shaft location, shaft size, depth, thickness, mining method, geologic problems.
Sanborn Map Company, Blue Mound, 1910 - Shaft location (direction from railroad tracks).

MINES WHOSE LOCATIONS ARE NOT KNOWN, MACON WEST QUADRANGLE

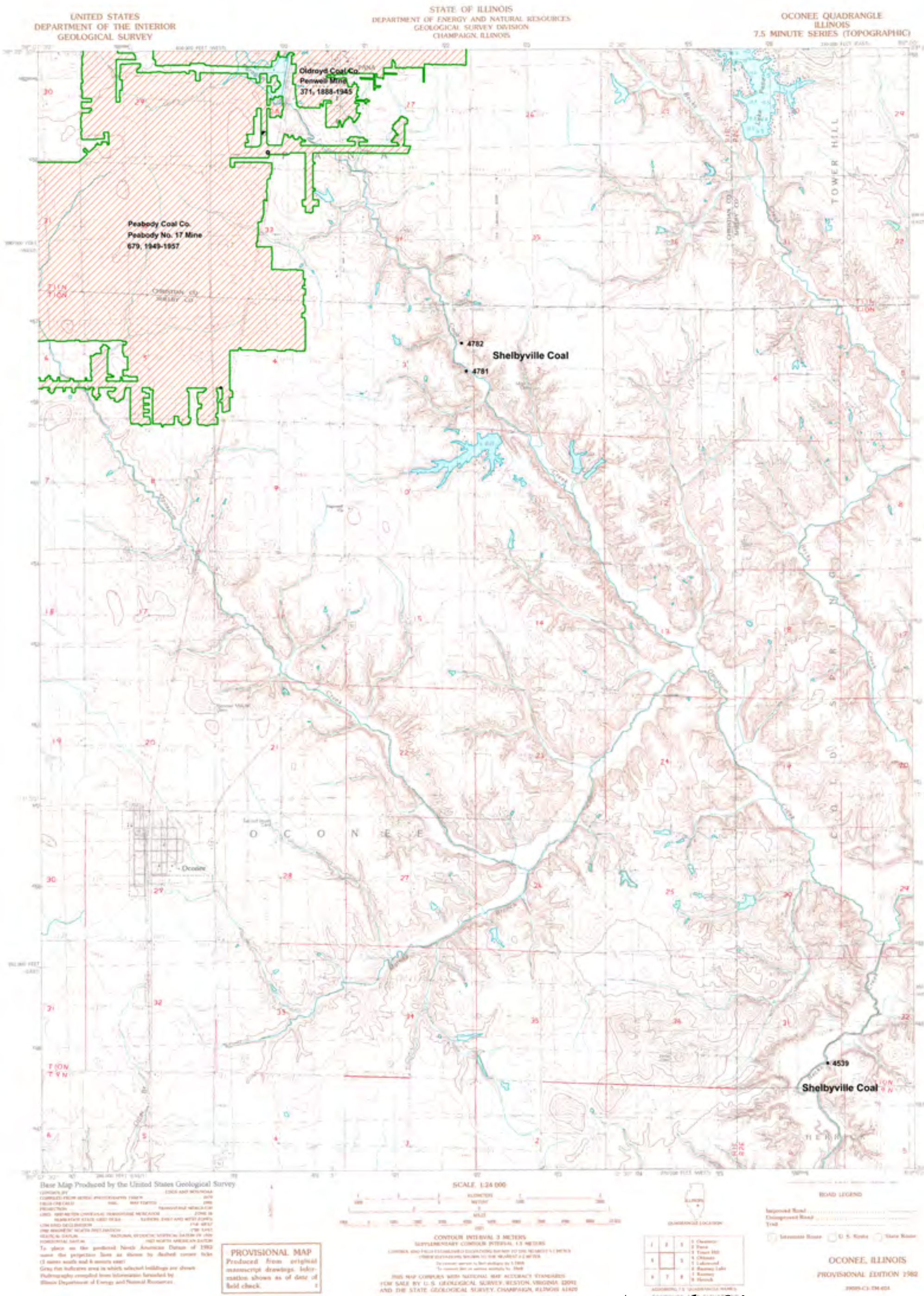
The locations of the following mines are unknown, but the production tonnage, operating names, and nearest town were reported in the Annual Coal Reports. The operators listed below mined in or near the Macon West Quadrangle. The information shown is similar to that presented on the summary sheets in the previous pages of this directory. The first item is the name the mine operated under as listed in the Coal Report, then the years the mine reported. If no physical data are available, the next item listed is the total tons produced by the mine. If physical data are available, the order of presentation is as follows: type of opening for the mine (drift, slope or shaft), depth of coal in feet, and thickness of coal in feet.

No production was mined by the unlocated mine near Moweaqua. The shaft may not have been completed.

MOWEAQUA

American Coal Company, 1892-1893, shaft	none

INDEX OF MINES IN THE MACON WEST QUADRANGLE



Coal Mines in Illinois
Oconee Quadrangle

Shelby & Christian Counties, Illinois

Herrin and Shelbyville Coals

This map accompanies the Coal Mines Directory for the Oconee Quadrangle. Consult the directory for a complete explanation of the information shown on this map.

Mining Method

- Room & Pillar (RP)
- Room & Pillar Basic (RPB)
- Modified Room & Pillar (MRP)
- Room & Pillar Panel (RPP)
- Blind Room & Pillar (BRP)
- Checkerboard Room & Pillar (CRP)
- High Extraction Retreat (HER)
- Longwall (LW)
- Underground, Method Unknown
- Strip Mine
- Auger Mine
- General Area of Mining

Source of Mine Outline

- Final Mine Map
- Not Final Mine Map
- Undated Mine Map
- Incomplete Mine Map
- Secondary Source Map

Tipple, Shaft, Slope, Drift Locations

- Strip Mine Tipple - Active
- Strip Mine Tipple - Abandoned
- Mine Shaft - Active
- Mine Shaft - Abandoned
- Mine Slope - Active
- Mine Slope - Abandoned
- Mine Drift - Active
- Mine Drift - Abandoned
- Air Shaft
- Uncertain Location
- Uncertain Type of Opening

Location

Mine Annotation
(space permiting)
Company
Mine Name
ISGS Index No., Years of Operation

Disclaimer

Please check the Coal Section at the Illinois State Geological Survey's web site at http://www.isgs.illinois.edu for the most up-to-date version of these products.

Note that each quadrangle scale mined-out area map requires the use of the associated text directory for full explanation of map features and mine attributes. Also note that some quadrangles have multiple seams of mining and therefore more than one map may be available for a particular quadrangle. Please take care to check for multiple maps, as extensive mining may exist in the other seams.

The maps and digital files used for these studies were compiled from data obtained from a variety of public and private sources and have varying degrees of completeness and accuracy. This compilation map presents reasonable interpretation of the geology of the area and is based on available data. Locations of some mine features may be offset by 500 feet or more due to errors in the original source maps, the compilation process, digitizing, or a combination of these factors. These data are not intended for use in site-specific screening or decision-making. Use of these documents does not eliminate the need for detailed studies to fully understand the geology of a specific site. The Illinois State Geological Survey, Prairie Research Institute, or the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this data set and accept no liability for the consequences of decisions made by others on the basis of the information presented here.

These maps were designed for use at 1:24,000. Enlarging the map may reduce accuracy, as the original scale of the source maps used to compile the outlines shown varies from 1:400 to 1:150,000, and some mine locations are known only from text descriptions. See the accompanying mine directory for the original scale of the source map used for a specific mine to check accuracy of a given portion of the map. Areas with no mines shown may still be undermined; see the unlocated mines list at the back of each mine directory.

The image of the U.S.G.S. topographic base map was projected from the original UTM to Lambert Conformal Conic.

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Prairie Research Institute
Illinois State Geological Survey
615 E. Peabody Dr.
Champaign, IL 61820

Mine Outlines Compiled by
Jennifer M. Obrad

January 20, 2012

Appendix M

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
OCONEE QUADRANGLE
SHELBY & CHRISTIAN COUNTIES

Jennifer M. Obrad

2012

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ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

This material is based upon work supported by the Illinois Mine Subsidence Insurance Fund. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the Illinois Mine Subsidence Insurance Fund.

Cover photo Track-mounted duckbill loading machine at a Peabody Coal Company mine, ca. 1915.

The ISGS updates the maps and directories periodically, and welcomes any new information or corrections. Please contact the Coal Section of the ISGS at the address shown on the title page of this directory, or telephone (217) 244-4610.

CONTENTS

INTRODUCTION

Coal has been mined in 76 counties of Illinois. More than 7,400 coal mines have operated since commercial mining began in Illinois about 1810; fewer than 30 are currently active. To detail the extent and location of coal mining in Illinois, the Illinois State Geological Survey (ISGS) has compiled maps and directories of known coal mines. The ISGS offers maps at a scale of 1:100,000 and accompanying directories for each county in which coal mining is known to have occurred. Maps at a scale of 1:24,000 and accompanying directories, such as this, are available for selected quadrangles. Contact the ISGS for a list of these quadrangles.

These larger scale maps show the approximate positions of mines in relation to surface features such as roads and water bodies, and indicate the mining method used and the accuracy of the mine boundaries. The maps are useful for locating mine boundaries relative to specific properties and for assessing the potential for subsidence in an area. Mine boundaries compiled from final mine surveys are generally shown within 200 feet of their true position. As a result of poor cartographic quality and inaccuracies in the original mine surveys, boundaries of some older mines may be mislocated on the map by 500 feet or more. Original mine maps should be consulted in situations that require precise delineation of mine boundaries or internal workings of mined areas.

This directory serves as a key to the accompanying mine map and provides basic information on the coal mines in the quadrangle. The directory is composed of two parts. Part I explains the symbols and patterns used on the accompanying map and the summary data presented for each mine. Part II numerically lists the mines in the quadrangle and summarizes the geology and production history of each mine. Total production for the mine, not the portion in the quadrangle, is given.

MINING IN THE OCONEE QUADRANGLE

Two seams were mined in the Oconee quad. The Herrin Coal was mined in the northern part of the quad by two large mines. The first of these to open was the Penwell Mine (mine index 371) in 1888. The Herrin Coal was deep here at over 700 feet, but the coal was thick, averaging 7.5 feet thick. This mine operated until 1945. In 1949, the Peabody No. 17 Mine (mine index 679) opened. This mine was also over 700 feet deep, with a thick Herrin Coal that averaged 8 feet. It operated until 1957.

The Shelbyville Coal was also mined in this quad on a much smaller scale. This coal was generally worked along or near streams, in small drift mines. These mines operated very early on.

PART I EXPLANATION OF MAP AND MINE SUMMARY SHEET

INTERPRETING THE MAP

The map accompanying this directory shows the location of coal mines known to be present in the quadrangle. The map, corresponding to a U.S. Geological Survey (USGS) 7.5-minute quadrangle, covers an area bounded by lines of latitude and longitude 7.5-minutes apart. In Illinois, a quadrangle is approximately 6.5 miles east to west and 8.5 miles north to south, an area of about 56 square miles. The ISGS generally offers one map of mines per quadrangle. In some areas where extensive mining occurred in two or more overlapping seams, separate maps are compiled for mines in each seam to maintain readability of the map.

Mine Type and Mining Method

The mine type is indicated on the map by pattern color: green represents surface mines; red and yellow represent underground mines. The red patterns are used for areas of underground mining that are documented by a primary or secondary source map. A yellow pattern is used for cases where no map of the mine workings is available, but a general area of mining can be inferred from property maps or production figures. The patterns indicate the main mining methods used in underground mines. The methods are (1) room and pillar and (2) high extraction. The method used gives some indication of the amount and pattern of coal extraction within each mined area, and has some influence on the timing and type of subsidence that can occur over a mine.

The following discussion and illustrations of mining methods are based on Guither et al. (1984).

In room-and-pillar mines, coal is removed from haulage-ways (entries) and selected areas called rooms. Pillars of unmined coal are left between the rooms to support the roof. Depending on the size of rooms and pillars, the amount of coal removed from the production areas will range from 40% to 70%.

Room and Pillar - mining is divided into six categories:

- room-and-pillar basic (RPB, fig. 1A), an early method that did not follow a preset mining plan and therefore resulted in very irregular designs;
- modified room and pillar (MRP, fig. 1B);
- room-and-pillar panel (RPP, fig. 1C);
- blind room and pillar (BRP, fig. 1D);
- checkerboard room and pillar (CRP, fig. 1E);
- room and pillar (RP), a classification used when the specific type of room-and-pillar mining is unknown.

Blind and checkerboard are the most common types of room-and-pillar mining used in Illinois today. The knowledge of room-and-pillar mining methods gives a trained engineer information on the nature of subsidence that may occur. A more extensive discussion of subsidence can be found in Bauer et al. (1993).

High-extraction These mining methods are subdivided into high-extraction retreat (HER, Fig 1F) and longwall (LW, Fig 1G, 1H). In these methods, much of the coal is removed within well defined areas of the mine. Subsidence of the surface above these areas occurs within weeks. Once the subsidence activity ceases, the potential for further movement over these areas is low; however, subsidence may continue for several years after mining.

High-extraction retreat mining is a form of room-and-pillar mining that extracts most of the coal. Rooms and pillars are developed in the panels, and the pillars are then systematically removed (fig. 1F).

In early (pre-1960) longwall mines, mining advanced in multiple directions from a central shaft (fig. 1G). Large pillars of coal were left around the shaft, but all coal was removed beyond these pillars. Miners placed rock and wooden props and cribs in the mined-out areas to support the mine roof. The overlying rock gradually settled onto these supports, thus producing subsidence at the surface. In post-1959 longwall mines, room-and-pillar methods have been used to develop the main entries of the mine and panel areas. Modern longwall methods extract 100 percent of the coal in the panel areas (fig. 1H).

SOURCE MAPS

Mine outlines depicted on the map are, whenever possible, based on maps made from original mine surveys. The process of compiling and digitizing the quadrangle map may produce errors of less than 200 feet in the location of mine boundaries. Larger errors of 500 feet or more are possible for mines that have incomplete or inaccurate source maps.

Because of the extreme complexity of some mine maps, detailed features of mined areas have been omitted. The digitized mine boundary includes the exterior boundary of all rooms or entries that were at least 80 feet wide or protruded 500 feet from the main mining area. Unmined areas between mines are shown if they are at least 80 feet wide; unmined blocks of coal within mines are shown if they are at least 400 feet on each side. Original source maps should be consulted when precise information on mine boundaries or interior features is needed.

The mine summary sheet lists the source maps used to determine each mine outline. The completeness of map sources is indicated on the map by a line symbol at the mine boundary. Source maps are organized in five categories.

Final mine map The mine outline was digitized from an original map made from mine surveys conducted within a few months after production ceased. The date of the map and the last reported production are listed on the summary sheet.

Not a final map The mine is currently active or the mine outline was made from a map based on mine surveys conducted more than few months before production ceased. This implies the actual mined-out area is probably larger than the outline on the map. The mine summary sheet indicated the dates of source maps and the last reported production, as well as the approximate tonnage mined between these two dates (if the mine is abandoned). The summary sheet also lists the approximate acreage mined since the date of the map and, in some cases, indicates the area where additional mining may have taken place. This latter information is determined by locating on the map the active faces relative to probable boundaries of the mine property.

Undated map The source map was undated, so it may or may not be based on a final mine survey. When sufficient data are available, the probable acreage of the mined area is estimated from reported production, average seam thickness and a recovery rate comparable to other mines in the area. This information is listed in the summary sheet for the mine.

Incomplete map The source map did not show the entire mine. The summary sheet indicates the missing part of the mine map and the acreage of the unmapped area, which is estimated from the amount of coal known to have been produced from the mine.

Secondary source map The original mine map was not found so the outline shown was determined from secondary sources (e.g., outlines from small-scale regional maps published in other reports). The summary sheet describes the secondary sources.

POINTS AND LABELS

The locations of all known mine openings (shafts, slopes, and drifts) and surface mine tipples are plotted on the map. Tipples are areas where coal was cleaned, stockpiled, and loaded for shipping.

Only openings or tipples are plotted for mines without source maps. If the precise locations of these features are unknown, a special symbol is used to indicate the approximate location of the mine.

Each mine on the map is labeled with the names of the mine and operating company, ISGS mine index number, and years of operation (if known) if space permits. A seam designation is given on maps where more than one seam was mined. For a mine that operated under more than one name, only the most recent name is generally given. When a mine changed names or ownership shortly before closing, an earlier name is listed. All company and mine names are listed on the mine summary sheet in the directory, under the production history segment.

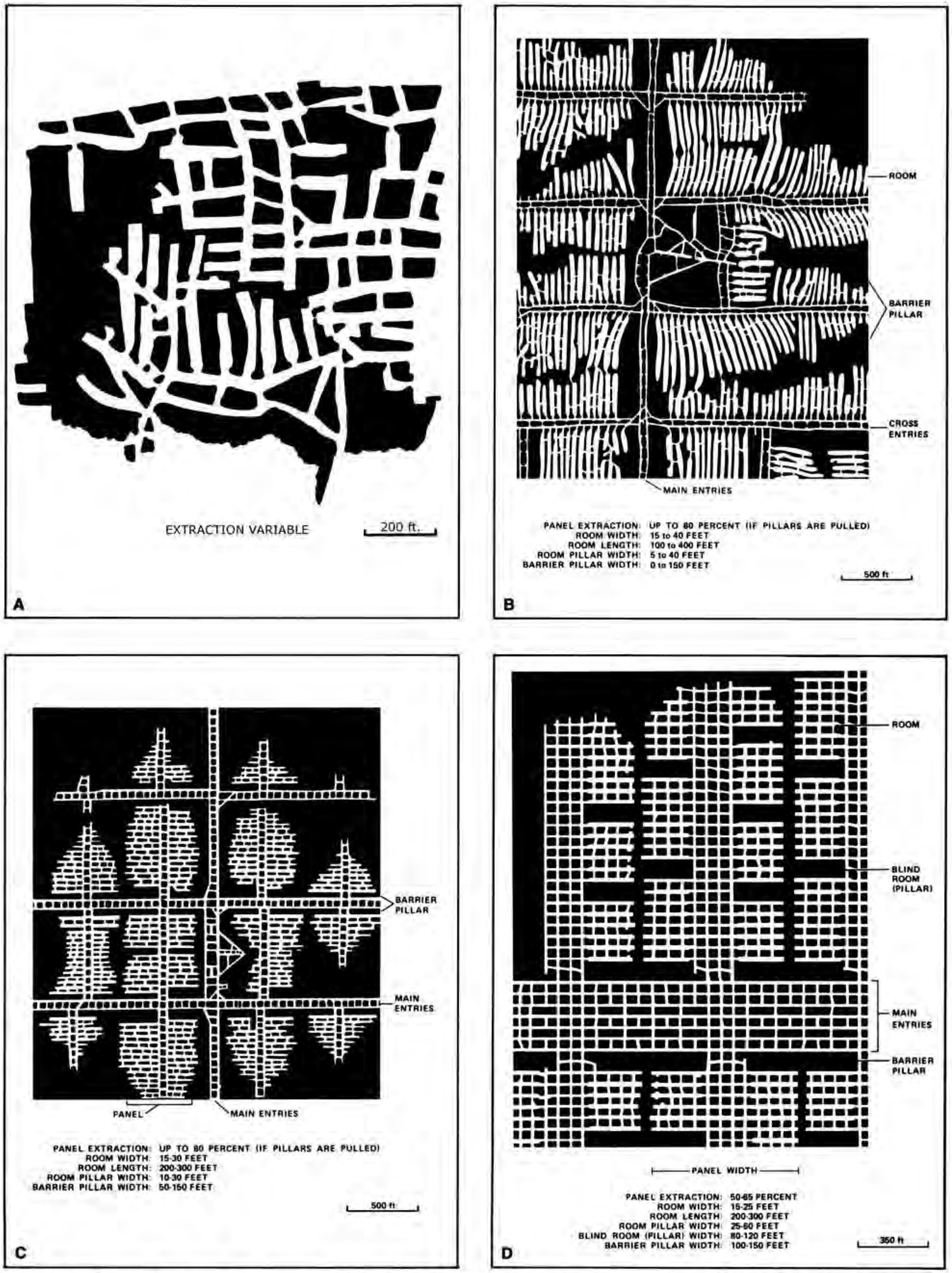


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

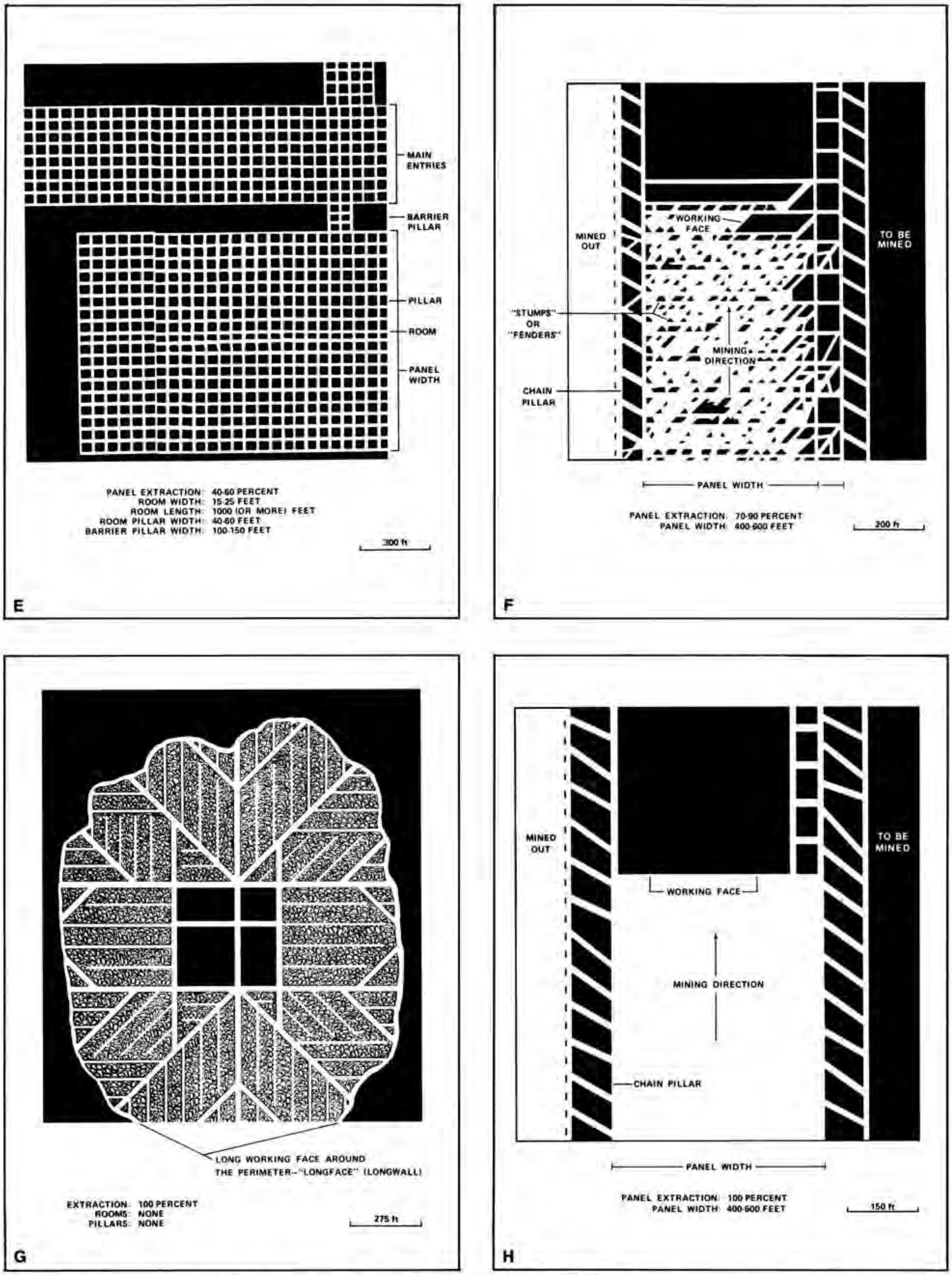


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

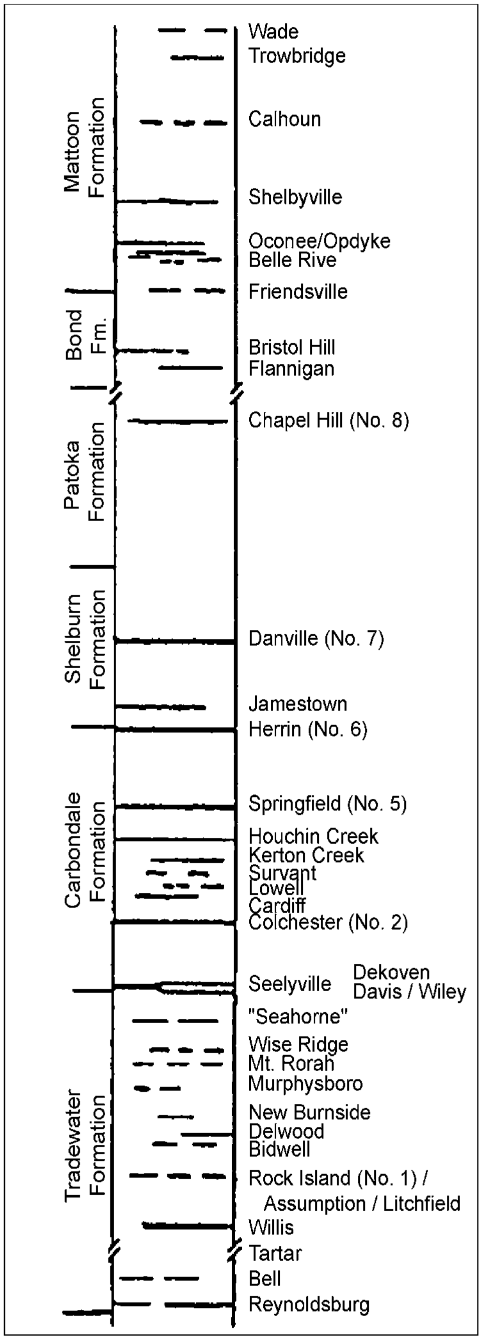


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

INTERPRETING A MINE SUMMARY SHEET

The mine summary sheet is arranged numerically by mine index number. Index numbers are shown on the map and in the mine listing. The mine summary sheet provides the following information (if available).

Company and mine name The last company or owner of the mine is used, unless no production was recorded for the last owner. In that case, the penultimate owner is listed. Mines often have no specific name; in these cases, the company name is also used as the mine name.

Type *Underground* denotes a subsurface mine in which the coal was reached through a shaft, slope, or a drift entry. *Surface* denotes a surface, open pit or strip mine.

Total mined-out acreage shown The total acreage of the mined area mapped, including any acreage mined on adjacent quadrangles, is calculated from the digitized outline of the mine. The acreage of large barrier pillars depicted on the map is excluded from the mined-out acreage. Small pillars not digitized are included in the acreage calculation. If the mine outline is not based on a final mine map, the acreage is followed by an estimate of additional acres that may have been mined. The estimate is determined from reported mine production, approximate thickness of the coal, and recovery rates calculated from nearby mines that used similar mining methods.

SHAFT, SLOPE, DRIFT OR TIPPLE LOCATIONS

Shaft, slope, drift, or tipple locations Locations of all known former entry points to underground mines or the location of coal cleaning, tipple, and shipping equipment used by the mine's facility are listed. The location is described in terms of county, township and range (Twp-Rge), section, and location within the section by quarters. NE SW NW, for instance, would describe the location in the northeast quarter of the southwest quarter of the northwest quarter. When sections are irregular in size, the quarters remain the same size and are oriented (or "registered") from the southeast corner of the section. Approximate footage from the section lines (FEL = from east line, FNL = from north line, for example) is given when that information is known; this indicates a surveyed location and is not derived from maps. Entry points are also plotted on the map and coded for the type of entry or tipple. A mine opening may have had many purposes during the life of the mine. Old hoist shafts are often later used for air and escape shafts; this information is included in the directory when known. The tipple for underground mines was generally located near the main shaft or slope. At surface mines, coal was sometimes hauled to a central tipple several miles from the mine pit.

GEOLOGY

Seam(s) mined The name of the coal seam(s) mined is listed, if known. If multiple seams were mined, they are all listed, although the mined-out area for each seam may be shown on separate maps. Figure 2 shows the stratigraphic section of the coal-bearing interval in Illinois, and the vertical relations among the coals.

Depth The depth to the top of the seam in the vicinity of the shaft is listed, if known. The depth is determined from notes made by geologists who visited the mine during its operation or from drill hole data in ISGS files. Depth generally varies little over the extent of a mine; however, reported depths for an individual mine may vary. Depth for surface-mined coals varies, and is usually represented as a range.

Thickness The approximate thickness of the mined seam is shown, if known. Thickness also comes from notes of geologists who visited the mine during its operation or from borehole data in ISGS files. Minimum, maximum, and average thicknesses are given when this information is available.

Mining method The principal mining method used at the mine (figs. 1A-H) is listed. See the mining methods section at the beginning of this directory for a discussion of this parameter.

Geologic problems reported Any known geologic problems, such as faults, water seepage, floor heaving, and unstable roof, encountered in the mine are reported. This information is from notes made by ISGS geologists who visited the mine, or from reports by mine inspectors published by the Illinois Department of Mines and Minerals, or from the source map(s). Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Production history Tons of coal produced from the mine by each mine owner are totaled. When the source map used for the mine outline is not a final mine map, the tonnage produced since the date of the map is identified. For mines that extend into adjacent quadrangles, the tonnage reported includes areas mined in adjacent quadrangles.

SOURCE OF DATA

Source map This section lists information about the map(s) used to compile the mine outline and the locations of tipples and mine openings. In some cases more than one source map was used. For example, a map drawn before the mine closed may provide better information on original areas of the mine than a later map. When more than one map was used, the bibliography section explains what information was taken from each source.

Date The date of the most recent mine survey listed on the source map is reported.

Original scale The original scale of the source map is listed. Many maps are photo-reductions and are no longer at their original scale. The original scale gives some indication of the level of detail of the mine outline and the accuracy of the mine boundary relative to surface features. Generally, the larger the scale, the greater the accuracy and detail of the mine map. Mine outlines taken from source maps at scales smaller than 1:24,000 may be highly generalized and may well be inaccurately located with respect to surface features.

Digitized scale The scale of the digitized map is reported. The scale may be different from that of the original source map. In many cases the digitized map was made from a photo-reduction of the original source map, or the source map was not in a condition suitable for digitizing and the mine boundaries were transferred to another base map.

Map type Source maps are classified into five categories to indicate the probable completeness of the map. See discussion of source maps in the previous section.

Annotated bibliography Sources that provide information about the mine are listed, with the data taken from each source. Some commonly used sources are described below. Full bibliographic references are given for all other sources. Unless otherwise noted, all sources are available for public inspection at the ISGS.

Coal Reports Published since 1881, these reports contain tabular data on mine ownership, production, employment, and accidents. Some volumes include short descriptions made by mine inspectors of physical features and conditions in selected mines.

Directory of Illinois Coal Mines This source is a compilation of basic data about Illinois coal mines, originally gathered by ISGS staff in the early 1950s. Sources used for this directory are undocumented, but they are primarily Illinois Department of Mines and Minerals annual reports, ISGS mine notes, and coal company officials.

ENR Document 85/01, Guither, H. D., J. K. Hines, and R. A. Bauer, 1985 The Economic Effect of Underground Mining Upon Land Used for Illinois Agriculture: Illinois Department of Energy and Natural Resources Document 85/01, 185 p.

Microfilm map The U.S. Bureau of Mines maintains a microfilm archive of mine maps. A microfilm file for Illinois is available for public viewing at the ISGS.

Mine notes ISGS geologists have visited mines or contacted mine officials throughout the state since the early 1900s. Notes made during these visits range from brief descriptions of the mine location to long narratives (including sketches) of mining conditions and geology.

Federal Land Bank of St. Louis, Preliminary Reports on Subsidence Investigations Mining engineers working for the Federal Land Bank of St. Louis mapped areas of subsidence due to coal mining in the early 1930s. These reports often include county maps of mine properties with mined-out areas including shaft locations, as well as subsidence areas.

REFERENCES

Bauer, R. A., B. A. Trent, and P. B. Dumontelle, 1993, Mine Subsidence in Illinois: Facts for the Homeowner Considering Insurance, Illinois State Geological Survey, Environmental Geology Note 144, 16p.

Guither, H. D., J. K. Hines, and R. A. Bauer, 1985, The Economic Effects of Underground Mining Upon Land Used for Illinois Agriculture, Illinois Department of Energy and Natural Resources Document 85/01, 185p.

Worthen, A. H., G. C. Broadhead, and E. T. Cox, 1875, Volume VI, Geology and Paleontology, Geological Survey of Illinois, Journal Company Book Print, Springfield, Illinois, 244p.

PART II DIRECTORY OF MINES IN THE OCONEE QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Oconee Quadrangle is provided. These summary sheets are arranged numerically by mine index number. Consult Part I for a complete explanation of the data listed in the summary sheet.

Mine Index 371
Oldroyd Coal Company, Penwell Mine

Type: Underground   Total mined-out acreage shown: 1,902

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft *	Christian	11N 1E	21	NW SE NE

* The mine was connected underground to Springside Mine (mine index 221) for escapement. This connection was completed in 1893, and was on the east side of the mine. After a fire in 1907, the west side of the mine was connected underground to the Pana No. 1 Mine (mine index 729) to ensure a safe escapement from either side of the mine. The source map also shows the location of booster fans in strategic locations in the mine, which allowed them to operate without the construction of air shafts separate from the main shaft.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	724-732	6.0	10.0	7.5	RPP, some HER

Geologic Problems Reported: Many slips were present in the roof, making unstable roof. Gas was present at the face and in the old workings.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Penwell Coal Company	Penwell	1888-1941	8,684,300
Victory Coal Mining Company	Penwell	1942-1944	350,573
Oldroyd Coal Company	Penwell	1944-1945	102,182
			9,137,055

Last reported production: November 1945

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351396	7-1947	1:2400	1:5297	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, geologic problems.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Christian County) - Mine type, seam, depth, thickness, geologic problems.
Microfilm map, document 351396, reel 03135, frames 482-484 - Shaft location, mine outline, mining method.

Mine Index 679
Peabody Coal Company, Peabody No. 17 Mine

Type: Underground   Total mined-out acreage shown: 3,311

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	11N 1E	28	SE NE SW
Air shaft	Christian	11N 1E	28	NE SE SW
Shaft *	Christian	10N 1E	4	SW NW SW

* This is a probable shaft location. The source map appears to indicate a shaft, and it is unlikely that a mine of this size would have only a single shaft and air shaft.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	700-713			8.0	RPP

Geologic Problems Reported: The roof was 3 to 15 feet of shale that came down readily. One roof fall was noted with about 8 feet of gray shale above the coal, and the rubble included occasional nodules over 1 foot across, and slickensided surfaces of rubble. The falls proceeded upward to the limestone above the shale. Various methods of roof support were practiced, including roof bolting, timbers, combinations of roof bolting with timbers, and top coal alone or with roof bolts or timbers. About 1.5 feet of top coal was left to support the roof. Pyrite was present in the seam in bands, lenses and nodules. The seam also had some shale bands. The product was used, unwashed, to fuel a nearby power plant, and excess slagging of the boilers indicate that impurities in the seam were higher than desired.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Peabody Coal Company	Peabody No. 17	1949-1957	15,451,943
			15,451,943

Last reported production: December 1957

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4103.C4 i5.1-13	1-1-1958	1:12000	1:12000	Final

Annotated Bibliography (data source, brief description of information)

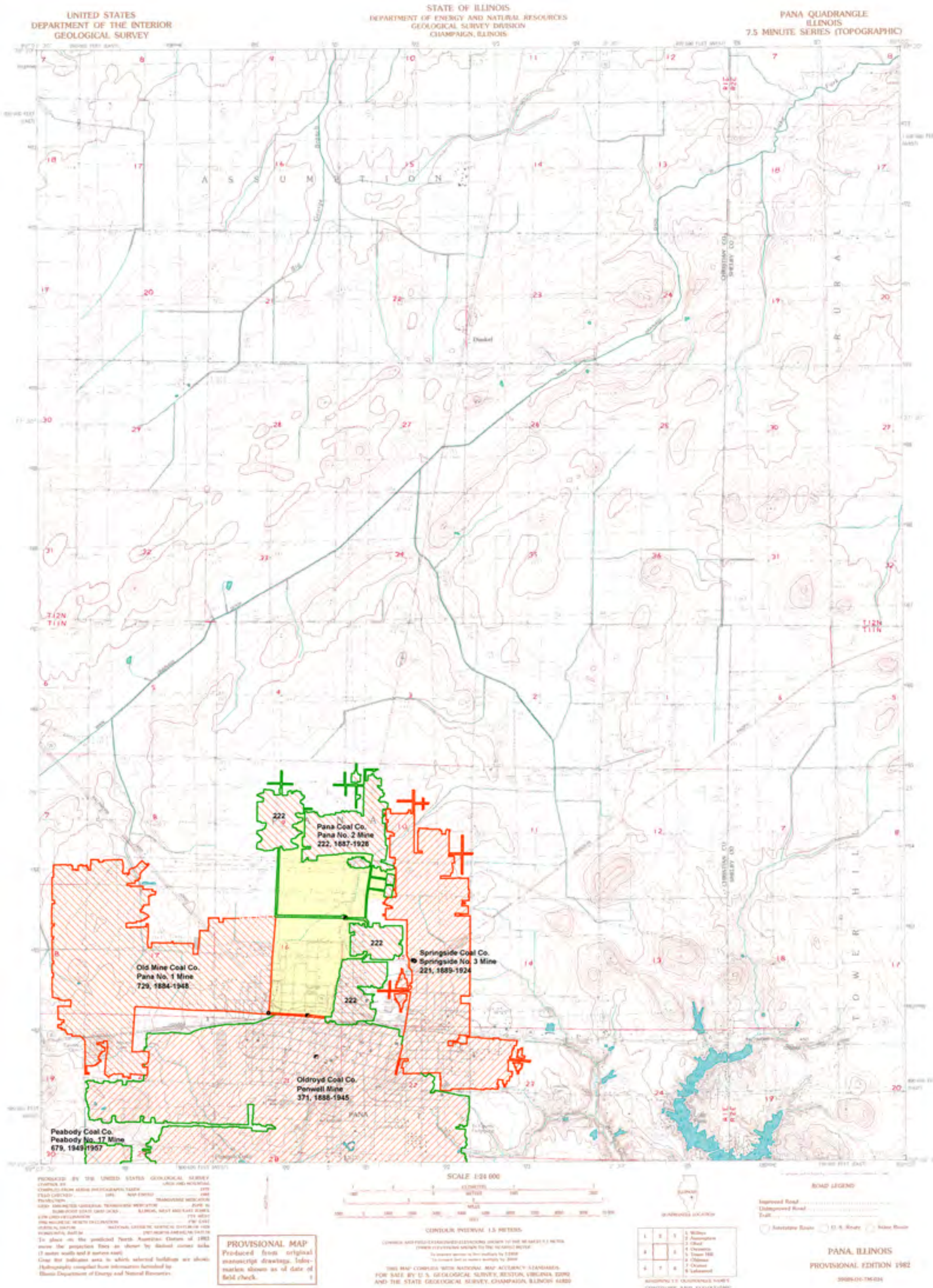
Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam, geologic problems.
Company map, ISGS map library 4103.C4 i5.1-13 - Shaft locations, mine outline, mining method.

OTHER MINES SHOWN ON OCONEE QUADRANGLE

(all mines in Shelbyville Coal, unless otherwise specified)

Mine Index 4539 SE 31-T10N-R2E source: Geology & Paleontology (Worthen, 1875)
Mine Index 4781 NE NE SE 3-T10N-R1E, drift source: ISGS field notes (S. E. Ekblaw, 10-6-1931)
Mine Index 4782 NE SE NE 3-T10N-R1E source: ISGS field notes (S. E. Ekblaw, 10-6-1931)

INDEX OF MINES IN THE OCONEE QUADRANGLE



Coal Mines in Illinois
Pana Quadrangle

Christian & Shelby Counties, Illinois

This map accompanies the Coal Mines Directory for the Pana Quadrangle. Consult the directory for a complete explanation of the information shown on this map.

Mining Method

- Room & Pillar (RP)
- Room & Pillar Basic (RPB)
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- Strip Mine Tipple - Active
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- Mine Slope - Active
- Mine Slope - Abandoned
- Mine Drift - Active
- Mine Drift - Abandoned
- Air Shaft
- Uncertain Location
- Uncertain Type of Opening

Location

Mine Annotation
(space permiting)
Company
Mine Name
ISGS Index No., Years of Operation

Disclaimer

Please check the Coal Section at the Illinois State Geological Survey's web site at http://www.isgs.illinois.edu for the most up-to-date version of these Products.

Note that each quadrangle scale mined out area map requires the use of the associated text directory for full explanation of map features and mine attributes. Also note that some quadrangles have multiple seams of mining and therefore more than one map may be available for a particular quadrangle. Please take care to check for multiple maps as extensive mining may exist in the other seams.

The maps and digital files used for these studies were compiled from data obtained from a variety of public and private sources and have varying degrees of completeness and accuracy. They present reasonable interpretations of the geology of the area and are based on available data. Locations of some features may be offset by 500 feet or more due to errors in the original source maps, the compilation process, digitizing, or a combination of these factors. These data are not intended for use in site-specific screening or decision-making. Use of these documents does not eliminate the need for detailed studies to fully understand the geology of a specific site. The Illinois State Geological Survey, Institute of Natural Resource Sustainability, or the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this data set and accept no liability for the consequences of decisions made by others on the basis of the information presented here.

These maps were designed for use at 1:24,000. Enlarging the map may reduce accuracy, as the original scale of the source maps used to compile the outlines shown varies from 1:400 to 1:150,000, and some mine locations are known only from text descriptions. See the accompanying mine directory for the original scale of the source map used for a specific mine to check accuracy of a given portion of the map. Areas with no mines shown may still be undermined; see the unlocated mines list at the back of each mine directory.

The image of the U.S.G.S. Pana Quadrangle used as a basemap was projected from the original UTM to Lambert Conformal Conic.

Illinois State Geological Survey
Coal Section

Institute of Natural Resource Sustainability
Illinois State Geological Survey
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Mine Outlines Compiled by
Jennifer M. Obrad

September 8, 2008

Appendix M

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
PANA QUADRANGLE
CHRISTIAN & SHELBY COUNTIES

Jennifer M. Obrad

Institute of Natural Resources Sustainability
ILLINOIS STATE GEOLOGICAL SURVEY
2008

Appendix M

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
PANA QUADRANGLE
CHRISTIAN & SHELBY COUNTIES

2008

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Cover photo Track-mounted duckbill loading machine at a Peabody Coal Company mine, ca. 1915.

DISCLAIMER: The accuracy and completeness of mine maps and directories vary with the availability of reliable information. Maps and other information used to compile this mine map and directory were obtained from a variety of sources and the accuracy of some of the original information cannot be verified. Consequently, the Illinois State Geological Survey (ISGS) cannot guarantee the mine maps are free of errors and disclaims any responsibility for damages that may result from actions or decisions based on them.

The ISGS updates the maps and directories periodically, and welcomes any new information or corrections. Please contact the Coal Section of the ISGS at the address shown on the title page of this directory, or telephone (217) 244-4610.

Printed by authority of the State of Illinois/2008

CONTENTS

INTRODUCTION

Coal has been mined in 76 counties of Illinois. More than 7,400 coal mines have operated since commercial mining began in Illinois about 1810; fewer than 30 are currently active. To detail the extent and location of coal mining in Illinois, the Illinois State Geological Survey (ISGS) has compiled maps and directories of known coal mines. The ISGS offers maps at a scale of 1:100,000 and accompanying directories for each county in which coal mining is known to have occurred. Maps at a scale of 1:24,000 and accompanying directories, such as this, are available for selected quadrangles. Contact the ISGS for a list of these quadrangles.

These larger scale maps show the approximate positions of mines in relation to surface features such as roads and water bodies, and indicate the mining method used and the accuracy of the mine boundaries. The maps are useful for locating mine boundaries relative to specific properties and for assessing the potential for subsidence in an area. Mine boundaries compiled from final mine surveys are generally shown within 200 feet of their true position. As a result of poor cartographic quality and inaccuracies in the original mine surveys, boundaries of some older mines may be mislocated on the map by 500 feet or more. Original mine maps should be consulted in situations that require precise delineation of mine boundaries or internal workings of mined areas.

This directory serves as a key to the accompanying mine map and provides basic information on the coal mines in the quadrangle. The directory is composed of two parts. Part I explains the symbols and patterns used on the accompanying map and the summary data presented for each mine. Part II numerically lists the mines in the quadrangle and summarizes the geology and production history of each mine. Total production for the mine, not the portion in the quadrangle, is given.

MINING IN THE PANA QUADRANGLE

The mines in this area were all located in the vicinity of the town of Pana. Mining was in the Herrin Coal seam, which is very deep in this area, at a depth of about 710 to 730 feet. Because the Herrin Coal was so deep, it was only economical for large mines to operate, given the depth of shaft that needed to be sunk. The first of the five mines to open near Pana was the Pana Coal & Mining Company (mine index 729) in 1884, which was open until 1948, one of the longest running mines. The last mine to close was the Peabody Coal Company No. 17 Mine (mine index 679), which closed in 1957.

The shale above the coal contained slips that made the roof treacherous in the mines of the Pana Quadrangle. Slabs came down without warning, and the operations often shot the roof down with the coal to avoid injuries and to make the mining process more efficient. Gas was also present in some areas, driven out of the coal by the tremendous pressure of the thick overburden.

PART I EXPLANATION OF MAP AND MINE SUMMARY SHEET

INTERPRETING THE MAP

The map accompanying this directory shows the location of coal mines known to be present in the quadrangle. The map, corresponding to a U.S. Geological Survey (USGS) 7.5-minute quadrangle, covers an area bounded by lines of latitude and longitude 7.5-minutes apart. In Illinois, a quadrangle is approximately 6.5 miles east to west and 8.5 miles north to south, an area of about 56 square miles. The ISGS generally offers one map of mines per quadrangle. In some areas where extensive mining occurred in two or more overlapping seams, separate maps are compiled for mines in each seam to maintain readability of the map.

Mine Type and Mining Method
The mine type is indicated on the map by pattern color: green represents surface mines; red and yellow represent underground mines. The red patterns are used for areas of underground mining that are documented by a primary or secondary source map. A yellow pattern is used for cases where no map of the mine workings is available, but a general area of mining can be inferred from property maps or production figures. The patterns indicate the main mining methods used in underground mines. The methods are (1) room and pillar and (2) high extraction. The method used gives some indication of the amount and pattern of coal extraction within each mined area, and has some influence on the timing and type of subsidence that can occur over a mine.

The following discussion and illustrations of mining methods are based on Guither et al. (1984).

In room-and-pillar mines, coal is removed from haulage-ways (entries) and selected areas called rooms. Pillars of unmined coal are left between the rooms to support the roof. Depending on the size of rooms and pillars, the amount of coal removed from the production areas will range from 40% to 70%.

Room and Pillar - mining is divided into six categories:

- room-and-pillar basic (RPB, fig. 1A), an early method that did not follow a preset mining plan and therefore resulted in very irregular designs;
- modified room and pillar (MRP, fig. 1B);
- room-and-pillar panel (RPP, fig. 1C);
- blind room and pillar (BRP, fig. 1D);
- checkerboard room and pillar (CRP, fig. 1E);
- room and pillar (RP), a classification used when the specific type of room-and-pillar mining is unknown.

Blind and checkerboard are the most common types of room-and-pillar mining used in Illinois today. The knowledge of room-and-pillar mining methods gives a trained engineer information on the nature of subsidence that may occur. A more extensive discussion of subsidence can be found in Bauer et al. (1993).

High-extraction   These mining methods are subdivided into high-extraction retreat (HER, Fig 1F) and longwall (LW, Fig 1G, 1H). In these methods, much of the coal is removed within well defined areas of the mine. Subsidence of the surface above these areas occurs within weeks. Once the subsidence activity ceases, the potential for further movement over these areas is low; however, subsidence may continue for several years after mining.

High-extraction retreat mining is a form of room-and-pillar mining that extracts most of the coal. Rooms and pillars are developed in the panels, and the pillars are then systematically removed (fig. 1F).

In early (pre-1960) longwall mines, mining advanced in multiple directions from a central shaft (fig. 1G). Large pillars of coal were left around the shaft, but all coal was removed beyond these pillars. Miners placed rock and wooden props and cribs in the mined-out areas to support the mine roof. The overlying rock gradually settled onto these supports, thus producing subsidence at the surface. In post-1959 longwall mines, room-and-pillar methods have been used to develop the main entries of the mine and panel areas. Modern longwall methods extract 100 percent of the coal in the panel areas (fig. 1H).

SOURCE MAPS

Mine outlines depicted on the map are, whenever possible, based on maps made from original mine surveys. The process of compiling and digitizing the quadrangle map may produce errors of less than 200 feet in the location of mine boundaries. Larger errors of 500 feet or more are possible for mines that have incomplete or inaccurate source maps.

Because of the extreme complexity of some mine maps, detailed features of mined areas have been omitted. The digitized mine boundary includes the exterior boundary of all rooms or entries that were at least 80 feet wide or protruded 500 feet from the main mining area. Unmined areas between mines are shown if they are at least 80 feet wide; unmined blocks of coal within mines are shown if they are at least 400 feet on each side. Original source maps should be consulted when precise information on mine boundaries or interior features is needed.

The mine summary sheet lists the source maps used to determine each mine outline. The completeness of map sources is indicated on the map by a line symbol at the mine boundary. Source maps are organized in five categories.

Final mine map The mine outline was digitized from an original map made from mine surveys conducted within a few months after production ceased. The date of the map and the last reported production are listed on the summary sheet.

Not a final map The mine is currently active or the mine outline was made from a map based on mine surveys conducted more than few months before production ceased. This implies the actual mined-out area is probably larger than the outline on the map. The mine summary sheet indicated the dates of source maps and the last reported production, as well as the approximate tonnage mined between these two dates (if the mine is abandoned). The summary sheet also lists the approximate acreage mined since the date of the map and, in some cases, indicates the area where additional mining may have taken place. This latter information is determined by locating on the map the active faces relative to probable boundaries of the mine property.

Undated map The source map was undated, so it may or may not be based on a final mine survey. When sufficient data are available, the probable acreage of the mined area is estimated from reported production, average seam thickness and a recovery rate comparable to other mines in the area. This information is listed in the summary sheet for the mine.

Incomplete map The source map did not show the entire mine. The summary sheet indicates the missing part of the mine map and the acreage of the unmapped area, which is estimated from the amount of coal known to have been produced from the mine.

Secondary source map The original mine map was not found so the outline shown was determined from secondary sources (e.g., outlines from small-scale regional maps published in other reports). The summary sheet describes the secondary sources.

POINTS AND LABELS

The locations of all known mine openings (shafts, slopes, and drifts) and surface mine tipples are plotted on the map. Tipples are areas where coal was cleaned, stockpiled, and loaded for shipping.

Only openings or tipples are plotted for mines without source maps. If the precise locations of these features are unknown, a special symbol is used to indicate the approximate location of the mine.

Each mine on the map is labeled with the names of the mine and operating company, ISGS mine index number, and years of operation (if known) if space permits. A seam designation is given on maps where more than one seam was mined. For a mine that operated under more than one name, only the most recent name is generally given. When a mine changed names or ownership shortly before closing, an earlier name is listed. All company and mine names are listed on the mine summary sheet in the directory, under the production history segment.

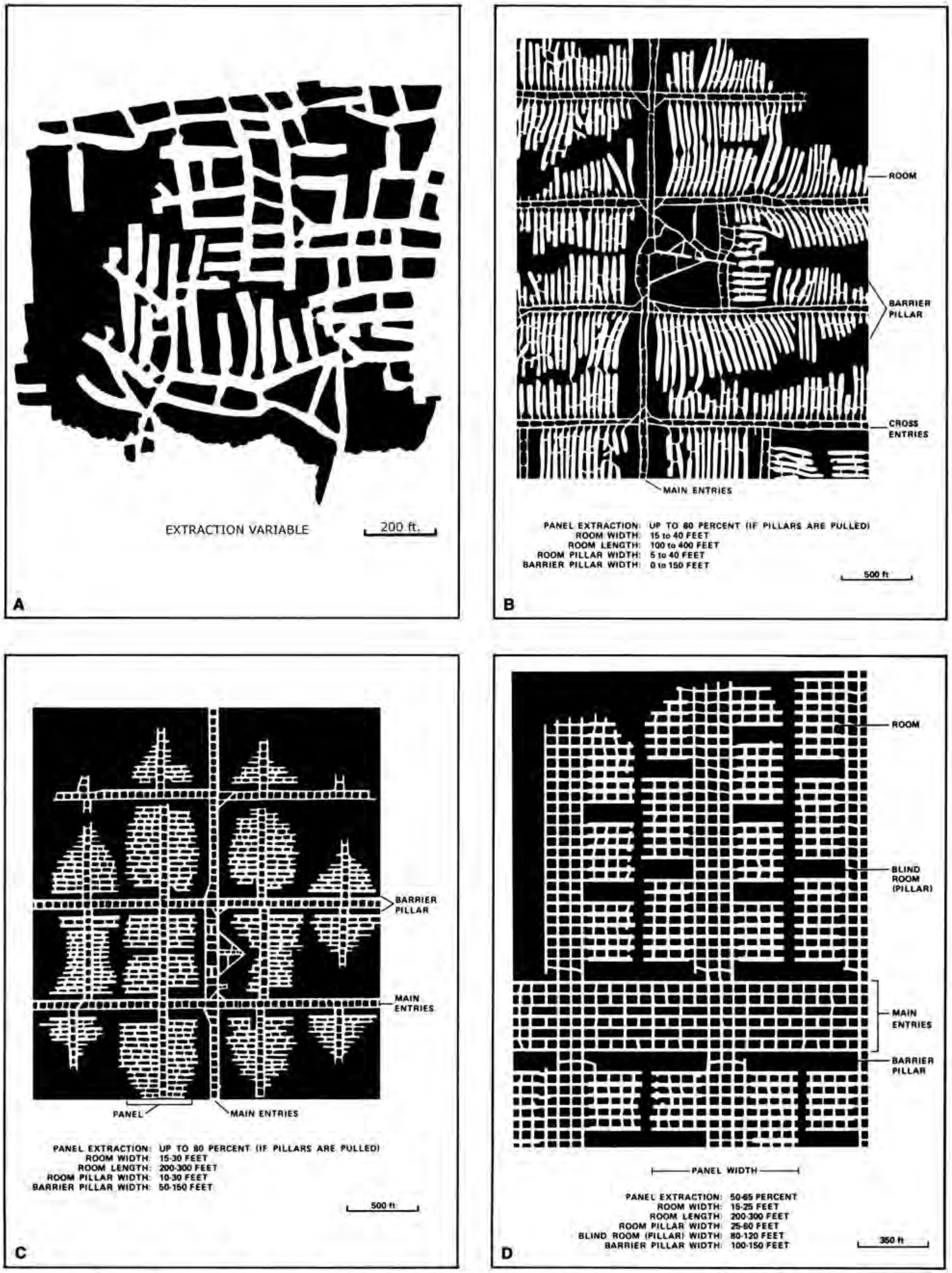


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

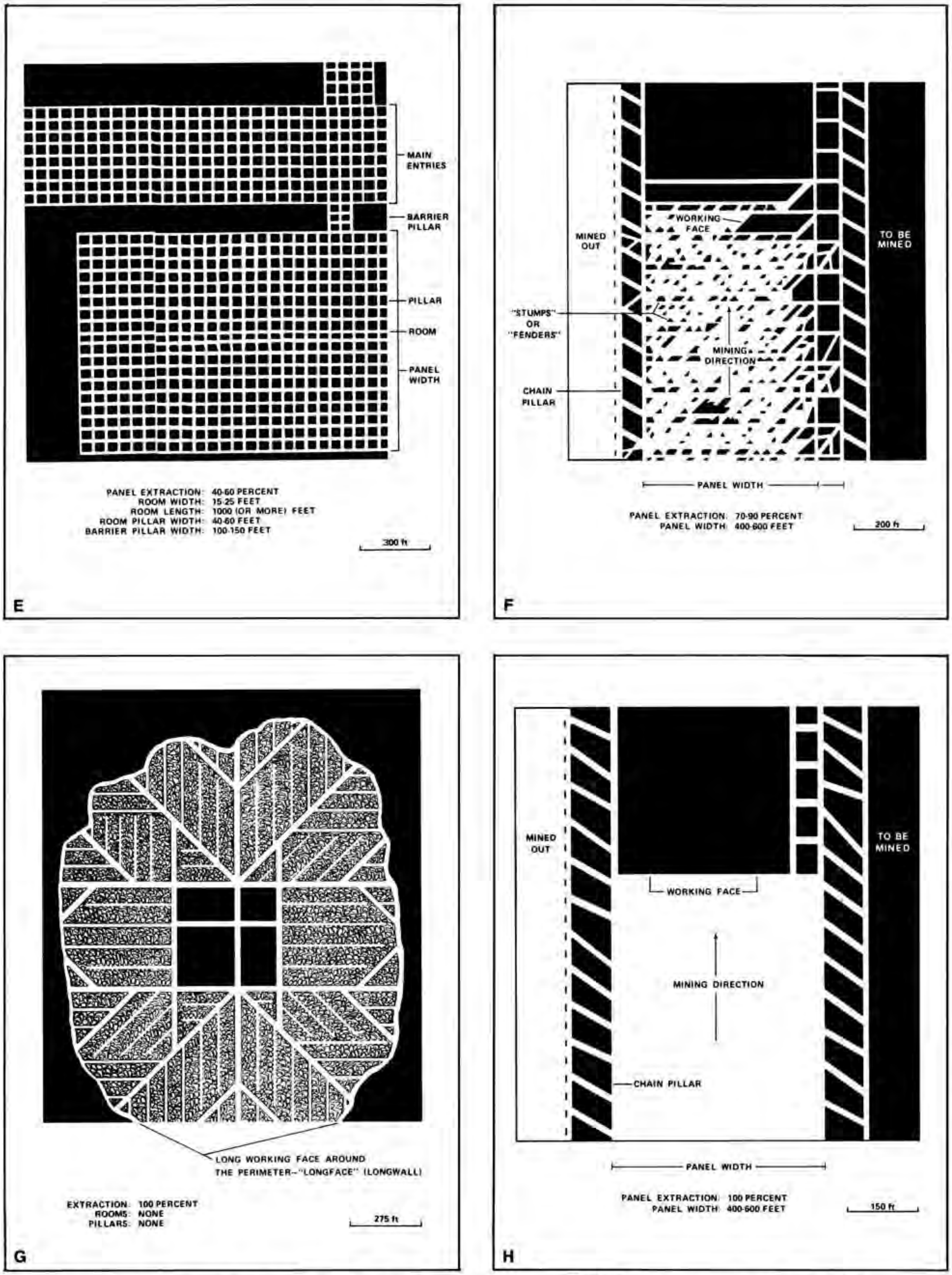


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

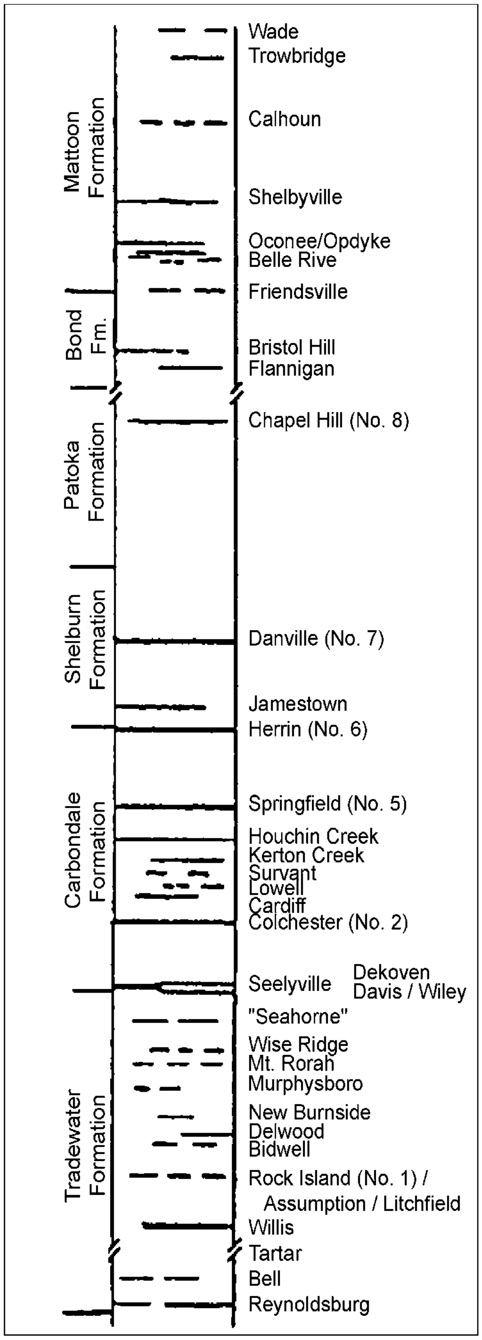


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

INTERPRETING A MINE SUMMARY SHEET

The mine summary sheet is arranged numerically by mine index number. Index numbers are shown on the map and in the mine listing. The mine summary sheet provides the following information (if available).

Company and mine name The last company or owner of the mine is used, unless no production was recorded for the last owner. In that case, the penultimate owner is listed. Mines often have no specific name; in these cases, the company name is also used as the mine name.

Type *Underground* denotes a subsurface mine in which the coal was reached through a shaft, slope, or a drift entry. *Surface* denotes a surface, open pit or strip mine.

Total mined-out acreage shown The total acreage of the mined area mapped, including any acreage mined on adjacent quadrangles, is calculated from the digitized outline of the mine. The acreage of large barrier pillars depicted on the map is excluded from the mined-out acreage. Small pillars not digitized are included in the acreage calculation. If the mine outline is not based on a final mine map, the acreage is followed by an estimate of additional acres that may have been mined. The estimate is determined from reported mine production, approximate thickness of the coal, and recovery rates calculated from nearby mines that used similar mining methods.

SHAFT, SLOPE, DRIFT OR TIPPLE LOCATIONS

Shaft, slope, drift, or tipple locations Locations of all known former entry points to underground mines or the location of coal cleaning, tipple, and shipping equipment used by the mine's facility are listed. The location is described in terms of county, township and range (Twp-Rge), section, and location within the section by quarters. NE SW NW, for instance, would describe the location in the northeast quarter of the southwest quarter of the northwest quarter. When sections are irregular in size, the quarters remain the same size and are oriented (or "registered") from the southeast corner of the section. Approximate footage from the section lines (FEL = from east line, FNL = from north line, for example) is given when that information is known; this indicates a surveyed location and is not derived from maps. Entry points are also plotted on the map and coded for the type of entry or tipple. A mine opening may have had many purposes during the life of the mine. Old hoist shafts are often later used for air and escape shafts; this information is included in the directory when known. The tipple for underground mines was generally located near the main shaft or slope. At surface mines, coal was sometimes hauled to a central tipple several miles from the mine pit.

GEOLOGY

Seam(s) mined The name of the coal seam(s) mined is listed, if known. If multiple seams were mined, they are all listed, although the mined-out area for each seam may be shown on separate maps. Figure 2 shows the stratigraphic section of the coal-bearing interval in Illinois, and the vertical relations among the coals.

Depth The depth to the top of the seam in the vicinity of the shaft is listed, if known. The depth is determined from notes made by geologists who visited the mine during its operation or from drill hole data in ISGS files. Depth generally varies little over the extent of a mine; however, reported depths for an individual mine may vary. Depth for surface-mined coals varies, and is usually represented as a range.

Thickness The approximate thickness of the mined seam is shown, if known. Thickness also comes from notes of geologists who visited the mine during its operation or from borehole data in ISGS files. Minimum, maximum, and average thicknesses are given when this information is available.

Mining method The principal mining method used at the mine (figs. 1A-H) is listed. See the mining methods section at the beginning of this directory for a discussion of this parameter.

Geologic problems reported Any known geologic problems, such as faults, water seepage, floor heaving, and unstable roof, encountered in the mine are reported. This information is from notes made by ISGS geologists who visited the mine, or from reports by mine inspectors published by the Illinois Department of Mines and Minerals, or from the source map(s). Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Production history Tons of coal produced from the mine by each mine owner are totaled. When the source map used for the mine outline is not a final mine map, the tonnage produced since the date of the map is identified. For mines that extend into adjacent quadrangles, the tonnage reported includes areas mined in adjacent quadrangles.

SOURCE OF DATA

Source map This section lists information about the map(s) used to compile the mine outline and the locations of tipples and mine openings. In some cases more than one source map was used. For example, a map drawn before the mine closed may provide better information on original areas of the mine than a later map. When more than one map was used, the bibliography section explains what information was taken from each source.

Date The date of the most recent mine survey listed on the source map is reported.

Original scale The original scale of the source map is listed. Many maps are photo-reductions and are no longer at their original scale. The original scale gives some indication of the level of detail of the mine outline and the accuracy of the mine boundary relative to surface features. Generally, the larger the scale, the greater the accuracy and detail of the mine map. Mine outlines taken from source maps at scales smaller than 1:24,000 may be highly generalized and may well be inaccurately located with respect to surface features.

Digitized scale The scale of the digitized map is reported. The scale may be different from that of the original source map. In many cases the digitized map was made from a photo-reduction of the original source map, or the source map was not in a condition suitable for digitizing and the mine boundaries were transferred to another base map.

Map type Source maps are classified into five categories to indicate the probable completeness of the map. See discussion of source maps in the previous section.

Annotated bibliography Sources that provide information about the mine are listed, with the data taken from each source. Some commonly used sources are described below. Full bibliographic references are given for all other sources. Unless otherwise noted, all sources are available for public inspection at the ISGS.

Coal Reports Published since 1881, these reports contain tabular data on mine ownership, production, employment, and accidents. Some volumes include short descriptions made by mine inspectors of physical features and conditions in selected mines.

Directory of Illinois Coal Mines This source is a compilation of basic data about Illinois coal mines, originally gathered by ISGS staff in the early 1950s. Sources used for this directory are undocumented, but they are primarily Illinois Department of Mines and Minerals annual reports, ISGS mine notes, and coal company officials.

ENR Document 85/01, Guither, H. D., J. K. Hines, and R. A. Bauer, 1985 The Economic Effect of Underground Mining Upon Land Used for Illinois Agriculture: Illinois Department of Energy and Natural Resources Document 85/01, 185 p.

Microfilm map The U.S. Bureau of Mines maintains a microfilm archive of mine maps. A microfilm file for Illinois is available for public viewing at the ISGS.

Mine notes ISGS geologists have visited mines or contacted mine officials throughout the state since the early 1900s. Notes made during these visits range from brief descriptions of the mine location to long narratives (including sketches) of mining conditions and geology.

Federal Land Bank of St. Louis, Preliminary Reports on Subsidence Investigations Mining engineers working for the Federal Land Bank of St. Louis mapped areas of subsidence due to coal mining in the early 1930s. These reports often include county maps of mine properties with mined-out areas including shaft locations, as well as subsidence areas.

REFERENCES

Bauer, R. A., B. A. Trent, and P. B. Dumontelle, 1993, Mine Subsidence in Illinois: Facts for the Homeowner Considering Insurance, Illinois State Geological Survey, Environmental Geology Note 144, 16p.

Guither, H. D., J. K. Hines, and R. A. Bauer, 1985, The Economic Effects of Underground Mining Upon Land Used for Illinois Agriculture, Illinois Department of Energy and Natural Resources Document 85/01, 185p.

PART II DIRECTORY OF MINES IN THE PANA QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Pana Quadrangle is provided. These summary sheets are arranged numerically by mine index number. Consult Part I for a complete explanation of the data listed in the summary sheet.

Mine Index 221
Springside Coal Company, Springside No. 3 Mine

Type: Underground Total mined-out acreage shown: 724 Production indicates approximately 20 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft *	Christian	11N 1E	15	NW NW SE
Air shaft	Christian	11N 1E	15	NW NW SE

* This mine was connected underground to the Penwell Mine (mine index 371) in 1893, for mutual escapement.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Thickness (ft) Max	Thickness (ft) Avg	Mining Method
Herrin	720	6.0	12.0	7.5	RPP

Geologic Problems Reported: Some gas was present; a gas explosion killed the company mine examiner in 1921. The immediate roof was 6 inches to 16 feet of black shale that had many slips. These slips made the roof unstable; it came down readily and required heavy timbering. Top coal may have been left to support the roof until the room was ready for abandonment, as evidenced by a fall of top coal causing a fatality in 1917. Above the black shale was a dark gray shale. A limestone cap rock was above the shale. Pyrite in lenses and bands was present throughout the coal, both laterally and vertically.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Springside Coal Mining Company **	Springside	1889-1903	1,405,850
Manufacturers Fuel Company	Springside	1903-1905 ***	110,503
Smith-Lohr Coal Company	Springside	1905-1922	2,361,459
Springside Coal Company	Springside No. 3	1922-1923	113,223
Springside Coal Company	Springside No. 3	1923-1924	106,760 †
			4,097,795

** Weaver Coal & Coke Company operated this mine in 1903.
*** Idle 1905
† Production after map date

Last reported production: March 1924

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, R4103.C4 i5.1-1	5-1923	1:2400	1:2400	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, geologic problems.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Company map, ISGS map library R4103.C4 i5.1-1 - Shaft locations, mine outline, mining method.

Mine Index 222
Pana Coal Company, Pana No. 2 Mine

Type: Underground   Total mined-out acreage shown: 453

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft *	Christian	11N 1E	15	SW NW NW

* This mine was connected underground to the Pana No. 1 Mine (mine index 729). The source map also shows the location of booster fans in strategic locations in the mine, which allowed them to operate without the construction of air shafts separate from the main shaft.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	714-732	6.5	8.0	7.5	MRP

Geologic Problems Reported: According to Netzeband (August 1921) in the Coal Section mine notes, "Lateral pressure is very great in this mine and posts set with a pitch of several degrees are soon pushed straight and eventually pitch in the opposite direction. The vertical pressure causes the coal to rash (chip off the ribs) and requires lagging and filling behind the lagging." The shale roof required heavy timbering, so when the shale was thin, it was shot down with the coal to leave a limestone roof. This shale varied from a well bedded (western part of mine) or massive (eastern part of mine) black shale to a dark gray massive shale. The shale varied in thickness from a feather edge to 8 feet. A brown limestone 1 to 2 feet thick was present in the eastern side of the mine. Slips were present in the shale roof and the upper part of the coal. The seam contained the usual blue band that ranged from 1/4 inch to 3/4 inches. A few slips were observed in the eastern part of the mine, with no discernible displacement. Pyrite lenses and calcite or gypsum fracture facings were present in the seam, throughout the coal both laterally and vertically. The underclay in the western part of the mine was soft and heaved when moistened. The main haulage route in that part of the mine had to be retimbered twice because of the heaving, and had already heaved another 2 feet at the time of the visit. The eastern part of the mine had a firmer clay and no trouble with heaving.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Pana Coal Company	Pana No. 2, North	1887-1902	250,000 **
Newbent Coal Company	Pana No. 2, North	1902-1905	257,965
Pana Coal Company	Pana No. 2	1905-1928	2,598,241 ***
			3,106,206

** Production was reported under Pana No. 1 Mine (mine index 729) all years except 1894.
*** Idle 1915-1917

Last reported production: March 1928

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351385	2-1948	1:2400	1:5131	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, seam, depth, thickness, geologic problems.
Microfilm map, document 351385, reel 03135, frames 439-442 - Shaft location, mine outline, mining method.

Mine Index 371
Oldroyd Coal Company, Penwell Mine

Type: Underground Total mined-out acreage shown: 1,902

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft *	Christian	11N 1E	21	NW SE NE

* The mine was connected underground to Springside Mine (mine index 221) for escapement. This connection was completed in 1893, and was on the east side of the mine. After a fire in 1907, the west side of the mine was connected underground to the Pana No. 1 Mine (mine index 729) to ensure a safe escapement from either side of the mine. The source map also shows the location of booster fans in strategic locations in the mine, which allowed them to operate without the construction of air shafts separate from the main shaft.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	724-732	6.0	10.0	7.5	RPP, some HER

Geologic Problems Reported: Many slips were present in the roof, making unstable roof. Gas was present at the face and in the old workings.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Penwell Coal Company	Penwell	1888-1941	8,684,300
Victory Coal Mining Company	Penwell	1942-1944	350,573
Oldroyd Coal Company	Penwell	1944-1945	102,182
			9,137,055

Last reported production: November 1945

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351396	7-1947	1:2400	1:5297	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, geologic problems.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Christian County) - Mine type, seam, depth, thickness, geologic problems.
Microfilm map, document 351396, reel 03135, frames 482-484 - Shaft location, mine outline, mining method.

Mine Index 679
Peabody Coal Company, Peabody No. 17 Mine

Type: Underground   Total mined-out acreage shown: 3,311

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	11N 1E	28	SE NE SW
Air shaft	Christian	11N 1E	28	NE SE SW
Shaft *	Christian	10N 1E	4	SW NW SW

* This is a probable shaft location. The source map appears to indicate a shaft, and it is unlikely that a mine of this size would have only a single shaft and air shaft.

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	700-713			8.0	RPP

Geologic Problems Reported: The roof was 3 to 15 feet of shale that came down readily. One roof fall was noted with about 8 feet of gray shale above the coal, and the rubble included occasional nodules over 1 foot across, and slickensided surfaces of rubble. The falls proceeded upward to the limestone above the shale. Various methods of roof support were practiced, including roof bolting, timbers, combinations of roof bolting with timbers, and top coal alone or with roof bolts or timbers. About 1.5 feet of top coal was left to support the roof. Pyrite was present in the seam in bands, lenses and nodules. The seam also had some shale bands. The product was used, unwashed, to fuel a nearby power plant, and excess slagging of the boilers indicate that impurities in the seam were higher than desired.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Peabody Coal Company	Peabody No. 17	1949-1957	15,451,943
			15,451,943

Last reported production: December 1957

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4103.C4 i5.1-13	1-1-1958	1:12000	1:12000	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam, geologic problems.
Company map, ISGS map library 4103.C4 i5.1-13 - Shaft locations, mine outline, mining method.

Mine Index 729
Old Mine Coal Company, Pana No. 1 Mine

Type: Underground   Total mined-out acreage shown: 1,036   Production indicates approximate 3 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (7x18)	Christian	11N 1E	16	SE SW SE
Air shaft *	Christian	11N 1E	16	SE SE SW

* Pana No. 1 Mine was connected underground to the Penwell Mine (mine index 371) by 1908, in addition to their escape shaft that was completed in 1888.

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	704-730			7.5	MRP

Geologic Problems Reported: Limestone roof covered much of the mine, but where the roof was shale, such as near the shaft bottom, the shale would weather and fall.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Pana Coal & Mining Company	Pana No. 1	1884-1941 **	7,197,197
Pana Mines Corporation	Pana No. 1	1942-1945	209,304
Old Mine Coal Company	Pana No. 1	1946-1948	124,316
Old Mine Coal Company	Pana No. 1	1948-1948	22,927 ***
			7,553,744

** Idle 1915, 1916, 1941
*** Production after map date

Last reported production: June 1948

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351385	2-1948	1:2400	1:5131	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, seam, thickness, geologic problems.
Microfilm map, document 351385, reel 03135, frames 439-442 - Shaft locations, mine outline, mining method.

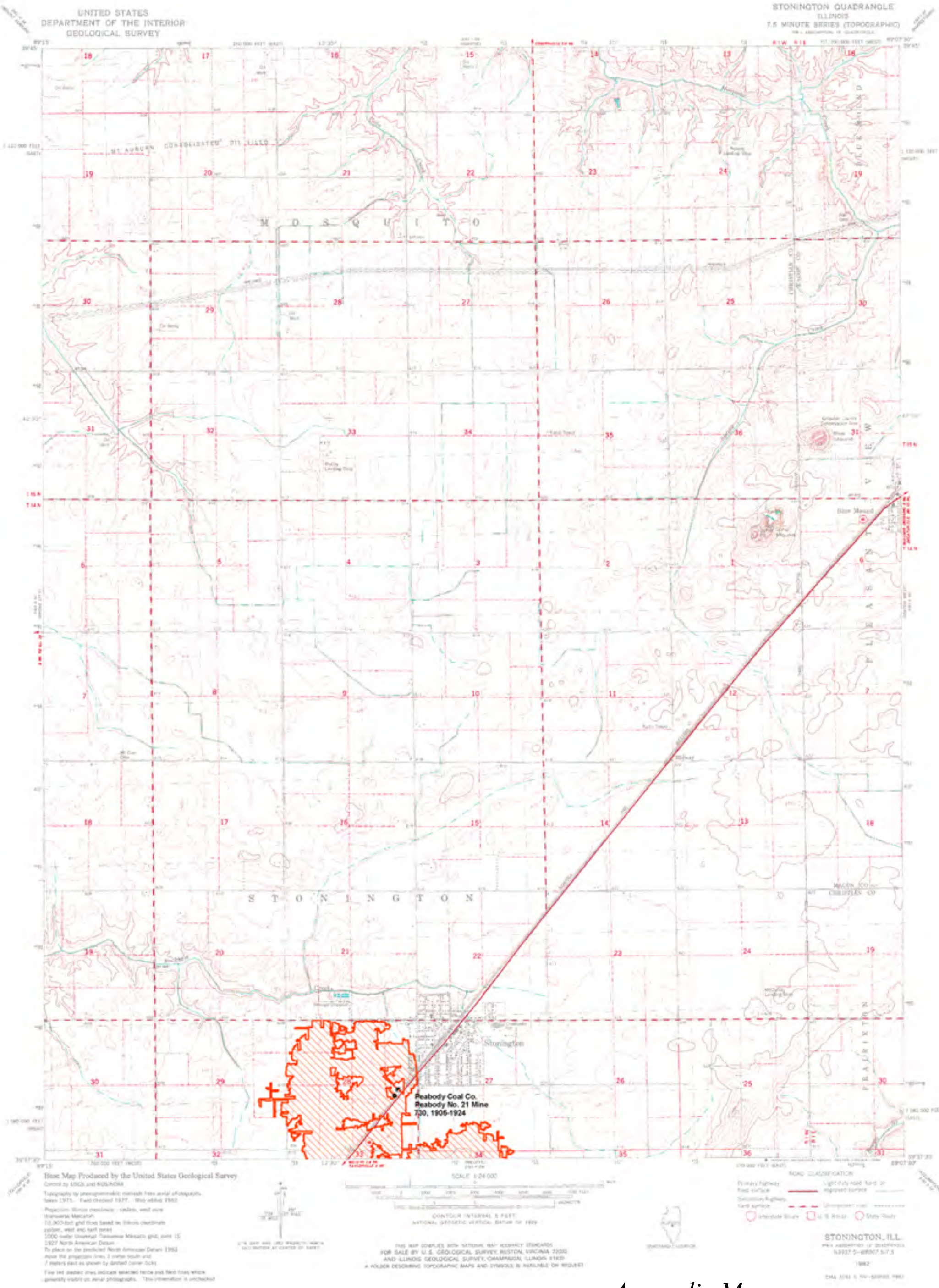
INDEX OF MINES IN THE PANA QUADRANGLE

Funding for this project was supplied by the Illinois Mine Subsidence Insurance Fund.

Coal Mines in Illinois
Stonington Quadrangle

Christian & Macon Counties, Illinois

This map accompanies the Coal Mines Directory for the Stonington Quadrangle. Consult the directory for a complete explanation of the information shown on this map.



Mining Method

- Room & Pillar (RP)
- Room & Pillar Basic (RPB)
- Modified Room & Pillar (MRP)
- Room & Pillar Panel (RPP)
- Blind Room & Pillar (BRP)
- Checkerboard Room & Pillar (CRP)
- High Extraction Retreat (HER)
- Longwall (LW)
- Underground, Method Unknown
- Strip Mine
- Auger Mine
- General Area of Mining

Source of Mine Outline

- Final Mine Map
- Not Final Mine Map
- Undated Mine Map
- Incomplete Mine Map
- Secondary Source Map

Tipple, Shaft, Slope, Drift Locations

- Strip Mine Tipple - Active
- Strip Mine Tipple - Abandoned
- Mine Shaft - Active
- Mine Shaft - Abandoned
- Mine Slope - Active
- Mine Slope - Abandoned
- Mine Drift - Active
- Mine Drift - Abandoned
- Air Shaft
- Uncertain Location
- Uncertain Type of Opening

Mine Annotation

(space permiting)
Company
Mine Name
ISGS Index No., Years of Operation

Location

DISCLAIMER

These data were compiled and digitized from the best source maps available. Locations of some features may be offset by 500 feet of more due to errors in the original source maps, the compilation process, digitizing or a combination of these factors. Documentation of the source materials used is contained in the directory that accompanies this map. It is the user's responsibility to read this documentation and understand the limitations of the data. Though efforts have been made to compile these data accurately, the Illinois State Geological Survey does not guarantee the validity or the accuracy of these data.

The image of the U.S.G.S. Stonington Quadrangle used as a basemap was projected from the original UTM to Lambert Conformal Conic.

Illinois State Geological Survey
615 E. Peabody Dr.
Champaign, IL 61820

Mine Outlines Compiled by
Jennifer M. Obrad

June 4, 2007

Appendix M

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
STONINGTON QUADRANGLE
CHRISTIAN & MACON COUNTIES

Jennifer M. Obrad

Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
2007

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
STONINGTON QUADRANGLE
CHRISTIAN & MACON COUNTIES

2007

ILLINOIS STATE GEOLOGICAL SURVEY
William Shilts, Chief

Natural Resources Building
615 East Peabody Drive
Champaign, Illinois 61820

Phone 1-217-244-4610
Fax 1-217-333-2830

Cover photo Track-mounted duckbill loading machine at a Peabody Coal Company mine, ca. 1915.

The ISGS updates the maps and directories periodically, and welcomes any new information or corrections. Please contact the Coal Section of the ISGS at the address shown on the title page of this directory, or telephone (217) 244-4610.

Printed by authority of the State of Illinois/2007

CONTENTS

INTRODUCTION

Coal has been mined in 76 counties of Illinois. More than 7,400 coal mines have operated since commercial mining began in Illinois about 1810; fewer than 30 are currently active. To detail the extent and location of coal mining in Illinois, the Illinois State Geological Survey (ISGS) has compiled maps and directories of known coal mines. The ISGS offers maps at a scale of 1:100,000 and accompanying directories for each county in which coal mining is known to have occurred. Maps at a scale of 1:24,000 and accompanying directories, such as this, are available for selected quadrangles. Contact the ISGS for a list of these quadrangles.

These larger scale maps show the approximate positions of mines in relation to surface features such as roads and water bodies, and indicate the mining method used and the accuracy of the mine boundaries. The maps are useful for locating mine boundaries relative to specific properties and for assessing the potential for subsidence in an area. Mine boundaries compiled from final mine surveys are generally shown within 200 feet of their true position. As a result of poor cartographic quality and inaccuracies in the original mine surveys, boundaries of some older mines may be mislocated on the map by 500 feet or more. Original mine maps should be consulted in situations that require precise delineation of mine boundaries or internal workings of mined areas.

This directory serves as a key to the accompanying mine map and provides basic information on the coal mines in the quadrangle. The directory is composed of two parts. Part I explains the symbols and patterns used on the accompanying map and the summary data presented for each mine. Part II numerically lists the mines in the quadrangle and summarizes the geology and production history of each mine. Total production for the mine, not the portion in the quadrangle, is given.

MINING IN THE STONINGTON QUADRANGLE

Only one mine is known to have operated near the town of Stonington. The Stonington Coal Company started mining in 1905 in the Herrin coal seam, at a depth of 460 feet. The Herrin coal, which averaged 7 feet in thickness, proved a good seam to work. In 1915, the mine became the Peabody Coal Company No. 21 mine, and it operated until 1924.

PART I EXPLANATION OF MAP AND MINE SUMMARY SHEET

INTERPRETING THE MAP

The map accompanying this directory shows the location of coal mines known to be present in the quadrangle. The map, corresponding to a U.S. Geological Survey (USGS) 7.5-minute quadrangle, covers an area bounded by lines of latitude and longitude 7.5-minutes apart. In Illinois, a quadrangle is approximately 6.5 miles east to west and 8.5 miles north to south, an area of about 56 square miles. The ISGS generally offers one map of mines per quadrangle. In some areas where extensive mining occurred in two or more overlapping seams, separate maps are compiled for mines in each seam to maintain readability of the map.

Mine Type and Mining Method
The mine type is indicated on the map by pattern color: green represents surface mines; red and yellow represent underground mines. The red patterns are used for areas of underground mining that are documented by a primary or secondary source map. A yellow pattern is used for cases where no map of the mine workings is available, but a general area of mining can be inferred from property maps or production figures. The patterns indicate the main mining methods used in underground mines. The methods are (1) room and pillar and (2) high extraction. The method used gives some indication of the amount and pattern of coal extraction within each mined area, and has some influence on the timing and type of subsidence that can occur over a mine.

The following discussion and illustrations of mining methods are based on Guither et al. (1984).

In room-and-pillar mines, coal is removed from haulage-ways (entries) and selected areas called rooms. Pillars of unmined coal are left between the rooms to support the roof. Depending on the size of rooms and pillars, the amount of coal removed from the production areas will range from 40% to 70%.

Room and Pillar - mining is divided into six categories:

- room-and-pillar basic (RPB, fig. 1A), an early method that did not follow a preset mining plan and therefore resulted in very irregular designs;
- modified room and pillar (MRP, fig. 1B);
- room-and-pillar panel (RPP, fig. 1C);
- blind room and pillar (BRP, fig. 1D);
- checkerboard room and pillar (CRP, fig. 1E);
- room and pillar (RP), a classification used when the specific type of room-and-pillar mining is unknown.

Blind and checkerboard are the most common types of room-and-pillar mining used in Illinois today. The knowledge of room-and-pillar mining methods gives a trained engineer information on the nature of subsidence that may occur. A more extensive discussion of subsidence can be found in Bauer et al. (1993).

High-extraction   These mining methods are subdivided into high-extraction retreat (HER, Fig 1F) and longwall (LW, Fig 1G, 1H). In these methods, much of the coal is removed within well defined areas of the mine. Subsidence of the surface above these areas occurs within weeks. Once the subsidence activity ceases, the potential for further movement over these areas is low; however, subsidence may continue for several years after mining.

High-extraction retreat mining is a form of room-and-pillar mining that extracts most of the coal. Rooms and pillars are developed in the panels, and the pillars are then systematically removed (fig. 1F).

In early (pre-1960) longwall mines, mining advanced in multiple directions from a central shaft (fig. 1G). Large pillars of coal were left around the shaft, but all coal was removed beyond these pillars. Miners placed rock and wooden props and cribs in the mined-out areas to support the mine roof. The overlying rock gradually settled onto these supports, thus producing subsidence at the surface. In post-1959 longwall mines, room-and-pillar methods have been used to develop the main entries of the mine and panel areas. Modern longwall methods extract 100 percent of the coal in the panel areas (fig. 1H).

SOURCE MAPS

Mine outlines depicted on the map are, whenever possible, based on maps made from original mine surveys. The process of compiling and digitizing the quadrangle map may produce errors of less than 200 feet in the location of mine boundaries. Larger errors of 500 feet or more are possible for mines that have incomplete or inaccurate source maps.

Because of the extreme complexity of some mine maps, detailed features of mined areas have been omitted. The digitized mine boundary includes the exterior boundary of all rooms or entries that were at least 80 feet wide or protruded 500 feet from the main mining area. Unmined areas between mines are shown if they are at least 80 feet wide; unmined blocks of coal within mines are shown if they are at least 400 feet on each side. Original source maps should be consulted when precise information on mine boundaries or interior features is needed.

The mine summary sheet lists the source maps used to determine each mine outline. The completeness of map sources is indicated on the map by a line symbol at the mine boundary. Source maps are organized in five categories.

Final mine map The mine outline was digitized from an original map made from mine surveys conducted within a few months after production ceased. The date of the map and the last reported production are listed on the summary sheet.

Not a final map The mine is currently active or the mine outline was made from a map based on mine surveys conducted more than few months before production ceased. This implies the actual mined-out area is probably larger than the outline on the map. The mine summary sheet indicated the dates of source maps and the last reported production, as well as the approximate tonnage mined between these two dates (if the mine is abandoned). The summary sheet also lists the approximate acreage mined since the date of the map and, in some cases, indicates the area where additional mining may have taken place. This latter information is determined by locating on the map the active faces relative to probable boundaries of the mine property.

Undated map The source map was undated, so it may or may not be based on a final mine survey. When sufficient data are available, the probable acreage of the mined area is estimated from reported production, average seam thickness and a recovery rate comparable to other mines in the area. This information is listed in the summary sheet for the mine.

Incomplete map The source map did not show the entire mine. The summary sheet indicates the missing part of the mine map and the acreage of the unmapped area, which is estimated from the amount of coal known to have been produced from the mine.

Secondary source map The original mine map was not found so the outline shown was determined from secondary sources (e.g., outlines from small-scale regional maps published in other reports). The summary sheet describes the secondary sources.

POINTS AND LABELS

The locations of all known mine openings (shafts, slopes, and drifts) and surface mine tipples are plotted on the map. Tipples are areas where coal was cleaned, stockpiled, and loaded for shipping.

Only openings or tipples are plotted for mines without source maps. If the precise locations of these features are unknown, a special symbol is used to indicate the approximate location of the mine.

Each mine on the map is labeled with the names of the mine and operating company, ISGS mine index number, and years of operation (if known) if space permits. A seam designation is given on maps where more than one seam was mined. For a mine that operated under more than one name, only the most recent name is generally given. When a mine changed names or ownership shortly before closing, an earlier name is listed. All company and mine names are listed on the mine summary sheet in the directory, under the production history segment.

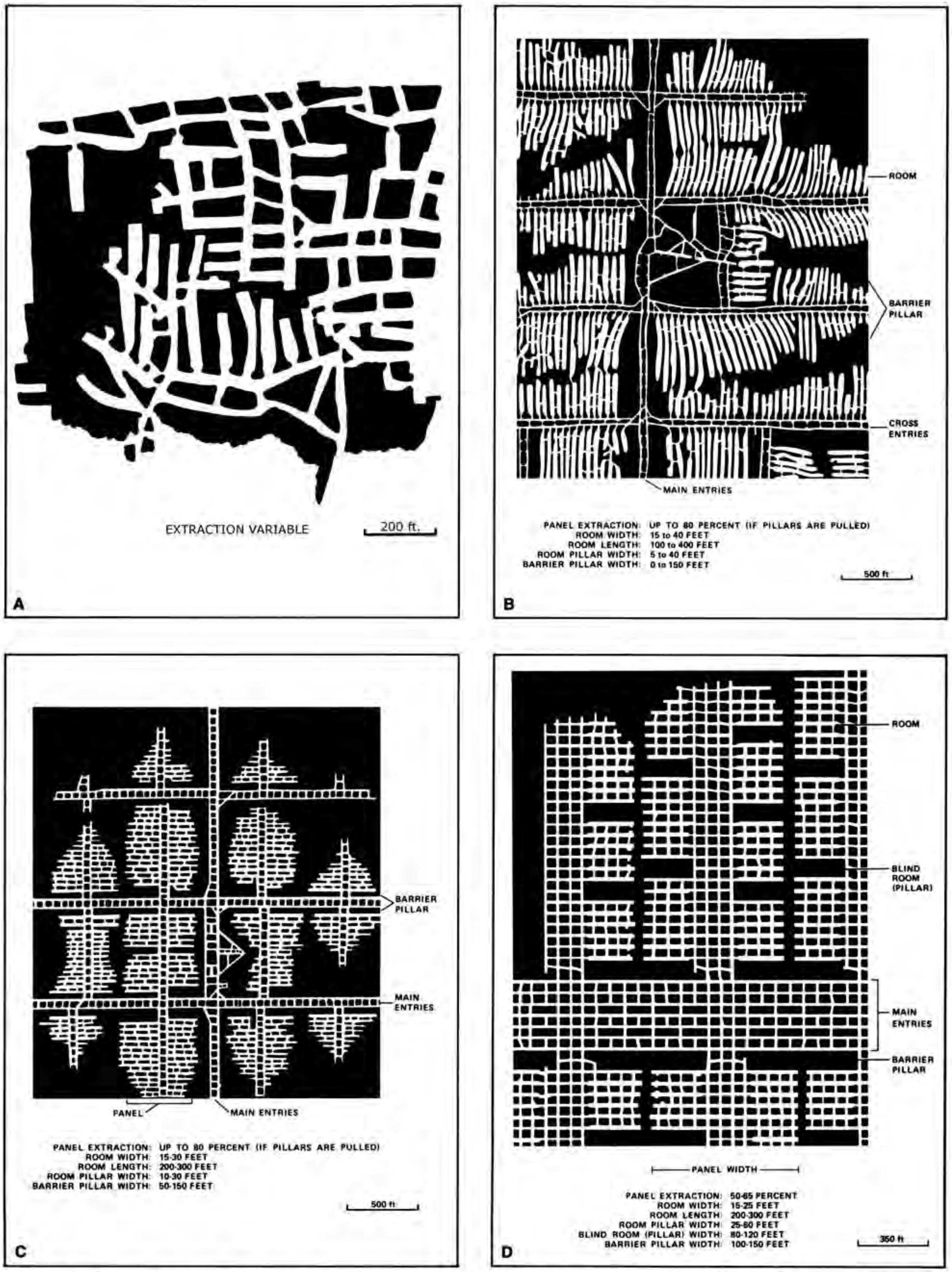


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

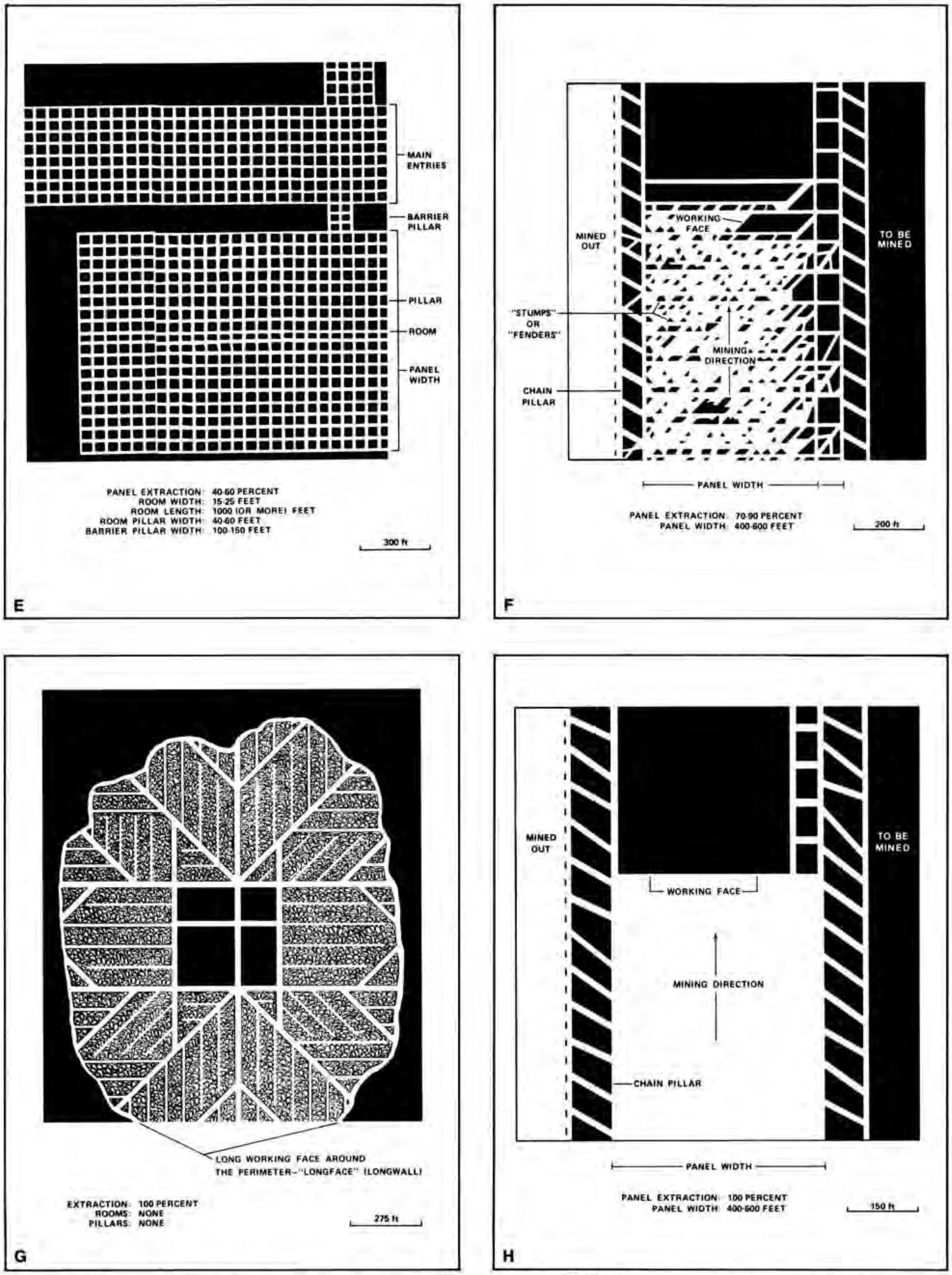


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

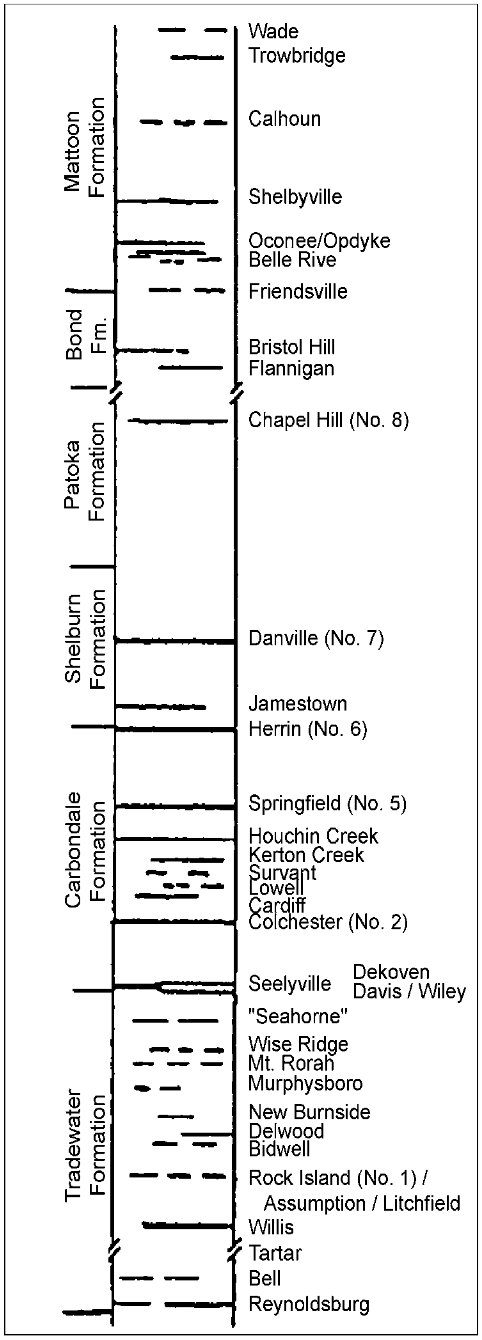


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

INTERPRETING A MINE SUMMARY SHEET

The mine summary sheet is arranged numerically by mine index number. Index numbers are shown on the map and in the mine listing. The mine summary sheet provides the following information (if available).

Company and mine name The last company or owner of the mine is used, unless no production was recorded for the last owner. In that case, the penultimate owner is listed. Mines often have no specific name; in these cases, the company name is also used as the mine name.

Type *Underground* denotes a subsurface mine in which the coal was reached through a shaft, slope, or a drift entry. *Surface* denotes a surface, open pit or strip mine.

Total mined-out acreage shown The total acreage of the mined area mapped, including any acreage mined on adjacent quadrangles, is calculated from the digitized outline of the mine. The acreage of large barrier pillars depicted on the map is excluded from the mined-out acreage. Small pillars not digitized are included in the acreage calculation. If the mine outline is not based on a final mine map, the acreage is followed by an estimate of additional acres that may have been mined. The estimate is determined from reported mine production, approximate thickness of the coal, and recovery rates calculated from nearby mines that used similar mining methods.

SHAFT, SLOPE, DRIFT OR TIPPLE LOCATIONS

Shaft, slope, drift, or tipple locations Locations of all known former entry points to underground mines or the location of coal cleaning, tipple, and shipping equipment used by the mine's facility are listed. The location is described in terms of county, township and range (Twp-Rge), section, and location within the section by quarters. NE SW NW, for instance, would describe the location in the northeast quarter of the southwest quarter of the northwest quarter. When sections are irregular in size, the quarters remain the same size and are oriented (or "registered") from the southeast corner of the section. Approximate footage from the section lines (FEL = from east line, FNL = from north line, for example) is given when that information is known; this indicates a surveyed location and is not derived from maps. Entry points are also plotted on the map and coded for the type of entry or tipple. A mine opening may have had many purposes during the life of the mine. Old hoist shafts are often later used for air and escape shafts; this information is included in the directory when known. The tipple for underground mines was generally located near the main shaft or slope. At surface mines, coal was sometimes hauled to a central tipple several miles from the mine pit.

GEOLOGY

Seam(s) mined The name of the coal seam(s) mined is listed, if known. If multiple seams were mined, they are all listed, although the mined-out area for each seam may be shown on separate maps. Figure 2 shows the stratigraphic section of the coal-bearing interval in Illinois, and the vertical relations among the coals.

Depth The depth to the top of the seam in the vicinity of the shaft is listed, if known. The depth is determined from notes made by geologists who visited the mine during its operation or from drill hole data in ISGS files. Depth generally varies little over the extent of a mine; however, reported depths for an individual mine may vary. Depth for surface-mined coals varies, and is usually represented as a range.

Thickness The approximate thickness of the mined seam is shown, if known. Thickness also comes from notes of geologists who visited the mine during its operation or from borehole data in ISGS files. Minimum, maximum, and average thicknesses are given when this information is available.

Mining method The principal mining method used at the mine (figs. 1A-H) is listed. See the mining methods section at the beginning of this directory for a discussion of this parameter.

Geologic problems reported Any known geologic problems, such as faults, water seepage, floor heaving, and unstable roof, encountered in the mine are reported. This information is from notes made by ISGS geologists who visited the mine, or from reports by mine inspectors published by the Illinois Department of Mines and Minerals, or from the source map(s). Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Production history Tons of coal produced from the mine by each mine owner are totaled. When the source map used for the mine outline is not a final mine map, the tonnage produced since the date of the map is identified. For mines that extend into adjacent quadrangles, the tonnage reported includes areas mined in adjacent quadrangles.

SOURCE OF DATA

Source map This section lists information about the map(s) used to compile the mine outline and the locations of tipples and mine openings. In some cases more than one source map was used. For example, a map drawn before the mine closed may provide better information on original areas of the mine than a later map. When more than one map was used, the bibliography section explains what information was taken from each source.

Date The date of the most recent mine survey listed on the source map is reported.

Original scale The original scale of the source map is listed. Many maps are photo-reductions and are no longer at their original scale. The original scale gives some indication of the level of detail of the mine outline and the accuracy of the mine boundary relative to surface features. Generally, the larger the scale, the greater the accuracy and detail of the mine map. Mine outlines taken from source maps at scales smaller than 1:24,000 may be highly generalized and may well be inaccurately located with respect to surface features.

Digitized scale The scale of the digitized map is reported. The scale may be different from that of the original source map. In many cases the digitized map was made from a photo-reduction of the original source map, or the source map was not in a condition suitable for digitizing and the mine boundaries were transferred to another base map.

Map type Source maps are classified into five categories to indicate the probable completeness of the map. See discussion of source maps in the previous section.

Annotated bibliography Sources that provide information about the mine are listed, with the data taken from each source. Some commonly used sources are described below. Full bibliographic references are given for all other sources. Unless otherwise noted, all sources are available for public inspection at the ISGS.

Coal Reports Published since 1881, these reports contain tabular data on mine ownership, production, employment, and accidents. Some volumes include short descriptions made by mine inspectors of physical features and conditions in selected mines.

Directory of Illinois Coal Mines This source is a compilation of basic data about Illinois coal mines, originally gathered by ISGS staff in the early 1950s. Sources used for this directory are undocumented, but they are primarily Illinois Department of Mines and Minerals annual reports, ISGS mine notes, and coal company officials.

ENR Document 85/01, Guither, H. D., J. K. Hines, and R. A. Bauer, 1985 The Economic Effect of Underground Mining Upon Land Used for Illinois Agriculture: Illinois Department of Energy and Natural Resources Document 85/01, 185 p.

Microfilm map The U.S. Bureau of Mines maintains a microfilm archive of mine maps. A microfilm file for Illinois is available for public viewing at the ISGS.

Mine notes ISGS geologists have visited mines or contacted mine officials throughout the state since the early 1900s. Notes made during these visits range from brief descriptions of the mine location to long narratives (including sketches) of mining conditions and geology.

Federal Land Bank of St. Louis, Preliminary Reports on Subsidence Investigations Mining engineers working for the Federal Land Bank of St. Louis mapped areas of subsidence due to coal mining in the early 1930s. These reports often include county maps of mine properties with mined-out areas including shaft locations, as well as subsidence areas.

REFERENCES

Bauer, R. A., B. A. Trent, and P. B. Dumontelle, 1993, Mine Subsidence in Illinois: Facts for the Homeowner Considering Insurance, Illinois State Geological Survey, Environmental Geology Note 144, 16p.

Guither, H. D., J. K. Hines, and R. A. Bauer, 1985, The Economic Effects of Underground Mining Upon Land Used for Illinois Agriculture, Illinois Department of Energy and Natural Resources Document 85/01, 185p.

PART II DIRECTORY OF MINES IN THE STONINGTON QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Stonington Quadrangle is provided. The summary sheets are arranged numerically by mine index number. Consult Part I for a complete explanation of the data listed in the summary sheet.

Mine Index 730
Peabody Coal Company, Peabody No. 21 Mine

Type: Underground   Total mined-out acreage shown: 814   Production indicates approximately 20 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	14N 1W	28	NW NE SE
Air shaft	Christian	14N 1W	28	NW NE SE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	460	5.7	7.5	7.0	MRP

Geologic Problems Reported: Gas explosions resulted in 4 deaths. In 1908, a room had "seven feet of gas overhead", and the mine was noted as having a lot of gas in a 1909 visit. Some small faults were observed. The roof was 0 to 3 feet of shale overlain by 0 to 14 feet of limestone. Pyrite bands were noted in the coal.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Stonington Coal Company	Stonington	1905-1915	1,665,925
Peabody Coal Company	Peabody No. 21	1915-1924	2,717,693
Peabody Coal Company	Peabody No. 21	1924-1924	115,012 *
			4,498,630

* Production after map date

Last reported production: April 1924

SOURCES OF DATA

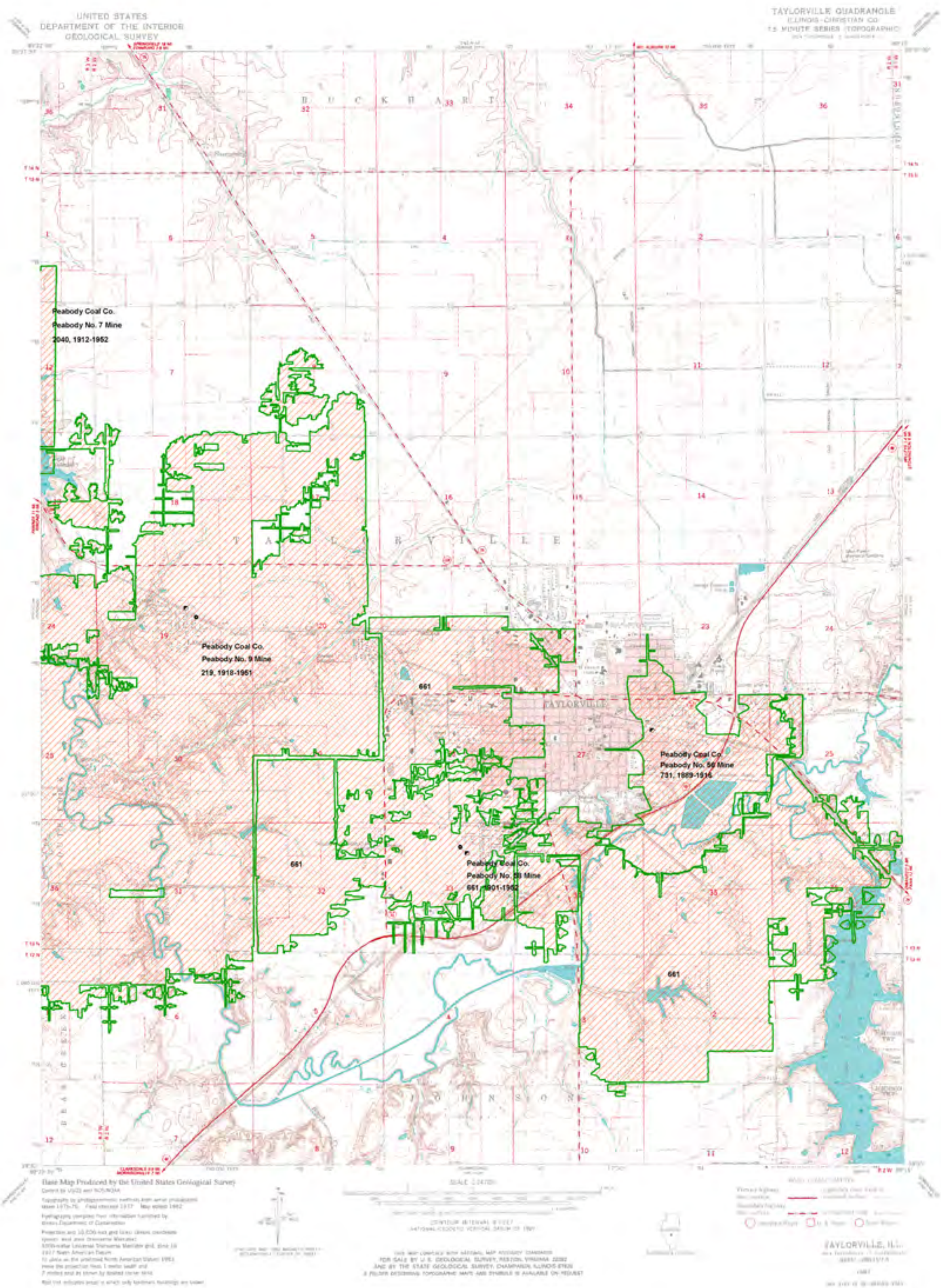
Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4103.C4 i5.1-8	1-15-1924	1:2400	1:2400	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, geologic problems.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Company map, ISGS map library 4103.C4 i5.1-8 - Shaft locations, mine outline, mining method.

INDEX OF MINES IN THE STONINGTON QUADRANGLE

Funding for this project was supplied by the Illinois Mine Subsidence Insurance Fund.



Coal Mines in Illinois
Taylorville Quadrangle
Christian County, Illinois

This map accompanies the Coal Mines Directory for the Taylorville Quadrangle. Consult the directory for a complete explanation of the information shown on this map.

Mining Method
- Room & Pillar (RP)
- Room & Pillar Basic (RPB)
- Modified Room & Pillar (MRP)
- Room & Pillar Panel (RPP)
- Blind Room & Pillar (BRP)
- Checkerboard Room & Pillar (CRP)
- High Extraction Retreat (HER)
- Longwall (LW)
- Underground, Method Unknown
- Strip Mine
- Auger Mine
- General Area of Mining

Source of Mine Outline
- Final Mine Map
- Not Final Mine Map
- Undated Mine Map
- Incomplete Mine Map
- Secondary Source Map

Tipple, Shaft, Slope, Drift Locations
- Strip Mine Tipple - Active
- Strip Mine Tipple - Abandoned
- Mine Shaft - Active
- Mine Shaft - Abandoned
- Mine Slope - Active
- Mine Slope - Abandoned
- Mine Drift - Active
- Mine Drift - Abandoned
- Air Shaft
- Uncertain Location
- Uncertain Type of Opening

Mine Annotation
(space permiting)
Company
Mine Name
ISGS Index No., Years of Operation

Location


DISCLAIMER

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The image of the U.S.G.S. Taylorville Quadrangle used as a basemap was projected from the original UTM to Lambert Conformal Conic.

Illinois State Geological Survey
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Champaign, IL 61820

Mine Outlines Compiled by
Jennifer M. Obrad

September 24, 2007

Appendix M

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
TAYLORVILLE QUADRANGLE
CHRISTIAN COUNTY

Jennifer M. Obrad

Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
2007

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
TAYLORVILLE QUADRANGLE
CHRISTIAN COUNTY

2007

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Cover photo Track-mounted duckbill loading machine at a Peabody Coal Company mine, ca. 1915.

The ISGS updates the maps and directories periodically, and welcomes any new information or corrections. Please contact the Coal Section of the ISGS at the address shown on the title page of this directory, or telephone (217) 244-4610.

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CONTENTS

INTRODUCTION

Coal has been mined in 76 counties of Illinois. More than 7,400 coal mines have operated since commercial mining began in Illinois about 1810; fewer than 30 are currently active. To detail the extent and location of coal mining in Illinois, the Illinois State Geological Survey (ISGS) has compiled maps and directories of known coal mines. The ISGS offers maps at a scale of 1:100,000 and accompanying directories for each county in which coal mining is known to have occurred. Maps at a scale of 1:24,000 and accompanying directories, such as this, are available for selected quadrangles. Contact the ISGS for a list of these quadrangles.

These larger scale maps show the approximate positions of mines in relation to surface features such as roads and water bodies, and indicate the mining method used and the accuracy of the mine boundaries. The maps are useful for locating mine boundaries relative to specific properties and for assessing the potential for subsidence in an area. Mine boundaries compiled from final mine surveys are generally shown within 200 feet of their true position. As a result of poor cartographic quality and inaccuracies in the original mine surveys, boundaries of some older mines may be mislocated on the map by 500 feet or more. Original mine maps should be consulted in situations that require precise delineation of mine boundaries or internal workings of mined areas.

This directory serves as a key to the accompanying mine map and provides basic information on the coal mines in the quadrangle. The directory is composed of two parts. Part I explains the symbols and patterns used on the accompanying map and the summary data presented for each mine. Part II numerically lists the mines in the quadrangle and summarizes the geology and production history of each mine. Total production for the mine, not the portion in the quadrangle, is given.

MINING IN THE TAYLORVILLE QUADRANGLE

Mining in this area occurred in the deep Herrin Coal. In this area, the Herrin Coal is 350 to almost 500 feet deep, and averages about 7 feet in thickness. This thickness of coal helped to justify going to such great depths to extract coal in this area. Some geologic problems were reported in these mines, but none were so severe as to bring about the closing of a mine.

Since the coal was so deep, sinking a shaft here was a major undertaking, and as such, the mines operated for long periods of time and extracted large amounts of coal. The earliest mining began in 1889 at the Taylorville No. 1 Mine (mine index 731), and mining continued until Peabody Coal Company closed their Nos. 58 (mine index 661) and 7 (mine index 2040) in the spring of 1952.

PART I EXPLANATION OF MAP AND MINE SUMMARY SHEET

INTERPRETING THE MAP

The map accompanying this directory shows the location of coal mines known to be present in the quadrangle. The map, corresponding to a U.S. Geological Survey (USGS) 7.5-minute quadrangle, covers an area bounded by lines of latitude and longitude 7.5-minutes apart. In Illinois, a quadrangle is approximately 6.5 miles east to west and 8.5 miles north to south, an area of about 56 square miles. The ISGS generally offers one map of mines per quadrangle. In some areas where extensive mining occurred in two or more overlapping seams, separate maps are compiled for mines in each seam to maintain readability of the map.

Mine Type and Mining Method
The mine type is indicated on the map by pattern color: green represents surface mines; red and yellow represent underground mines. The red patterns are used for areas of underground mining that are documented by a primary or secondary source map. A yellow pattern is used for cases where no map of the mine workings is available, but a general area of mining can be inferred from property maps or production figures. The patterns indicate the main mining methods used in underground mines. The methods are (1) room and pillar and (2) high extraction. The method used gives some indication of the amount and pattern of coal extraction within each mined area, and has some influence on the timing and type of subsidence that can occur over a mine.

The following discussion and illustrations of mining methods are based on Guither et al. (1984).

In room-and-pillar mines, coal is removed from haulage-ways (entries) and selected areas called rooms. Pillars of unmined coal are left between the rooms to support the roof. Depending on the size of rooms and pillars, the amount of coal removed from the production areas will range from 40% to 70%.

Room and Pillar - mining is divided into six categories:
- room-and-pillar basic (RPB, fig. 1A), an early method that did not follow a preset mining plan and therefore resulted in very irregular designs;
- modified room and pillar (MRP, fig. 1B);
- room-and-pillar panel (RPP, fig. 1C);
- blind room and pillar (BRP, fig. 1D);
- checkerboard room and pillar (CRP, fig. 1E);
- room and pillar (RP), a classification used when the specific type of room-and-pillar mining is unknown.

Blind and checkerboard are the most common types of room-and-pillar mining used in Illinois today. The knowledge of room-and-pillar mining methods gives a trained engineer information on the nature of subsidence that may occur. A more extensive discussion of subsidence can be found in Bauer et al. (1993).

High-extraction These mining methods are subdivided into high-extraction retreat (HER, Fig 1F) and longwall (LW, Fig 1G, 1H). In these methods, much of the coal is removed within well defined areas of the mine. Subsidence of the surface above these areas occurs within weeks. Once the subsidence activity ceases, the potential for further movement over these areas is low; however, subsidence may continue for several years after mining.

High-extraction retreat mining is a form of room-and-pillar mining that extracts most of the coal. Rooms and pillars are developed in the panels, and the pillars are then systematically removed (fig. 1F).

In early (pre-1960) longwall mines, mining advanced in multiple directions from a central shaft (fig. 1G). Large pillars of coal were left around the shaft, but all coal was removed beyond these pillars. Miners placed rock and wooden props and cribs in the mined-out areas to support the mine roof. The overlying rock gradually settled onto these supports, thus producing subsidence at the surface. In post-1959 longwall mines, room-and-pillar methods have been used to develop the main entries of the mine and panel areas. Modern longwall methods extract 100 percent of the coal in the panel areas (fig. 1H).

SOURCE MAPS

Mine outlines depicted on the map are, whenever possible, based on maps made from original mine surveys. The process of compiling and digitizing the quadrangle map may produce errors of less than 200 feet in the location of mine boundaries. Larger errors of 500 feet or more are possible for mines that have incomplete or inaccurate source maps.

Because of the extreme complexity of some mine maps, detailed features of mined areas have been omitted. The digitized mine boundary includes the exterior boundary of all rooms or entries that were at least 80 feet wide or protruded 500 feet from the main mining area. Unmined areas between mines are shown if they are at least 80 feet wide; unmined blocks of coal within mines are shown if they are at least 400 feet on each side. Original source maps should be consulted when precise information on mine boundaries or interior features is needed.

The mine summary sheet lists the source maps used to determine each mine outline. The completeness of map sources is indicated on the map by a line symbol at the mine boundary. Source maps are organized in five categories.

Final mine map The mine outline was digitized from an original map made from mine surveys conducted within a few months after production ceased. The date of the map and the last reported production are listed on the summary sheet.

Not a final map The mine is currently active or the mine outline was made from a map based on mine surveys conducted more than few months before production ceased. This implies the actual mined-out area is probably larger than the outline on the map. The mine summary sheet indicated the dates of source maps and the last reported production, as well as the approximate tonnage mined between these two dates (if the mine is abandoned). The summary sheet also lists the approximate acreage mined since the date of the map and, in some cases, indicates the area where additional mining may have taken place. This latter information is determined by locating on the map the active faces relative to probable boundaries of the mine property.

Undated map The source map was undated, so it may or may not be based on a final mine survey. When sufficient data are available, the probable acreage of the mined area is estimated from reported production, average seam thickness and a recovery rate comparable to other mines in the area. This information is listed in the summary sheet for the mine.

Incomplete map The source map did not show the entire mine. The summary sheet indicates the missing part of the mine map and the acreage of the unmapped area, which is estimated from the amount of coal known to have been produced from the mine.

Secondary source map The original mine map was not found so the outline shown was determined from secondary sources (e.g., outlines from small-scale regional maps published in other reports). The summary sheet describes the secondary sources.

POINTS AND LABELS

The locations of all known mine openings (shafts, slopes, and drifts) and surface mine tipples are plotted on the map. Tipples are areas where coal was cleaned, stockpiled, and loaded for shipping.

Only openings or tipples are plotted for mines without source maps. If the precise locations of these features are unknown, a special symbol is used to indicate the approximate location of the mine.

Each mine on the map is labeled with the names of the mine and operating company, ISGS mine index number, and years of operation (if known) if space permits. A seam designation is given on maps where more than one seam was mined. For a mine that operated under more than one name, only the most recent name is generally given. When a mine changed names or ownership shortly before closing, an earlier name is listed. All company and mine names are listed on the mine summary sheet in the directory, under the production history segment.

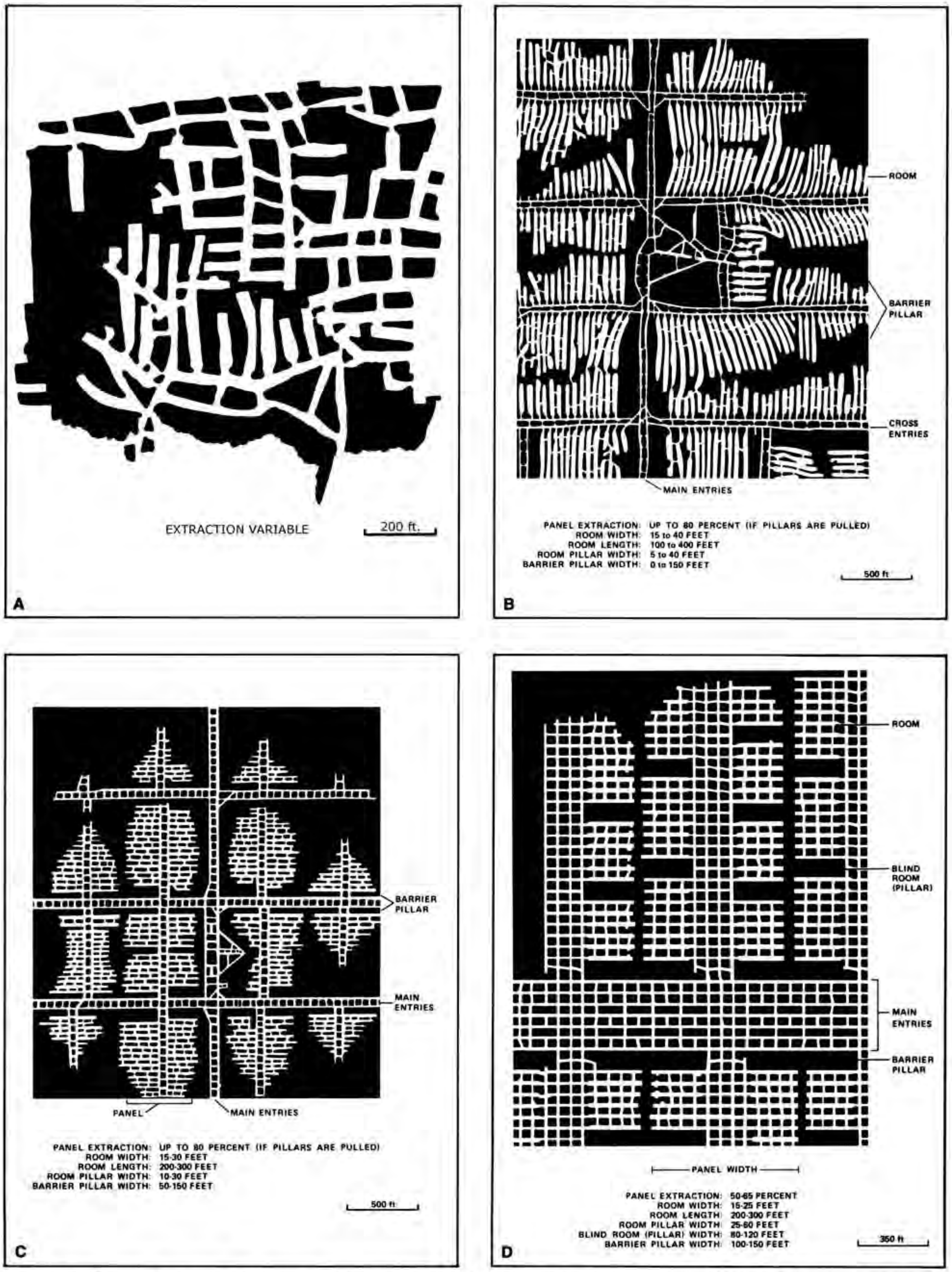


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

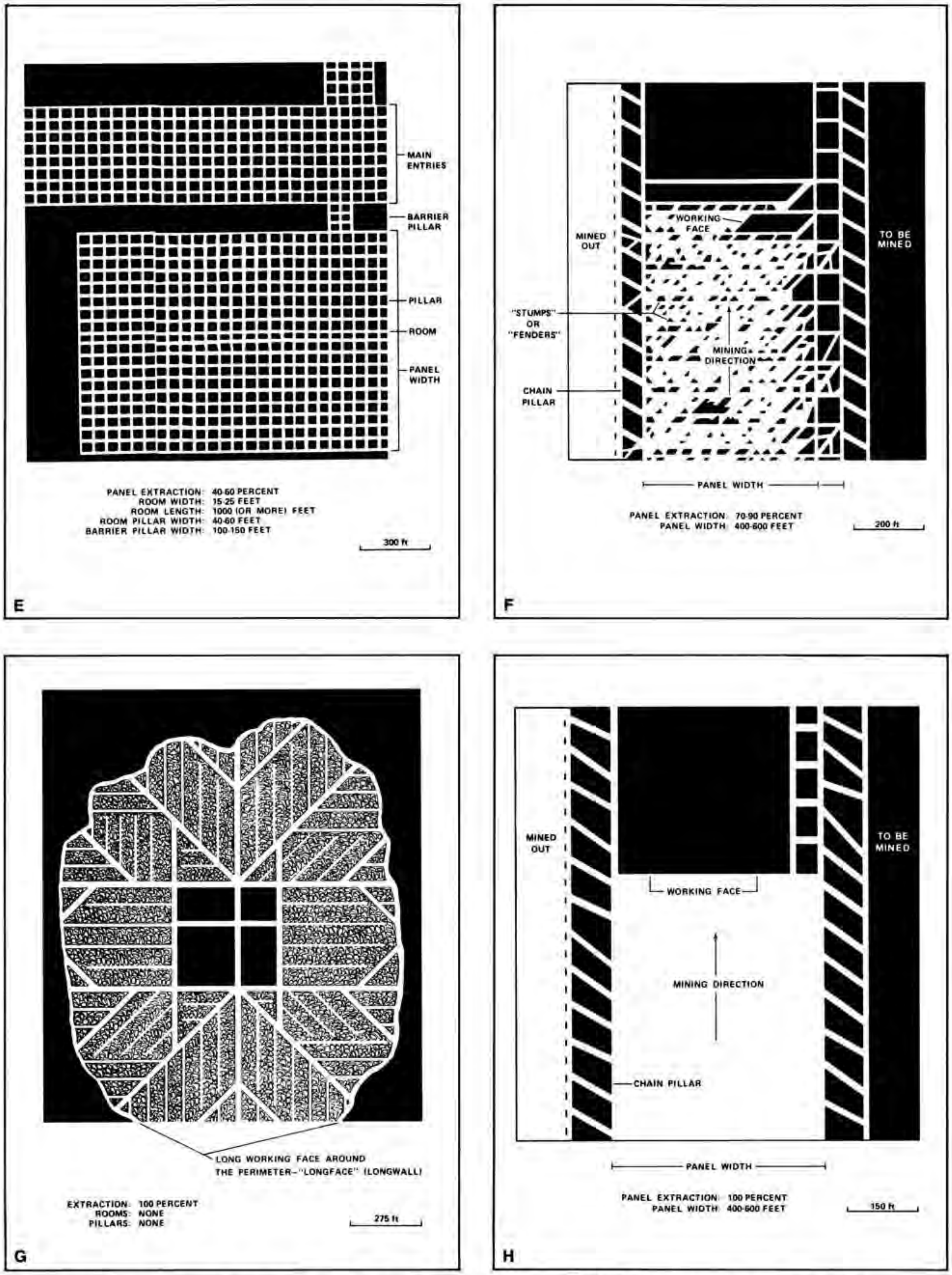


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

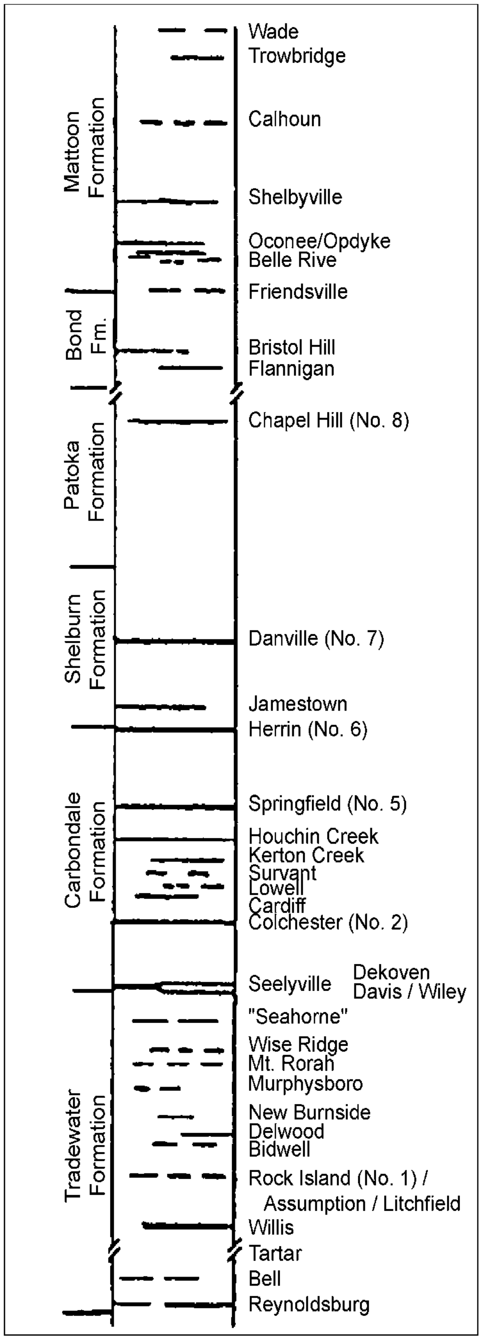


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

INTERPRETING A MINE SUMMARY SHEET

The mine summary sheet is arranged numerically by mine index number. Index numbers are shown on the map and in the mine listing. The mine summary sheet provides the following information (if available).

Company and mine name The last company or owner of the mine is used, unless no production was recorded for the last owner. In that case, the penultimate owner is listed. Mines often have no specific name; in these cases, the company name is also used as the mine name.

Type *Underground* denotes a subsurface mine in which the coal was reached through a shaft, slope, or a drift entry. *Surface* denotes a surface, open pit or strip mine.

Total mined-out acreage shown The total acreage of the mined area mapped, including any acreage mined on adjacent quadrangles, is calculated from the digitized outline of the mine. The acreage of large barrier pillars depicted on the map is excluded from the mined-out acreage. Small pillars not digitized are included in the acreage calculation. If the mine outline is not based on a final mine map, the acreage is followed by an estimate of additional acres that may have been mined. The estimate is determined from reported mine production, approximate thickness of the coal, and recovery rates calculated from nearby mines that used similar mining methods.

SHAFT, SLOPE, DRIFT OR TIPPLE LOCATIONS

Shaft, slope, drift, or tipple locations Locations of all known former entry points to underground mines or the location of coal cleaning, tipple, and shipping equipment used by the mine's facility are listed. The location is described in terms of county, township and range (Twp-Rge), section, and location within the section by quarters. NE SW NW, for instance, would describe the location in the northeast quarter of the southwest quarter of the northwest quarter. When sections are irregular in size, the quarters remain the same size and are oriented (or "registered") from the southeast corner of the section. Approximate footage from the section lines (FEL = from east line, FNL = from north line, for example) is given when that information is known; this indicates a surveyed location and is not derived from maps. Entry points are also plotted on the map and coded for the type of entry or tipple. A mine opening may have had many purposes during the life of the mine. Old hoist shafts are often later used for air and escape shafts; this information is included in the directory when known. The tipple for underground mines was generally located near the main shaft or slope. At surface mines, coal was sometimes hauled to a central tipple several miles from the mine pit.

GEOLOGY

Seam(s) mined The name of the coal seam(s) mined is listed, if known. If multiple seams were mined, they are all listed, although the mined-out area for each seam may be shown on separate maps. Figure 2 shows the stratigraphic section of the coal-bearing interval in Illinois, and the vertical relations among the coals.

Depth The depth to the top of the seam in the vicinity of the shaft is listed, if known. The depth is determined from notes made by geologists who visited the mine during its operation or from drill hole data in ISGS files. Depth generally varies little over the extent of a mine; however, reported depths for an individual mine may vary. Depth for surface-mined coals varies, and is usually represented as a range.

Thickness The approximate thickness of the mined seam is shown, if known. Thickness also comes from notes of geologists who visited the mine during its operation or from borehole data in ISGS files. Minimum, maximum, and average thicknesses are given when this information is available.

Mining method The principal mining method used at the mine (figs. 1A-H) is listed. See the mining methods section at the beginning of this directory for a discussion of this parameter.

Geologic problems reported Any known geologic problems, such as faults, water seepage, floor heaving, and unstable roof, encountered in the mine are reported. This information is from notes made by ISGS geologists who visited the mine, or from reports by mine inspectors published by the Illinois Department of Mines and Minerals, or from the source map(s). Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Production history Tons of coal produced from the mine by each mine owner are totaled. When the source map used for the mine outline is not a final mine map, the tonnage produced since the date of the map is identified. For mines that extend into adjacent quadrangles, the tonnage reported includes areas mined in adjacent quadrangles.

SOURCE OF DATA

Source map This section lists information about the map(s) used to compile the mine outline and the locations of tipples and mine openings. In some cases more than one source map was used. For example, a map drawn before the mine closed may provide better information on original areas of the mine than a later map. When more than one map was used, the bibliography section explains what information was taken from each source.

Date The date of the most recent mine survey listed on the source map is reported.

Original scale The original scale of the source map is listed. Many maps are photo-reductions and are no longer at their original scale. The original scale gives some indication of the level of detail of the mine outline and the accuracy of the mine boundary relative to surface features. Generally, the larger the scale, the greater the accuracy and detail of the mine map. Mine outlines taken from source maps at scales smaller than 1:24,000 may be highly generalized and may well be inaccurately located with respect to surface features.

Digitized scale The scale of the digitized map is reported. The scale may be different from that of the original source map. In many cases the digitized map was made from a photo-reduction of the original source map, or the source map was not in a condition suitable for digitizing and the mine boundaries were transferred to another base map.

Map type Source maps are classified into five categories to indicate the probable completeness of the map. See discussion of source maps in the previous section.

Annotated bibliography Sources that provide information about the mine are listed, with the data taken from each source. Some commonly used sources are described below. Full bibliographic references are given for all other sources. Unless otherwise noted, all sources are available for public inspection at the ISGS.

Coal Reports Published since 1881, these reports contain tabular data on mine ownership, production, employment, and accidents. Some volumes include short descriptions made by mine inspectors of physical features and conditions in selected mines.

Directory of Illinois Coal Mines This source is a compilation of basic data about Illinois coal mines, originally gathered by ISGS staff in the early 1950s. Sources used for this directory are undocumented, but they are primarily Illinois Department of Mines and Minerals annual reports, ISGS mine notes, and coal company officials.

ENR Document 85/01, Guither, H. D., J. K. Hines, and R. A. Bauer, 1985 The Economic Effect of Underground Mining Upon Land Used for Illinois Agriculture: Illinois Department of Energy and Natural Resources Document 85/01, 185 p.

Microfilm map The U.S. Bureau of Mines maintains a microfilm archive of mine maps. A microfilm file for Illinois is available for public viewing at the ISGS.

Mine notes   ISGS geologists have visited mines or contacted mine officials throughout the state since the early 1900s. Notes made during these visits range from brief descriptions of the mine location to long narratives (including sketches) of mining conditions and geology.

Federal Land Bank of St. Louis, Preliminary Reports on Subsidence Investigations Mining engineers working for the Federal Land Bank of St. Louis mapped areas of subsidence due to coal mining in the early 1930s. These reports often include county maps of mine properties with mined-out areas including shaft locations, as well as subsidence areas.

REFERENCES

Bauer, R. A., B. A. Trent, and P. B. Dumontelle, 1993, Mine Subsidence in Illinois: Facts for the Homeowner Considering Insurance, Illinois State Geological Survey, Environmental Geology Note 144, 16p.

Guither, H. D., J. K. Hines, and R. A. Bauer, 1985, The Economic Effects of Underground Mining Upon Land Used for Illinois Agriculture, Illinois Department of Energy and Natural Resources Document 85/01, 185p.

PART II DIRECTORY OF MINES IN THE TAYLORVILLE QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Taylorville Quadrangle is provided. These summary sheets are arranged numerically by mine index number. Consult Part I for a complete explanation of the data listed in the summary sheet.

Mine Index 219
Peabody Coal Company, Peabody No. 9 Mine

Type: Underground   Total mined-out acreage shown: 5,769

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	13N 2W	19	NE SE NW
Air shaft	Christian	13N 2W	19	SW SW NE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	407-417	4.0	9.0	7.5	RPP

Geologic Problems Reported: The source map shows problem areas designated along the southwestern edge and all along the north and northwestern side of the mine. The symbol is thought to denote sandstone channels. Channels or associated wet areas (from the water seeping from the sandstone) may have also caused some of the problems that resulted in the larger interior un-mined areas. The roof in the eastern and western parts of the mine was black shale, while gray shale predominated in the southeastern part of the mine. The sandy shale in the northeastern part was very dangerous and gave much trouble, because micaceous layers separating the bedding planes parted readily and allowed large parts of the roof to come down. This sandy shale was either directly on the coal or separated from it by 4 to 36 inches of black shale. A persistent pyrite layer in the coal ranged up to 1.5 inches thick. Pyrite lenses up to 1 inch thick were common. The source map shows faulty areas along the northern and southern borders of the mine.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Peabody Coal Company	Peabody No. 9	1918-1951 *	36,290,433
			36,290,433

* Idle 1928

Last reported production: March 1951

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company	5-29-1952	1:4800	1:4800	Final
Microfilm, document 351393	5-29-1952	1:4800	1:9600	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Christian County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Company map, ISGS map library, 4103.C4 i5.1-6, copy 1 - Shaft locations, mine outline, mining method, geologic problems.
Microfilm map, document 351393, reel 03135, frames 470-475, map of Peabody #7 (mine index 2040) - Mine outline (far NW part of mine).

Mine Index 661
Peabody Coal Company, Peabody No. 58 Mine

Type: Underground   Total mined-out acreage shown: 4,817

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	13N 2W	33	SW NW NE
Escape shaft	Christian	13N 2W	33	SW NW NE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	480	6.5	9.0	7.7	BRP

Geologic Problems Reported: The roof was a very good black shale and required no top coal to hold it up. The coal from this mine was of a superior quality, even compared to the Peabody No. 9 Mine (mine index 219) nearby. The visible impurities were in the form of pyrite bands in the middle band of the seam and were few and easily removed, which was not the case with the visible impurities of the coal from the Peabody No. 9 Mine coal.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Christian County Coal Company	Taylorville	1901-1915	3,175,613
Springfield District Coal Company	Springfield District No. 8 *	1916-1918	734,957
Springfield District Coal Mining Company	Springfield District No. 58	1918-1924	2,086,795
Peabody Coal Company	Peabody No. 58	1924-1952	24,900,213
			30,897,578

* Although the Coal Report indicates that Springfield No. 6 Mine (mine index 731) had a name change to Springfield District No. 8, the reserves were combined with the recently closed Taylorville Mine, and the coal was hoisted from this shaft. The production from the No. 8 Mine is assigned to this index number by the ISGS convention of shafts retaining the same index number.

Last reported production: March 1952

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company	3-28-1952	1:24000	1:24000	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Christian County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Company map, ISGS map library, 4103.C4 i5.1-12 - Shaft locations, mine outline, mining method.

Mine Index 731
Springfield Coal & Mining Company, Springfield No. 6 Mine

Type: Underground Total mined-out acreage shown: 810

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft *	Christian	13N 2W	26	NW SW NW

* No air or escape shaft was shown on the source map, which only includes the main haulage entries of the mine.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	487	7.0	9.0	7.0	RPP

Geologic Problems Reported: Many slips were noted in the roof, some with offsets of up to 2 feet.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Taylorville Coal Company	Taylorville	1889-1902	2,481,847
Springfield Coal & Mining Company	Springfield No. 6	1902-1916 **	3,007,992
Springfield District Coal Mining Company	Springfield No. 56 ***	1916-1918	(none reported)
Peabody Coal Company	Peabody No. 56 ***	1918-1952	(none reported)
			5,489,839

** The Coal Report for 1917 indicated that this No. 6 Mine became Springfield District No. 8 Mine. However, the surface facilities at this location were dismantled, and the coal was hoisted out of the shaft for the Taylorville Mine (mine index 661). The Coal Section holds to the convention of naming the shaft based on its ownership at the time of production. Therefore, since this shaft location was not in use as a hoist shaft, the production associated with the Springfield District No. 8 Mine is attached to shaft that was used to hoist the production, the Taylorville Mine (mine index 661) of the Christian County Coal Company in 26-T13N-R2W.

*** No production was reported under these names. The owners continued to maintain the reserves, and a mine name change occurred. When Peabody Coal Company purchased the reserves, the mine became known as Peabody No. 56 Mine.

Last reported production: March 1916

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company	10-2-1916	1:4800	1:4800	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, geologic problems.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Christian County) - Mine type, shaft location, seam, depth, thickness.
Company map, ISGS map library, 4103.C4 i5.1-23 - Shaft location, mine outline, mining method.

Mine Index 2040
Peabody Coal Company, Peabody No. 7 Mine

Type: Underground Total mined-out acreage shown: 7,127

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	13N 3W	14	SW NW NW
Air shaft	Christian	13N 3W	14	SW NW NW
Air shaft	Christian	13N 3W	27	SE SE SW

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	349-365			6.5-7.5	RPP

Geologic Problems Reported: The source map shows a probable sandstone channel that limited mine expansion in the southeastern part of the mine. Only three pairs of entries were driven across the channel to access the coal on the other side, implying that almost no coal was minable there. The coal was either eroded or never deposited. Another channel was between the Peabody No. 7 and Peabody No. 9 Mines (mine index 219). The source map showed unmined areas in 36-T14N-R3W (SE NW, S ½ NE and SE SW), some marked by the same symbol used to denote channels elsewhere on the same map.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Illinois Midland Coal Company	Illinois Midland No. 7	1912-1913	74,824
Peabody Coal Company	Peabody No. 7	1913-1952	44,886,555
			44,961,379

Last reported production: May 1952

SOURCES OF DATA

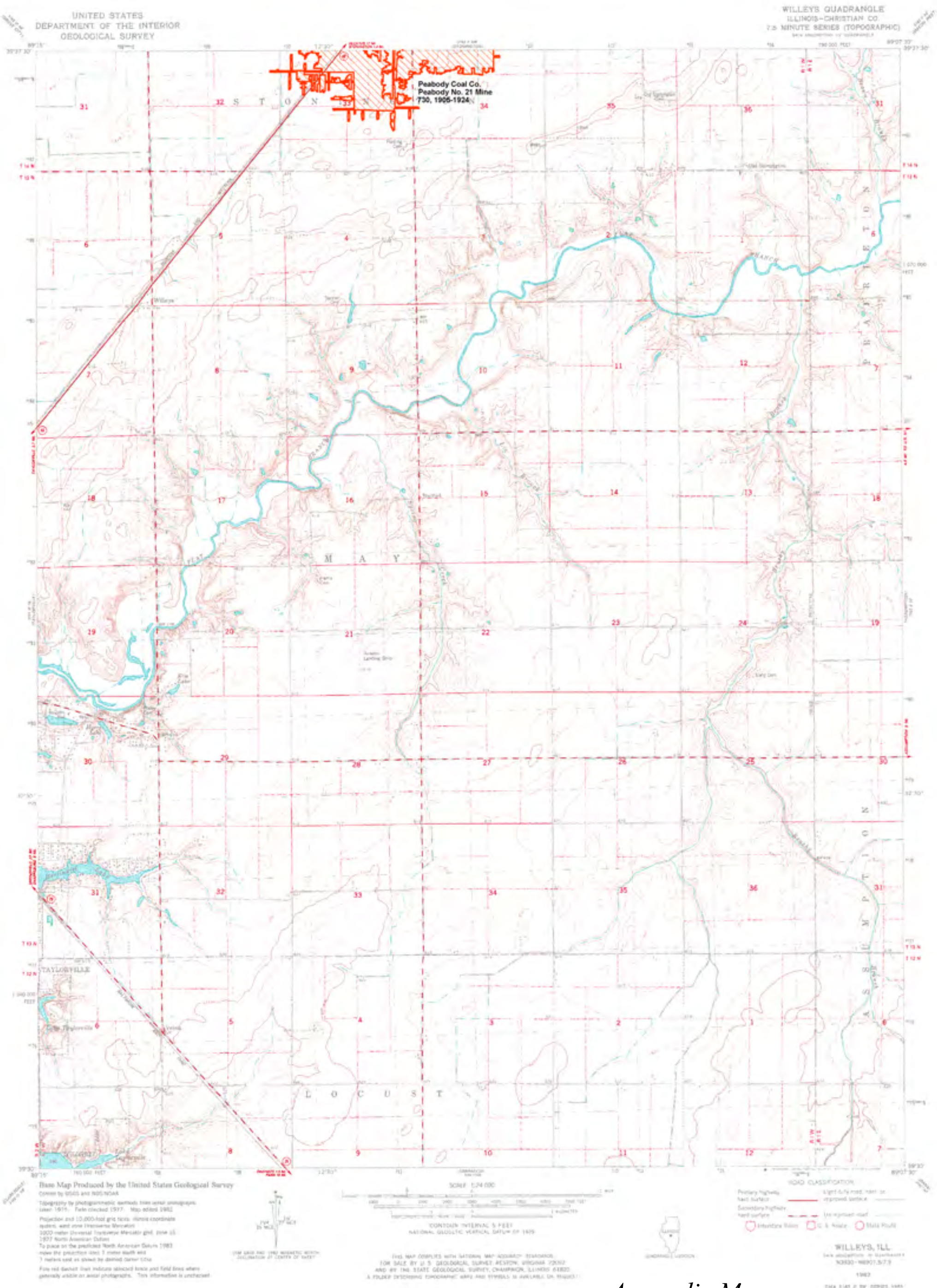
Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351393	5-29-1952	1:4800	1:9600	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam.
Microfilm map, document 351393, reel 03135, frames 470-475 - Shaft locations, mine outline, mining method.

INDEX OF MINES IN THE TAYLORVILLE QUADRANGLE

Funding for this project was supplied by the Illinois Mine Subsidence Insurance Fund.



Coal Mines in Illinois
Willeys Quadrangle
Christian County, Illinois

This map accompanies the Coal Mines Directory for the Willeys Quadrangle. Consult the directory for a complete explanation of the information shown on this map.

Mining Method
- Room & Pillar (RP)
- Room & Pillar Basic (RPB)
- Modified Room & Pillar (MRP)
- Room & Pillar Panel (RPP)
- Blind Room & Pillar (BRP)
- Checkerboard Room & Pillar (CRP)
- High Extraction Retreat (HER)
- Longwall (LW)
- Underground, Method Unknown
- Strip Mine
- Auger Mine
- General Area of Mining

Source of Mine Outline
- Final Mine Map
- Not Final Mine Map
- Undated Mine Map
- Incomplete Mine Map
- Secondary Source Map

Tipple, Shaft, Slope, Drift Locations
- Strip Mine Tipple - Active
- Strip Mine Tipple - Abandoned
- Mine Shaft - Active
- Mine Shaft - Abandoned
- Mine Slope - Active
- Mine Slope - Abandoned
- Mine Drift - Active
- Mine Drift - Abandoned
- Air Shaft
- Uncertain Location
- Uncertain Type of Opening

Mine Annotation
(space permiting)
Company
Mine Name
ISGS Index No., Years of Operation

Location

DISCLAIMER

These data were compiled and digitized from the best source maps available. Locations of some features may be offset by 500 feet of more due to errors in the original source maps, the compilation process, digitizing or a combination of these factors. Documentation of the source materials used is contained in the directory that accompanies this map. It is the user's responsibility to read this documentation and understand the limitations of the data. Though efforts have been made to compile these data accurately, the Illinois State Geological Survey does not guarantee the validity or the accuracy of these data.

The image of the U.S.G.S. Willeys Quadrangle used as a basemap was projected from the original UTM to Lambert Conformal Conic.

Illinois State Geological Survey
615 E. Peabody Dr.
Champaign, IL 61820

Mine Outlines Compiled by
Jennifer M. Obrad

June 4, 2007

Appendix M

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
WILLEYS QUADRANGLE
CHRISTIAN COUNTY

Jennifer M. Obrad

Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
2007

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
WILLEYS QUADRANGLE
CHRISTIAN COUNTY

2007

ILLINOIS STATE GEOLOGICAL SURVEY
William Shilts, Chief

Natural Resources Building
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Cover photo Track-mounted duckbill loading machine at a Peabody Coal Company mine, ca. 1915.

DISCLAIMER: The accuracy and completeness of mine maps and directories vary with the availability of reliable information. Maps and other information used to compile this mine map and directory were obtained from a variety of sources and the accuracy of some of the original information cannot be verified. Consequently, the Illinois State Geological Survey (ISGS) cannot guarantee the mine maps are free of errors and disclaims any responsibility for damages that may result from actions or decisions based on them.

The ISGS updates the maps and directories periodically, and welcomes any new information or corrections. Please contact the Coal Section of the ISGS at the address shown on the title page of this directory, or telephone (217) 244-4610.

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CONTENTS

INTRODUCTION

Coal has been mined in 76 counties of Illinois. More than 7,400 coal mines have operated since commercial mining began in Illinois about 1810; fewer than 30 are currently active. To detail the extent and location of coal mining in Illinois, the Illinois State Geological Survey (ISGS) has compiled maps and directories of known coal mines. The ISGS offers maps at a scale of 1:100,000 and accompanying directories for each county in which coal mining is known to have occurred. Maps at a scale of 1:24,000 and accompanying directories, such as this, are available for selected quadrangles. Contact the ISGS for a list of these quadrangles.

These larger scale maps show the approximate positions of mines in relation to surface features such as roads and water bodies, and indicate the mining method used and the accuracy of the mine boundaries. The maps are useful for locating mine boundaries relative to specific properties and for assessing the potential for subsidence in an area. Mine boundaries compiled from final mine surveys are generally shown within 200 feet of their true position. As a result of poor cartographic quality and inaccuracies in the original mine surveys, boundaries of some older mines may be mislocated on the map by 500 feet or more. Original mine maps should be consulted in situations that require precise delineation of mine boundaries or internal workings of mined areas.

This directory serves as a key to the accompanying mine map and provides basic information on the coal mines in the quadrangle. The directory is composed of two parts. Part I explains the symbols and patterns used on the accompanying map and the summary data presented for each mine. Part II numerically lists the mines in the quadrangle and summarizes the geology and production history of each mine. Total production for the mine, not the portion in the quadrangle, is given.

MINING IN THE WILLEYS QUADRANGLE

Only one mine is known to have operated in this quadrangle. The Stonington Coal Company started mining in 1905 in the Herrin coal seam, at a depth of 460 feet. The Herrin coal, which averaged 7 feet in thickness, proved a good seam to work. In 1915, the mine was bought by Peabody Coal Company to become their Peabody No. 21 Mine, and it operated until 1924.

PART I EXPLANATION OF MAP AND MINE SUMMARY SHEET

INTERPRETING THE MAP

The map accompanying this directory shows the location of coal mines known to be present in the quadrangle. The map, corresponding to a U.S. Geological Survey (USGS) 7.5-minute quadrangle, covers an area bounded by lines of latitude and longitude 7.5-minutes apart. In Illinois, a quadrangle is approximately 6.5 miles east to west and 8.5 miles north to south, an area of about 56 square miles. The ISGS generally offers one map of mines per quadrangle. In some areas where extensive mining occurred in two or more overlapping seams, separate maps are compiled for mines in each seam to maintain readability of the map.

Mine Type and Mining Method
The mine type is indicated on the map by pattern color: green represents surface mines; red and yellow represent underground mines. The red patterns are used for areas of underground mining that are documented by a primary or secondary source map. A yellow pattern is used for cases where no map of the mine workings is available, but a general area of mining can be inferred from property maps or production figures. The patterns indicate the main mining methods used in underground mines. The methods are (1) room and pillar and (2) high extraction. The method used gives some indication of the amount and pattern of coal extraction within each mined area, and has some influence on the timing and type of subsidence that can occur over a mine.

The following discussion and illustrations of mining methods are based on Guither et al. (1984).

In room-and-pillar mines, coal is removed from haulage-ways (entries) and selected areas called rooms. Pillars of unmined coal are left between the rooms to support the roof. Depending on the size of rooms and pillars, the amount of coal removed from the production areas will range from 40% to 70%.

Room and Pillar - mining is divided into six categories:

- room-and-pillar basic (RPB, fig. 1A), an early method that did not follow a preset mining plan and therefore resulted in very irregular designs;
- modified room and pillar (MRP, fig. 1B);
- room-and-pillar panel (RPP, fig. 1C);
- blind room and pillar (BRP, fig. 1D);
- checkerboard room and pillar (CRP, fig. 1E);
- room and pillar (RP), a classification used when the specific type of room-and-pillar mining is unknown.

Blind and checkerboard are the most common types of room-and-pillar mining used in Illinois today. The knowledge of room-and-pillar mining methods gives a trained engineer information on the nature of subsidence that may occur. A more extensive discussion of subsidence can be found in Bauer et al. (1993).

High-extraction These mining methods are subdivided into high-extraction retreat (HER, Fig 1F) and longwall (LW, Fig 1G, 1H). In these methods, much of the coal is removed within well defined areas of the mine. Subsidence of the surface above these areas occurs within weeks. Once the subsidence activity ceases, the potential for further movement over these areas is low; however, subsidence may continue for several years after mining.

High-extraction retreat mining is a form of room-and-pillar mining that extracts most of the coal. Rooms and pillars are developed in the panels, and the pillars are then systematically removed (fig. 1F).

In early (pre-1960) longwall mines, mining advanced in multiple directions from a central shaft (fig. 1G). Large pillars of coal were left around the shaft, but all coal was removed beyond these pillars. Miners placed rock and wooden props and cribs in the mined-out areas to support the mine roof. The overlying rock gradually settled onto these supports, thus producing subsidence at the surface. In post-1959 longwall mines, room-and-pillar methods have been used to develop the main entries of the mine and panel areas. Modern longwall methods extract 100 percent of the coal in the panel areas (fig. 1H).

SOURCE MAPS

Mine outlines depicted on the map are, whenever possible, based on maps made from original mine surveys. The process of compiling and digitizing the quadrangle map may produce errors of less than 200 feet in the location of mine boundaries. Larger errors of 500 feet or more are possible for mines that have incomplete or inaccurate source maps.

Because of the extreme complexity of some mine maps, detailed features of mined areas have been omitted. The digitized mine boundary includes the exterior boundary of all rooms or entries that were at least 80 feet wide or protruded 500 feet from the main mining area. Unmined areas between mines are shown if they are at least 80 feet wide; unmined blocks of coal within mines are shown if they are at least 400 feet on each side. Original source maps should be consulted when precise information on mine boundaries or interior features is needed.

The mine summary sheet lists the source maps used to determine each mine outline. The completeness of map sources is indicated on the map by a line symbol at the mine boundary. Source maps are organized in five categories.

Final mine map The mine outline was digitized from an original map made from mine surveys conducted within a few months after production ceased. The date of the map and the last reported production are listed on the summary sheet.

Not a final map The mine is currently active or the mine outline was made from a map based on mine surveys conducted more than few months before production ceased. This implies the actual mined-out area is probably larger than the outline on the map. The mine summary sheet indicated the dates of source maps and the last reported production, as well as the approximate tonnage mined between these two dates (if the mine is abandoned). The summary sheet also lists the approximate acreage mined since the date of the map and, in some cases, indicates the area where additional mining may have taken place. This latter information is determined by locating on the map the active faces relative to probable boundaries of the mine property.

Undated map The source map was undated, so it may or may not be based on a final mine survey. When sufficient data are available, the probable acreage of the mined area is estimated from reported production, average seam thickness and a recovery rate comparable to other mines in the area. This information is listed in the summary sheet for the mine.

Incomplete map The source map did not show the entire mine. The summary sheet indicates the missing part of the mine map and the acreage of the unmapped area, which is estimated from the amount of coal known to have been produced from the mine.

Secondary source map The original mine map was not found so the outline shown was determined from secondary sources (e.g., outlines from small-scale regional maps published in other reports). The summary sheet describes the secondary sources.

POINTS AND LABELS

The locations of all known mine openings (shafts, slopes, and drifts) and surface mine tipples are plotted on the map. Tipples are areas where coal was cleaned, stockpiled, and loaded for shipping.

Only openings or tipples are plotted for mines without source maps. If the precise locations of these features are unknown, a special symbol is used to indicate the approximate location of the mine.

Each mine on the map is labeled with the names of the mine and operating company, ISGS mine index number, and years of operation (if known) if space permits. A seam designation is given on maps where more than one seam was mined. For a mine that operated under more than one name, only the most recent name is generally given. When a mine changed names or ownership shortly before closing, an earlier name is listed. All company and mine names are listed on the mine summary sheet in the directory, under the production history segment.

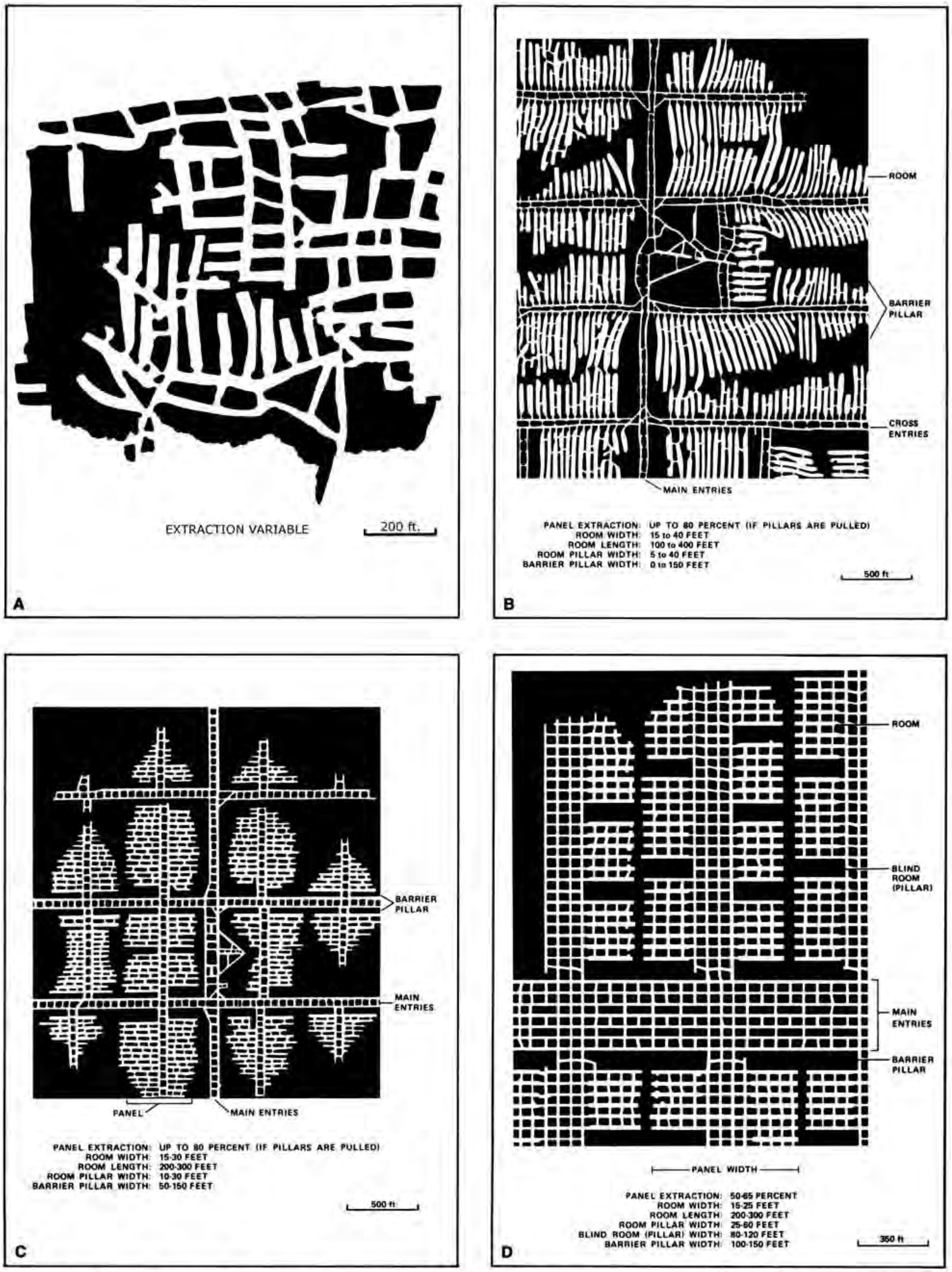

Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

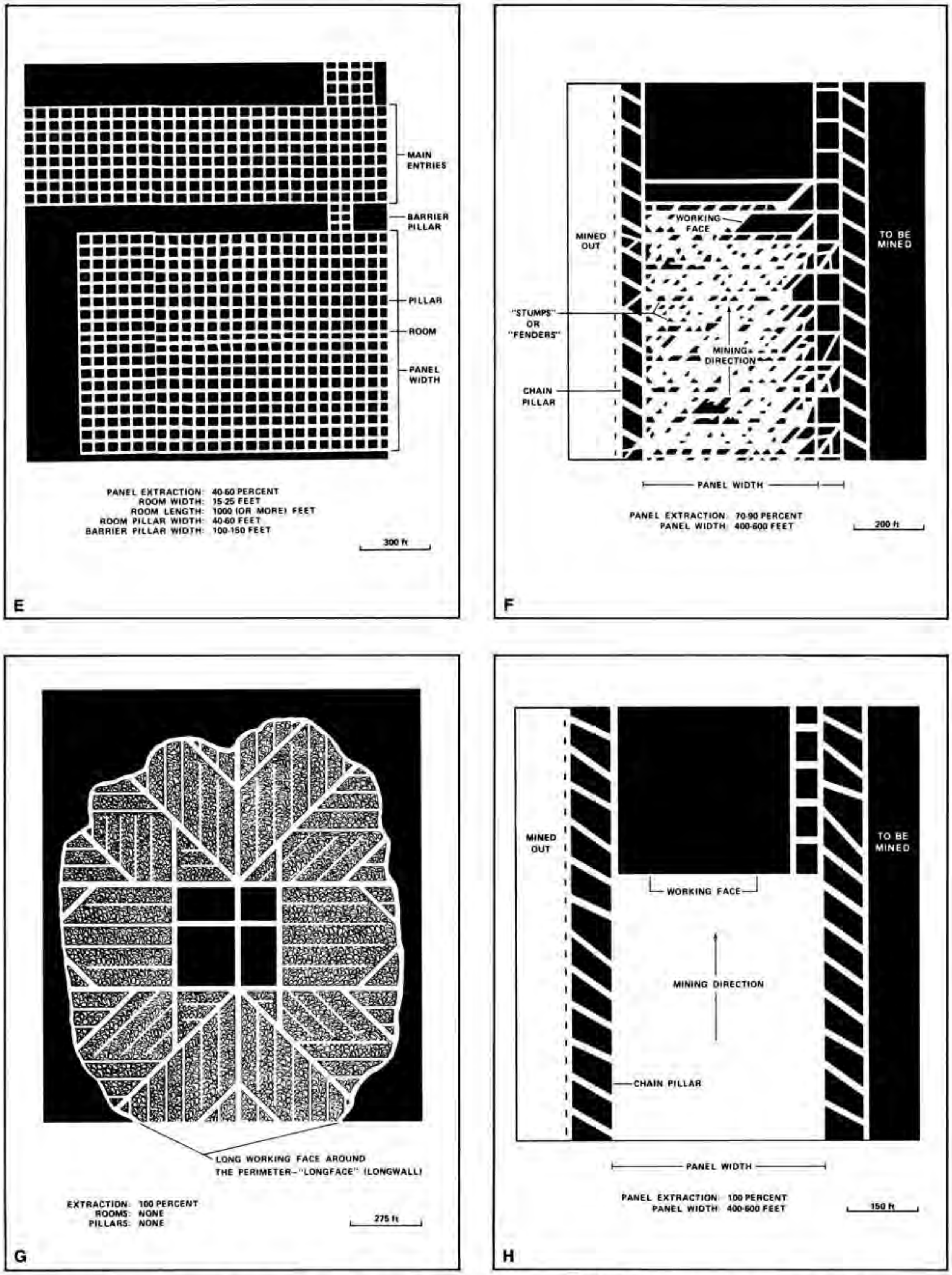

Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

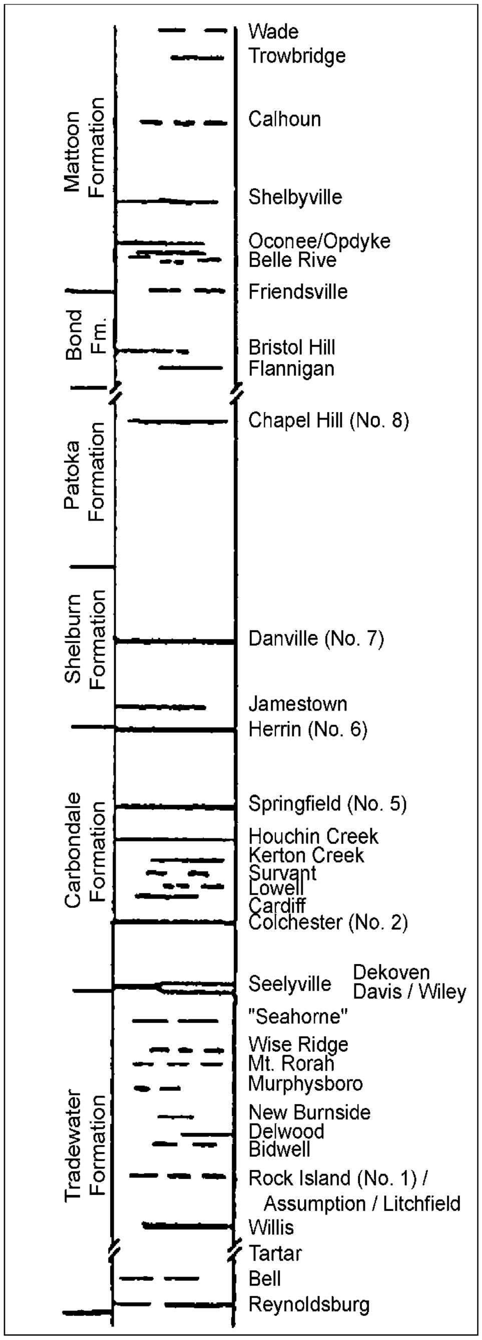

Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

INTERPRETING A MINE SUMMARY SHEET

The mine summary sheet is arranged numerically by mine index number. Index numbers are shown on the map and in the mine listing. The mine summary sheet provides the following information (if available).

Company and mine name The last company or owner of the mine is used, unless no production was recorded for the last owner. In that case, the penultimate owner is listed. Mines often have no specific name; in these cases, the company name is also used as the mine name.

Type *Underground* denotes a subsurface mine in which the coal was reached through a shaft, slope, or a drift entry. *Surface* denotes a surface, open pit or strip mine.

Total mined-out acreage shown The total acreage of the mined area mapped, including any acreage mined on adjacent quadrangles, is calculated from the digitized outline of the mine. The acreage of large barrier pillars depicted on the map is excluded from the mined-out acreage. Small pillars not digitized are included in the acreage calculation. If the mine outline is not based on a final mine map, the acreage is followed by an estimate of additional acres that may have been mined. The estimate is determined from reported mine production, approximate thickness of the coal, and recovery rates calculated from nearby mines that used similar mining methods.

SHAFT, SLOPE, DRIFT OR TIPPLE LOCATIONS

Shaft, slope, drift, or tipple locations Locations of all known former entry points to underground mines or the location of coal cleaning, tipple, and shipping equipment used by the mine's facility are listed. The location is described in terms of county, township and range (Twp-Rge), section, and location within the section by quarters. NE SW NW, for instance, would describe the location in the northeast quarter of the southwest quarter of the northwest quarter. When sections are irregular in size, the quarters remain the same size and are oriented (or "registered") from the southeast corner of the section. Approximate footage from the section lines (FEL = from east line, FNL = from north line, for example) is given when that information is known; this indicates a surveyed location and is not derived from maps. Entry points are also plotted on the map and coded for the type of entry or tipple. A mine opening may have had many purposes during the life of the mine. Old hoist shafts are often later used for air and escape shafts; this information is included in the directory when known. The tipple for underground mines was generally located near the main shaft or slope. At surface mines, coal was sometimes hauled to a central tipple several miles from the mine pit.

GEOLOGY

Seam(s) mined The name of the coal seam(s) mined is listed, if known. If multiple seams were mined, they are all listed, although the mined-out area for each seam may be shown on separate maps. Figure 2 shows the stratigraphic section of the coal-bearing interval in Illinois, and the vertical relations among the coals.

Depth The depth to the top of the seam in the vicinity of the shaft is listed, if known. The depth is determined from notes made by geologists who visited the mine during its operation or from drill hole data in ISGS files. Depth generally varies little over the extent of a mine; however, reported depths for an individual mine may vary. Depth for surface-mined coals varies, and is usually represented as a range.

Thickness The approximate thickness of the mined seam is shown, if known. Thickness also comes from notes of geologists who visited the mine during its operation or from borehole data in ISGS files. Minimum, maximum, and average thicknesses are given when this information is available.

Mining method The principal mining method used at the mine (figs. 1A-H) is listed. See the mining methods section at the beginning of this directory for a discussion of this parameter.

Geologic problems reported Any known geologic problems, such as faults, water seepage, floor heaving, and unstable roof, encountered in the mine are reported. This information is from notes made by ISGS geologists who visited the mine, or from reports by mine inspectors published by the Illinois Department of Mines and Minerals, or from the source map(s). Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Production history Tons of coal produced from the mine by each mine owner are totaled. When the source map used for the mine outline is not a final mine map, the tonnage produced since the date of the map is identified. For mines that extend into adjacent quadrangles, the tonnage reported includes areas mined in adjacent quadrangles.

SOURCE OF DATA

Source map This section lists information about the map(s) used to compile the mine outline and the locations of tipples and mine openings. In some cases more than one source map was used. For example, a map drawn before the mine closed may provide better information on original areas of the mine than a later map. When more than one map was used, the bibliography section explains what information was taken from each source.

Date The date of the most recent mine survey listed on the source map is reported.

Original scale The original scale of the source map is listed. Many maps are photo-reductions and are no longer at their original scale. The original scale gives some indication of the level of detail of the mine outline and the accuracy of the mine boundary relative to surface features. Generally, the larger the scale, the greater the accuracy and detail of the mine map. Mine outlines taken from source maps at scales smaller than 1:24,000 may be highly generalized and may well be inaccurately located with respect to surface features.

Digitized scale The scale of the digitized map is reported. The scale may be different from that of the original source map. In many cases the digitized map was made from a photo-reduction of the original source map, or the source map was not in a condition suitable for digitizing and the mine boundaries were transferred to another base map.

Map type Source maps are classified into five categories to indicate the probable completeness of the map. See discussion of source maps in the previous section.

Annotated bibliography Sources that provide information about the mine are listed, with the data taken from each source. Some commonly used sources are described below. Full bibliographic references are given for all other sources. Unless otherwise noted, all sources are available for public inspection at the ISGS.

Coal Reports Published since 1881, these reports contain tabular data on mine ownership, production, employment, and accidents. Some volumes include short descriptions made by mine inspectors of physical features and conditions in selected mines.

Directory of Illinois Coal Mines This source is a compilation of basic data about Illinois coal mines, originally gathered by ISGS staff in the early 1950s. Sources used for this directory are undocumented, but they are primarily Illinois Department of Mines and Minerals annual reports, ISGS mine notes, and coal company officials.

ENR Document 85/01, Guither, H. D., J. K. Hines, and R. A. Bauer, 1985 The Economic Effect of Underground Mining Upon Land Used for Illinois Agriculture: Illinois Department of Energy and Natural Resources Document 85/01, 185 p.

Microfilm map The U.S. Bureau of Mines maintains a microfilm archive of mine maps. A microfilm file for Illinois is available for public viewing at the ISGS.

Mine notes ISGS geologists have visited mines or contacted mine officials throughout the state since the early 1900s. Notes made during these visits range from brief descriptions of the mine location to long narratives (including sketches) of mining conditions and geology.

Federal Land Bank of St. Louis, Preliminary Reports on Subsidence Investigations Mining engineers working for the Federal Land Bank of St. Louis mapped areas of subsidence due to coal mining in the early 1930s. These reports often include county maps of mine properties with mined-out areas including shaft locations, as well as subsidence areas.

REFERENCES

Bauer, R. A., B. A. Trent, and P. B. Dumontelle, 1993, Mine Subsidence in Illinois: Facts for the Homeowner Considering Insurance, Illinois State Geological Survey, Environmental Geology Note 144, 16p.

Guither, H. D., J. K. Hines, and R. A. Bauer, 1985, The Economic Effects of Underground Mining Upon Land Used for Illinois Agriculture, Illinois Department of Energy and Natural Resources Document 85/01, 185p.

PART II DIRECTORY OF MINES IN THE WILLEYS QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Willeys Quadrangle is provided. The summary sheets are arranged numerically by mine index number. Consult Part I for a complete explanation of the data listed in the summary sheet.

Mine Index 730
Peabody Coal Company, Peabody No. 21 Mine

Type: Underground   Total mined-out acreage shown: 814   Production indicates approximately 20 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Christian	14N 1W	28	NW NE SE
Air shaft	Christian	14N 1W	28	NW NE SE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Avg	Method
Herrin	460	5.7	7.5	7.0	MRP

Geologic Problems Reported: Gas explosions resulted in 4 deaths. In 1908, a room had "seven feet of gas overhead", and the mine was noted as having a lot of gas in a 1909 visit. Some small faults were observed. The roof was 0 to 3 feet of shale overlain by 0 to 14 feet of limestone. Pyrite bands were noted in the coal.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Stonington Coal Company	Stonington	1905-1915	1,665,925
Peabody Coal Company	Peabody No. 21	1915-1924	2,717,693
Peabody Coal Company	Peabody No. 21	1924-1924	115,012 *
			4,498,630

* Production after map date

Last reported production: April 1924

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4103.C4 i5.1-8	1-15-1924	1:2400	1:2400	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, geologic problems.
Directory of Illinois Coal Mines (Christian County) - Mine names, mine index, ownership, years of operation.
Mine notes (Christian County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Company map, ISGS map library 4103.C4 i5.1-8 - Shaft locations, mine outline, mining method.

INDEX OF MINES IN THE WILLEYS QUADRANGLE

Funding for this project was supplied by the Illinois Mine Subsidence Insurance Fund.

2010 CHRISTIAN COUNTY MITIGATION STRATEGIES

APPENDIX N

Table 5-5: Mitigation Strategies

	Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
1	Develop a debris management plan that includes roles and responsibilities of the LEPC and other county departments	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.	Flood	Christian County	Ongoing	The County has a debris management plan in place; however, it may require updates. Local resources will be used to update and maintain the plan.
2	Develop ordinances to bury new power lines in subdivisions	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	Christian County	Ongoing	Although there is not a formal ordinance in place, new subdivisions typically bury power lines. The county will propose development of ordinances to require this practice for all future infrastructure. Local resources will be used to develop the ordinances.
3	Work with local radio stations to establish a protocol for issuing weather warnings to the public	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Drought, Fire, Hazmat, Subsidence	Christian County	Ongoing	The County works with local radio stations to issue warnings to the public.
4	Implement Nixle for mass media release via e-mail and text messages; advertise to the public for participation	Goal: Enhance County's Emergency Notification System Objective: Evaluate and strengthen the communication and transportation abilities of emergency services	Tornado, Flood, Earthquake, Thunderstorm, Drought, Winter Storm, Hazmat, Fire, Subsidence	Christian County	High	The county will implement Nixle but wants to continue researching other systems for mass notification. The ESDA director will oversee this project. Funding for advertisement of the system will be sought from FEMA. If funding is available,
5	Institute Reverse 911 or similar system	Goal: Enhance County's Emergency Notification System Objective: Evaluate and strengthen the communication and transportation abilities of emergency services	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire, Subsidence	Christian County	High	The County ESDA oversees the implementation of the project. Nixle will be implemented as an interim system. Local resources will be used to maintain the system. Funding to implement the new system will be sought from the PDM
6	Strengthen mutual aid response agreements	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and	Winter Storms, Hazmat	Christian County	High	The ESDA director will work with neighboring counties to establish the agreements. If resources are available, implementation will begin within one year.
7	Conduct a new flood study (DFIRM)	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP for each jurisdiction.	Flood	Christian County, Taylorville, Pana, Assumption, Kincaid, Morrisonville, Mount Auburn, Owaneco, Moweaqua, Palmer, Stonington, Tovey	High	The County Floodplain Manager will oversee this project. FEMA will be approached for funding and assistance with the study. If funding is available, implementation will begin within one year.

	Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
8	Harden critical facilities and older public buildings	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Christian County, Taylorville, Pana, Assumption, Kincaid, Morrisonville, Mount Auburn, Owaneco, Moweaqua, Palmer, Stonington, Tovey	High	The County Engineer will oversee the implementation of this project. Local resources will be used to identify the required structures to be hardened. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. Implementation, if funding is available, will begin within one year.
9	Purchase generators and/or transfer switches to provide back-up power to critical facilities and sewer systems in Kinkaid and Tovey	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Christian County, Taylorville, Pana, Assumption, Kincaid, Morrisonville, Mount Auburn, Owaneco, Moweaqua, Palmer, Stonington, Tovey	High	The County and other jurisdictions will oversee the implementation of this project. Local resources will be used to determine which facilities should receive generators. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within one year.
10	Distribute brochures related to hazard mitigation and preparedness at public events such as the county fair	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Drought, Hazmat, Fire	Christian County, Taylorville, Pana, Assumption, Kincaid, Morrisonville, Mount Auburn, Owaneco, Moweaqua, Palmer, Stonington, Tovey	High	The County ESDA will oversee implementation of this project. Local resources, e.g. schools, healthcare facilities, and businesses, will be approached to help develop the literature. FEMA may be approached for additional funding. If resources and funding are available, implementation will begin within one year.
11	Establish shelters/warming centers	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm, Hazmat, Subsidence, Fire	Mount Auburn, Tovey, Christian County	High	The County ESDA will work with American Red Cross to establish the new shelters. Funding will be sought from local businesses and healthcare facilities. If funding is available, implementation will begin within one year.
12	Increase water capacity by dredging Lake Taylorville	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Drought	Taylorville	High	The County Engineer will work with DNR to oversee implementation of this project. Local resources and DNR are proposed sources of funding. Implementation will begin within one year.

	Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
13	Establish and enforce drainage ordinances	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.	Flood	Christian County	Medi um	The County Engineer will work with the local planning commission to establish ordinances. The MHMP planning committee will develop public education options to re-affirm the ordinances in the communities. If local, state, and federal resources are available, implementation of this project will begin within three years.
14	Establish ordinances to restrict development in undermined areas in the county	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.	Subsidence	Christian County, Taylorville, Pana, Assumption, Kincaid, Morrisonville, Mount Auburn, Owaneco, Moweaqua, Palmer, Stonington, Tovey	Medium	The County ESDA will oversee this project. The county will seek assistance from IEMA and community grants to develop the ordinances. If funding is available, implementation will begin within three years.
15	Conduct an engineering study to identify and map areas of subsidence	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.	Subsidence	Christian County, Taylorville, Pana, Assumption, Kincaid, Morrisonville, Mount Auburn, Owaneco, Moweaqua, Palmer, Stonington, Tovey	Medium	The County Engineer will oversee this project. The county will seek assistance from IEMA and community grants to fund the study. If funding is available, implementation will begin within three years.
16	Conduct a study to determine shelter capacity in the county, especially mobile home parks	Goal: Lessen the impacts of disaster to at risk populations Objective: Improve emergency sheltering in the community.	Tornado, Flood, Earthquake, Thunderstorm, Drought, Winter Storm, Hazmat, Fire, Subsidence	Christian County, Taylorville, Pana, Assumption, Kincaid, Morrisonville, Mount Auburn, Owaneco, Moweaqua, Palmer, Stonington, Tovey	Medium	The ESDA director will work with local shelters to complete this project and will perhaps use HAZUS-MH. If additional shelters or supplies are needed, the PDM program or local resources are funding options. If funding is available, implementation will begin within three years.
17	Repair drainage around the viaduct rail underpass	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Taylorville	Medium	The City of Taylorville will coordinate this project. Funding will be sought from DNR, FEMA, and IEMA. If funding is available, implementation will begin within three years.
18	Trim trees to minimize the amount/duration of power outages	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Christian County	Low	The County ESDA will coordinate a team to work with utility companies to address this strategy. Funding may come from community grants or local resources. If funding and resources are available, implementation will begin within five years.

	Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
19	Install inertial valves at critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Earthquake	Christian County, Taylorville, Pana, Assumption, Kincaid, Morrisonville, Mount Auburn, Owaneco, Moweaqua, Palmer, Stonington, Tovey	Low	The County ESDA will oversee implementation of this project and determine which facilities do not currently have inertial valves. Funding has not been secured as of 2010, but the PDM program and community grants are an option. If funding is available, implementation will begin within five years.
20	Repair culverts in all communities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Christian County, Taylorville, Pana, Assumption, Kincaid, Morrisonville, Mount Auburn, Owaneco, Moweaqua, Palmer, Stonington, Tovey	Low	The County Engineer will oversee this project. Funding will be sought from DNR, FEMA, and IEMA. If funding is available, implementation will begin within five years.
21	Enforce codes requiring mobile homes to have tie-downs	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Tornado, Thunderstorm	Christian County, Taylorville, Pana, Assumption, Kincaid, Morrisonville, Mount Auburn, Owaneco, Moweaqua, Palmer, Stonington, Tovey	Low	The County ESD will coordinate this planning effort. Local resources will be used to review existing codes and research new options. Implementation will begin within five years.
22	Conduct a study to potentially re-engineer intersections with frequent vehicle accidents and complete pre-staged evacuation exercises	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat, Fire	Taylorville	Low	The County Engineer will work with the County and State Highway Departments to implement this project. Funding for engineers will be sought from state and federal agencies and community grants. Implementation will begin within five years.
23	Implement natural snow fences/tree barriers	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Christian County	Low	The County Engineer will oversee implementation of this project. Local resources and ILDOT will be used for funding. If funding is available, implementation will begin within five years.

PLAN ADOPTION RESOLUTIONS

APPENDIX O

COUNTY of CHRISTIAN, Illinois
Resolution of Adoption
of the
Christian County Multi-Jurisdictional All Hazards Mitigation Plan
R2021 CB 002

WHEREAS, COUNTY of CHRISTIAN is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the COUNTY of CHRISTIAN desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was updated in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, COUNTY of CHRISTIAN has participated in updating the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

NOW THERFORE, be it resolved that the COUNTY of CHRISTIAN hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan update as the official Hazard Mitigation Plan of COUNTY of CHRISTIAN and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on February 16, 2021

CERTIFIED by Matthew Wells
Matthew Wells, Chairman
Christian County Board

(SEAL)

ATTESTED by Michael C. Gianasi
Michael Gianasi, County
Clerk, Christian County

CITY OF ASSUMPTION, Illinois
Resolution of Adoption 2021 - 3
of the
Christian County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, the CITY OF ASSUMPTION is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the CITY OF ASSUMPTION desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was updated in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, the CITY OF ASSUMPTION has participated in updating the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

NOW THERFORE, be it resolved that the CITY OF ASSUMPTION hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan update as the official Hazard Mitigation Plan of the CITY OF ASSUMPTION; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

PASSED AND APPROVED by the City Council of the City of Assumption, Christian County, Illinois, this 7th day of April, 2021; by the following roll call the vote:

AYES: 6

NAYES: Ø

ABSENT: Ø

DATED this 7th day of April, 2021

APPROVED:

Roger D Cox

Roger Cox, Mayor

ATTEST:

Janet Waller

Janet Waller, City Clerk

Resolution 2021-01

VILLAGE OF EDINBURG, Illinois
Resolution of Adoption
of the
Christian County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, VILLAGE OF EDINBURG is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the VILLAGE OF EDINBURG desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was updated in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, VILLAGE OF EDINBURG has participated in updating the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

NOW THERFORE, be it resolved that the VILLAGE OF EDINBURG hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan update as the official Hazard Mitigation Plan of VILLAGE OF EDINBURG; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on JANUARY 11, 2021

CERTIFIED by David M. Rothwell
VILLAGE PRESIDENT

(SEAL)
(IF REQUIRED)

ATTESTED by Maureen A. Carter
CLERK

(NAME of MUNICIPALITY or COUNTY), Illinois
Resolution of Adoption
of the
Christian County Multi-Jurisdictional All Hazards Mitigation Plan

JEISYVILLE CHRISTIAN
WHEREAS, (NAME of MUNICIPALITY or COUNTY) is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

JEISYVILLE CHRISTIAN
WHEREAS, the (NAME of MUNICIPALITY or COUNTY) desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was updated in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

JEISYVILLE CHRISTIAN
WHEREAS, (NAME of MUNICIPALITY or COUNTY) has participated in updating the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

JEISYVILLE
NOW THERFORE, be it resolved that the (NAME of MUNICIPALITY or COUNTY) hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan update as the official Hazard Mitigation Plan of (NAME of MUNICIPALITY or COUNTY); and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on (MONTH, DATE, YEAR) 3-10-2021

CERTIFIED by (SIGNATURE) MAYOR
(NAME & TITLE)

(SEAL)
(IF REQUIRED)

ATTESTED by (SIGNATURE) T Clark
(NAME & TITLE) Toni Clark
Village
Clerk

VILLAGE OF KINCAID, Illinois
Resolution of Adoption
of the
Christian County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, VILLAGE OF KINCAID is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the VILLAGE OF KINCAID desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was developed in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, VILLAGE OF KINCAID has participated in developing the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

NOW THERFORE, be it resolved that the VILLAGE OF KINCAID hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan as the official Hazard Mitigation Plan of VILLAGE OF KINCAID; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on FEBRUARY 8, 2021

CERTIFIED by
ROBERT MORRIS,
MAYOR

ATTESTED by
MARLA O'DELL, CLERK

(Village Of Morrisonville), Illinois
Resolution of Adoption
Of the
Christian County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, (Village Of Morrisonville) is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the (Village Of Morrisonville) desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was updated in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, (Village of Morrisonville) has participated in updating the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

NOW THERFORE, be it resolved that the (Village Of Morrisonville) hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan update as the official Hazard Mitigation Plan of (Village Of Morrisonville); and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on January 20, 2021

CERTIFIED by Darcy Montgomery Village Clerk

ATTESTED by Darcy Montgomery Village Clerk

The Village of Mount Auburn, Illinois
Resolution of Adoption
of the
Christian County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, the Village of Mount Auburn is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the Village of Mount Auburn desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was updated in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, the Village of Mount Auburn has participated in updating the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

NOW THERFORE, be it resolved that the Village of Mount Auburn hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan update as the official Hazard Mitigation Plan of the Village of Mount Auburn; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on February 2, 2021

CERTIFIED by Amber Dooley
Amber Dooley, Mayor

ATTESTED by Sheri Clayton
Sheri Clayton, Clerk

VILLAGE OF PALMER, Illinois
2021-001 Resolution of Adoption
of the
Christian County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, VILLAGE OF PALMER is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the VILLAGE OF PALMER desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was updated in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, VILLAGE OF PALMER has participated in updating the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

NOW THERFORE, be it resolved that the VILLAGE OF PALMER hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan update as the official Hazard Mitigation Plan of VILLAGE OF PALMER; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on January 11, 2021

CERTIFIED by Jim Hill
(JIM HILL, MAYOR)

(SEAL)
(IF REQUIRED)

ATTESTED by Laura A. Wilkinson
(Laura Wilkinson, CLERK)

THE CITY OF PANA
CHRISTIAN COUNTY, ILLINOIS

RESOLUTION NO. 21-01

A RESOLUTION OF ADOPTION OF THE CHRISTIAN COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

DONALD KROSKI, Mayor
TERRY KLEIN, City Clerk

GLEN SCHNEIDER
TIM EDDY
STEVEN SCOTT
KIRK WOODS
BURTH HOCQ
RON MILES
KATHERINE STEPHENS
LEON GOFF

City Council

Published in pamphlet form by authority of the Mayor and Council of the City of Pana on February 9, 2021

Ancel, Glink, P.C. – 202 North Prospect, Suite 203 - Bloomington, Illinois 61704

THE CITY OF PANA
CHRISTIAN COUNTY, ILLINOIS

RESOLUTION NO. 20-01

A RESOLUTION OF ADOPTION OF THE CHRISTIAN COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

WHEREAS, the City of Pana, Christian County, is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the City of Pana, Christian County, desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was developed in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, the City of Pana, Christian County, has participated in developing the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County.

NOW, THEREFORE, BE IT RESOLVED by the Mayor and City Council for the City of Pana, Christian County, Illinois, as follows:

Section 1. That the City of Pana adopts the Cristian County Multi-Jurisdictional All Hazards Mitigation Plan as the official Hazard Mitigation Plan of the City of Pana, Christian County.

Section 2. That the City of Pana agrees to participate in the annual and 5-year updates of the Plan.

Section 3. That the City Clerk be and is hereby authorized to attest the signature of the Mayor on said Multi-Jurisdictional All Hazards Mitigation Plan as the official Hazard Mitigation Plan of the City of Pana, and keep an original of said Plan in his office for public inspection.

Section 4. This Resolution shall be in full force and effect from and after its passage and approval in accordance with law.

APPROVED AND ADOPTED by the City of Pana this 8th day of February, 2021, pursuant to a roll call vote as follows:

	YES	NO	ABSENT	PRESENT
Schneider	x			
Eddy	x			
Scott	x			
Woods	x			
Hocq			x	
Miles	x			
Stephens	x			
Goff	x			
Kroski* (To the extent mayoral vote may be necessary)				

TOTAL: Seven Ayes. No Nays. One Absent

APPROVED by the City Mayor on 9th day of February, 2021.

Donald Kroski, City Mayor

ATTEST:

Terry Klein, City Clerk

4833-9571-8874, v. 1

Village of Stonington

RESOLUTION NUMBER 21-453

VILLAGE OF STONINGTON RESOLUTION OF ADOPTION OF THE CHRISTIAN COUNTY MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN

PASSED BY THE
VILLAGE BOARD OF TRUSTEES
OF THE VILLAGE OF STONINGTON, ILLINOIS
THIS 4th DAY OF JANUARY, 2021

Published in pamphlet form by authority of the Village Board of Trustees of the Village of Stonington, Christian County, Illinois, the 4th day of January, 2021.

Village of Stonington
RESOLUTION NUMBER 21-453

VILLAGE OF STONINGTON RESOLUTION OF ADOPTION OF THE CHRISTIAN COUNTY MULTI-JURISDICTINOAL ALL HAZARDS MITIGATION PLAN

WHEREAS, VILLAGE OF STONINGTON is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the VILLAGE OF STONINGTON desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was updated in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, VILLAGE OF STONINGTON has participated in updating the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

NOW THERFORE, be it resolved that the VILLAGE OF STONINGTON hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan update as the official Hazard Mitigation Plan of VILLAGE OF STONINGTON; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED by a unanimous vote of the Board of Trustees this 4th day of January, 2021.

APPROVED:

____
Bruce Dowdy, President

ATTEST:

Jill Gilpin, Village Clerk

(SEAL)

Certificate

STATE OF ILLINOIS }

COUNTY OF CHRISTIAN } ss.

VILLAGE OF STONINGTON }

I, Jill Gilpin, certify that I am the duly elected and acting Municipal Clerk of the Village of Stonington, Christian County, Illinois.

I further certify that on January 4, 2021, the Board of Trustees of the Village Stonington passed and approved **RESOLUTION NO. 21-453, VILLAGE OF STONINGTON RESOLUTION OF ADOPTION OF THE CHRISTIAN COUNTY MULTI-JURISDICTINOAL ALL HAZARDS MITIGATION PLAN.**

In witness whereof, I have set my hand and affixed the corporate seal of the Village of Stonington, Illinois, this 4th day of January, 2021.

Jill Gilpin

Jill Gilpin, Village Clerk
Village of Stonington, Illinois

(SEAL)

Resolution No. 1465
City of Taylorville, Illinois
Resolution of Adoption
of the
Christian County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, City of Taylorville is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the City of Taylorville desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was updated in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, City of Taylorville has participated in updating the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

NOW THERFORE, be it resolved that the City of Taylorville hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan update as the official Hazard Mitigation Plan of City of Taylorville; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

Resolution No. 1461 is hereby repealed; date of adoption of Resolution No. 1465 is retroactive to February 1, 2021.

ADOPTED on April 19, 2021

CERTIFIED by Bruce J Barry
Bruce J Barry, Mayor

ATTESTED by Julie Lilly
Julie Lilly, City Clerk

YEAS:Aldermen Bryant, Budd, Burtle, Dorchinecz, Driskell, Lanzotti, Olive, and Skultety

NAYS:None

Taylorville CUSD#3
Resolution of Adoption of the
Christian County Multi-Jurisdictional All Hazards Mitigation Plan

WHEREAS, Taylorville CUSD#3 is subject to natural and man-made hazards including severe thunderstorms, severe winter storms, floods, tornadoes, and drought among others, that pose risks to public health and property; and

WHEREAS, the Taylorville CUSD#3 desires to prepare and mitigate for such natural and man-made hazards; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the Christian County Multi-Jurisdictional All Hazards Mitigation Plan was updated in accordance with the regulations of the Disaster Mitigation Act of 2000 and the guidance provided by FEMA; and

WHEREAS, Taylorville CUSD#3 has participated in updating the Christian County Multi-Jurisdictional All Hazards Mitigation Plan covering member jurisdictions of Christian County:

NOW THERFORE, be it resolved that the Taylorville CUSD#3 hereby:

1. Adopts the Christian County Multi-Jurisdictional All Hazards Mitigation Plan update as the official Hazard Mitigation Plan of Taylorville CUSD#3; and
2. Agrees to participate in the annual and 5-year updates to this Plan.

ADOPTED on January 11, 2021

CERTIFIED by Stephen L Turner

Stephen Turner,
School Board President

Seal

ATTESTED by Tricia Marburger

Tricia Marburger,
School Board Secretary