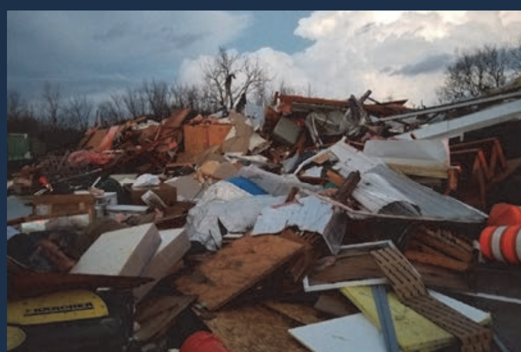
Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Plan

2024 Update

Draft

Montgomery County, Illinois




Participants:

Montgomery County
Coffeen, City of
Coffeen Volunteer Fire Department
Farmersville, Village of
Fillmore Community Fire Protection District
Harvel, Village of
Hillsboro, City of
Litchfield, City of
Nokomis, City of
Nokomis Area Fire Protection District
Raymond, Village of
Raymond-Harvel Fire Department
Rountree Township
Schram City, Village of
Taylor Springs, Village of
Waggoner, Village of
Witt, City of

January 2024

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

Cover photographs from left to right and top to bottom:

- *Roadway flooding at Meisenheimer Ave. looking east, Glenn Shoals Lake in Hillsboro from December 27, 2015 – photograph courtesy of the Montgomery County Emergency Management Agency*
- *Tree damaged sustained during the December 1, 2006 severe winter storm at Hillsboro – photograph courtesy of the Hillsboro Journal-News*
- *An August 19, 2009 thunderstorm with damaging downed trees – photograph courtesy of the Montgomery County Emergency Management Agency*
- *A thunderstorm with damaging winds caused tree damage – photograph courtesy of the Hillsboro Journal-News*
- *An EF1 tornado damaged Kinney Contractors southwest of Raymond along Interstate 55 on December 1, 2018 – photograph courtesy of Kinney Contractors*
- *Flash flooding caused water to flow across South Main Street in Hillsboro – photograph courtesy of the Hillsboro Journal-New*

MONTGOMERY COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

MONTGOMERY COUNTY, ILLINOIS

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Researched and written for the Montgomery 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 Montgomery County. Since 2002 Montgomery County has been included in four major federally-declared disasters. **Figure I-1** identifies each declaration including the year the disaster was declared and the type of hazard that triggered the declaration. Since 2010, the County has been included in eight state disaster proclamations. **Figure I-2** identifies the year the proclamation was issued and the type of natural hazard that triggered the declaration. The hazard(s) recognized as contributing to the declaration for Montgomery County is identified in bold.

Figure I-1
Major Federal Disaster Declarations: Montgomery County

Declaration #	Year	Hazard(s) Covered by Declaration
1416	2002	**severe storms**; tornadoes; **flooding**
1681	2006	**severe winter storm**
1800	2008	severe storms; **flooding**
4489	2020	**COVID-19 pandemic**

Figure I-2
State Disaster Proclamations: Montgomery County

Year	Hazard(s) Covered by Declaration
2011	**winter weather**
2011	**high wind**; tornadoes; torrential rain
2014	**heavy snowfall; frigid temperatures**
2019	**winter storm** (frigid temperatures)
2020	**COVID-19**
2021	**winter storms**
2022	**winter storms**
2022	**Monkeypox**

In the last 10 years alone (2013 – 2022), there have been 54 excessive heat events, 43 thunderstorms with damaging winds, 27 flash flood events, 19 extreme cold events, 18 tornadoes, 13 severe winter storms, 9 riverine flood events, 8 severe storms with hail one inch in diameter or greater, 2 lightning strike events with verified damages, and one wildfire in the County.

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

What is hazard mitigation planning?

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

Why update a natural hazards mitigation plan?

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

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

How is this plan different from other emergency plans?

A natural hazards mitigation plan is aimed at identifying projects and activities that can be conducted prior to a natural disaster, unlike other emergency plans which provide direction on how to respond to a disaster after it occurs. This is the second time that Montgomery County has updated its hazard mitigation plan. The original plan was completed in 2010 and the first update was competed in 2016. This update describes in detail the actions that can be taken to help reduce or eliminate damages caused by specific types of natural hazards.

1.1 PARTICIPATING JURISDICTIONS

Recognizing the benefits of having an updated Natural Hazards mitigation plan, the Montgomery County Board authorized the update of the Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Plan (hereto referred to as the Plan). The County then invited all the local government entities within Montgomery County to participate. **Figure I-3** identifies the participating jurisdictions represented in the Plan update who sought Plan approval.

Figure I-3 Participating Jurisdictions Represented in the Plan	
❖ Coffeen, City of	❖ Nokomis Area Fire Protection District
❖ Coffeen Volunteer Fire Department	❖ Raymond, Village of
❖ Farmersville, Village of	❖ Raymond-Harvel Fire Department
❖ Fillmore Community Fire Protection District	❖ Rountree Township
❖ Harvel, Village of	❖ Schram City, Village of
❖ Hillsboro, City of	❖ Taylor Springs, Village of
❖ Litchfield, City of	❖ Waggoner, Village of
❖ Nokomis, City of	❖ Witt, City of

While all of the municipalities within the County were invited and encouraged to participate in the Plan update via both electronic and verbal communications, none of the remaining municipalities chose to engage in the process and therefore are not included as participating jurisdictions in the Plan update.

1.2 COUNTY PROFILE

Montgomery County is located in central Illinois and covers approximately 710 square miles. **Figure I-4** provides a location map of the County and the participating municipalities while **Figure I-5** identifies the boundaries of the census tracts located in the County. **Figures I-6** and **I-7** identify the boundaries of the Montgomery County townships and fire protection districts. It should be noted that since the Previous Plan update was completed South Fillmore Township merged with Fillmore Township to create Fillmore Consolidated Township. As a result there are now 18 townships located in the County.

The County is bounded to the north by Sangamon and Christian Counties, to the east by Shelby and Fayette Counties, to the south by Bond and Madison Counties and to the west by Macoupin County. The County seat is located in the City of Hillsboro. The topography is generally flat to gently sloping.

The County is situated in the northern portion of the Till Plains Section of the Central Lowland Province of the Interior Plains. Soils are predominantly loess and Illinoisan till. There are well defined valleys with broad flood plains and stream terraces along the major streams and rivers. Most areas are well-drained for crops grown in this area. The Kaskaskia watershed encompasses almost the entire County, with the exception of northwestern portion which is drained by the Macoupin and Sangamon watersheds and a small portion of the western edge which is drained by the Mississippi watershed.

According to the Multi-Resolution Land Characteristics (MRLC) Consortium, in approximately 94% of the County's land cover was vegetation, including developed open spaces, cultivated crop land, pasture/hay, and deciduous/mixed forest while 7.2% of the County's land cover was considered developed with 1.9% impervious surfaces. Between 2016 and 2021 approximately 1.77 square miles or 0.25% of the land cover in the County changed with 0.03 square miles of development and 0.22 square miles of impervious surfaces gained. **Figure I-8** illustrates the changes by land cover type.

Agriculture is an important enterprise in Montgomery County. According to the 2017 Census of Agriculture, there were 1,067 farms in Montgomery County occupying approximately 97.3% (438,834 acres) of the total land area in the County. In comparison, there were 1,021 farms occupying approximately 84% (382,388 acres) of the total land area in the County in 2012. The major crops include corn, soybeans, and winter wheat while the major livestock includes hogs and beef cattle. The County ranks 13th in the State for crop cash receipts and 35th for livestock cash receipts.

The largest employment sectors in Montgomery County are health care/social assistance and retail trade, followed by manufacturing, educational services, and construction according to the Illinois Department of Commerce and Economic Opportunity. Leading employers include Curaleaf, Dometic, Graham Correctional Center, Hillsboro CUSD, Hillsboro Area Hospital, HSHS St. Francis Hospital, Walmart, and area nursing centers.

Figure I-8
Montgomery County Land Cover Data: 2016 to 2021

Land Cover Categories	Area 2016	Area Lost	Area Gained	Area 2021	Net Change	Percent Change
Developed, High Intensity	1.32	0.00	0.08	1.39	0.08	5.94%
Developed, Medium Intensity	6.47	-0.01	0.37	6.83	0.37	5.67%
Developed, Low Intensity	22.90	-0.16	0.08	22.82	-0.07	-0.32%
Developed, Open Space	20.44	-0.36	0.02	20.10	-0.34	-1.66%
Cultivated Crops	500.80	-0.27	0.08	500.61	-0.19	-0.04%
Pasture/Hay	45.85	-0.10	0.01	45.77	-0.09	-0.19%
Grassland	0.78	-0.08	0.33	1.03	0.25	32.06%
Deciduous Forest	90.17	-0.14	0.04	90.07	-0.10	-0.11%
Evergreen Forest	0.10	0.00	0.00	0.10	0.00	-2.01%
Mixed Forest	11.07	-0.06	0.01	11.02	-0.05	-0.46%
Scrub/Shrub	0.28	-0.04	0.09	0.32	0.05	17.53%
Woody Wetland	0.46	0.00	0.00	0.46	0.00	0.00%
Emergent Herbaceous Wetland	0.15	0.00	0.33	0.49	0.33	217.65%
Barren Land	0.53	-0.10	0.31	0.73	0.21	39.18%
Open Water	8.33	-0.47	0.02	7.89	-0.44	-5.32%
Perennial Snow/Ice	0.00	0.00	0.00	0.00	0.00	0.00%

Source: Multi-Resolution Land Characteristics Consortium's National Landcover Database.

Figure I-9, located at the end of this section, provides demographic and socio-economic data for the County, township, and municipalities. Of the participating jurisdictions, Coffeen, Farmersville, Harvel, Raymond, Schram City, Taylor Springs, Waggoner, and Witt meet the definition of an Economically Disadvantaged Rural Community (EDRC). FEMA defines an EDRC as a community of 3,000 or fewer individuals whose residents have an average per capita annual income not exceeding 80 percent of the U.S. per capita income based on best available data.

Figure I-10, also located at the end of this section, provides additional demographic information by census tract with the U.S. Council on Environmental Quality Climate and Economic Justice Screening Tool (CEJST) and the CDC/ATSDR Social Vulnerability Index (SVI) and overall level of vulnerability. CEJST is a geospatial mapping tool that identifies census tracts across the nation where communities are faced with significant burdens, which are grouped into eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. Communities are considered disadvantaged if they are in census tracts that meet the thresholds for at least one of these categories. In Montgomery County, Farmersville, Harvel, Hillsboro, Litchfield, Raymond, Waggoner, Witt, Fillmore Community Fire Protection District, and Raymond-Harvel Fire Department are considered disadvantaged.

The SVI is a database that uses U.S. Census Bureau American Community Survey data to rank census tracts and counties on 16 social factors within four themes: Socioeconomic Status, Household Characteristics, Racial & Ethnic Minority Status, and Housing Type & Transportation. The goal of the SVI is to help emergency response planners and public health officials identify, map, and plan support for communities that will most likely need support before, during, and after a public health emergency.

The rankings generated by the SVI describe a county's or census tract's relative vulnerability among all other U.S. counties and census tracts. The SVI data used in this document is based on 2020 census tract information. Rankings are based on percentiles ranging from 0 to 1, with higher values indicating greater vulnerability. Each ranking is assigned to one of four levels of vulnerability: Low (0 – 0.2499), Low to Medium (0.2500 – 0.4999), Medium to High (0.5000 – 0.7499), and High (0.7500 – 1). A community with an SVI of 0.6000 or greater is considered an underserved and/or disadvantaged community. In Montgomery County the participating jurisdictions that meet this definition would be Hillsboro, Litchfield, and Schram City.

Figure I-11 provides basic demographic information about the size and populations served by the participating fire protection districts.

Figure I-11
Demographic Data by Participating Fire Protection District

Participating District	Number of Fire Stations	Estimated Population Served	Area Served (Sq. Miles) (2020)	Communities / Unincorp. Areas Served in the County	Census Tracts Falling with the District
Coffeen Volunteer Fire Department	1	2,800	81	Coffeen	9580
Fillmore Community Fire Protection District	1	1,500	82	Fillmore	9574, 9580
Nokomis Area Fire Protection District	1	3,500	110	Coalton, Nokomis, Ohlman, Wenonah	9573, 9574
Raymond-Harvel Fire Department	2	3,500	127	Harvel, Raymond	9574, 9575, 9576

Source: Capability Assessment Worksheets – Fire Protection Districts.

1.3 Land Use and Development Trends

Population growth and economic development are two major factors that trigger changes in land use. Montgomery County is largely rural with a population that has seen a 2.4% decrease between 1900 and 2010 from 30,836 to 30,104. Between 2010 and 2020 the population decreased by 6.0% from 30,124 to 28,288. During that same time period, all of the participating municipalities experienced population decreases with the exception of Taylor Springs, which increased by about 5%.

Land use in Montgomery County is primarily agricultural. As discussed in the previous section, approximately 97% 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 mainstay of the County's economy.

According County and municipal officials, changes in development since the previous Plan was approved have only occurred in Litchfield and unincorporated Montgomery County. According to the Litchfield Economic Development Director, the Dean Meier Industrial Park ahs been built out and the Route 66 Industrial Park has approximately 24 acres remaining out of approximately 66 acres. The City has also annexed property on the northwest side of Interstate 55 converting 130 acres of farmland into the I-55 Enterprise Hub industrial park and will be installing a high-pressure gas main to this area in 2024.

According to the Montgomery County Emergency Management Agency Director and Supervisor of Assessments, the 915 megawatt coal-fired Coffeen Power Station, located south of Coffeen, was shut down in November 2019. Currently a solar panel and lithium battery storage facility is being planned for this property. No other development projects are on the immediate horizon for the County, although it is open to the development of wind energy.

Of the participating jurisdictions, only Litchfield has experienced any small residential development (i.e., new home subdivisions, multi-family use housing, etc.). According to the Litchfield Economic Development Director, a 41-lot residential subdivision on 70 acres owned by the City is being developed along Lake Lou Yaeger near 16th Avenue about three miles northeast of the City.

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.

Figure I-4
Location Map

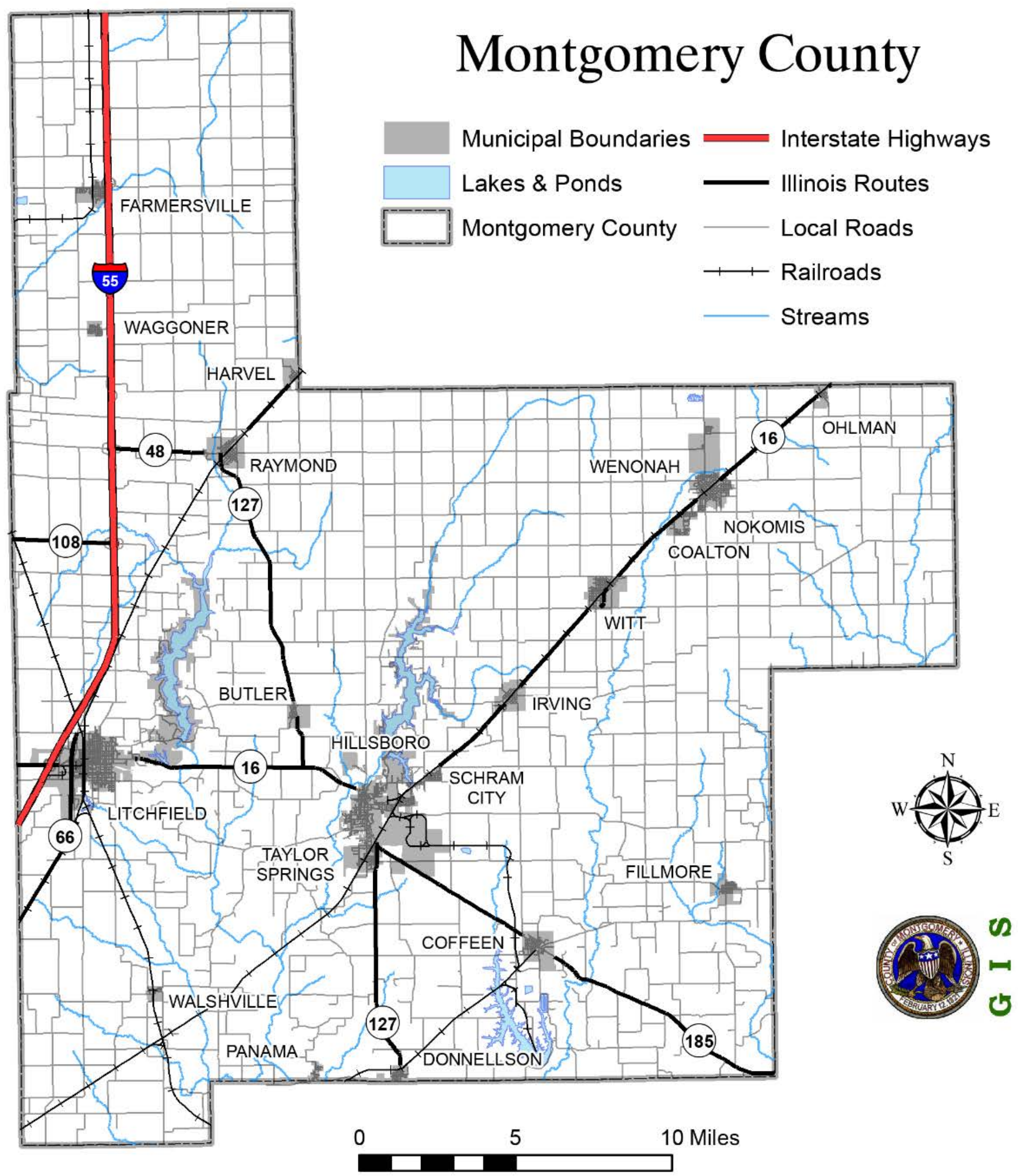


Figure I-5
Montgomery County 2020 Census Tract Map

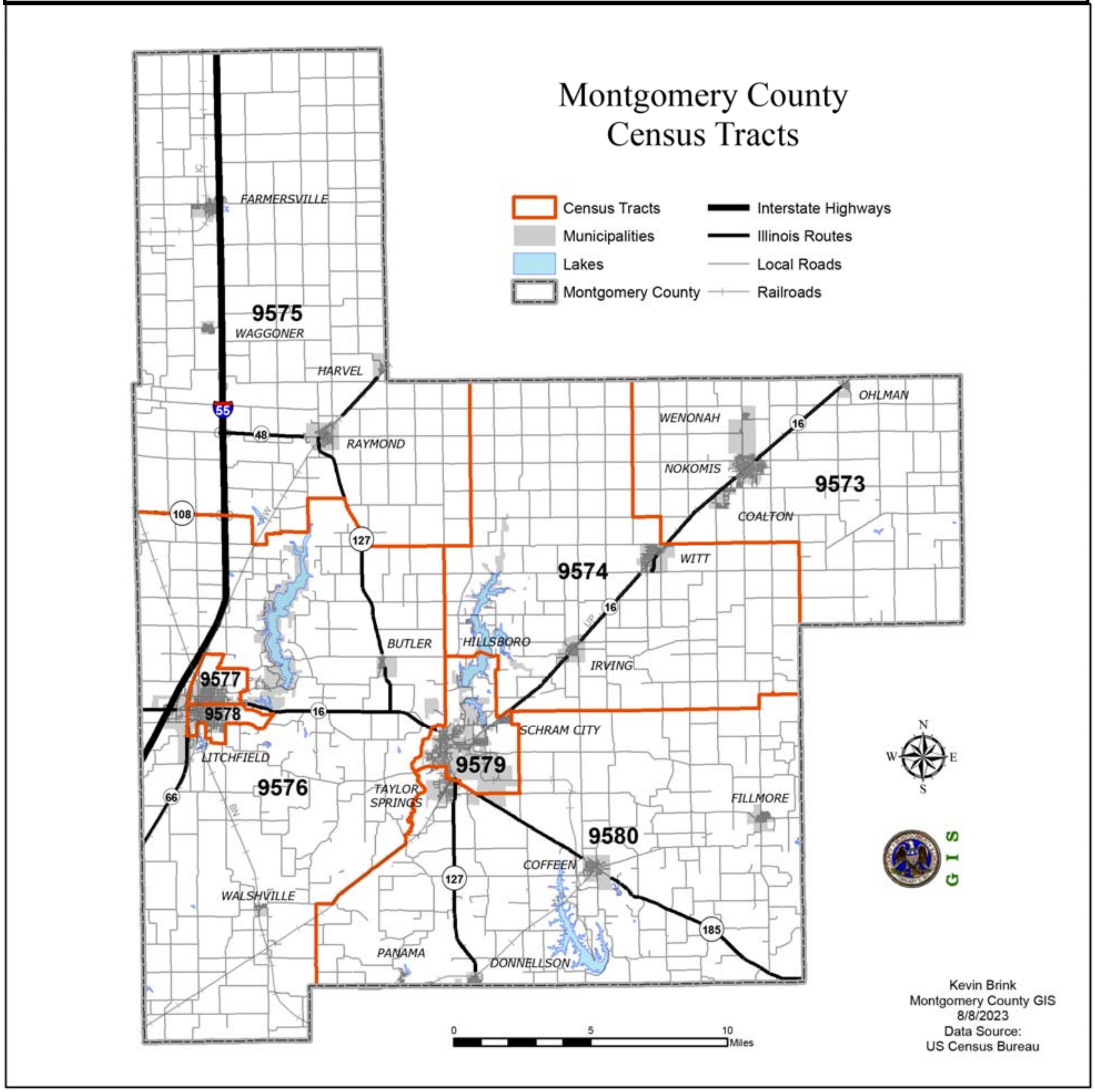


Figure I-6
Township Boundary Map

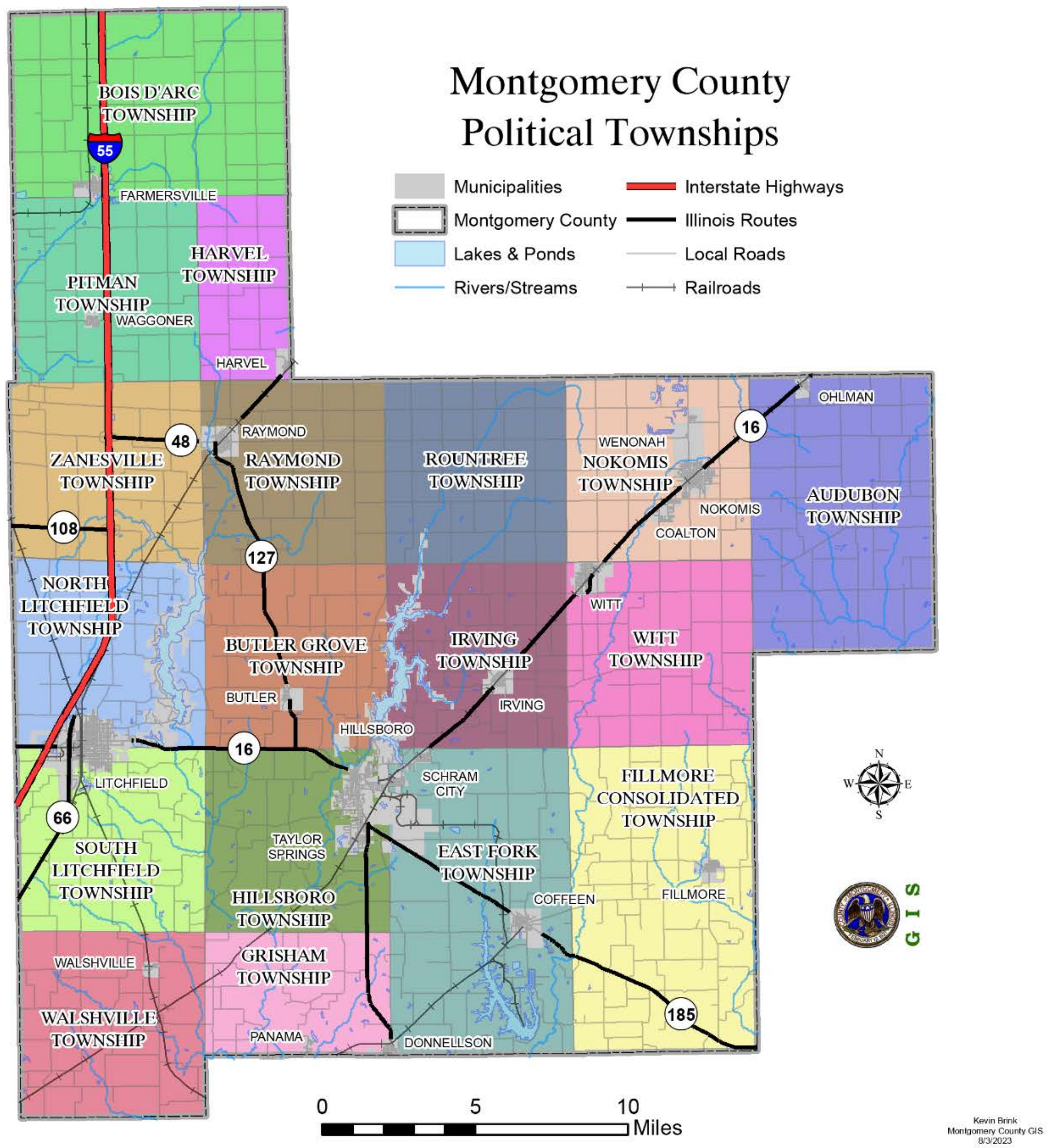


Figure I-7
Fire Protection District Boundary Map

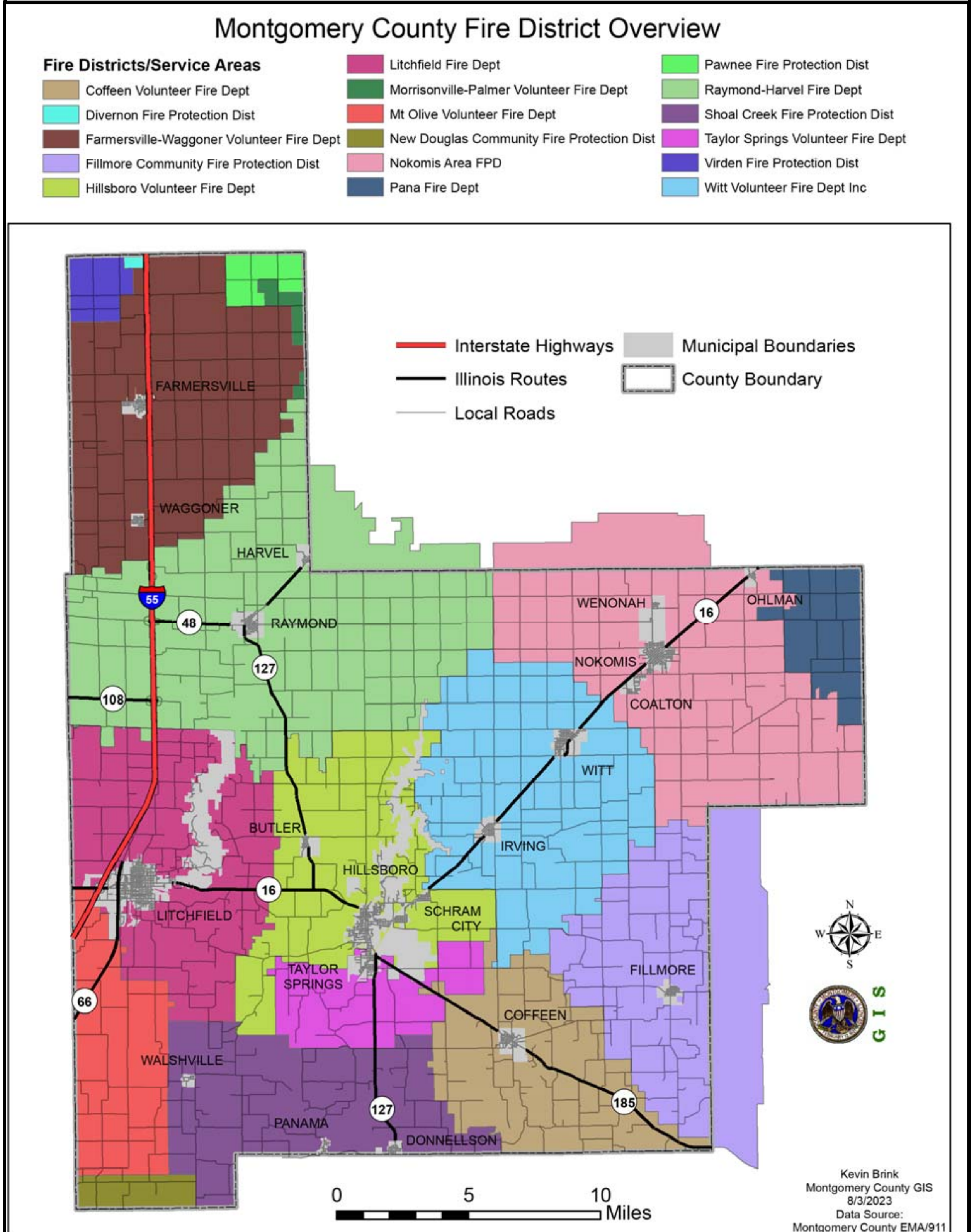


Figure I-9
2017-2021 Demographic Data by Participating Jurisdiction

Participating Jurisdiction	**Population**	**Projected Population (2030)**	**Total Area (Sq. Miles) (2020)**	**Number of Housing Units**	**Percent Race**								**Income**			**Total Assessed Value of Housing Units (2021)**
					White (alone)	Black or African American (alone)	Asian (alone)	Hispanic or Latino (of any race)	American Indian & Alaska Native (alone)	Native Hawaiian & Other Pacific Islander (alone)	Some other Race (alone)	Two or more Races	% of People whose Income is below the Poverty Line	Per Capita Income	EDRC*	
Montgomery County (Total)	28,482	27,058	703.764	12,581	93.7%	3.9%	0.4%	1.8%	0.1%	0.0%	0.5%	1.4%	14.6%	$28,449	---	$402,273,201
Montgomery County (Unincorp.)	6,391	6,072	672.805	3,096	98.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	9.6%	---	---	$157,956,532
Coffeen	542	515	1.161	292	99.6%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	14.8%	$26,877	Y	$1,611,064
Farmersville	690	656	0.703	329	97.2%	0.0%	0.0%	14.1%	0.3%	0.0%	0.1%	2.3%	15.3%	$27,468	Y	$7,859,613
Harvel	172	163	0.438	74	99.2%	0.0%	0.0%	9.2%	0.0%	0.0%	0.0%	0.8%	22.7%	$17,711	Y	$710,036
Hillsboro	6,633	6,301	8.262	1,951	81.8%	14.6%	0.0%	5.0%	0.1%	0.0%	2.0%	1.5%	16.5%	$20,441	N	$37,287,643
Litchfield	6,960	6,612	8.989	3,466	95.9%	1.8%	0.5%	0.3%	0.1%	0.0%	0.0%	1.8%	17.6%	$27,020	N	$62,399,386
Nokomis	2,252	2,139	1.261	1,020	97.8%	0.1%	1.5%	0.3%	0.0%	0.0%	0.0%	0.6%	10.0%	$31,843	N	$14,541,458
Raymond	1,000	950	1.258	407	95.8%	0.0%	2.4%	0.1%	0.6%	0.0%	0.0%	1.2%	13.1%	$24,857	Y	$10,732,089
Schram City	539	512	0.674	315	96.7%	1.1%	0.0%	1.9%	0.0%	0.0%	1.9%	0.4%	13.4%	$28,921	Y	$3,752,849
Taylor Springs	702	667	1.050	326	99.7%	0.0%	0.0%	3.1%	0.0%	0.0%	0.3%	0.0%	21.2%	$23,010	Y	$3,490,151
Waggoner	139	132	0.244	88	98.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	27.3%	$25,971	Y	$1,027,117
Witt	638	606	1.237	347	98.6%	0.6%	0.0%	0.8%	0.0%	0.0%	0.3%	0.5%	16.6%	$25,133	Y	$4,339,260
Rountree Township	120	114	35.812	84	100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	$54,762	N	$641,630
Illinois	12,821,813	12,841,250	55,513.18	5,412,995	67.8%	14.1%	5.7%	17.5%	0.3%	0.04%	6.2%	6.2%	11.8%	$39,571	---	---
US	329,725,481	---	3,533,038	139,647,020	68.2%	12.6%	5.7%	18.4%	0.8%	0.2%	5.6%	5.6%	12.6%	$37,638	---	---

* For the purposes of FEMA's Hazard Mitigation Assistance grant programs administered by the Illinois Emergency Management Agency and Office of Homeland Security, an Economically Disadvantaged Rural Community (EDRC) is defined in Illinois as a community of 3,000 or fewer individuals whose residents have an average per capita annual income not exceeding 80 percent of the U.S. per capita income based on best available data.

Sources: Montgomery County Clerk.
Illinois Department Public Health, Population Projections – Illinois, Chicago and Illinois Counties by Age and Sex: July 1, 2015 to July 1, 2030 (2019 Edition).
U. S. Census Bureau, American Community Survey, 5-Year Data Profile.

Figure I-10
2017-2021 Demographic Data by Census Tract
(Sheet 1 of 2)

Census Tract (2020)	Incorporated Municipalities and Townships that Fall Within Census Tract	Population (2017-2021)	Total Area (Sq. Miles) (2020)	Number of Housing Units (2017-2021)	Percent Race								Income	CEJST	Social Vulnerability Index	
					White (alone)	Black or African American (alone)	Asian (alone)	Hispanic or Latino (of any race)	American Indian & Alaska Native (alone)	Native Hawaiian & Other Pacific Islander (alone)	Some other Race (alone)	Two or more Races	% of People whose Income is below the Poverty Line	Identified as Dis-Advantaged	Nation-wide Overall SVI Ranking (2020)	Level of Vulnerability
9573	Coalton, Nokomis, Ohlman, Wenonah, Audubon Township, Nokomis Township	3,083	89.350	1,499	98.4%	0.1%	1.1%	0.2%	0.0%	0.0%	0.0%	0.4%	9.8%	No	0.4385	Low to Medium
9574	Hillsboro, Irving, Witt, Buttler Grove Township, Irving Township, Nokomis Township, Rountree Township, Witt Township	2,006	109.841	979	99.3%	0.3%	0.0%	0.4%	0.0%	0.0%	0.1%	0.3%	20.9%	Yes	0.4257	Low to Medium
9575	Farmersville, Harvel, Raymond, Waggoner, Bois D'Arc Township, Harvel Township, Pittman Township, Raymond Township, Zanseville Township	2,915	173.763	1,267	97.8%	0.0%	0.8%	4.1%	0.3%	0.0%	0.0%	1.1%	11.1%	Yes	0.2183	Low
9576	Butler, Litchfield, Walshville, Butler Grove Township, Grishham Township, Hillsboro Township, North Litchfield Township, Raymond Township, South Litchfield Township, Walshville Township, Zanseville Township	3,427	167.374	1,595	99.3%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.5%	6.3%	No	0.0531	Low
Montgomery County		28,482	703.764	12,581	93.7%	3.9%	0.4%	1.8%	0.1%	0.0%	0.5%	1.4%	14.6%	---	0.0598	Low

Figure I-10
2017-2021 Demographic Data by Census Tract
(Sheet 1 of 2)

Census Tract (2020)	**Incorporated Municipalities and Townships that Fall Within Census Tract**	**Population (2017-2021)**	**Total Area (Sq. Miles) (2020)**	**Number of Housing Units (2017-2021)**	**Percent Race**								**Income**	**CEJST**	**Social Vulnerability Index**	
					White (alone)	Black or African American (alone)	Asian (alone)	Hispanic or Latino (of any race)	American Indian & Alaska Native (alone)	Native Hawaiian & Other Pacific Islander (alone)	Some other Race (alone)	Two or more Races	% of People whose Income is below the Poverty Line	Identified as Dis-Advantaged	Nation-wide Overall SVI Ranking (2020)	Level of Vulnerability
9577	Litchfield, North Litchfield Township	2,997	2.926	1,447	93.8%	0.9%	1.3%	0.2%	0.0%	0.0%	0.0%	4.1%	16.4%	No	0.3475	Low to Medium
9578	Litchfield, North Litchfield Township, South Litchfield Township	3,390	2.570	1,699	97.1%	2.8%	0.0%	0.4%	0.1%	0.0%	0.0%	0.0%	21.8%	Yes	0.7337	Medium to High
9579	Hillsboro, Schram City, Butler Grove Township, East Fork Township, Hillsboro Township, Irving Township	4,657	11.892	2,291	97.9%	0.3%	0.0%	1.9%	0.1%	0.0%	1.5%	0.3%	16.3%	No	0.6336	Medium to High
9580	Coffeen, Donnellson, Fillmore, Panama, Taylor Springs, East Fork Township, Fillmore Consolidated Township, Hillsboro Township, Grisham Township, Witt Township	6,007	146.048	1,804	79.1%	16.2%	0.1%	4.6%	0.0%	0.0%	1.3%	3.3%	15.9%	No	0.4261	Low to Medium
Montgomery County		28,482	703.764	12,581	93.7%	3.9%	0.4%	1.8%	0.1%	0.0%	0.5%	1.4%	14.6%	---	0.0598	Low

Sources: CDC/ATSDR Social Vulnerability Index.
U.S. Census Bureau, American Community Survey, 5-Year Data Profile.

2.0 PLANNING PROCESS

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

Figure PP-1
Description of Planning Process

Tasks	Description
Task One: Building the Planning Team	The Planning Committee was reformed with broad representation and specific expertise to assist the County, and the Consultant in updating the Plan.
Task Two: Outreach Strategy	Early and ongoing public involvement activities were conducted throughout the Plan's development to ensure the stakeholders and public was given every opportunity to participate and provide input.
Task Three: Risk Assessment	The Consultant identified and profiled the natural hazards that have impacted the County and conducted vulnerability analyses to evaluate the risk to each participating jurisdiction.
Task Four: Capability Assessment	Participating jurisdictions have a unique set of capabilities and resources available to accomplish hazard mitigation. Capabilities that include planning and regulatory, administrative and technical, financial, and education and outreach were identified and cataloged to determine the existing capabilities of each participant related to hazard and loss reduction/prevention.
Task Five: Mitigation Strategy	After reviewing existing plans and completing the risk assessment, the Consultant assisted the Planning Committee in updating the goals and objectives for the Plan. The participating jurisdictions were then asked to identify mitigation actions that had been started and/or completed since the previous Plan was adopted. In addition, they were 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 Six: Plan Maintenance and Update	The method and schedule for monitoring, evaluating, and updating the Plan was reviewed and discussed with the participating jurisdictions. The Plan update will be monitored and evaluated by a Plan Maintenance Subcommittee on an annual basis and updated again in five years.
Task Seven: Review and Adopt the Plan	The draft Plan update summarized the results of Tasks Two through Seven. The Plan was reviewed by the participants and a public forum was held to give the public an additional opportunity to provide input. Comments received were incorporated into the draft Plan update and submitted to the Illinois Emergency Management Agency and Office of Homeland Security (IEMA-OHS) and FEMA for review and approval. Comments received from IEMA-OHS and FEMA were incorporated into the final Plan update. The final Plan update was then submitted to the County and participating jurisdictions for adoption.

The Plan update and development was led at the staff level by Kevin Schott, the Montgomery County Emergency Management Agency (EMA) Director. American Environmental Corp. (AEC) an environmental consulting firm, with experience in hazard mitigation, risk assessment and public involvement, was employed to guide the County and participating jurisdictions through the planning process.

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

- Attend at least one Committee meeting.
- Complete a capability assessment identifying existing capabilities and resources (i.e., plans, policies, ordinances studies, reports, maps, etc.) available to accomplish hazard mitigation.
- Identify/update a list of critical infrastructure and facilities.
- Review the risk assessment and provide additional information on events and damages when available.
- Participate in the update of the mitigation goals and project prioritization methodology.
- Provide information on any mitigation actions started and/or completed since the adoption of the previous 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 Mitigation Advisory Committee

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

Figure PP-2 details the entities represented on the Committee and the individuals who attended on their behalf. The Planning Committee was chaired by the Montgomery County EMA. Additional technical expertise was provided by the staff at the Illinois Emergency Management Agency and the Illinois Department of Natural Resources Office of Water Resources.

Mission Statement

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

The mission of the Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee is to update the County's mitigation plan in an effort to identify and reduce the negative impacts of natural hazards on individuals, infrastructure, private property and critical facilities.

Figure PP-2
Montgomery County Planning Committee Member Attendance Record

Representing	Name	Title	10/19/2022	2/8/2023	5/24/2023	8/23/2023	1/24/2024
Ameren Illinois	Passariello, Vito	Supervisor of Business Administration and Customer Service	X				
American Environmental Corporation	Bostwick-Campbell, Andrea	EMS Manager	X	X	X	X	
American Environmental Corporation	Smith, Callie	Environmental Analyst	X	X	X	X	
Audubon Township	Rakers, Jackie	Township Clerk	X				
Coffeen Volunteer Fire Department	Tarran, Walter	Fire Chief	X	X	X		
Coffeen Volunteer Fire Department	Wasson, Collin	Fire Chief				X	
Coffeen Volunteer Fire Department	Wessell, Robert	President		X	X		
Coffeen, City of	Wessell, Robert	Mayor / Commissioner	X	X	X		
Coffeen, City of	White, Sheila	Mayor	X				
Farmersville, Village of	Clarke, Lynn	Trustee	X	X	X		
Farmersville, Village of	Orr, Douglas	President				X	
Farmersville-Waggoner Volunteer Fire Department	Byers, Brian	Fire Chief	X				
Fillmore Community Fire Protection District	Beckman, Darin	Fire Chief			X	X	
Fillmore Community Fire Protection District	Boliard, Rex	Assistant Chief	X				
Fillmore, Village of	Boliard, Rex	Village President	X				
Fillmore, Village of	Casterline, John	EMA Representative		X			
Harvel, Village of	Downey, Cathie	President				X	
Hillsboro, City of	Downs, Don	Mayor				X	
Hillsboro, City of	Leetham, Randy	Police Chief	X				
Irving Township	Singler, Randy	Supervisor	X				
Irving, Village of	Caulk, Kenda	President		X			
Litchfield, City of	Dougherty, Steve	Mayor	X	X			
Litchfield, City of	Hollo, Dave	Council Member	X	X			
Litchfield, City of	Pennock, Adam	EMA Coordinator / Firefighter / Fire Chief	X	X		X	
Litchfield, City of	Vazquez, Breann	Administrator				X	
Montgomery County - 911	Boyd, Ed	Coordinator	X	X			
Montgomery County - Clerk's Office	Leitheiser, Sandy	Clerk & Recorder	X	X	X	X	
Montgomery County - Coroner's Office	Leetham, Randy	Coroner	X				
Montgomery County - County Coordinator's Office	Daniels, Christine	County Coordinator	X	X	X	X	
Montgomery County - EMA	Gasparich, Joseph	Deputy Director	X	X	X		
Montgomery County - EMA	Hough, Dan	Deputy Director	X	X			
Montgomery County - EMA	Schott, Kevin	Director	X		X		
Montgomery County - GIS Office	Brink, Kevin	GIS Technician	X	X	X	X	
Montgomery County - Health Department	Satterlee, Hugh	Administrator	X	X	X		
Montgomery County - Highway Department	Greenwood, Cody	County Engineer	X	X			
Montgomery County - Sheriff's Office	Robbins, Rick	Sheriff	X				
Nokomis Area Fire Protection District	Smalley, Michael	Fire Chief	X	X	X	X	
Nokomis, City of	Gasparich, Joseph	ESDA Coordinator	X	X	X		
Nokomis, City of	Stauder, Louis	Commissioner	X		X		
Ohlman, Village of	Rakers, Jackie	Mayor	X				
Raymond, Village of	Held, Dennis	Mayor		X	X	X	
Raymond, Village of	Hough, Dan	Trustee	X	X			
Raymond-Harvel Fire Department	McCallum, Danny	Fire Chief	X	X	X		
Rountree Township	Folkerts, Kenneth	Supervisor	X		X	X	
Schram City, Village of	Oberle, Albert	Mayor	X		X	X	
Schram City, Village of	Stewart, Kelvin	Trustee	X	X	X		
Taylor Springs, Village of	Daniels, Christine	Clerk	X	X	X	X	
Taylor Springs, Village of	Harrell, Kane	Public Works Superintendent			X		
Taylor Springs, Village of	Jackson, Harry	Mayor	X		X		
Taylor Springs, Village of	Reynolds, Sheri	Trustee	X				
Taylor Springs, Village of	Saathoff, Elwin	Trustee	X				
Waggoner, Village of	Seton, Ron	Mayor	X			X	
Walshville, Village of	Applegate, Gary	Trustee	X				
Witt, City of	Keiser, Don	Fire Chief				X	
Witt, City of	Keiser, Don	Fire Chief				X	

Planning Committee Meetings

The Planning Committee met five times between October 2022 and January 2024. **Figure PP-2** identifies the representatives by jurisdiction 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 – October 19, 2022

The purpose of this meeting was to explain the planning process to the Planning Committee members and give them a brief overview of the planning process including what mitigation is, what a hazards mitigation plan is and why the Plan needs to be updated. A discussion regarding the hazards to be included in the Plan update was conducted and an electronic survey was sent out following the meeting asking Planning members whether mine subsidence, wildfires, and landslides should be included in the Plan update. Based on the responses received, the Planning Committee chose to include mine subsidence and wildfires. The Committee did not feel landslides posed a significant impact on the County and therefore decided not to include the hazard in the update.

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

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

Second Planning Committee Meeting – February 8, 2023

At the second Committee meeting portions of the updated natural hazard risk assessment sections were presented for review. Following the review of the risk assessment, the Committee members participated in an exercise to calculate the Risk Priority Index (RPI) for the County and participating jurisdictions. The RPI can assist participants in determining which hazards present the highest risks and therefore which ones to focus on when formulating mitigation projects and activities. The Committee then reviewed and discussed the previous mission statement and mitigation goals. The mission statement was finalized with no changes. The previous list of goals was approved with a wording modification to Goal 6, “rivers” was changed to “waterways”.

Next, mitigation actions were defined, and examples were discussed. Committee members were asked to identify any mitigation projects and activities their jurisdictions had started and/or completed since the previous Plan was completed in 2016. 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 – May 24, 2023

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

The concept of community lifelines was also discussed. Community lifelines enable the continuous operation of critical government and business functions essential to human health and safety or economic security. While the concept was developed to support emergency response and planning, FEMA has begun applying it to all phases of emergency management, including mitigation. Community lifelines will be included in most project descriptions to create a clear connection to the concept.

Next, an explanation of what a mitigation action prioritization methodology is and how it fits into the Mitigation Strategy was provided. The Committee reviewed the updated previous mitigation project prioritization methodology and approved it with no changes. Finally, a discussion on how the mitigation projects and activities identified by the participating jurisdictions will be presented in the Plan update was provided. Participants were encouraged to provide their mitigation project lists prior to the 4th meeting when draft lists will be distributed for review.

Fourth Planning Committee Meeting – August 23, 2023

At the fourth Committee Meeting, members reviewed the draft jurisdiction-specific mitigation action tables which identified and prioritized the new and existing mitigation projects and activities provided by the participants. Members were given the opportunity to add additional projects and activities to their tables.

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

Fifth Planning Committee Meeting – January 24, 2024

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

2.2 OUTREACH STRATEGY

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

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

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

Citizen Questionnaire

A citizen questionnaire was developed to gather facts and gauge public perceptions about natural hazards that affect Montgomery County. The questionnaire was distributed electronically to the Committee members who were encouraged to make it available to their residents and the general public. A copy of the questionnaire as well as website and social media posts related to the questionnaire are contained in **Appendix C**.

A total of 28 questionnaires were completed and returned to the Committee. Questionnaires were completed by residents in each participating jurisdiction with the exception of Harvel, Schram City, Waggoner, and Witt. 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 Montgomery County followed by severe winter storms and excessive heat. However, compiled weather records indicate that excessive heat events followed by flood events, in fact, occur more frequently than severe winter storms.
- The most effective means of communication identified by respondents to disseminate information about natural hazards were the Internet and social media, followed by television and radio. Fact sheets/brochures disseminated via fire departments/law enforcement, as well as public workshops/meetings also received some support among respondents.
- In terms of the most needed mitigation projects and activities, the following categories received the strongest support:
  - maintain power during storms by burying power lines, trimming trees and/or purchasing backup generators (79%);
  - maintain roadway passages during snowstorms and heavy rains (64%);
  - flood or drainage protection (61%);
  - tornado safe shelters (50%); and
  - Sirens or other Alert Systems (46%).

FAQ Fact Sheet

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

News Releases/Articles & Web/Social Media Posts

News releases were prepared and submitted to local media outlets and posted to the Montgomery County Facebook and web pages prior to each 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 news releases while copies of the releases, Facebook posts, and any news articles published can be found in **Appendix F**.

Planning Committee Meetings

All of the meetings conducted by the Planning Committee were open to the public and publicized in advance to encourage public participation. At the end of each meeting, time was set aside for public comment. In addition, Committee members were available throughout the planning process to talk with residents and local government officials and were responsible for relaying any concerns and questions voiced by the public to the Committee. Interested individuals from the public who attended the Planning Committee meetings were provided handout materials and encouraged though not required to provide their names and/or sign the attendance sheets. Copies of the attendance sheets are included in **Appendix A**.

Public Forum

The final meeting of the Committee, held on January 24, 2024, was conducted as an open-house public forum. The open-house format was chosen for this forum instead of a hearing to provide greater flexibility for residents who wished to participate. Residents were able to come and go at any time during the forum, reducing conflicts with business, family, and social obligations.

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

At the forum, residents could review a draft of the Plan update; meet with representatives from the County, the participating jurisdictions, and the Consultant; ask any questions; and provide verbal and/or written comments on the draft Plan update. Individuals attending the public forum were provided with a two-page handout summarizing the planning process and a comment sheet that could be used to provide feedback on the draft Plan update. **Appendices G** and **H** contain copies of these materials.

Public Comment Period

After the public forum, the draft Plan update was made available for public review and comment through February 7, 2024 at the Montgomery County Emergency Management Agency's Office and on the County's website. A two-page handout summarizing the planning process and a link to a comment survey that could be used to provide feedback on the draft Plan update were also posted on the website. **Appendix H** contains a copy of the online comment survey. Residents were encouraged to submit their comments electronically, by mail or through representatives of the Committee.

Results of Outreach Strategy

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 thunderstorms with damaging winds, lightning strikes, and wildfires not available from state and federal databases.
- *Obtained critical facilities damage information.* Data collection surveys soliciting information about critical facilities damaged by natural hazards were used to supplement information obtained from government databases. This information was vital to the preparation of the vulnerability analysis.
- *Increased awareness of the impacts associated with natural hazard events within the County.* Understanding how mitigation actions can reduce risk to life and property helped generate ***approximately 50 new mitigation projects and activities*** at the local level that had not been previously identified in any other planning process.

2.3 Participation Opportunities for Interested Parties

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

Education

While the school districts serving Montgomery County were invited to serve on the Planning Committee through the Regional Office of Education (ROE) #3 and provide input into the planning process. While the ROE chose not to serve on the Planning Committee, it did receive all of the electronic communications including surveys, meeting announcements, and meeting handouts.

Healthcare & Social Service Agencies

Input was sought from the healthcare community and social service agencies. Representatives from the American Red Cross, Hillsboro Area Hospital, Latter Rain Ministries, Montgomery County Health Department, and St. Francis Hospital were invited to serve on the Planning Committee. While only the Health Department attended the Committee meetings and provided input into the planning process the other agencies did receive all of the electronic communications including surveys, meeting announcements, and meeting handouts. Multiple attempts via telephone and email were made to engage both hospitals with no success.

Utilities
Ameren Illinois was invited to serve on the Planning Committee. The utility Committee meetings and provided input into the planning process.

Other Government Entities
The fire departments/fire protection districts and townships in Montgomery County were contacted and invited to participate in the Plan update. Representatives from Auburn Township, Coffeen Volunteer Fire Department (FD), Farmersville-Waggoner Volunteer FD, Fillmore Community Fire Protection District (FPD), Irving Township, Nokomis Area FPD, Raymond-Harvel FD, and Rountree Township served on the Committee and provided input into the planning process. The Coffeen Volunteer FD, Fillmore Community FPD, Nokomis Area FPD, Raymond-Harvel FD, and Rountree Township chose to be included as participating jurisdictions in the Plan update.

Neighboring Counties
A memo was sent to EMA/ESDA/OEM coordinators in the neighboring counties inviting them to participate in the mitigation planning process. The counties contacted included Bond, Christian, Fayette, Macoupin, Madison, Sangamon, and Shelby. **Appendix I** contains a copy of the invitation memo.

2.4 IDENTIFICATION OF EXISTING CAPABILITIES

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

In order to catalog the existing capabilities of each participant, Capability Assessment Worksheets were distributed to each of the participating jurisdictions at the first Committee meeting on January 31, 2023. The worksheets requested information on four primary types of capabilities: planning and regulatory; administrative and technical; financial; and education and outreach. The following provides a brief description of each capability type.

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

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

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

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

Figures PP-3 through **PP-10** summarize the results of the Capability Assessment by participating jurisdiction type (i.e., county/municipalities, schools, fire protection districts, townships, healthcare facilities, etc.) A capability level of "Limited", "Moderate" or "High" was assigned by capability type to each participating jurisdiction based on the number of available capabilities and resources as well as the jurisdiction's size/area served. **Figure PP-11** summarizes the individual capability levels by capability type and provides an overall capability ranking for each participant.

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

Highlights from the Capability Assessment include:

- ❖ Only Litchfield and Schram City have building codes in place.
- ❖ Six of the eleven municipalities (Farmersville, Harvel, Hillsboro, Litchfield, Raymond, and Schram City) have a zoning ordinance in place.
- ❖ Only the County and Litchfield have comprehensive/master and continuity of operations plans in place.

The County, Hillsboro, Litchfield, Coffeen Volunteer FD, Fillmore Community FPD, Nokomis Area FPD, and Raymond-Harvel FD are fortunate to have the resources and abilities to potentially expand on and improve the existing policies and programs identified. Coffeen, Farmersville, Harvel, Nokomis, Raymond, Schram City, Taylor Springs, Waggoner, Witt, and Rountree Township have more limited resources and abilities to expand on and improve the existing policies and programs identified. The lack of legal authority and policies/programs currently in place, may hamper these participants' abilities to expand and strengthen existing policies and programs. Their fiscal and staffing situations are also limited.

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.

Based on conversations with Committee members, none of the jurisdictions that participated in the 2016 Plan update, with the exception of Litchfield, have incorporated it into other planning mechanisms within their jurisdictions.

Litchfield completed an update of its comprehensive plan in 2021. While specific actions from the 2016 Plan update's Mitigation Strategy were not incorporated into the comprehensive plan, several of the objectives and key results related to infrastructure and utilities incorporate hazard mitigation planning principles including:

- **Objective 6.1: Increase capacity of the City's sewer and water system, while maintaining high quality service.**
  - Key Result 1 – Complete a future growth study for sewer and water capacity to identify future plant construction needs.
  - Key Result 2 – Inventory location, age, and capacity of existing lines to identify potential issue and investment areas.
  - Key Result 3 – Incentivize or promote sustainable new construction to maintain and protect the City's water supply.
- **Objective 6.3: Make drainage management in the City more sustainable and effective.**
  - Key Result 1 – Review the existing drainage and stormwater requirements for new construction against recommended best practices.
  - Key Result 2 – Develop a Sedimentation, Siltation and Erosion Prevention Plan to coordinate strategies and funding from an infrastructure and recreation position.
  - Key Result 3 – Obtain additional grant funding to support shoreline restoration and protection of lakes and creeks.

While the County has a comprehensive/land use plan, it has not been updated since the 2016 Plan was completed and the next scheduled update has not been identified. None of the other participating jurisdictions have developed comprehensive/land use plans. Litchfield updated its building codes in 2017 adopting codes consistent with the 2015 International Building Codes. Neither Litchfield nor Schram City identified when their next scheduled building code update will take place. Aside from Hillsboro, none of the municipalities with zoning ordinances (Farmersville, Harvel, Litchfield, Raymond, and Schram City) completed updates since the 2016 Plan was completed. Hillsboro updated its zoning ordinance in 2019 and indicated it is again in the process of reviewing and updating its ordinance.

2.5 REVIEW & INCORPORATION OF EXISTING PLANS

The existing plans, studies, reports, technical information, and maps that were reviewed and incorporated into the Plan update, where appropriate, can be found in Section 7.0 References and are cited in each appropriate section.

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

Capability Type	**County/Municipality**											
	Montgomery County	Coffeen	Farmersville	Harvel	Hillsboro	Litchfield	Nokomis	Raymond	Schram City	Taylor Springs	Waggoner	Witt
Plans, Policies, Codes & Ordinances												
Comprehensive/Master Land Use Plan	X					X						
Continuity of Operations Plan	X					X						
Stormwater Management Plan						X						X
Transportation Plan												
Economic Development Plan	X				X	X						X
Emergency Operations Plan	X					X						
Disaster Recovery Plan	X					X						
Threat & Hazard Identification Risk Assessment (THIRA) - County Only	X											
Infrastructure Maps		X		X	X	X	X	X	X	X	X	X
Building Codes						X			X			
Floodplain Ordinance	X				X	X	X					X
Stormwater Ordinance						X						
Zoning Ordinance			X	X	X	X		X	X			
Subdivision Ordinance	X	X			X	X	X	X	X			
Historic Preservation Ordinance					X							
Private Sewage Disposal System Ordinance - County Only												
Manufactured/Mobile Home Tie Down Ordinance		X			X	X	X		X			X
Steep Slope Ordinance												
Mined Areas/Developed Over Mined Areas Ordinance												
National Incident Management System (NIMS) Adoption	X					X						
National Flood Insurance Program (NFIP) Participation	X				X	X	X					X
Community Rating System (CRS) Participation												
Level of Capability	**M**	**L**	**L**	**L**	**L/M**	**H**	**L**	**L**	**L**	**L**	**L**	**L**

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

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

Capability Type	County/Municipality											
	Montgomery County	Coffeen	Farmersville	Harvel	Hillsboro	Litchfield	Nokomis	Raymond	Schram City	Taylor Springs	Waggoner	Witt
Adminstrative & Technical												
Zoning Board			X		X	X		X				
Public Utility Board												
Planning Commission	X				X	X						
Mutual Aid Agreements	X				X	X	X	X	X	X		X
Administrator/Manager						X	X				X	
Building Inspector/Officer						X						
Community/Economic Development Planner					X	X						
Emergency Manager	X				X		X					X
Engineer/Construction Project Manager	X					X			X			
GIS Coordinator	X											
Grant Administrator/Writer									X			
Fire Chief - Municipalities Only					X	X						
Floodplain Administrator	X											
Police Chief - Municipalities Only		X			X	X	X	X		X		X
Public Works/Streets Director - Municipalities Only					X	X		X	X	X		X
Water Superintendent - Municipalities Only			X	X		X	X	X	X	X	X	X
Zoning Officer/Administrator			X		X	X			X			
Solid Waste Director - County Only												
Level of Capability	**L/M**	**L**	**L**	**L**	**M**	**M/H**	**L**	**L**	**L**	**L**	**L**	**L**

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

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

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

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

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

Capability Type	Township: Rountree Township
Plans, Policies, Codes & Ordinances	
Comprehensive/Master Land Use Plan	
Stormwater Management Plan	
Open Space/Recreational Area Plan	
Building Codes	
Stormwater Ordinance	
Zoning Ordinance	
Subdivision Ordinance	
Private Sewage Disposal System Ordinance	
Manufactured/Mobile Home Tie Down Ordinance	
Steep Slope Ordinance	
Mined Areas/Developed Over Mined Areas Ordinance	
Road Weight Restriction Ordinance	
Nuisance Weed, Grass & Tree Ordinance	
National Incident Management System (NIMS) Adoption	
Level of Capability	**L**

Capability Type	Rountree Township
Adminstrative & Technical	
Zoning Board	
Public Utility Board	
Planning Commission	
Mutual Aid Agreements	
Assessor	X
Clerk	X
Collector	
Highway/Road District Commissioner	X
Supervisor	X
Level of Capability	**L/M**

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

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

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

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

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

Figure PP-8
Fire Protection Districts – Planning & Regulatory Capabilities

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

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

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

Capability Type	Fire District			
	Coffeen Volunteer FD	Fillmore Community FPD	Nokomis Area FPD	Raymond-Harvel FD
Adminstrative & Technical				
Board of Trustees	X	X	X	X
Board of Fire Commissioners				
Mutual Aid Box Alarm System (MABAS)	X	X	X	X
Mutual Aid Agreements	X	X	X	X
Hazardous Materials Response Team	X	X	X	X
Water Rescue/Dive Team				
Technical Rescue Team				
Fire Chief	X	X	X	X
Deputy Fire Chief	X	X		X
Administrative Assistant				
Financial/Business Manager				
Inspector				X
Public Education Director/Officer				
Telecom Director				
Training Coordinator	X	X	X	X
Level of Capability	**M**	**M**	**M**	**M**

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

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

Capability Type	Fire District			
	Coffeen Volunteer FD	Fillmore Community FPD	Nokomis Area FPD	Raymond-Harvel FD
Financial				
Capital Improvements Program	X	X		
Tax Levies for Special Purposes		X	X	X
General Obligation Bonds and/or Special Tax Bonds				
Federal Funding Programs (Non-FEMA)				
Level of Capability	**L**	**M**	**L**	**L**
Education & Outreach				
Natural Disaster/Safety-Related School Programs			X	X
Ongoing Public Education or Information Programs (Fire Safety, Household Preparedness, Responsible Water Use)	X		X	X
Seasonal Outreach			X	
Public-Private Partnership Initiatives Addressing Disaster-Related Issues				
Level of Capability	**L**	**L**	**M**	**M**

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

Figure PP-11
Capability Rankings by Participating Jurisdiction

Capability Type	**County/Municipality**												**Township**	**Fire District**			
	Montgomery County	Coffeen	Farmersville	Harvel	Hillsboro	Litchfield	Nokomis	Raymond	Schram City	Taylor Springs	Waggoner	Witt	Rountree Township	Coffeen Volunteer FD	Fillmore Community FPD	Nokomis Area FPD	Raymond-Harvel FD
Planning & Regulatory	M	L	L	L	L/M	H	L	L	L	L	L	L	L	M	M	M/H	M
Administrative & Technical	L/M	L	L	L	M	M/H	L	L	L	L	L	L	L/M	M	M	M	M
Financial	L	M	L	L	M	H	M	L	M	L	L	L	L	L	M	L	L
Education & Outreach	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L	M	M
Overall Capability	**L/M**	**L**	**L**	**L**	**L/M**	**M/H**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L/M**	**M**	**M**	**M**

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

3.0 RISK ASSESSMENT

Risk assessment is the process of evaluating the vulnerability of assets in order to estimate the potential loss of life, personal injury, economic loss, and property damage resulting from natural hazards. Assets are determined by each participant and can include people; structures (i.e., critical facilities, lifelines, and infrastructure); systems (i.e., networks such as electrical and communications, etc.); and natural, historic, and cultural resources). This section summarizes the results of the risk assessment conducted on the natural hazards in Montgomery County. The information contained in this section was gathered by evaluating local, state, and federal records from the last 20 to 70 years.

This risk assessment identifies the natural hazards deemed most important to the Planning Committee and includes a profile of each hazard that identifies past occurrences, the severity or extent of the events, and the likelihood of future occurrences. It also provides a vulnerability analysis that identifies the impacts to public health and property, evaluates the assets of the participating jurisdictions and estimates the potential impacts each natural hazard would have on the evaluated assets. 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 Committee was to review the natural hazards detailed in the previous Plan and decide if additional hazards should be included in the Plan update. Over the course of the first two meetings, the Committee members discussed their experiences with natural hazard events and reviewed information on various hazards. After discussing the information provided, the Committee to add mine subsidence and wildfires to this Plan update.

The following identifies the hazards included in the Plan update:

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

The Planning Committee chose not to include levee failures or landslides in the Plan update. Information obtained from the U.S. Army Corps of Engineers' National Levee Database indicates there are no public or private levees located in Montgomery County. A review of the USGS Landslide Inventory, NASA's Global Landslide Catalog, and Illinois State Geological Survey's *Landslide Inventory of Illinois* did not identify any landslide events within the County. Discussions with the Planning Committee did not reveal any known occurrences of landslides.

Based on the information provided, the Planning Committee did not consider levee failures and landslides warranted inclusion in the Plan update.

Risk Priority Index

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

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

The Consultant took the point values assigned to each category and averaged the remaining results and came up with an overall value for each category. The values for each category were then added together to calculate an RPI score for each hazard. A ranking was then assigned to each hazard based on the RPI score. **Figure R-2**, located at the end of this section, provides the hazard rankings for the participating jurisdictions. Hazard ratings of "1" are highlighted in yellow by jurisdiction. RPI scores were not generated for Witt.

FEMA's National Risk Index

The National Risk Index (NRI) is an online mapping and data-based interface that helps illustrate a community's risk to 18 identified natural hazards. The natural hazards identified by the NRI and included in this Plan are cold wave, drought, earthquake, hail, heat wave, ice storm, landslides, lightning, riverine flooding, strong wind, tornado, and winter weather. The NRI leverages available source data for natural hazard and community risk factors, such as social vulnerability and community resilience, to develop a baseline relative risk measurement for each county and census tract in the U.S. The goal is to help individuals better understand the natural hazard risk of their communities.

In the NRI, risk is defined as the potential for negative impacts as a result of a natural hazard. The risk equation behind the NRI includes three components: a natural hazards risk component (expected annual loss), a consequence enhancing component (social vulnerability), and a consequence reduction component (community resilience). Social vulnerability represents the susceptibility of social groups to the adverse impacts of natural hazards. Community resilience represents the ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.

The scores and ratings generated by the NRI describe a county's or census tract's relative position among all other U.S. counties and census tracts for a given component. Dataset Update Version 1.19.0 released March 2023 was used in this analysis. Scores can range from 0 (the lowest possible value) to 100 (the highest possible value). For every score there is assigned one of five qualitative ratings: "Very Low", "Relatively Low", "Relatively Moderate", "Relatively High", and "Very High." Because all ratings are relative, there are no specific numeric values that determine the rating.

In order to provide the participating jurisdictions and public with additional information on the natural hazards included in the Plan, **Figure R-3** located at the end of this section, presents the overall NRI scores and ratings for each census tract as well as for the County. 2020 census tract information was used in this version of the NRI. In 2020, there were eight census tracts in Montgomery County. Six census tracts have a Risk Index rating of "Relatively Moderate". The remaining two census tracts have a Risk Index rating of "Relatively Low". Two census tracts have a Social Vulnerability rating of " Relatively High" while two more census tracts have a Social Vulnerability rating of "Relatively Moderate". The remaining four census tracts have a Social Vulnerability rating of "Relatively Low" or "Very Low".

Figure R-4, located at the end of this section, provides the NRI scores and ratings by hazard type for each census tract as well as the County. Hazard ratings of "Relatively High" and "Very High" are highlighted in yellow by census tract. The hazards with the highest relative ratings include hail, excessive heat, tornadoes, and severe winter storms.

Critical Facilities & Infrastructure

Critical facilities and infrastructure include structures, lifelines, systems, networks, and institutions 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 reviewed and/or completed a questionnaire identifying the critical facilities and infrastructure located within their jurisdiction, both publicly and privately-owned. **Figure R-5**, 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, Coffeen Volunteer Fire Department (FD), Fillmore Community Fire Protection District (FPD), Nokomis Area FPD, Raymond-Harvel FD, and Rountree Township do not have an extensive inventory of assets to consider when conducting the risk assessment.

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

The critical facilities for Rountree Township are located in unincorporated Mercer County. Their risk is considered to be the same or similar to the risk experienced by the County for those hazards that either impact the entire planning area or can occur at any location within the planning area (i.e., severe storms, severe winter storms, etc.) For those hazards where the risk to township critical facilities varies from the risk facing the planning area (i.e., the County), a separate narrative assessment will be provided under the appropriate hazard's vulnerability subsection.

The Fillmore Community FPD's critical facilities are located in the Village of Fillmore. Fillmore's risk is considered to be the same or similar to the risk experienced by the participating municipalities and the County for those hazards that either impact the entire planning area or can occur at any location within the planning area (i.e., severe storms, severe winter storms, etc.). For those hazards where the risk to the FPD's critical facilities varies from the risk facing the municipalities, a separate narrative assessment will be provided under the appropriate hazard's vulnerability subsection.

Assets Vulnerability Survey

The participating jurisdictions were also asked to complete an Assets Vulnerability Survey at the third meeting to assist them in creating problem statements summarizing the consequences and/or effects the studied hazards have on their assets. The Survey asked participants to describe their jurisdiction's greatest vulnerabilities to natural hazards and which assets they felt have the greatest vulnerabilities and the hazards they are most vulnerable to. This information is summarized under the appropriate hazard's vulnerability subsection.

Future Conditions

While we cannot predict with certainty what the weather of the future will look like, we can use models to help us make sense of the patterns we have seen in the past and to use that information to predict what events will be more likely to occur going forward.

By looking at data from previous weather conditions and taking into account trends in that data that have emerged over time, we can with some degree of accuracy project what weather may look like in the future. It is important to consider that nearer term predictions have the greatest likelihood of accuracy since they require the least extrapolation and guesswork; however, this does not mean that longer term predictions are not plausible or not useful. Often, having a prediction that is even partly right is preferable to having no guide at all. By coming up with best case and worst case scenarios, even if neither is terribly likely, we can gain a better understanding of the range of potential outcomes and a good idea of what the most probable outcomes might look like.

Earth's weather and climate have always been variable. Over time, sea levels have risen and fallen, glaciers have advanced and retreated, and droughts, floods, wildfires, and storms have periodically upended the notion of "normal". In recent years in the U.S., there have been several trends observed in weather patterns that offer us some insight as to what the near future may hold. Broadly, these likely changes can be referred to as "future conditions". They include more general seasonal trends as well as more specific weather pattern trends.

In recent decades we have seen both earlier springs (earlier last frost dates) and later winters (later first frost dates) in the U.S. Taken together, these two changes mean that winters are likely to be shorter and milder, and summers are likely to be longer and hotter across much of the continental U.S. than they were historically. In combination, shorter, milder winters and longer, more intense summers have resulted in an observed increase in average annual temperature.

As with any change that occurs gradually, the difference can be difficult to perceive if the time frame you are looking at is small. Additionally, smaller windows of time are more likely to be skewed by rare occurrences or anomalies. Looking at longer time frames allows us to see the big picture, putting highly unusual years into context by averaging them out with other more typical years. Looking at consecutive 30-year period averages called "Normals" allows us to detect how what is average (or 'normal') has shifted over time.

Figure R-6 shows U.S. annual temperature compared to 20th-century averages. By looking at 30 Year Normals for average annual temperature compared to overall 20th century averages, a trend of increasing annual temperature is particularly apparent in the final three 30 year periods. (1971-2000, 1981-2010, 1991-2020). Since these are average annual temperatures, even a small difference corresponds to larger temperature changes recorded within a year.

Also observed have been changes in when, where, and how much precipitation occurs across the U.S. **Figure R-7** shows U.S. annual precipitation compared to 20th-century averages. For some areas of the Country, this has resulted in increases in overall precipitation. The Midwestern U.S. has been on average getting progressively wetter in 30 year rolling averages from the period of 1951-1980 onwards; elsewhere, it has resulted in decreases, such as in much of the Western and Southwestern US, which has been getting drier since the period of 1971-2000 onwards.

Figure R-6
U.S. Annual Temperature Compared to 20th Central Average

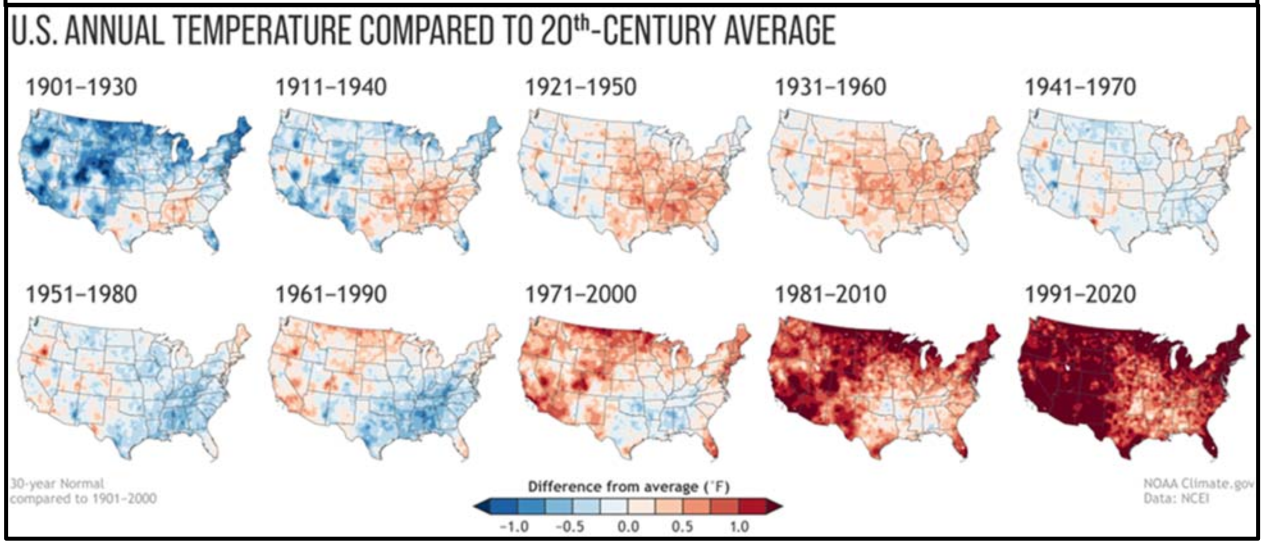
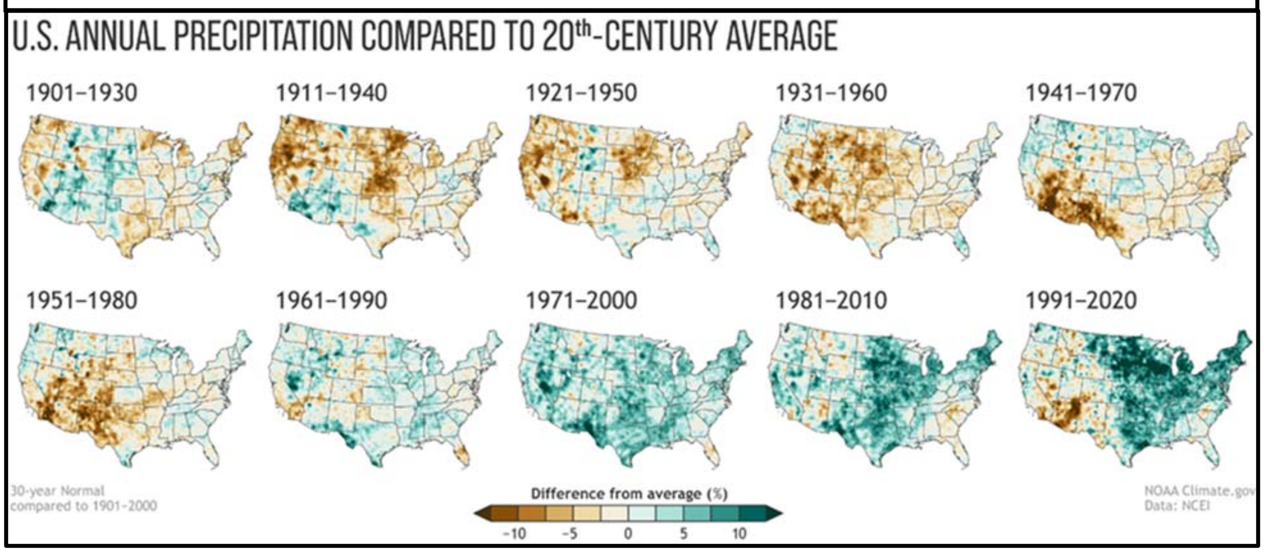


Figure R-7
U.S. Annual Precipitation Compared to 20th Central Average



Trends also reveal an uptick in the frequency and severity of hazardous weather events. While this is in part due to better record-keeping and a higher number of people and monitoring devices to witness hazardous events in order to report them, this trend is at least in part due to warmer bodies of air that tend to "supercharge" summer storm systems, making them more likely to produce severe weather events.

Specific information on future conditions is summarized under the appropriate hazard's probability subsection.

Figure R-1
Risk Priority Index Scoring System

Category	Factors	Value	Point Value
Hazard Frequency	An event is likely to occur in the next 1 to 3 years.	High	3
	An event is possible in the next 3 to 10 years.	Moderate	2
	An event is unlikely to occur within the next 10 years.	Low	1
Impacts on Life & Health	While fatalities are unlikely, injuries, some requiring hospitalization, may occur during the event.	High	3
	Minor injuries not requiring hospitalization may occur during the event.	Moderate	2
	Injuries or fatalities are unlikely to occur during the event.	Low	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 infrastructure and critical facilities (i.e., road & school closures, loss of power to drinking water/wastewater treatment facilities, municipal buildings, etc.) is anticipated for a period of time (i.e., a day or more).	High	3
	- Some minor property damage is anticipated (i.e., shingles & siding torn off homes, windows broken, etc.) but no significant 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).	Moderate	2
	- Property damage is likely to be negligible and no loss of access/operations is anticipated at any infrastructure/critical facilities during the event.	Low	1

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

Hazard	**Hazard Ranking by Participating Jurisdiction**										
	Montgomery County	Coffeen	Farmersville	Harvel	Hillsboro	Litchfield	Nokomis	Raymond	Schram City	Taylor Springs	Waggoner
Dam Failures	14	n/a	n/a	n/a	7	n/a	n/a	n/a	n/a	n/a	n/a
Drought	10/11	9/10/11/12	4/5/6	12	**1/2/3/4/5**	10/11/12/13	11/12/13	**1**	10/11	10/11/12	7/8/9
Earthquakes	6	9/10/11/12	11/12/13	11	10/11/12/13	10/11/12/13	9/10	12	12/13	4/5/6/7/8/9	11/12
Excessive Heat	3	6/7/8	3	3/4	8/9	2/3/4	7/8	10/11	7/8/9	4/5/6/7/8/9	2
Extreme Cold	4/5	9/10/11/12	8/9/10	5/6	**1/2/3/4/5**	5/6/7/8	11/12/13	2/3/4/5/6/7/	7/8/9	4/5/6/7/8/9	4/5/6
Floods	8	13	11/12/13	10	8/9	9	7/8	2/3/4/5/6/7/	5/6	4/5/6/7/8/9	4/5/6
Hail	12	9/10/11/12	8/9/10	8/9	10/11/12/13	5/6/7/8	3/4	2/3/4/5/6/7/	10/11	4/5/6/7/8/9	4/5/6
Heavy Rain	10/11	4/5	4/5/6	8/9	6	5/6/7/8	5/6	2/3/4/5/6/7/	2	10/11/12	7/8/9
Lightning	7	3	11/12/13	**1**	**1/2/3/4/5**	5/6/7/8	3/4	9	5/6	4/5/6/7/8/9	3
Mine Subsidence	13	6/7/8	**1**	n/a	10/11/12/13	10/11/12/13	11/12/13	13.0	7/8/9	10/11/12	n/a
Thunderstorms with Damaging Winds	4/5	4/5	7	3/4	**1/2/3/4/5**	**1**	**1/2**	2/3/4/5/6/7/	**1**	2/3	**1**
Tornadoes	**1**	**1**	2	2	10/11/12/13	2/3/4	**1/2**	2/3/4/5/6/7/	3/4	**1**	10
Wildfires	9	14	8/9/10	5/6	14	10/11/12/13	9/10	10/11	12/13	13.0	11/12
Winter Storms	2	2	4/5/6	7	**1/2/3/4/5**	2/3/4	5/6	2/3/4/5/6/7/	3/4	2/3	7/8/9

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

Hazard	**Hazard Ranking by Participating Jurisdiction**				
	Rountree Township	Coffeen Volunteer FD	Fillmore Community FPD	Nokomis Area FPD	Raymond-Harvel FD
Dam Failures	n/a	11/12	n/a	n/a	n/a
Drought	8/9	13/14	7/8/9	9/10/11/12	10
Earthquakes	10/11	13/14	11/12	13	11/12
Excessive Heat	5/6/7	2/3/4	2/3/4/5/6	7/8	6/7/8/9
Extreme Cold	**1/2/3/4**	**1**	7/8/9	**1/2/3/4/5/6**	6/7/8/9
Floods	5/6/7	6/7/8/9	11/12	**1/2/3/4/5/6**	11/12
Hail	10/11	11/12	10	9/10/11/12	6/7/8/9
Heavy Rain	8/9	10	2/3/4/5/6	9/10/11/12	6/7/8/9
Lightning	5/6/7	6/7/8/9	2/3/4/5/6	9/10/11/12	2/3/4/5
Mine Subsidence	n/a	2/3/4	n/a	7/8	13
Thunderstorms with Damaging Winds	**1/2/3/4**	2/3/4	2/3/4/5/6	**1/2/3/4/5/6**	2/3/4/5
Tornadoes	**1/2/3/4**	6/7/8/9	7/8/9	**1/2/3/4/5/6**	**1**
Wildfires	12	6/7/8/9	2/3/4/5/6	**1/2/3/4/5/6**	2/3/4/5
Winter Storms	**1/2/3/4**	5	**1**	**1/2/3/4/5/6**	2/3/4/5

Figure R-3
National Risk Index Overall Scores/Ratings by Census Tract

Census Tract No.	Participating Jurisdiction Located in Census Tract	Risk Index Score	Risk Index Rating	Social Vulnerability Score	Social Vulnerability Rating	Community Resilience Score	Community Resilience Rating
9573	Nokomis, Nokomis Area FPD	65.44	Relatively Moderate	44.32	Relatively Moderate	*	*
9574	Hillsboro, Witt, Rountree Township, Fillmore Community FPD, Nokomis Area FPD, Raymond-Harvel FPD	55.67	Relatively Low	39.78	Relatively Low	*	*
9575	Farmersville, Harvel, Raymond, Waggoner, Raymond-Harvel FPD	71.59	Relatively Moderate	21.36	Relatively Low	*	*
9576	Litchfield, Raymond-Harvel FPD	70.73	Relatively Moderate	5.54	Very Low	*	*
9577	Litchfield	50.99	Relatively Low	33.70	Relatively Low	*	*
9578	Litchfield	67.55	Relatively Moderate	74.72	Relatively High	*	*
9579	Hillsboro, Schram City	76.23	Relatively Moderate	67.18	Relatively High	*	*
9580	Coffeen, Taylor Springs, Coffeen Volunteer Fire Department, Fillmore Community FPD	76.90	Relatively Moderate	44.99	Relatively Moderate	*	*
Montgomery County		56.28	Relatively Low	25.05	Relatively Low	69.10	Relatively High

* Community Resilience scores are only available at the county level.

Figure R-4
NRI Hazard Scores/Ratings by Hazard by Census Tract
(Sheet 1 of 2)

Tract No.	Located in Census Tract	Hail Score	Hail Rating	Lightning Score	Lightning Rating	Strong Wind Score	Strong Wind Rating	Ice Storm Score	Ice Storm Rating	Winter Weather Score	Winter Weather Rating	Score	Rating
9573	Nokomis, Nokomis Area FPD	93.88	RH	58.25	RM	63.46	RM	88.08	RM	74.78	RM	45.26	RL
9574	Hillsboro, Witt, Rountree Township, Fillmore Community FPD, Nokomis Area FPD, Raymond-Harvel FPD	91.65	RH	48.20	RM	54.08	RL	83.80	RM	67.95	RM	38.34	RL
9575	Farmersville, Harvel, Raymond, Waggoner, Raymond-Harvel FPD	95.21	RH	54.21	RM	57.36	RM	89.68	RH	77.62	RM	41.74	RL
9576	Litchfield, Raymond-Harvel FPD	95.80	RH	51.42	RM	55.90	RM	89.21	RH	77.38	RM	51.67	RL
9577	Litchfield	90.21	RH	48.65	RM	58.86	RM	82.19	RM	65.00	RM	29.65	VL
9578	Litchfield	94.74	RH	61.14	RM	69.94	RM	86.77	RM	74.17	RM	38.07	RL
9579	Hillsboro, Schram City	96.51	RH	71.39	RM	76.36	RM	90.42	RH	80.53	RM	44.02	RL
9580	Coffeen, Taylor Springs, Coffeen Volunteer Fire Department, Fillmore Community FPD	95.95	RH	72.36	RM	77.18	RM	89.37	RH	79.21	RM	58.24	RL
Montgomery County		90.50	RM	40.50	RL	31.80	RL	75.00	RM	47.30	RL	15.80	VL

Rating Abbreviations: NR = No Rating; VL = Very Low; RL = Relatively Low; RM = Relatively Moderate; RH = Relatively High; VH = Very High

Figure R-4
NRI Hazard Scores/Ratings by Hazard by Census Tract
(Sheet 2 of 2)

Census Tract No.	Participating Jurisdiction Located in Census Tract	Extreme Cold		Excessive Heat		Tornadoes		Drought		Wildfires		Earthquakes	
		Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating
9573	Nokomis, Nokomis Area FPD	88.42	RM	89.11	RH	81.42	RH	93.05	RL	66.98	RL	83.65	RM
9574	Hillsboro, Witt, Rountree Township, Fillmore Community FPD, Nokomis Area FPD, Raymond-Harvel FPD	85.90	RM	84.43	RH	71.87	RM	93.76	RM	61.90	RL	82.43	RM
9575	Farmersville, Harvel, Raymond, Waggoner, Raymond-Harvel FPD	88.54	RM	87.18	RH	82.88	RH	95.00	RM	53.91	RL	85.72	RM
9576	Litchfield, Raymond-Harvel FPD	85.71	RM	84.62	RH	83.42	RH	93.30	RL	67.29	RL	85.31	RM
9577	Litchfield	82.52	RM	84.76	RH	71.08	RM	79.41	VL	42.43	VL	81.72	RM
9578	Litchfield	87.46	RM	90.21	RH	84.12	RH	76.02	VL	46.16	VL	83.99	RM
9579	Hillsboro, Schram City	90.71	RH	93.22	RH	91.37	RH	83.81	RL	66.48	RL	85.18	RM
9580	Coffeen, Taylor Springs, Coffeen Volunteer Fire Department, Fillmore Community FPD	92.97	RH	94.25	RH	90.31	RH	93.81	RM	72.40	RL	85.60	RM
Montgomery County		70.20	RM	85.00	RM	71.20	RM	68.90	RL	19.03	VL	88.10	RL

Rating Abbreviations: NR = No Rating; VL = Very Low; RL = Relatively Low; RM = Relatively Moderate; RH = Relatively High; VH = Very High

Figure R-5
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
Montgomery County	5	2	8	---	1	---	4	2	38	---	---
Coffeen	3	2	---	1	2	2	---	---	5	---	---
Farmersville	3	3	---	1	2	1	1	---	3	---	---
Harvel	4	1	---	---	1	---	---	---	2	---	---
Hillsboro	5	2	3	3	2	23	1	1	7	---	---
Litchfield	5	3	7	10	3	9	2	---	12	---	---
Nokomis	4	4	3	4	2	6	1	2	6	---	---
Raymond	4	2	2	4	2	5	1	2	2	---	---
Schram City	2	---	---	---	1	5	1	1	6	---	---
Taylor Springs	2	3	---	---	5	---	1	1	7	---	---
Waggoner	3	1	---	---	1	---	---	---	1	---	---
Witt	3	3	---	---	2	3	1	---	4	---	---
Rountree Township	2	---	---	---	---	---	---	2	3	---	---
Coffeen Volunteer FD	3	1	---	1	1	---	1	---	1	---	---
Fillmore Community FPD	2	1	---	---	1	3	---	---	3	---	---
Nokomis Area FPD	---	1	---	---	---	---	---	---	---	---	---
Raymond-Harvel FD	---	2	---	---	---	---	---	---	---	---	---

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

3.1 Severe Storms (Thunderstorms, Hail, Lightning & Heavy Rain)

Hazard Identification

What is the definition of a severe storm?

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

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

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

What is a thunderstorm?

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

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

<u>Single-cell Thunderstorm</u>

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.

<u>Multi-cell Thunderstorm</u>

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.

<u>Squall Line</u>

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.

<u>Supercell Thunderstorm</u>
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 U.S., 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 U.S., hail causes more than $1 billion in damages to property and crops annually. Hail has been known to cause injuries, although it rarely causes fatalities or serious injury.

How is the severity of a hail event measured?

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

Figure SS-2
Hail Size Descriptions

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

Source: NOAA, National Severe Storm Laboratory.

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

The severity of a hail event can also be measured or rated using the TORRO Hailstorm Intensity Scale. This scale was developed in 1986 by the Tornado and Storm Research Organisation of the United Kingdom. It measures the intensity or damage potential of a hail event based on several factors including: maximum hailstone size, distribution, shape and texture, numbers, fall speed and strength of the accompanying winds.

The Hailstorm Intensity Scale identifies ten different categories of hail intensity, H0 through H10. **Figure SS-3** gives a brief description of each category. This scale is unique because it recognizes that, while the maximum hailstone size is the most important parameter relating to structural damage, size alone is insufficient to accurately categorize the intensity and damage potential of a hail event.

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

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.

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

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

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

Lightning on average causes 60 fatalities and 400 injuries annually in the U.S. 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 U.S. and Alaska are started by lightning. According to the NWS lightning strikes cost more than $1 billion in insured losses each year.

Are alerts issued for severe storms?

Yes. The NWS Weather Forecast Office in St. Louis, Missouri is responsible for issuing ***severe thunderstorm watches*** and ***warning****s* for Montgomery 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 Montgomery County. Severe storm events are separated into four categories: thunderstorms with damaging winds, hail, lightning, and heavy rain. In Montgomery County, severe storms are the most frequently occurring natural hazard.

Severe Storms Fast Facts – Occurrences

Number of recorded Thunderstorms with Damaging Winds (1956 – 2022): ***151***

Number of recorded Severe Hail Events (1982 – 2022): ***62***

Number recorded of Lightning Strike Events (1996 – 2022): ***8***

Number recorded of Heavy Rain Events (2003 – 2022): ***2***

Highest Recorded Wind Speed: ***70 knots (May 30, 2004, May 31, 2013 & April 29, 2017)***

Largest Hail Recorded: ***4.50 inches (May 28, 2011)***

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

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

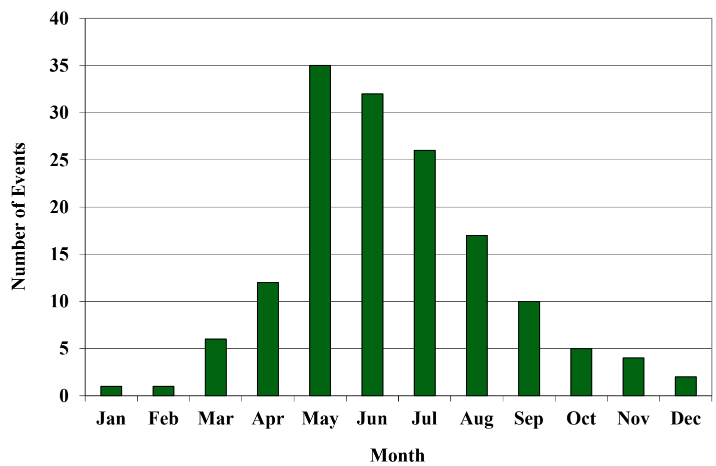
<u>*Thunderstorms with Damaging Winds*</u>

NOAA's Storm Events Database was used to document 151 reported occurrences of thunderstorms with damaging winds in Montgomery County between 1956 and 2022. Of the 151 occurrences, 122 had reported wind speeds of 50 knots or greater. There were 39 occurrences, however, where the wind speed was not recorded.

The highest wind speed recorded in Montgomery occurred at Litchfield on April 29, 2017 and again on May 30, 2004 and near Farmersville on May 31, 2013 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 by month. Of the 151 events, 93 (62%) took place in May, June, and July making this the peak period for thunderstorms with damaging winds in Montgomery County. Of those 96 events, 35 (36%) occurred during May, making this the peak month for thunderstorms with damaging winds. Of the 151 occurrences, 82% of all thunderstorms with damaging winds occurred during the p.m. hours.

Figure SS-4
Thunderstorms with Damaging Winds by Month
1973 – 2022



Hail

NOAA's Storm Events Database was used to document 62 reported occurrences of severe storms with hail one (1) inch in diameter or greater in Montgomery County between 1982 and 2022. Of the 62 occurrences, 28 produced hailstones 1.50 inches or larger in diameter.

The largest hail stones documented in Montgomery County measured 4.5 inches in diameter (softball sized) and fell on May 28, 2011 at Lake Lou Yaeger and Irving. Hail one (1) inch in diameter or greater has been recorded in every participating jurisdiction except Schram City, Waggoner, and Witt on at least one occasion. This does not mean that hail one inch in diameter or greater has not fallen in these municipalities, it simply indicates it wasn't recorded.

Figure SS-5 charts the reported occurrences of hail by month. Of the 62 occurrences, 40 (65%) took place in April, May, and June making this the peak period for hail in Montgomery County. Of these 40 events, 26 (65%) occurred during May, making this the peak month for hail events. Fifty-two (84%) of the 62 severe storms with hail occurred during the p.m. hours.

Lightning

While lightning strike events occur regularly across northwestern Illinois, NOAA's Storm Events Database and Committee Member records were only able to identify eight occurrences of lightning strikes with verified damages in Montgomery County between 1996 and 2022. The data limitations are almost certainly due to the rural nature of the County.

According to data from Vaisala's National Lightning Detection Network, Montgomery County averaged from 12 to 20 cloud-to-ground lightning flashes per square mile annually between 2009 and 2018. **Figure SS-6** illustrates the cloud-to-ground lightning flash density (number of cloud-to-ground flashes per square mile per year) by county for the continental U.S. In comparison, Illinois averaged 12.7 cloud-to-ground lightning flashes per square mile from 2009 to 2018, ranking it eighth in the Country for lightning flash density.

Figure SS-5
Hail Events by Month
1971 – 2022

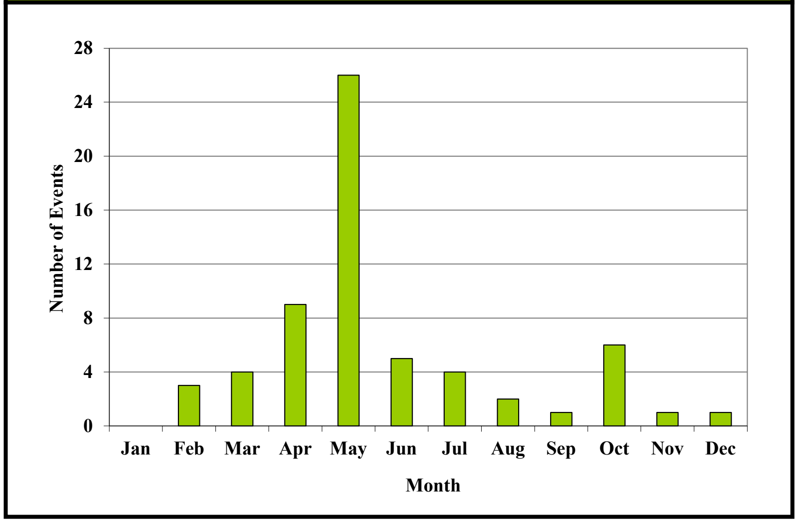
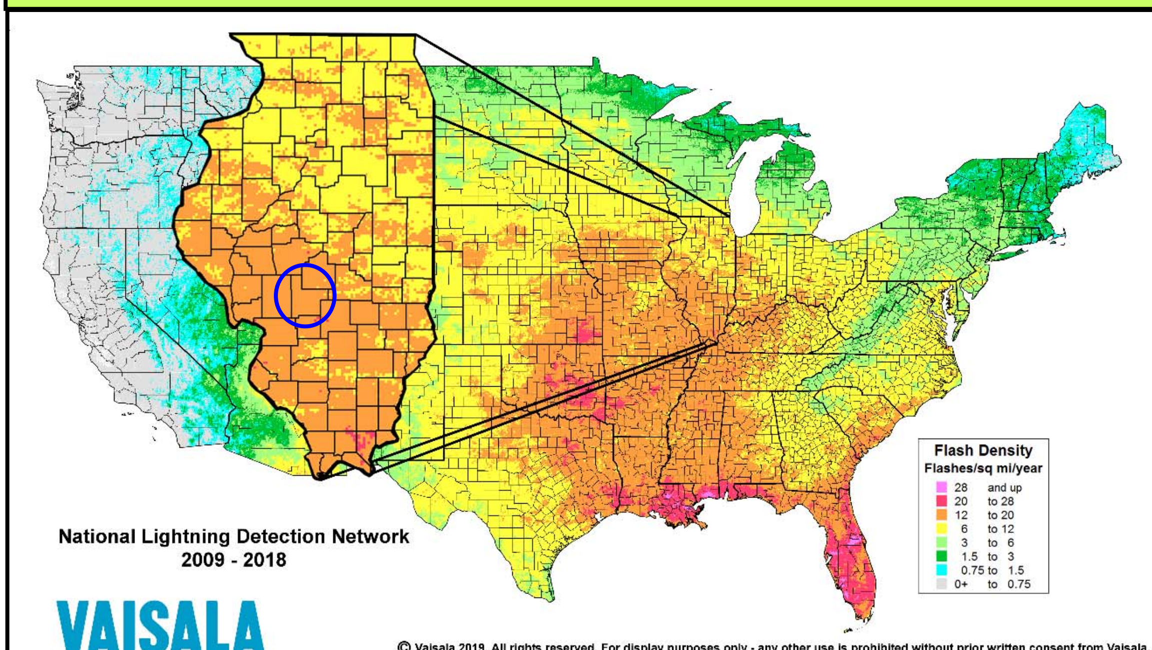


Figure SS-6
Cloud-to-Ground Lightning Flash Density: Continental U.S.



Heavy Rain

While heavy rain events occur on a fairly regular basis across central Illinois, NOAA's Storm Events Database was only able to identify two occurrences of heavy rain in Montgomery County. This may be due in part to a lack of uniform reporting guidelines for heavy rain events and the rural nature of most of the County.

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. Severe storms have been recorded in every participating jurisdiction within the County on multiple occasions.

What is the probability of future severe storm events occurring based on historical data?

Thunderstorms with Damaging Winds

Montgomery County has had 151 verified occurrences of thunderstorms with damaging winds between 1956 and 2022. With 151 occurrences over the past 67 years, Montgomery County would expect to experience at least two thunderstorms with damaging winds in any given year. There were 22 years over the last 67 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 33%.

This tree along School Street in Nokomis was uprooted during a thunderstorm accompanied by high winds

Photograph provided by Angela Keady, Nokomis City Clerk

Hail

There have been 62 verified occurrences of hail one (1) inch in diameter or greater between 1982 and 2022. With 62 occurrences over the past 31 years, Montgomery County would expect to experience about two severe storms with hail in any given year. There were 11 years over the last 31 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 35%.

What is the probability of future severe storm events occurring based on modeled future conditions?

Severe storms are very difficult to forecast in the near-term future, let alone in the long-term future. This owes to the fact that these events arise due to a combination of multiple factors (including pressure fronts, wind speeds, temperatures, and humidity) working together.

What can be predicted with more certainty looking into the future is the likelihood of supercell formation, which occurs with fewer conditions needing to be met, mainly a temperature differential in fronts and a relatively low moisture content. Supercells are strong, longer-lived storm systems characterized by rotation and updrafts that make them capable of producing hazards such as damaging winds, hail, and even tornadoes. While the formation of a supercell does not ensure that severe storm events will follow, supercells increase the probability of these events significantly, making supercell formation a good predictor for the likelihood of these other weather events.

In addition, in the last 120 years total annual precipitation in Illinois has increased by between 12% to 15% across the State. This trend is likely to continue, and as a result, precipitation in Illinois is forecasted to increase in coming decades. In addition to changes in the overall amount of precipitation, changes in precipitation patterns indicate that future events will likely be less frequent, but larger and more severe. The Illinois State Climatologist indicates that since the beginning of the 20th Century, Illinois has seen a 40% increase in the number of days with extreme precipitation events (rainfall of 2 inches or greater) per year.

Based on existing trends of increasing supercell formation and future projections of precipitation and temperature, supercells are likely to continue to become more common in the future. For a discussion on future projections of temperature, see Section 3.2. Supercell formation today is mostly confined to the Great Plains and the Midwest, but future projections indicate that the geographic range over which supercells may develop is likely to increase as parts of the Country that were previously unfavorable to supercell formation become warmer and dryer. Additionally, if current trends of milder winters persist, supercell season is also likely to lengthen, starting earlier in the year and ending later.

Figure SS-7 contains a series of maps that show how the number of supercell tracks is likely to change in the future. The map at the top labeled a) depicts late 20th Century historical data showing the average number of supercells per year occurring within each grid square on the map. Below, projections for two different late 21st Century future scenarios for supercell frequency are given on the left, a low emission scenario depicted the top left map labeled b) and a high emission scenario depicted in the lower left map labeled d). On the right, the difference between each late 21st Century scenario and the late 20th Century historic baseline is shown, with redder areas showing an increase in supercell tracks per year, and blue areas showing a reduction.

Thunderstorms with Damaging Winds

Damaging winds in severe storms are most often associated with powerful downdrafts, so looking at the changing prevalence of conditions favorable to generating these downdrafts can give us an indicator of how likely damaging thunderstorm winds may be in the future. The formation of powerful storms is typically energized by an influx of warm moist air. As the climate in the Midwest continues to become wetter and warmer, this makes strong thunderstorms with damaging winds a more probable occurrence in the future.

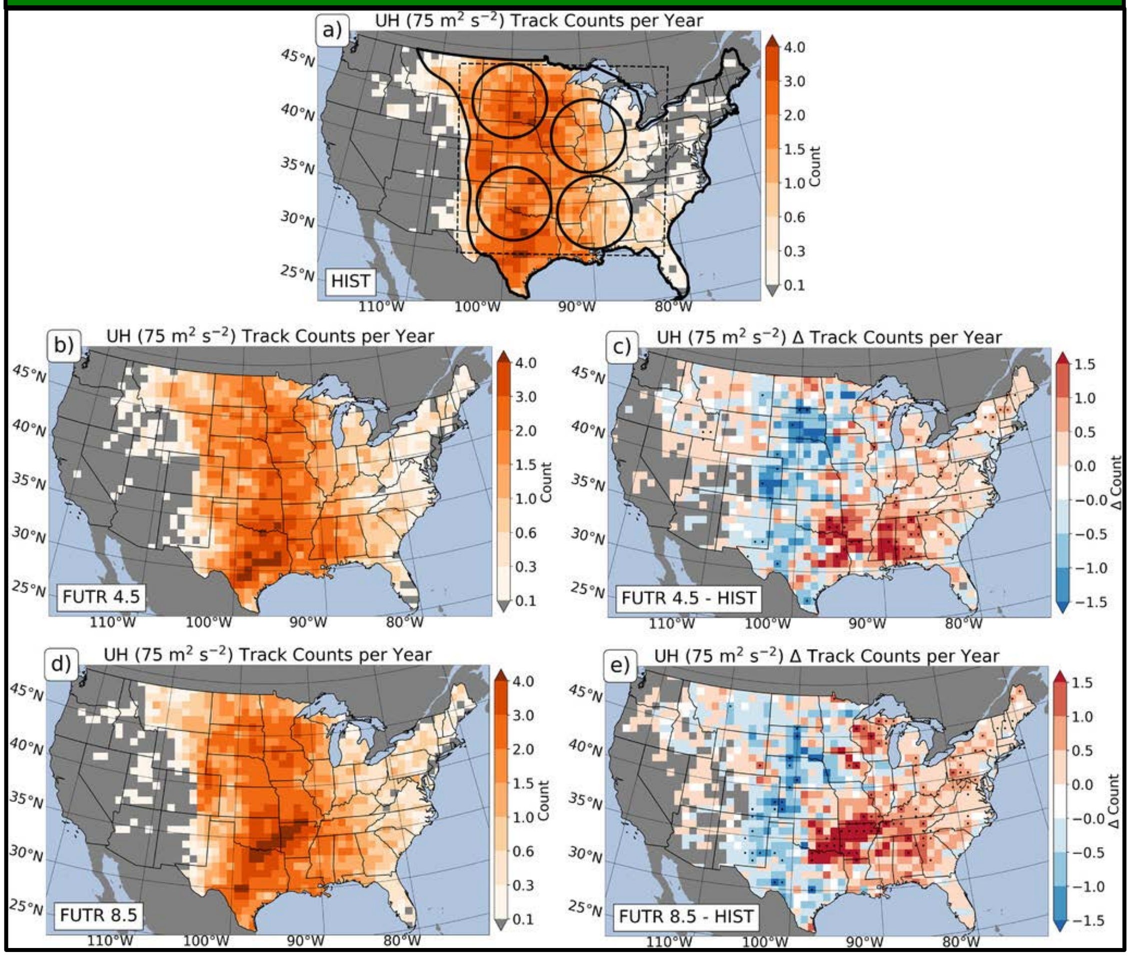
On the other hand, stronger warming occurring at more northerly latitudes is likely to decrease wind shear (a measurement of wind's change in speed and direction along a column of air), which is another important predictor of damaging winds. It is difficult to know which of these trends may be stronger than the other, or whether these two trends may wind up roughly cancelling each other out. The analysis of these trends should be revisited in subsequent planning efforts as more data becomes available.

<u>*Hail*</u>

Hail forms in storm systems with strong updrafts, so the formation of strong supercell storms is a good predictor of the occurrence of hail. The influx of moist, warm air rising over dryer, cooler air tends to create these updrafts, but for hail to occur, the air above the warm air must be cold enough for hail to form. Hail formation also depends on seasonality since the air above is cooler in spring and warmer in fall.

While a wetter and warmer climate will likely lead to more severe storms with stronger updrafts, it is more difficult to predict whether more hailstorms will result. Less gradual warming in spring may mean there will not be sufficiently cool air aloft for hail to form. When cool enough air is present for hailstones to form, stronger updrafts and more massive storms could be able to generate larger hailstones on average than those seen today. As these trends play out and more data becomes available regarding any shifts in hail frequency or intensity, it will be important to continually reassess the risk posed by hail in future planning efforts.

Figure SS-7
Mean Annual Supercell Track Counts



Citation: Bulletin of the American Meteorological Society 104, 1; 10.1175/BAMS-D-22-0027.1

Heavy Rain

Figures SS-8, SS-9, and **SS-10** provide tabular and graphical projections for Montgomery County, showing estimations for average annual precipitation and number of days with total precipitation greater than 2 inches in the early, mid, and late 21st century with both low and high estimates for each time period. Most likely, the true value will fall between these two estimates. By midcentury, the average annual precipitation in Montgomery County is projected to increase by 1.3 to 1.8 inches per year, while the average number of days with precipitation per year is projected to decrease by 3 to 5 days according to the Climate Mapping for Resilience and Adaptation's Assessment Tool.

The annual number of days with total precipitation greater than 2 inches is not projected to increase significantly. This is confirmed by the Climate Explorer which indicates that in Montgomery County the annual counts of intense rainstorms (rainfall of 2 inches or greater in one day) are not projected to increase. This is based on the findings of the 2018 National Climate Assessment and compares projections for the middle third of the century (2035-2064) with average conditions observed from 1961-1990.

Figure SS-8
Average Annual Precipitation Projections Table – Montgomery County

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Annual average total precipitation	**39"** 37 - 40	**40"** 37 - 44	**39"** 33 - 43	**40"** 35 - 45	**40"** 35 - 45	**40"** 34 - 46	**41"** 34 - 47
Days per year with precipitation (wet days)	**169 days** 165 - 174	**167 days** 153 - 177	**166 days** 149 - 178	**166 days** 149 - 182	**165 days** 139 - 180	**165 days** 152 - 179	**161 days** 124 - 186
Maximum period of consecutive wet days	**11 days** 10 - 13	**11 days** 10 - 13	**11 days** 10 - 13	**11 days** 10 - 14	**11 days** 10 - 13	**11 days** 9 - 14	**11 days** 9 - 14
Annual days with:							
Annual days with total precipitation > 1inch	**5 days** 4 - 5	**5 days** 4 - 6	**5 days** 4 - 7	**5 days** 4 - 6	**6 days** 4 - 8	**6 days** 4 - 7	**7 days** 5 - 9
Annual days with total precipitation > 2 inches	**0 days** 0 - 1	**0 days** 0 - 1	**0 days** 0 - 1	**1 days** 0 - 1	**1 days** 0 - 1	**1 days** 0 - 1	**1 days** 0 - 1
Annual days with total precipitation > 3 inches	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0
Annual days that exceed 99th percentile precipitation	**5 days** 5 - 6	**6 days** 6 - 7	**6 days** 6 - 7	**7 days** 6 - 7	**7 days** 7 - 8	**7 days** 6 - 8	**8 days** 8 - 9
Days with maximum temperature below 32 °F	**25 days** 22 - 27	**18 days** 12 - 25	**18 days** 13 - 23	**15 days** 9 - 24	**14 days** 8 - 22	**13 days** 6 - 22	**8 days** 2 - 17

N/A = Data Not Available for the selected area

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 Montgomery County is vulnerable to the dangers presented by severe storms due to the topography of the region and its location in relation to the movement of weather fronts across north-central Illinois. Since 2013, Montgomery County has recorded 43 thunderstorms with damaging winds, eight severe storms with hail one (1) inch in diameter or greater, and two lightning strikes with verified damages

Figure SS-9
Average Annual Precipitation Projections Graph – Montgomery County

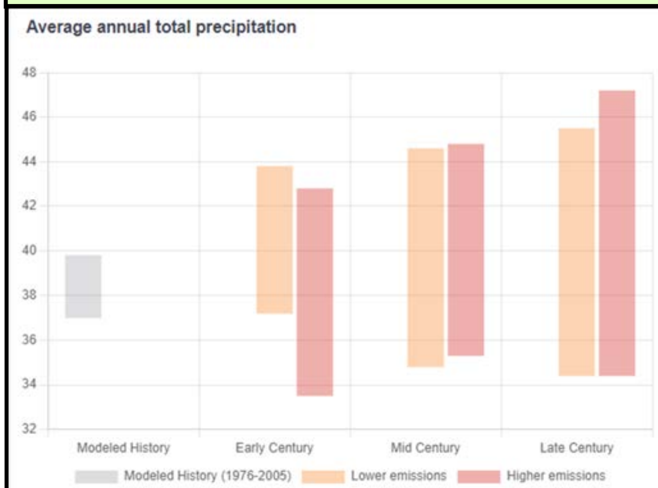


Figure SS-10
Number of Days with Total Precipitation > 2 Inches Graph – Montgomery County

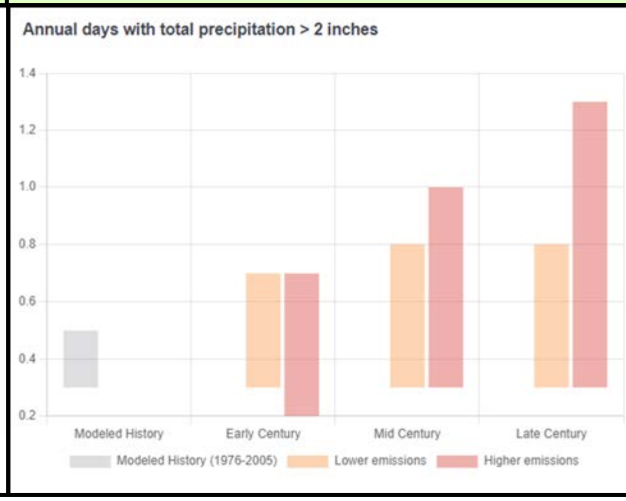


Figure SS-11 details the number of thunderstorms with damaging winds and hail events that were recorded in or near each participating municipality while **Figure SS-12** details the number of thunderstorms with damaging winds and hail events that were recorded in or near unincorporated areas of Montgomery County.

Figure SS-11
Verified Severe Storm Events by Participating Municipality

Participating Municipality	Number of Events	
	Thunderstorm & High Wind	Severe Hail
Coffeen[1]	7	3
Farmersville	13	3
Harvel[4]	3	1
Hillsboro	23	6
Litchfield	36	24
Nokomis[3]	22	6
Raymond[4]	20	2
Schram City	1	0
Taylor Springs	4	2
Waggoner	5	0
Witt	10	0

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

Unincorporated Area	Number of Events	
	Thunderstorm & High Wind	Severe Hail
Chapman[2]	0	1
Honey Bend	3	1
Lake Lou Yaeger	1	3
Van Burensburg[1]	0	1

[1]Coffeen Volunteer Fire Department
[2]Fillmore Community FPD
[3]Nokomis Area FPD
[4]Raymond-Harvel Fire Department

Of the participating municipalities, Litchfield has had more recorded occurrences of thunderstorms with damaging winds and the greatest number of recorded severe storms with hail events than any of the other municipalities. The differences in the number of recorded events between participating municipalities is likely due to the relative size of the municipalities.

The *2023 Illinois Natural Hazard Mitigation Plan* prepared by the Illinois Emergency Management Agency and Office of Homeland Security (IEMA-OHS) classifies Montgomery County's hazard rating for wind (thunderstorms) and hail as "medium" and lightning as "low". IEMA-OHS's overall hazard rating system has five levels: very low, low, medium, high, and very high.

On November 17, 2013 a thunderstorm with damaging winds near Nokomis knocked down a power pole causing a line connected to a house to spark in the attic causing a house fire.

Photograph provided by Angela Keagy, Nokomis City Clerk

FEMA's National Risk Index (NRI) rates the County as a whole as "Relatively Low" for strong wind (thunderstorms), "Relatively Moderate" for hail, and "Relatively Low" for lightning. For strong wind, seven census tracts are rated "Relative Moderate", and the remaining census tract is rated "Relatively Low". For hail, all the census tracts are rated "Relatively High". For lightning, all census tracts are rated "Relatively Moderate". **Table R-4 presents** the overall NRI scores and ratings for each census tract as well as for the County as a whole.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of severe storms?

Yes. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to severe storms.

Montgomery County:

- Severe storms with damaging winds have the potential to down power and communication lines impacting service to critical county infrastructure as well as residents.
- The Health Department's vaccine storage is vulnerable to potential power outages caused by severe storms.
- Lightning strikes and/or power surges have the ability to render communication and computer equipment inoperable impacting critical county systems.
- The Historic County Courthouse does not have an emergency backup generator making it vulnerable to potential power outages caused by severe storms.
- There are not enough emergency shelters with backup power supplies in the County to serve residents if power is lost during a severe storm event.
- The power grid in the County is vulnerable to severe storms. The cascading effects from power disruption could have a major impact on vulnerable assets including people, critical infrastructure, and systems.

Coffeen:

- ❖ Thunderstorms with damaging winds have the potential to down electrical lines impacting service to residents.
- ❖ Water infiltrates the sanitary sewer system during heavy rain events. The excess discharge resulting from the infiltration can overwhelm the wastewater treatment lagoon.

Coffeen Volunteer Fire Department:

- ❖ Severe storms with damaging winds have downed power lines impacting service to critical facilities as well as residents.
- ❖ Heavy rain events have flooded some roads in the creek bottoms within the District impeding travel and delaying emergency response times.

Harvel:

- ❖ The Village's water plant does not have emergency backup power supplies so loss of power due to high winds associated with a severe storm will impact service to residents.
- ❖ Straight-line winds have caused damage in the Village, especially to trees, and caused power outages.

Hillsboro:

- ❖ The City's dispatch center and water treatment plant have been struck by lightning and damaged numerous times.
- ❖ During heavy rain events the underpass on Illinois Route 16 floods causing the roadway to be closed for periods of time impeding travel.

Litchfield:

- ❖ The City's weather sirens have been struck by lightning numerous times rendering the sirens inoperable.
- ❖ The City's three communication repeater sites have been struck by lightning numerous times resulting in a loss of communications for fire, EMS, and police.
- ❖ Thunderstorms with damaging winds have the potential to disrupt the City's communications network, which would limit the City's ability quickly respond to emergency situations.
- ❖ Water infiltration into the sanitary sewer system can overwhelm the wastewater treatment plant.

Nokomis:

- ❖ The City's drinking water treatment plant and wastewater treatment plant are both vulnerable to lightning strikes. The wastewater treatment plant has been struck by lightning causing the main control panel to short out.
- ❖ The wastewater treatment plant does not have an emergency backup generator that will power the entire facility and therefore is vulnerable to potential power outages caused by severe storms.
- ❖ None of the City's lift stations have emergency backup generators making them vulnerable to potential power outages caused by severe storms.
- ❖ Heavy rain events have caused street flooding, which adversely impacts travel.

Nokomis Area Fire Protection District:

- ❖ Heavy rain has caused road flooding within the District, which impedes travel and delays emergency response times.
- ❖ Severe storms have damaged historic buildings on Main Street.
- ❖ Severe storms with damaging winds have the potential to down power lines, which can block roadways, impacting travel and delaying emergency response times.

- ❖ The fire station does not have its own emergency backup generator making it vulnerable to potential power outages caused by severe storms.

Raymond:

- ❖ The Village's drinking water wells sustained severe storm damage within nine months of each other.
- ❖ Severe storms with damaging winds have the potential to down power lines impacting service to residents.

Raymond-Harvel Fire Department:

- ❖ The Harvel fire station does not have an emergency backup generator making it vulnerable to potential power outages caused by severe storms.
- ❖ Communications equipment (radio repeaters) are vulnerable to damage from lightning strikes, which would limit the Department's ability quickly respond to emergency situations.

Rountree Township:

- ❖ Severe storms with damaging winds have downed power lines impacting service within the Township.
- ❖ Heavy rain has flooded several roads within the Township making them impassable and causing adverse travel.

Schram City:

- ❖ Severe storms with damaging winds have the potential to down power lines impacting service critical infrastructure as well as residents.
- ❖ Streets in the Village flood during heavy rain events adversely impacting travel.

Taylor Springs:

- ❖ The Village's main pump station and lift stations do not have emergency backup generators making them vulnerable to potential power outages caused by severe storms and impacting service to residents.
- ❖ The Taylor Springs fire station roof was damaged a few months ago by a severe storm.
- ❖ None of the Village's critical facilities or infrastructure have emergency backup generators making them vulnerable to potential power outages caused by severe storms.
- ❖ None of the Village's critical facilities or infrastructure have been hardened to reduce damages from severe storms.

Waggoner:

- ❖ The Village's storm warning siren have been struck by lightning twice.
- ❖ Thunderstorms with damaging constantly down trees and tree limbs blocking roadways, impacting travel and delaying emergency response times.
- ❖ Heavy rains overwhelm the Village's drainage ditches causing roadway flooding. Vehicles cannot cross the roads until the water subsides.

Witt:

The fire station does not have an emergency backup generator making it vulnerable to potential power outages caused by severe storms.

What impacts resulted from the recorded severe storms?

Severe storms as a whole have caused an estimated $1,158,223 in recorded property damages and $25,000 million in recorded crop damages. The following provides a breakdown of impacts by category.

Thunderstorms with Damaging Winds

Data obtained from NOAA's Storm Events Database and Committee member records indicates that between 1956 and 2022, 19 of the 151 thunderstorms with damaging winds caused $471,300 in property damages. Damage information was either unavailable or none was recorded for the remaining 132 reported occurrences.

NOAA's Storm Events Database documented two injuries as the result of two separate thunderstorm with damaging wind events. The following provides a brief description of each.

- On November 27, 1994, a thunderstorm with damaging winds injured one person in Witt.
- A thunderstorm with damaging winds overturned a mobile home in the Nokomis area, injuring an occupant on July 10, 2017.

Severe Storms Fast Facts – Impacts/Risk

Thunderstorms with Damaging Winds Impacts:
- Total Property Damage (19 events): ***$417,300***
- Total Crop Damage : ***n/a***
- Injuries (2 events): ***2***
- Fatalities: ***n/a***

Severe Hail Impacts:
- Total Property Damage (1 event): ***$25,000***
- Total Crop Damage (1 event) : ***$50,000***
- Injuries: ***n/a***
- Fatalities: ***n/a***

Lightning Strike Impacts:
- Total Property Damage (6 events): ***$515,923***
- Total Crop Damage: ***n/a***
- Injuries: (1 event): ***1***
- Fatalities: ***n/a***

Heavy Rain Impacts:
- Total Property Damage (2 events): ***$200,000***
- Total Crop Damage: ***n/a***
- Injuries: ***n/a***
- Fatalities: ***n/a***

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

Hail

Data obtained from NOAA's Storm Events Database indicates that between 1982 and 2022, two of the 62 hail events caused $25,000 in property damages and $50,000 in crop damages. Damage information was either unavailable or none was recorded for the remaining 60 events.

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 Committee member records indicate that that six of the eight lightning strike events caused $515,923 in property damages. Damage information was unavailable for the remaining two events. One injury was reported as the result of a July 9, 2002 lightning strike event in Hillsboro. A man was treated for burns at a local hospital after being struck by lightning.

Heavy Rain

Data obtained from a local insurance agent indicates that two heavy rain events caused $200,000 in property damages. No injuries or fatalities were reported as a result of any of the heavy rain events.

What other impacts can result from severe storms?

In Montgomery 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 2017 through 2021 indicates that wet road surface conditions were present for 11.7% to 17.8% 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 Montgomery County

Year	Total # of Crashes	Presence of Wet Road Surface Conditions		
		# of Crashes	# of Injuries	# of Fatalities
2017	590	70	32	0
2018	533	95	19	1
2019	541	74	33	2
2020	514	60	17	1
2021	648	88	25	0
Total:	**2,826**	**387**	**126**	**4**

Source: Illinois Department of Transportation.

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

For Montgomery 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, both St. Francis Hospital in Litchfield and Hillsboro Area Hospital in Hillsboro as well as nearby hospitals in Springfield (Sangamon County), Taylorville, (Christian County), Shelbyville (Shelby County), Vandalia (Fayette County), Carlinville (Macoupin County), Greenville (Bond County), and the Metro East St. Louis area (Madison County) 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 Montgomery County and the participating jurisdictions are vulnerable to damage from severe storms. Structural damage to buildings is a relatively common occurrence with severe storms. Damage to roofs, siding, awnings, and windows can occur from hail, flying and falling debris and high winds. Lightning strikes can damage electrical components and equipment (i.e., appliances, computers etc.) and can cause fires that consume buildings. If the roof is compromised or windows are broken, rain can cause additional damage to the structure and contents of a building.

Infrastructure and critical facilities tend to be just as vulnerable to severe storm damage as buildings. The infrastructure and critical facilities that are the most vulnerable to severe storms are related to power distribution and communications. High winds, lightning and flying and falling debris have the potential to cause damage to communication and power lines; power substations; transformers and poles; and communication antennas and towers.

The damage inflicted by severe storms often leads to disruptions in communication and creates power outages. Depending on the damage, it can take anywhere from several hours to several days to restore service. Power outages and disruptions in communications can impair vital services, particularly when backup power generators are not available. **SS-14**, located at the end of this section, identifies by participating jurisdiction critical facilities and infrastructure for select categories that are supported by backup power generators. Eleven of the 16 participating jurisdictions acknowledged the need for emergency backup generators to allow continued operation of critical facilities and infrastructure such as county/municipal buildings, communication infrastructure, drinking water wells, water towers, wastewater treatment plants, lift stations, fire stations, and shelters.

A thunderstorm with damaging winds downed a large tree at Beckemeyer Elementary School in Hillsboro.

Photograph courtesy of the Hillsboro Journal-News

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 Montgomery 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***.

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

Yes and No. While Litchfield and Schram City 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 nine participating municipalities do not. However, 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 29 of the 222 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 Montgomery County Clerk the total equalized assessed values of all residential, commercial, and industrial buildings in the planning area is $335,308,343. Since all of the structures in the planning area are vulnerable to damage, this total represents the countywide property exposure to severe storm events.

Figure SS-14
Critical Facilities & Infrastructure Supported by Backup Generators by Jurisdiction

Participating Jurisdiction	Government/ Administrative[1]	Emergency Protection[2]	Medical & Healthcare[3]	Schools	Warming/ Cooling Centers	Drinking Water[4]	Wastewater Treatment[5]
Montgomery County	2	2	4	---	---	1	---
Coffeen	1	1	---	---	---	---	---
Farmersville	1	2	---	---	---	1	1
Harvel	---	---	---	---	---	---	---
Hillsboro	---	2	1	---	---	1	1
Litchfield	1	5	1	---	1	1	1
Nokomis	1	2	---	---	1	2	1
Raymond	---	3	---	---	---	---	1
Schram City	2	---	---	---	---	---	---
Taylor Springs	---	---	---	---	---	---	---
Waggoner	---	---	---	---	---	---	---
Witt	---	3	---	---	1	1	---
Rountree Township	---	---	---	---	---	---	---
Coffeen Volunteer FD	---	1	---	---	---	---	---
Fillmore Community FPD	---	1	---	---	---	---	---
Nokomis Area FPD	---	---	---	---	---	---	---
Raymond-Harvel FD	---	1	---	---	---	---	---

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

3.2 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 U.S. 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 St. Louis, Missouri. The St. Louis Office is responsible for issuing alerts for Montgomery County.

- **Outlook.** An excessive heat outlook is issued when the potential exists for an excessive heat event to develop over the next three (3) to seven (7) days.
- **Watch.** An excessive heat watch is issued when conditions are favorable for an excessive heat event to occur within the next 24 to 72 hours.
- **Advisory.** An excessive heat advisory is issued when the heat index is expected to be around 105°F, *or* when the heat index will range from 100°F to 104°F for at least four (4) consecutive days.
- **Warning.** An excessive heat warning is issued when the heat index is expected to be around 110°F, *or* when the heat index is expected to reach 105°F for four (4) consecutive days.

HAZARD PROFILE

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

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

Excessive Heat Fast Facts – Occurrences

Number of Excessive Heat Events Reported (1995 – 2022): ***154***

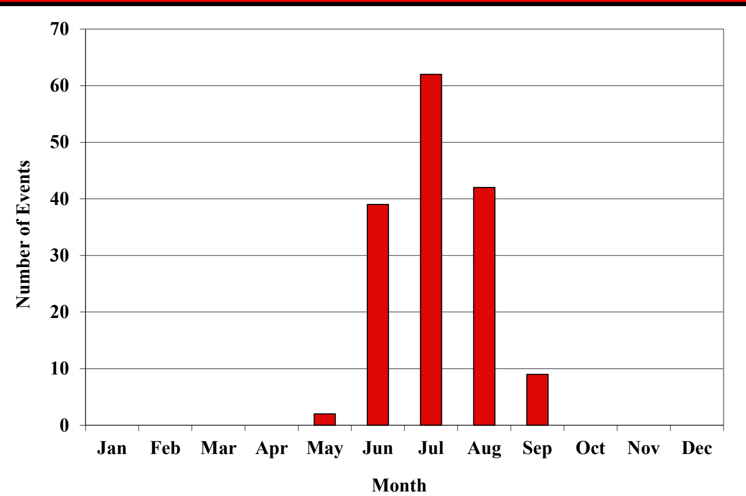
Hottest Temperature Recorded in the County: ***114°F (July 14, 1954)***

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

Table 5, located in **Appendix J**, summarizes the previous occurrences as well as the extent or magnitude of excessive heat events recorded in Montgomery County. NOAA's Storm Events Database, Iowa State University's National Weather Service Watch, Warning, and Advisories database, Midwestern Regional Climate Center's cli-MATE database, and NWS's COOP Data records were used to document 154 occurrences of excessive heat in Montgomery County between 1995 and 2022.

Figure EH-3 charts the reported occurrences of excessive heat by month. Sixty-two of the 154 events (40%) began in July making this the peak month for excessive heat events in Montgomery County. There were 11 events that spanned two months; however, for illustration purposes only the month the event started is graphed.

Figure EH-3
Excessive Heat by Month
1995 – 2022



According to the Midwestern Regional Climate Center, near continuous temperature records for Montgomery County have been kept from July 1896 to the present at the Hillsboro NWS COOP Observation Station. **Figure EH-4** lists the hottest days recorded at this Station. Based on the available records, the hottest temperature recorded in the County was 114°F at the Hillsboro Observation Station on July 14, 1954.

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

	Date	Temperature		Date	Temperature
1	07/14/1954	114°F	5	07/12/1954	110°F
2	07/18/1954	113°F	6	07/24/1901	109°F
3	08/04/1918	112°F	7	08/08/1930	109°F
4	07/28/1930	112°F	8	07/14/1936	109°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.

Do any of the participating jurisdictions have designated cooling centers?

Yes. Nine of the 16 participating municipalities, townships, and fire protection districts 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 Coffeen Volunteer FD, Farmersville, Harvel, Nokomis Area FPD, Rountree Township, Schram City, and Waggoner do not have any cooling centers designated. In addition, there are no State of Illinois-designated cooling centers in Montgomery County.

Figure EH-5
Designated Cooling Centers by Participating Jurisdiction

Name/Address	Name/Address
Coffeen	*Nokomis*
City Hall, 107 Locust St.	City Complex, 22 S. Cedar St.
Fillmore Community FPD	Nokomis Jr./Sr. High School, 511 Oberle St.
Fire Station, 107 W. North St., Fillmore	North Elementary School, 110 W. Hamilton St.
Hillsboro	South School/Cornerstone Academy, 316 E. South St.
Free Methodist Church, 1400 Seymour Ave.	St. Louis Parish Center, 523 E. Union St.
Moose Lodge, 411 S. Main St.	*Raymond / Raymond-Harvel FD*
Challacombe House, 502 School St.	Fire House, 121 East Broad, Raymond
Litchfield	Raymond K of C Hall, 510 East Sparks, Raymond
City Hall, 120 E. Ryder St.	*Taylor Springs*
Litchfield Community & Senior Center, 1100 S. State St.	Community Building, 613 E. Main St.
Litchfield CUSD Office, 1100 Old Rte. 66 N	*Witt*
National Guard Armory, 1617 N. Jefferson St.	City Hall, 106A W. Broadway St.
LRM Missions Hospitality House, 1285 E. Union Ave.	Fire Station, 226 N. Hirst St.

What is the probability of future excessive heat events occurring based on historical data?

Montgomery County has experienced 154 verified occurrences of excessive heat between 1995 and 2022. With 154 occurrences over the past 28 years, Montgomery County should expect to experience at least five excessive heat events a year. It is important to keep in mind that there are almost certainly gaps in the excessive heat data. More events have almost certainly occurred than are documented in this section, which means that the probability is almost certainly higher than reported.

There were 27 years over the last 28 years where multiple (three or more) excessive heat events occurred. This indicates that the probability that multiple excessive heat events may occur during any given year within the County is 96%.

What is the probability of future excessive heat events occurring based on modeled future conditions?

Temperature in Illinois has trended upwards over the last century, with average temperatures in Illinois having increased by 1°F to 2°F in the past 120 years according to the Illinois State Climatologist. This trend is likely to continue, with conservative long-term estimates placing average temperatures by the end of the 21st century between 4° and 9° F warmer than they are today.

With increasing temperatures comes the increasing risk of extreme heat events, which are projected to continue to become more frequent and more severe than they have been historically. This is due to increases in temperatures observed during summer months, where just a few degrees difference can turn a hot day into a dangerously hot day. The number of days greater than 95° F in Illinois are forecasted to increase in the coming decades, with conservative projections predicting that even northern Illinois will see a minimum of 10 extreme heat days per year by the end of the 21st century, compared with one or two extreme heat days per year today. Even just a few additional extreme heat days a year could prove very damaging, both in terms of human health and economic costs.

Figures EH-6, EH-7, and **EH-8** provide tabular and graphical projections for Montgomery County, showing estimations for annual high temperature extremes in the early, mid, and late 21st century with both low and high estimates for each time period. Most likely, the true value will fall between these two estimates. By midcentury, the average number of days per year exceeding 90° F in Montgomery County is forecasted to increase from around 27 today to between 71 and 80, and the single hottest temperature recorded in a year is predicted to increase by 6°F to 7° F according to the Climate Mapping for Resilience and Adaptation's Assessment Tool.

The Climate Explorer indicates that in Montgomery County, extreme temperatures on the hottest days of the year are projected to increase by 7°F. This is based on the findings of the 2018 National Climate Assessment and compares projections for the middle third of the century (2035-2064) with average conditions observed from 1961-1990.

Taken together, an increase in the number of days per year with temperatures greater than 90° F and an increase in extreme temperatures on the hottest days for Montgomery County indicates increased risk for extreme heat events.

Figure EH-6
Annual High Temperature Extreme Projections Table – Montgomery County

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**27 days** 27 - 37	**58 days** 37 - 85	**62 days** 42 - 84	**71 days** 44 - 109	**80 days** 52 - 111	**82 days** 49 - 118	**113 days** 74 - 145
Annual days with maximum temperature > 95°F	**8 days** 5 - 10	**23 days** 10 - 51	**26 days** 12 - 53	**33 days** 12 - 82	**43 days** 18 - 84	**43 days** 17 - 93	**77 days** 31 - 123
Annual days with maximum temperature > 100°F	**1 days** 0 - 1	**6 days** 1 - 23	**7 days** 1 - 22	**11 days** 2 - 51	**16 days** 3 - 55	**17 days** 3 - 51	**43 days** 8 - 98
Annual days with maximum temperature > 105°F	**0 days** 0 - 0	**1 days** 0 - 7	**1 days** 0 - 4	**2 days** 0 - 24	**4 days** 0 - 20	**4 days** 0 - 37	**17 days** 1 - 69
Annual temperature:							
Annual single highest maximum temperature °F	**99 °F** 98 - 101	**103 °F** 99 - 112	**103 °F** 100 - 107	**105 °F** 100 - 122	**106 °F** 102 - 112	**106 °F** 101 - 123	**111 °F** 104 - 121
Annual highest maximum temperature averaged over a 5-day period °F	**95 °F** 94 - 95	**98 °F** 95 - 104	**99 °F** 96 - 103	**100 °F** 96 - 110	**101 °F** 98 - 107	**101 °F** 97 - 113	**107 °F** 100 - 116
Cooling degree days (CDD)	**1263 degree-days** 1193 - 1353	**1,697 degree-days** 1,431 - 2,075	**1,751 degree-days** 1,496 - 2,094	**1,914 degree-days** 1,549 - 2,609	**2,104 degree-days** 1,740 - 2,704	**2,131 degree-days** 1,630 - 2,892	**2,868 degree-days** 2,130 - 3,858

N/A = Data Not Available for the selected area

Figure EH-7
Number of Days with Maximum Temperature > 90°F Graph – Montgomery County

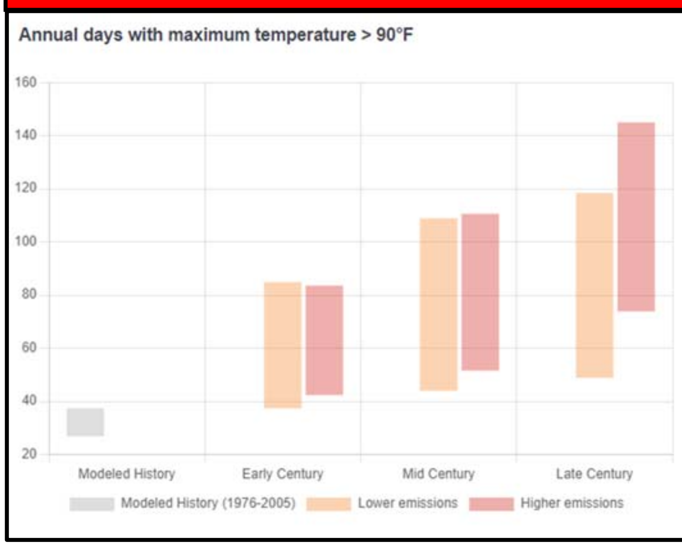
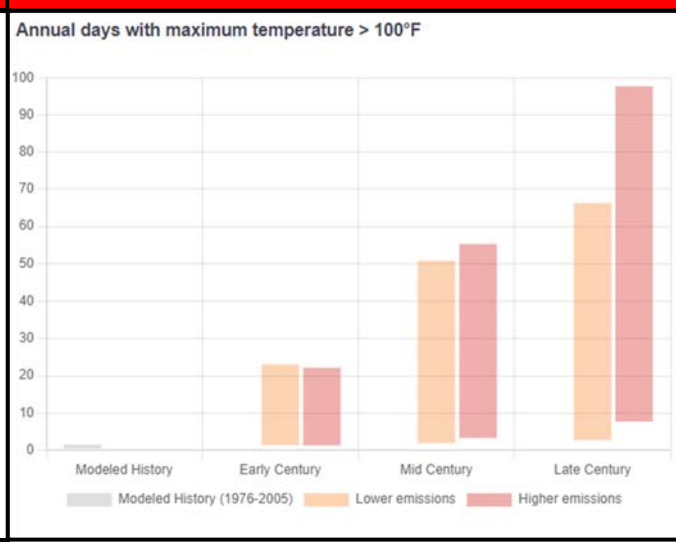


Figure EH-8
Number of Days with Maximum Temperature > 100°F Graph – Montgomery County



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 excessive heat.

Are the participating jurisdictions vulnerable to excessive heat?

Yes. All of Montgomery County, including the participating jurisdictions, is vulnerable to the dangers presented by excessive heat. Since 2013, the County has experienced 54 excessive heat events.

The *2023 Illinois Natural Hazard Mitigation Plan* prepared by IEMA-OHS classifies Montgomery County's hazard rating for heat wave as "medium". IEMA-OHS's overall hazard rating system has five levels: very low, low, medium, high, and very high.

For excessive heat, the FEMA's National Risk Index (NRI) rates the County as a whole as "Relatively Moderate". All eight census tracts are rated "Relatively High" for excessive heat. **Table R-4 presents** the overall NRI scores and ratings for each census tract as well as for the County as a whole.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of excessive heat?

Yes. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to excessive heat.

Montgomery County:
Individuals in the County are vulnerable to excessive heat and its impacts, especially the elderly and unhoused.

Coffeen:
Individuals in the community are vulnerable to excessive heat and its impacts, especially the elderly and young children.

Harvel:
The Village does not have any designated cooling centers to protect residents, especially vulnerable individuals and the elderly.

Nokomis:
Individuals in the community are vulnerable to excessive heat and its impacts, especially the elderly and low income individuals.

Nokomis Area Fire Protection District:
The elderly within the District are vulnerable to excessive heat and its impacts.

Schram City:
Individuals in the community are vulnerable to excessive heat and its impacts, especially the elderly.

Waggoner:
The Village does not have any designated cooling center for residents' use during excessive heat events.

What impacts resulted from the recorded excessive heat events?

Damage information was either unavailable or none was recorded for any of the excessive heat events. No injuries or fatalities were reported as a result of an excessive heat event. This does not mean that injuries or fatalities didn't occur; it simply means that excessive heat was not identified as the primary cause. This is especially true for fatalities. Usually, heat is not listed as the primary cause of death, but rather an underlying cause. The heat indices were sufficiently high for all the excessive heat events to produce heat cramps or heat exhaustion with the possibility of heat stroke in cases of prolonged exposure or physical activity.

Excessive Heat Fast Facts – Impacts/Risk

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

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

In comparison, Illinois averages 74 heat-related fatalities annually according to the Illinois State Water Survey's Climate Atlas of Illinois.

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 Montgomery County, excessive heat should not impact municipal water supplies since none obtain their water from surface water bodies. Excessive heat may impact residents in unincorporated Montgomery County who rely on shallow private wells for their drinking water.

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 Montgomery 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 frequency with which excessive heat occurs within the County; the impacts associated with these events; the types of living conditions (such as older, poorly-ventilated high rise buildings and low-income neighborhoods) that tend to contribute to heat-related injuries and fatalities; as well as the fact that injuries and fatalities due to excessive heat may be under reported. For the purposes of this analysis, *general population* includes healthy, able-bodied individuals who should have the ability to physiologically acclimatize to hot conditions over a period of days to weeks. Should that prove difficult, cooling centers are available in seven of the eleven participating municipalities to provide relief during peak heat hours.

The level of risk or vulnerability posed by excessive heat to the public health and safety of *socially vulnerable populations* is considered to be ***medium***. Socially vulnerable populations such as older adults (those 75 years of age and older) and small children (those younger than 5 years of age) are more susceptible to heat-related reactions and therefore their risk is elevated. **Figure EH-9** identifies the percent of socially vulnerable populations by participating municipality and the County based on the U.S. Census Bureau's 2017-2021 American Community Survey data. 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.

Figure EH-9
Sensitive Populations by Participating Jurisdictions

Participating Jurisdiction	% of Population 75 year of age & Older	% of Population Younger than 5 years of age	Total % of Sensitive Population
Coffeen	12.5%	4.8%	17.3%
Farmersville	3.3%	13.3%	16.6%
Harvel	4.6%	11.3%	15.9%
Hillsboro	8.3%	1.4%	9.7%
Litchfield	11.2%	7.7%	18.9%
Nokomis	8.3%	4.4%	12.7%
Raymond	4.4%	7.2%	11.6%
Schram City	9.6%	6.7%	16.3%
Taylor Springs	22.9%	5.7%	28.6%
Waggoner	3.6%	21.0%	24.6%
Witt	7.2%	3.4%	10.6%
Rountree Township	45.0%	0.0%	45.0%
Unincorp. Montgomery County	7.8%	5.0%	13.8%
Montgomery County	8.9%	5.2%	14.1%
State of Illinois	6.4%	5.8%	12.4%

[1]Coffeen Volunteer Fire Department [2]Fillmore Community FPD
[3]Nokomis Area FPD [4]Raymond-Harvel Fire Department
Source: U.S. Census Bureau.

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

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

While buildings do not typically sustain damage from excessive heat, in rare cases infrastructure and critical facilities may be directly or indirectly damaged. While uncommon, excessive heat has been known to contribute to damage caused to roadways within Montgomery 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 Montgomery County, there is the potential for this to occur. The potential may increase over the next two decades if new power sources are not built to replace the state's aging nuclear power facilities that are expected to be decommissioned.

In general, the risk or vulnerability to buildings, infrastructure and critical facilities from excessive heat is considered ***low***, even taking into consideration the potential for damage to roadways and disruptions to the electrical grid.

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

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

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

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

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 U.S. 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 Montgomery 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 U.S., 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.

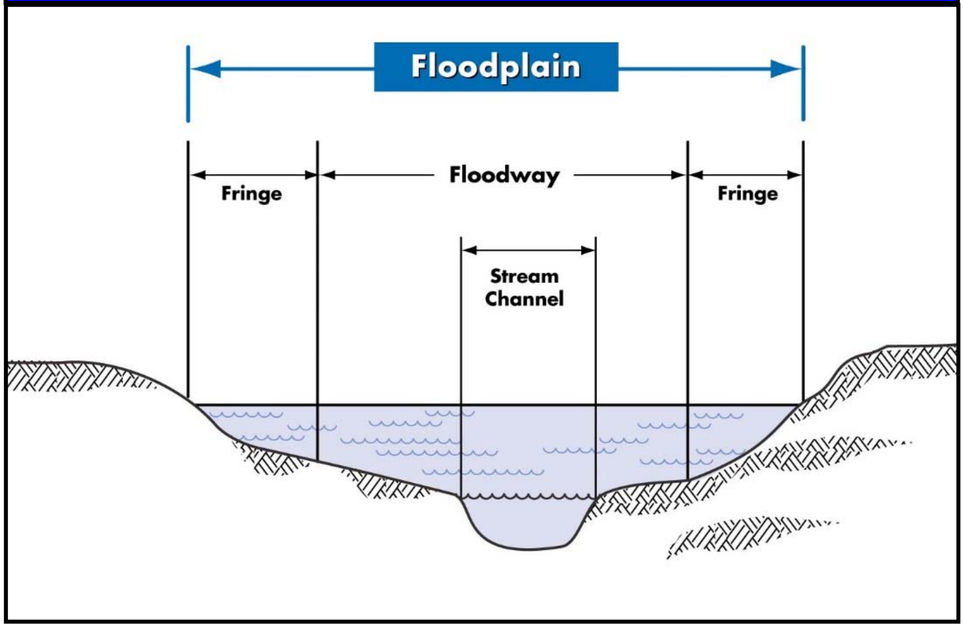
What is a floodplain?

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.

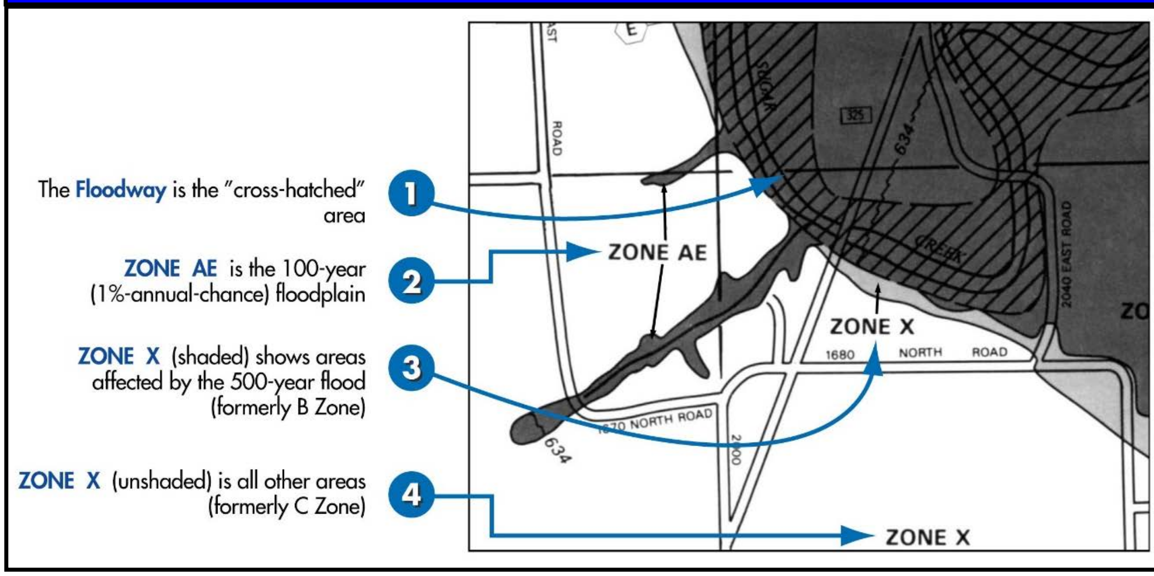
What is a Special Flood Hazard Area?

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 0.2% chance or 500-year flood. Land areas located within Zone X (shaded) are affected by the 500-year flood and are considered at a moderate risk for flooding.

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

What is a Repetitive Loss Structure or Property?

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

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

What is floodplain management?

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

What is the National Flood Insurance Program?

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

- mitigates future flood losses nationwide through community-enforced building and zoning ordinances; and

- provides access to affordable, federally-backed insurance protection against losses from flooding to property owners in participating communities.

It is designed to provide an insurance alternative to disaster assistance to meet escalating costs of repairing damage to buildings and their contents due to flooding. The U.S. Congress established the NFIP on August 1, 1968 with the passage of the National Flood Insurance Act of 1968. This Program has been broadened and modified several times over the years, most recently with the passage of the Flood Insurance Reform Act of 2004.

Prior to the creation of the NFIP, the national response to flood disasters was generally limited to constructing flood-control projects such as dams, levees, sea-walls, etc. and providing disaster relief to flood victims. While flood-control projects were able to initially reduce losses, their gains were offset by unwise and uncontrolled development practices within floodplains. In light of the continued increase in flood losses and the escalating costs of disaster relief to taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for protection.

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

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

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

What is the NFIP's Community Rating System?

The NFIP's Community Rating System (CRS) is a voluntary program developed by FEMA to provide incentives (in the form of flood insurance premium discounts) for NFIP participating communities that have gone beyond the minimum NFIP floodplain management requirements to develop extra measures to provide protection from flooding. CRS discounts on flood insurance premiums range from 5% up to 45%. The discounts provide an incentive for communities to implement new flood protection activities that can help save lives and property when a flood occurs.

Are alerts issued for flooding?

Yes. The National Weather Service Weather Forecast Office in St. Louis, Missouri is responsible for issuing ***flood watches*** and ***warnings*** for Montgomery 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 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 6 and **7**, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of flood events recorded in Montgomery 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 and Iowa State University's National Weather Service Watch, Warning, and Advisories database were used to document 17 occurrences of general flooding in Montgomery County between 2008 and 2022.

Flash Floods

NOAA's Storm Events Database and Iowa State University's National Weather Service Watch, Warning, and Advisories database were used to document 60 reported occurrences of flash flooding in Montgomery County between 1994 and 2022. Included in the 60 flash flood events are three events that contributed to two major federal disaster declarations for Montgomery County.

Flood Fast Facts – Occurrences

Number of General Floods Reported (2008 – 2022): ***17***

Number of Flash Floods Reported (1994 – 2022): ***60***

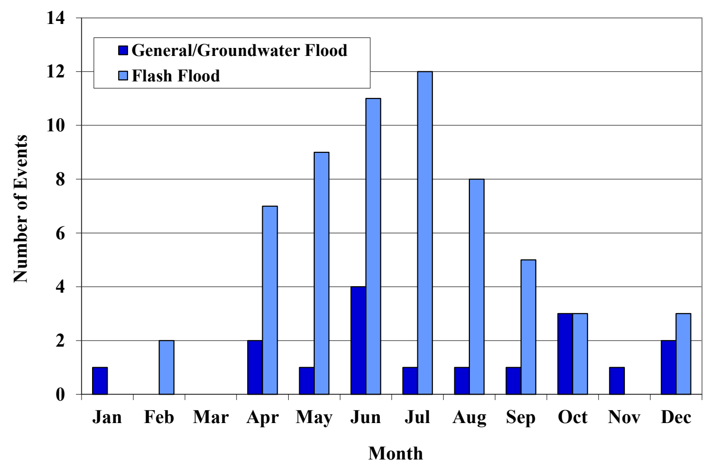
Most Likely Month for General Floods to Occur: ***June***

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

Number of Federal Disaster Declarations Related to General and Flash Flooding: ***2 (2002 & 2008)***

Figure F-3 charts the reported occurrences of flooding by month. Of the 17 general flood events, seven (41%) began in April, May, and June making this the peak period for general flooding. Of those seven events, four (57%) began during June making this the peak month for general flooding. There were two events that spanned two or more months; however, for illustration purposes only the month the event started in is graphed.

Figure F-3
Flood Events by Month



In comparison, 32 of the 60 flash flood events (53%) took place in May, June, and July making this the peak period for flash floods. Of these 32 events, 12 (38%) occurred in July making this the peak month for flash flooding. Of the flash flood events with recorded times, 50% began during the a.m. hours and 50% began during the p.m. hours.

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 Montgomery County, only 2.8% of the area in the County is designated as being within the base floodplain and susceptible to riverine floods.

FIRMs have only been developed for three of the municipalities within the County: Hillsboro, Litchfield, and Nokomis. These maps became effective between August 19, 1985 and August 19, 1987. **Appendix K** contains maps identifying the floodplains located in these three municipalities. While FIRMs have not been developed for the County, Flood Hazard Boundary Maps (FHBMs) were developed and became effective on January 9, 1981. Copies of the County FHBMs are also located in **Appendix K**. No other FHBMs or FIRMs have been developed for any of the other municipalities in Montgomery County.

According to the Illinois State Water Survey's (ISWS) Coordinated Hazard Assessment and Mapping Program (CHAMP), the County is currently in the data development phase of FEMA's Risk MAP project to create FIRMs. The ISWS held a project initiation community coordination call on March 28, 2023 with federal, state, county, and municipal officials to discuss the development of new floodplain studies for Montgomery County and provide an estimated project schedule. Data development to complete the draft FIRM database is scheduled for Fall 2023. Pending conclusion of data development, a DFIRM Project will follow.

Figure F-4 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 FIRMs or FHBMs) are identified in bold.

Figure F-4
Bodies of Water Subject to Flooding

Participating Jurisdiction	Water Bodies
Coffeen	unnamed tributary East Fork Shoal Creek
Farmersville	Macoupin Creek
Harvel	unnamed tributary Prairie Fork
Hillsboro	**Middle Fork Shoal Creek**, **unnamed tributary Middle Fork Shoal Creek, Lake Glenn Shoals**, Lake Hillsboro
Litchfield	Litchfield Lake, Walton Park Lake, **unnamed tributary West Fork Shoal Creek**
Nokomis	**East Fork Shoal Creek**, **unnamed tributary East Fork Shoal Creek**
Raymond	West Fork Shoal Creek
Schram City	unnamed tributary Lake Hillsboro
Taylor Springs	unnamed tributary Middle Fork Shoal Creek
Waggoner	---
Witt	unnamed tributary East Fork Shoal Creek
Unincorp. Montgomery County	**Bearcat Creek**, **Blue Grass Creek**, **Brush Creek**, **Caesar Creek**, Chautauqua Lake, **Coffeen Lake**, **Cress Creek**, Crown Mine Pond, Dry Branch, **Dry Fork**, **East Branch**, **East Fork Shoal Creek**, **Elliott Creek**, Fillmore Lake, **Five Mile Lake**, Gilham Creek, **Grove Branch**, **Horse Creek**, **Hurricane Creek**, **Lake Fork**, **Lake Lou Yaeger**, **Lanes Branch**, **Little Creek**, Long Branch, **Macoupin Creek**, McDavid Branch, **Middle Fork Shoal Creek**, **Miller Creek**, Mud Creek, **Otter Branch**, Panama Lake, **Piatt Creek**, **Ramsey Creek**, Rocky Ford Lakes, **Shoal Creek**, **Shop Creek**, **Three Mile Branch**, Walton Park Lake, **Waveland Creek**, **West Branch Horse Creek**, **West Fork Shoal Creek**, Yankee Creek

Source: FEMA's FIRMs and FHBMs.

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

Prior to the 1960s, overland flooding occurred frequently in Litchfield and Hillsboro. To combat the flooding, federal funds were obtained to help create Lake Lou Yaeger in Litchfield and Glen Shoals Lake in Hillsboro. The creation of these two bodies of water substantially reduced the impacts flooding had on these communities. **Figure F-5** contains an article published in the Hillsboro Journal-News on June 18, 2015 discussing the historic flooding in Hillsboro during June, 1957.

Figure F-5
The Journal-News: Remembering the Rains, Floods from June 1957

The Journal-News

Remembering The Rains, Floods From June 1957

This month's wet weather brought to mind another wet spring for Hillsboro farmer Harold Green: June 1957.

In one six-day period, according to *The Hillsboro Journal,* nearly seven inches of rain fell, including a four-inch soaking that began on June 14.

Mr. Green can remember water running over Route 16 just west of Hillsboro, and a photo printed on the front page of the June 17, 1957, edition of *The Hillsboro Journal* showed the entire Shoal Creek east fork out of its banks, flooding the Bremer bottoms and covering the North Road in places.

The 1957 rain also inundated the creek that runs through Hillsboro, flooding the Central Park pool and the dress factory on School Street just upstream.

Floods such as the one that followed the June 1957 rain provided much of the impetus behind the construction of Lake Lou Yaeger in Litchfield in 1964-66 and Glenn Shoals Lake in Hillsboro in 1976-78.

Date	H	L	Rain
June 11	90	67	.05
June 12	88	68	1.14
June 13	85	66	.47
June 14	85	67	.72
June 15	89	65	4.05
June 16	91	92	.40

This clipping taken from the June 17, 1957 edition of *The Hillsboro Journal* show nearly seven inches of rain fell in six days.

A much larger version of this photo was published on the front page of the June 17, 1957, edition of *The Hillsboro Journal.* The caption, in part, read "An indication of the vast amount of rich cropland that was flooded last weekend is shown in this picture taken just north of Hillsboro, looking south down the east branch of Shoal Creek. The circle in the lower left corner is the Hillsboro sewage disposal plant. The North Road, under water in several places, is shown in the center of the picture."

What jurisdictions within the County take part in the NFIP?

Participating Jurisdictions

Montgomery County, Hillsboro, Litchfield, Nokomis, and Witt participate in the NFIP. **Figure F-6** ***provides information on each NFIP-participating jurisdiction,*** including the date each participant joined, the date of their current effective FIRM and the year of their most recently adopted floodplain zoning ordinance. Coffeen, Farmersville, Harvel, Raymond, Schram City, Taylor Springs, and Waggoner have no identified flood hazard boundaries within their corporate limits and do not wish to participate in the NFIP at this time.

Figure F-6
NFIP Participating Jurisdictions

Participating Jurisdictions	Participation (Date)	Current Effective FIRM (Date)	Floodplain Zoning/FIRM Adoption Ordinance (Year)	Adoption of Minimum NFIP Criteria (Yes/No)	Local Floodplain Management Regulations Implemented & Enforced (Yes/No)	Position Responsible for Implementation of NFIP Commitments/ Requirements	CRS Participation
Montgomery County	02/03/2000	01/09/1981 (FHBM)	1999	Yes	Yes	Highway Engineer	No
Hillsboro	08/19/1986	08/19/1986	2015	Yes	Yes	City Clerk	No
Litchfield	08/19/1985	08/19/1985	1989	Yes	Yes	Building Inspector	No
Nokomis	08/18/1987	08/19/1987	2010	Yes	Yes	Commissioner of Public Health and Safety	No
Witt	06/15/1998	n/a	1998	Yes	Yes	Mayor	No

Discussions with the individuals responsible for implementation of the NFIP commitments and requirements within their jurisdiction and a review of the participating jurisdictions floodplain ordinances indicates that each monitor flood events and, when applicable, conduct substantial damage determinations for structures within the floodplain using FEMA's Substantial Damage Estimator Tool. For structures that meet the definition of substantial damage (total cost of repairs is 50% or more of the structure's market value before the disaster occurred, regardless of the cause of damage), the owners are notified, and the structure must be brought back into compliance with local floodplain management regulations.

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.

Non-Participating Jurisdictions
Butler, Coalton, Donnellson, Fillmore, Irving, Ohlman, Panama, Walshville, and Wenonah have no identified flood hazard boundaries within their corporate limits and have chosen not to participate in the Program.

What is the probability of future flood events occurring based on historical data?

General Floods
Montgomery County has had 17 verified occurrences of general flooding between 2008 and 2022. With 17 occurrences over the past 15 years, the County should expect at least one general flood event in any given year. It is important to keep in mind there are almost certainly gaps in the general flood data. More events have almost certainly occurred than are documented in this section, which means that the probability is almost certainly higher than reported.

There were five years over the past 17 years where two or more general flood events occurred. This indicates that the probability or likelihood that more than one general flood event may occur during any given year within the County is 29%.

Flash Floods

There have been 60 verified flash flood events between 1994 and 2022. With 60 occurrences over the past 29 years, the County should expect about two flash flood events in any given year. There were 13 years over the past 29 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 45%.

What is the probability of future flood events occurring based on modeled future conditions?

In the last 120 years, total annual precipitation in Illinois has increased by between 12% to 15% across the State. This means, according to the Illinois State Climatologist, that we get about an additional 5 inches of yearly rainfall compared to what was expected historically.

This trend is likely to continue, and as a result, precipitation in Illinois is forecasted to increase in coming decades. In addition to changes in the overall amount of precipitation, changes in precipitation patterns indicate that future events will likely be less frequent, but larger and more severe. The Illinois State Climatologist indicates that since the beginning of the 20th Century, Illinois has seen a 40% increase in the number of days with extreme precipitation events (rainfall of 2 inches or greater) per year.

A portion of IL Rte. 16 outside of Nokomis was temporarily closed due water flowing over the road as a result of a flash flood event on December 28, 2015.

Photograph provided by the Montgomery County EMA Coordinator

One result of more precipitation overall and an increase in heavy rain events is an increased risk of flooding. In particular, extreme precipitation events are likely to lead to flash floods along rivers and in urban areas, where impermeable surfaces such as buildings, roads, and sidewalks will make drainage systems more likely to be overwhelmed. Rural areas will face different challenges, most notably those close to rivers and in low-lying areas with little or no drainage capability.

Figures SS-8 and **SS-9**, located in Section 3.1, provide tabular and graphical projections for Montgomery County, showing estimations for average annual precipitation in the early, mid, and late 21st century with both low and high estimates for each time period. Most likely, the true value will fall between these two estimates. By midcentury, the average annual precipitation in Montgomery County is projected to increase by two inches per year, while the average number of days with precipitation per year is projected to decrease by 3 to 5 days according to the Climate Mapping for Resilience and Adaptation's Assessment Tool.

By midcentury, the annual number of days with total precipitation greater than 1 inch is projected to increase by one day. The annual number of days with total precipitation greater than 2 inches is not projected to increase significantly. This is confirmed by the Climate Explorer, which indicates that in Montgomery County the annual counts of intense rainstorms (rainfall of 2 inches or greater in once day) are not projected to increase. This is based on the findings of the 2018 National Climate Assessment and compares projections for the middle third of the century (2035-2064) with average conditions observed from 1961-1990.

Taken together, the projected increase in annual rainfall, the decrease in frequency of rain events, and the negligible threat of intense rain events in Montgomery County means that the likelihood of flooding may be slightly higher than it is today.

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. Montgomery County and the participating jurisdictions 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 2013, Montgomery County has experienced nine general flood events and 27 flash flood events.

All of the general flood and flash flood events impacted either a large portion or the entire County and were not location specific, with the exception of one flash flood event which took place in the Raymond-Harvel area.

The *2023 Illinois Natural Hazard Mitigation Plan* prepared by IEMA-OHS classifies Montgomery County's hazard rating for riverine flooding as "medium" and flash flooding as "very low". IEMA-OHS's overall hazard rating system has five levels: very low, low, medium, high, and very high.

For riverine floods the FEMA's National Risk Index (NRI) rates the County as a whole as "Very Low". Seven of the eight census tracts are rated "Relatively Low" and one is rated "Very Low" for riverine floods. **Table R-4 presents** the overall NRI scores and ratings for each census tract as well as for the County as a whole.

Montgomery County's vulnerability to flooding was greatly reduced following a series of construction projects that began in the 1950s. Federal funds were used to help construct Lake Lou Yaeger in Litchfield, Glenn Shoals Lake in Hillsboro and several dams along the Middle and West

Forks of Shoal Creek. These projects helped reduce the number and severity of flood events within the County, especially in Litchfield and Hillsboro.

While the frequency and severity of flooding is greater in most other counties, localized drainage problems remain in several municipalities where poorly drained soils and small creeks are present. The majority of these recurring drainage problems occur in Litchfield, Nokomis, Hillsboro and to a lesser extent in Raymond.

During the process to update Litchfield's Comprehensive Plan (approved June 2021), drainage management was identified as one of the three strategic infrastructure objectives within the City. Recommendations listed within the Comprehensive Plan call for:

- reviewing the existing drainage and stormwater requirements for new construction against recommended best practices;
- developing a Sedimentation, Siltation and Erosion Prevention Plan to coordinate strategies and funding from an infrastructure and recreation position; and
- obtaining additional grant funding to support shoreline restoration and protection of lakes and creeks.

During the December 28, 2015 flash flood event, Glenn Shoals Lake overtopped Glenn Shoals Drive as the emergency spillway was utilized to handle the excess water.

Photograph provided by Montgomery County EMA Coordinator

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. According to the Multi-Resolution Land Characteristics (MRLC) Consortium, approximately 7.2% of the County's land cover is considered developed with 1.9% impervious surfaces. Areas with impervious surface rates approaching or exceeding 12 to 15 percent will likely experience negative impacts to water quality. Between 2016 and 2021 approximately 0.03 square miles of development and 0.22 square miles of impervious surfaces were gained.

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.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of flooding?

Yes. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to flooding.

Coffeen Volunteer Fire Department:
Some roads in the creek bottoms are closed following flood events, which impedes travel and delaying emergency response times.

Hillsboro:
The Village's wastewater treatment plant is located adjacent to the base floodplain of the Middle Fork of Shoal Creek and potentially vulnerable to flooding.

Litchfield:
Flooding has the potential to damage the Lake Lou Yaeger Dam.

Rountree Township:

- ❖ Several roads within the District flood during heavy rain events making them impassable and causing adverse travel.
- ❖ Roads and bridges within the Township have been damaged by flood events.

Taylor Springs:
The Village's lift stations are all located in low areas and vulnerable to flooding.

What impacts resulted from the recorded floods?

Floods as a whole have caused a *minimum* of $1.15 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.

Flood Fast Facts – Impacts/Risk

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

Flash Flood Impacts:
- ❖ Total Property Damage (5 events): ***$1,150,385***
- ❖ Total Crop Damage: ***n/a***
- ❖ Injuries: ***n/a***
- ❖ Fatalities (1 event): ***1***

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

General Floods
Damage information was either unavailable or none was recorded for any of the reported general flood events. 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 1994 and 2022, five of the 60 flash flood events caused $1,150,385 in property damages. Damage information was either unavailable or none was recorded for the remaining 55 reported occurrences. NOAA's Storm Events Database documented one fatality as a result of the April 11, 1994 flash event. A man traveling north near White Oak drowned when he tried to cross a flooded roadway and his car was swept off the road into Horse Creek.

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.

Flash flooding on September 13, 2008 flooded Litchfield Armory and OK Grain Elevator in Litchfield.

Photograph courtesy of the Hillsboro Journal-News

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 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, one-third 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 Montgomery County?

Yes. According to information obtained from IEMA-OHS, there is one repetitive loss structure in Fillmore, one is Witt, and three in unincorporated Montgomery 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-7 identifies the repetitive flood loss structures by jurisdiction and provides the total flood insurance claim payments. The exact location and/or address of the insured structures are not included in this Plan to protect the owners' privacy. According to IEMA-OHS, According to IEMA-OHS, there have been 23 flood insurance claim payments totaling $377,693.40 for the five repetitive flood loss structures.

Figure F-7
Repetitive Flood Loss Structures

Jurisdiction	Structure Type	Number of Structures	Number of Claim Payments	Flood Insurance Claim Payments		Total Flood Insurance Claim Payments
				Structure	Contents	
Fillmore	Single Family	1	9	$150,603.15	$66,443.27	$217,046.42
Witt	Single Family	1	2	$14,181.51	$991.22	$15,172.73
Unincorp. County	Single Family	3	12	$119,087.76	$26,386.49	$145,474.25
Total:		**5**	**23**	**$283,872.42**	**$93,820.98**	**$377,693.40**

Source: Illinois Emergency Management Agency and Office of Homeland Security

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

Yes. **Figure F-8** identifies the *estimated number* of existing structures by participating jurisdiction located within a base floodplain. These counts were prepared by the Consultant using FEMA's FIRMs, building footprints prepared by the Illinois State Water Survey and ArcGIS. It should be noted that while the identified structures are located in a floodplain, the actual number impacted may differ during a real flood event.

Figure F-8
Existing Buildings, Infrastructure and Critical Facilities Located in a Base Floodplain by Participating Jurisdiction

Participating Jurisdiction	Residential			Residential Garages	Businesses (Commercial/ Industrial)	Miscellaneous (Barns, Sheds, Silos)	Infrastructure/ Critical Facilities
	Houses	Duplexes	Apartment Complexes				
Coffeen[1]	---	---	---	---	---	---	---
Farmersville	---	---	---	---	---	---	---
Harvel[4]	---	---	---	---	---	---	---
Hillsboro	9	---	---	7	3	3	---
Litchfield	20	---	3	9	3	1	1
Nokomis[3]	13	---	---	4	---	7	---
Raymond[4]	---	---	---	---	---	---	---
Schram City	---	---	---	---	---	---	---
Taylor Springs	---	---	---	---	---	---	---
Waggoner	---	---	---	---	---	---	---
Witt	---	---	---	---	---	---	---

[1]Coffeen Volunteer Fire Department
[2]Fillmore Community FPD
[3]Nokomis Area FPD
[4]Raymond-Harvel Fire Department

Only three of the municipalities within the County have current effective FIRMs: Hillsboro, Litchfield, and Nokomis. None of the other municipalities have been mapped. While Flood Hazard Boundary Maps were developed for the unincorporated portions of Montgomery County, FIRMs have not been. As a result, estimates of existing residential structures in unincorporated Montgomery and the townships are not included. Only one other county in Illinois, Macoupin County, has a smaller percentage of acres located in the floodplain. This fact, coupled with the lack of mapping is the primary reason that there are so few residential structures located in the floodplain.

Water flows across South Main Street in downtown Hillsboro as a result of a flash flood event.

Photograph courtesy of the Hillsboro Journal-News

Aside from key roads, bridges, electrical substations, and buried power and communication lines, the only participating jurisdiction that has specific infrastructure/ critical facilities located within a floodplain is Litchfield. One of the Street Department's maintenance buildings is located in the base floodplain of an unnamed tributary of West Fork Shoal Creek.

While 2.8% of the land area in Pike County lies within the base floodplain and is susceptible to riverine flooding, ***almost the entire County is vulnerable to flash flooding***. As a result, ***a majority of the buildings, infrastructure and critical facilities that may be impacted by flooding are located outside of the base floodplain and are not easily identifiable.***

The risk or vulnerability of existing buildings, infrastructure and critical facilities to all forms of flooding is considered to be ***medium*** based on: (a) the frequency and severity of recorded flood events within the County; (b) the fact that most of the County is vulnerable to flash flooding; and (c) 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*** can be calculated if several assumptions are made. These assumptions represent a probable scenario based on the reported occurrences of flooding in Montgomery County.

The purpose of providing an estimate is to help residents and local officials make informed decisions about how they can better protect themselves and their communities. These estimates are meant to provide a ***general idea*** of the magnitude of the potential damage that could occur from a flood event in each of the participating municipalities.

Assumptions

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

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

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

Assumption #1

A riverine flood event will impact vulnerable residential structures.

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 base floodplain and the number of structures impacted can change with each event depending on the amount of precipitation received, the topography and the land use of the area.

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

Assumption #2

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

Scope of the Flood Event. To establish the number of vulnerable residential structures (potentially-damaged housing units), the scope of the riverine flood event 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.

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

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

This assumption results in the following conditions for each municipality:

- ➢ Coffeen, Farmersville, Harvel, Raymond, Schram City, Taylor Springs, Waggoner, and Witt would not experience any residential flooding since there are no river, stream or creek base floodplains located within their municipal limits;
- ➢ *Hillsboro*: Middle Fork Shoal Creek and an unnamed tributary of Middle Fork Shoal Creek would overflow their banks and flood a small portion within the middle of the City;
- ➢ *Litchfield*: two unnamed tributaries of West Fork Shoal Creek would overflow their banks and flood a small portion on the eastern edge of the City; and
- ➢ *Nokomis:* East Fork Shaol Creek and an unnamed tributary of East Branch Shoal Creek would overflow their banks and flood a small portion along the northern and southern edges of the City.
- ➢

Assumption #3

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

Number of Potentially-Damaged Housing Units. Since this scenario assumes that all the base floodplains will experience the same degree of flooding, the number of existing residential structures located within the base floodplain(s) can be used to determine the number of potentially-damaged housing units. **Figure F-8** identifies the total number of existing residential structures located within the base floodplains(s) of each participating municipality These counts were prepared by the Consultant.

Assumption #4

The average market value for a residential structure 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 will be used.

To determine the average market value, the average assessed value must first be calculated. The average assessed value is determined by taking the total assessed value of residential buildings within a jurisdiction and dividing that number by the total number of housing units within the jurisdiction. The average market value is then determined by taking the averaged assessed value and multiplying that number by three (the assessed value of a structure in Montgomery County is approximately one-third of the market value). **Figure F-9** provides a sample calculation. The total assessed value is based on 2021 tax assessment information provided by the Montgomery County Clerk's Office. **Figures F-10** provides the average assessed value and average market value for each participating municipality.

Figure F-9
Sample Calculation of Average Assessed Value & Average Market Value – Nokomis

Average Assessed Value

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

Nokomis: $14,541,458 ÷ 1,020 housing units = $14,256

Average Market Value

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

Nokomis: $14,256 x 3 = $42,768

Figure F-10
Average Market Value of Housing Units by Participating Municipality

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2021)	Total Housing Units (2017-2021)	Average Assessed Values	Average Market Value (2021)
Coffeen[1]	$1,611,064	292	$5,517	$16,551
Farmersville	$7,859,613	329	$23,889	$71,667
Harvel[4]	$710,036	74	$9,595	$28,785
Hillsboro	$37,287,643	1,951	$19,112	$57,336
Litchfield	$62,399,386	3,466	$18,003	$54,009
Nokomis[3]	$14,541,458	1,020	$14,256	$42,768
Raymond[4]	$10,732,089	407	$26,369	$79,107
Schram City	$3,752,849	315	$11,914	$35,742
Taylor Springs	$3,490,151	326	$10,706	$32,118
Waggoner	$1,027,117	88	$11,672	$35,016
Witt	$4,339,260	347	$12,505	$37,515

[1]Coffeen Volunteer Fire Department [2]Fillmore Community FPD
[3]Nokomis Area FPD [4]Raymond-Harvel Fire Department

Source: Montgomery County Clerk's Office.

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)

Assumption #5

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

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-11** calculates the percent loss to a structure and its contents for different scenarios based on flood depth and structure type.

Figure F-11
FEMA Flood Loss Estimation Tables

Flood Building Loss Estimation Table

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

Flood Content Loss Estimation Table

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

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

For this scenario it is assumed that the potentially-damaged housing units are one or two-story homes with basements and the flood depth is two feet. With these assumptions the expected percent damage sustained by the ***structure*** is estimated to be 20% and the expected percent damage sustained by the structure's ***contents*** is estimated to be 30%.

Potential Dollar Losses

Now that all of the decisions/assumptions have been made, the potential dollar losses can be calculated. First the potential dollar losses to the ***structure*** of the potentially-damaged housing units must be determined. This is done by taking the average market value for a residential structure and multiplying that by the percent damage 20% to get the average structural damage per unit. Next the average structural damage per unit is multiplied by the number of potentially-damaged housing units. **Figure F-12** provides a sample calculation.

Figure F-12
Structure: **Potential Dollar Loss Sample Calculation – Nokomis**

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

Nokomis: $42,768 x 20% = $8,553.60 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)

Nokomis: $8,553.60 per housing unit x 13 housing units = $111,197

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-13** provides a sample calculation.

Figure F-13 ***Content:*** **Potential Dollar Loss Sample Calculation – Nokomis**
½ (Average Market Value of a Housing Unit with the Jurisdiction) x Percent Damage = Average Content Damage per Housing Unit
Nokomis: ½ ($42,768) x 30% = $6,415.20 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)
Nokomis: $6,415.20 per housing unit x 13 housing units = $83,398

Finally, the ***total potential dollar losses*** may be calculated by adding together the potential dollar losses to the structure and the content. **Figure F-14** provides a breakdown of the total potential dollar losses by participating municipality.

Figure F-14
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Riverine Flood Event by Participating Municipality

Participating Jurisdiction	Average Market Value (2021)	Potentially-Damaged Housing Units	Potential Dollar Losses		Total Potential Dollar Losses (Rounded to the Nearest Dollar)
			Structure	Content	
Coffeen[1]	$16,551	0	$ 0	$ 0	$ 0
Farmersville	$71,667	0	$ 0	$ 0	$ 0
Harvel[4]	$28,785	0	$ 0	$ 0	$ 0
Hillsboro	$57,336	9	$103,205	$77,404	$180,609
Litchfield	$54,009	20	$216,036	$162,027	$378,063
Nokomis[3]	$42,768	13	$111,197	$83,398	$194,595
Raymond[4]	$79,107	0	$ 0	$ 0	$ 0
Schram City	$35,742	0	$ 0	$ 0	$ 0
Taylor Springs	$32,118	0	$ 0	$ 0	$ 0
Waggoner	$35,016	0	$ 0	$ 0	$ 0
Witt	$37,515	0	$ 0	$ 0	$ 0

[1]Coffeen Volunteer Fire Department [2]Fillmore Community FPD
[3]Nokomis Area FPD [4]Raymond-Harvel Fire Department

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 $180,609 in Hillsboro to $378,063 in Litchfield***. There are eight participating municipalities in this scenario who do not have any residences considered vulnerable to riverine flooding.

Vulnerability of Infrastructure/Critical Facilities

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

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

In terms of specific infrastructure vulnerability, none of the municipalities that are mapped have infrastructure within or adjacent to the base floodplain. However, the wastewater treatment in Raymond has experienced flooding issues. No above-ground infrastructure within the participating jurisdictions, other than key roads, bridges and electrical substations, were identified as being vulnerable to riverine flooding.

Considerations

While the potential dollar loss scenario was only for a riverine flood event, the participating jurisdictions have been made aware through the planning process of the impacts that can result from flash flood events. Montgomery 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 SEVERE WINTER STORMS

HAZARD IDENTIFICATION

What is the definition of a severe winter storm?

A severe winter storm can range from moderate snow over a few hours to significant accumulations of sleet and/or ice to blizzard conditions with blinding, wind-driven snow that last several days. The amount of snow or ice, air temperature, wind speed and event duration all influence the severity and type of severe winter storm that results. In general, there are three types of severe winter storms: blizzards, heavy snowstorms and ice storms. The following provides a brief description of each type as defined by the National Weather Service (NWS).

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

What is snow?

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

What is sleet?

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

What is freezing rain?

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

Are alerts issued for severe winter storms?

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

- **Winter Storm Watch.** A winter storm watch is issued when the risk of hazardous winter weather has increased significantly and there is a strong possibility that conditions will reach warning criteria for the area within the next 12 to 48 hours.
- **Advisories.** Winter advisories are issued for lesser winter weather events that while presenting an inconvenience, do not pose an immediate threat of injury, death or significant property damage. The following advisories will be issued when an event is occurring, is imminent or has a high probability of occurring.
    - **Winter Weather Advisory.** Depending on the time of occurrence and the temperature, a winter weather advisory is issued for:
        - snowfall of 1 to 5 inches;
        - sleet accumulations of less than ½ inch; or
        - a combination of winter precipitation which will produce hazardous conditions.
    - **Freezing Rain Advisory.** A freezing rain advisory is issued when light freezing rain will produce ice accumulations of less than ¼ inch.
- **Warnings.** Winter weather warnings are issued for events that can be life threatening. The following warnings will be issued when an event is occurring, is imminent, or has a high probability of occurring.
    - **Blizzard Warning.** A blizzard warning is issued when sustained winds or frequent gusts greater than or equal to 35 mph are accompanied by falling and/or blowing snow that frequently reduces visibility to less than ¼ mile for three hours or more.
    - **Ice Storm Warning.** An ice storm warning is issued when freezing rain is expected to produce ice accumulations of ¼ inch or more.
    - **Winter Storm Warning.** A winter storm warning is issued when:
        - 6 inches or more of snow is expected;
        - ½ inch or more of sleet accumulations are expected; or
        - a combination of winter precipitation will produce life threatening conditions.

HAZARD PROFILE

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

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

Table 8, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of severe winter storms (snow & ice) recorded in Montgomery County.

NOAA's Storm Events Database, Midwestern Regional Climate Center's cli-MATE database, and NWS's COOP data records were used to document 85 reported occurrences of severe winter storms (snow, ice and/or a combination of both) in Montgomery County between 1950 and 2022. Of the 85 recorded occurrences there were 53 heavy snowstorms or blizzards; 28 combination events (freezing rain, sleet, ice and/or snow); and four ice or sleet storms. Included in the 85 severe winter storms is one event from 2006 which contributed to a federal emergency declaration in Montgomery County.

Severe Winter Storm Fast Facts – Occurrences

Number of Severe Winter Storm Events Reported (1950 -2022): ***85***

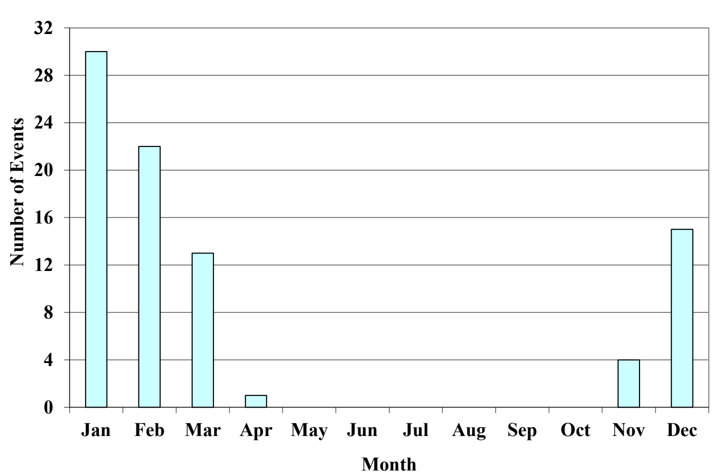
Maximum 24-Hour Snow Accumulation: ***14.3 inches (Mar. 25, 2013)***

Most Likely Month for Severe Winter Storms to Occur: ***January***

Number of Federal Disaster Declarations Related to Severe Winter Storms: ***1 (2006)***

Figure SWS-1 charts the reported occurrences of severe winter storms by month. Of the 85 events, 67 (79%) took place in in December, January, and February making this the peak period for severe winter storms. Of these 67 events, 30 (45%) occurred during January, making this the peak month for severe winter storms. There were three events that spanned two months; however, for illustration purposes only the month when the event started is graphed. Of the winter storm events with recorded times, 59% began during the a.m. hours.

Figure SWS-1
Severe Winter Storms by Month
1950 – 2022



According to the NWS's COOP data records, the maximum 24-hour snow accumulation in Montgomery County is 14.3 inches, which occurred on March 25, 2013 at the Hillsboro NWS COOP Observation Station.

What locations are affected by severe winter storms?

Severe winter storms affect the entire County. All communities in Montgomery County have been affected by severe winter storms. Severe winter storms generally extend across the entire County and affect multiple locations.

What is the probability of future severe winter storms occurring based on historical data?

Montgomery County has had 85 verified occurrences of severe winter storms between 1950 and 2022. With 85 occurrences over the past 73 years, Montgomery County should expect at least one severe winter storms in any given year. There were 23 years over the past 73 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 32%.

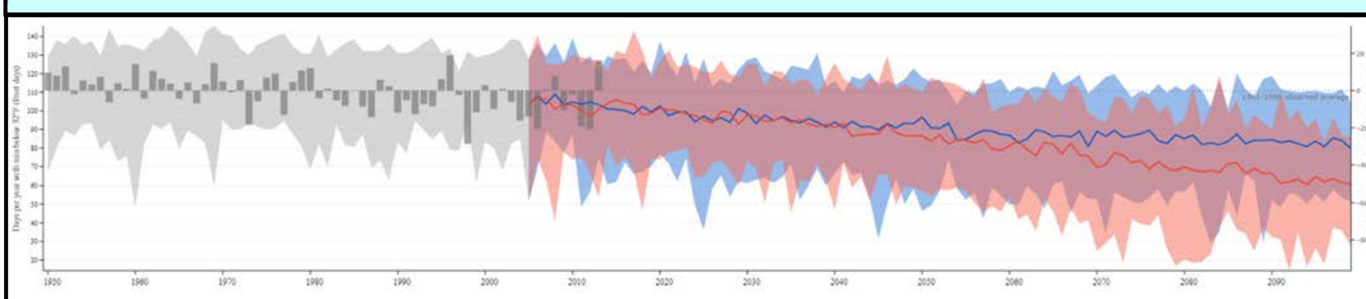
What is the probability of future severe winter storms occurring based on modeled future conditions?

The number of days in a year where the temperature falls below 32°F are gradually decreasing in number, meaning that though there will still be winter weather events, there will be fewer days in a given year that could produce them. **Figure SWS-2 and SWS-3** provide tabular and graphical projections for Montgomery County showing estimations for the number of days per year with minimum temperatures below 32°F by decade in the early, mid, and late 21st century with both low and high estimates for each time period.

Figure SWS-2
Number of Days Per Year with Minimum Temperature < 32°F Table – Montgomery County

Indicator	Modeled Time Frame						
	2030s Min - Max	2040s Min - Max	2050s Min - Max	2060s Min - Max	2070s Min - Max	2080s Min - Max	2090s Min - Max
Days with minimum temperature below 32°F							
Lower Emissions	**95 days** 63 - 123	**92 days** 58 - 117	**89 days** 55 – 113	**86 days** 54 - 114	**87 days** 52 - 113	**84 days** 49 - 111	**83 days** 53 - 111
Higher Emissions	**95 days** 64 - 118	**89 days** 60 - 117	**83 days** 54 - 111	**80 days** 44 - 107	**72 days** 31 - 101	**69 days** 30 - 101	**63 days** 28 - 93

Figure SWS-3
Number of Days Per Year with Minimum Temperature < 32°F Graph – Montgomery County



However, while overall trends of rising temperatures will lead to milder winters on average, this does not mean that severe winter storms will become a thing of the past. Heavy snow events could actually become more common due to rising temperatures. Warmer air is more favorable to the formation of high precipitation clouds, which in winter will increase the likelihood of severe winter storm events when it gets cold enough to snow instead of rain. Snow from these events tends to be warm, wet, and heavy, but will melt relatively quickly in comparison to the finer, dustier snow that falls when temperatures are colder.

HAZARD VULNERABILITY

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

Are the participating jurisdictions vulnerable to severe winter storms?

Yes. All of Montgomery County, including the participating jurisdictions, is vulnerable to the dangers presented by severe winter storms. Severe winter storms are among the more frequently occurring natural hazards in Illinois. Since 2013, Montgomery County has experienced 13 severe winter storms.

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

The *2023 Illinois Natural Hazard Mitigation Plan* prepared by IEMA-OHS classifies Montgomery County's hazard rating for winter storms as "medium" and ice storms as "low". IEMA-OHS's overall hazard rating system has five levels: very low, low, medium, high, and very high.

For winter weather, FEMA's National Risk Index (NRI) rates the County as a whole as "Relatively Low". For ice storm, the NRI rates the County as a whole as "Relatively Moderate". All eight census tracts are rated "Relatively Moderate" for winter weather. Four of the eight census tracts are rated "Relatively High" and four are rated "Relatively Moderate" for ice storm. **Table R-4 presents** the overall NRI scores and ratings for each census tract as well as for the County as a whole.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of severe winter storms?

Yes. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to severe winter storms.

Montgomery County:

- ❖ Severe winter storms with damaging winds have the potential to down power and communication lines impacting service to critical county infrastructure as well as residents.
- ❖ The Health Department's vaccine storage is vulnerable to potential power outages caused by severe winter storms.

- The Historic County Courthouse does not have an emergency backup generator making it vulnerable to potential power outages caused by severe winter storms.
- There are not enough emergency shelters with backup power supplies in the County to serve residents if power is lost during a severe winter storm event.
- The power grid in the County is vulnerable to severe winter storms. The cascading effects from power disruption could have a major impact on vulnerable assets including people, critical infrastructure and systems.

Coffeen:
Ice storms have the potential to down electrical lines impacting service to residents.

Coffeen Volunteer Fire Department:
Ice storms have downed power lines impacting service to critical facilities as well as residents.

Farmersville:
Severe winter storms have the potential to disrupt travel and cause accidents, especially on Interstate 55.

Fillmore Community Fire Protection District:
The District has experienced ice storms that have caused extensive power outages.

Harvel:

- The Village's water plant does not have emergency backup power supplies so loss of power due to a severe winter storm will impact service to residents.
- During ice storms Illinois Route 48 through the Village becomes treacherous and impedes travel, which impacts emergency response times and services.

Litchfield:
Communication systems have the potential to be damaged ice storms, which would limit the City's ability to quickly respond to emergency calls.

Nokomis:

- The wastewater treatment plant does not have an emergency backup generator that will power the entire facility and therefore is vulnerable to potential power outages caused by severe winter storms.
- None of the City's lift stations have emergency backup generators making them vulnerable to potential power outages caused by severe winter storms.
- The power infrastructure in the City is vulnerable to damage from ice storms, which could have a major impact on vulnerable assets including people, critical infrastructure and systems.

Nokomis Area Fire Protection District:

- Severe winter storms have the potential to down power lines, which can block roadways, impacting travel and delaying emergency response times.
- The fire station does not have its own emergency backup generator making it vulnerable to potential power outages caused by severe winter storms.

Raymond:
Severe winter storms have the potential to down power lines impacting service to residents.

Raymond-Harvel Fire Department:

- The Harvel fire station does not have an emergency backup generator making it vulnerable to potential power outages caused by severe winter storms.
- Severe winter storms cause highways and secondary roads to become impassable causing accidents and impacting emergency response times.

Rountree Township:
Severe winter storms have the potential to down power lines impacting service within the Township.

Schram City:
Severe winter storms have the potential to down power lines impacting service to residents.

Taylor Springs:
None of the Village's critical facilities or infrastructure have emergency backup generators making them vulnerable to potential power outages caused by severe winter storms.

Witt:
The fire station does not have an emergency backup generator making it vulnerable to potential power outages caused by severe winter storms.

What impacts resulted from the recorded severe winter storms?

Data obtained from NOAA's Storm Events Database and FEMA Public Assistance figures indicates that between 1950 and 2022, three of the 85 severe winter storms caused $964,847 in property damages. Property damage information was either unavailable or none was recorded for the remaining 82 reported occurrences.

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

Severe Winter Storm (Snow & Ice) Impacts:
- Total Property Damage (3 events): ***$964,847***
- Injuries: ***n/a***
- Fatalities: ***n/a***

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

In comparison, the State of Illinois has averaged $102 million annually in winter storm losses according to the Illinois State Water Survey's Climate Atlas of Illinois, ranking winter storms second only to flooding in terms of economic loss in the State. While behind floods in terms of the amount of property damage caused, severe winter storms have a greater ability to immobilize larger areas, with rural areas being particularly vulnerable.

No injuries or fatalities were reported as a result of any of the recorded severe winter storms.

What other impacts can result from severe winter storms?

In Montgomery 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 2017 through 2021 indicates that treacherous road conditions caused by snow/slush and ice were present for 2.2% to 7.4% of all crashes recorded annually in the County. **Figure SWS-4** 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-4
Severe Winter Weather Crash Data for Montgomery County

Year	Total # of Crashes	Presence of Treacherous Road Conditions caused by Snow/slush and Ice		
		# of Crashes	# of Injuries	# of Fatalities
2017	590	13	5	0
2018	533	30	10	0
2019	541	40	8	0
2020	514	21	4	0
2021	648	38	6	0
Total:	**2,826**	**142**	**33**	**0**

Source: Illinois Department of Transportation.

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

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

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

The level of risk or vulnerability posed by severe winter storms to the public health and safety of *socially vulnerable populations* is considered to be ***medium***. Socially vulnerable populations such as older adults (those 75 years of age and older) are more susceptible to slips and falls caused by treacherous walking conditions and therefore their risk is elevated. **Figure SWS-5** identifies the percent of socially vulnerable populations by participating municipality and the County based on the U.S. Census Bureau's 2017-2021 American Community Survey data.

The winter storm that began on November 29, 2006 covered the area with up to an inch of ice and sleet.

Photograph courtesy of the Hillsboro Journal-News

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

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

Figure SWS-5
Socially Vulnerable Populations by Participating Jurisdictions

Participating Jurisdiction	% of Population 75 year of age & Older
Coffeen	12.5%
Farmersville	3.3%
Harvel	4.6%
Hillsboro	8.3%
Litchfield	11.2%
Nokomis	8.3%
Raymond	4.4%
Schram City	9.6%
Taylor Springs	22.9%
Waggoner	3.6%
Witt	7.2%
Rountree Township	45.0%
Unincorp. Montgomery County	7.8%
Montgomery County	8.9%
State of Illinois	6.4%

[1]Coffeen Volunteer Fire Department
[2]Fillmore Community FPD
[3]Nokomis Area FPD
[4]Raymond-Harvel Fire Department

Source: U.S. Census Bureau.

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 Montgomery 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.

Many trees were damaged in Hillsboro during the winter storm that began on November 29, 2006.

Photograph courtesy of the Hillsboro Journal-News

When transportation is disrupted, schools close, emergency, and medical services are delayed, some businesses close and government services can be affected. When a severe winter storm hits there is also an increase in cost to the County, township, and municipalities for snow removal and de-icing. Road resurfacing and pothole repairs are additional costs incurred each year as a result of severe winter storms.

According to the Montgomery County Highway Engineer, the County spends approximately $33,800 for snow removal and de-icing for an average winter weather event. (An average winter weather event is considered to be 5 inches or less of snow with normal winds and average temperatures.) To completely clear the roads for this type of event, it generally takes two-12 hour days and one-8 hour day and requires approximately 650 gallons of fuel and 168 tons of sand/salt mixture.

Based on the frequency with which severe winter storms have occurred in Montgomery 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***.

Snow accumulations along Niemanville Trail South during the winter of 1978 reached the height of a pickup truck.

Photograph provided by the Montgomery County Highway Dept.

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

Yes and No. While Litchfield and Schram City have building codes in place that will likely lessen the vulnerability of new buildings and critical facilities to damage from severe winter storms, the County and the nine remaining participating municipalities do not. However, infrastructure such as new communication and power lines will continue to be vulnerable to severe winter storms, especially to ice accumulations, as long as they are located above ground. Rural areas of the County have experienced extended periods without power due to severe winter storms. Steps to bury all new lines would eliminate the vulnerability, but this action would be cost prohibitive in most areas. In terms of new roads and bridges, there is very little that can be done to reduce or eliminate their vulnerability to severe winter storms.

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

Unlike other natural hazards, such as tornadoes, there are no standard loss estimation models or methodologies for severe winter storms. Since only three of the 85 recorded events listed property damage numbers for severe winter storms, it is difficult to accurately estimate future potential dollar losses. However, according to the Montgomery County Clerk the total equalized assessed values of all residential, commercial, and industrial buildings in the planning area is $335,308,343. Since all of the structures in the planning area are vulnerable to damage, this total represents the countywide property exposure to severe winter storms.

3.5 Extreme Cold

Hazard Identification

What is the definition of extreme cold?

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

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

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

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

What is wind chill?

Wind chill, or wind chill factor, is a measure of the rate of heat loss from exposed skin resulting from the combined effects of wind and temperature. As the wind increases, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature.

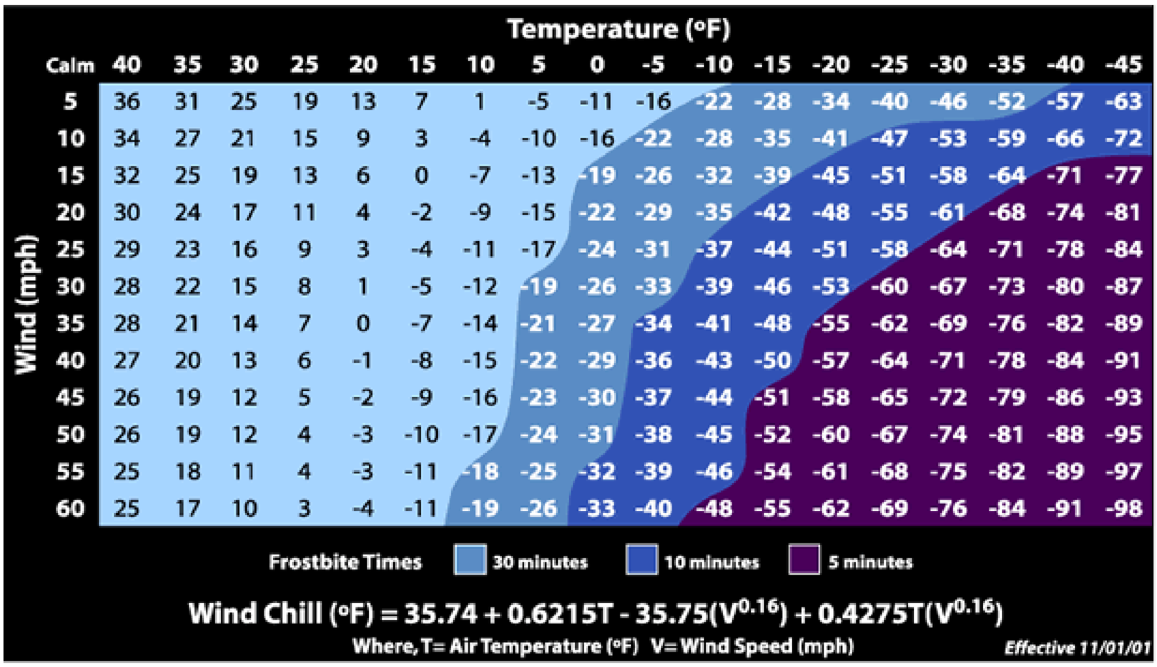
The unit of measurement used to describe the wind chill factor is known as the wind chill temperature. The wind chill temperature is calculated using a formula. **Figure EC-1** identifies the formula and calculates the wind chill temperatures for certain air temperatures and wind speeds.

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

Use of the current Wind Chill Temperature (WCT) index was implemented by the NWS on November 1, 2001. The new WCT index was designed to more accurately calculate how cold air feels on human skin. The new index uses advances in science, technology and computer modeling to provide an accurate, understandable and useful formula for calculating the dangers from winter winds and freezing temperatures. The former index was based on research done in 1945 by Antarctic researchers Siple and Passel.

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

Figure EC-1
Wind Chill Chart



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.

What cold-related illnesses are associated with extreme cold?

Frostbite and hypothermia are both cold-related illnesses that can result when individuals are exposed to dangerously low temperatures and wind chills. The following provides a brief description of the symptoms associated with each.

- **Frostbite.** During exposure to extremely cold weather the body reduces circulation to the extremities (i.e., feet, hands, nose, cheeks, ears, etc.) in order to maintain its core temperature. If the extremities are exposed, then this reduction in circulation coupled with the cold temperatures can cause the tissue to freeze.

  Frostbite is characterized by a loss of feeling and a white or pale appearance. At a wind chill of -19°F, exposed skin can freeze in as little as 30 minutes. Seek medical attention immediately if frostbite is suspected. It can permanently damage tissue and in severe cases can lead to amputation.

- **Hypothermia.** Hypothermia occurs when the body's temperature begins to fall because it is losing heat faster than it can produce it. If an individual's body temperature falls below 95°F, then hypothermia has set in, and immediate medical attention should be sought.

  Hypothermia is characterized by uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness and exhaustion. Left untreated, hypothermia will lead to death. Hypothermia occurs most commonly at very cold temperatures but can occur at cool temperatures (above 40°F) if an individual isn't properly clothed or becomes chilled.

What is a wind chill alert?

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

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

HAZARD PROFILE

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

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

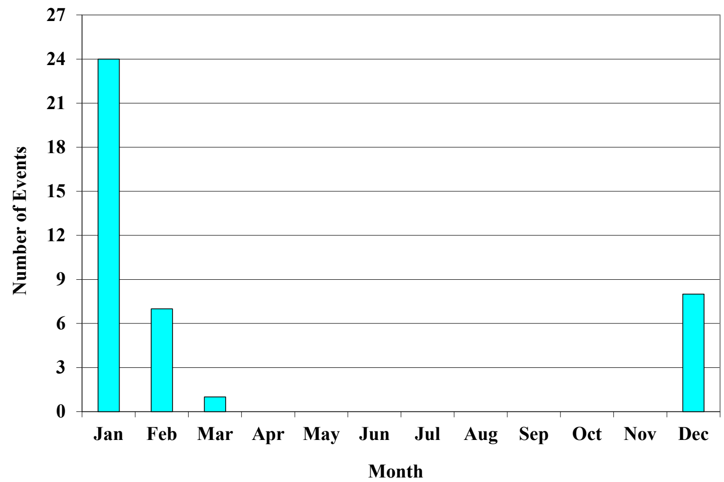
Table 9, located in **Appendix J**, summarize the previous occurrences as well as the extent or magnitude of extreme cold events recorded in Montgomery County. NOAA's Storm Events Database, Iowa State University's National Weather Service Watch, Warning, and Advisories database, Midwestern Regional Climate Center's cli-MATE database, and NWS's COOP Data records were used to document 40 occurrences of extreme cold in Montgomery County between 1995 and 2022.

Extreme Cold Fast Facts – Occurrences

Number of Extreme Cold Events Reported (1995 - 2022): ***40***
Coldest Temperature Recorded in the County: ***-22°F (Feb. 14, 1905)***
Most Likely Months for Extreme Cold Events to Occur: ***January***

Figure EC-2 charts the reported occurrences of extreme cold by month. Twenty-four of the 40 events (60%) took place in January, making this the peak month for extreme cold events. There was one event that spanned two months; however, for illustration purposes only the month the event started in is graphed.

Figure EC-2
Extreme Cold by Month
1995 - 2022



According to the Midwestern Regional Climate Center, near continuous temperature records for Montgomery County have been kept from July 1896 to the present at the Hillsboro NWS COOP Observation Station. **Figures EC-3** lists the coldest days recorded at this Station. Based on the available records, the coldest temperature recorded in Montgomery County was -22°F at Hillsboro on February 14, 1905.

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

	Date	Temperature		Date	Temperature
1	02/14/1905	-22°F	6	01/18/1930	-20°F
2	01/12/1918	-21°F	7	12/22/1989	-20°F
3	01/20/1985	-21°F	8	02/09/1899	-20°F
4	01/27/1904	-20°F	9	02/12/1899	-20°F
5	01/07/1912	-20°F			

Source: Midwest Regional Climate Center cli-MATE

What locations are affected by extreme cold?

Extreme cold affects the entire County. Extreme cold, like excessive heat and severe winter storms, generally extends across the entire County and affects multiple locations.

Do any of the participating jurisdictions have designated warming centers?

Yes. Eleven of the 16 participating municipalities, townships, and fire protection districts have designated warming centers. A "designated" warming center is identified as any facility that has been *formally* identified by the jurisdiction (through emergency planning, resolution, Memorandum of Agreement, etc.) as a location available for use by residents during severe winter storms and extreme cold events.

Figure EC-4 identifies the location of each warming center by jurisdiction. At this time Farmersville, Harvel, Nokomis Area FPD, Rountree Township, and Schram City do not have any warming centers designated. In addition, there are no State of Illinois-designated warming centers in Montgomery County.

Figure EC-4
Designated Warming Centers by Participating Jurisdiction

Name/Address	Name/Address
Coffeen	*Nokomis*
City Hall, 107 Locust St.	City Complex, 22 S. Cedar St.
Coffeen Volunteer FD Station, 113 W. Main St.	Nokomis Jr./Sr. High School, 511 Oberle St.
Coffeen Volunteer FD	North Elementary School, 110 W. Hamilton St.
Fire Station, 113 W. Main St., Coffeen	South School/Cornerstone Academy, 316 E. South St.
Fillmore Community FPD	St. Louis Parish Center, 523 E. Union St.
Fire Station, 107 W. North St., Fillmore	*Raymond / Raymond-Harvel FD*
Hillsboro	Fire House, 121 East Broad, Raymond
Free Methodist Church, 1400 Seymour Ave.	Raymond K of C Hall, 510 East Sparks, Raymond
Moose Lodge, 411 S. Main St.	*Taylor Springs*
Challacombe House, 502 School St.	Community Building, 613 E. Main St.
Litchfield	*Waggoner*
City Hall, 120 E. Ryder St.	Centennial Building, 369 E. Main St.
Litchfield Community & Senior Center, 1100 S. State St.	*Witt*
Litchfield CUSD Office, 1100 Old Rte. 66 N	City Hall, 106A W. Broadway St.
National Guard Armory, 1617 N. Jefferson St.	Fire Station, 226 N. Hirst St.
LRM Missions Hospitality House, 1285 E. Union Ave.	

What is the probability of future extreme cold events occurring based on historical data?

Montgomery County has experienced 40 verified occurrences of extreme cold between 1995 and 2022. With 40 occurrences over the past 28 years, Montgomery County should expect to experience at least one extreme cold events in any given year. It is important to keep in mind that there are almost certainly gaps in the early extreme cold data. More events have almost certainly occurred than are documented in this section, which means that the probability is almost certainly higher than reported.

There were 11 years over the last 28 years where multiple (two or more) extreme cold events occurred. This indicates that the probability that multiple extreme cold events may occur during any given year within the County is 39%.

What is the probability of future extreme cold events occurring based on modeled future conditions?

The warming trend observed in Illinois over the past century hasn't just meant increasingly hotter summers; it has meant milder winters. Over the past 120 years, average temperatures in Illinois have increased by 1°F to 2°F according to the Illinois State Climatologist, with the most prominent changes occurring in overnight temperatures and in increased winter and spring temperatures. As a result, extreme cold events are likely to continue to become less common and less intense than they were in the past. The number of days less than 32°F in Illinois are forecasted to decrease in the coming decades. Reductions in extreme cold events could prevent some of the damages associated with them, both in terms of human health costs and economic costs.

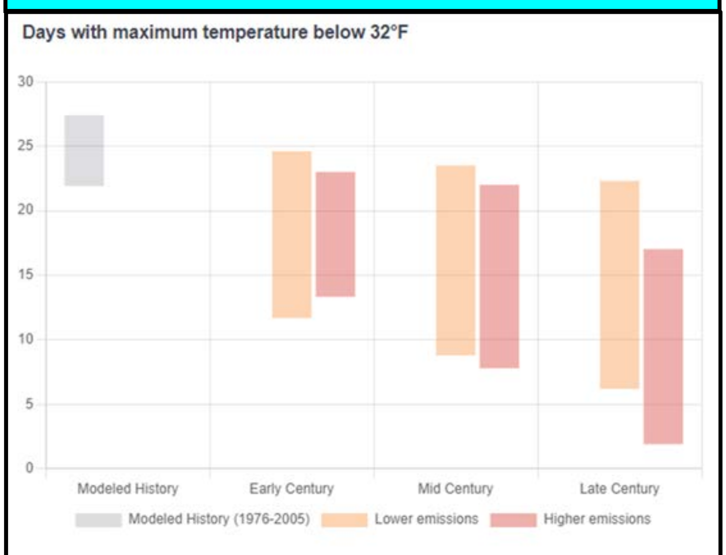
Figures EC-5, EC-6, and **EC-7** provide tabular and graphical projections for Montgomery County, showing estimations for number of days where high temperatures will not exceed 32°F in the early, mid, and late 21st century with both low and high estimates for each time period. Most likely, the true value will fall between these two estimates. By midcentury, the average number of days per year not exceeding 32°F in Montgomery County is forecasted to decrease from around 25 today to between 15 and 14 according to the Climate Mapping for Resilience and Adaptation's Assessment Tool.

Figure EC-5
Days with Maximum Temperature < 32°F Projection Table – Montgomery County

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Annual days with:							
Days with maximum temperature below 32 °F	25 days 22 - 27	18 days 12 - 25	18 days 13 - 23	15 days 9 - 24	14 days 8 - 22	13 days 6 - 22	8 days 2 - 17

N/A = Data Not Available for the selected area

Figure EC-6
Number of Days with Maximum Temperature < 32°F Graph – Montgomery County

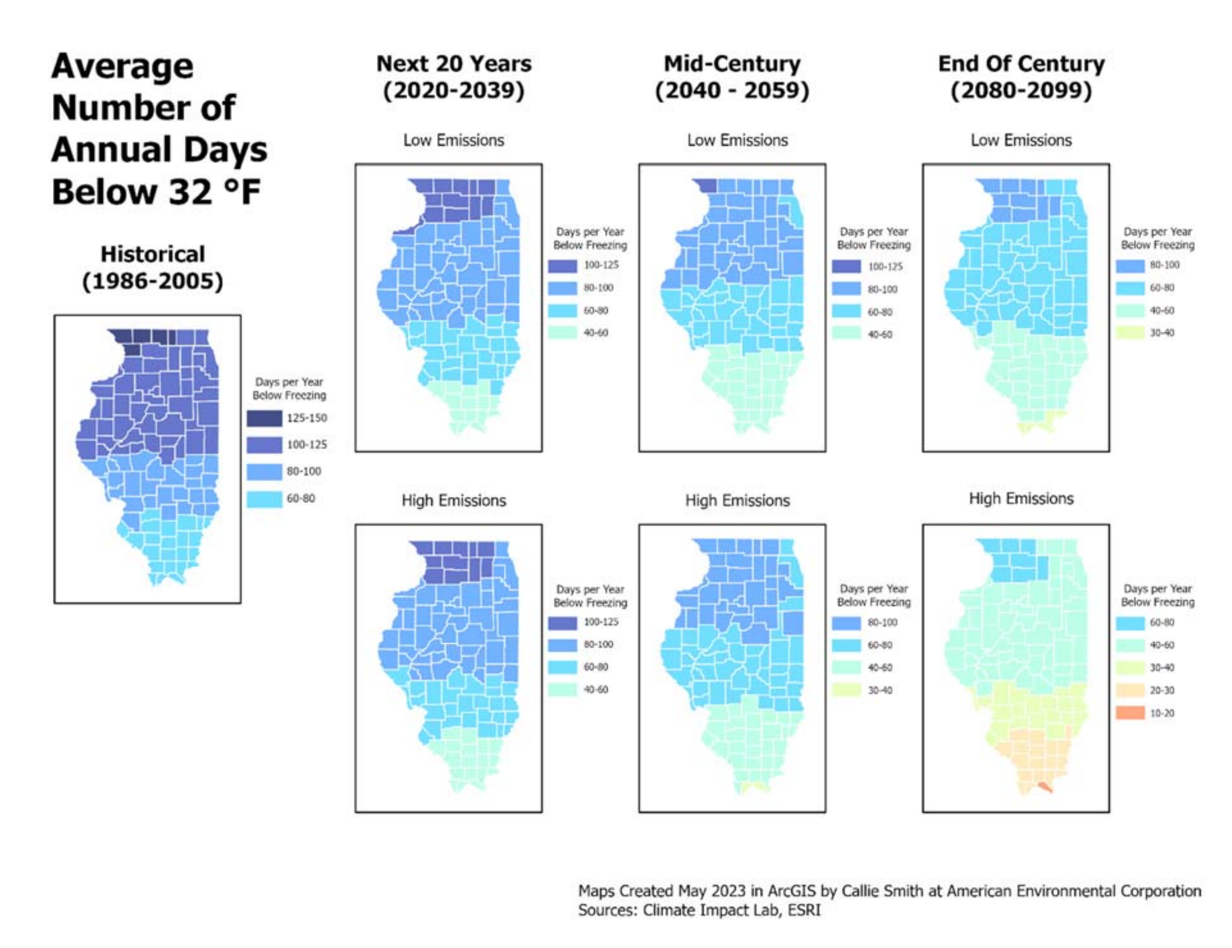


By contrast, projections from Great Lakes Integrated Sciences + Assessments indicate that there is likely to be a change of 1 to 2 days in the number of days per year where temperatures will fall below 20° F by midcentury in Montgomery County.

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 extreme cold.

Figure EC-7
Average Number of Annual Days Below 32°F



Are the participating jurisdictions vulnerable to extreme cold?

Yes. All of Montgomery County, including the participating jurisdictions, is vulnerable to the dangers presented by extreme cold. Since 2013, Montgomery County has experienced 19 extreme cold events.

The *2023 Illinois Natural Hazard Mitigation Plan* prepared by IEMA-OHS classifies Montgomery County's hazard rating for cold wave as "medium". IEMA-OHS's overall hazard rating system has five levels: very low, low, medium, high, and very high.

For extreme cold, FEMA's National Risk Index (NRI) rates the County as a whole as "Relatively Moderate". For extreme cold, two of the eight census tracts are rated "Relatively High" and the remaining six census tracts are rated "Relatively Moderate". **Table R-4 presents** the overall NRI scores and ratings for each census tract as well as for the County as a whole.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of extreme cold?

Yes. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to extreme cold.

<u>Extreme Cold Fast Facts – Impacts/Risk</u>

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

<u>Extreme Cold Risk/Vulnerability:</u>
- Public Health & Safety – General Population: ***Low to Medium***
- Public Health & Safety – Socially Vulnerable Populations: ***Medium***
- Buildings/Infrastructure/Critical Facilities: ***Low***

<u>Montgomery County:</u>
Individuals in the County are vulnerable to extreme cold and its impacts, especially the elderly and unhoused.

<u>Coffeen:</u>
Individuals in the community are vulnerable to extreme cold and its impacts, especially the elderly and young children.

<u>Coffeen Volunteer Fire Department:</u>
Individuals in the community are vulnerable to extreme cold and its impacts, especially during power outages.

<u>Harvel:</u>
The Village does not have any designated warming centers to protect residents, especially vulnerable individuals and the elderly.

<u>Nokomis:</u>
Individuals in the community are vulnerable to extreme cold and its impacts, especially the elderly and low income individuals.

<u>Nokomis Area Fire Protection District:</u>
The elderly within the District are vulnerable to extreme cold and its impacts.

<u>Waggoner:</u>
The Village is in need of additional warming centers for residents' use during extreme cold events.

What impacts resulted from the recorded extreme cold events?

Damage information was either unavailable or none was recorded, and no injuries or fatalities were reported as a result of any of the extreme cold events. In comparison, the State of Illinois averages

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

What other impacts can result from extreme cold events?

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

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

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

The level of risk or vulnerability posed by extreme cold to the public health and safety of *socially vulnerable populations* is considered to be ***medium***. Socially vulnerable populations such as individuals with dementia and access and functional needs populations may be more susceptible to cold-related exposures if they become disoriented outdoors during an event and therefore their risk is elevated. However, demographic information is not available for these segments of the population.

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

Yes. All existing buildings, infrastructure and critical facilities located in Montgomery County and the participating jurisdictions are vulnerable to damage from extreme cold. Individual water pipes and distribution lines and mains are especially susceptible to freezing during extreme cold events. This freezing can lead to cracks or ruptures in the pipes in buildings as well as in buried service lines and mains. As a result, flooding can occur as well as disruptions in service. Since most buried service lines and water mains are located under local streets and roads, fixing a break requires portions of the street or road to be blocked off, excavated, and eventually repaired. These activities can be costly and must be carried out under less than ideal working conditions.

Based on the frequency with which extreme cold events have occurred in Montgomery County; the damages described; the amount of property damage previously reported; and the potential for disruptions to power distribution and communication; the risk or vulnerability to buildings, infrastructure and critical facilities from extreme cold events is ***low***.

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

Yes and No. While Litchfield and Schram City have building codes in place that will likely help lessen the vulnerability of new buildings and critical facilities to damage from extreme cold, the County and the remaining nine participating municipalities do not. However, infrastructure such as residential water pipes will continue to be vulnerable as long as they are located in areas such as outside walls, attics and crawl spaces that do not contain proper insulation.

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

Unlike other natural hazards, such as tornadoes, there are no standard loss estimation models or methodologies for extreme cold events. With none of the recorded events listing property damage figures, there is no way to accurately estimate future potential dollar losses from extreme cold. However, according to the Montgomery County Clerk the total equalized assessed values of all residential, commercial, and industrial buildings in the planning area is $335,308,343. Since all of the structures in the planning area are vulnerable to damage, this total represents the countywide property exposure to extreme cold.

3.6 TORNADOES

HAZARD IDENTIFICATION

What is the definition of a tornado?

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

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

About 1,200 tornadoes hit the U.S. 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 U.S. annually.

How are tornadoes rated?

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

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

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

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

Source: NOAA, Storm Prediction Center.

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

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

Are alerts issued for tornadoes?

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

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

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

HAZARD PROFILE

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

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

Table 10, located in **Appendix J**, summarizes the previous occurrences as well as the extent or magnitude of tornado events recorded in Montgomery County. NOAA's Storm Events Database, Storm Data Publication and Storm Prediction Center have documented 49 occurrences of tornadoes in Montgomery County between 1950 and 2022. In comparison, there have been 2,745 tornadoes statewide between 1950 and 2021 according to NOAA's Storm Prediction Center.

Tornado Fast Facts – Occurrences

Number of Tornadoes Reported (1950 – 2022): ***49***

Highest F-Scale Rating Recorded: ***F3 (January 1, 1950, March 20, 1976 & June 1, 1999)***

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

Average Length of a Tornado: ***4.7 miles***

Average Width of a Tornado: ***73 yards***

Average Damage Pathway of a Tornado: ***0.20 sq. mi.***

Longest Tornado Path in the County: ***30.0 miles (March 6, 1961)***

Widest Tornado Path in the County: ***300 yards (July 15, 2020 & December 10, 2021)***

Figure T-2 charts the reported occurrences of tornadoes by magnitude. Of the 49 reported occurrences there were: 3 – F3s, 7 – F2s, 7 – F1s, 11 – F0s, 0 – EF3s, 3 – EF2s, 7 – EF1s, 9 – EF0s, and 2 – EFUs.

Figure T-3 charts the reported tornadoes by month. Of the 49 events, 28 (57%) took place in March, April, and May making this the peak period for tornadoes in Montgomery County. Of those 28 events, 14 (50%) occurred during April, making this the peak month for tornadoes. In comparison, 1,720 of the 2,745 tornadoes (63%) recorded in Illinois from 1950 through 2021 took place in April, May, and June.

Forty-one of the 49 tornado events (84%) in the County occurred during the p.m. hours, with 33 of the tornado events (67%) taking place between 2 p.m. and 8 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 Montgomery County have varied from 0.1 mile to 30.0 miles in length and from 10 yards to 300 yards in width. The average length of a tornado in Montgomery County is 4.7 miles and the average width is 73 yards (0.041 miles).

Figure T-2
Tornadoes by Magnitude
1950 – 2022

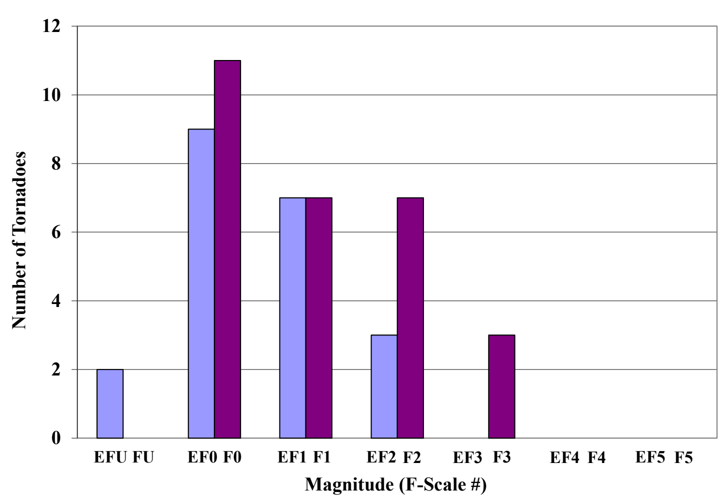


Figure T-3
Tornadoes by Month
1950 – 2022

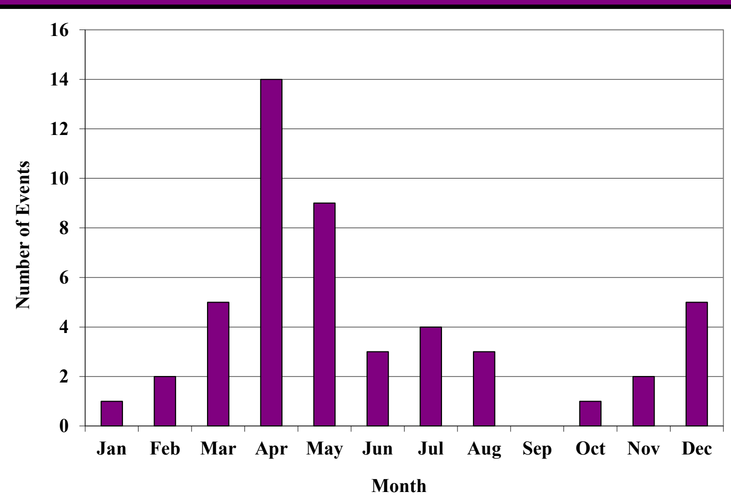
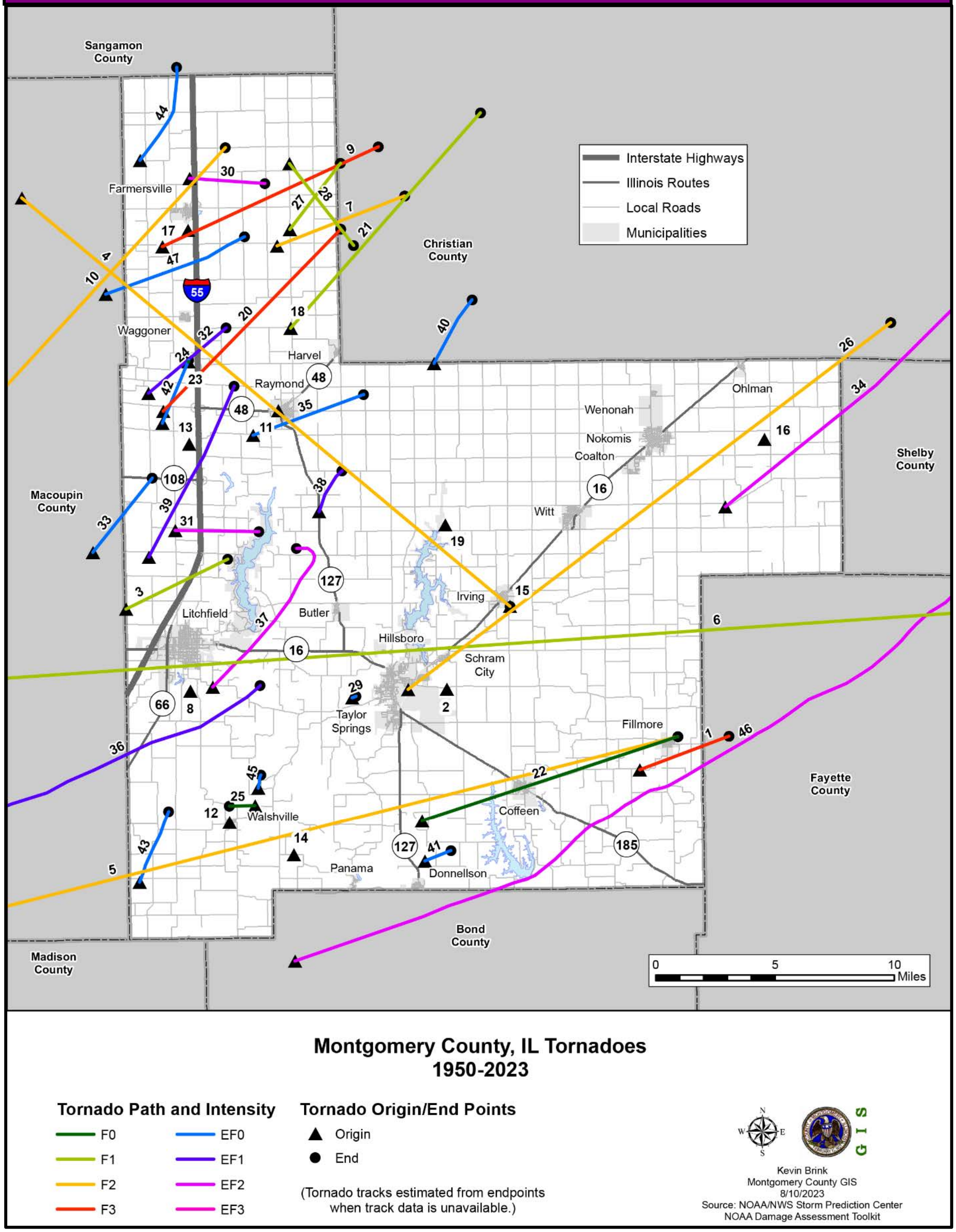


Figure T-4 shows the pathway of each reported tornado. The numbers by each tornado correspond with the tornado description in **Table 10** located in **Appendix J.** Records indicate that most of these tornadoes generally moved from southwest to northeast across the County. Unlike other natural hazards (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 Montgomery County, the average damage pathway or area impacted by a tornado is 0.20 square miles.

Figure T-4
Tornado Pathways in Montgomery County



The longest tornado recorded in Montgomery County occurred on March 6, 1961. This F1 tornado measured 64.4 miles in length and touched down just north of Jerseyville (Jersey County) and traveled east-northeast through Macoupin County and into Montgomery County where it bypassed all populated areas before lifting off near the Montgomery County/Shelby County line, approximately 11 miles east-southeast of Witt. The tornado was on the ground in Montgomery County for approximately 30.0 miles. The damage pathway of this tornado covered an estimated 2.82 square miles, with approximately 1.31 square miles occurring in Montgomery County.

The widest tornado recorded in Montgomery County measured 300 yards in width and occurred on two separate occasions. The first tornado occurred on July 15, 2020 when an EF0 touched down northwest of Farmersville and travelled north into Sangamon County before lifting off southwest of Divernon. The second tornado occurred on December 10, 2021 when an EF1 touched down in Bond County south of Sorento and traveled northeast, passing through the southeast corner of Montgomery County and the northwest corner of Fayette County before lifting off northwest of Cowden in Shelby County.

What locations are affected by tornadoes?

Tornadoes have the potential to affect the entire County. Six of the eleven participating municipalities have had reported occurrences of tornadoes within their corporate limits.

What is the probability of future tornadoes occurring based on historical data?

Montgomery County has had 49 verified occurrences of tornadoes between 1950 and 2022. With 49 tornadoes over the past 73 years, the probability or likelihood that a tornado will touchdown somewhere in the County in any given year is 67%. There were eight years over the last 73 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 11%.

What is the probability of future tornadoes occurring based on modeled future conditions?

Since tornadoes only occur when several conditions are met, predicting them is extremely difficult, even in the short-term future. Somewhat easier to predict are supercell formations, which are large and longer-lived storm systems that create conditions favorable to producing tornadoes, such as strong rotational winds and updrafts. These systems are fed by warm humid air, which means that a wetter and warmer climate could make them a more likely occurrence. Since future condition forecasts suggest a wetter and warmer Illinois as discussed in Section 3.2, it is likely that the conditions that create tornadoes will become more frequent as well, increasing their likelihood. **Figure SS-7,** located in Section 3.1, contains a series of maps that show how the number of supercell tracks is likely to change in the future. The analysis of this trend should be revisited in subsequent planning efforts as more data becomes available.

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 Montgomery County, including the participating jurisdictions, is vulnerable to the dangers presented by tornadoes. Since 2013, 18 tornadoes have been recorded in Montgomery County. Six of the eleven participating municipalities have had a tornado touch down or pass through their municipal boundaries while both of the participating townships have had tornadoes touch down or pass through them. **Figure T-5** lists the verified tornadoes that have touched down in or near or passed through each participating municipality and township.

Figure T-5
Verified Tornadoes In or Near Participating Municipalities & Townships

Participating Municipality / Township	Number of Verified Tornadoes	Year: Touched Down/Passed Through Municipality / Township	Year: Touched Down/Passed Near Municipality
Coffeen[1]	2	1959, 2000	---
Farmersville	10	1996, 2011	1964,1976, 1978, 2006, 2006, 2020, 2020, 2022
Harvel[4]	5	---	1997, 1999, 1999, 2016, 2018
Hillsboro	2	2006	2010
Litchfield	7	1974	1956, 1961, 1993, 2017, 2018, 2018
Nokomis[3]	4	---	1987, 1995, 206, 2014
Raymond[4]	7	1959	1988, 1999, 2016, 2018, 2018, 2020
Schram City	2	2006	1955
Taylor Springs	---	---	---
Waggoner	4	---	2005, 2013, 2020, 2022
Witt	3	---	1961, 2006, 2017
Rountree Township		1997, 2018	---

[1]Coffeen Volunteer Fire Department
[2]Fillmore Community FPD
[3]Nokomis Area FPD
[4]Raymond-Harvel Fire Department

Nineteen tornadoes have touched down in or passed through the Raymond-Harvel Fire Department (FD), five tornadoes have touched down in or passed through the Fillmore Community Fire Protection District (FPD), four tornadoes have touched down in or passed through the Coffeen Volunteer FD, and two tornadoes have touched down in or passed through the Nokomis Area FPD.

Unincorporated areas vulnerable to tornadoes include Chapman, which has had two tornadoes touch down near its vicinity. **Figure T-6** details the verified tornadoes that have touched down in or near unincorporated areas in Montgomery County.

The *2023 Illinois Natural Hazard Mitigation Plan* prepared by IEMA-OHS classifies Montgomery County's hazard rating for tornadoes as "medium." IEMA-OHS's overall hazard rating system has five levels: very low, low, medium, high, and very high.

For tornadoes FEMA's National Risk Index (NRI) rates the County as a whole as "Relatively Moderate". Six of the eight census tracts are rated "Relatively High" and the remaining two census tracts are rated "Relatively Moderate" for tornadoes. **Table R-4 presents** the overall NRI scores and ratings for each census tract as well as for the County as a whole.

Figure T-6 **Verified Tornadoes In or Near Unincorporated Areas of Montgomery County**			
Participating Municipality	**Number of Verified Tornadoes**	**Year**	
		Touched Down/Passed *Through* Unincorporated Area	**Touched Down/Passed *Near* Unincorporated Area**
Barnett	1	---	2013
Chapman	2	---	1950, 2000
Coffeen Lake	1	---	2021
Honey Bend	1	---	2011
Lake Lou Yaeger	1	---	2018

[1]Coffeen Volunteer Fire Department [2]Fillmore Community FPD
[3]Nokomis Area FPD [4]Raymond-Harvel Fire Department

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of tornadoes?

Yes. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to tornadoes.

Montgomery County:

- ❖ Tornadoes have the potential to down power lines and communication lines impacting service to critical county infrastructure as well as residents.
- ❖ The County does not have enough warning sirens to adequately alert residents of an impending tornado in the unincorporated portions of the County.

Fillmore Community Fire Protection District:

Short-lived tornadoes have caused damage to residential structures and disrupted the power grid causing power outages.

Taylor Springs:

None of the Village's critical facilities or infrastructure have been hardened to reduce damages from tornadoes.

What impacts resulted from the recorded tornadoes?

Data obtained from NOAA's Storm Events Database, Storm Data Publications, Storm Prediction Center, and Committee member records indicates that between 1950 and 2022, 16 of the 49 tornadoes caused $1,845,700 in property damage and $250 in crop damage. The March 6, 1961 tornado caused $300,000 in property damages alone. Property damage information was either unavailable or none was recorded for the remaining 33 reported occurrences.

Tornado Fast Facts – Impacts/Risk

Tornado Impacts:
- ❖ Total Property Damage (16 events): ***$1,845,700^***
- ❖ Total Crop Damage (1 event): ***$250***
- ❖ Injuries (5 events): ***17***
- ❖ Fatalities(2 events): ***3***

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

^ Includes property damages sustained as a result of three separate tornado events that represent losses incurred in two counties. A detailed breakdown by county was not available.

NOAA's Storm Events Database documented three fatalities and 17 injuries as a result of six tornado events. Detailed information on the injuries sustained was only available for four of the events. The following provides a brief description.

- ❖ Two men drown when an F1 tornado overturned their boat near Litchfield on April 28, 1956.
- ❖ On April 2, 1964 an individual sustained minor injuries when an F2 tornado ripped the roof off the Lone Elm School near Farmersville. Detailed information on the remaining three injuries associated with this event was unavailable.
- ❖ An F3 tornado overturned a two-truck on I-55 near Farmersville slightly injuring the driver and two passengers on March 20, 1976. Detailed information on the remaining injury associated with this event was unavailable.
- ❖ On June 1, 1999 an F3 tornado hit the rest area along I-55 west of Raymond overturning six tractor-trailer trucks, killing one driver and injuring four others.

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?

For Montgomery County, the level of risk or vulnerability posed by tornadoes to public health and safety depends on not only frequency, but other factors as well 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. All these must be examined when assessing vulnerability.

In terms of adequate access to health care, both St. Francis Hospital in Litchfield and Hillsboro Area Hospital in Hillsboro as well as nearby hospitals in Springfield (Sangamon County), Taylorville, (Christian County), Shelbyville (Shelby County), Vandalia (Fayette County), Carlinville (Macoupin County), Greenville (Bond County), and the Metro East St. Louis area (Madison County) are equipped to provide care and have sufficient capacity for the influx of additional patients from one or more counties.

Montgomery County (including townships & fire protection districts)
For Montgomery County, including the fire protection districts and townships, 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 tornadoes do not occur frequently in the County and a large majority of the tornadoes that have impacted the County have touched down in rural areas away from concentrated populations. In addition, the County is not densely populated and there is not a large number of high-risk living accommodations present.

Participating Municipalities
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 all of the participating jurisdictions 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. The Raymond Grade School in Raymond includes a community safe room. None of the other participating jurisdictions have community safe rooms built to standard within their jurisdictions. 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. Each jurisdiction should consider whether the potential impacts to public health and safety from a tornado are considered great enough to warrant the consideration of community safe rooms as a mitigation action.

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

Yes. All existing buildings, infrastructure, and critical facilities located within the County and participating municipalities are vulnerable to tornado damage. Buildings, infrastructure, and critical facilities located in the path of a tornado usually suffer extensive damage, if not complete destruction.

While some buildings adjacent to a tornado's path may remain standing with little or no damage, all are vulnerable to damage from flying debris. It is common for flying debris to cause damage to roofs, siding, and windows. In addition, mobile homes, homes on crawlspaces, and buildings with large spans (i.e., schools, barns, airport hangers, factories, etc.) are more likely to suffer damage. Most workplaces and many residential units do not provide sufficient protection from tornadoes.

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

Assessing the Vulnerability of Existing Residential Structures

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

- the size (area impacted) of 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 = 0.20 sq. miles

Assumption #1: Size of Tornado. To calculate the number of existing residential structures vulnerable to a tornado, the size (area impacted) of 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 Montgomery County will be used since it has a higher probability of recurring. In Montgomery County, the area impacted by an average-sized tornado has not changed since the 2016 Plan Update. It is still 0.20 square miles. This average is based on more than 70 years of data.

Assumption #2

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

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.

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

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

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

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-7** provides a sample calculation.

Figure T-7 **Calculation of Average Housing Unit Density – Montgomery County**
Total Housing Units in the Jurisdiction ÷ Land Area within the Jurisdiction = Average Housing Unit Density (Rounded Up to the Nearest Whole Number)
Montgomery County: 12,581 housing units ÷ 703.764 sq. miles = 17.877 housing units/sq. mile **(18 housing units)**

Figure T-8 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-8
Average Housing Unit Density by Participating Jurisdiction

Participating Jurisdiction	Township Location	Total Housing Units (2017-2021)	Mobile Homes (2017-2021)	Land Area (Sq. Miles) (2020)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)
Coffeen[1]	East Fork	292	40	1.161	251.507
Farmersville	Bois D'Arc	329	4	0.703	---
Harvel[4]	Harvel	74	9	0.438	---
Hillsboro	Butler Grove, East Fork, Hillsboro, & Irving	1,951	18	8.262	236.141
Litchfield	North Litchfield & South Litchfield	3,466	56	8.989	385.582
Nokomis[3]	Nokomis	1,020	16	1.261	808.882
Raymond[4]	Raymond & Zanesville	407	16	1.258	323.529
Schram City	East Fork	315	21	0.674	---
Taylor Springs	Hillsboro	326	78	1.050	310.476
Waggoner	Pitman	88	52	0.244	---
Witt	Nokomis & Witt	347	13	1.237	280.517
Unincorp. County		3,096	298	672.805	4.602
County		12,581	744	703.764	17.877

[1]Coffeen Volunteer Fire Department
[2]Fillmore Community FPD
[3]Nokomis Area FPD
[4]Raymond-Harvel Fire Department

Source: U.S. Census Bureau, American Community Survey, 5-Year Data Profile.

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 Montgomery County.

In Montgomery County, as well as many other central Illinois counties, there are pronounced differences in housing unit densities. A majority of all housing units (71%) are still located in five of the County's 18 townships (East Fork, Hillsboro, Nokomis, North Litchfield, and South Litchfield), while approximately 76% of all mobile homes are located in eight of the townships (Audubon, East Fork, Fillmore, Grisham, Hillsboro, North Litchfield, Pitman, and South Litchfield). **Figure I-5**, located in Section 1.2, identifies the township boundaries. As noted previously, there are now 18 townships located in the County. South Fillmore Township merged with Fillmore Township to create Fillmore Consolidated Township.

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. While Coffeen, Hillsboro, Litchfield, Nokomis, Schram City, and Witt have ordinances that require anchoring systems for mobile home that would help limit the damage from lower rated tornadoes, the County and the remaining five participating municipalities do not.

This substantial difference in density skews the average *county* housing unit density in Montgomery County and is readily apparent when compared to the average housing unit densities for each of the townships within the County. **Figure T-9** provides a breakdown of housing unit densities by township and illustrates the differences between the various townships and the County as a whole.

For 13 of the 18 townships, the *average county* housing unit density is greater (in most 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 four of the five most populated townships.

Estimating the Number of Potentially-Damaged Housing Units

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

Figure T-9
Average Housing Unit Density by Township

Township	Incorporated Municipalities Located in Township	Total Housing Units (2017-2021)	Mobile Homes (2017-2021)	Land Area (Sq. Miles) (2020)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)
Audubon[3]	Ohlman	206	48	53.971	3.817
Bois D'Arc	Farmersville	400	4	54.550	7.333
Butler Grove[4]	Butler & Hillsboro	358	27	35.724	10.021
East Fork[1,2]	Coffeen, Donnellson, Hillsboro, & Schram City	1,132	122	58.006	19.515
Fillmore Consoidated[1,2]	Fillmore	350	49	60.490	5.786
Grisham	Donnellson & Panama	279	46	24.363	11.452
Harvel[4]	Harvel	124	9	18.013	6.884
Hillsboro	Hillsboro & Taylor Springs	2,481	117	36.127	68.674
Irving	Hillsboro & Irving	435	36	34.346	12.665
Nokomis[3]	Coalton, Nokomis, Wenonah, & Witt	1,296	42	36.398	35.606
North Litchfield[4]	Litchfield	2,434	55	36.164	67.305
Pitman	Waggoner	178	52	36.448	4.884
Raymond[4]	Raymond	457	41	36.059	12.674
Rountree[3,4]		84	0	35.812	2.346
South Litchfield	Litchfield	1,637	73	37.152	44.062
Walshville	Walshville	161	10	36.747	4.381
Witt[2,3]	Witt	437	13	36.761	11.888
Zanesville[4]	Raymond	132	0	36.634	3.603
Townships - 5 most populated		8,980	409	203.847	44.053
Townships - 13 least populated		3,601	335	499.918	7.203

[1]Coffeen Volunteer Fire Department
[2]Fillmore Community FPD
[3]Nokomis Area FPD
[4]Raymond-Harvel Fire Department

Source: U.S. Census Bureau, American Community Survey, 5-Year Data Profile.

In Montgomery County, all of the participating municipalities have large commercial/industrial and/or undeveloped land areas within their municipal boundaries. These areas account for approximately one-fourth to four-fifths 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-10** provides a breakdown of the refined land area figures for the municipalities. These refined land area figures will be used to update the average housing unit density calculations for these municipalities.

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 Montgomery County tornado. **Figure T-11** provides a sample calculation.

Figure T-10
Refined Land Area Figures for Participating Municipalities with Large Tracts of Commercial/Industrial and Undeveloped Land Areas

Participating Jurisdiction	Land Area (Sq. Miles) (2020)	Estimated Open Land Area & Commercial/ Industrial Tracts (Sq. Miles)	Refined Land Area (Sq. Miles)
Coffeen[1]	1.161	0.910	0.251
Farmersville	0.703	0.600	0.103
Harvel[4]	0.438	0.388	0.050
Hillsboro	8.262	1.940	6.322
Litchfield	8.989	4.090	4.899
Nokomis[3]	1.261	0.610	0.651
Raymond[4]	1.258	0.980	0.278
Schram City	0.674	0.430	0.244
Taylor Springs	1.050	0.730	0.320
Waggoner	0.244	0.150	0.094
Witt	1.237	0.980	0.257

[1]Coffeen Volunteer Fire Department [2]Fillmore Community FPD
[3]Nokomis Area FPD [4]Raymond-Harvel Fire Department

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

Figure T-11
Sample Calculation of Potentially-Damaged Housing Units – Montgomery County

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

Montgomery County: 17.877 housing units/sq. mile x 0.2 sq. miles = 3.58 housing units **(4 housing units)**

To calculate the number of potentially-damaged housing units for these municipalities, the area impacted by the averaged-sized Montgomery 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-12** provides a sample calculation. Since the refined land areas in Farmersville, Harvel, and Waggoner are less than the average area impacted, it is assumed that all of the housing units within these villages will be potentially damaged.

Figure T-12
Sample Calculation of Potentially-Damaged Housing Units for Municipalities Covering Less Than One Square Mile – Nokomis

Area Impacted by the Average-Sized Montgomery County Tornado ÷ Land Area within the Jurisdiction x Total Housing Units in the Jurisdiction = Potentially-Damaged Housing Units
(Rounded Up to the Nearest Whole Number)

Nokomis: 0.20 sq. mile ÷ 0.651 sq. miles x 1,020 housing units = 313.36
(314 housing units)

Figures T-13 and **T-14** 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 most densely populated townships, the estimated number of potentially-damaged housing units would only be reached if a tornado's pathway included the major municipality within the township. If the tornado remained in the rural portion of the township, then the number of potentially-damaged housing units would be considerably lower.

Figure T-13
Estimated Number of Housing Units by Participating Jurisdiction Potentially Damaged by a Tornado

Participating Jurisdiction	Total Housing Units (2017-2021)	Land Area/Refined Land Area (Sq. Miles) (2020)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.2 Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.2 Sq. Mi.) (Rounded Up)
Coffeen[1]	292	0.251	---	232.67	233
Farmersville	329	0.103	---	329.00	329
Harvel[4]	74	0.050	---	74.00	74
Hillsboro	1,951	6.322	308.60	61.72	62
Litchfield	3,466	4.899	707.49	141.50	142
Nokomis[3]	1,020	0.651	---	313.36	314
Raymond[4]	407	0.278	---	292.81	293
Schram City	315	0.244	---	258.20	259
Taylor Springs	326	0.320	---	203.75	204
Waggoner	88	0.094	---	88.00	88
Witt	347	0.257	---	270.04	271
Unincorp. County	3,096	672.805	4.602	0.92	1
County	12,581	703.764	17.877	3.58	4

[1]Coffeen Volunteer Fire Department
[2]Fillmore Community FPD
[3]Nokomis Area FPD
[4]Raymond-Harvel Fire Department

Figure T-14
Estimated Number of Housing Units by Township Potentially Damaged by a Tornado

Township	Total Housing Units (2017-2021)	Land Area (Sq. Miles) (2020)	Average Housing Unit Density (Units/Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.2 Sq. Mi.) (Raw)	Potentially-Damaged Housing Units (Units/0.2 Sq. Mi.) (Rounded Up)
Audubon[3]	206	53.971	3.817	0.76	1
Bois D'Arc	400	54.550	7.333	1.47	2
Butler Grove[4]	358	35.724	10.021	2.00	3
East Fork[1,2]	1,132	58.006	19.515	3.90	4
Fillmore Consoidated[1,2]	350	60.490	5.786	1.16	2
Grisham	279	24.363	11.452	2.29	3
Harvel[4]	124	18.013	6.884	1.38	2
Hillsboro	2,481	36.127	68.674	13.73	14
Irving	435	34.346	12.665	2.53	3
Nokomis[3]	1,296	36.398	35.606	7.12	8
North Litchfield[4]	2,434	36.164	67.305	13.46	14
Pitman	178	36.448	4.884	0.98	1
Raymond[4]	457	36.059	12.674	2.53	3
Rountree[3,4]	84	35.812	2.346	0.47	1
South Litchfield	1,637	37.152	44.062	8.81	9
Walshville	161	36.747	4.381	0.88	1
Witt[2,3]	437	36.761	11.888	2.38	3
Zanesville[4]	132	36.634	3.603	0.72	1
Townships - 5 most populated	8,980	203.847	44.053	8.81	9
Townships - 13 least populated	3,601	499.918	7.203	1.44	2

[1]Coffeen Volunteer Fire Department [2]Fillmore Community FPD
[3]Nokomis Area FPD [4]Raymond-Harvel Fire Department

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

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

Unincorporated Montgomery County (including Fire Protection Districts and Townships)

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

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

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

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

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

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

Unlike other hazards, such as flooding, there are no standard loss estimation models or methodologies for tornadoes. However, a rough estimate of potential dollar losses to the *potentially-damaged housing units* determined previously can be calculated if several additional decisions/assumptions are made regarding:

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

These assumptions represent a ***probable scenario*** based on the reported historical occurrences of tornadoes in Montgomery County. The purpose of providing a rough estimate is to help residents and government 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 Montgomery County is approximately one-third of the market value). **Figure T-15** provides a sample calculation. The total assessed value is based on 2021 tax assessment information obtained from the Montgomery County Clerk.

Figure T-15 **Sample Calculation of Average Assessed Value & Average Market Value – Nokomis**
Average Assessed Value Total Assessed Value of Residential Buildings in the Jurisdiction÷ Total Housing Units in the Jurisdiction = Average Assessed Value (Rounded to the Nearest Dollar) Nokomis: $14,541,458 ÷ 1,020 housing units = $14,256 **Average Market Value** Average Assessed Value x 3 = Average Market Value Nokomis: $14,256 x 3 = $42,768 **($42,768)**

Figures T-16 and **T-17** provide the average assessed value and average market value for each participating municipality as well as by township and for the unincorporated areas of the County and the County as a whole.

Figure T-16
Average Market Value of Housing Units by Participating Jurisdiction

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2021)	Total Housing Units (2017-2021)	Average Assessed Values	Average Market Value (2021)
Coffeen[1]	$1,611,064	292	$5,517	$16,551
Farmersville	$7,859,613	329	$23,889	$71,667
Harvel[4]	$710,036	74	$9,595	$28,785
Hillsboro	$37,287,643	1,951	$19,112	$57,336
Litchfield	$62,399,386	3,466	$18,003	$54,009
Nokomis[3]	$14,541,458	1,020	$14,256	$42,768
Raymond[4]	$10,732,089	407	$26,369	$79,107
Schram City	$3,752,849	315	$11,914	$35,742
Taylor Springs	$3,490,151	326	$10,706	$32,118
Waggoner	$1,027,117	88	$11,672	$35,016
Witt	$4,339,260	347	$12,505	$37,515
Unincorp. County	$157,956,532	3,096	$51,020	$153,060
County	$402,273,201	12,581	$31,975	$95,925

[1]Coffeen Volunteer Fire Department
[2]Fillmore Community FPD
[3]Nokomis Area FPD
[4]Raymond-Harvel Fire Department
Source: Montgomery County Clerk.

Figure T-17
Average Market Value of Housing Units by Township

Participating Jurisdiction	Total Assessed Value of Residential Buildings (2021)	Total Housing Units (2017-2021)	Average Assessed Values	Average Market Value (2021)
Audubon[3]	$2,067,370	206	$10,036	$30,107
Bois D'Arc	$9,992,633	400	$24,982	$74,945
Butler Grove[4]	$8,847,628	358	$24,714	$74,142
East Fork[1,2]	$14,993,054	1,132	$13,245	$39,734
Fillmore Consoidated[1,2]	$2,272,602	350	$6,493	$19,479
Grisham	$2,883,540	279	$10,335	$31,006
Harvel[4]	$1,183,596	124	$9,545	$28,635
Hillsboro	$37,515,531	2,481	$15,121	$45,363
Irving	$2,252,276	435	$5,178	$15,533
Nokomis[3]	$18,615,765	1,296	$14,364	$43,092
North Litchfield[4]	$61,560,787	2,434	$25,292	$75,876
Pitman	$2,886,924	178	$16,219	$48,656
Raymond[4]	$11,866,556	457	$25,966	$77,899
Rountree[3,4]	$641,630	84	$7,638	$22,915
South Litchfield	$17,069,526	1,637	$10,427	$31,282
Walshville	$1,428,451	161	$8,872	$26,617
Witt[2,3]	$4,992,594	437	$11,425	$34,274
Zanesville[4]	$3,366,933	132	$25,507	$76,521
Townships - 5 most populated	$149,754,663	8,980	$16,676	$50,029
Townships - 13 least populated	$54,682,733	3,601	$15,185	$45,556

[1]Coffeen Volunteer Fire Department [2]Fillmore Community FPD
[3]Nokomis Area FPD [4]Raymond-Harvel Fire Department
Source: Montgomery County Clerk.

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

Calculating Potential Dollar Losses

With all the decisions and assumptions made, the potential dollar losses can now be calculated. First, the potential dollar losses to the ***structure*** of a potentially-damaged housing unit must be determined. This is done by taking the average market value for a residential structure and multiplying it by the percent damage (100%) to get the average structural damage per unit. Next the average structural damage per unit is multiplied by the number of potentially-damaged housing units. **Figure T-18** provides a sample calculation.

Figure T-18 ***Structure:* Potential Dollar Loss Sample Calculation – Nokomis**
Average Market Value of a Housing Unit with the Jurisdiction x Percent Damage = Average Structural Damage per Housing Unit Nokomis: $42,768 x 100% = $42,768 per housing unit
Average Structural Damage per Housing Unit x Number of Potentially-Damaged Housing Units within the Jurisdiction = *Structure* Potential Dollar Losses Nokomis: $42,768 per housing unit x 314 housing units = $13,429,152 **($13,429,152)**

Next, the potential dollar losses to the ***content*** of a potentially-damaged housing unit must be determined. Based on FEMA guidance, the average 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-19** provides a sample calculation.

Figure T-19 ***Content:* Potential Dollar Loss Sample Calculation – Nokomis**
½ (Average Market Value of a Housing Unit) with the Jurisdiction x Percent Damage = Average Content Damage per Housing Unit Nokomis: ½ ($42,768) x 100% =$21,384 per housing unit
Average Content Damage per Housing Unit x Number of Potentially-Damaged Housing Units within the Jurisdiction = *Content* Potential Dollar Losses Nokomis: $21,384 per housing unit x 314 housing units = $6,714,576 **($6,714,576)**

Finally, the ***total potential dollar losses*** may be calculated by adding together the potential dollar losses to the structure and content. **Figures T-20** and **T-21** give a breakdown of the total potential dollar losses by municipality and township. For comparison, an estimate of potential dollar losses was calculated for the entire County, the unincorporated portions of the County, the five most populated townships and the 13 least populated townships.

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 Montgomery County would be expected to exceed at least $3.1 million in any of the participating municipalities.***

Figure T-20
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Tornado by Participating Jurisdiction

Participating Jurisdiction	Average Market Value (2021)	Potentially-Damaged Housing Units (Rounded Up)	Potential Dollar Losses		Total Potential Dollar Losses
			Structure	Content	
Coffeen[1]	$16,551	233	$3,856,383	$1,928,192	$5,784,575
Farmersville	$71,667	329	$23,578,443	$11,789,222	$35,367,665
Harvel[4]	$28,785	74	$2,130,090	$1,065,045	$3,195,135
Hillsboro	$57,336	62	$3,554,832	$1,777,416	$5,332,248
Litchfield	$54,009	142	$7,669,278	$3,834,639	$11,503,917
Nokomis[3]	$42,768	314	$13,429,152	$6,714,576	$20,143,728
Raymond[4]	$79,107	293	$23,178,351	$11,589,176	$34,767,527
Schram City	$35,742	259	$9,257,178	$4,628,589	$13,885,767
Taylor Springs	$32,118	204	$6,552,072	$3,276,036	$9,828,108
Waggoner	$35,016	88	$3,081,408	$1,540,704	$4,622,112
Witt	$37,515	271	$10,166,565	$5,083,283	$15,249,848
Unincorp. County	$153,060	1	$153,060	$76,530	$229,590
County	$95,925	4	$383,700	$191,850	$575,550

[1]Coffeen Volunteer Fire Department
[2]Fillmore Community FPD
[3]Nokomis Area FPD
[4]Raymond-Harvel Fire Department

Potential dollar losses caused by an average tornado in Montgomery County townships would be expected to range from $39,926 in Walshville Township to at least $1.5 million in North Litchfield Township. 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.

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.

Figure T-21
Estimated Potential Dollar Losses to Potentially-Damaged Housing Units from a Tornado by Township

Participating Jurisdiction	Average Market Value (2021)	Potentially-Damaged Housing Units (Rounded Up)	Potential Dollar Losses		Total Potential Dollar Losses
			Structure	Content	
Audubon[3]	$30,107	1	$30,107	$15,054	$45,161
Bois D'Arc	$74,945	2	$149,890	$74,945	$224,835
Butler Grove[4]	$74,142	3	$222,426	$111,213	$333,639
East Fork[1,2]	$39,734	4	$158,936	$79,468	$238,404
Fillmore Consoidated[1,2]	$19,479	2	$38,958	$19,479	$58,437
Grisham	$31,006	3	$93,018	$46,509	$139,527
Harvel[4]	$28,635	2	$57,270	$28,635	$85,905
Hillsboro	$45,363	14	$635,082	$317,541	$952,623
Irving	$15,533	3	$46,599	$23,300	$69,899
Nokomis[3]	$43,092	8	$344,736	$172,368	$517,104
North Litchfield[4]	$75,876	14	$1,062,264	$531,132	$1,593,396
Pitman	$48,656	1	$48,656	$24,328	$72,984
Raymond[4]	$77,899	3	$233,697	$116,849	$350,546
Rountree[3,4]	$22,915	1	$22,915	$11,458	$34,373
South Litchfield	$31,282	9	$281,538	$140,769	$422,307
Walshville	$26,617	1	$26,617	$13,309	$39,926
Witt[2,3]	$34,274	3	$102,822	$51,411	$154,233
Zanesville[4]	$76,521	1	$76,521	$38,261	$114,782
Townships - 5 most populated	$50,029	9	$450,261	$225,131	$675,392
Townships - 13 least populated	$45,556	2	$91,112	$45,556	$136,668

[1]Coffeen Volunteer Fire Department [2]Fillmore Community FPD
[3]Nokomis Area FPD [4]Raymond-Harvel Fire Department

3.7 DROUGHTS

HAZARD IDENTIFICATION

What is the definition of a drought?

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

Drought is a normal and recurrent feature of climate and can occur in all climate zones, though its characteristics and impacts vary significantly from one region to another. Unlike other natural hazards, drought does not have a clearly defined beginning or end. Droughts can be short, lasting just a few months, or they can persist for several years. There have been 28 drought events with losses exceeding $1 billion each (CPI-Adjusted) across the U.S. between 1980 and 2022. 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 U.S. 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 U.S. 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 U.S. 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 U.S. The USDM is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the U.S. Department of Agriculture (USDA), and the National Oceanic and Atmospheric Administration (NOAA).

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

Because the ranges of the various indicators often don't coincide, the final drought category tends to be based on what a majority of the indictors show and on local observations. The authors also weight the indices according to how well they perform in various parts of the country and at different times of the year. It is the combination of the best available data, location observations and experts' best judgment that make the U.S. Drought Monitor more versatile than other drought indices.

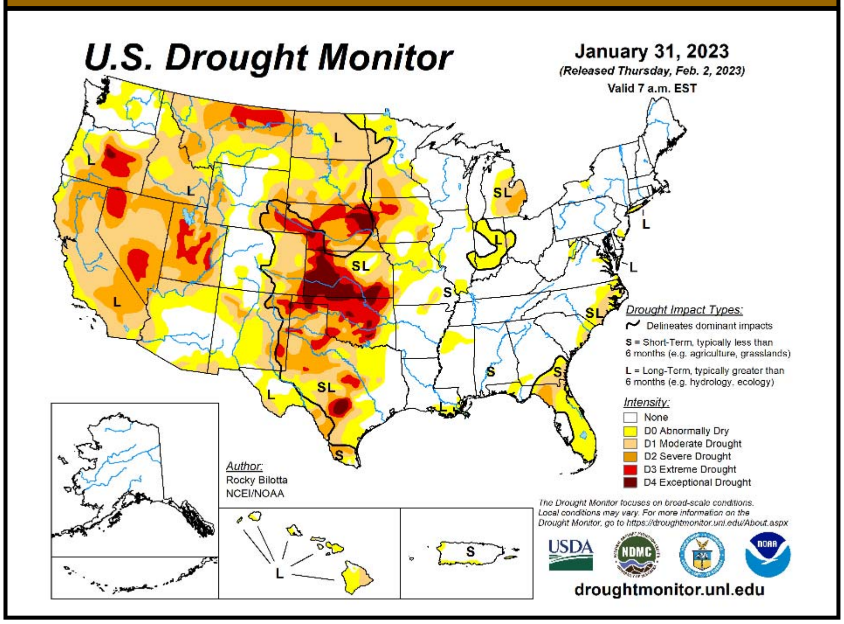
In addition to identifying and categorizing general areas of drought, the USDM also identifies whether a drought's impacts are short-term (typically less than 6 months – agriculture, grasslands) or long-term (typically more than 6 months – hydrology, ecology). **Figure DR-2** shows an example of the USDM weekly map. The USDM is designed to provide a consistent big-picture look at drought conditions in the U.S. It is not designed to infer specifics about local conditions.

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

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

Source: U.S. Drought Monitor.

Figure DR-2
U. S. Drought Monitor



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

HAZARD PROFILE

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

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

Drought Fast Facts – Occurrences

Number of Drought Events Reported (1980 – 2022): ***5***

Table 11, located in **Appendix J**, summarizes the previous occurrences as well as the extent or magnitude of the drought events recorded in Montgomery County. NOAA's Storm Events Database, the Illinois State Water Survey, the Illinois Emergency Management Agency and Office of Homeland Security (IEMA-OHS), the NDMC at the University of Nebraska-Lincoln, and the USDA have documented five official droughts for Montgomery County between 1980 and 2022. The County was designated a USDA Primary Natural Disaster area for the 2012 drought.

The recorded drought events ranged in length from 6.5 to 16 months. Of the three drought events with a recorded starting month, one began in May, two began in June, and one began in August. Three of the drought events were assigned drought intensity category ratings by the USDM, with the 2012 drought reaching D3, extreme drought.

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

What is the probability of future drought events occurring based on historical data?

Montgomery County, including the participating jurisdictions, has experienced five droughts between 1980 and 2022. With five occurrences over 43 years, the probability or likelihood that the County may experience a drought in any given year is 11.6%. However, if earlier recorded droughts are factored in, then the probability that Montgomery County may experience a drought in any given year decreases to 9.9%.

What is the probability of future drought events occurring based on modeled future conditions?

Despite precipitation trending upwards in Illinois in recent decades, drought conditions are likely to be more problematic in the future than they have been in the recent past, due to a combination of changes in precipitation patterns and an increase in summer temperatures.

In terms of predicting the likelihood of drought conditions, the amount of precipitation received is important, but even more critical is the timing of precipitation events. More frequent precipitation events maintain soil in a spongy, porous state that readily absorbs moisture; alternatively, more infrequent precipitation events tend to lead to dry, hardened earth, which is more effective at repelling water than absorbing it. When a precipitation event does occur over this drought-stricken soil, most of the water runs off and pools in bottomlands, leaving most land 'high and dry' while simultaneously flooding the lowest-lying areas.

Another factor making this outcome more likely is the trend of increasing temperatures in Illinois, particularly during the summer when rain events are already more sporadic. Over the past 120 years, average temperatures in Illinois have increased by 1°F and 2°F according to the Illinois State Climatologist, a trend that is likely to continue. In the future, hotter summer temperatures are likely to lead to more evaporation that will exacerbate dry conditions, causing droughts to intensify more rapidly and become more intense.

Figures SS-8 and **SS-9,** located in Section 3.1, and **Figures EH-6, EH-7,** and **EH-8,** located in Section 3.2, provide tabular and graphical projections for Montgomery County showing average annual estimates for temperature and precipitation in the early, mid, and late century, with both low and high estimates for each time period. Most likely, the true values will fall between these two estimates. According to the Climate Mapping for Resilience and Adaptation's Assessment Tool, the number of days exceeding 90°F in Mercer County is projected to go from 27 today to between 71 and 80, while days exceeding 100°F are likely to increase from an average of one a year today to 11 to 16 days by midcentury. It also forecasts that the average annual precipitation in Mercer County is likely to increase by 1.3 to 1.8 inches per year, while the average number of days per year without precipitation is projected to increase by 3 to 5 days.

The Climate Explorer indicates that in Montgomery County, the average number of dry spells (a period of consecutive days without precipitation) is projected to increase by one. Extreme temperatures on the hottest days of the year are projected to increase by 7°F. This is based on the findings of the 2018 National Climate Assessment and compares projections for the middle third of the century (2035-2064) with average conditions observed from 1961-1990.

In combination, a decrease in the frequency of precipitation and a significant increase in the number of days with extreme heat in Montgomery County would create conditions that will be more likely to produce droughts than today.

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 Montgomery County, including the participating jurisdictions, is vulnerable to drought. Neither the amount nor the distribution of precipitation; soil types; topography; or water table conditions provides protection for any area within the County.

The *2023 Illinois Natural Hazard Mitigation Plan* prepared by IEMA-OHS classifies Montgomery County's hazard rating for drought as "low". IEMA-OHS's overall hazard rating system has five levels: very low, low, medium, high, and very high.

For drought, FEMA's National Risk Index (NRI) rates the County as a whole as "Relatively Low". Of the eight census tracts, three are rated "Relatively Moderate", three are rated "Relatively Low", and two are rated "Very Low" for drought. **Table R-4 presents** the overall NRI scores and ratings for each census tract as well as for the County as a whole.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of drought?

No. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdictions consider specific assets within their jurisdictions vulnerable to drought.

What impacts resulted from the recorded drought events?

Data obtained from the USDA Risk Management Agency, the Montgomery County Farm Bureau, the University of Illinois Extension Service serving Christian, Jersey, Macoupin & Montgomery Counties, and the Montgomery County Soil and Water Conservation District indicates that between 1980 and 2022, three of the five droughts (2005, 2011, & 2012) caused an estimated $76,644,318 in crop damages in Montgomery County. Damage information was either unavailable or none was recorded for the remaining two reported occurrences.

<u>Drought Fast Facts – Impacts/Risk</u>

<u>Drought Impacts:</u>
- Total Property Damage: ***n/a***
- Total Crop Damage: ***$76.6 million)***

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

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

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.

<u>Crop Yield Reductions</u>

Agriculture is an important industry in Montgomery County. Farmland accounts for approximately 97.3% of all the land in the County. According to the 2017 Census of Agriculture, there were 1,021 farms in Montgomery County occupying 438,834 acres. The acreage of land in crop production that is irrigated was not reported. In comparison, there were 1,021 farms occupying 84% (382,388 acres) of the total land area in the County in 2012. Of the land in farms in 2017, 91% or approximately 399,339 acres are in crop production.

According to the 2017 Census of Agriculture, total crop and livestock sales accounted for $225.1 million in revenue. This is a 1.0% decrease in revenue from the 2012 Census of Agriculture when total crop and livestock sales accounted for $227.3 million. Montgomery County ranks 13th in Illinois in crop cash receipts and 35th in Illinois for livestock cash receipts. A severe drought would have a major financial impact on the large agricultural community, particularly if it occurred during the growing season. Dry weather conditions, particularly when accompanied by excessive heat, can result in diminished crop yields and place stress on livestock.

A reduction in crop yields was seen as a result of the 1983, 1988, 2005, 2011, and 2012 droughts. **Figure DR-3** illustrates the reduction yields seen for corn and soybeans during the recorded drought events. The USDA's National Agricultural Statistics Service records show that yield reductions for corn and soybeans were most severe for the 1983 drought when there was a 56.1% reduction in corn yields and a 37.3% reduction in soybean yields.

Figure DR-3
Crop Yield Reductions Due to Drought – Montgomery County

Year	Corn		Soybeans	
	Yield (bushel)	% Reduction Previous Year	Yield (bushel)	% Reduction Previous Year
1982	132.0	--	37.5	--
1983	**58.0**	**56.1%**	**23.5**	**37.3%**
1984	112.0	--	30.0	--
1987	128.0	--	34.0	--
1988	**80.0**	**37.5%**	**25.0**	**26.5%**
1989	127.0	--	38.0	--
2004	181.0	--	50.0	--
2005	**159.0**	**12.2%**	**45.0**	**10.0%**
2006	**139.0**	**12.6%**	47.0	--
2007	154.0	--	**37.0**	**21.3%**
2010	156.3	--	55.5	--
2011	**138.6**	**11.3%**	**44.2**	**20.4%**
2012	**73.2**	**47.2%**	**42.5**	**3.8%**
2013	182.9	--	50.0	--

Source: USDA, National Agricultural Statistics Service.

Drinking Water Shortages

Municipalities that rely on surface water sources for their drinking water supplies are more vulnerable to shortages as a result of drought. In Montgomery County, ***five of the participating municipalities rely exclusively on surface water sources*** for their drinking water supply. Hillsboro and Litchfield rely solely on surface water (Lake Hillsboro, Glenn Shoals Lake, Lake Lou Yaeger and Lake Litchfield) to obtain their drinking water. Coffeen, Schram City, and Taylor Springs purchase their water from Hillsboro.

According to Illinois State Water Survey's *Drought Risk Analysis Tool for Illinois' Community Surface Water Systems*, both Hillsboro's and Litchfield's water supplies are classified as "Adequate". The ISWS indicates that for a system to be considered adequate, it should with 90%

confidence be able to fulfill the community's water demand through a severe drought similar to the historical drought of record.

The remaining participating municipalities obtain their water from community water supplies that draw water from wells drilled into sand and gravel aquifers. Witt has the shallowest wells with depths of 30 feet, while Raymond and Waggoner have the deepest wells at 59 feet. These shallow wells make Farmersville, Harvel, Nokomis, Raymond, Waggoner, and Witt potentially vulnerable to the effects of a prolonged drought.

While some 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 Montgomery County and the participating jurisdictions are not vulnerable to drought. The primary concern centers on the financial impacts that result from loss of crop yields and livestock.

While buildings do not typically sustain damage from drought events, in rare cases infrastructure and critical facilities may be directly or indirectly impacted. While uncommon, droughts can contribute to roadway damage. Severe soil shrinkage can compromise the foundation of a roadway and lead to cracking and buckling.

Prolonged heat associated with drought can also increase the demand for energy to operate air conditioners, fans, and other devices. This increase in demand places stress on the electrical grid, which increases the likelihood of power outages.

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

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

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

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

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

Unlike other natural hazards there are no standard loss estimation models or methodologies for drought. Since drought typically does not cause structure damage, it is unlikely that future dollar losses will be excessive. The primary concern associated with drought is the financial impacts that result from loss of crop yields and the potential impacts to drinking water supplies. Since a large part of the County is involved in farming activities, it is likely that there will be future dollar losses to drought. In addition, reduced water levels and the water conservation measures that typically accompany a drought will most likely impact consumers as well as businesses and industries that are water-dependent (i.e., car washes, landscapers, etc.).

3.8 EARTHQUAKES

HAZARD IDENTIFICATION

What is the definition of an earthquake?

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

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

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

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

According to the U.S. Geological Survey, more than 143 million Americans in the contiguous U.S. are exposed to potentially damaging ground shaking from earthquakes. More than 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 U.S. (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, reverse (thrust) and strike-slip (lateral).

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. Reverse or thrust 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.

<u>Magnitude</u>

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-1** 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 U.S. 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.

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.

Figure EQ-1
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, UPSeis

Although numerous intensity scales have been developed over the years, the one currently used in the U.S. is the Modified Mercalli Intensity Scale. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. The lower numbers of the intensity scale are based on human observations (i.e., felt only by a few people at rest, felt quite noticeably by persons indoors, etc.).

The higher numbers of the scale are based on observed structural damage (i.e., broken windows, general damage to foundations etc.). Structural engineers usually contribute information when assigning intensity values of VIII or greater. **Figure EQ-2** provides a description of the damages associated with each level of intensity as well as comparing Richter Scales values to Modified Mercalli Intensity Scale values.

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

When and where do earthquakes occur?

Earthquakes can strike any location at any time. However, history has shown that most earthquakes occur in the same general areas year after year, principally in three large zones around the globe. The world's greatest earthquake belt, the circum-Pacific seismic belt (nicknamed the "Ring of Fire"), is found along the rim of the Pacific Ocean, where about 81 percent of the world's largest earthquakes occur.

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

Figure EQ-2
Comparison of Richter Scale and Modified Mercalli Intensity Scale

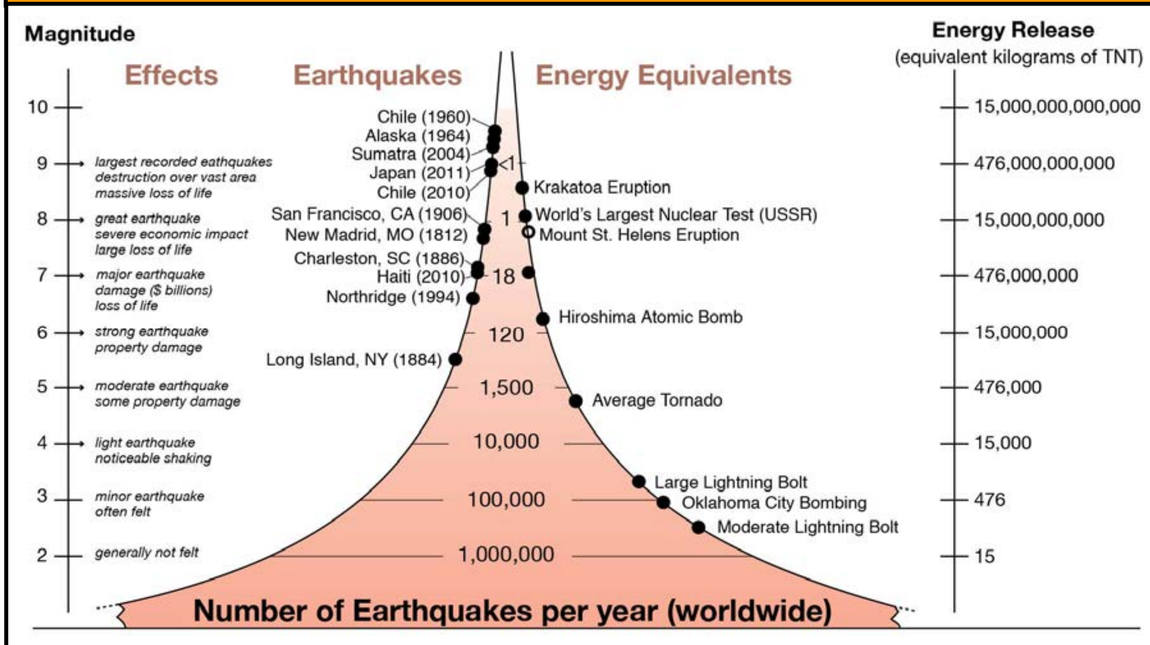
Richter Scale	Modified Mercalli Scale	Observations
1.0 – 1.9	I	Felt by very few people; barely noticeable. No damage.
2.0 – 2.9	II	Felt by a few people, especially on the upper floors of buildings. No damage.
3.0 – 3.9	III	Noticeable indoors, especially on the upper floors of buildings, but may not be 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.

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-3** 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-3
Approximate Number of Earthquakes Recorded Annually



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

HAZARD PROFILE

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

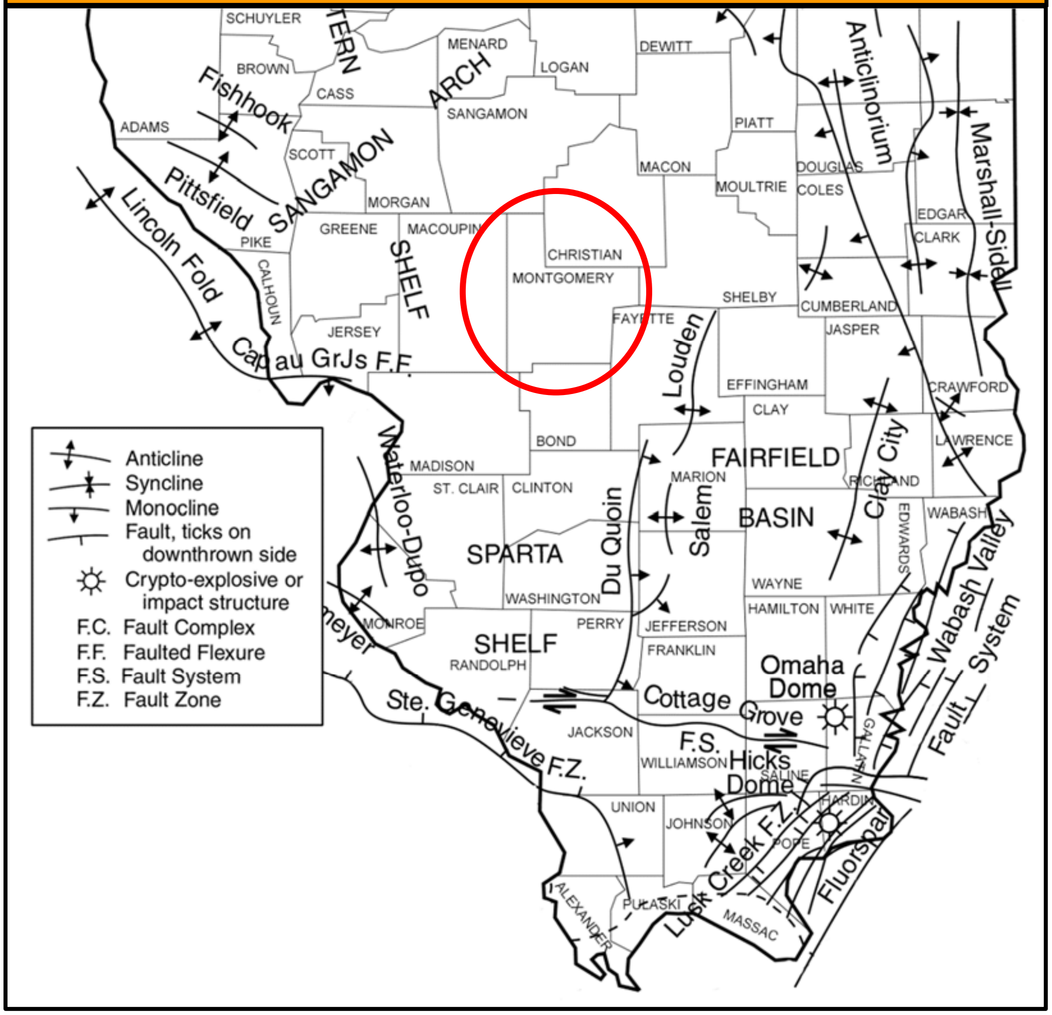
Are there any faults located within the County?

No, there are no known faults or geologic structures located in Montgomery County. However, there is one geological structure, the Louden Anticline, located in the immediate region. The Louden Anticline is a slightly sinuous structure that occurs in eastern Fayette and Marion Counties and provides the structural closure for the Louden Oil Field, the second-largest oil-producing structure of the Illinois Basin. **Figure EQ-4** illustrates the location of this geologic structure.

Earthquake Fast Facts – Occurrences

Earthquakes Originating in the County (1795 – 2022): ***None***
Fault Zones Located within the County: ***None***
Geological Structures Located within the County: ***None***
Earthquakes Originating in Adjacent Counties (1795-2022): ***5***
Fault Zones Located in Nearby Counties: ***None***
Geologic Structures Located in Adjacent Counties: ***1***

Figure EQ-4
Geological Structures in Central Illinois



Source: Illinois State Geological Survey.

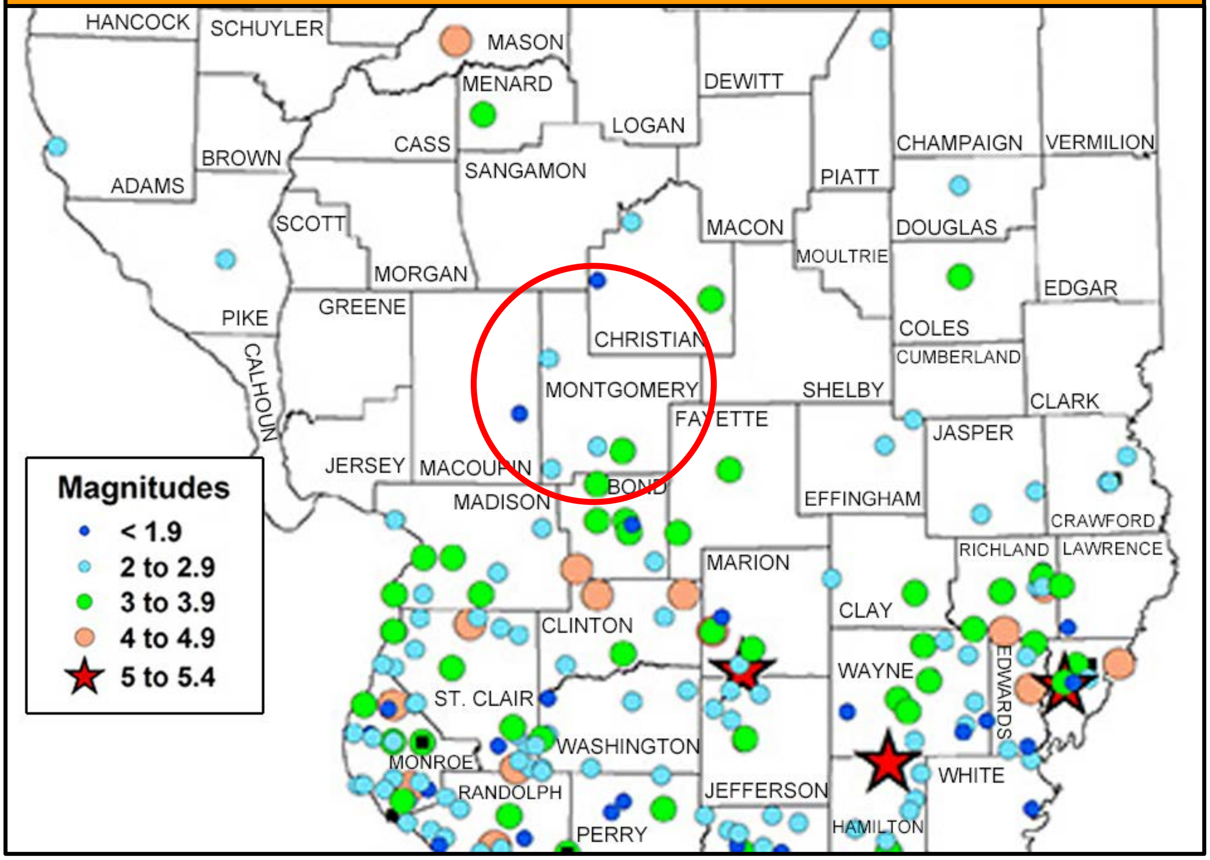
When have earthquakes occurred previously? What is the extent of these previous quakes?

According to the Illinois State Geological Survey, the U.S. Geological Survey, and Center for Earthquake Research and Information (CERI) at the University of Memphis, four earthquakes have originated in Montgomery County during the last 200 years. . **Figure EQ-5** provides basic details on this event while **Figure EQ-6** illustrates the epicenters of the nearby earthquakes.

Figure EQ-5
Earthquakes Originating in Montgomery County

Date	Magnitude	Intensity	Location
03/17/1903	2.3	III	2 miles south of Taylor Springs
07/01/1982	2.8	n/a	2 miles southwest of Waggoner
03/28/1985	2.5	n/a	2.5 miles southwest of Walshville
03/13/1987	3.3	n/a	1 mile west of Coffeen

Figure EQ-6
Earthquakes Originating in Montgomery Illinois



Source: Illinois State Geological Survey.

In addition to the above referenced events, Montgomery 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 U.S. 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 U.S. and southern Ontario, Canada.
- The strongest earthquake in the central U.S. during the 20th century occurred along the Wabash Valley seismic zone in southeastern Illinois near Dale in Hamilton County. This magnitude 5.4 earthquake occurred on November 9, 1968, with an intensity estimated at VII for the area surrounding the epicenter. Moderate structural damage was reported in several towns in south-

central Illinois, southwest Indiana, and northwest Kentucky. Ground shaking was felt over all or parts of 23 states in the central and eastern U.S. and southern Ontario, Canada.

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

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

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

Earthquake events generally affect the entire County. Earthquakes, like drought, impact large areas extending across an entire region and affecting multiple counties. Montgomery County's proximity to multiple fault zones, both large and small, makes the entire area likely to be affected by an earthquake if these faults become seismically active.

According to the USGS, Montgomery County can expect 10 to 50 occurrences of damaging earthquake shaking over a 10,000-year period. **Figure EQ-7** illustrates the frequency of damaging earthquake shaking around the U.S.

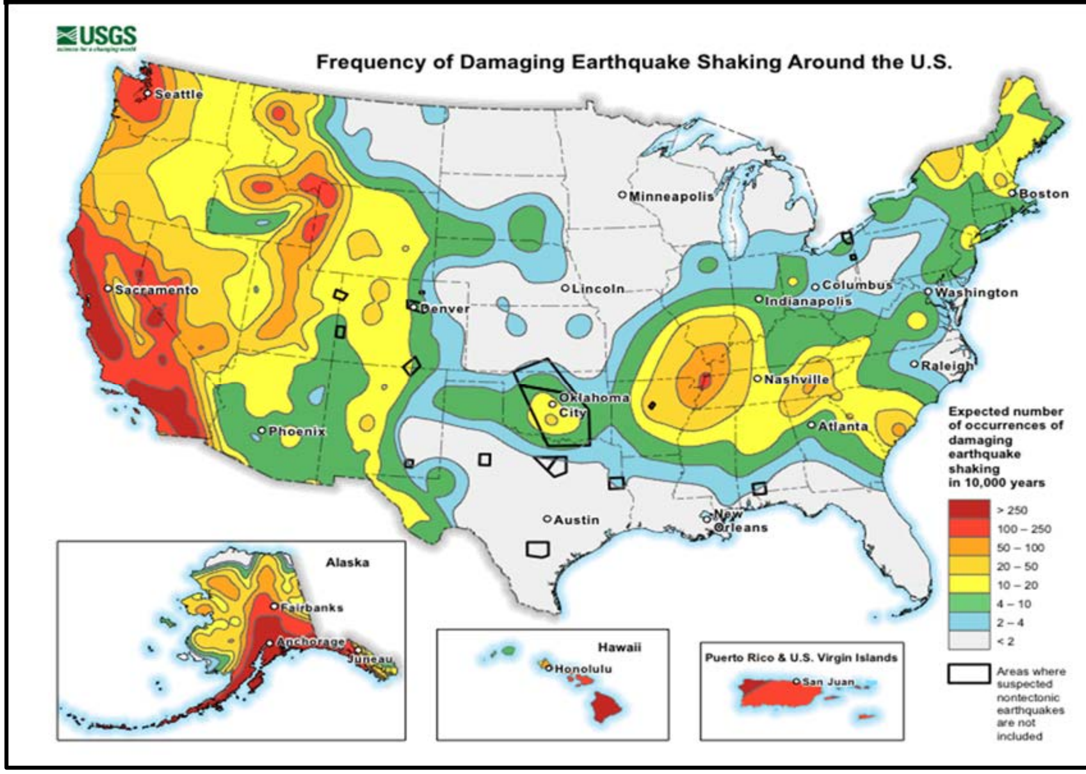
What is the probability of future earthquake events occurring based on historical data?

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 U.S. 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%.

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



Source: U.S. Geological Survey.

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 Montgomery County is vulnerable to earthquakes. The unique geological formations topped with glacial drift soils found in the central U.S. conduct an earthquake's energy farther than in other parts of the Nation. Consequently, earthquakes that originate in the Midwest tend to be felt at greater distances than earthquakes with similar magnitudes that originate on the West Coast.

Earthquake Fast Facts – Risk

Earthquake Risk/Vulnerability:
- ❖ Public Health & Safety – Light/Moderate Quake within the County or immediate region: ***Low***
- ❖ Public Health & Safety – Strong Quake in the region: ***Low to Medium***
- ❖ Buildings/Infrastructure/Critical Facilities – Light/ Moderate Quake within the County or immediate region: ***Low***
- ❖ Buildings/Infrastructure/Critical Facilities – Strong Quake in the region: ***Low to Medium***

This vulnerability, found throughout most of Illinois and all of Montgomery County, is compounded by relatively high water tables within the region. When earthquake shaking mixes the groundwater and soil, ground support is further weakened thus adding to the potential structural damages experienced by buildings, roads, bridges, electrical lines, and natural gas pipelines.

The *Projected Earthquake Intensities Map* prepared by the Missouri State Emergency Management Agency predicts that if a magnitude 6.7 earthquake were to take place anywhere along the New Madrid seismic zone, then the highest projected intensity felt in Montgomery 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 Montgomery County is not vulnerable to damaging earthquakes. This perception has allowed the County and participating municipalities to develop largely without regard to earthquake safety.

The *2023 Illinois Natural Hazard Mitigation Plan* prepared by IEMA-OHS classifies Montgomery County's hazard rating for earthquake as "low". IEMA-OHS's overall hazard rating system has five levels: very low, low, medium, high, and very high.

For earthquakes, FEMA's National Risk Index (NRI) rates the County as a whole as "relatively low". All eight census tracts are rated "Relatively Moderate" for earthquakes. **Table R-4** presents the overall NRI scores and ratings for each census tract as well as for the County as a whole.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of earthquakes?

Yes. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, the following jurisdiction(s) considered specific assets within their jurisdiction vulnerable to earthquakes.

<u>*Taylor Springs:*</u>

- ❖ The Village's wastewater treatment system, including lagoons, lift station, and main pump station, are vulnerable to the impacts of earthquakes.
- ❖ None of the Village's critical facilities or infrastructure have been hardened to reduce damages from earthquakes.

What impacts resulted from the recorded earthquake events?

Property damage figures were either unavailable or none were recorded, and no injuries or fatalities were reported as a result of any of the four earthquakes that originated in Montgomery County. While Montgomery County residents felt the earthquakes that have occurred in 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 Montgomery County felt those quakes; however, historical records do not indicate the intensity or impacts that these quakes had on the County.

What other impacts can result from earthquakes?

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

Figure EQ-8
Potential Earthquake Impacts

Direct	Indirect
Buildings • Temporary displacement of businesses, households, schools, and other critical services where heat, water and power are disrupted • Long-term displacement of businesses, households, schools, and other critical services due to structural damage or fires *Transportation* • Damages to bridges (i.e., cracking of abutments, subsidence of piers/supports, etc.) • Cracks in the pavement of critical roadways • Increased traffic on Interstate, U.S., 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 Montgomery County, the likelihood that an earthquake will originate in the County is small, decreasing the changes for catastrophic damages. However, if another light earthquake originates within the County or from the structures in the immediate region, the risk or vulnerability to public health and safety is considered ***low***. This risk is elevated to ***low to medium*** for a strong earthquake originating along seismic zones in the region (i.e., New Madrid or Wabash Valley).

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

Yes. All existing buildings, infrastructure and critical facilities located in Montgomery County and the participating jurisdictions are vulnerable to damage from earthquakes. However, given the County's size (about 28,500 individuals), its population density, the fact that there are few buildings higher than two stories (with the exception of grain elevators and several three to four story buildings in Litchfield and Hillsboro) tempered by the low potential for magnitude 5.0 and above earthquakes to occur in the immediate region, the damage is anticipated to be slight with only superficial structure damage such as broken windows and cracks in weak plaster and masonry.

If a strong earthquake (6.0 – 6.9) were to occur in the region, then unreinforced masonry buildings are most at risk during an earthquake because the walls are prone to collapse outward. Steel and wood buildings have more ability to absorb the energy from an earthquake while wood buildings with proper foundation ties have rarely collapsed in earthquakes. In this scenario building damage in Montgomery County would range from moderate to considerable for well-built ordinary structures and considerable to severe for poorly-built structures. **Figure EQ-9**, located at the end of this section, identifies the number of unreinforced masonry buildings that serve as critical facilities within the participating jurisdictions.

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

An earthquake also has the ability to damage infrastructure and critical facilities such as roads and utilities. In the event of a major earthquake, bridges are expected to experience moderate damage such as cracking in the abutments and subsidence of piers and supports. The structural integrity may be compromised to the degree where safe passage is not possible, resulting in adverse travel times as alternate routes are taken. Some rural families may become isolated where alternate paved routes do not exist. In addition, cracks may form in the pavement of key roadways. **Figure R-5** lists the number of each type of critical infrastructure by jurisdiction.

Of previous concern was structural damage to the coal-fueled power plant outside of Coffeen. This plant provided power to customers in Montgomery County and surrounding areas. However, the plant was shut down on November 1, 2019.

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

As with public health and safety, the risk or vulnerability to buildings, infrastructure and critical facilities is dependent on the intensity and location of the event. The risk to buildings, infrastructure and critical facilities is considered to be ***low*** for a light to moderate earthquake that originates within the County or immediate region. This risk is elevated to ***low to medium*** for a strong earthquake originating along seismic zones in the region (i.e., New Madrid or Wabash Valley.)

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

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

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

Since property damage information was either unavailable or none was recorded for the documented earthquakes that impacted Montgomery County, there is no way to accurately estimate future potential dollar losses to vulnerable structures. However, according to the Montgomery County Clerk the total equalized assessed values of all residential, commercial, and industrial buildings in the planning area is $335,308,343. Since all of the structures in the planning area are susceptible to earthquake impacts to varying degrees, this total represents the countywide property exposure to earthquake events.

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

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

Participating Jurisdiction	Government[1]	Law Enforcement	Fire Stations	Ambulance Service	Schools	Drinking Water	Wastewater Treatment	Medical[2]	Healthcare Facilities[3]
Montgomery County	2	---	---	---	---	1	---	4	---
Coffeen	---	---	---	---	---	---	---	---	---
Farmersville	1	---	1	1	---	---	---	---	---
Harvel	2	---	---	---	---	1	---	---	---
Hillsboro	---	---	1	---	---	---	1	---	---
Litchfield	1	1	---	---	7	1	1	4	3
Nokomis	1	---	---	---	4	---	1	3	2
Raymond	1	1	---	---	---	---	1	---	---
Schram City	2	---	---	---	---	---	---	---	---
Taylor Springs	3	1	---	1	---	---	---	---	---
Waggoner	---	---	---	---	---	---	---	---	---
Witt	---	---	---	---	---	---	---	---	---
Rountree Township	---	---	---	---	---	---	---	---	---
Coffeen Volunteer FD	1	---	---	---	1	---	---	---	---
Fillmore Community FPD	2	---	---	---	---	---	---	---	---
Nokomis Area FPD	---	---	---	---	---	---	---	---	---
Raymond-Harvel FD	---	---	---	---	---	---	---	---	---

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

3.9 Dam Failures

Hazard Identification

What is the definition of a dam?

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

According to the U.S. Army Corps of Engineers' National Inventory of Dams (NID), there are approximately 91,785 dams in the U.S. and Puerto Rico, with 1,639 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 1,639 dams in Illinois, approximately 93.5% 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 U.S.; 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 1,100 individuals, destroying approximately 550 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 49 classified dams located in Montgomery County. Of those 49 dams, eight have a hazard potential classification of "High", 13 have a hazard potential classification of "Significant" and the remaining 28 dams have a hazard potential classification of "Low". These 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 dams?

Yes. Hillsboro owns the Shoal Creek Structure 5 Dam and Litchfield owns the Lake Lou Yaeger Dam and Litchfield City Lake Dam. **Figure DF-2** provides a brief description of this dam.

Dam Failure Fast Facts – Occurrences

Number of "High" Hazard Classified Dams Located in the County: ***8***

Number of "High" Hazard Dams owned by Participating Jurisdictions: ***3***

Number of Dam Failures Reported: ***None***

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

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

Yes. There are five privately-owned "High" hazard classified dams in Montgomery County. **Figure DF-2** provides a brief description of these dams.

When have dam failures occurred previously?

According to data from Stanford University's National Performance of Dams Incident Database and discussions with Committee members, there are no known recorded dam failures associated with the "High" hazard dams in Montgomery County.

What is the extent of future potential dam failures?

Emergency Action Plans (EAPs) defining the extent or magnitude of a potential dam failure (water depth, area of impact) were developed for seven of the eight "High" hazard dams in Montgomery County. An EAP has not been prepared for the Shoal Creek Structure 5 Dam. Only three of the seven EAPs developed (Coffeen Gypsum Stack Dam, Lake Lou Yaeger Dam, and Litchfield City Lake Dam) were made available to the Montgomery County Emergency Management Agency (EMA). As a result, a data deficiency exists in terms of estimating inundation times for various distances downstream.

Figures DF-3 and DF-4 detail the estimated inundation time and depths based on distance downstream for a Sunny Day and Probable Maximum Flood (PMF) breach events. The PMF is a rainy-day failure scenario that refers to the flood magnitude that may be expected from the worst combination of meteorological and hydrologic conditions for a watershed. A Sunny Day failure results from a structural breach at a time when the reservoir is at normal pool level with less water entering the reservoir and therefore a smaller amount of water is being released at a lesser velocity than would occur during a PMF.

Figure DF-2
"High" Hazard Dams Located in Montgomery County

Dam Name	Hazard Classification	Associated Waterway	Owner	Type	Primary Purpose	Completion Year	Height (feet)	Length (feet)	Maximum Storage (acre-feet)	Impoundment Surface Area (acres)	Drainage Area (square miles)	Emergency Action Plan
Publicly-Owned												
Lake Lou Yaeger Dam	High	West Fork Shoal Creek	City of Litchfield	Earth	Recreation & Water Supply	1966	54	1,720	44,430	1,410	104	Yes
Litchfield City Lake Dam	High	Tributary of West Fork Shoal Creek	City of Litchfield	Earth	Recreation	1925	51	565	370	n/a	n/a	Yes
Shoal Creek Structure 5 Dam	High	Tributary of Middle Fork Shoal Creek	City of Hillsboro	Earth	Flood Risk Reduction	1973	30	480	1,010	26	2.1	No
Privately-Owned												
Coffeen Gypsum Stack Dam	High	McDavid Branch East Fork Shoal	Dynergy Midwest Generation	Earth	Debris Control	n/a	108	5,100	2,355	38.5	38.5	Yes
Hillsboro Energy CRD Facility 1 Dam	High	Tributary of Middle Fork Shoal Creek	Hillsboro Energy	Earth	Tailings	n/a	80	6,430	5,664	81.4	0.13	Yes
Hillsboro Energy CRD Facility 2 Dam	High	Tributary of Shoal Creek	Hillsboro Energy	Earth	Other	n/a	77	10,800	8,500	n/a	n/a	Yes
Springfield Coal North Refuse Dam	High	Perched Reservoir	Springfield Coal Co.	Earth	Other	1982	34	6,143	2,053	n/a	n/a	Yes
Springfield Coal North Refuse Extension Dam	High	Perched Reservoir	Springfield Coal Co.	Earth	Other	2000	35	3,800	730	35	35	Yes

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

Figure DF-3
Lake Lou Yaeger Dam – Water Depth and Speed of Onset Estimates for Sunny Day & Probable Maximum Flood

Location	Distance Downstream from Dam (miles)	Overtopping or Low Water Elevation (feet)	Sunny Day		Probable Maximum Flood (PMF)	
			Time of Peak Flow (hr:mm)	Peak Flow Elevation (feet)	Time of Peak Flow (hr:mm))	Peak Flow Elevation (feet))
Illinois Route 16	1.5	572.67	1:05	574.14	25:00	578.09
House #1 (IL Rte. 16)	1.9	561.57	1:10	571.13	25:00	579.66
House #2 (Old Quarry Trail)	2.3	562.20 / 564.22	1:15	569.90	25:10	578.10
Old Litchfield Trail	4.8	551.15	2:05	562.71	25:40	568.96
Walshville Trail	7.7	542.30	3:35	540.42	26:40	546.84
Union Pacific Railroad	10.3	530.0	4:15	532.27	28:42	539.32
Bridge (out of service)	12.2	523.0	5:15	524.08	28:55	533.47
Long Bridge Trail	14.4	533.75	6:45	520.22	29:45	532.20
Panama Avenue	16	515.00	7:25	518.15	30:00	528.55
Norfolk Southern Railroad	16.9	510.00	8:25	513.71	30:35	524.37

Figure DF-4
Litchfield City Lake Dam – Water Depth and Speed of Onset Estimates for Sunny Day & Probable Maximum Flood

Location	Distance Downstream from Dam (miles)	Overtopping or Low Water Elevation (feet)	Sunny Day		Probable Maximum Flood (PMF)	
			Time of Peak Flow (hr:mm)	Peak Flow Elevation (feet)	Time of Peak Flow (hr:mm))	Peak Flow Elevation (feet))
Illinois Route 16	0.75	572.67	0:15	567.49	16:15	572.40
House #1 (IL Rte. 16)	1.1	561.57	0:15	564.27	16:25	569.50
House #2 (Old Quarry Trail)	1.5	562.20 / 564.22	0:25	561.16	16:30	569.30
Old Litchfield Trail	3.8	551.15	1:15	553.24	17:15	565.60
Walshville Trail	6.25	542.30	1:35	532.23	18:55	548.30
Union Pacific Railroad	8.6	530.0	3:00	524.51	20:05	541.80
Bridge (out of service)	10.3	523.0	3:25	519.24	20:20	536.60
Long Bridge Trail	11.8	533.75	5:50	512.45	21:05	535.20

= Structure flooded/overtopped by dam breach

Based on the analysis for the Lake Lou Yaeger Dam, two houses, one state route, two local roads, two railroads, an out-of-service bridge, and the driveway leading to the City's water treatment plant will be flooded/overtopped by a Sunny Day breach while all but Long Bridge Trail will be flooded/overtopped by a PMF. The analysis for the Litchfield Lake Dam indicates that one house, one local road, and the driveway leading to the City's water treatment plant will be flooded/overtopped by a Sunny Day breach while all but Illinois Route 16 will be flooded/overtopped by a PMF.

According to the EAP for the Coffeen Gypsum Management Facility (GMF) Gypsum Stack Dam, when saturated gypsum liquifies (due to shaking or excessive stress) it will flow much like a liquid until the surface of the gypsum is flat enough to resist flow or "freeze". The estimated travel time required for a gypsum wave breach to reach a sufficiently flat slope to "freeze" in this area is less than five minutes. During this time the gypsum flow could be expected to travel up to ¾ of a mile. The analysis assumes a worst case scenario, i.e., failure after gypsum has been stacked to its ultimate height of approximately 100 feet, with a breach occurring in the northwest portion of the facility. This analysis indicates that seven residences and one business would be inundated to a depth of five feet. Depending on the location of the breach, other residences, or the power plant, could be affected by a failure of the dam. Although material could reach Coffeen Lake as a result of a dam breach in a southwesterly direction, it is not anticipated that reservoir levels would significantly impacted.

What locations are affected by dam failure?

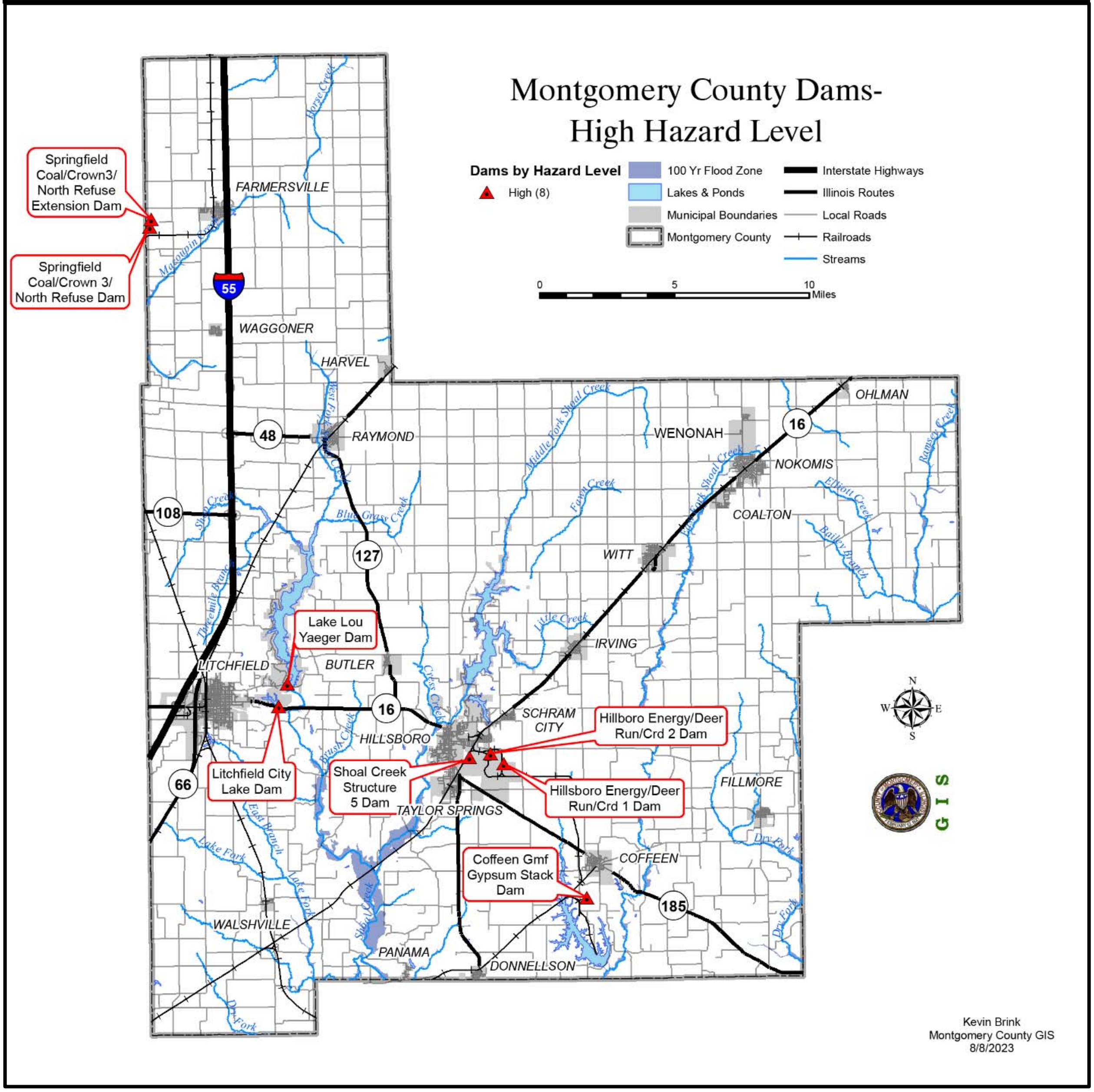
Figure DF-5 shows the locations of the "High" hazard dams in Montgomery County. Dam failures have the potential to impact the following areas:

- ❖ wooded and agricultural land along the West Fork Shoal Creek east of Litchfield in unincorporated Montgomery County;
- ❖ agricultural and wooded land along an unnamed tributary of West Fork Shoal Creek east of Litchfield in unincorporated Montgomery County;
- ❖ agricultural and wooded land east of Coffeen Lake southwest of Coffeen in unincorporated Montgomery County;
- ❖ wooded land along an unnamed tributary of Middle Fork Shoal Creek east of Hillsboro in unincorporated Montgomery County;
- ❖ agricultural and wooded land along an unnamed tributary of Lake Hillsboro east of Hillsboro in unincorporated Montgomery County;
- ❖ agricultural land west-southwest of Farmersville in unincorporated Montgomery County.

What is the probability of future dam failure events occurring?

Since none of the dams have experienced a dam failure, it is difficult to specifically establish the probability of a future failure. However, based on the capacity of the reservoirs and the scope and type of development and infrastructure located downstream, the probability is estimated to be ***low***. For the purposes of this analysis "low" is defined as having a less than 10% chance of occurring in any given year.

Figure DF-5
Location of "High" Hazard Classified Dams in Montgomery County



What is the probability of future dam failure events occurring based on modeled future conditions?

Dam failures are caused by a combination of multiple factors, including construction practices, soil permeability and conditions, wave erosion, precipitation, and most importantly maintenance. Although there are not yet sufficient studies exploring the possible relationship between dam failures and trends in temperature and precipitation changes in the U.S., it can be reasonably inferred that increases in heavy rain events could potentially increase the probability of dam failures. Since future condition forecasts suggest an increase in total annual precipitation in Illinois as discussed in Section 3.1, it is possible that one of the factors that contributes to dam failures will become more frequent. It is impossible to say how much of an impact, if any, this will have on any given dam, but this increased level of uncertainty should be taken into account in planning for the future. This analysis should be revisited in subsequent planning efforts as more data becomes available.

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. Hillsboro, Coffeen Volunteer FD, and unincorporated areas of Montgomery 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 rest of the participating jurisdictions or the remainder of the County are considered vulnerable.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of dam failures?

No. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdictions considered specific assets within their jurisdiction vulnerable to dam failures.

What impacts resulted from the recorded dam failures?

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

What other impacts can result from dam failures?

Dam Failure Fast Facts – Risk

Dam Failure Risk/Vulnerability:

- Public Health & Safety: "High" Hazard Classification Dams – ***Low to Medium***
- Buildings/Infrastructure/Critical Facilities: "High" Hazard Classification Dams – ***Low to Medium***

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

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

Flooding from dam failures also can 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 also may carry away agricultural chemicals that have been applied to farm fields and cause damage to or loss of crops.

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

In terms of the risk or vulnerability to public health and safety from a dam failure, there are several factors that must be taken into consideration including the severity of the event, the capacity of the reservoir and the extent and type of development and infrastructure located downstream. When these factors are taken into consideration, the overall risk to public health and safety posed by a dam failure at the "High" hazard dams studied in Montgomery County is considered to be ***low to medium***.

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

Yes. **Figure DF-6**, located at the end of this section, provides an ***rough estimate*** of the buildings, infrastructure, and critical facilities vulnerable to a dam failure from "High" hazard dams in Montgomery County.

The EPAs for Lake Lou Yaeger Dam, Litchfield City Lake Dam, and Coffeen GMF Gypsum Stack Dam included inundation maps, figures, and narrative that identified potentially-impacted structures and public facilities, as well as time of onset and flood wave depth. **Figures DF-7** and **DF-8** provide a breakdown of the buildings and infrastructure vulnerable to a dam failure based on each scenario. The EPA for the Coffeen GFM Gypsum Stack Dam included an inundation map and narrative for the worst case scenario that identified approximately 11 residences, one business, five local roads, and the Norfolk Southern Railroad within the area of potential impact.

As discussed previously, EAPs for the remaining five dams were either not provided to the Montgomery County EMA or were not developed. As a result, a data deficiency exists in terms of comprehensively identifying existing buildings, infrastructure, and critical facilities vulnerable to dam failures for these dams. While detailed information was not available, the Consultant conducted a visual inspection of the areas surrounding the "High" hazard classified dams in order to provide an estimate of the number of potentially-impacted buildings, infrastructure, and critical facilities that are vulnerable to a dam failure.

Depending on whether there is a full or partial dam failure, all of the vulnerable buildings, infrastructure, and critical facilities may be inundated by water and structural damage may result. Because none of the reservoirs are immense in size, the damage sustained from dam failure flooding may not be to the structure, but to the contents of the buildings or nearby infrastructure and critical facilities.

Figure DF-7
Lake Lou Yaeger Dam – Buildings and Infrastructure Vulnerable to a Dam Failure

Scenario	Number of Impacted Buildings/Infrastructure			
	Residential	Commercial	Roadways / Bridges	Railroads
Sunny Day	2	---	4	2
Probable Maximum Flood (PMF)	2	---	5	2

Figure DF-8
Litchfield City Lake Dam – Buildings and Infrastructure Vulnerable to a Dam Failure

Scenario	Number of Impacted Buildings/Infrastructure			
	Residential	Commercial	Roadways / Bridges	Railroads
Sunny Day	1	---	1	---
Probable Maximum Flood (PMF)	2	---	4	1

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 to existing buildings, infrastructure, and critical facilities posed by a dam failure in Montgomery County is considered to be ***low*** to ***medium*** for the "High" hazard dams.

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

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

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

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

Figure DF-6 Buildings, Infrastructure & Critical Facilities Vulnerable to a Dam Failure from High & Significant Hazard Classified Dams (Sheet 1 of 2)					
Dam Name	**Location**	**Number of Vulnerable Buildings/Infrastructure**			
		Residential	**Commercial**	**Infrastructure**	**Critical Facilities**
Publicly-Owned					
Lake Lou Yaeger Dam	Litchfield	2	---	- Illinois Route 16 - Old Litchfield Trail - Walshville Trail - Long Bridge Trail - Panama Avenue - Union Pacific Railroad - Norfolk Southern Railroad	---
Litchfield City Lake Dam	Litchfield	2	---	- Old Litchfield Trail - Walshville Trail - Long Bridge Trail - Union Pacific Railroad	---
Shoal Creek Structure 5 Dam	Approx. 0.25 miles southeast of Hillsboro (Unincorp. Montgomery County)	---	---	- Union Pacific Railroad	- ---

Figure DF-6
Buildings, Infrastructure & Critical Facilities Vulnerable to a Dam Failure from High & Significant Hazard Classified Dams
(Sheet 2 of 2)

Dam Name	Location	Number of Vulnerable Buildings/Infrastructure			
		Residential	Commercial	Infrastructure	Critical Facilities
Privately-Owned					
Coffeen GMF Gypsum Stack Dam	Approx. 1 mile southwest of Coffeen (Unincorp. Montgomery County)	11	1	- Red Ball Trail/CR 1650 E - CIPS Trail/CR 1575 E - CIPS Lane - CR 525 N - Fox Lane - Norfolk Southern Railroad	- Coffeen Power Station (closed in 2019)
Hillsboro Energy CRD Facility 1 Dam	Approx. 1.25 miles southeast of Hillsboro (Unincorp. Montgomery County)	---	---	- Filmore Trail	-
Hillsboro Energy CRD Facility 2 Dam	Approx. 0.75 miles southeast of Hillsboro (Unincorp. Montgomery County)	---	---	- Filmore Trail - Union Pacific Railroad	-
Springfield Coal North Refuse Dam	Approx. 2 miles south-southwest of Farmersville (Unincorp. Montgomery County)	---	---	- County Road 100E	-
Springfield Coal North Refuse Extension Dam	Approx. 2 miles south-southwest of Farmersville (Unincorp. Montgomery County	---	---	- County Road 100E	-

3.10 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 Montgomery County.

Mining has long figured prominently into Illinois' history. According to the National Mining Association, Illinois has the second largest recoverable reserves of coal in the country, behind only Montana. 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 2018, Illinois ranked fourth in the U.S. 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 nine active underground coal mines in Illinois in 2021. The U.S. Geological Survey identified nine active metal and industrial mineral underground mines in Illinois in their most recent Mineral Industry Survey.

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.

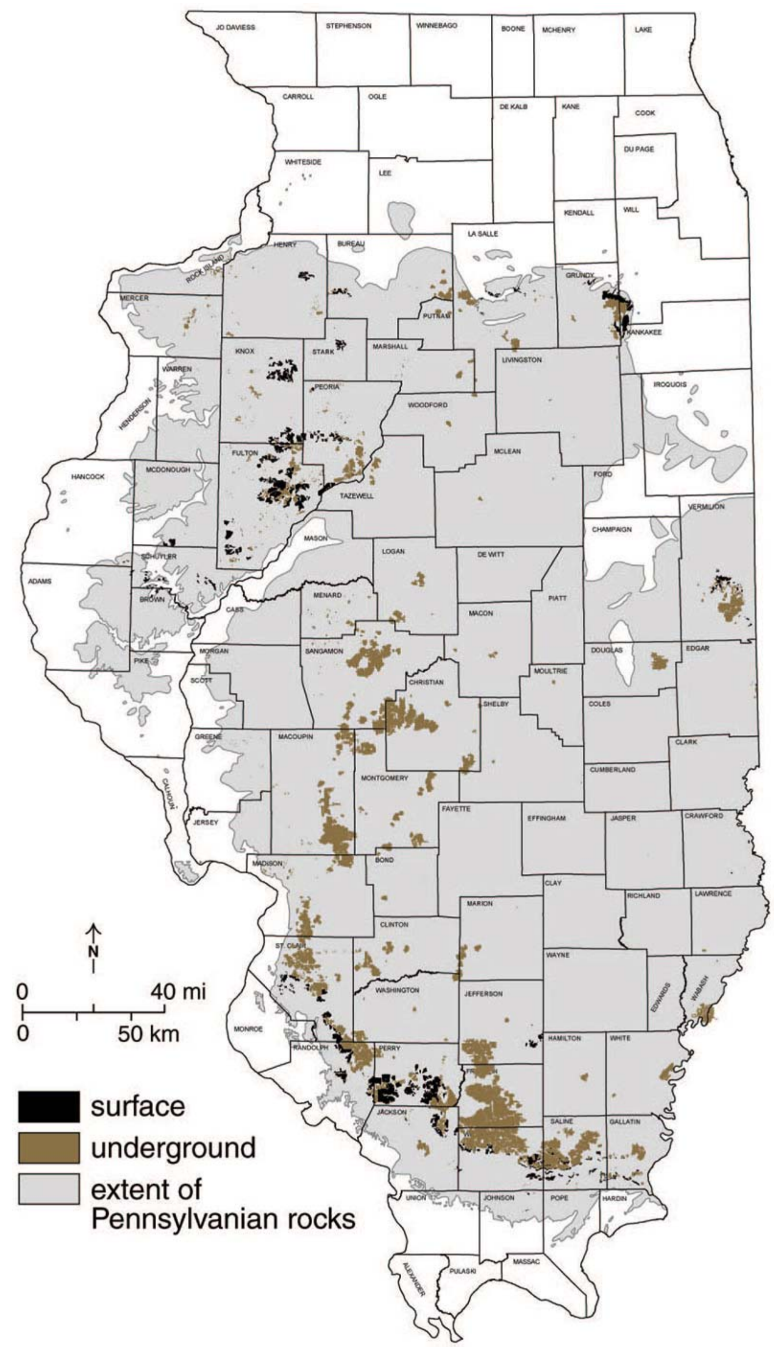
Room-and-Pillar

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.

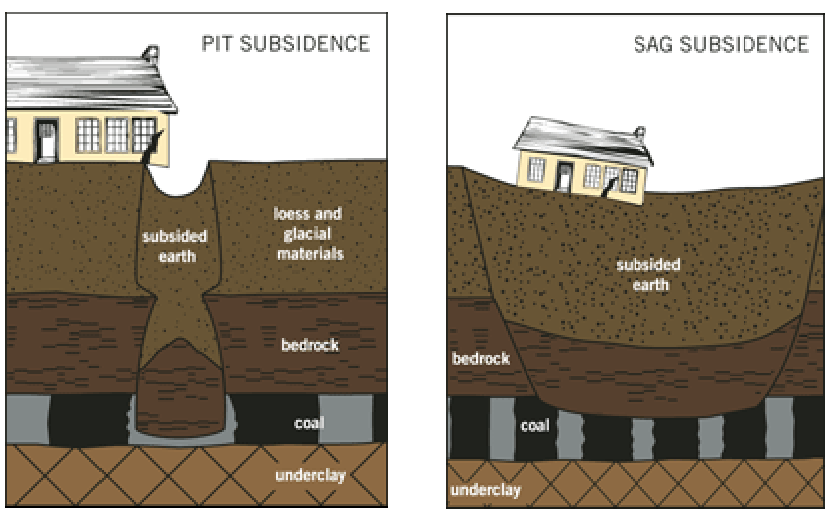
Pit Subsidence

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 Montgomery County, there are 24 documented underground mines located in the County. A copy of the Directory for Montgomery County and detailed maps of the studied quadrangles are included in **Appendix L. Figure MS-4** illustrates the locations of these mines.

<u>Mine Subsidence Fast Facts – Occurrences</u>

Number of Underground Mines Located within the County: ***24***
Number of Mine Subsidence Events Reported ***None***
Probability of Future Mine Subsidence Events: ***Low to 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. A review of local news articles and discussions with Committee members did not identify any known recorded mine subsidence events in Montgomery County.

According to the Illinois Mine Subsidence Insurance Fund (IMSIF), there were 190 mine subsidence claims submitted to the IMSIF for Montgomery County between 1980 and 2022. 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.

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 43,221 acres (9.7% of the land area) and 3,924 housing units (31.4% of the total housing units) in Montgomery County are located in Zone 1, land over or adjacent to mapped mines and an additional 16,697 acres (3.8% of the land area) and 2,272 housing units (18.2% 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-4
Underground Mines Located Montgomery County

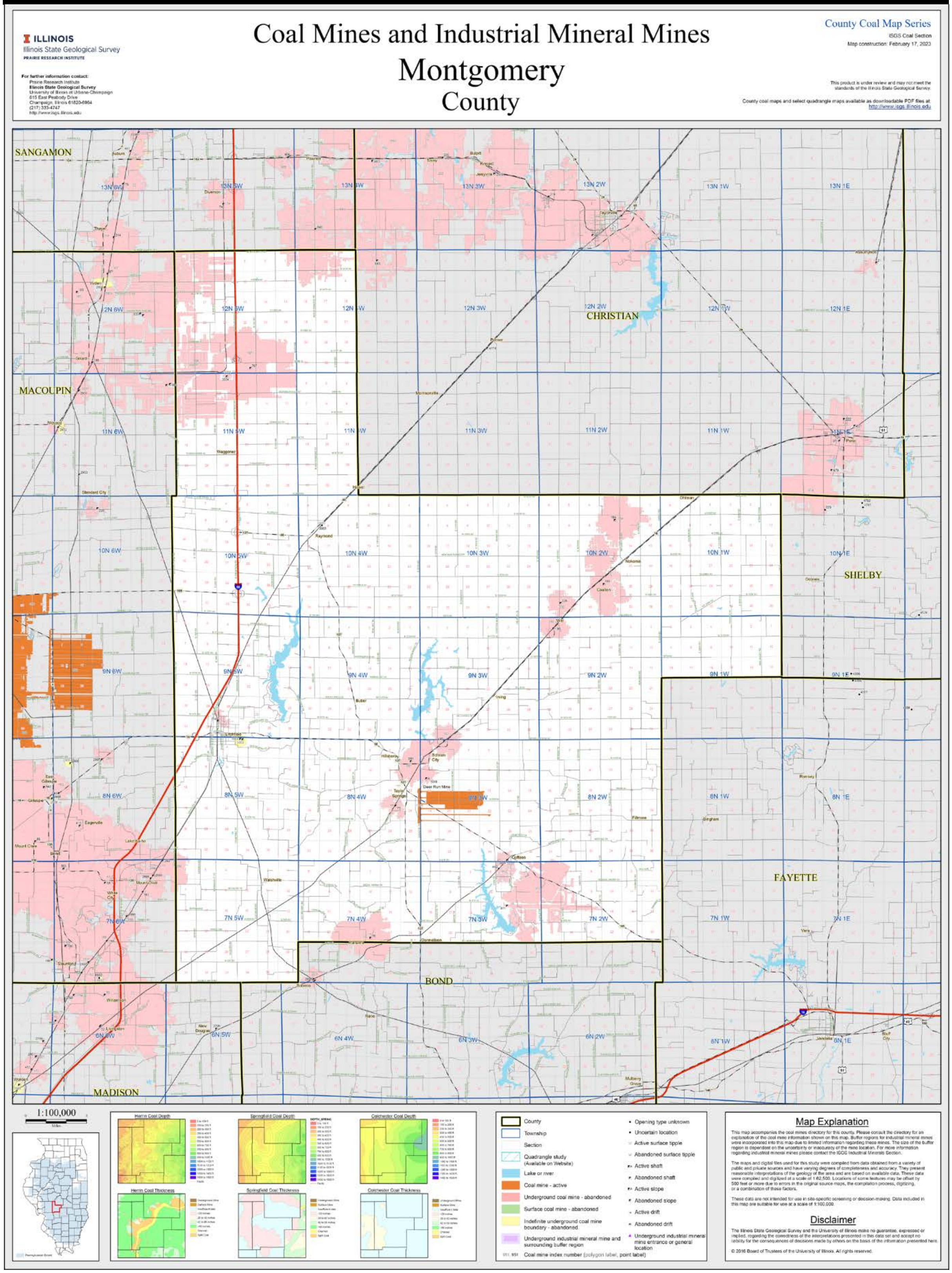


Figure MS-5
Illinois Mine Subsidence Insurance Fund Claims* by Year – Montgomery County

Year	No. of Claims	Year	No. of Claims	Year	No. of Claims	Year	No. of Claims
1980	5	1991	9	2002	6	2013	1
1981	4	1992	5	2003	2	2014	8
1982	4	1993	4	2004	1	2015	2
1983	4	1994	6	2005	6	2016	5
1984	8	1995	3	2006	2	2017	2
1985	5	1996	1	2007	5	2018	2
1986	2	1997	2	2008	6	2019	3
1987	5	1998	6	2009	3	2020	1
1988	7	1999	5	2010	6	2021	6
1989	8	2000	4	2011	2	2022	3
1990	8	2001	8	2012	5		

* Some of the claims submitted were proven not be caused by mine subsidence according to the IMSIF.

Figure MS-6 identifies the location of the Zone 1 and 2 areas in Montgomery County. Based on this mapping, mine subsidence has the potential to impact Coalton, Coffeen, Farmersville, Hillsboro, Litchfield, Nokomis, Panama, Raymond, Schram City, Taylor Springs, and Witt as well as unincorporated areas of Montgomery County.

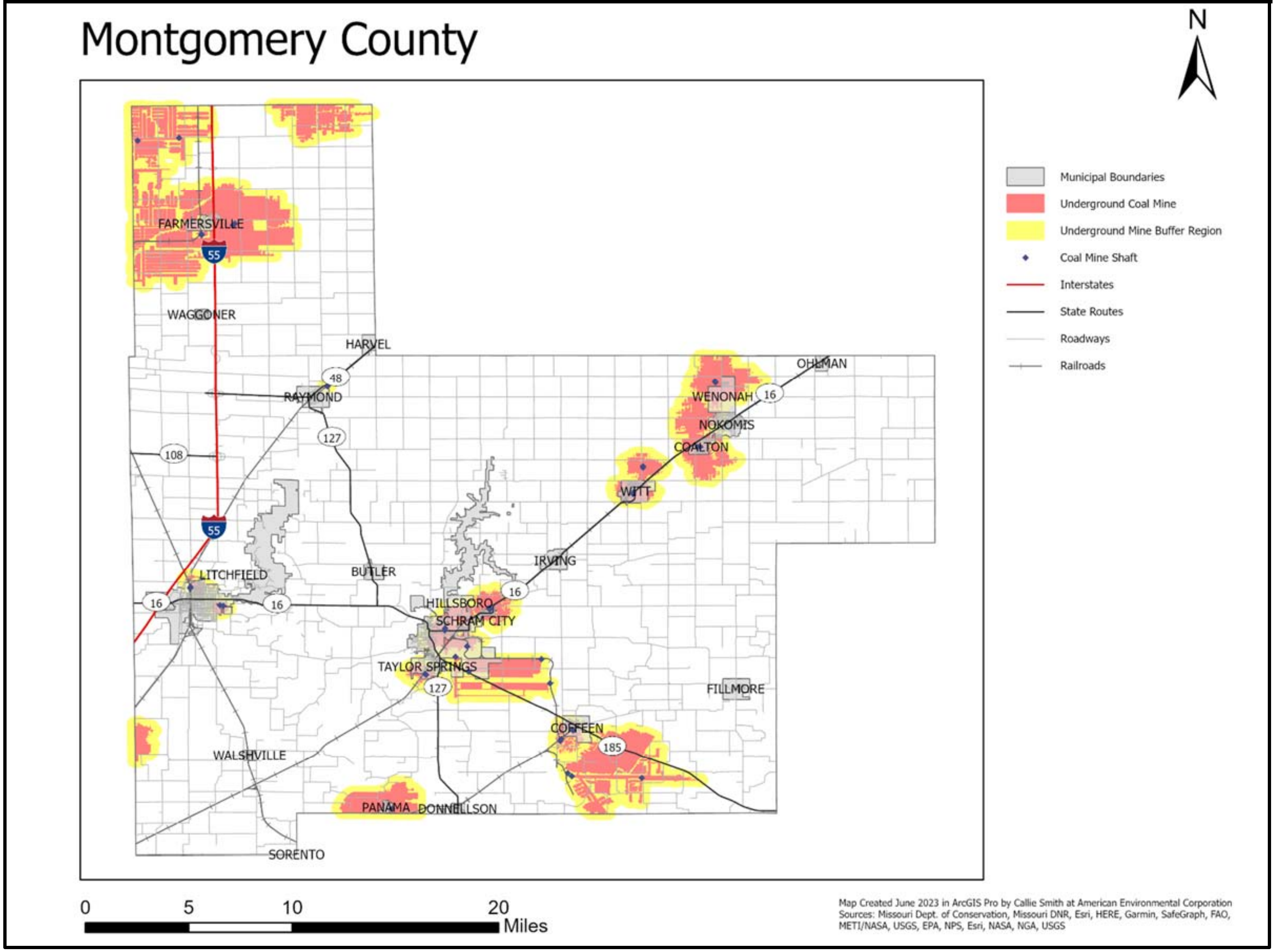
What is the probability of future mine subsidence events occurring?

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. The extent of future potential mine subsidence events is also 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.

Given the unpredictability of mine subsidence events, the variables involved and the lack of data available for Mercer 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 unincorporated Montgomery County, Coalton, Coffeen, Farmersville, Hillsboro, Litchfield, Nokomis, Panama, Raymond, Schram City, Taylor Springs, and Witt will experience future mine subsidence events is estimated to be ***low*** to ***medium*** and ***unlikely*** for the remaining participating jurisdictions and most of unincorporated Montgomery 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.

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



What is the probability of future mine subsidence events occurring based on modeled future conditions?

No data was available to accurately predict the impacts of future conditions on the frequency and severity of mine subsidence events in this region of the U.S.

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. Coffeen, Farmersville, Hillsboro, Litchfield, Nokomis, Schram City, Taylor Springs, Witt, Coffeen Volunteer FD, Nokomis Area FPD, Raymond, Raymond-Harvel FD, and parts of unincorporated Montgomery County are vulnerable to mine subsidence. None of the other participating jurisdictions or the remainder of the County are considered vulnerable. According to ISGS, approximately 43,221 acres (9.7% of the land area) of Montgomery County are over or adjacent to mapped mines and vulnerable to mine subsidence while an additional 16,697 acres (3.8% of the land area) could be affected by mine subsidence if the mine boundaries are inaccurate or uncertain.

The *2023 Illinois Natural Hazard Mitigation Plan* prepared by IEMA-OHS classifies Montgomery's County's hazard rating for mine subsidence as "medium". IEMA-OHS's overall hazard rating system has five levels: very low, low, medium, high, and very high. FEMA's National Risk Index does not currently rate mine subsidence hazard.

Mine Subsidence Fast Facts – Impacts/Risk

Mine Subsidence Impacts:
- IMSIF Claims Reimbursed (1980 – 2022): ***$398,581***
- Total Property Damage: ***n/a***
- 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 to Low***
- Buildings/Infrastructure/Critical Facilities – Areas Outside Zones 1 & 2: ***Low***

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

Yes. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, the following jurisdictions considered specific assets within their jurisdiction vulnerable to mine subsidence.

Montgomery County / Coffeen Volunteer Fire Department:

Illinois Route 185 between Coffeen and Hillsboro has been closed due to mine subsidence.

Taylor Springs:

The Village's wastewater treatment lagoons and lift stations are located over undermined areas and vulnerable to mine subsidence.

What impacts resulted from the recorded mine subsidence events?

Since there have been no *recorded* mine subsidence events in Montgomery County, there are no recorded impacts, including injuries or fatalities, to report. According to the IMSIF, $398,581 in claims for confirmed damages were reimbursed in Montgomery County between 1980 and 2022. 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 Tazewell County.

Figure MS-7
Illinois Mine Subsidence Insurance Fund Claim Reimbursements by Year – Montgomery County

Year	Amount	Year	Amount	Year	Amount	Year	Amount
1980	$0	1991	$0	2002	$0	2013	$0
1981	$0	1992	$0	2003	$0	2014	$0
1982	$0	1993	$0	2004	$0	2015	$0
1983	$0	1994	$0	2005	$0	2016	$0
1984	$0	1995	$0	2006	$0	2017	$0
1985	$4,905	1996	$0	2007	$0	2018	$22,648
1986	$0	1997	$1,737	2008	$0	2019	$15,193
1987	$0	1998	$80,121	2009	$89,182	2020	$0
1988	$0	1999	$0	2010	$0	2021	$0
1989	$0	2000	$0	2011	$0	2022	$184,795
1990	$0	2001	$0	2012	$0		

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 Montgomery 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 3,924 housing units (31.4% of the total housing units in the County) are located over or adjacent to mapped mines and vulnerable to mine subsidence while an additional 2,272 housing units (18.2% 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 of critical facilities located within Zones 1 and 2 for the County, Coffeen, Farmersville, Hillsboro, Litchfield, Nokomis, Schram City, Taylor Springs, Witt, Coffeen Volunteer FD, Nokomis Area FPD, and Raymond-Harvel FD for select categories.

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 Montgomery County is considered to be ***medium to low*** 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. Still, those housing units that reside in Zone 1 have the potential to experience future dollar losses from mine subsidence.

Figure MS-8
Critical Facilities Located in Zones 1 and 2 by Jurisdiction

Participating Jurisdiction	Government[1]	Law Enforcement	Fire Stations	Ambulance Service	Schools	Drinking Water	Wastewater Treatment	Medical[2]	Healthcare Facilities[3]
Montgomery County	5	1	---	---	---	---	---	5	---
Coffeen	3	1	1	---	---	1	1	---	---
Farmersville	3	---	1	1	1	2	1	---	---
Harvel	---	---	---	---	---	---	---	---	---
Hillsboro	5	2	1	1	3	2	23	3	3
Litchfield	1	---	---	---	5	1	4	5	4
Nokomis	1	1	1	1	3	---	1	1	1
Raymond	---	---	---	---	---	---	---	---	---
Schram City	1	---	---	---	---	1	5	---	---
Taylor Springs	3	1	1	1	---	---	---	---	1
Waggoner	---	---	---	---	---	---	---	---	---
Witt	3	1	1	1	---	2	3	---	---
Rountree Township	---	---	---	---	---	---	---	---	---
Coffeen Volunteer FD	2	---	1	---	1	1	---	---	---
Fillmore Community FPD	---	---	---	---	---	---	---	---	---
Nokomis Area FPD	---	---	1	---	---	---	---	---	---
Raymond-Harvel FD	---	---	---	---	---	---	---	---	---

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

3.11 WILDFIRES

HAZARD IDENTIFICATION

What is the definition of a wildfire?

A wildfire is an unplanned fire that spreads through vegetation and natural areas such as forests, grasslands, or prairies. They can happen anytime and anywhere. These dangerous fires spread quickly and can devastate not only wildlife and natural areas, but also communities.

What causes wildfires?

Between 2017 and 2022, approximately 89% of wildfires in the U.S. were caused by humans. Human-caused fires result from campfires left unattended, burning debris, equipment use and malfunctions, negligently discarded cigarettes, and intentional acts of arson. Wildfires can also be caused by nature – mostly due to lightning strikes. Wildfires ignited by lightning tend to be slightly larger and burn more acreage than human-caused wildfires.

Wildfire behavior is influenced by many factors including terrain, climate, weather, and types of fuel. The terrain or topography of an area can help or hinder the spread of a wildfire. Fires burn faster up hillsides than they do on flat ground. Though wildfires can happen anytime conditions are right, the climate (time of year) influences the effects of fire. During some seasons more moisture is present than in others, thus reducing fire threat. Wildfire season in the western U.S. is June through October while March through May is wildfire season in the southeastern U.S. Weather conditions such as wind, temperature, and humidity can affect the severity and duration of a fire. Areas that have experienced prolonged droughts are at the highest risk of wildfires. In terms of fuel, the type and amount as well as its burning qualities and moisture level affect wildfire potential and behavior.

How big a threat are wildfires and where do they occur?

Every year, wildfires burn millions of acres across the country. In 2022, wildfires occurred in every state according to the National Interagency Coordination Center (NICC). A total of 68,988 wildfires burned 7.5 million acres and more than 2,700 structures in 2022. For comparison, between 2013 and 2022 there were an average of 61,410 wildfires annually and an average of 7.2 million acres impacted annually. While more wildfires occur in the eastern U.S. (including the central states), wildfires in the West are larger and burn more acreage. In 2022, just over 20,000 wildfires burned approximately 5.8 million acres in the West, compared with the over 48,000 wildfires that burned just over 1.8 million acres in the East. According to the National Interagency Fire Center, fire suppression costs on federal lands alone totaled approximately $4.3 billion in 2021, the most recent year for which data was available.

While only a small fraction of wildfires become catastrophic, that small percentage accounts for the vast majority of acres burned. In 2022, less than 2% (1,289 wildfires) of the total wildfires reported nationally were classified as large or significant with 28 exceeding 40,000 acres in size and 17 exceeding 100,000 acres. **Figures WF-1** and **WF-2** illustrate the total number of wildfires and acres impacted in the U.S. and Illinois between 2017 and 2022.

Figure WF-1 U.S. Wildfire Frequency & Acres Impacted 2017 – 2022						
Year	**# of Wildfires Human**	**Acres Impacted Human**	**# of Wildfires Lightning**	**Acres Impacted Lightning**	**Total # of Wildfires**	**Total Acres Impacted**
2017	63,546	4,830,476	7,953	5,195,610	71,499	10,026,086
2018	51,576	5,640,489	6,507	3,127,003	58,083	8,767,492
2019	44,115	1,217,324	6,362	3,447,038	50,477	4,664,362
2020	53,563	5,998,813	5,387	4,123,523	58,950	10,122,336
2021	52,641	3,023,759	6,344	4,101,884	58,985	7,125,643
2022	61,429	3,370,169	7,467	4,206,960	68,988	7,577,183
Total:	**326,870**	**24,081,030**	**40,020**	**24,202,018**	**366,982**	**48,283,102**

Source: National Interagency Coordination Center.

Figure WF-2 Illinois Wildfire Frequency & Acres Impacted 2017 – 2022						
Year	**# of Wildfires Human**	**Acres Impacted Human**	**# of Wildfires Lightning**	**Acres Impacted Lightning**	**Total # of Wildfires**	**Total Acres Impacted**
2017	n/a	n/a	n/a	n/a	n/a	n/a
2018	6	120	0	0	6	120
2019	2	41	0	0	2	41
2020	19	240	0	0	19	240
2021	29	219	0	0	29	219
2022	32	298	0	0	32	298
Total:	**88**	**918**	**0**	**0**	**88**	**918**

Source: National Interagency Coordination Center.

HAZARD PROFILE

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

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

No comprehensive, publicly-accessible database detailing wildfire occurrences currently exists in Illinois. NOAA's Storm Events Database does not contain any records for wildfires in Kankakee County. A review of NOAA's Storm Events Database, local news articles and discussions with Planning Committee members documented one wildfire event in Montgomery County in 2020. On October 17, 2020, a field fire started just outside of Donnellson and stretched eight miles north to south and four miles east to west ending near Hillsboro and burned close to 10,000 acres. Forty fire departments responded to this fire with nearly 300 firefighters assisting in the response.

Wildfire Fast Facts – Occurrences

Number of Wildfire (Brushfire) Incidents Reported (2020): ***1***

What locations are affected by wildfires?

Wildfire events have the potential to affect the entire County. According to the Multi-Resolution Land Characteristics (MRLC) Consortium approximately 94% of the County's land cover is vegetation, including cultivated crop land, pasture/hay and deciduous/mixed forest.

A field fire that started just outside of Donnellson on October 17, 2020 burned approximately 10,000 acres.

Photograph courtesy of Joe Gasparich

What is the probability of future wildfires occurring?

Given the limited amount of data available, it is difficult to specifically establish the probability of future wildfires. However, if factors such as weather conditions, ground cover (fuel sources), and severity of previous wildfires are taken into consideration then the probability is estimated to be ***low*** to ***medium***. For the purposes of this analysis "medium" is defined as having at least a 50% chance of occurring in any given year while "low" is defined as having less than a 10% change of occurring in any given year.

What is the probability of future wildfires occurring based on modeled future conditions?

Despite precipitation trending upwards in Illinois in recent decades, wildfire conditions are likely to be more problematic in the future than they have been in the recent past, due to a combination of changes in precipitation patterns and an increase in summer temperatures.

In terms of predicting the likelihood of wildfire conditions, the amount of precipitation received is important, but even more critical is the timing of precipitation events. More frequent precipitation events maintain soil in a spongy, porous state that readily absorbs moisture; alternatively, more infrequent precipitation events tend to lead to dry, hardened earth, which is more effective at repelling water than absorbing it. When a precipitation event does occur over this hardened soil, most of the water runs off and pools in bottomlands, leaving most land "high and dry" while simultaneously flooding the lowest-lying areas.

Another factor making this outcome more likely is the trend of increasing temperatures in Illinois, particularly during the summer when rain events are already more sporadic. Over the past 120 years, average temperatures in Illinois have increased by 1°F and 2°F according to the Illinois State Climatologist, a trend that is likely to continue. In the future, hotter summer temperatures are likely to lead to more evaporation that will exacerbate dry conditions.

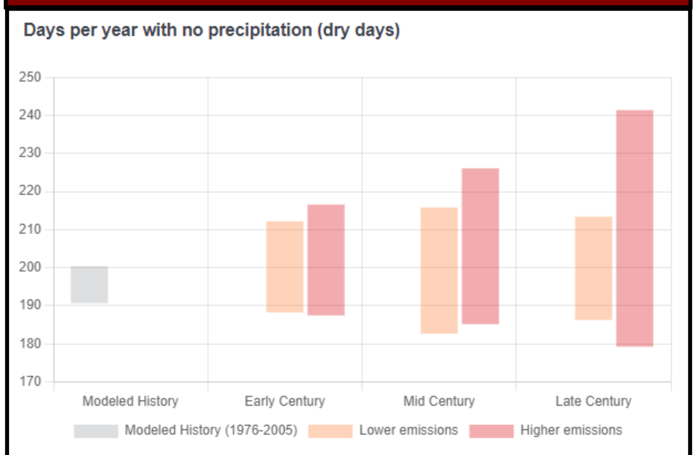
Figures WF-3 and **WF-4**, and **Figures EH-7,** and **EH-8,** located in Section 3.2, provide tabular and graphical projections for Montgomery County showing days per year with no precipitation (dry days) and average annual estimates for temperature in the early, mid, and late 21st century with both low and high estimates for each time period. Most likely, the true value will fall between these two estimates. By midcentury, the number of days per year with no precipitation is projected to increase by 3 to 5 days while the average annual precipitation in Montgomery County is likely to increase by 1.3 to 1.8 inches per year according to the Climate Mapping for Resilience and Adaptation's Assessment Tool.

Figure WF-3
Precipitation Projections Table – Montgomery County

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Days per year with no precipitation (dry days)	**196 days** 191 - 200	**198 days** 188 - 212	**199 days** 187 - 217	**199 days** 183 - 216	**201 days** 185 - 226	**200 days** 186 - 213	**204 days** 179 - 241
Maximum number of consecutive dry days	**15 days** 12 - 17	**15 days** 12 - 17	**15 days** 13 - 18	**15 days** 13 - 19	**16 days** 13 - 20	**16 days** 13 - 19	**16 days** 13 - 23
Days per year with precipitation (wet days)	**169 days** 165 - 174	**167 days** 153 - 177	**166 days** 149 - 178	**166 days** 149 - 182	**165 days** 139 - 180	**165 days** 152 - 179	**161 days** 124 - 186
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**27 days** 27 - 37	**58 days** 37 - 85	**62 days** 42 - 84	**71 days** 44 - 109	**80 days** 52 - 111	**82 days** 49 - 118	**113 days** 74 - 145
Annual days with maximum temperature > 100°F	**1 days** 0 - 1	**6 days** 1 - 23	**7 days** 1 - 22	**11 days** 2 - 51	**16 days** 3 - 55	**17 days** 3 - 51	**43 days** 8 - 98

N/A = Data Not Available for the selected area

Figure WF-4
Days per Year with No Precipitation (Dry Days) Graph – Montgomery County



The number of days exceeding 90°F in Montgomery County is projected to go from 27 today to between 71 and 80, while days exceeding 100°F are likely to increase from an average of one a year today to 11 to 16 days by midcentury according to the Climate Mapping for Resilience and Adaptation's Assessment Tool. The Climate Explorer indicates that in Montgomery County, the average number of dry spells (a period of consecutive days without precipitation) is projected to increase by one. Extreme temperatures on the hottest days of the year are projected to increase by 7°F. This is based on the findings of the 2018 National Climate Assessment and compares projections for the middle third of the century (2035-2064) with average conditions observed from 1961-1990.

In combination, a decrease in the frequency of precipitation and a significant increase in the number of days with extreme heat in Montgomery County would create conditions that will be more conducive to wildfires than today.

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 wildfire.

Are the participating jurisdictions vulnerable to wildfires?

Yes. All of Montgomery County is vulnerable to the dangers presented by wildfires. The *2023 Illinois Natural Hazard Mitigation Plan* prepared by IEMA-OHS classifies Montgomery County's hazard rating for wildfire as "very low". IEMA-OHS's overall hazard rating system has five levels: very low, low, medium, high, and very high.

For wildfires, the FEMA's National Risk Index (NRI) rates the County as a whole as "Very Low". All eight census tracts are rated "Relatively Low" or "Very Low" for wildfires. **Table R-4 presents** the overall NRI scores and ratings for each census tract as well as for the County as a whole.

Have any of the participating jurisdictions identified specific assets vulnerable to the impacts of wildfires?

No. Based on responses to an Assets Vulnerability Survey distributed to the participating jurisdictions, none of the participating jurisdiction considered specific assets within their jurisdiction vulnerable to wildfires.

What impacts resulted from the recorded wildfires?

Damage figures were either unavailable or none were recorded for the October 2020 wildfire. A review of local news articles indicated that one house burned in the fire and two firefighters sustained minor injuries as the result of the incident.

Wildfire Fast Facts – Impacts/Risk

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

Wildfire Risk/Vulnerability:
- Public Health & Safety – General Population: ***Low***
- Public Health & Safety – Socially Vulnerable Populations: ***Medium***
- Buildings/Infrastructure/Critical Facilities: ***Low to Medium***

What other impacts can result from wildfires?

Wildfires can disrupt transportation, communications, and utility service. They can also lead to a deterioration in air quality and loss of property, crops, resources, animals, and people. Wildfires also simultaneously impact weather and the climate by releasing large quantities of carbon dioxide, carbon monoxide, and fine particulate matter into the atmosphere. The resulting air pollution can cause a range of health issues, ranging from eye and respiratory tract irritation to more serious disorders, including reduced lung function, bronchitis, exacerbation of asthma and heart failure, and premature death. Another significant health effect of wildfires is on the mental health of affected individuals.

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

The risk or vulnerability to public health and safety from a wildfire is dependent on the intensity and location of the incident. While wildfires have occurred previously, the number of injuries and fatalities is low. Taking into consideration the various conditions, the risk or vulnerability posed by wildfires to public health and safety of the *general population* is considered to be ***low***. The level of risk or vulnerability posed by wildfires to the public health and safety of *socially vulnerable populations* is considered to be ***medium***. Socially vulnerable populations such as very small children and individuals with chronic conditions are more susceptible to respiratory effects and therefore their risk is elevated. However, demographic information is not available for these segments of the population.

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

Yes. All existing buildings, infrastructure, and critical facilities located in Montgomery County and the participating jurisdictions are vulnerable to damage from wildfires. In addition to impacting structures, wildfires can damage infrastructure such as roads and utilities. Roadways, culverts, and bridges can be weakened by wildfire and overhead power and communication lines can be rendered inoperable by wildfires. Only one of the participating fire departments/fire protection districts, Nokomis Area FPD, has a burn ordinance in place that may lessen the number of incidents.

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 incident and the extent and type of development and infrastructure located in the vicinity of the wildfire. When these factors are taken into consideration, the overall risk posed by a wildfire in Montgomery County is considered to be ***low*** to ***medium***.

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

Yes. All future buildings, infrastructure and critical facilities located within the Montgomery County are vulnerable to damage from wildfires. As a result, future buildings, infrastructure, and critical facilities face the same vulnerabilities as those of existing buildings, infrastructure, and critical facilities described previously. **Figure R-5** lists the number of each type of critical infrastructure by jurisdiction.

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

Unlike other natural hazards, such as tornadoes, there are no standard loss estimation models or methodologies for wildfire incidents. Since damage figures were not available for any of recorded wildfire incidents, there is no way to accurately estimate future potential dollar losses to vulnerable structures. However, according to the Montgomery County Clerk the total equalized assessed values of buildings in the planning area is $335,308,343. Since all of the structures in the planning area are susceptible to wildfire impacts to varying degrees, this total represents the countywide property exposure to wildfires.

4.0 MITIGATION STRATEGY

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

- Reviewing, re-evaluating, and updating the mitigation goals. Mitigation goals describe the objective(s) or desired outcome(s) that the participants would like to accomplish in terms of hazard and loss prevention. These goals are intended to reduce or eliminate long-term vulnerabilities to natural hazards.
- Evaluating the status of the existing mitigation actions and identifying a comprehensive range of jurisdiction-specific mitigation actions including those related to continued compliance with the National Flood Insurance Program (NFIP). Mitigation actions are projects, plans, activities, or programs that achieve at least one of the mitigation goals identified.
- Analyzing the existing and new mitigation actions identified for each jurisdiction. This analysis ensures each action will reduce or eliminate future losses associated with the hazards identified in the Risk Assessment section.
- Reviewing, re-evaluating, 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 of 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 from the previous Plan were reviewed and re-evaluated. The previous list of mitigation goals was distributed to the Committee members at the first meeting on October 19, 2022. Members were asked to review the list before the second meeting and consider whether any changes needed to be made or if additional goals should be included. At the Committee's February 8, 2023 meeting the group discussed the previous list of goals and approved them with a wording modification to Goal 6, "rivers" was changed to "waterways". **Figure MIT-1** lists the approved mitigation goals.

Figure MIT-1 Mitigation Goals	
Goal 1	Educate people about the natural hazards they face and the ways they can protect themselves, their homes, and their businesses from those hazards.
Goal 2	Protect the lives, health, and safety of the people and animals living in the County from the dangers of natural hazards.
Goal 3	Protect existing infrastructure and design new infrastructure (roads, bridges, utilities, water supplies, sanitary sewer systems, etc.) to be resilient to the impacts of natural hazards.
Goal 4	Incorporate natural hazard mitigation into existing as well as new community plans and regulations.
Goal 5	Place a priority on protecting public services (i.e., critical facilities & infrastructure such as utilities and roads), schools, and community lifelines (i.e., safety and security; food, water and shelter; health and medical; energy; communication; and transportation.)
Goal 6	Preserve and protect the waterways and floodplains in our County.
Goal 7	Ensure future development does not increase the vulnerability of hazard-prone areas within the county or create unintended exposures to natural hazards.
Goal 8	Protect historic, cultural, and natural resources from the effects of natural and man-made hazards.
Goal 9	Ensure proper communication between emergency services and government organizations that comply with NIMS regulations.

4.2 Existing Mitigation Actions Review

The Plan update process included a review and evaluation of the ***existing hazard mitigation actions*** listed in the previous Plan. Each jurisdiction who chose to participate in the Plan update was provided a copy of their previous list of existing mitigation actions at the second meeting held on February 8, 2023. They were asked to identify those actions that were either in progress or that had been completed since the previous Plan was adopted in 2016. A review of the existing hazard mitigation actions revealed that several of the actions identified focused on emergency preparedness, response, or maintenance and not mitigation. As a result, these actions were eliminated. 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-12**, located at the end of this section, summarize the results of this evaluation by jurisdiction. None of the participants identified changes in priorities since the previous Plan was approved. Coffeen Volunteer Fire Department (FD), Fillmore Community Fire Protection District (FPD), Nokomis Area FPD, Raymond-Harvel FD, and Rountree Township did not participate in the previous Plan and therefore are not included in the summary. While Donnellson, Hillsboro Area Hospital, Panama, Regional Office of Education #3, and St. Francis Hospital participated in the previous Plan, they chose not to participate in the Plan update process and are not included in the summary.

4.3 New Mitigation Action Identification

Following the review and evaluation of the existing mitigation actions, the Committee members were asked to consult with their respective jurisdictions to identify ***new, jurisdiction-specific mitigation actions***.

Representatives of Montgomery County, Hillsboro, Litchfield, Nokomis, and Witt were also asked to identify mitigation actions that would ensure their continued compliance with the National Flood Insurance Program. The compiled lists of new mitigation actions were then reviewed to assure the appropriateness and suitability of each action. Those actions that were not deemed appropriate and/or suitable were either reworded or eliminated.

4.4 MITIGATION ACTION ANALYSIS

Next, those existing mitigation actions retained, and the new mitigation actions identified were assigned to one of four broad mitigation activity categories that allowed Committee members to compare and consolidate similar actions. **Figure MIT-13** identifies each mitigation activity category and provides a brief description.

Figure MIT-13
Types of Mitigation Activities

Category	Description
Local Plans & Regulations (LP&R)	Local Plans & Regulations include actions that influence the way land and buildings are being developed and built. Examples include stormwater management plans, floodplain regulations, capital improvement projects, participation in the NFIP Community Rating System, comprehensive plans, and local ordinances (i.e., building codes, etc.)
Structure & Infrastructure Projects (S&IP)	Structure & Infrastructure Projects include actions that protect infrastructure and structures from a hazard or remove them from a hazard area. Examples include acquisition and elevation of structures in flood prone areas, burying utility lines to critical facilities, construction of community safe rooms, install "hardening" materials (i.e., impact resistant window film, hail resistant shingles/doors, etc.) and detention/retention structures.
Natural System Protection (NSP)	Natural System Protection includes actions that minimize damage and losses and also preserve or restore natural systems. Examples include sediment and erosion control, stream restoration and watershed management.
Education & Awareness Programs (E&A)	Education & Awareness Programs include actions to inform and educate citizens, elected officials and property owners about hazards and the potential ways to mitigate them. Examples include outreach/school programs, brochures, and handout materials, becoming a StormReady community, evacuation planning and drills, and volunteer activities (i.e., culvert cleanout days, initiatives to check in on the elderly/disabled during hazard events such as storms and extreme heat events, etc.)

Each mitigation action was then analyzed to determine:

- the hazard or hazards being mitigated;
- the general size of the population affected (i.e., small, medium, or large), the participant's Social Vulnerability Index (SVI) ranking, as well as the participant's status as an Economically Disadvantaged Rural Community (EDRC);
- 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.

Each mitigation action was also evaluated to determine whether it would mitigate risk to one or more of FEMA's seven Community Lifelines. Community Lifelines are the most fundamental services in the community that, when stabilized, enable all aspects of society to function. These fundamental services enable the continuous operation of critical government and business functions essential to human health and safety or economic security. The Community Lifelines include Safety & Security; Food, Water, Shelter; Health & Medical; Energy (Power & Fuel); Communications; Transportation; and Hazardous Materials. **Figure MIT-14** provides a brief description of each Community Lifeline.

Figure MIT-14
Community Lifelines

Category	Components/Subcomponents
Safety & Security	- Law Enforcement/Security (police stations, law enforcement, site security, correctional facilities) - Fire Service (fire stations, firefighting resources) - Search & Rescue (local search & rescue) - Government Service (emergency operation centers, essential government functions, government offices, schools, public records, historic/cultural resources) - Community Safety (flood control, other hazards, protective actions)
Food, Water, Shelter	- Food [commercial food distribution, commercial food supply chain, food distribution programs (e.g., food banks)] - Water [drinking water utilities (intake, treatment, storage & distribution), wastewater systems, commercial water supply chain]; - Shelter [housing (e.g., homes, shelters), commercial facilities (e.g., hotels)]; - Agriculture (animals & agriculture)
Health & Medical	- Medical Care (hospitals, dialysis, pharmacies, long-term care facilities, VA health system, veterinary services, home care) - Patient Movement (emergency medical services) - Fatality Management (mortuary and post-mortuary services) - Public Health (epidemiological surveillance, laboratory, clinical guidance, assessment/interventions/treatments, human services, behavioral health) - Medical Supply Chain [blood/blood products, manufacturing (e.g., pharmaceutical, device, medical gases), distribution, critical clinical research, sterilization, raw materials]
Energy	- Power Grid (generation systems, transmission systems, distribution systems) - Fuel [refineries/fuel processing, fuel storage, pipelines, fuel distribution (e.g., gas stations, fuel points), off-shore oil platforms]
Communications	- Infrastructure [wireless, cable systems and wireline, broadcast (e.g., TV and radio), satellite, data centers/internet] - Alerts, Warnings, & Messages (local alert/warning ability, access to IPAWS, NAWAS terminals) - 911 & Dispatch (public safety answering points, dispatch) - Responder Communications (LMR networks) - Finance (banking services, electronic payment processing)
Transportation	- Highway/Roadway/Motor Vehicle (roads, bridges) - Mass Transit (bus, rail, ferry) - Railway (freight, passenger) - Aviation [commercial (e.g., cargo/passenger), general, military] - Maritime (waterways, ports and port facilities)
Hazardous Materials	- Facilities [oil/hazmat facilities (e.g., chemical, nuclear), oil/hazmat/toxic incidents from facilities] - Hazmat, Pollutants, Contaminants (oil/hazmat/toxic incidents from non-fixed facilities, radiological or nuclear incidents)

4.5 Mitigation Action Prioritization Methodology & Cost/Benefit Analysis Review

The methodology applied to prioritize mitigation actions in the previous Plan was reviewed by the Planning Committee as part of the Plan update process. This methodology was based on two key factors: 1) the frequency of the hazard and 2) the degree of mitigation attained. It was presented to the Planning Committee members at the third meeting held on May 24, 2023. The group reviewed and discussed the methodology and chose to approve it with no changes.

Figure MIT-15 identifies and describes the four-tiered prioritization methodology re-evaluated and approved by the Committee. This methodology provides a means of objectively determining which projects and activities have a greater likelihood of reducing the long-term vulnerabilities associated with the most frequently-occurring natural hazards.

<table>
<tr><th colspan="4">Figure MIT-15
Mitigation Action Prioritization Methodology</th></tr>
<tr><td colspan="2" rowspan="2"></td><th colspan="2">Hazard</th></tr>
<tr><td>Most Frequent Hazard
(M)
(i.e., severe storms, excessive heat, severe winter storms, floods, tornadoes)</td><td>Less Frequent Hazard
(L)
(i.e., extreme cold, drought, earthquakes, dam failures, mine subsidence, wildfires)</td></tr>
<tr><th rowspan="2">Mitigation Action</th><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 frequent hazards</td><td>HL
mitigation action will virtually eliminate damages and/or significantly reduce the probability of fatalities and injuries from less frequent 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 frequent hazards</td><td>LL
mitigation action has the potential to reduce damages, fatalities and/or injuries from less frequent hazards</td></tr>
</table>

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.

While this methodology does not take cost into consideration, it is a factor that may affect the order in which projects are implemented. As a result, a preliminary qualitative cost/benefit analysis was conducted to demonstrate each action's monetary and non-monetary benefits and provide additional information that can be considered in each participant's decision-making process. The costs and benefits were analyzed in terms of the general overall cost to complete an action as well as the staffing efforted needed and the action's likelihood of permanently eliminating or significantly 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. It was repeatedly communicated to the Planning Committee members that when a grant application is submitted to IEMA/FEMA for a specific action, a detailed cost/benefit analysis will be required to receive funding.

4.6 MITIGATION ACTION IMPLEMENTATION & ADMINISTRATION

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; and
- describing the time frame for completion.

<u>Oversight & Administration</u>

It is important to keep in mind that some of the participating jurisdictions have limited capabilities related to organization and staffing for oversight and administration of the identified mitigation actions. Eight of the eleven participating municipalities are small in size, with populations of 1,000 or fewer individuals. In most cases these jurisdictions have minimal staff. 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 of trustees) 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 fell under the purview of the entity's governing body (board/council) and not individual departments.

<u>Funding Sources</u>

Since none of the participating jurisdictions are associated with entities that provide grant writing services and/or do not have staff with grant writing capabilities, assistance was needed in identifying possible funding sources for the mitigation actions identified. The consultant provided written information to the participants about FEMA and non-FEMA funding opportunities that have been used previously to finance mitigation actions. In addition, funding information was discussed with participants during Committee meetings and in one-on-one contacts so that an appropriate funding source could be identified for each mitigation action.

A handout was prepared and distributed that provided specific information on the non-FEMA grant sources available including the grant name, the government agency responsible for administering the grant, grant ceiling, contact person, and application period among other key points. Specific grants from the following agencies were identified: U.S. Department of Agricultural – Rural Development (USDA – RD), Illinois Department of Agriculture (IDOA), Illinois Department of Commerce and Economic Opportunity (DCEO), Illinois Environmental Protection Agency (IEPA), Illinois Department of Natural Resources (IDNR) and Illinois Department of Transportation (IDOT).

The funding source identified for each action is the most likely source to be pursued; however, if grant funding is unavailable through the most likely or other suggested sources, then implementation of medium and large-scale projects and activities is unlikely due to the budgetary constraints experienced by most, if not all, of the participants due to their size, projected population growth and limited revenue streams. It is important to remember that the population for the entire County is approximately 28,500 individuals. Eight of the eleven participating municipalities are small in size, with populations of 1,000 of fewer individuals. Some 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 most cases, 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.

4.7 RESULTS OF MITIGATION STRATEGY

Figures MIT-16 through **MIT-32**, 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
Montgomery County – Status of Existing Mitigation Actions
(Sheet 1 of 12)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
County Board							
Scan Montgomery County records from all County offices for easier public access and secure archival of paper originals or paper copies of same.		✓				✓	
Better binding and archiving of paper originals or paper copies of same of Montgomery County records from all County offices to preserve these valuable records.		✓				✓	
Design and construct a community safe room (tornado shelter) at the Recycling Center that is equipped with automatic emergency backup generator and heating/air conditioning units that can also serve as an emergency shelter/heating and cooling center for staff and area residents.	✓				Recycling program was shut down – project no longer needed		✓
Purchase and install R95 grounding system at all Montgomery County facilities to protect critical systems and improve the building's ability to survive a lightning strike/ electromagnetic pulse event.		✓				✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Montgomery County – Status of Existing Mitigation Actions
(Sheet 2 of 12)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
County Board (Continued)							
Replace all the windows in the County buildings with shatter-resistant/shatter-proof glass to make the buildings resistant to natural hazards.		✓				✓	
Retrofit the Montgomery County Courthouse to include a community safe room (tornado shelter) with automatic emergency backup generator for use by staff and area residents. The shelter would also serve as a heating/cooling center and emergency services shelter and contact center.	✓					✓	
Purchase and install automatic emergency backup generator at the County Courthouse to provide uninterrupted power and maintain operations during power outages.	✓					✓	
Purchase and install automatic emergency backup generator at the County Highway Department to provide uninterrupted power and maintain operations during power outages.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Montgomery County – Status of Existing Mitigation Actions
(Sheet 3 of 12)

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
County Board (Continued)							
Purchase and install automatic emergency backup generator at the County Health Department to provide uninterrupted power and maintain operations during power outages.	✓					✓	
Purchase and install automatic emergency backup generator at the Historic Courthouse to provide uninterrupted power and maintain operations during power outages.	✓					✓	
Purchase and install automatic emergency backup generator at the Montgomery County Jail to provide uninterrupted power and maintain operations during power outages.			✓				✓

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Montgomery County – Status of Existing Mitigation Actions
(Sheet 4 of 12)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Animal Control							
Design and construct a community safe room (tornado shelter) at the Animal Control Facility that is equipped with automatic emergency backup generator and heating/air conditioning units that can also serve as an emergency shelter for staff, volunteers, visitors and area residents.	✓					✓	
Develop and distribute educational materials to the general public on emergency preparedness and evacuation plans for companion animals & farm animals in the event of a natural hazard occurrence.	✓					✓	
Purchase and install grounding system at Animal Control Facility to protect critical systems and improve each facility's ability to survive a lightning strike.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2 Montgomery County – Status of Existing Mitigation Actions (Sheet 5 of 12)							
Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Animal Control (Continued)							
Install landscape (living snow fences)/man-made barriers along 9th Ave. in Hillsboro in the low areas to maintain access to the Animal Control Facility and ease hazardous driving conditions.	✓					✓	
Instruct staff on Emergency Operations Plan for companion animals.	✓					✓	
Purchase and install a water storage tank to serve as an auxiliary water supply source during natural hazard events.	✓					✓	
Develop small animal rescue strike tem per FEMA 508-1 Typed Resource Definitions Animal Health Resources guidance.	✓					✓	
Develop small animal sheltering team per FEMA 508-1 Typed Resource Definitions Animal Health Resources guidance.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Montgomery County – Status of Existing Mitigation Actions
(Sheet 6 of 12)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Clerk/Recorder							
Scan Montgomery County Land Records (deeds, mortgages, surveys, easements, misc.) from 1822 – 1991 for easier public access and secure archival of paper originals or paper copies of same housed in Land Records Vault.		✓				✓	
Better binding and archiving of paper originals or paper copies of same housed in Land Records Vault, Historic Courthouse, Hillsboro, IL.		✓				✓	
911							
Purchase and install a grounding system for file repeater and store forward radio sites to improve their ability to survive lightning strikes.	✓					✓	
Purchase stand alone generators for each repeater/store forward tower site in the County (seven total).	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Montgomery County – Status of Existing Mitigation Actions
(Sheet 7 of 12)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
911							
Purchase a repeater system for backup needs in case of main system failure during emergencies.	✓					✓	
Evaluate existing 911 facilities/tower sites for potential natural hazard vulnerabilities.	✓					✓	
Alternate tower site for primary communications systems during primary system failure.	✓					✓	
Alternate paging system for public safety agencies to enhance the ability to page agencies during reduced operations during an emergency.	✓					✓	
Evaluate the need and design of an enhanced trunked radio system for public safety agencies to improve crisis/emergency communications and meet narrow banding requirements.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Montgomery County – Status of Existing Mitigation Actions
(Sheet 8 of 12)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
EMA							
Purchase and install storm warning siren systems in unincorporated communities and subdivisions within the County.	✓					✓	
Purchase and install storm warning sirens in communities that do not have any sirens or do not have adequate coverage with existing sirens.	✓					✓	
Review and present for adoption the revised Flood Insurance Rate Maps when they become available.*	✓					✓	
Make the most recent Flood Insurance Rate Maps available at the County Clerk/Recorder's office to assist the public in considering where to construct new buildings and make county officials aware of the maps and issues related to construction in a floodplain.*		✓				✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Montgomery County – Status of Existing Mitigation Actions
(Sheet 9 of 12)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
EMA (Continued)							
Make information materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.*	✓				DFIRMs have not yet been created for the County making it difficult to establish the number of policy holders who would benefit from participation in the CRS. Therefore a project related to the CRS is premature. The County will determine the feasibility of participating in the CRS program once DFIRMs have been approved and adopted.		✓
Highway Department							
Remove and dispose of trees and brush adjacent to highways.		✓				✓	
Evaluate existing road, bridge, culvert and storm sewer infrastructure to identify natural hazard vulnerabilities.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Montgomery County – Status of Existing Mitigation Actions
(Sheet 10 of 12)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Highway Department (Continued)							
Perform preliminary engineering and construct, retrofit or completely replace road, bridge, culvert and storm sewer infrastructure as recommended to mitigate natural hazard vulnerabilities.	✓					✓	
Evaluate existing Highway Department administrative, maintenance, equipment storage buildings and radio transmitter to identify natural hazard vulnerabilities.	✓					✓	
Perform preliminary engineering and architecture work to construct, retrofit or completely replace the Highway Department's administrative, maintenance, equipment storage buildings and radio transmitter to mitigate identified natural hazard vulnerabilities.	✓					✓	
Prepare public information, including long range plans, maps, policies, and procedures and make them available online along with an area for the public to make comments.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Montgomery County – Status of Existing Mitigation Actions
(Sheet 11 of 12)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Highway Department (Continued)							
Protect historical Highway Department documents including plans, specifications, construction records and agreements by scanning, inventorying and storing off site.	✓					✓	
Purchase road signage and barricades to warn and detour traffic in the event a natural disaster causes dangerous or impassable conditions.	✓					✓	
Retrofit the Simpson Bridge against seismic and flood damage.			✓	2016	Replaced existing structure		✓

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-2
Montgomery County – Status of Existing Mitigation Actions
(Sheet 12 of 12)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Sheriff's Office							
Establish a Montgomery County Sheriff's Office (MCSO) Building/Jail Emergency Operating Center (EOC) in the event that the main facility is destroyed or inoperable.	✓				Actions focused on emergency preparedness/response and not mitigation were eliminated		✓
Training for Montgomery County Sheriff's Office personnel on County Emergency Operating Procedures.	✓				Actions focused on emergency preparedness/response and not mitigation were eliminated		✓
Supervisor of Assessments							
Obtain new high resolution orthographic photography of Montgomery County with LIDAR topographic Digital Elevation Model (1 ft. contours) for flood analysis.	✓					✓	
Upon obtaining new LIDAR data, perform floodway delineation analysis of selected waterways and streams in the County to identify areas where flood mitigation measures need to be implemented.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the County's vulnerability nor did the County identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Montgomery County has one administrative activity in progress that has the potential to decrease the vulnerability of flood prone areas. It is still too early to tell the degree of reduction that will be experienced from the implementation of these actions. The County also has an additional three infrastructure projects and two administrative activities in progress. These projects have the potential to decrease vulnerability to Safety & Security Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the County.

Figure MIT-3
Coffeen – Status of Existing Mitigation Actions
(Sheet 1 of 3)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Conduct sewer line reconnaissance study to identify locations where storm water infiltrates the lines.			✓	2022	Obtained $30,000 search grant (USDA Rural Development) video-taped sewer lines (20%) prep. of environmental report		✓
Repair/reline sewer line sections/mains where storm water infiltration is occurring to prevent sewage backups.		✓				✓	
Select, design and construct the appropriate remedy(s) to alleviate recurring drainage problems within the City.		✓				✓	
Install new storm water drainage system (ditches, culverts, etc.) in select areas of the City to alleviate recurring roadway drainage/ponding issues.		✓				✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Coffeen has two infrastructure improvement projects in progress that have the potential to decrease the vulnerability of inundation-prone areas and one administrative activity completed that decreases the overall drought vulnerability of the City's drinking water supply. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. The City also has an additional three infrastructure projects completed or in progress that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-3
Coffeen – Status of Existing Mitigation Actions
(Sheet 2 of 3)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Construct retention pond next to wastewater treatment facility to manage excess storm water that infiltrates the sewer system during heavy rains, overwhelming the facility's capacity.	✓					✓	
Secure agreement with neighboring water system(s) to provide alternative/backup drinking water supply to the City.			✓	2022	Installed emergency backup water connection w/EJ water cooperative		✓
Purchase barricades, road signage and portable light to warn and detour traffic in the event a natural disaster causes dangerous or impassable conditions.		✓				✓	
Develop a Memorandum of Agreement with Coffeen Elementary School designating the school as a storm/emergency shelter and heating/cooling center for City residents.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Coffeen has two infrastructure improvement projects in progress that have the potential to decrease the vulnerability of inundation-prone areas and one administrative activity completed that decreases the overall drought vulnerability of the City's drinking water supply. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. The City also has an additional three infrastructure projects completed or in progress that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-3
Coffeen – Status of Existing Mitigation Actions
(Sheet 3 of 3)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Evaluate condition of water tower and assess vulnerability to natural hazards.		✓				✓	
If needed, replace existing water tower.	✓					✓	
Purchase and install automatic emergency generator at city-owned water tower/pump station located on IL Rte. 185 northwest of the City to provide uninterrupted power and maintain operations during power outages.	✓						✓
Purchase and install an automatic emergency generator for water tower/pump station located on Maple Street to provide uninterrupted power and maintain operations during power outages.	✓					✓	
Purchase and install an automatic emergency backup generator at the wastewater treatment facility to provide uninterrupted power and maintain operations during power outages.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Coffeen has two infrastructure improvement projects in progress that have the potential to decrease the vulnerability of inundation-prone areas and one administrative activity completed that decreases the overall drought vulnerability of the City's drinking water supply. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. The City also has an additional three infrastructure projects completed or in progress that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects and activities will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-4
Farmersville – Status of Existing Mitigation Actions
(Sheet 1 of 2)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Design and construct an Emergency Operations Center (retrofit an existing building or construct a new multi-use building) to use during natural hazard or other emergency events.		✓				✓	
Separate the combined sewer system within the Village to accommodate stormwater flow, maximize the carrying capacity of the sewer system and reduce the potential for sewer backups and flooding problems.	✓						✓
Bury power lines to critical facilities to limit service disruption during natural hazard events.	✓						✓
Install emergency generator at critical facilities/shelter for power outages.		✓				✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the 2016 Plan was approved. The Village did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Farmersville has one infrastructure improvement project and one administrative activity in progress that have the potential to decrease the vulnerability of inundation-prone areas and another infrastructure improvement project in progress that has the potential to decrease the overall vulnerability to hazard prone areas in the Village. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There is one additional infrastructure projects in progress that has the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However this project will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-4
Farmersville – Status of Existing Mitigation Actions
(Sheet 2 of 2)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Conduct study to identify ways to improve road drainage to prevent flooding of residential areas.		✓				✓	
Improve road drainage to prevent flooding of residential areas.		✓				✓	
Upgrade wastewater treatment facility to better protect it from natural hazard events and minimize down time.	✓					✓	
Upgrade drinking water treatment facility to better protect it from natural hazards to minimize down time.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the 2016 Plan was approved. The Village did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Farmersville has one infrastructure improvement project and one administrative activity in progress that have the potential to decrease the vulnerability of inundation-prone areas and another infrastructure improvement project in progress that has the potential to decrease the overall vulnerability to hazard prone areas in the Village. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There is one additional infrastructure projects in progress that has the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However this project will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-5
Hillsboro – Status of Existing Mitigation Actions
(Sheet 1 of 4)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Replace aging sanitary, storm and drinking water lines to prevent storm water infiltration and increase resilience to contraction and expansion of surrounding soils.		✓				✓	
Improve storm sewer system to alleviate drainage problems and better manage stormwater.		✓				✓	
Conduct sewer line reconnaissance study to identify locations where storm water infiltrates the lines.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Hillsboro has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that has the potential to decrease the overall vulnerability of individuals in hazard prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects in progress that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-5
Hillsboro – Status of Existing Mitigation Actions
(Sheet 2 of 4)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Repair/reline sewer line sections/mains where storm water infiltration is occurring to prevent sewage backups.	✓					✓	
Expand the City's storm sewer system to include the Northwood Heights and Parkside areas to better manage stormwater runoff and alleviate recurring drainage/flooding problems experienced in these areas.	✓					✓	
Replace/upsize roadway culvert at Fairground Ave. (near Hillsboro Jr. & Sr. High Schools) to increase carrying capacity, alleviate recurring roadway overtopping and flooding problems.		✓				✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Hillsboro has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that has the potential to decrease the overall vulnerability of individuals in hazard prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects in progress that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-5
Hillsboro – Status of Existing Mitigation Actions
(Sheet 3 of 4)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Replace portable and in-car radio communication systems for fire, police and dispatch departments.		✓				✓	
Redesign the drainage system for the Route 16 underpass of the Union Pacific Railroad.	✓					✓	
Replace existing storm warning siren and/or system and install additional storm warning sirens at strategic locations within the City to ensure maximum coverage.			✓	2016	Installed 4 new outdoor warning sirens around the City (Kinkaed Rd., Challacombe Park, Sports Complex, and South Marina)		✓
Conduct drainage study to identify how to correct a chronic drainage problem impacting homes in the vicinity of an unnamed creek near Mechanic Street and Hollis Lane.		✓				✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Hillsboro has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that has the potential to decrease the overall vulnerability of individuals in hazard prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects in progress that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-5
Hillsboro – Status of Existing Mitigation Actions
(Sheet 4 of 4)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Review and present for adoption the revised Flood Insurance Rate Maps when they become available.*	✓					✓	
Make the most recent Flood Insurance Rate Maps available at the City Clerk's Office to assist the public in considering where to construct new buildings and make city officials aware of the maps and issues related to construction in a floodplain.*		✓				✓	
Make information materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.*	✓				DFIRMs have not yet been created for the City making it difficult to establish the number of policy holders who would benefit from participation in the CRS. Therefore a project related to the CRS is premature. The city will determine the feasibility of participating in the CRS program once DFIRMs have been approved and adopted.		✓

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Hillsboro has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that has the potential to decrease the overall vulnerability of individuals in hazard prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects in progress that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-6
Litchfield – Status of Existing Mitigation Actions
(Sheet 1 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Purchase and install automatic emergency backup generator at the City Hall/Police Department (a designated storm/emergency shelter and heating/cooling center) to provide uninterrupted power and maintain operations during power outages.			✓	2019			✓
Purchase and install automatic emergency backup generator at the main Fire Station to provide uninterrupted power and maintain operations during power outages.			✓	2019			✓
Purchase and install automatic emergency backup generator at the Westside Emergency Station to provide uninterrupted power and maintain operations during power outages.			✓	2018			✓

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Litchfield has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are four additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-6
Litchfield – Status of Existing Mitigation Actions
(Sheet 2 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Purchase and install automatic emergency backup generator at the Streets Shed to provide uninterrupted power and maintain operations during power outages.	✓					✓	
Repair/replace sewer line sections/mains to minimize storm water infiltration in the wastewater system and to prevent sewage backups.		✓				✓	
Design and construct a community safe room (tornado shelter) built to seismic standards and equipped with emergency backup generator and heating/air conditioning units that can also serve as an emergency shelter/heating and cooling center for City residents.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Litchfield has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are four additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-6
Litchfield – Status of Existing Mitigation Actions
(Sheet 3 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Construct railroad overpass/underpass over Norfolk Southern/BNSF rail lines to maintain vital municipal services throughout the entire City. Presently there are six at-grade crossings all within a mile of each other in the City. The main crossings are only blocks apart. If a train were to breakdown or derail, a majority, if not all of the crossings could be blocked separating west side of the City and Interstate 55 from critical services.	✓					✓	
Construct a silt basin around Lake Lou Yaeger to capture sediment laden runoff and prevent it from entering the lake and impacting water quality and storage capacity. Lake Yaeger is one of two surface water bodies used to supply drinking water to Litchfield.		✓				✓	
Construct storm water drainage system (lines, ditches, culverts, etc.) in select areas of the City to alleviate recurring drainage/flooding problems.		✓				✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Litchfield has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are four additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-6
Litchfield – Status of Existing Mitigation Actions
(Sheet 4 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Bury power supply lines to critical facilities to limit service disruption during natural hazard events.	✓					✓	
Perform seismic upgrades to critical facilities.	✓					✓	
Perform seismic upgrade to bridge across Lake Yaeger Dam.	✓					✓	
Perform seismic upgrade to the Lake Yaeger intake structure and earth dam.	✓					✓	
Perform seismic upgrade to the Lake Litchfield intake structure and earth dam.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Litchfield has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are four additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-6
Litchfield – Status of Existing Mitigation Actions
(Sheet 5 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Design and construct community safe rooms (tornado shelters) equipped with emergency backup generators and heating/air conditioning units at strategic locations within the City that can also serve as an emergency shelters/heating and cooling centers for City residents.	✓					✓	
Design and install mine subsidence protection measures at Litchfield High School.	✓					✓	
Review and present for adoption the revised Flood Insurance Rate Maps when they become available.*	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Litchfield has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are four additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-6
Litchfield – Status of Existing Mitigation Actions
(Sheet 6 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Make the most recent Flood Insurance Rate Maps available at the City Clerk's Office to assist the public in considering where to construct new buildings and make city officials aware of the maps and issues related to construction in a floodplain.*		✓				✓	
Make information materials available to the public about the National Flood Insurance Program's voluntary Community Rating System.*	✓				DFIRMs have not yet been created for the City making it difficult to establish the number of policy holders who would benefit from participation in the CRS. Therefore a project related to the CRS is premature. The city will determine the feasibility of participating in the CRS program once DFIRMs have been approved and adopted.		✓

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Litchfield has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are four additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Safety & Security and Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-7
Nokomis – Status of Existing Mitigation Actions
(Sheet 1 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Conduct wastewater system reconnaissance study to identify locations where storm water is infiltrating the system.		✓				✓	
Repair/reline sewer line sections and repair/replace mains to minimize storm water infiltration in the wastewater system and to prevent sewage backups.	✓					✓	
Replace/upsize approx. 900 feet of storm sewer line along S. Union St. to better manage stormwater runoff and alleviate recurring drainage/flooding problems.		✓			150 feet to be replaced in 2023	✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Nokomis has one infrastructure improvement project and two administrative activities in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that has the potential to decrease the overall vulnerability of individuals in hazard prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-7
Nokomis – Status of Existing Mitigation Actions
(Sheet 2 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Replace/upsize approx. 2,000 feet of storm sewer line along South St. to better manage stormwater runoff and alleviate recurring drainage/flooding problems.	✓					✓	
Replace/upsize approx. 900 feet of storm sewer line in an alley running between State St. and South St. (behind McKay's Auto Parts) to increase capacity, better manage stormwater runoff and alleviate recurring drainage/flooding problems.	✓					✓	
Replace S. Union St. structure over unnamed tributary of East Fork Shoal Creek (adjacent to Shane Coal Park) to address scour damage and erosion caused by repeated flooding and increase flow capacity.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Nokomis has one infrastructure improvement project and two administrative activities in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that has the potential to decrease the overall vulnerability of individuals in hazard prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-7
Nokomis – Status of Existing Mitigation Actions
(Sheet 3 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Purchase a portable emergency backup generator for use at lift stations to maintain operations during power outages.		✓				✓	
Remove debris, vegetative overgrowth, snags and brush in unnamed tributary of East Fork Shoal Creek (within the City limits) to maintain/increase carrying capacity, better manage stormwater runoff and reduce/prevent flooding problems.	✓					✓	
Design and construct a community safe room (tornado shelter) built to seismic standards and equipped with emergency backup generator and heating/air conditioning units that can also serve as an emergency shelter/heating and cooling center for City residents.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Nokomis has one infrastructure improvement project and two administrative activities in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that has the potential to decrease the overall vulnerability of individuals in hazard prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-7
Nokomis – Status of Existing Mitigation Actions
(Sheet 4 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Purchase and install new storm warning sirens.			✓	2023			✓
Conduct study of storm sewer and small stream capacity in order to better manage storm water runoff for an area south of UPRR tracks within the City. The study will take into account the present configuration of the storm sewer and small stream "system" and make recommendations to increase capacity.	✓					✓	
Modify/correct contour and path of unnamed tributary of East Fork Shoal Creek (within the City limits) to allow for more efficient management of storm water runoff. Emphasis on increased capacity (retention ponds) and environmental "friendliness" of the creek in the area of Shane Cole Park.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Nokomis has one infrastructure improvement project and two administrative activities in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that has the potential to decrease the overall vulnerability of individuals in hazard prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-7
Nokomis – Status of Existing Mitigation Actions
(Sheet 5 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Upgrade storm sewer system south of the UPRR tracks to increase capacity and alleviate drainage/flooding problems.	✓					✓	
Review and present for adoption the revised Flood Insurance Rate Maps when they become available.*	✓					✓	
Make the most recent Flood Insurance Rate Maps available at the City Clerk's Office to assist the public in considering where to construct new buildings and make city officials aware of the maps and issues related to construction in a floodplain.*		✓				✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Nokomis has one infrastructure improvement project and two administrative activities in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that has the potential to decrease the overall vulnerability of individuals in hazard prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-7
Nokomis – Status of Existing Mitigation Actions
(Sheet 6 of 6)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Make information materials available about the National Flood Insurance Program's voluntary Community Rating System.*	✓				DFIRMs have not yet been created for the City making it difficult to establish the number of policy holders who would benefit from participation in the CRS. Therefore a project related to the CRS is premature. The City will determine the feasibility of participating in the CRS program once DFIRMs have been approved and adopted.		✓
Upgrade the existing main water line from the drinking water treatment facility to the water tower to eliminate breaks and leaks and improve infrastructure reliability, prevent stormwater infiltration, improve infrastructure resilience to contraction and expansion of surrounding soils, ensure a constant supply of water for residents and to aid in fire suppression during natural hazard events.			✓	2023			✓

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Nokomis has one infrastructure improvement project and two administrative activities in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that has the potential to decrease the overall vulnerability of individuals in hazard prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects in progress or completed that have the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-8
Raymond – Status of Existing Mitigation Actions

Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Drill an additional drinking water well to provide additional capacity to improve resiliency to drought and aid in fire suppression as necessary during natural hazard events.			✓	2022	Drilled new well; built new well house		✓
Conduct reconnaissance study of the combined sewer system to identify locations where storm water infiltration is occurring.		✓				✓	
Repair/reline sewer line sections and repair/replace mains to minimize storm water infiltration into the combined sewer system and to prevent sewage backups.		✓				✓	
Remove debris, vegetative overgrowth, snags and brush in Shoal Creek to maintain/increase carrying capacity, better manage stormwater runoff and reduce/prevent flooding problems at the cemetery and Wastewater Plant.		✓			2020 – clean ditch from Rt. 48 north	✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the 2016 Plan was approved. The Village did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Raymond has two infrastructure improvement projects and one administrative activity in progress that have the potential to decrease the vulnerability of flood and inundation-prone areas and another infrastructure improvement project completed that decreases the overall drought vulnerability of the Village's drinking water supply. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions.

Figure MIT-9
Schram City – Status of Existing Mitigation Actions
(Sheet 1 of 2)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Designate emergency shelters within the Village (including the Kortkamp area) for use by residents.		✓			Yearly agreement with FAYCO need to get agreement with Pro-Built for Kortkamp	✓	
Purchase and install automatic emergency backup generators for use at designated emergency shelters to provide uninterrupted power and maintain operations during power outages.		✓			Have installed one at village hall	✓	
Conduct drainage/hydraulic study to identify the cause(s) and determine the appropriate remedy(s) to alleviate recurring drainage/flooding problems experienced in residential areas.	✓					✓	
Select, design and construct the appropriate remedy(s) to alleviate recurring drainage/flooding problems experienced in residential areas.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the 2016 Plan was approved. The Village did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Schram City has one infrastructure improvement project completed that has the potential to decrease the vulnerability of inundation-prone areas in the Village. It is still too early to tell the degree of reduction that will be experience from the implementation of this action. There is one additional infrastructure project and one administrative activity in progress that have the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-9
Schram City – Status of Existing Mitigation Actions
(Sheet 2 of 2)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Design and construct a community safe room (tornado shelter) built to seismic standards and equipped with emergency backup generator and heating/air conditioning units that can also serve as an emergency shelter/heating and cooling center for Village residents (including those in the Kortkamp area).	✓					✓	
Purchase and install automatic emergency backup generators at the Village's five (5) lift stations to provide uninterrupted power to maintain operations during power outages.	✓					✓	
Upgrade and reroute the main sewer line and install a lift station and flow meter from the Kortkamp area to Hillsboro to increase capacity, better manage stormwater runoff and alleviate drainage/flooding problems.			✓	2021			✓
Review and present for adoption the new Flood Insurance Rate Maps when they become available. Schram City has not been mapped and has no FIRM on record.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the 2016 Plan was approved. The Village did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Schram City has one infrastructure improvement project completed that has the potential to decrease the vulnerability of inundation-prone areas in the Village. It is still too early to tell the degree of reduction that will be experience from the implementation of this action. There is one additional infrastructure project and one administrative activity in progress that have the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-10
Taylor Springs – Status of Existing Mitigation Actions
(Sheet 1 of 3)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Upgrade pumps at sanitary lift stations to maximize pumping capacity and alleviate recurring drainage problems and sewer backups.	✓					✓	
Select, design and construct the appropriate remedy(s) to alleviate recurring drainage problems south of Hamilton St.		✓				✓	
Purchase and install an automatic emergency backup generator at Village Hall to provide uninterrupted power and maintain operations during power outages.	✓					✓	
Purchase and install an automatic emergency backup generator at Community Building (a designated emergency shelter/heating and cooling center) to provide uninterrupted power and maintain operations during power outages.			✓	2017			✓

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the 2016 Plan was approved. The Village did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Taylor Springs has two infrastructure improvement projects in progress that have the potential to decrease the vulnerability of inundation-prone areas in the Village. It is still too early to tell the degree of reduction that will be experience from the implementation of this action. There is one additional infrastructure project completed that has the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However this project will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-10
Taylor Springs – Status of Existing Mitigation Actions
(Sheet 2 of 3)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Purchase and install an automatic emergency backup generator at the Fire Department to provide uninterrupted power and maintain operations during power outages.	✓					✓	
Retrofit the bathrooms in the Community Building (a designated emergency shelter /heating and cooling center) to meet ADA standards.	✓				Actions focused on emergency response/maintenance and not mitigation were eliminated		✓
Identify and install “hardening” materials (i.e., shatter-proof glass, hail resistant shingles/doors, etc.) at the Community Building (a designated emergency shelter/heating and cooling center) to make the buildings resistant to natural hazards.	✓					✓	
Identify and install “hardening” materials (i.e., shatter-proof glass, hail resistant shingles/doors, etc.) at the Village Hall to make the buildings resistant to natural hazards.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village’s vulnerability since the 2016 Plan was approved. The Village did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Taylor Springs has two infrastructure improvement projects in progress that have the potential to decrease the vulnerability of inundation-prone areas in the Village. It is still too early to tell the degree of reduction that will be experience from the implementation of this action. There is one additional infrastructure project completed that has the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However this project will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-10 Taylor Springs – Status of Existing Mitigation Actions (Sheet 3 of 3)							
Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Construct an additional wastewater treatment lagoon to manage excess storm water from the combined sewer system during heavy rains.	✓					✓	
Replace/upsize roadway culverts along major drainage ditches and install new drainage structures where needed to alleviate drainage/flooding problems.		✓				✓	
Construct a new water tower to increase the amount of water available in reserve and to aid in fire suppression as necessary during natural hazard events.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the 2016 Plan was approved. The Village did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Taylor Springs has two infrastructure improvement projects in progress that have the potential to decrease the vulnerability of inundation-prone areas in the Village. It is still too early to tell the degree of reduction that will be experience from the implementation of this action. There is one additional infrastructure project completed that has the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However this project will not significantly change the vulnerability of hazard prone areas within the Village.

Figure MIT-11
Waggoner – Status of Existing Mitigation Actions

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Conduct drainage/hydraulic study to identify the cause(s) and determine the appropriate remedy(s) to alleviate recurring drainage/flooding problems experienced within the Village.		✓				✓	
Select, design and construct the appropriate remedy(s) to alleviate recurring drainage/flooding problems experienced within the Village.		✓			2023 – replacing culverts at S. North St. & E. Virginia	✓	
Purchase and install an automatic emergency backup generator at Centennial Building (a designated emergency shelter/heating center) to provide uninterrupted power and maintain operations during power outages.	✓					✓	
Upsize culverts at select locations to alleviate recurring drainage problems.	✓					✓	

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the Village's vulnerability since the 2016 Plan was approved. The Village did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Waggoner has one infrastructure improvement project and one administrative activity in progress that have the potential to decrease the vulnerability of inundation-prone areas in the Village. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions.

Figure MIT-12 Witt – Status of Existing Mitigation Actions (Sheet 1 of 3)							
Mitigation Action Description	**Status of Mitigation Action**			**Year Completed**	**Summary/Details of Completed Action (i.e., location, scope, etc.)**	**Status of No/In Progress Actions**	
	No Progress (✓)	**In Progress (✓)**	**Completed (✓)**			**Included in Updated Action Plan (✓)**	**No Longer Relevant (✓)**
Replace aging sanitary and drinking water lines to prevent storm water infiltration and increase resilience to contraction and expansion of surrounding soils.		✓				✓	
Conduct sewer line reconnaissance study to identify locations where storm water infiltrates the lines.		✓				✓	
Repair/reline sewer line sections/mains where storm water infiltration is occurring to prevent sewage backups.		✓				✓	
Design and construct a community safe room (tornado shelter) built to seismic standards and equipped with emergency backup generator and heating/air conditioning units that can also serve as an emergency shelter/heating and cooling center for Village residents.	✓						✓

No substantial changes in development have occurred in hazard prone areas that would increase or decrease the City's vulnerability since the 2016 Plan was approved. The City did not identify any changes in priorities since the previous Plan was approved.

In terms of changes in vulnerability associated with mitigation actions in progress or completed, Witt has two infrastructure improvement projects and two administrative activities in progress that have the potential to decrease the vulnerability of inundation-prone areas in the City. It is still too early to tell the degree of reduction that will be experience from the implementation of these actions. There are two additional infrastructure projects and one administrative activity in progress that have the potential to decrease vulnerability to Food, Water, Shelter Community Lifelines. However these projects will not significantly change the vulnerability of hazard prone areas within the City.

Figure MIT-12
Witt – Status of Existing Mitigation Actions
(Sheet 2 of 3)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Reshape existing drainage ditches and construct new ditches where needed to increase flow capacity and alleviate drainage/flooding issues.		✓				✓	
Conduct drainage/hydraulic study to identify the cause(s) and determine the appropriate remedy(s) to alleviate recurring drainage/flooding problems experienced in residential areas including but not limited to the areas at Vine Street & IL Rte. 16 and S. Main St. & IL Rte. 16.		✓				✓	
Select, design and construct the appropriate remedy(s) to alleviate recurring drainage/flooding problems experienced in residential areas.		✓				✓	

Figure MIT-12
Witt – Status of Existing Mitigation Actions
(Sheet 3 of 3)

Mitigation Action Description	Status of Mitigation Action			Year Completed	Summary/Details of Completed Action (i.e., location, scope, etc.)	Status of No/In Progress Actions	
	No Progress (✓)	In Progress (✓)	Completed (✓)			Included in Updated Action Plan (✓)	No Longer Relevant (✓)
Review and present for adoption the revised Flood Insurance Rate Maps when they become available.*	✓					✓	
Make the most recent Flood Insurance Rate Maps available at the City Clerk's Office to assist the public in considering where to construct new buildings and make city officials aware of the maps and issues related to construction in a floodplain.*		✓				✓	
Make information materials available to the public about the National Flood Insurance Programs' Voluntary Community Rating System.*	✓				DFIRMs have not yet been created for the City making it difficult to establish the number of policy holders who would benefit from participation in the CRS. Therefore a project related to the CRS is premature. The City will determine the feasibility of participating in the CRS program once DFIRMs have been approved and adopted.		✓

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 1 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
County Board													
Design and construct a community safe room at the Montgomery County Courthouse, built to high wind standards and equipped with an emergency backup generator and HVAC system, that can also serve as a warming/cooling center and emergency shelter for staff and area residents to establish a Community Lifeline essential to human health and safety.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	---	S&IP	Small SVI: 0.2505	Yes	---	2	HM	High/High	County Board Chair / County Board	5 years	County / FEMA HMGP BRIC	Existing (2016)
Purchase and install R95 grounding systems at critical County-owned buildings & infrastructure to address potential electromagnetic pulse (EMP) damage from natural hazard events (i.e., lightning strikes, etc.), improve infrastructure resilience, and ensure continued operations of Community Lifelines.	SS	C H&M S&S T	S&IP	Medium SVI: 0.2505	---	Yes	3, 5	HM	Medium/High	County Board Chair / County Board	5 years	County	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 (approximately 6,100 individuals in unincorporated areas), projected population growth, and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 2 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
County Board Continued…													
Inventory, scan/digitize, store off-site and/or arrange for better binding and archiving of vital county records from all departments (1822 to present) to protect, preserve, and maintain service in the event a natural hazard event impacts County-owned buildings.	EC, EH, EQ, F, MS, SS, SWS, T	S&S	LP&R	Large SVI: 0.2505	---	---	5, 8	LM	Medium/High	County Board Chair County Board / Clerk/Recorder / Highway Engineer	3 years	County	Existing (2016)
Install hardening materials (i.e., shatter-resistant/ shatter-proof windows, roof anchoring system, hail resistant doors/ shingles, etc.) at County-owned buildings and infrastructure systems to increase building resilience to natural hazards, maintain continuity of government/operations, protect staff, and mitigate risk to Community Lifelines.	EQ, SS, SWS, T	S&S	S&IP	Medium SVI: 0.2505	---	Yes	2, 3, 5	HM	High/High	County Board Chair / County Board	5 years	County / FEMA BRIC HMGP	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 (approximately 6,100 individuals in unincorporated areas), 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

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 3 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
County Board Continued…													
Purchase and install emergency backup generators at County-owned critical facilities and infrastructure systems, including, but not limited to the County Courthouse, Historic Courthouse, Highway Department, and Health Department, to establish resilient and reliable power supplies, maintain continuity of government/operations, and mitigate risk to Community Lifelines.	DF, EC, EH, EQ, F, MS, SS, SWS, T	C FWS S&S	S&IP	Medium SVI: 0.2505	---	Yes	2, 3, 5	HM	Medium/High	County Board Chair / County Board	5 years	County / FEMA HMGP BRIC	Existing (2016)
Animal Control													
Design and construct a community safe room at the Animal Control Facility, built to high wind standards and equipped with an emergency backup generator and HVAC system, that can also serve as a warming/cooling center and emergency shelter for staff, volunteers, visitors, and area residents to establish a Community Lifeline essential to human health and safety.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	---	S&IP	Small SVI: 0.2505	Yes	---	2	HM	High/High	Animal Control Director	5 years	County / FEMA HMGP BRIC	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 (approximately 6,100 individuals in unincorporated areas), projected population growth, and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 4 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Animal Control Continued…													
Distribute educational materials to residents that detail the risk to companion and farm animals associated with the natural hazards that impact the County, outline emergency preparedness and evacuation plans, and provide steps they can take to reduce their animals' risks.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	---	E&A	Large SVI: 0.2505	---	---	2	LM	Low/Medium	Animal Control Director	1-5 years	County	Existing (2016)
Install landscape (living snow fences) in low areas along 9th Avenue in Hillsboro to maintain access to the Animal Control Facility, ensure continued functionality of Community Lifelines, and ease hazardous driving conditions.	SWS	S&S FWS	S&IP	Small SVI: 0.2505	---	Yes	3, 5	LM	Low/Medium	Animal Control Director	1-5 years	County	Existing (2016)
Purchase a water storage tank to serve as an auxiliary/backup water supply to establish a constant and reliable supply of water for shelter animals.	DR, EC, EH, EQ, F, MS, SS, SWS, T	S&S FWS	S&IP	Small SVI: 0.2505	---	---	2	LM	Low/Medium	Animal Control Director	5 years	County	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 (approximately 6,100 individuals in unincorporated areas), projected population growth, and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 5 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Animal Control Continued…													
Train staff on Emergency Operations Plan for companion animals.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	FWS	E&A	Medium SVI: 0.2505	---	---	2	LM	Low/Medium	Animal Control Director	1-5 years	County	Existing (2016)
Develop small animal rescue strike team per FEMA 508-1 Typed Resource Definitions Animal Health Resources guidance.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	FWS	LP&R	Medium SVI: 0.2505	---	---	2	LM	Low/Medium	Animal Control Director	1-5 years	County	Existing (2016)
Develop small animal sheltering team per FEMA 508-1 Typed Resource Definitions Animal Health Resources guidance.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	FWS	LP&R	Medium SVI: 0.2505	---	---	2	LM	Low/Medium	Animal Control Director	1-5 years	County	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 (approximately 6,100 individuals in unincorporated areas), projected population growth, and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 6 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
911													
Purchase and install additional communications towers to improve system resilience, maintain continuity of government/operations allowing for the exchange of critical communications across departments, agencies, and jurisdictions, and ensure continued operations of a Communications Community Lifeline.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	C	S&IP	Large SVI: 0.2505	---	Yes	2, 5, 9	HM	High/High	911 Coordinator	5 years	County / FEMA BRIC	New
Purchase and install grounding systems for file repeater and store forward radio tower sites to address potential electromagnetic pulse (EMP) damage from natural hazard events (i.e., lightning strikes, etc.), improve infrastructure resilience, and ensure continued operations of Community Lifelines.	SS	C	S&IP	Large SVI: 0.2505	---	Yes	2, 3, 5, 9	HM	Medium/High	911 Coordinator	2 years	County	Existing (2016)
Purchase and install emergency backup generators at file repeater/store forward tower sites (seven total) to establish resilient and reliable power supplies, maintain continuity of government/operations, and mitigate risk to Community Lifelines.	DF, EC, EH, EQ, F, MS, SS, SWS, T	C	S&IP	Large SVI: 0.2505	---	Yes	2, 3, 5, 9	HM	Medium/High	911 Coordinator	3 years	County / FEMA HMGP BRIC	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 (approximately 6,100 individuals in unincorporated areas), projected population growth, and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 7 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
911 Continued…													
Purchase a repeater system to serve as a backup communications system in the event the main system is damaged by a natural hazard event and is rendered inoperable.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	C	S&IP	Large SVI: 0.2505	---	Yes	2, 5, 9	HM	Medium/High	911 Coordinator	4 years	County / FEMA BRIC	Existing (2016)
Identify alternate paging system to ensure system resilience and continued functionality of a Community Lifeline in the event the primary system is rendered inoperable during a natural hazard event.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	C	S&IP	Large SVI: 0.2505	---	Yes	2, 5, 9	HM	Medium/High	911 Coordinator	6 years	County / FEMA BRIC	Existing (2016)
Install an alternate primary communications system tower site to serve as a backup in the event the primary system is damaged by a natural hazard event and rendered inoperable.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	C	S&IP	Large SVI: 0.2505	---	Yes	2, 5, 9	HM	High/High	911 Coordinator	5 years	County / FEMA BRIC	Existing (2016)
Evaluate existing 911 facilities/tower sites to identify their exposure/vulnerability to damage from natural hazards and identify appropriate protective measures that could be undertaken to harden this critical infrastructure.	EC, EH, EQ, MS, SS, SWS, T, WF	C	LP&R E&A	Large SVI: 0.2505	---	---	3, 5, 9	LM	Low/Medium	911 Coordinator	4 years	County	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 (approximately 6,100 individuals in unincorporated areas), projected population growth, and budgetary constraints. The County works hard to maintain critical services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 8 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
911 Continued…													
Evaluate the need and design of an enhanced trunked radio system to improve system resilience and communications, meet narrow banding requirements, and ensure continued functionality of a Community Lifeline.	EC, EH, EQ, MS, SS, SWS, T, WF	C	LP&R E&A	Large SVI: 0.2505	---	---	3, 5, 9	LM	Low/Medium	911 Coordinator	6 years	County	Existing (2016)
Emergency Management Agency													
Purchase and install storm warning siren systems in unincorporated communities and subdivisions without alert coverage within County to establish Communications Community Lifelines essential to human health and safety.	SS, T	C	S&IP E&A	Medium SVI: 0.2505	---	---	2	HM	Medium/High	EMA Director	5 years	County / FEMA BRIC HMGP	Existing (2016)
Purchase and install storm warning siren systems in communities without alert coverage or with inadequate coverage to establish Communications Community Lifelines essential to human health and safety.	SS, T	C	S&IP E&A	Medium SVI: 0.2505	---	---	2	HM	Medium/High	EMA Director	5 years	County / FEMA BRIC HMGP	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

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Acronyms

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Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 9 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Highway Department Continued…													
Trim trees and remove dead material adjacent to County highways to minimize road blockages, improve system resilience, and mitigate risk to Community Lifelines.	SS, T	T	S&IP	Medium SVI: 0.2505	Yes	Yes	2, 3, 5	HM	Low/Medium	County Highway Engineer	1-5 years	County	Existing (2016)
Evaluate existing road, bridge, culvert, and storm sewer infrastructure to identify their exposure/vulnerability to damage from natural hazards and identify appropriate protective measures that could be undertaken to harden this critical infrastructure.	DF, DR, EC, EH, EQ, F, MS, SS, SWS, T, WF	T	LP&R E&A	Large SVI: 0.2505	---	---	3, 5	LM	Low/Medium	County Highway Engineer	1-5 years	County	Existing (2016)
Based on evaluation, harden existing road, bridge, culvert, and storm sewer infrastructure to increase system resilience, maintain continuity of operations, and ensure the continued functionality of Community Lifelines.	DF, DR, EC, EH, EQ, F, MS, SS, SWS, T, WF	T	S&IP	Medium SVI: 0.2505	---	Yes	3, 5	HM	High/High	County Highway Engineer	5-10 years	County / FHWA PROTECT	Existing (2016)

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Acronyms

Priority

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Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 10 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Highway Department Continued…													
Evaluate existing Highway Department facilities (administrative, maintenance, equipment storage buildings, and radio transmitter) to identify their exposure/vulnerability to damage from natural hazards and identify appropriate protective measures that could be undertaken to harden these critical facilities.	DF, DR, EC, EH, EQ, F, MS, SS, SWS, T, WF	C T	LP&R E&A	Medium SVI: 0.2505	---	---	3, 5	LM	Low/Medium	County Highway Engineer	1-3 years	County	Existing (2016)
Based on evaluation, harden existing Highway Department facilities (administrative, maintenance, equipment storage buildings, and radio transmitter) to increase infrastructure resilience, maintain continuity of operations, and ensure the continued functionality of Community Lifelines.	DF, DR, EC, EH, EQ, F, MS, SS, SWS, T, WF	C T	S&IP	Medium SVI: 0.2505	---	Yes	3, 5	HM	High/High	County Highway Engineer	3-5 years	County / FHWA BRIC HMGP	Existing (2016)
Make County highway documents available online including long range plans, maps, policies, and procedures to assist residents in preparing for and reducing their risk to natural hazards.	DF, EQ, F, MS, SS, SWS, T, WF	---	E&A	Large SVI: 0.2505	---	---	1, 4	LM	Low/Medium	County Highway Engineer	2 years	County	Existing (2016)

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Acronyms

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Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 11 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Highway Department Continued…													
Purchase road signage and barricades to alert motorists of hazardous driving conditions, detours, etc. associated with natural hazard events.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	C	E&A	Medium SVI: 0.2505	---	---	2	LM	Medium/Medium	County Highway Engineer	2-5 years	County	Existing (2016)
Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to exceed federal standards and reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	S&S	LP&R	Small SVI: 0.2505	Yes	Yes	1, 2, 6, 7	HM	Low/Medium	Highway Engineer / County Board	1-5 years	County	Existing (2016)
Continue to make the most recent Flood Insurance Rate Maps available at the Highway Department to assist the public in considering where to construct new buildings.*	F	S&S	E&A	Small SVI: 0.2505	Yes	---	1, 2, 6, 7	LM	Low/Medium	Highway Engineer	1-5 years	County	Existing (2016)

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* Mitigation action to ensure continued compliance with NFIP.

Acronyms

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Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter 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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-16
Montgomery County Hazard Mitigation Actions
(Sheet 12 of 12)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Highway Department Continued…													
Continue to make County officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	S&S	E&A	Small SVI: 0.2505	Yes	---	1	LM	Low/Medium	Highway Engineer	1-5 years	County	Existing (2016)
Supervisor of Assessments													
Obtain new high resolution orthographic photography of Montgomery County with LIDAR topographic Digital Elevation Model (1 ft. contours) for flood analysis.	F, SS	---	LP&R	Small SVI: 0.2505	---	---	3, 4, 5, 6, 7	LM	Medium/Medium	Supervisor of Assessments	1-3 years	County	Existing (2016)
Upon obtaining new LIDAR data, perform floodway delineation analysis of selected waterways and streams in the County to identify areas where flood mitigation measures need to be implemented.	F, SS	S&S	LP&R	Small SVI: 0.2505	Yes	Yes	3, 4, 5, 6, 7	HM	Medium/High	Supervisor of Assessments	3-5 years	County / FEMA FMA	Existing (2016)

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* Mitigation action to ensure continued compliance with NFIP.

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Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
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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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-17
Coffeen Hazard Mitigation Actions
(Sheet 1 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Retrofit City Hall/Police Department to include a community safe room, equipped with an emergency backup generator and HVAC system, that can also serve as a warming/cooling center and emergency shelter for City residents to establish a Community Lifeline essential to human health and safety.	EC, EH, EQ, F, MS, SS, SWS, T	---	S&IP	Small SVI: 0.4261 CEJST: No EDRC: Yes	Yes	---	2	HM	High/High	Mayor / City Council	5 years	City / FEMA HMGP BRIC	New
Purchase and install emergency backup generator at City Hall to establish a resilient and reliable power supply, maintain operations during extended power outages, and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, MS, SS, SWS, T	C S&S	S&IP	Medium SVI: 0.4261 CEJST: No EDRC: Yes	---	Yes	2, 3, 5	HM	High/High	Mayor / City Council	1-3 years	City / FEMA HMGP BRIC	New
Purchase and install automatic emergency backup generator at the City's Streets Buildings to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, MS, SS, SWS, T	T	S&IP	Medium SVI: 0.4261 CEJST: No EDRC: Yes	---	Yes	3, 5	HM	Medium/High	Streets Commissioner	1-3 years	City / FEMA HMGP BRIC	New

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Acronyms

Priority

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Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-17
Coffeen Hazard Mitigation Actions
(Sheet 2 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upsize main storm sewer drain along IL Route 185 increase storage and draining capacity, ensure system resilience and functionality, and better manage stormwater runoff in an effort to address recurring heavy rain/flood events that overwhelm the system.	F, SS	FWS	S&IP	Medium SVI: 0.4261 CEJST: No EDRC: Yes	---	Yes	3, 5	HM	High/High	Streets Commissioner	5 years	City / IEPA SRF – WPCLP / USDA – RD Water & Waste Disposal Program	New
Purchase an interoperable communications system to ensure emergency communications system resiliency and functionality and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, MS, SS, SWS, T	C	S&IP LP&R	Medium SVI: 0.4261 CEJST: No EDRC: Yes	---	Yes	2, 5, 9	LM	High/High	Mayor / City Council	1-2 years	City / FEMA BRIC / USDA – RD Community Facilities Programs	New
Conduct hydrologic/hydraulic analysis to identify design solutions to alleviate recurring drainage/flooding problems within the City.	F, SS	T	LP&R	Medium SVI: 0.4261 CEJST: No EDRC: Yes	---	---	3, 5	LM	Medium/Medium	Streets Commissioner	3-5 years	City / Township / IDOT Local Roads	New

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Acronyms

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Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-17
Coffeen Hazard Mitigation Actions
(Sheet 3 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Construct the identified design solutions to alleviate recurring drainage problems and better manage stormwater runoff within the City.	F, SS	T	S&IP	Medium SVI: 0.4261 CEJST: No EDRC: Yes	---	Yes	3, 5	HM	High/High	Streets Commissioner	5-10 years	Village / Township / FHWA PROTECT	Existing (2016)
Upgrade/slip line sanitary sewer sections/mains to eliminate stormwater infiltration, increase system resilience, prevent sewage backups, and mitigate risk to a Community Lifeline.	F, SS	FWS	S&IP	Medium SVI: 0.4261 CEJST: No EDRC: Yes s	Yes	Yes	3, 5	HM	High/High	Water/Sewer Commissioner	3-5 years	City / USDA – RD Water & Waste Program / IEPA SRF – WPCLP	Existing (2016)
Construct stormwater drainage system (ditches, culverts, etc.) in select areas of the City to alleviate recurring drainage/ponding problems experienced during heavy rain events, better manage stormwater runoff, and increase system resilience.	F, SS	T	S&IP	Medium SVI: 0.4261 CEJST: No EDRC: Yes	---	Yes	3, 5	HM	Medium/High	Streets Commissioner	1-5 years	City / USDA – RD Water & Waste Program / IEPA SRF – WPCLP	Existing (2016)

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Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-17
Coffeen Hazard Mitigation Actions
(Sheet 4 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Construct a retention pond at the wastewater treatment facility to manage excess stormwater that infiltrates the sewer system during heavy rains, overwhelming the facility's capacity.	F, SS	FWS	S&IP	Large SVI: 0.4261 CEJST: No EDRC: Yes	Yes	Yes	3, 5	HM	High/High	Streets Commissioner	5-10 years	City / USDA – RD Water & Waste Disposal Program / IEPA SRF – WPCLP	Existing (2016)
Purchase barricades, road signage, and portable lights to alert motorists of hazardous driving conditions, detours, etc. associated with natural hazard events.	EC, EH, EQ, F, MS, SS, SWS, T	C	E&A	Medium SVI: 0.4261 CEJST: No EDRC: Yes	---	---	2	LM	Medium/Medium	Streets Commissioner	2-5 years	City	Existing (2016)
Secure Memorandum of Agreement with Coffeen Elementary School to designate the building as a warming/cooling center and emergency shelter for use by area residents to establish a Community Lifeline essential to human health and safety.	EC, EH, EQ, F, MS, SS, SWS, T	---	LP&R	Medium SVI: 0.4261 CEJST: No EDRC: Yes	---	---	2	LM	Low/Medium	Mayor / City Council	1-3 years	City	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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. 550 individuals). The City\ works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-17
Coffeen Hazard Mitigation Actions
(Sheet 5 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Assess the water tower to identify its exposure/vulnerability to damage from natural hazards and identify appropriate protective measures that could be undertaken to harden this critical infrastructure.	DR, EC, EQ, SS, SWS, T	FWS	LP&R	Large SVI: 0.4261 CEJST: No EDRC: Yes	---	---	2, 3, 5	LM	Low/Medium	Water/Sewer Commissioner	1-5 years	City	Existing (2016)
Harden existing water tower and/or construct a new water tower to ensure community resiliency and reliability of a Community Lifeline.	DR, EC, EH, EQ, SS , SWS, T	FWS	S&IP	Large SVI: 0.4261 CEJST: No EDRC: Yes	---	Yes	2, 3, 5	HM	High/High	Water/Sewer Commissioner	5-10 years	City / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	Existing (2016)
Purchase and install automatic emergency backup generator at the water tower/pump station located on Maple Street to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Community Lifeline.	EC, EH, EQ, MS, F, SS, SWS, T	FWS	S&IP	Large SVI: 0.4261 CEJST: No EDRC: Yes	---	Yes	2, 3, 5	HM	Medium/High	Water/Sewer Commissioner	3-5 years	City / FEMA HMGP BRIC	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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. 550 individuals). The City\ works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-17
Coffeen Hazard Mitigation Actions
(Sheet 6 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase and install automatic emergency backup generator at the wastewater treatment facility to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Community Lifeline.	EC, EH, EQ, MS, F, SS, SWS, T	FWS	S&IP	Large SVI: 0.4261 CEJST: No EDRC: Yes	---	Yes	2, 3, 5	HM	Medium/High	Water/Sewer Commissioner	5 years	City / FEMA HMGP BRIC	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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. 550 individuals). The City\ works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-18
Coffeen Volunteer Fire Department Hazard Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Design and construct a community safe room (built to high wind standards and equipped with emergency backup generator and HVAC system) at the fire station for use by first responders and City residents to establish a Community Lifeline.	SS, T	---	S&IP	Medium SVI: 0.4261 CEJST: No	Yes	---	2	HM	High/High	Fire Chief Board of Trustees / Mayor City Council	2 years	FD / City / FEMA HMGP BRIC / USDA – RD Critical Facilities Programs	New
Establish dedicated emergency detour routes within the District to ensure functionality of Safety & Security Community Lifelines in the event key transportation routes are inaccessible due to natural hazard incidents.	DF, EH, EQ, F, MS, SS, SWS, T, WF	S&S	LP&R	Large SVI: 0.4261 CEJST: No	---	---	2, 4, 5	LM	Low/High	Fire Chief / Board of Trustees	2 years	FD	New
Identify alternate location for District trucks, equipment, gear, etc. in the event a natural hazard incident impacts the fire house to ensure continued functionality of a Community Lifeline service.	DF, EH, EQ, F, MS, SS, SWS, T, WF	S&S	LP&R	Large SVI: 0.4261 CEJST: No	---	---	2, 4, 5	LM	Low/Medium	Fire Chief / Board of Trustees	2 years	FD	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 small rural, all-volunteer fire protection district of this size (serving approx2,800 individuals in a service area of 81 square miles). Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-18
Coffeen Volunteer Fire Department Hazard Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase P25-compliant interoperable land mobile radio system to allow District staff to exchange critical communications/provide mutual aid across partner agencies and jurisdictions within and outside of the County.	DF, EC, EH, EQ, F, MS, SS, SWS, T, WF	C	S&IP	Large SVI: 0.4261 CEJST: No	---	---	2, 3, 5, 9		High/High	Fire Chief / Board of Trustees	1-5 years	FD / FEMA BRIC	New
Make public information materials available to District residents that detail the risks to life and property associated with the natural hazards that impact the District and the proactive approaches they can take to reduce their risk.	DF, DR, EC, EH, EQ, F, MS, SS, SWS, T, WF	---	E&A	Large SVI: 0.4261 CEJST: No	---	---	3, 4	LM	Low/Medium	Fire Chief / Board of Trustees	1-5 years	FD	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 small rural, all-volunteer fire protection district of this size (serving approx2,800 individuals in a service area of 81 square miles). Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DF	Dam Failure	MS	Mine Subsidence
DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-19
Farmersville Hazard Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Design and construct a new Emergency Operations Center (EOC) that serves as a central command and control facility for carrying out emergency management and ensuring the continuity of government/operations for the Village during hazard events.	DF, EC, EH, EQ, F, MS, SS, SWS, T	C S&S	S&IP	Large SVI: 0.2183 CEJST: Yes EDRC: Yes	Yes	---	2, 3, 5	HM	High/High	President / Village Board	5 years	Village	Existing (2016)
Purchase and install emergency backup generators at village-owned critical facilities, infrastructure systems, and shelters to establish resilient and reliable power supplies, maintain continuity of government/operations, and mitigate risk to Community Lifelines.	DF, EC, EH, EQ, F, MS, SS, SWS, T	C FWS S&S	S&IP	Medium SVI: 0.2183 CEJST: Yes EDRC: Yes	---	Yes	2, 3, 5	HM	Medium/High	President / Village Board	5 years	Village / FEMA HMGP BRIC	Existing (2016)
Conduct hydrologic/hydraulic analysis to determine the cause and identify design solutions to alleviate recurring roadway drainage/flooding problems in residential areas and ensure continued functionality of Community Lifelines.	F, SS	T	LP&R	Medium SVI: 0.2183 CEJST: Yes EDRC: Yes	---	---	3, 5	LM	Medium/Medium	President / Village Board	5 years	Village / Township / IDOT Local Roads	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 700 individuals). The Village works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-19
Farmersville Hazard Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Construct the identified design solutions to alleviate recurring roadway drainage/flooding problems in residential areas, better manage stormwater runoff, and ensure continued functionality of Community Lifelines.	F, SS	T	S&IP	Medium SVI: 0.2183 CEJST: Yes EDRC: Yes	---	Yes	3, 5	HM	High/Medium	President / Village Board	10 years	Village / Township / FHWA PROTECT	Existing (2016)
Harden essential key infrastructure such as the drinking water treatment facility and wastewater treatment plant to increase system resilience, maintain continuity of government/operations, and mitigate risk to Community Lifelines.	DF, EC, EH, EQ, F, MS, SS, SWS, T	FWS	S&IP	Large SVI: 0.2183 CEJST: Yes EDRC: Yes	---	Yes	3, 5	HM	High/High	President / Village Board	10 years	Village / USDA – RD Water & Waste Disposal Program / FEMA HMGP BRIC	Existing (2016)
Make public information materials available to residents that detail the risk to life and property associated with the natural hazards that impact the Village and the proactive approaches they can take to reduce their risk.	DF, DR, EC, EH, EQ, F, MS, SS, SWS, T	---	E&A	Large SVI: 0.2183 CEJST: Yes EDRC: Yes	---	---	2	LM	Low/Medium	President / Village Board	1-5 years	Village	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 700 individuals). The Village works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-20
Fillmore Community Fire Protection District Hazard Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Design and construct a community safe room at the fire station (built to high wind standards and equipped with HVAC system and emergency backup generator and/or electrical hookups to the fire station's generator) for use by first responders and Village residents to establish a Community Lifeline.	SS, T	---	S&IP	Medium SVI: 0.4257 – 0.4261 CEJST: No	Yes	---	2	HM	High/High	Fire Chief / Board of Trustees	5 years	FPD / FEMA HMGP BRIC / USDA – RD Critical Facilities Programs	New
Identify dry hydrants and water wells within the District that can be used as filling stations to supply an uninterrupted flow of water to aid in fire suppression as necessary during natural hazard events.	DR, EQ, SS, T, WF	S&S	LP&R	Large SVI: 0.4257 – 0.4261 CEJST: No	---	---	2, 4, 5	LM	Low/Medium	Fire Chief / Board of Trustees	2-5 years	FPD	New
Identify alternate location for District trucks, equipment, gear, etc. in the event a natural hazard incident impacts the fire house to ensure continued functionality of a Community Lifeline service.	EH, EQ, F, SS, SWS, T, WF	S&S	LP&R	Large SVI: 0.4257 – 0.4261 CEJST: No	---	---	2, 4, 5	LM	Low/Medium	Fire Chief / Board of Trustees	2 years	FPD	New

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Acronyms

Priority

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

Hazard(s) to be Mitigated:

DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-20
Fillmore Community Fire Protection District Hazard Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Purchase P25-compliant interoperable land mobile radio system to allow District staff to exchange critical communications/provide mutual aid across partner agencies and jurisdictions within and outside of the County.	EC, EH, EQ, F, MS, SS, SWS, T, WF	C	S&IP	Large SVI: 0.4257 – 0.4261 CEJST: No	---	---	2, 3, 5, 9		High/High	Fire Chief / Board of Trustees	1-5 years	FPD / FEMA BRIC	New
Make public information materials available to District residents that detail the risks to life and property associated with the natural hazards that impact the District and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T, WF	---	E&A	Large SVI: 0.4257 – 0.4261 CEJST: No	---	---	3, 4	LM	Low/Medium	Fire Chief / Board of Trustees	1-5 years	FPD	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 small rural, all-volunteer fire protection district of this size (serving approx. 1,500 individuals in a service area of 82 square miles). Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-21
Harvel Hazard Mitigation Actions

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase and install automatic emergency backup generator at drinking water treatment facility to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, SS, SWS, T	FWS	S&IP	Large SVI: 0.2183 CEJST: Yes EDRC: Yes	---	Yes	2, 3, 5	HM	Medium/High	President / Village Board	1-3 years	Village / FEMA HMGP BRIC	New
Retrofit the Community Center (former school gymnasium) to include a community safe room, equipped with an emergency backup generator and HVAC system, that can also serve as a warming/cooling center and emergency shelter for Village residents to establish a Community Lifeline essential to human health and safety.	EC, EH, EQ, F, SS, SWS, T	---	S&IP	Large SVI: 0.2183 CEJST: Yes EDRC: Yes	Yes	---	2	HM	High/High	President / Village Board	2-5 years	Village / FEMA HMGP BRIC	New
Make public information materials available to residents that detail the risk to life and property associated with the natural hazards that impact the Village and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	---	E&A	Large SVI: 0.2183 CEJST: Yes EDRC: Yes	---	---	2	LM	Low/Medium	President / Village Board	1-5 years	Village	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 200 individuals). The Village struggles to provide even the most critical of services to residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-22
Hillsboro Hazard Mitigation Actions
(Sheet 1 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase and install additional storm warning sirens in areas without alert coverage to maximize the system's effectiveness and establish/ensure continued operation of a Community Lifeline essential to human health and safety. One potential location would be the North Marina.	SS, T	C	S&IP E&A	Medium SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	---	---	2	HM	Medium/High	Mayor / City Council	1-2 years	City / FEMA BRIC / USDA – RD Critical Facilities Programs	New
Install new force main at Helston Place to accommodate increased flow during heavy rain/flood events & alleviate drainage problems.	F, SS	FWS	S&IP	Small SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	Yes	Yes	2, 3, 5	HM	Medium/Medium	Commissioner of Public Property	1-2 years	City / IEPA SRF – WPCLP / USDA – RD Water & Waste Disposal Program	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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. 6,600 individuals). The City works hard to maintain 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-22
Hillsboro Hazard Mitigation Actions
(Sheet 2 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Replace Seward St. bridge over an unnamed tributary of Middle Fork Shoal Creek to increase carrying capacity, alleviate flood/drainage problems, and ensure continued functionality of a Transportation Community Lifeline.	F, SS	T	S&IP	Small SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	Yes	Yes	3, 5	HM	Medium/High	Commissioner of Streets & Public Improvement	4 years	City / FHWA PROTECT / FEMA FMA HMGP	New
Upgrade/retrofit the storm sewer system to eliminate stormwater infiltration, increase storage and draining capacity, ensure system resilience and functionality, and better manage stormwater runoff in an effort to address recurring heavy rain/flood events that overwhelm the system.	F, SS	FWS	S&IP	Medium SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	Yes	Yes	3, 5	HM	High/High	Mayor / City Council	5-10 years	City / IEPA SRF – WPCLP / USDA – RD Water & Waste Disposal Program	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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. 6,600 individuals). The City works hard to maintain 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-22
Hillsboro Hazard Mitigation Actions
(Sheet 3 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure: New	Reduce Effects of Hazard(s) on Buildings & Infrastructure: Existing	Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
Expand the storm sewer system to include the areas of Northwood Heights, Parkside, and Helston Place to better manage stormwater runoff and alleviate recurring drainage/flooding problems experienced in these areas.	F, SS	FWS	S&IP	Small SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	Yes	Yes	3, 5	HM	High/High	Mayor / City Council	5-10 years	City / IEPA SRF – WPCLP / USDA – RD Water & Waste Disposal Program	Existing (2016)
Conduct sewer line reconnaissance study to identify locations where storm water infiltrates the system and mitigate risk to a Community Lifeline.	F, SS	FWS	LP&R	Medium SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	---	---	3, 5	LM	Medium/Medium	Mayor / City Council	2-5 years	City / USDA – RD Water & Waste Program	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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. 6,600 individuals). The City works hard to maintain 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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HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-22
Hillsboro Hazard Mitigation Actions
(Sheet 4 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upgrade/slip line sanitary sewer sections/mains to eliminate stormwater infiltration, increase system resilience, prevent sewage backups, and mitigate risk to a Community Lifeline.	F, SS	FWS	S&IP	Medium SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	Yes	Yes	3, 5	HM	High/High	Mayor / City Council	5-10 years	City / USDA – RD Water & Waste Program / IEPA SRF – WPCLP	Existing (2016)
Upgrade/retrofit drinking water system (water lines, mains, hydrants, pumping system, etc.) within the Village to increase system resilience, ensure a constant supply of water for residents, and aid in fire suppression during hazard events. Locations include but are not limited to Fairgrounds Road.	DR, EC, EH, EQ, F, MS, SS, SWS, T	FWS	S&IP	Medium SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	Yes	Yes	3, 5	HM	High/High	Mayor / City Council	5-10 years	City / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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. 6,600 individuals). The City works hard to maintain 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-22
Hillsboro Hazard Mitigation Actions
(Sheet 5 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upsize roadway culverts at Fairground Avenue (near Hillsboro Jr. & Sr. High Schools) to increase carrying capacity, better manage stormwater runoff, alleviate recurring drainage problems, and ensure system resilience and functionality.	F, SS	T	S&IP	Small SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	---	Yes	3, 5	HM	Medium/High	President / Village Board	5 years	City / FHWA PROTECT	Existing (2016)
Purchase an interoperable communications system for use by fire, police, and dispatch to ensure system resilience and functionality, improve coordination, and mitigate risk to a Community Lifeline.	DF, EC, EH, EQ, F, MS, SS, SWS, T	C	S&IP LP&R	Large SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	---	Yes	2, 5, 9	LM	High/High	Mayor / City Council	5 years	City / FEMA BRIC / USDA – RD Community Facilities Programs	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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. 6,600 individuals). The City works hard to maintain 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-22
Hillsboro Hazard Mitigation Actions
(Sheet 6 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Coordinate with IDOT regarding remedies to address recurring drainage/flooding problems of IL Route 16 underpass of the Union Pacific Railroad.	F, SS	T	E&S	Medium SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	---	---	2, 3, 5	LM	Low/Low	Mayor / City Council	1-3 years	City	Existing (2016)
Conduct hydrologic/hydraulic analysis to identify design solutions to alleviate recurring drainage problems impacting homes in the vicinity of an unnamed creek near Mechanic Street and Hollis Lane.	F, SS	T	LP&R	Small SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	---	---	2, 3, 5	LM	Low/Medium	Mayor / City Council	5 years	City / IDOT Local Roads	Existing (2016)
Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to exceed federal standards and reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	S&S	LP&R	Small SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	Yes	Yes	1, 2, 6, 7	HM	Low/Medium	Mayor City Council / City Clerk	1-5 years	City	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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. 6,600 individuals). The City works hard to maintain critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

* Mitigation action to ensure continued compliance with NFIP.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-22
Hillsboro Hazard Mitigation Actions
(Sheet 7 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Continue to make the most recent Flood Insurance Rate Maps available at the City Clerk's Office to assist the public in considering where to construct new buildings.*	F	S&S	E&A	Small SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	Yes	---	1, 2, 6, 7	LM	Low/Low	City Clerk	1-5 years	City	Existing (2016)
Continue to make City officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	S&S	E&A	Small SVI: 0.4257 – 0.6336 CEJST: No EDRC: No	Yes	---	1	LM	Low/Lowe	City Clerk	1-5 years	City	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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. 6,600 individuals). The City works hard to maintain critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

* Mitigation action to ensure continued compliance with NFIP.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-23
Litchfield Hazard Mitigation Actions
(Sheet 1 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase P25-compliant interoperable land mobile radio system to allow City personnel to exchange critical communications across departments, agencies, and jurisdictions to maintain continuity of government/ operations and ensure system resilience and functionality of a Community Lifeline.	DF, EC, EH, EQ, F, MS, SS, SWS, T	C	S&IP	Medium SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	---	---	2, 3, 5, 9		High/High	Mayor / City Council	1-5 years	City / FEMA BRIC	New
Purchase and install automatic emergency backup generators at the City's Streets Buildings to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, SS, SWS, T	T	S&IP	Medium SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	---	Yes	3, 5	HM	Medium/High	Mayor / City Council	3-5 years	City / FEMA HMGP BRIC	Existing (2016)
Upgrade/slip line sanitary sewer sections/mains to eliminate stormwater infiltration in the wastewater system, increase system resilience, prevent sewage backups, and mitigate risk to a Community Lifeline.	F, SS	FWS	S&IP	Medium SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	Yes	Yes	3, 5	HM	High/High	Mayor / City Council	5-10 years	City / USDA – RD Water & Waste Program / IEPA SRF – WPCLP	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

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Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-23
Litchfield Hazard Mitigation Actions
(Sheet 2 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Design and construct a community safe rooms as strategic locations in the City, built to high wind and seismic standards and equipped with an emergency backup generators and HVAC systems, that can also serve as a warming/cooling centers and emergency shelters for City residents to establish Community Lifelines essential to human health and safety.	DF, EC, EH, EQ, F, MS, SS, SWS, T	---	S&IP	Medium SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	Yes	---	2	HM	High/High	Mayor / City Council	5 years	City / FEMA HMGP BRIC	Existing (2016)
Construct railroad overpass/underpass of Norfolk Southern/BNSF rail lines to ensure community resilience by maintaining access to vital municipal services throughout the entire City. Presently there are six at-grade crossings all within a mile of each other in the City. The main crossings are only blocks apart. If a train were to breakdown or derail, a majority, if not all of the crossings could be blocked separating the west side of the City and Interstate 55 from critical emergency services.	DF, EC, EH, EQ, F, MS, SS, SWS, T	S&S T	S&IP	Large SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	---	Yes	2, 3, 5	HM	High/High	Mayor / City Council	5-10 years	City / ICC Grade Crossing Protection Funds	Existing (2016)

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Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-23
Litchfield Hazard Mitigation Actions
(Sheet 3 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Construct a sediment basin at Lake Lou Yaeger to capture sediment laden runoff and prevent it from entering the Lake, impacting storage capacity and water quality. Lake Lou Yaeger is one of two surface water bodies used to supply drinking water to the City.	DR, F, SS	FWS	S&IP NSP	Large SVI: 0.0531 – 0.7337 CEJST: No EDRC: No	Yes	Yes	3, 5, 6, 8	LM	High/Medium	Mayor / City Council	5-10 years	City / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	Existing (2016)
Construct stormwater drainage system (ditches, culverts, etc.) in select areas of the City to alleviate recurring flood problems experienced during heavy rain events, better manage stormwater runoff, and increase system resilience.	F, SS	T	S&IP	Small SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	---	Yes	3, 5	HM	Medium/High	Mayor / City Council	2-5 years	City / USDA – RD Water & Waste Program / IEPA SRF – WPCLP	Existing (2016)

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Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-23
Litchfield Hazard Mitigation Actions
(Sheet 4 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Bury power lines to critical facilities and infrastructure systems to establish a resilient and reliable power supply, limit service disruptions, and mitigate risk to a Community Lifeline.	DF, EQ, F, SS, SWS, T	E S&S	S&IP	Medium SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	Yes	Yes	3, 5	HM	Medium/High	Mayor / City Council	5 years	City / FEMA HMGP BRIC	Existing (2016)
Harden key critical facilities and infrastructure systems to increase community resilience, ensure the continued functionality of Community Lifelines and maintain continuity of government/operations. Measures could include but are not limited to seismic retrofits, roof anchoring systems, shatter resistant/shatter-proof windows, etc.).	EQ, SS, T	S&S	S&IP	Medium SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	---	Yes	2, 3, 5	HM	High/High	Mayor / City Council	5-10 years	City / FEMA HMGP BRIC	Existing (2016)
Seismically retrofit Lake Lou Yaeger's earthen dam, intake structure, and bridge across the dam to increase system resilience and ensure the continued functionality of a Community Lifeline. Lake Lou Yaeger is one of two surface water bodies used to supply drinking water to the City.	EQ, SS, T	S&S T	S&IP	Medium SVI: 0.0531 – 0.7337 CEJST: No EDRC: No	---	Yes	2, 3, 5	HM	High/High	Mayor / City Council	5-10 years	City / FEMA HMGP BRIC	Existing (2016)

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Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-23
Litchfield Hazard Mitigation Actions
(Sheet 5 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Seismically retrofit Lake Litchfield's earthen dam and intake structure to increase system resilience and ensure the continued functionality of a Community Lifeline. Lake Litchfield is one of two surface water bodies used to supply drinking water to the City.	EQ, SS, T	S&S T	S&IP	Medium SVI: 0.0531 – 0.7337 CEJST: No EDRC: No	---	Yes	2, 3, 5	HM	High/High	Mayor / City Council	5-10 years	City / FEMA HMGP BRIC	Existing (2016)
Install mine subsidence protection measures at Litchfield High School to improve infrastructure resilience and mitigate risk to a Community Lifeline.	MS	S&S	S&IP	Medium SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	---	Yes	2, 3, 5	HL	High/High	Mayor / City Council	5-10 years	City / USDA – RD Critical Facilities Program	Existing (2016)
Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to exceed federal standards and reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	S&S	LP&R	Small SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	Yes	Yes	1, 2, 6, 7	HM	Low/Medium	Mayor City Council / Building Inspector	1-5 years	City	Existing (2016)

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* Mitigation action to ensure continued compliance with NFIP.

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Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-23
Litchfield Hazard Mitigation Actions
(Sheet 6 of 6)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Continue to make the most recent Flood Insurance Rate Maps available at the Building & Zoning Department's Office to assist the public in considering where to construct new buildings.*	F	S&S	E&A	Small SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	Yes	---	1, 2, 6, 7	LM	Low/Low	Building Inspector	1-5 years	City	Existing (2016)
Continue to make City officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	S&S	E&A	Small SVI: 0.0531 – 0.7337 CEJST: Yes EDRC: No	Yes	---	1	LM	Low/Lowe	Building Inspector	1-5 years	City	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

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Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-24
Nokomis Hazard Mitigation Actions
(Sheet 1 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase a portable emergency backup generator or purchase and install automatic emergency backup generators at sanitary lift stations to establish resilient and reliable power supplies in order to maintain continuity of operations and mitigate risk to a Community Lifeline.	EC, EH, EQ, MS, F, SS, SWS, T	FWS	S&IP	Large SVI: 0.4385 CEJST: No EDRC: No	Yes	Yes	3, 5	HM	Medium/High	Mayor / City Council	3-5 years	City / FEMA HMGP BRIC	New
Purchase and install automatic emergency backup generators at existing drinking water wells to establish resilient and reliable power supplies in order to maintain continuity of operations and mitigate risk to a Community Lifeline.	EC, EH, EQ, MS, F, SS, SWS, T	FWS	S&IP	Large SVI: 0.4385 CEJST: No EDRC: No	Yes	Yes	3, 5	HM	Medium/High	Mayor / City Council	3-5 years	City / FEMA HMGP BRIC	New
Identify an alternate/emergency drinking water supply option (i.e., interconnect with EJ Water Coop., etc.) to establish a constant and reliable supply of water for residents, ensure community resilience to drought, and aid in fire suppression during natural hazard events.	DR, EC, EH, EQ, F, MS, SS, SWS, T	FWS	LP&R	Large SVI: 0.4385 CEJST: No EDRC: No	---	---	2, 3, 4, 5	LM	Low/High	Mayor / City Council	2-5 years	City	New

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Acronyms

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Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-24
Nokomis Hazard Mitigation Actions
(Sheet 2 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Conduct sewer line reconnaissance study to identify locations where storm water infiltrates the system and mitigate risk to a Community Lifeline.	F, SS	FWS	LP&R	Large SVI: 0.4385 CEJST: No EDRC: No	---	---	3, 5	LM	Medium/Medium	Mayor / City Council	1-2 years	City / USDA – RD Water & Waste Program	Existing (2016)
Upgrade/slip line sanitary sewer sections/mains to eliminate stormwater infiltration, increase system resilience, prevent sewage backups, and mitigate risk to a Community Lifeline.	F, SS	FWS	S&IP	Large SVI: 0.4385 CEJST: No EDRC: No	Yes	Yes	3, 5	HM	High/High	Mayor / City Council	1-2 years	City / USDA – RD Water & Waste Program / IEPA SRF – WPCLP	Existing (2016)

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Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
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Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-24
Nokomis Hazard Mitigation Actions
(Sheet 3 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upsize approximately 900 feet of storm sewer line along S. Union Street to eliminate stormwater infiltration, increase storage and draining capacity, ensure system resilience and functionality, and better manage stormwater runoff in an effort to address recurring heavy rain/flood events that overwhelm the system.	F, SS	FWS	S&IP	Small SVI: 0.4385 CEJST: No EDRC: No	---	Yes	3, 5	HM	High/High	Mayor / City Council	2-3 years	City / IEPA SRF – WPCLP / USDA – RD Water & Waste Disposal Program	Existing (2016)
Upsize approximately 2,000 feet of storm sewer line along South Street to eliminate stormwater infiltration, increase storage and draining capacity, ensure system resilience and functionality, and better manage stormwater runoff in an effort to address recurring heavy rain/flood events that overwhelm the system.	F, SS	FWS	S&IP	Small SVI: 0.4385 CEJST: No EDRC: No	---	Yes	3, 5	HM	High/High	Mayor / City Council	2-3 years	City / IEPA SRF – WPCLP / USDA – RD Water & Waste Disposal Program	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,250 individuals). The City works hard to maintain 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-24
Nokomis Hazard Mitigation Actions
(Sheet 4 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upsize approximately 900 feet of storm sewer line in alley running between State Street and South Street (behind McKay Auto Parts) to eliminate stormwater infiltration, increase storage and draining capacity, ensure system resilience and functionality, and better manage stormwater runoff in an effort to address recurring heavy rain/flood events that overwhelm the system.	F, SS	FWS	S&IP	Small SVI: 0.4385 CEJST: No EDRC: No	---	Yes	3, 5	HM	High/High	Mayor / City Council	2-3 years	City / IEPA SRF – WPCLP / USDA – RD Water & Waste Disposal Program	Existing (2016)
Upsize S. Union Street structure over unnamed tributary of East Fork Shoal Creek (adjacent to Shane Coal Park) to address scour damage and erosion caused by repeated flooding and increase carrying capacity to ensure structure resilience and functionality.	F, SS	T	S&IP	Small SVI: 0.4385 CEJST: No EDRC: No	---	Yes	3, 5	HM	Medium/High	Mayor / City Council	5 years	City / IDOT Local Roads	Existing (2016)
Remove debris, vegetative overgrowth, snags, and brush from unnamed tributary of East Fork Shoal Creek within the City to maximize flow/carrying capacity, better manage stormwater runoff, and reduce/prevent drainage problems.	F, SS	T	S&IP	Small SVI: 0.4385 CEJST: No EDRC: No	---	Yes	5, 6, 8	LM	Low/Medium	Mayor / City Council	2-3 years	City	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,250 individuals). The City works hard to maintain 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 frequent hazards
LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-24
Nokomis Hazard Mitigation Actions
(Sheet 5 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Design and construct a community safe room, built to high wind and seismic standards and equipped with an emergency backup generator and HVAC system, that can also serve as a warming/cooling center and emergency shelter for City residents to establish a Community Lifeline essential to human health and safety.	EC, EH, EQ, F, MS, SS, SWS, T	---	S&IP	Small SVI: 0.4385 CEJST: No EDRC: No	Yes	---	2	HM	High/High	Mayor / City Council	3-5 years	City / FEMA HMGP BRIC	Existing (2016)
Conduct a study of the storm sewer system and small stream capacity in the area south of the Union Pacific Railroad tracks within the City to identify design solutions to better manage stormwater runoff in an effort to address recurring heavy rain/flood events that overwhelm the system. The study will take into account the present configuration of the systems and make recommendations to increase capacity.	F, SS	FWS	LP&R	Small SVI: 0.4385 CEJST: No EDRC: No	---	---	3, 5	LM	Medium/Medium	Mayor / City Council	3 years	City	Existing (2016)

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Acronyms

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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-24
Nokomis Hazard Mitigation Actions
(Sheet 6 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upgrade the storm sewer system south of the Union Pacific Railroad tracks to increase storage and draining capacity, ensure system resilience and functionality, and better manage stormwater runoff in an effort to address recurring heavy rain/flood events that overwhelm the system.	F, SS	FWS	S&IP	Small SVI: 0.4385 CEJST: No EDRC: No	Yes	Yes	3, 5	HM	High/High	Mayor / City Council	3-5 years	City / IEPA SRF – WPCLP / USDA – RD Water & Waste Disposal Program	Existing (2016)
Correct contour and path of unnamed tributary of East Fork Shoal Creek with the City limits and create additional capacity through the construction of "blue spaces" (stormwater retention/infiltration basins, swales, etc.) in the area of Shane Cole Park to improve community resilience, provide additional storage and capacity to slow stormwater runoff in an effort to reduce flood impacts.	F, SS	S&S	S&IP NSP	Medium SVI: 0.4385 CEJST: No EDRC: No	---	Yes	3, 5, 6	HM	High/High	Mayor / City Council	3-5 years	City / FEMA FMA BRIC	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a city of this size (approx. 2,250 individuals). The City works hard to maintain critical of services to its residents. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-24
Nokomis Hazard Mitigation Actions
(Sheet 7 of 7)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to exceed federal standards and reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	S&S	LP&R	Small SVI: 0.4385 CEJST: No EDRC: No	Yes	Yes	1, 2, 6, 7	HM	Low/Medium	Mayor City Council	1-5 years	City	Existing (2016)
Continue to make the most recent Flood Insurance Rate Maps available at the City Clerk's Office to assist the public in considering where to construct new buildings.*	F	S&S	E&A	Small SVI: 0.4385 CEJST: No EDRC: No	Yes	---	1, 2, 6, 7	LM	Low/Low	Mayor / City Clerk	1-5 years	City	Existing (2016)
Continue to make City officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	S&S	E&A	Small SVI: 0.4385 CEJST: No EDRC: No	Yes	---	1	LM	Low/Lowe	Mayor / City Clerk	1-5 years	City	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

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* Mitigation action to ensure continued compliance with NFIP.

Acronyms

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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-25
Nokomis Area Fire Protection District Hazard Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase and install an automatic emergency backup generator at the Fire Station to establish a resilient and reliable power supply, ensure sustained functionality during extended power outages, maintain continuity of operations, and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, MS, SS, SWS, T, WF	S&S	S&IP	Medium SVI: 0.4257 – 0.4385 CEJST: No	---	Yes	2, 3, 5	HM	Medium/High	Fire Chief / Board of Trustees	5 years	FPD / FEMA BRIC HMGP / USDA – RD Critical Facilities Program	New
Identify dry hydrants and water wells within the District that can be used as filling stations to supply an uninterrupted flow of water to aid in fire suppression as necessary during natural hazard events.	DR, EQ, SS, T, WF	S&S	LP&R	Large SVI: 0.4257 – 0.4385 CEJST: No	---	---	2, 4, 5	LM	Low/Medium	Fire Chief / Board of Trustees	2-5 years	FPD	New
Identify alternate location for District trucks, equipment, gear, etc. in the event a natural hazard incident impacts the fire house to ensure continued functionality of a Community Lifeline service.	EH, EQ, F, SS, SWS, T, WF	S&S	LP&R	Large SVI: 0.4257 – 0.4385 CEJST: No	---	---	2, 4, 5	LM	Low/Medium	Fire Chief / Board of Trustees	2 years	FPD	New

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† 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 small rural, all-volunteer fire protection district of this size (serving approx. 3,500 individuals in a service area of 110 square miles). Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood	WF	Wildfire

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-25
Nokomis Area Fire Protection District Hazard Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase P25-compliant interoperable land mobile radio system to allow District staff to exchange critical communications/provide mutual aid across partner agencies and jurisdictions within and outside of the County.	EC, EH, EQ, F, MS, SS, SWS, T, WF	C	S&IP	Large SVI: 0.4257 – 0.4385 CEJST: No	---	---	2, 3, 5, 9		High/High	Fire Chief / Board of Trustees	1-5 years	FPD / FEMA BRIC	New
Make public information materials available to District residents that detail the risks to life and property associated with the natural hazards that impact the District and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, MS, SS, SW, T, WF	---	E&A	Large SVI: 0.4257 – 0.4385 CEJST: No	---	---	3, 4	LM	Low/Medium	Fire Chief / Board of Trustees	1-5 years	FPD	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

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Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood	WF	Wildfire

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-26
Raymond Hazard Mitigation Actions
(Sheet 1 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Conduct sewer line reconnaissance study of combined sewer system to identify locations where storm water infiltrates the system and mitigate risk to a Community Lifeline.	F, SS	FWS	LP&R	Medium SVI: 0.2183 CEJST: Yes EDRC: Yes	---	---	3, 5	LM	Medium/Medium	President / Village Board	2-5 years	Village / USDA – RD Water & Waste Program	Existing (2016)
Upgrade/slip line sanitary sewer sections/mains of combined sewer system to eliminate stormwater infiltration, increase system resilience, prevent sewage backups, and mitigate risk to a Community Lifeline.	F, SS	FWS	S&IP	Medium SVI: 0.2183 CEJST: Yes EDRC: Yes	Yes	Yes	3, 5	HM	High/High	President / Village Board	5-10 years	Village / USDA – RD Water & Waste Program / IEPA SRF – WPCLP	Existing (2016)
Remove debris, vegetative overgrowth, snags, and brush from Shoal Creek within the Village to maximize flow/carrying capacity, better manage stormwater runoff, and reduce/prevent drainage problems at the Cemetery and Wastewater Treatment Plant.	F, SS	FWS S&S	S&IP	Small SVI: 0.2183 CEJST: Yes EDRC: Yes	---	Yes	5, 6, 8	LM	Low/Medium	President / Village Board	1-5 years	Village	Existing (2016)

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Acronyms

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LL	Mitigation action with the potential to reduce impacts from the less frequent hazards

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-26
Raymond Hazard Mitigation Actions
(Sheet 2 of 2)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Make public information materials available to residents that detail the risk to life and property associated with the natural hazards that impact the Village and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, MS, SS, SWS, T	---	E&A	Large SVI: 0.2183 CEJST: Yes EDRC: Yes	---	---	2	LM	Low/Medium	President / Village Board	1-5 years	Village	New

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Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
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Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-27
Raymond-Harvel Fire Department Hazard Mitigation Actions

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase and install warning sirens in areas without alert coverage to establish a Community Lifeline essential to human health and safety. One potential area would be at Interstate 55 and IL Route 108 near businesses, a rehab facility, and a campground.	SS, T	---	S&IP E&A	Medium SVI: 0.0531 – 0.4257 CEJST: Yes	---	---	4	HM	Medium/High	Fire Chief / Board of Trustees	3-5 years	FD / FEMA BRIC HMGP / USDA – RD Critical Facilities Program	New
Purchase P25-compliant interoperable land mobile radio system to allow District staff to exchange critical communications/provide mutual aid across partner agencies and jurisdictions within and outside of the County.	EC, EH, EQ, F, MS, SS, SWS, T, WF	C	S&IP	Large SVI: 0.0531 – 0.4257 CEJST: Yes	---	---	2, 3, 5, 9		High/High	Fire Chief / Board of Trustees	1-5 years	FD / FEMA BRIC	New
Make public information materials available to District residents that detail the risks to life and property associated with the natural hazards that impact the District and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, MS, SS, SWS, T, WF	---	E&A	Large SVI: 0.0531 – 0.4257 CEJST: Yes	---	---	3, 4		Low/Medium	Fire Chief / Board of Trustees	1-5 years	FD	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 small rural, all-volunteer fire protection district of this size (serving approx. 3,500 individuals in a service area of 127 square miles). Additional funding is necessary if implementation is to be achieved.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado
F	Flood	WF	Wildfire

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-28
Rountree Township Hazard Mitigation Actions

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upsize bridge on E. 17th Road to increase carrying capacity and alleviate recurring flooding problems.	F, SS	T	S&IP	Small SVI: 0.4257 CEJST: Yes EDRC: No	---	Yes	3, 5	HM	High/Medium	Highway Commissioner & Supervisor / County Highway Engineer	1-2 years	Township / County / FHWA PROTECT	New
Make public information materials available to township residents about the risks to life and property associated with the natural hazards that impact the Township and the proactive actions they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T, WF	---	E&A	Large SVI: 0.4257 CEJST: Yes EDRC: No	---	---	1	LM	Low/Medium	Highway Commissioner / Supervisor	1-5 years	Township	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 small, rural township of this size (approx. 120 individuals). The Township works hard to maintain critical services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

DR	Drought	SS	Severe Storms
EC	Extreme Cold	SWS	Severe Winter Storm
EH	Excessive Heat	T	Tornado
EQ	Earthquake	WF	Wildfire
F	Flood		

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-29
Schram City Hazard Mitigation Actions
(Sheet 1 of 3)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase and install storm warning sirens within the City to establish Community Lifelines essential to human health and safety.	SS, T	---	S&IP E&A	Large SVI: 0.6336 CEJST: No EDRC: Yes	---	---	2	HM	Medium/High	President / Village Board	1-3 year	Village / FEMA BRIC HMGP / USDA – RD Critical Facilities Programs	New
Designate emergency shelters within the Village for use by area residents.	DF, EC, EH, EQ, F, MS, SS, SWS, T	---	LP&R	Large SVI: 0.6336 CEJST: No EDRC: Yes	---	---	2	LM	Low/Medium	President / Village Board	1-5 years	Village	Existing (2016)
Purchase and install emergency backup generators at designated emergency shelters to establish a resilient and reliable power supply, maintain operations during extended power outages, and mitigate risk to a Community Lifeline.	DF, EC, EH, MS, EQ, F, MS, SS, SWS, T	FWS	S&IP	Large SVI: 0.6336 CEJST: No EDRC: Yes	---	Yes	2, 3, 5	HM	High/High	President / Village Board	5 years	Village / FEMA BRIC HMGP / USDA – RD Critical Facilities Programs	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 550 individuals). The Village works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-29
Schram City Hazard Mitigation Actions
(Sheet 2 of 3)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Conduct hydrologic/hydraulic analysis to determine the cause(s) and identify design solutions to alleviate recurring drainage/flooding problems experienced in residential areas.	F, SS	T	LP&R	Medium SVI: 0.6336 CEJST: No EDRC: Yes	---	---	3, 5	LM	Medium/Medium	President / Village Board	3-5 years	Village / Township / IDOT Local Roads	Existing (2016)
Construct the identified design solution(s) to alleviate recurring drainage problems experienced in residential areas and better manage stormwater runoff.	F, SS	T	S&IP	Medium SVI: 0.6336 CEJST: No EDRC: Yes	---	Yes	3, 5	HM	High/High	President / Village Board	5-10 years	Village / Township / FHWA PROTECT	Existing (2016)
Design and construct a community safe room, built to high wind and seismic standards and equipped with an emergency backup generator and HVAC system, that can also serve as a warming/cooling center and emergency shelter for Village residents to establish a Community Lifeline essential to human health and safety.	DF, EC, EH, EQ, F, MS, SS, SWS, T	---	S&IP	Medium SVI: 0.6336 CEJST: No EDRC: Yes	Yes	---	2	HM	High/High	President / Village Board	5 years	Village / FEMA HMGP BRIC	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 550 individuals). The Village works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-29
Schram City Hazard Mitigation Actions
(Sheet 3 of 3)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase and install automatic emergency backup generators at the Village five lift stations to establish a resilient and reliable power supply in order to maintain continuity of operations and mitigate risk to a Community Lifeline.	DF, EC, EH, EQ, F, SS, SWS, T	FWS	S&IP	Medium SVI: 0.6336 CEJST: No EDRC: Yes	Yes	Yes	3, 5	HM	High/High	President / Village Board	3-5 years	Village / FEMA HMGP BRIC	Existing (2016)
Review the Flood Insurance Rate Maps (FIRMs) when they become available. Prepare a flood ordinance and present both the FIRMs and ordinance for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding. Currently Schram City is not mapped and has no FIRMs on record.	F	S&S	LP&R	Small SVI: 0.6336 CEJST: No EDRC: Yes	Yes	---	1, 2, 6, 7	HM	Low/Medium	President / Village Board	3-5 years	Village	Existing (2016)
Make public information materials available to residents that detail the risk to life and property associated with the natural hazards that impact the Village and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	---	E&A	Small SVI: 0.6336 CEJST: No EDRC: Yes	---	---	2	LM	Low/Medium	President / Village Board	1-5 years	Village	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† 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 550 individuals). The Village works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-30
Taylor Springs Hazard Mitigation Actions
(Sheet 1 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Design and construct a community safe room, built to high wind standards and equipped with an emergency backup generator and HVAC system, that can also serve as a warming/cooling center for Village residents to establish a Community Lifeline essential to human health and safety.	DF, EC, EH, EQ, F, MS, SS, SWS, T	---	S&IP	Medium SVI: 0.0531 CEJST: No EDRC: Yes	Yes	---	2	HM	High/High	President / Village Board	2 years	Village / FEMA HMGP BRIC	New
Upgrade/retrofit the storm sewer system to eliminate stormwater infiltration, increase storage and draining capacity, ensure system resilience and functionality, and better manage stormwater runoff in an effort to address recurring heavy rain/flood events that overwhelm the system.	F, SS	FWS	S&IP	Medium SVI: 0.0531 CEJST: No EDRC: Yes	Yes	Yes	3, 5	HM	High/High	President / Village Board	3 years	Village / IEPA SRF – WPCLP / USDA – RD Water & Waste Disposal Program	New

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 700 individuals). The Village works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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LM	Mitigation action with the potential to reduce impacts from the most frequent hazards
HL	Mitigation action with the potential to virtually eliminate or significantly reduce impacts from the less frequent hazards
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Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-30
Taylor Springs Hazard Mitigation Actions
(Sheet 2 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upgrade pumps at sanitary lift stations to increase pump capacity, improve system resilience, and ensure continued functionality of a Safety & Security Community Lifeline.	F, SS	FWS	S&IP	Medium SVI: 0.0531 CEJST: No EDRC: Yes	---	Yes	3, 5	HM	Medium/High	President / Village Board	1-5 years	Village / USDA – RD Water & Waste Disposal Program	Existing (2016)
Construct the identified design solution(s) to alleviate recurring drainage problems south of Hamilton Street and better manage stormwater runoff.	F, SS	T	S&IP	Medium SVI: 0.0531 CEJST: No EDRC: Yes	---	Yes	3, 5	HM	High/High	President / Village Board	5-10 years	Village / Township / FHWA PROTECT	Existing (2016)
Purchase and install emergency backup generator at Village Hall to establish a resilient and reliable power supply, maintain operations during extended power outages, and mitigate risk to a Community Lifeline.	DF, EC, EH, EQ, F, MS, SS, SWS, T	C S&S	S&IP	Medium SVI: 0.0531 CEJST: No EDRC: Yes	---	Yes	2, 3, 5	HM	High/High	President / Village Board	1-2 years	Village / FEMA HMGP BRIC	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 700 individuals). The Village works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-30
Taylor Springs Hazard Mitigation Actions
(Sheet 3 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure: New	Reduce Effects of Hazard(s) on Buildings & Infrastructure: Existing	Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
Secure a memorandum of Agreement with Taylor Springs Volunteer Fire Department to install an emergency backup generator at the Fire Station to establish a resilient and reliable power supply and ensure continued operations of a Community Lifeline essential to human health and safety.	DF, EC, EH, EQ, F, MS, SS, SWS, T	---	LP&R	Large SVI: 0.0531 CEJST: No EDRC: Yes	---	---	2, 3, 5	LM	Low/Medium	President Village Board / Fire Chief Board of Trustees	1-2 years	Village / Fire Dept. / FEMA HMGP BRIC	Existing (2016)
Install hardening materials (i.e., shatter-resistant/ shatter-proof windows, roof anchoring system, hail resistant doors/ shingles, etc.) at Village Hall to increase building resilience to natural hazards, maintain continuity of government/operations, protect staff, and mitigate risk to Community Lifelines.	EQ, SS, SWS, T	S&S	S&IP	Medium SVI: 0.0531 CEJST: No EDRC: Yes	---	Yes	2, 3, 5	HM	High/High	President / Village Board	5 years	Village / FEMA BRIC HMGP	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 700 individuals). The Village works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-30
Taylor Springs Hazard Mitigation Actions
(Sheet 4 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)[§]	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)[†]	Status
					New	Existing							
Install hardening materials (i.e., shatter-resistant/ shatter-proof windows, roof anchoring system, hail resistant doors/ shingles, etc.) at Community Buildings, a designated warming/cooling center and emergency shelter, to increase building resilience to natural hazards, maintain continuity of operations, protect staff and residents, and mitigate risk to Community Lifelines.	EQ, SS, T	FWS	S&IP	Medium SVI: 0.0531 CEJST: No EDRC: Yes	---	Yes	2, 3, 5	HM	High/High	President / Village Board	5 years	Village / FEMA BRIC HMGP	Existing (2016)
Upsize roadway culverts along major drainage ditches and install new drainage structures where needed to increase carrying capacity, better manage stormwater runoff, alleviate recurring drainage/flooding problems, and ensure system resilience and functionality.	F, SS	T	S&IP	Large SVI: 0.0531 CEJST: No EDRC: Yes	Yes	Yes	3, 5	HM	Medium/High	President / Village Board	1-5 years	Village / Township / IDOT Local Roads	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

† Identifies the most likely funding source to be pursued for the activity/project described. However, if funding is unavailable through the most likely or other suggested sources, then implementation of medium to large-scale activities/projects is unlikely due to the budgetary constraints experienced by a village of this size (approx. 700 individuals). The Village works hard to provide even the most critical of services to its residents, but it's a struggle. Additional funding is necessary if implementation is to be achieved within the time frames specified.

Acronyms

Priority

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

Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-30
Taylor Springs Hazard Mitigation Actions
(Sheet 5 of 5)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Construct additional wastewater treatment lagoon to increase storage capacity, better manage excess stormwater runoff from the combined sewer system, ensure system resilience and functionality in an effort to address recurring heavy rain events that overwhelm the system.	F, SS	FWS	S&IP	Large SVI: 0.0531 CEJST: No EDRC: Yes	Yes	Yes	3, 5	HM	High/High	President / Village Board	5-10 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – WPCLP	Existing (2016)
Construct a new water tower to provide additional capacity and ensure community resilience to drought, ensure reliability of a Community Lifeline, and aid in fire suppression during natural hazard events.	DR, EC, EH, EQ, SS , SWS, T	FWS	S&IP	Large SVI: 0.0531 CEJST: No EDRC: Yes	---	Yes	2, 3, 5	HM	High/High	President / Village Board	5-10 years	Village / USDA – RD Water & Waste Disposal Program / IEPA SRF – PWSLP	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

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Hazard(s) to be Mitigated:

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

Type of Mitigation Activity:

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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-31
Waggoner Hazard Mitigation Actions
(Sheet 1 of 3)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase and install grounding system on the storm warning siren to protect critical systems and improve the siren's ability to survive a lightning strike.	SS	C	FWS	Large SVI: 0.4257 CEJST: Yes EDRC: Yes	--	Yes	2, 3, 5	HM	Medium/High	President / Village Board	1-5 years	Village / USDA – RD Critical Facilities Programs	New
Construct stormwater drainage system (ditches, culverts, etc.) in select areas of the Village to alleviate recurring flood problems experienced during heavy rain events, better manage stormwater runoff, and increase system resilience. and increase system resilience.	F, SS	T	S&IP	Large SVI: 0.4257 CEJST: Yes EDRC: Yes	---	Yes	3, 5	HM	Medium/High	President / Village Board	1-5 years	Village / USDA – RD Water & Waste Program / IEPA SRF – WPCLP	New

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
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Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-31
Waggoner Hazard Mitigation Actions
(Sheet 2 of 3)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Conduct hydrologic/hydraulic analysis to determine the cause and identify design solutions to alleviate recurring drainage problems.	F, SS	T	LP&R	Large SVI: 0.4257 CEJST: Yes EDRC: Yes	---	---	3, 5	LM	Medium/Medium	President / Village Board	3-5 years	Village / Township / IDOT Local Roads	Existing (2016)
Construct the identified design solutions to alleviate recurring drainage problems and better manage stormwater runoff.	F, SS	T	S&IP	Large SVI: 0.4257 CEJST: Yes EDRC: Yes	---	Yes	3, 5	HM	High/Medium	President / Village Board	5-10 years	Village / Township / FHWA PROTECT	Existing (2016)
Purchase and install emergency backup generator at the Centennial Building, a designated warming/cooling center and emergency shelter, to establish a resilient and reliable power supply, maintain operations during extended power outages, and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, SS, SWS, T	FWS	S&IP	Large SVI: 0.4257 CEJST: Yes EDRC: Yes	---	Yes	2, 3, 5	HM	High/High	President / Village Board	3-5 years	Village / FEMA BRIC HMGP	Existing (2016)

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
EQ	Earthquake	T	Tornado

Type of Mitigation Activity:

E&A	Education & Awareness	NSP	Natural Systems Protection
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Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-31 **Waggoner Hazard Mitigation Actions** **(Sheet 3 of 3)**													
Activity/Project Description	**Hazard(s) to be Mitigated**	**Community Lifeline(s) to be Mitigated**	**Type of Mitigation Activity**	**Population Affected (Size, SVI, CEJST, and/or EDRC)§**	**Reduce Effects of Hazard(s) on Buildings & Infrastructure**		**Goal(s) Met**	**Priority**	**Cost/Benefit Analysis**	**Organization / Department Responsible for Implementation & Administration**	**Time Frame to Complete Activity**	**Funding Source(s)†**	**Status**
					New	**Existing**							
Upsize select culverts at various locations to increase carrying capacity, better manage stormwater runoff, alleviate recurring drainage problems, and ensure system resilience and functionality.	F, SS	T	S&IP	Medium SVI: 0.4257 CEJST: Yes EDRC: Yes	Yes	Yes	3, 5	HM	Medium/High	President / Village Board	1-5 years	Village / Township / IDOT Local Roads	Existing (2016)
Make public information materials available to residents that detail the risk to life and property associated with the natural hazards that impact the Village and the proactive approaches they can take to reduce their risk.	DR, EC, EH, EQ, F, SS, SWS, T	---	E&A	Medium SVI: 0.4257 CEJST: Yes EDRC: Yes	---	---	2	LM	Low/Medium	President / Village Board	1-5 years	Village	New

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Hazard(s) to be Mitigated:

DR	Drought	F	Flood
EC	Extreme Cold	SS	Severe Storms
EH	Excessive Heat	SWS	Severe Winter Storm
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Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-32
Witt Hazard Mitigation Actions
(Sheet 1 of 4)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Purchase and install an automatic emergency backup generator at the Fire Station to establish a resilient and reliable power supply, ensure sustained functionality during extended power outages, maintain continuity of operations, and mitigate risk to a Community Lifeline.	EC, EH, EQ, F, MS, SS, SWS, T	S&S	S&IP	Medium SVI: 0.4257 CEJST: Yes EDRC: Yes	---	Yes	2, 3, 5	HM	Medium/High	Mayor City Council / Fire Chief Board of Trustees	1-5 years	City / FPD / FEMA BRIC HMGP / USDA – RD Critical Facilities Program	New
Purchase and install storm warning sirens within the City to establish Community Lifelines essential to human health and safety.	SS, T	---	S&IP E&A	Large SVI: 0.4257 CEJST: Yes EDRC: Yes	---	---	2	HM	Medium/High	Mayor City Council	1-3 year	Village / FEMA BRIC HMGP / USDA – RD Critical Facilities Programs	New

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Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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
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Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-32
Witt Hazard Mitigation Actions
(Sheet 2 of 4)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Upgrade drinking water system (water lines, mains, hydrants, pumping system, etc.) within the City to increase system resilience, ensure a constant supply of water for residents, and aid in fire suppression during hazard events.	DR, EC, EH, EQ, F, SS, SWS, T	FWS	S&IP	Medium SVI: 0.4257 CEJST: Yes EDRC: Yes	Yes	Yes	2, 3, 5	HM	High/High	Mayor / City Council	5-10 years	City / USDA – RD Water & Waste Program / IEPA SRF – PWSLP	Existing (2016)
Conduct sanitary sewer line reconnaissance study to identify locations where storm water infiltrates the system and mitigate risk to a Community Lifeline	F, SS	FWS	LP&R	Medium SVI: 0.4257 CEJST: Yes EDRC: Yes	---	---	3, 5	LM	Medium/Medium	Mayor / City Council	2-5 years	City / USDA – RD Water & Waste Program	Existing (2016)
Upgrade/slip line sanitary sewer sections/mains to eliminate stormwater infiltration, increase system resilience, prevent sewage backups, and mitigate risk to a Community Lifeline.	F, SS	FWS	S&IP	Medium SVI: 0.4257 CEJST: Yes EDRC: Yes	Yes	Yes	3, 5	HM	High/High	Mayor / City Council	5-10 years	City / USDA – RD Water & Waste Program / IEPA SRF – WPCLP	Existing (2016)

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Hazard(s) to be Mitigated:

DR	Drought	MS	Mine Subsidence
EC	Extreme Cold	SS	Severe Storms
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

Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-32
Witt Hazard Mitigation Actions
(Sheet 3 of 4)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Improve drainage characteristics (re-grade/contour areas, install culverts, ditches, etc.) within the City to alleviate drainage/flooding problems that occur at the result of heavy rain events, better manage stormwater runoff, and increase community resilience.	F, SS	T	S&IP	Medium SVI: 0.4257 CEJST: Yes EDRC: Yes	Yes	Yes	3, 5	HM	High/High	Mayor / City Council	3-5 years	City / USDA – RD Water & Waste Program	Existing (2016)
Conduct hydrologic/hydraulic analysis to determine the cause and identify design solutions to alleviate recurring drainage problems in residential areas (including but not limited to Vine Street & IL Route 16 and S. Main St. & IL Route 16) and ensure continued functionality of Community Lifelines.	F, SS	T	LP&R	Medium SVI: 0.4257 CEJST: Yes EDRC: Yes	---	---	3, 5	LM	Low/Medium	Mayor / City Council	3 years	City / Township / IDOT Local Roads	Existing (2016)
Construct the identified design solutions to alleviate recurring roadway drainage problems, better manage stormwater runoff, and ensure continued functionality of Transportation Community Lifelines.	F, SS	T	S&IP	Medium SVI: 0.4257 CEJST: Yes EDRC: Yes	---	Yes	3, 5	HM	High/Medium	Mayor / City Council	3-5 years	City / Township / FHWA PROTECT	Existing (2016)

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EC	Extreme Cold	SS	Severe Storms
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Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

Figure MIT-32
Witt Hazard Mitigation Actions
(Sheet 4 of 4)

Activity/Project Description	Hazard(s) to be Mitigated	Community Lifeline(s) to be Mitigated	Type of Mitigation Activity	Population Affected (Size, SVI, CEJST, and/or EDRC)§	Reduce Effects of Hazard(s) on Buildings & Infrastructure		Goal(s) Met	Priority	Cost/Benefit Analysis	Organization / Department Responsible for Implementation & Administration	Time Frame to Complete Activity	Funding Source(s)†	Status
					New	Existing							
Review new Flood Insurance Rate Maps (FIRMs) when they become available. Update the flood ordinance to exceed federal standards and reflect the revised FIRMs and present both for adoption. Enforce flood ordinance to ensure new development does not increase flood vulnerability or create unintended exposures to flooding.*	F	S&S	LP&R	Small SVI: 0.4257 CEJST: Yes EDRC: Yes	Yes	Yes	1, 2, 6, 7	HM	Low/Medium	Mayor City Council	1-5 years	City	Existing (2016)
Make the most recent Flood Insurance Rate Maps available at the City Clerk's Office to assist the public in considering where to construct new buildings.*	F	S&S	E&A	Small SVI: 0.4257 CEJST: Yes EDRC: Yes	Yes	---	1, 2, 6, 7	LM	Low/Low	Mayor / City Clerk	1-5 years	City	Existing (2016)
Make City officials aware of the most recent Flood Insurance Rate Maps and issues related to construction in a floodplain.*	F	S&S	E&A	Small SVI: 0.4257 CEJST: Yes EDRC: Yes	Yes	---	1	LM	Low/Lowe	Mayor / City Clerk	1-5 years	City	Existing (2016)

§ Size refers to the general size of the population affected (i.e., small, medium, or large, while a Social Vulnerability Index (SVI) ranking of 0.6 or greater, a Climate and Economic Justice Screening Tool (CEJST) designation of "Yes", and/or an Economically Disadvantaged Rural Community (EDRC) designation of "Yes" identifies potentially underserved communities and/or socially vulnerable populations using the SVI, CEJST, and EDRC as described in Section 1.2.

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* Mitigation action to ensure continued compliance with NFIP.

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DR	Drought	MS	Mine Subsidence
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Type of Mitigation Activity:

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Community Lifelines to be Mitigated:

C	Communications	H&M	Health & Medical
E	Energy (Power & Fuel)	S&S	Safety & Security
FWS	Food, Water, Shelter	T	Transportation
HM	Hazardous Material		

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 requirements of the Plan will be incorporated into existing planning mechanisms; and
- detailing how continued public input will be obtained during the plan maintenance process.

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 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 Subcommittee will be composed of the participating jurisdictions who sought Plan approval and other key members of the Committee. The Montgomery County Emergency Management Agency (EMA) will chair the Plan Maintenance Subcommittee.

The Montgomery County EMA will assume lead responsibility for monitoring and tracking the implementation status of the mitigation actions identified in the Plan update. It will be the responsibility of each Plan participant to provide the Montgomery County EMA with an annual progress report on the status of their existing mitigation actions and identify whether any actions need to be modified. New mitigation actions may be added to the Plan during the annual monitoring and evaluation period or at any time during the plan maintenance cycle by contacting the Montgomery County EMA and providing the appropriate information.

Monitoring & Evaluating

- A Plan Maintenance Subcommittee will be formed to monitor and evaluate the Plan update.
- The ***Plan update will be monitored and evaluated*** on an ***annual basis***.
- Each Plan participant will be responsible for providing an annual progress report on the status of their mitigation actions.
- Plan participants can add ***new mitigation actions*** to the Plan ***during the annual monitoring phase or by contacting*** the Montgomery County EMA.

The Montgomery County EMA together with the Plan Maintenance Subcommittee will also evaluate the Plan update on an annual basis to determine the effectiveness of the Plan at achieving its stated purpose and goals. In order to evaluate the effectiveness of the Plan update, the Subcommittee will review the mitigation actions that have been successfully implemented and determine whether the action achieved the identified goal(s) and had the intended result (i.e., losses were avoided, or the vulnerability of hazard-prone areas were reduced).

The Subcommittee will also ask each Plan participant to identify any significant changes in development or priorities that have occurred within the previous 12 months; whether any new plans, policies, regulations, or reports have been adopted; and if any hazard-related damages to critical facilities and infrastructure have been sustained.

In order to streamline the plan maintenance process, the Montgomery County EMA will provide each Plan participant with a Plan Maintenance Checklist along with the necessary forms to complete and return. **Appendix M** contains a copy of Checklist and associated forms.

The Montgomery County EMA will then prepare a progress report detailing the results of the annual Plan monitoring and evaluation period and provide copies to the Subcommittee. The annual progress report will include:

- information on any hazard-related damages sustained by critical facilities and infrastructure within the planning area during the previous year.
- implementation status of the mitigation actions identified in the Mitigation Strategy.
- identification of any new mitigation actions proposed by the Plan participants.
- information on changes in development, priorities, and planning and regulatory capabilities for the Plan participants.
- identification of how information will be disseminated to stakeholders and constituents on the Plan and its progress in effort to seek continued public participation.

If any existing mitigation actions are modified or new mitigation actions are identified for the Plan participants, then Section 4.7 of the Mitigation Strategy will be updated, and the Plan update resubmitted to the Illinois Emergency Management Agency (IEMA) and FEMA for reference.

On an as needed basis the Montgomery County EMA, in consultation with the Subcommittee, will evaluate requests from non-participating jurisdictions to "join" the Plan before the five-year update. Consideration will be given if certain conditions are met as outlined in Appendix D of *FEMA's Local Mitigation Planning Policy Guide.*

5.1.2 Updating the Plan

The Plan must be updated within five years of the of the Plan approval date indicated on the signed FEMA final approval letter. (This date can be found in Section 6, Plan Adoption.) This ensures that all the participating jurisdictions will remain eligible to receive federal grant funds to implement those mitigation actions identified in this Plan.

Updating the Plan

- The Montgomery County EMA, with assistance from the Plan Maintenance Subcommittee, will be responsible for updating the Plan.
- The Plan ***must be updated within 5 years*** of the ***date of the final approval letter*** provided by FEMA.
- Once the Plan update has received FEMA/IEMA approval, each participating jurisdiction ***must adopt the Plan to remain eligible to receive federal mitigation funds.***

The Montgomery County EMA, with assistance from the Plan Maintenance Subcommittee, will be responsible for updating the Plan. The update will incorporate all of the information gathered during the monitoring and evaluation phase and will also include:

- a review of the Mitigation Strategy, including potential updates to the mitigation goals and prioritization methodology;
- an evaluation of whether additional natural or man-made hazards need to be addressed or included in the Plan;
- a review of new hazard data that may affect the Risk Assessment Section;
- identification of any changes in priorities within each participating jurisdiction; and
- identification of any changes in development that have occurred in hazard prone areas that would increase or decrease the participating jurisdictions' vulnerability.

A Planning Committee will be reformed to update the Plan and a public involvement strategy similar to the one employed for this Plan update will be implemented to ensure that the public and stakeholders have ample opportunities to become engaged and provide input during the development of the Plan update. In addition, any jurisdictions that did not take part in the previous Plan update 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.

A public forum will be held to present the Plan update to the public for review and comment. The comments received at the public forum will be reviewed and incorporated into the Plan update. The Plan update will then be submitted to IEMA and FEMA for review and approval. ***Once the Plan update has received state and federal approval, FEMA requires that each of the participating jurisdictions adopt the Plan to remain eligible to receive federal funds to implement identified mitigation actions.***

5.2 INCORPORATING THE MITIGATION STRATEGY INTO EXISTING PLANNING MECHANISMS

As part of the planning process, the Committee identified each participating jurisdiction's existing capabilities (i.e., existing authorities, policies, programs, technical information, etc.) and resources available to support or accomplish mitigation and reduce long-term vulnerability. **Figures PP-3** through **PP-10** identify the existing authorities, policies, programs, technical information, and resources available by capability type by jurisdiction. ***It will be the responsibility of each participating jurisdiction to incorporate, where applicable, the mitigation strategy and other information contained in the Plan update into the planning mechanisms identified for their jurisdiction.***

Adoption of this Plan update will trigger each participating jurisdiction to review and, where appropriate, integrate the Plan into other available planning mechanisms. The Plan Maintenance Subcommittee's annual review will help maintain awareness of the Plan among the participating jurisdictions and encourage active integration of the Plan into their day-to-day operations and planning mechanisms. Any time a mitigation action is slated for implementation by a participating jurisdiction, it will be integrated into their capital improvement plan/budget.

Based on conversations with the Committee, only Hillsboro has identified the need to adopt, review, and/or strengthen current policies or programs in the near future. With the exception of the County, Hillsboro, Litchfield, the fire departments/fire protection districts, the participating jurisdictions have limited capabilities to integrate the mitigation strategy and other information contained in the Plan update into existing planning mechanisms. These jurisdictions are small in size and may not have the financial resources or trained personnel to develop planning mechanisms such as comprehensive plans or building and zoning ordinances.

5.3 CONTINUED PUBLIC INVOLVEMENT

The County and participating jurisdictions understand the importance of continued public involvement and will seek public input on the Plan update throughout the plan maintenance cycle. Any meetings held by the Plan Maintenance Subcommittee will be noticed and open to the public. Stakeholders and public will be encouraged to participate and provide feedback. Following distribution of the annual progress report, each participating jurisdiction will be encouraged to discuss the findings at their monthly board/council meetings to help maintain awareness of the Plan and encourage integration of the Plan in day-to-day operations.

Participating jurisdictions will also be encouraged to make the annual progress report available via social media and on their websites, as available, and at their offices. As the lead organization responsible for maintaining the Plan update, the Montgomery County EMA will also periodically post mitigation-related topics to social media including where to access the approved Plan, information on the hazards that have the potential to impact the County, interesting facts about each hazard, and no or low-cost actions that residents can take to reduce their risk from natural hazards.

A copy of the approved Plan will be maintained and available for review at the Montgomery County EMA Office and on the County's website. Individuals will be encouraged to provide feedback and submit comments for the next Plan update to the Montgomery County EMA Director. The comments received will be compiled and included in the annual progress report and considered for incorporation into the next Plan update. Separate Committee meetings and a public forum will be held prior to the next Plan update submittal to ensure that the public and stakeholders have ample opportunity to become engaged, provide input during the development of the Plan update, and 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 adopt the Plan to become or remain eligible for federal grant funds to implement mitigation actions identified in this Plan.

6.1 PLAN ADOPTION PROCESS

Before the Plan update could be adopted by the participating jurisdictions, it was made available for public review and comment through a public forum and comment period. Comments received were incorporated into the Plan update and the Plan was then submitted to the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA) for their review and approval.

Upon receipt of the Approval Pending Adoption (APA) letter from FEMA, the Plan update was presented to the County and participating jurisdictions for adoption. ***Each participating jurisdiction was required to formally adopt*** the Plan to become or remain eligible to receive federal grant funds to implement the mitigation actions identified in this Plan. Any jurisdiction that chose not to adopt the Plan update did not affect the eligibility of those who did.

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

Figure PA-1
Plan Adoption Dates

Participating Jurisdiction	Plan Adoption Date

7.0 References

Provided below is a listing, by section, of the resources utilized to create this document.

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4.0 MITIGATION STRATEGY

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2. Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee. Hazard Mitigation Projects. Form.

APPENDIX A

Attendance Sheet

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

October 19, 2022

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Callie Smith	American Environmental Corp.	Environmental Analyst
2.	DANNY McCALLUM	RAYMOND COMMUNITY FIRE PROT. DIST	FIRE CHIEF
3.	~~Ron Setter~~	Mayor	
4.	Dan Hough	EMA - Village RAYMOND TRUSTEE	
5.	ALBERT OBERLE	VILLAGE OF SCHRAM CITY	VILLAGE PRESIDENT
6.	Louis STAUDER	CITY OF NOKOMIS	COMMISSIONER
7.	Michael Smalley	Nokomis Area Fire Prot. Dist	Chief
8.	Sandy Leitheiser	Montgomery County	County Clerk/Recorder
9.	ED BOYD	MONTGOMERY COUNTY 911	COORDINATOR
10.	Randy Singler	Irving Township	Supervisor
11.	Kelvin Stewart	Schram City	Trustee
12.	HARRY JACKSON		MAYOR
13.	Dave Hollo	City of Litchfield	Alderman
14.	BRIAN Byers	Farmersville Waggoner	Fire / Ambulance
15.	Randy Leetham	City of Hillsboro / Mont. Co Coroner	Chief of Police / Coroner
16.	Hugh Satterlee	Mont. County Health Dept	Administrator

Appendix A

Attendance Sheet

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

October 19, 2022

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Joseph V Gasparich	MCEMA / City of Nokomis	Deputy Director ESDA Coordinator
2.	Kenneth Folkerts	Rountree Township	Supervisor
3.	Christine Daniels	Montgomery County & Taylor Springs	County Coordinator Village Clerk
4.	Adam Pennock	Litchfield FD / City of Litchfield	FF/MEDIC - EMA Liason
5.	[illegible]	Taylor Spring-	Truste
6.	Kevin Schott	Montgomery Co EMA	Director
7.	[illegible]	Fillmore Fire / Village of Fillmore	Assistant Chief / Village President
8.	Andrea Bostwick-Campbell	American Environmental	EMS Manager
9.	Sheila D White	City of Coffeen	Mayor
10.	Robert K. Wessel	City of Coffeen	Commissioner
11.	Jackie Rakers	Village of Ohlman / Audubon TWP	Mayor / TWP Clerk
12.	Gary Applegate	Village of Walshville	Trustee
13.	Cody Greenwood	Montgomery County Highway Dept.	County Engineer
14.	Sheri Reynolds	Village of Taylor Springs	Council member
15.	Kevin Brink	Montgomery County GIS	GIS Tech / Plat Act Officer
16.	Steve Dougherty	City of Litchfield	Mayor

Attendance Sheet

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

October 19, 2022

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	LYNN CLARKE	CITY of FARMERSVILLE	
2.	Rick Robbins	Sheriffs Office	Sheriff
3.	VITO PASSARIELLO	AMEREN ILLINOIS	SUPERVISOR
4.	Walter Jarvan	Coffeen Fire Prot. Dist	Chief
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Attendance Sheet

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

February 8, 2023

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	CODY GREENWOOD	MONTGOMERY COUNTY HIGHWAY	COUNTY ENGINEER
2.	Kelvin Stewart	Montgomery, Schram City	Trustee
3.	ROBERT K. WESSELL	Coffeen / Coffeen Fire Prot. Distr.	Mayor / President
4.	Kenda Caulk	Village of Irving	mayor / President
5.	Andrea Bostwick-Campbell	AEC	EMS Manager
6.	Sandy Leitheiser	Montgomery County	Clerk
7.	Adam Pennock	City of Litchfield Fire	
8.	Christine Daniels	Taylor Springs & Montgomery	Village Clerk & County Coord.
9.	Dave Hollo	City of Litchfield Alderman	Alderman
10.	Kevin Brink	Montgomery County GIS	GIS Tech/Plat Act Officer
11.	Dan Hewitt	MC EMA	Dept Dir
12.	John Casterline	Fillmore	EMA Rep
13.			
14.			
15.			
16.			

Attendance Sheet

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

February 8, 2023

	Name (Please Print)	*Representing (Jurisdiction/Organization)*	*Title*
1.	Joseph Gasparich	MC EMA / City of Nokomis	Coordinator
2.	Dan McCallum	Raymond Community Fire Protection	Fire Chief
3.	Michael Smalley	Nokomis Area Fire Prot. Dist	Fire Chief
4.	Lynn Clarke	Farmersville	Board Member
5.	Walter Tarran	Coffeen Fire Protection District	Fire Chief
6.	[illegible]	AEC	Environmental Analyst
7.	[illegible]	City of [illegible]	Mayor
8.	Dennis Heid	Village of Raymond	Mayor
9.	Edward Boyd	Mont. Co. 911	Coordinator
10.	Hugh Satterlee	MCHD	Administrator
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16.			

Appendix A

Attendance Sheet

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

May 24, 2023

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Chris Daniels	Village of T.S. & Montgomery Co.	Village Clerk
2.	Harry Jackson	Village of T.S.	Mayor T.S.
3.	Kane Harrell	Village of T.S	Water/Street Public Works Supt.
4.	Michael Smalley	Nokomis Fire Montgomery HazMat	Chief, Unitlead
5.	Darin Beckman	Fillmore Fire Prot Dist./Fillmore P.D.	Chief
6.	Danny McCallum	Raymond-Harvel Fire Dept	Chief
7.	Lynn Clarke	Farmersville	Trustee
8.	Albert Oberle	Schram City	President
9.	Denny Held	Raymond	Mayor Village of Raymond
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Attendance Sheet

Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee Meeting

May 24, 2023

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Callie Smith	AEC	Environmental Analyst
2.	Kelvin Stewart	Schram City	
3.	Andrea Bostwick-Campbell	AEC	EMS Manager
4.	Kenneth Folkerts	Rountree Township	Supervisor
5.	Lou Stauder	Nokomis City	Commissioner
6.	Sandy Leitheuser	Montgomery County Clerk	Clerk
7.	Walter Farrar	Coffeen Fire Prot. Dist	Chief
8.	Robert K. Wessell	City of Coffeen	Mayor
9.	Kevin Brink	Montgomery County GIS	GIS Tech / Plat Act Officer
10.	Hugh Satterlee	Montgomery County Health Dept	Administrator
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Attendance Sheet

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

May 24, 2023

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Kevin Schott	Montgomery County EMA	Director
2.	GASPARICH, JOSEPH ✓	MONT Co EMA	DEPUTY DIRECTOR
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Attendance Sheet

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

August 23, 2023

	Name (Please Print)	Representing (Jurisdiction/Organization)	Title
1.	Callie Smith	AEC	Environmental Analyst
2.	ALBERT OBERLE	VILLAGE OF SCHRAM CITY	VILLAGE PRESIDENT
3.	Kenneth Folkerts	Rountree Township	Supervisor
4.	Sandy Leitheiser	Montgomery County	County Clerk
5.	Chris Daniels	Mont. Cty & Taylor Springs	Cty Coord. T.S Village Clerk
6.	Collin Wasson	Coffeen Fire Protection District/City	Chief
7.	Darin Beckman	Fillmore Fire Prot. Dist.	Chief
8.	Cathie Downey	Harvel (Village of)	President
9.	Don Downs	City of Hillsboro	MAYOR
10.	DENNY HELD	Village of Raymond	Mayor
11.	Breann Vazquez	City of Litchfield	City Administrator
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Appendix A

Attendance Sheet

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee Meeting

August 23, 2023

	Name (Please Print)	***Representing (Jurisdiction/Organization)***	***Title***
1.	Douglas Orr	Village of Farmersville	Pres of the Board
2.	Andrea Bostwick-Campbell	AEC	EMS Manager
3.	Adam Pennock	City of Litchfield	Fire Chief
4.	Michael Smalley	Nokomis Fire	Chief
5.	Ron Seaton	Waggoner IL	Mayor
6.	Don Keiser	City of Witt	Fire chief
7.	Kevin Brink	Montgomery County GIS	GIS Tech
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Appendix A

APPENDIX B

Meeting Minutes

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee

October 19, 2022
6:30 p.m.

Committee Members

Ameren Illinois
Audubon Township
Coffeen, City of
Coffeen Volunteer Fire Department
Farmersville, City of
Farmersville-Waggoner Volunteer Fire Department
Fillmore, Village of
Fillmore Community Fire Protection District
Hillsboro, City of
Irving Township
Litchfield, City of
Montgomery County Offices:
- 911
- Clerk/Recorder
- Coroner
- County Coordinator

Montgomery County Offices:
- EMA
- GIS
- Health Department
- Highway Department
- Sheriff's Office

Nokomis, City of
Nokomis Area Fire Protection District
Ohlman, Village Of
Raymond, Village of
Raymond-Harvel Fire Department
Rountree Township
Schram City, Village of
Taylor Springs, Village of
Waggoner, Village of
Walshville, Village of
American Environmental Corp.

<u>Welcome and Introductions</u>

Kevin Schott, Director of the Montgomery County Emergency Management Agency, welcomed attendees. He indicated that the purpose of this Committee is to update the Montgomery County Natural Hazards Mitigation Plan.

Handout materials were distributed to each member, including a Natural Hazard Events Questionnaire. A link to a citizen questionnaire was provided to potential members via email as well. The questionnaires will help gauge residents and committee member understanding of the natural hazards that impact the County and also identifies communication preferences.

Andrea Bostwick, American Environmental Corporation (AEC) began the meeting by providing background information on the planning grant and the planning process. Montgomery County EMA applied for and received a planning grant from FEMA to update the County's hazard mitigation plan. This grant is administered through the Illinois Emergency Management Agency (IEMA) and pays for 90% of the planning cost. The remaining 10% will be met through in-kind services. The goal of the grant is to obtain a

FEMA-approved hazard mitigation plan. The process generally takes about 16 to 18 months from start to finish.

What is Mitigation?

Andrea explained that for the purpose of this process, mitigation is any sustained action that reduces the long-term risk to people and property from natural hazards and their impacts. Sustained actions can include projects and activities such as building a community safe room or establishing warming and cooling centers. Mitigation is one of the phases of emergency management and is an important component in creating hazard-resistant communities.

What is a Natural Hazards Mitigation Plan?

Andrea then explained that a Natural Hazards Mitigation Plan details the natural hazard events that have previously impacted the County and identifies activities and projects that reduce the risk to people and property from these hazards before an event occurs. A hazard mitigation plan is different from the County's Emergency Operations Plan/ Emergency Response Plan (EOP/ERP) because it identifies actions that can be taken before a disaster strikes whereas the EOP/ERP identifies how the County will respond during and immediately after an event occurs.

The natural hazards that will be included in the Plan update are severe summer storms (including thunderstorms with damaging winds, hail, lightning, and heavy rain events); severe winter storms (including ice and snowstorms); floods (both flash flood and riverine floods); tornadoes; excessive heat; extreme cold; drought; earthquakes; and dam failures.

Andrea indicated that the Committee can also include additional hazards it feels have a significant impact on the County and then discussed mine subsidence, landslides, levee failures, and wildfires. AEC will send out a survey in the next week to poll the Committee on whether to include any of these hazards in the Plan update.

Why Update a Natural Hazards Mitigation Plan?

Since the early 1990s damages caused by weather extremes have risen substantially. In 2021 the U.S. experienced $141 billion in severe storm damages from twenty (20) severe weather and natural hazard events. The losses experienced in 2021 were the 3rd highest only behind 2017 (Harvey, Irma, Maria, and California Wildfires) and 2005 (Katrina, Rita, & Wilma). In the last decade, the U.S. has experienced the top three years with the highest total number of billion-dollar events and two of the top three years with the highest total losses ever recorded. Consequently, the Federal Emergency Management Agency (FEMA) continues to encourage counties throughout the U.S. to prepare and develop hazard mitigation plans because what they've found is that for every dollar spent on mitigation, $6 dollars can be reaped in savings.

Updating this plan provides several major benefits:

1. Access to federal mitigation assistance fund. Specific projects and activities will be developed and updated through the planning process to help each participating jurisdiction reduce damages. By including these actions in this Plan, the participating

jurisdictions will become eligible to receive state and federal funds to implement the actions.

2. Increased awareness of the impacts associated with natural hazards. Verifiable information about the natural hazards that occur in Montgomery 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 Plan to meet state and federal requirements so that it can be approved by the IEMA and FEMA. The Planning Committee is an integral part of the planning process and ensures that the Plan is tailored to the needs of the County and participating jurisdictions.

A five meeting process has been developed to achieve this goal. Specific activities for the Committee meetings include:

1st Committee meeting	Orientation to the Planning Process Required Information Needed to Participate
2nd Committee meeting	Discuss the Risk Assessment Approve Mission Statement & Goals Participants Return Required Forms Begin discussing Mitigation Projects and Activities
3rd Committee meeting	Discuss and approve Mitigation Strategy Committee returns draft list of Mitigation Projects and Activities
4th Committee meeting	Finish discussing Mitigation Projects and Activities Committee discusses approval/adoption of the Plan
5th Committee meeting (Public Forum)	Present the Plan update for public review Committee helps answer questions from the public

Jurisdictions who wish to be part of the Plan must meet certain participation requirements that include:

- Participating in the planning meetings and public forum
- Completing required forms
- Coordinating with their constituents and the public; and
- Adopting the Plan once it's completed

Information Needed from the Committee

As part of the Plan update, Andrea indicated that there is information that will be needed from each participating jurisdiction. The information provided will be used to meet FEMA plan requirements. She then talked about each of the forms that must be completed at the beginning of the planning process. These Include:

Critical Facilities. Completed lists of Critical Facilities will be used to identify facilities vulnerable to natural hazards and will be provided to IEMA and FEMA as a separate supplement. Copies of the Plan made available to the public will not include these lists for security reasons.

Capability Assessment: Each jurisdiction has a unique set of capabilities and resources available to accomplish hazard mitigation and reduce long-term vulnerabilities to hazard events. As part of the update of the plan, the existing capabilities of each jurisdiction need to be identified and described.

Shelter Surveys. Identifies locations designated as severe weather shelters within each jurisdiction including warming centers, cooling centers and community safe rooms.

Drinking Water Supply Worksheet: Information on the drinking water supplies that serve the participating communities needs to be identified to assist in assessing drought vulnerability.

Callie Smith, also of American Environmental, passed out the forms as Andrea fielded questions. Andrea asked participants to complete the forms and return them by the next meeting if possible and to let her know if they had any questions.

Severe Weather Events

Andrea told the Committee that, while AEC will review multiple data sources, including NOAA, NWS, and state and federal databases, these sources don't always include every event nor do they always include damage information, especially dollar amounts. In many cases, individuals at the local level are her best resource for this kind of information.

She then asked Committee members to share their memories of hazardous events that have occurred in the County including any damages to critical infrastructure and facilities.

Hazard events related include:

- ❖ A seven-mile long field fire om October 17, 2020 required the fire resources of four counties to put out
- ❖ A tornado tore through Coffeen on December 10, 2021, damaging buildings and powerlines
- ❖ A lightning strike in September 2022 in Raymond took out a brand new wellhouse microwave link
- ❖ A lightning strike in August 2021 took out a 911 communication tower, causing about $13,500 in damage
- ❖ Flash flooding shut down Route 16 between Irving and Witt the Sunday before Labor Day of 2022

She 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.

Andrea also asked Committee members if they had any storm damage photos, they would be willing to share for inclusion in the Plan.

Community Participation

Andrea stressed the importance of attending each committee meeting and indicated that member participation helps the County meet its 10% match for this grant in addition to assuring that member jurisdictions are eligible for IEMA/FEMA funds. She indicated that tag-teaming and designating substitute representatives is permissible when other obligations arise. Andrea pointed out that a designated substitute representative does not have be an official or employee of the jurisdiction.

Andrea requested that each jurisdiction consider sharing meeting information with their boards, councils, etc. at regularly scheduled meetings and consider posting the press release or adding a calendar item to their web pages. She also asked jurisdictions who are on Facebook to consider posting about the Plan on their pages as well.

Andrea indicated that another opportunity to include the public in the process is to post the link to the Citizen Questionnaire on their web pages or Facebook. The more individuals who complete the survey, the better our understanding will be of the public's perception of the hazards that impact the County. Finally, she asked the participants to consider posting or making available at their offices the "Frequently Asked Questions" document in their meeting packet. It provides a quick summary of what the Plan is and why it's important to participate.

Mission Statement & Goals

Copies of updated mission statement and mitigation goals were distributed in the meeting packet. Committee Members were asked to review these prior to the next meeting. The mitigation goals describe the objectives or end results the Committee would like to accomplish in terms of hazard and loss reduction/prevention. Every project included in the Plan should be aimed at one or more of the goals identified by this Committee. Specific goals related to each jurisdiction can be added to this list as well.

What Happens Next?

The risk assessment will be the main topic of the next committee meeting.

The second meeting of the Committee was scheduled for:

Wednesday, February 8, 2023
County Board Room, 1 Courthouse Square, Hillsboro
6:30 P.M.

Andrea asked Committee members to please review the "Tasks to be Completed" handout before the next meeting and indicated that AEC's contact information could be found on the last page of the meeting handout if any questions come up. With no further questions the meeting was adjourned, and Kevin Schott closed by thanking attendees for their participation.

Meeting Minutes

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee

February 8, 2023, 6:30 p.m.
County Board Room, 2nd Floor
Of Historic Courthouse
1 Courthouse Square, Hillsboro IL

Committee Members

Coffeen, City of
Coffeen Volunteer Fire Department
Farmersville, Village of
Fillmore, Village of
Irving, Village of
Litchfield, City of
Montgomery County
- 911
- Clerk's Office
- County Coordinator's Office
- EMA

Montgomery County (cont.)
- GIS Office
- Health Department
- Highway Department

Nokomis, City of
Nokomis Area Fire Protection District
Raymond, Village of
Raymond-Harvel Fire Department
Schram City, Village of
Taylor Springs, Village of
American Environmental Corporation

<u>Welcome and Introductions</u>

Kevin Schott, Director of Montgomery County EMA, welcomed attendees. He turned the meeting over to Andrea Campbell, American Environmental Corporation (AEC), who opened the meeting.

Handout materials were distributed to each Committee Member in attendance.

Andrea provided a brief recap to reorient Committee Members as to what has been accomplished at the previous meeting. Before beginning the risk assessment presentation, Andrea asked the participating jurisdictions to submit their completed, "Critical Facilities", "Capability Assessments" and "Shelter Surveys" if they haven't done so already.

<u>Risk Assessment</u>

Andrea began the presentation by noting that there have been four major federally-declared disasters in Montgomery County since 2002. A total of 634 verified natural hazard events have been documented over the last 20 to 70 years, with 159 events identified since the last plan update in 2015. A minimum of $5.5 million in property damage was recorded for 49 of these events. In addition, $72.3 million in crop damages were recorded for just three events. Four fatalities and 22 injuries were recorded for 11 of the documented natural hazard events.

The damage amounts are actually much higher based on several facts:

1.) damage descriptions for many floods, tornadoes and severe storm events did not include dollar amounts;
2.) damages to roads from heat and freeze/thaws conditions were not included; and
3.) crop damage figures were unavailable for a majority of the events, including drought.

The frequency, magnitude, and property damages for each category of natural hazard were then described.

Severe Storms

Severe storms are one of the most frequently occurring natural hazard in Montgomery County with 220 events verified since 1956, with 46 of those events occurring since 2015. Approximately $1 million in damages has resulted from just 26 events, which is 18% of all the property damage recorded in the County. Additionally, $50,000 in crop damages occurred from a single hail event. At least 4 fatalities and 129 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 at Litchfield on April 29, 2017 & May 30, 2004 and near Farmersville on May 31, 2013. The largest hail recorded in the county is 4.5 inches (softball sized) at Lake Lou Yeager and Irving on May 28, 2011.

Excessive Heat

Additional resources were reviewed to fill historic gaps which led to the identification of 154 recorded excessive heat events reported in Montgomery County since 1995. Since 2015, there have been 42 excessive heat events. No damages were recorded for any of the events, and no fatalities or injuries have occurred as the result of any of the recorded excessive heat events. The highest recorded temperature in the County was 114°F at the Hillsboro COOP Station on July 14th, 1954.

Severe Winter Storms

There were at least 84 verified events involving severe winter storms (snow and/or ice) since 1950 and 37 extreme cold events since 1995. Seven severe winter storms and 13 extreme cold events have occurred since 2015. One of the four major federal disaster declarations for Montgomery County included severe winter storms – the 2006 severe winter storm. Approximately $964,000.00 in property damages/emergency protective measures resulted due to the severe winter/ice storms in 1999 and 2007. No direct injuries or fatalities were recorded, however 33 injuries can be attributed to crashes involving ice and snow-covered roadways between 2017 and 2021.

At least ten severe winter storms have occurred every decade since 1960. In the last decade, 13 severe winter storms took place.

The record maximum 24-hour snowfall in the County since 1950 is 14.3 inches, which occurred at Hillsboro COOP Station on March 25th, 2013. The coldest recorded temperature is -22°F at the Hillsboro Station on February 14th,1905.

Floods

Gaps in historical data were reviewed to document at least 79 verified flood events in Montgomery County, 19 riverine/shallow flood events since 2008 and 60 flash flood events since 1994. Ten general flood events and 25 flash flood events have occurred since 2015. At least $1.1 million in damages has resulted from four flash floods, which is approximately 20% of all the property damage recorded in the county. One fatality was reported as a result of an April 1994 flash flood. Two of the four major federal disaster declarations for Montgomery County are related to flooding.

Tornadoes

Since 1950, 49 tornadoes have been verified in Montgomery County, with 15 of those 49 occurring since 2015. Approximately $2 million in property damages has resulted from 16 of these tornadoes, which is more than 36% of all the property damage recorded in the County. Three fatalities and 17 injuries can be attributed to six tornado events, which is over 75% of the fatalities and injuries recorded in the County as the result of natural hazards.

The highest recorded F-Scale rating for a tornado in the County was an F3, which occurred on 3 separate occasions: January 1, 1950, March 20, 1976, and June 1, 1999. The longest tornado in the County was an F1 tornado that was 30 miles long in the County on March 6, 1961. The widest tornado in the County was an EF0 from July 15, 2020 and an EF1 from December 10, 2021- both 300 yards wide.

Drought

Five major droughts have occurred during the last four decades – 1983, 1988, 2005, 2011, and 2012. There has been at least one drought per decade with the exception of the 1990s when no substantial droughts were recorded. The County was designated a Primary Natural Disaster Area by USDA for the 2012 drought.

The 2012 drought caused an estimated $72.3 million in corn crop damages. Following each declared drought, crop yield reductions were generally experienced, some substantial. Corn and soybean yield reductions were most severe for the 1983 drought when there was a 56.1% reduction in corn and a 37.3% reduction in soybeans.

Year	Corn	Soybeans
1983	56.1%	37.3%
1988	37.5%	26.5%
2005	12.2%	10.0%
2011	11.3%	20.4%
2012	47.2%	3.8%

Mine Subsidence

There are 24 documented underground coal mines located in Montgomery County according to the Illinois State Geological Survey's Directory of Coal Mines. The Illinois Mine Subsidence Insurance Fund (IMSIF) had 190 confirmed claims between 1980 and 2022 in Montgomery County, though some were proven not to be mine subsidence. A total of $398,581.00 has been reimbursed for mine subsidence claims according to the IMSIF.

According to the Illinois State Geological Survey, 59,918 acres (13.5% of the land area) and 6,197 housing units (49.6% of the total housing units) in Montgomery 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. Mine subsidence has the potential to impact Coalton, Coffeen, Farmersville, Hillsboro, Litchfield, Nokomis, Panama, Schram City, Taylor Springs, and Witt as well as unincorporated areas of the County.

Earthquakes

In the previous 200 years, four earthquakes have originated in Montgomery County: on March 17, 1903, a 2.3 magnitude earthquake originated south of Taylor Springs; on July 1, 1982 a 2.8 magnitude earthquake occurred south of Waggoner; on March 28th, 1985, a 2.5 magnitude earthquake originated southwest of Walshville; and on March 13, 1987, a 3.3 magnitude earthquake originated 1 mile west of Coffeen. While there are no known fault zones located in the County, there is one known geologic structure in the immediate region, the Louden Anticline which is located in Fayette County.

Wildfires

No comprehensive, publicly-accessible databases detailing wildfire occurrences currently exists in Illinois; however, committee member records identified a field fire on October 17, 2020 that burned close to 10,000 acres and stretched 8 miles north to south and 4 miles east to west. No property/crop damage figures were available, but a news article did indicate that 1 home was burned. There were no fatalities, but two firefighters sustained minor injuries.

Dams

There are 49 classified dams in the County according to the US Army Corps of Engineers' National Inventory of Dams. Seven dams are publicly-owned: Litchfield owns four (Lake Lou Yaeger, Litchfield City, Walton Park, Shoal Creek Structure 2), and Hillsboro owns three (Lake Glenn Shoals, Lake Hillsboro, Shoal Creek Structure 5). The remaining 42 dams are privately owned. Of the 49 dams, 8 are classified as "high" hazard, 13 are classified as "significant" hazard, and 28 are classified as "low" hazard. One known dam failure was recorded in the County, which occurred on September 8, 2008 when the Walton Park Lake Dam in Litchfield experienced a partial failure due to heavy rain, which caused overtopping of the dam.

Risk Priority Index Exercise

Following the risk assessment, Andrea led the Committee through a Risk Priority Index (RPI) exercise. The RPI is a quantitative means of providing guidance for ranking the hazards that have the potential to impact the County. This ranking can assist participants in determining which hazards present the highest risks and therefore which ones to focus on when formulating mitigation projects and activities. Each hazard is scored on three categories: frequency, impacts on life and health, and impacts on property and infrastructure based on a scoring system provided. Andrea walked the Committee through the scoring system using excessive heat as an example and then provided time for the Committee to fill out the PRI form during the meeting. The results will be compiled, and the findings will be presented at the next meeting.

Mission Statement & Goals

Andrea asked Committee members to review the updated mission statement and mitigation goals provided in the meeting materials. Both of these are required elements of the Plan. As part of the Plan update process both items need to be reviewed and re-evaluated. The mission statement was reviewed, and no revisions were made to the wording.

Next Andrea discussed the mitigation goals which are intended to reduce long-term vulnerabilities to natural hazards. Each project included in the updated Plan should be aimed at one or more of the goals developed by the Committee. The updated goals were reviewed, and a revision was made to the wording of Goal 6, which changed 'rivers' to 'waterways'. The mission statement and goals will be added to the Plan update.

Mitigation

Andrea explained that mitigation actions include activities and projects that reduce the long-term risk to people and property from the natural hazards discussed in the risk assessment.

Status of Existing Projects

Callie distributed **"Status of Existing Mitigation Actions"** forms to each of the previously participating jurisdictions detailing the mitigation projects and activities included in the 2016 Plan. Andrea explained that as part of the update process the status of these projects needs to be determined. She described how the form should be completed so that this information can be included in the Plan update.

New Projects

Callie distributed the form titled **"Hazard Mitigation Projects"** 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 other jurisdictions. 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 to the committee that individual mitigation project lists will be developed for each participating jurisdiction and that these are lists of projects each jurisdiction would like to see accomplished if funding becomes available. FEMA is trying to stimulate the implementation of mitigation projects and activities to reduce the extraordinary amount of money being expended on hazard event damages.

The projects and activities included in the Plan should be mitigation-related, not emergency preparedness, response, recovery, or maintenance. Mitigation projects can include studies, regulatory activities, 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 or Callie if questions arise before they return to the next Committee meeting.

What Happens Next?

The vulnerability assessment and mitigation project prioritization methodology will be the main topics of the next Committee meeting.

The third meeting of the Committee was scheduled for:

May 24, 2023 6:30 p.m.
County Board Room, 2nd Floor
Of Historic Courthouse
1 Courthouse Square, Hillsboro IL

Public Comment

With no questions or comments, Andrea adjourned the meeting.

Meeting Minutes

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee

May 24, 2023, 6:30 p.m.
County Board Room, 2nd Floor
Of Historic Courthouse
1 Courthouse Square, Hillsboro IL

Committee Members

Coffeen, City of
Coffeen Volunteer Fire Department
Farmersville, Village of
Fillmore, Village of
Fillmore Community FPD
Montgomery County
- Clerk's Office
- County Coordinator's Office
- EMA
- GIS Office
- Health Department

Nokomis, City of
Nokomis Area FPD
Raymond, Village of
Raymond-Harvel Fire Department
Rountree Township
Schram City, Village of
Taylor Springs, Village of
American Environmental Corporation

<u>Welcome</u>

Kevin Schott, Director of Montgomery County EMA, welcomed attendees. He turned the meeting over to Andrea Campbell, American Environmental Corporation (AEC), who opened the meeting.

Handout materials were distributed to each member in attendance. Andrea provided a brief recap to reorient Committee Members as to what has been accomplished at previous meetings. Before beginning the vulnerability analysis presentation, Andrea asked the participating jurisdictions to submit their completed "Critical Facilities", "Capability Assessments", and "Shelter Surveys" if they haven't done so already.

<u>Vulnerability Analysis</u>

Andrea began the vulnerability analysis discussion by noting that the focus of this meeting is the vulnerability posed by tornadoes. The analysis estimates future potential damages in terms of dollar loss to residences, including contents, for each participating jurisdiction based on FEMA acceptable formulas. The potential damages were calculated on the magnitude most likely to be encountered, not on a worst-case event.

Tornadoes

Since 1950, 49 tornadoes have been verified in Montgomery County. While occurring less frequently than severe storms and severe winter storms, tornadoes have caused more than $2 million in property damages, 3 fatalities, and 17 injuries.

Using information from the 49 verified tornadoes, damages were calculated based on an "average" tornado. The average tornado in Montgomery County impacts approximately 0.2 square miles. The area impacted by the average tornado has not changed since the 2016 Plan update. 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 $4.6 million in any of the participating municipalities besides Fillmore, Ohlman, and Walshville. Losses ranged from $1.5 million in Walshville to $35.5 million in Farmersville. Potential dollar losses by township would be expected to range from $39,926 in Walshville Township to $1.5 million in North Litchfield Township. Andrea noted that the damage figure for the North Litchfield Township would only be reached if the tornado's path included a portion of the City of Litchfield.

Risk Priority Index Exercise Results

Andrea then presented the results of the Risk Priority Index Exercise that was conducted at the February 8, 2023 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 winter storms and excessive heat. The hazards that scored the lowest included hail, mine subsidence, and dam failures.

Community Lifelines

Next, Andrea took a few minutes to discuss the concept of community lifelines. FEMA has identified seven community lifelines that are the most fundamental services in the community that, when stabilized, enable all aspects of society to function. The seven community lifelines include: safety & security; food, water, shelter; health & medical; energy (power & fuel); communications; transportation; and hazardous materials.

While the concept of community lifelines was developed to support emergency response and planning, FEMA has begun applying it to all phases of emergency management. Efforts to protect community lifelines and prevent and mitigate potential impacts to them is one of the focuses of the BRIC grant program. A handout with a brief description of the community lifelines was included in the meeting packet. Community lifelines will be included in most project description to create a clear connection to the concept.

Asset Vulnerability Survey

As part of the Plan update, Andrea indicated that vulnerable community assets need to be identified for the participating jurisdictions. FEMA requires that the Plan include a summary, such as a list of key issues or problem statements, which describes the effects the hazards have on each participating jurisdiction and their assets. Assets include people, structures (including critical facilities, infrastructure, and community lifelines), systems (networks and capabilities such as electrical and communications grids), and natural, historic, and cultural resources. Andrea asked Committee members to complete a 2-page survey distributed to help identify each community's vulnerable assets and the hazards they are vulnerable to. This information will be used in the vulnerability analysis.

Mitigation Actions Prioritization Methodology

The Mitigation Actions Prioritization Methodology outlines the approach used to classify each mitigation action identified by the participating jurisdictions and is a FEMA-required element of the Plan. As part of the update process, the methodology used in the 2016 Plan update needs to be reviewed and evaluated to determine if revisions are needed. Andrea explained that the 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 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 methodology, the existing and new lists of mitigation projects, finalized goals and other information will be presented for Committee review.

Andrea chose a frequently requested mitigation project, a community safe room (tornado shelter), as an example to show how a typical project is prioritized and entered into the Plan on a Mitigation Action Table. She described how each column in the Mitigation Action Table would be completed for this example project.

Andrea explained that the information in the Mitigation Action Tables would be prepared by AEC, but that the Tables cannot be completed until all of the participants submit their draft lists of projects. Committee Members will have the opportunity at the next meeting to review all of the mitigation projects submitted so that they can make adjustments to their lists if they choose.

It was noted that each jurisdiction will have their own list of jurisdiction-specific mitigation projects and they do not need to get approval from the County or any of the other participants for any of their projects. Participants were also reminded that this is a list of projects and activities they would like to see accomplished if funding becomes available. For a jurisdiction to be eligible for a project, it must be on its list.

Andrea also reminded the Committee that this is a mitigation plan, and that there are some projects that IEMA/FEMA do not consider mitigation. Projects associated with emergency preparedness, disaster response & recovery and maintenance will not be included in the Plan. Andrea noted that as the committee members put their lists together, if they are unsure about whether a project would be considered mitigation, go ahead, and include it on their list. AEC will review the lists and help make the appropriate determinations.

What Happens Next?

Andrea asked that mitigation project forms and all other previously-distributed forms be returned to AEC by June 30. The Committee agreed to schedule the next meeting on:

August 23, 2023 6:30 p.m.
County Board Room, 2nd Floor
Of Historic Courthouse
1 Courthouse Square, Hillsboro IL

Public Comment

With no additional questions or comments, Andrea adjourned the meeting.

Meeting Minutes

Montgomery County Multi-Jurisdictional
Natural Hazards Mitigation Planning Committee

August 23, 2023, 6:30 p.m.
County Board Room, 2nd Floor
Of Historic Courthouse
1 Courthouse Square, Hillsboro IL

Committee Members

Coffeen, City of
Coffeen Volunteer Fire Department
Farmersville, Village of
Fillmore Community FPD
Harvel, Village of
Hillsboro, City of
Litchfield, City of
Montgomery County
- Clerk's Office
- County Coordinator's Office
- EMA
- GIS Office

Nokomis Area FPD
Raymond, Village of
Rountree Township
Schram City, Village of
Taylor Springs, Village of
Waggoner, Village of
Witt, City of
American Environmental Corporation

<u>Welcome</u>

Kevin Schott, Director of Montgomery County EMA, welcomed attendees. He turned the meeting over to Andrea Bostwick-Campbell, American Environmental Corporation (AEC), who opened the meeting.

Handout materials were distributed to each member in attendance. Andrea provided a brief recap to reorient Committee members as to what has been accomplished and what will be covered at this meeting.

<u>Mitigation Project Submittal & Action Tables</u>

Andrea thanked the Committee Members for assembling their lists of mitigation projects and activities. She explained that the information in the draft Mitigation Action Tables handout was prepared by AEC using the lists of mitigation projects and activities provided by the participation jurisdictions. A draft of the Mitigation Strategy section that details the review and re-evaluation of the goals and prioritization methodology as well as how the mitigation projects were analyzed in the tables was also provided in the meeting handouts for review by the Committee.

Committee members were asked to review the Mitigation Action Tables containing the descriptions of the mitigation projects and activities. Andrea and Callie Smith of AEC moved throughout the room to discuss questions members. Some committee members expressed interest in removing currently listed projects, and others expressed interest in adding additional mitigation projects to these tables. Andrea advised Committee Members who wished to add additional projects to provide them to her as soon as possible, and no later than October 31st.

Participants were reminded that this is a list of projects and activities they would like to see accomplished if the money becomes available. Also, for a jurisdiction to be eligible for a project, it must be on its list.

Since this is a mitigation plan, some projects were either removed or not included if they were not considered mitigation. Projects associated emergency preparedness/response, recovery, and maintenance will not be included in the Plan.

Public Forum and Adoption

Andrea laid out the timeline for the remainder of the Plan update process and explained in more detail how the final meeting and adoption process would proceed. The final Committee meeting will be conducted as an open-house style public forum to present the draft Plan for review and comment. A paper copy of the draft Plan will be available for review at the meeting and posted online on the County's website. There will be a two-week public comment period following the public forum.

Unless otherwise specified, Committee members will receive an electronic copy of the draft plan to make available for public comment.

Once the comment period is over, any comments received will be incorporated into the Plan and submitted to IEMA/FEMA. Following IEMA and FEMA review, any edits requested will be made and then FEMA will issue an Approval Pending Adoption letter. At this point an email will be sent to all the participating jurisdictions, along with a copy of a model adoption resolution, asking them to formally adopt the Plan by resolution. A copy of the executed resolution should then be provided to AEC. Once all the adoption resolutions are received, Andrea will submit them to IEMA and FEMA. FEMA will then issue the Final Approval letter starting the clock for the five-year update.

Plan Maintenance and Update

Andrea described the commitments detailed in a draft of the Plan Maintenance and Update section provided in the meeting handouts for review by the Committee. The Plan will be monitored and evaluated on an annual basis by a Plan Maintenance Subcommittee, which will be made up of the participating jurisdictions and key member of the Planning Committee. The Montgomery County EMA Office will send out a Plan Maintenance Checklist to each of the participating jurisdictions who will be responsible for providing information to the Subcommittee. This information will include: the status of their mitigation actions; any hazard-related damages to critical facilities and infrastructure; the adoption of any new plans, policies, or regulations; and any significant changes in development. The Subcommittee will also evaluate the Plan to determine its effectiveness at achieving its stated purpose and goals. Participants can also add new mitigation actions during the annual monitoring phase or by contacting the EMA Director.

The EMA Office will then prepare an annual progress report detailing the results of the annual monitoring and evaluation period and provide copies to the Subcommittee. Any modifications or additions to the mitigation project list will require an update of the Mitigation Strategy and a resubmittal of the Plan to IEMA and FEMA for reference.

At least once every five years, the Plan must be reviewed, revised, and resubmitted to IEMA/FEMA for the participating jurisdictions to remain eligible for mitigation project funds. At the five-year update, any jurisdiction that is not already part of this Plan and who wants to become part of the updated Plan may do so. New jurisdictions must supply the same information that all the current jurisdictions supplied.

What Happens Next?

Public Forum

The final Committee meeting will be conducted as an open-house style public forum where the draft Plan update will be presented for review and comment.

The public forum will be held on:

> **Wednesday, January 24, 2023**
> **County Board Room, 2nd Floor**
> **Of Historic Courthouse**
> **1 Courthouse Square, Hillsboro IL**

Public Comment

With no other questions, the meeting was adjourned.

APPENDIX C

Montgomery County Citizen Questionnaire

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

Asterisk (*) desonates required questions for form completion.

* 1. **Please indicate where you live in the County (Please check only one.):**

- ☐ Butler
- ☐ Coalton
- ☐ Coffeen
- ☐ Donnellson
- ☐ Farmersville
- ☐ Fillmore
- ☐ Harvel
- ☐ Hillsboro
- ☐ Irving
- ☐ Litchfield
- ☐ Nokomis
- ☐ Ohlman
- ☐ Panama
- ☐ Raymond
- ☐ Schram City
- ☐ Taylor Springs
- ☐ Waggoner
- ☐ Walshville
- ☐ Wenonah
- ☐ Witt
- ☐ Unincorporated County
- ☐ Other (please specify)

* 2. **Please place a checkmark next to each of the natural hazards listed below that you have experienced in the County (please check all that apply).**

- ☐ Severe Summer Storms (thunderstorms, hail, lightning strikes)
- ☐ Floods
- ☐ Severe Winter Storms (snow,sleet, ice)
- ☐ Excessive Heat
- ☐ Extreme Cold
- ☐ Tornadoes
- ☐ Drought
- ☐ Earthquakes
- ☐ Mine/Land Subsidence

- [ ] Landslides
- [ ] Dam Failures
- [ ] Other (please specify)

3. **Which of the natural hazards above have you encountered most frequently?**

4. **Rank the natural hazards listed below in order from 1 to 11 based on which hazard you feel poses the greatest threat. (1 = greatest threat and 11 = least threat)**
Each number should only be used once.

- Severe Summer Storms
- Floods
- Severe Winter Storms
- Excessive Heat
- Extreme Cold
- Tornadoes
- Drought
- Earthquakes
- Mine/Land Subsidence
- Landslides
- Dam Failures

* 5. **What types of mitigation projects or activities are most needed in the County?**
Please check the five you feel are most important

- [ ] Public information fact sheets and brochures describing actions residents can take to protect themselves and their property against natural hazard impacts.
- [ ] Tornado Safe Shelters
- [ ] Maintain roadway passage during snow storms and heavy rains

- [ ] Floodplain Ordinances
- [ ] Building Codes and Enforcement
- [ ] Sirens or other Alert Systems
- [ ] Flood or Drainage Protection (i.e., culvert and drainage ditch maintenance, retention pond construction, dam or levee conctruction/maintenance and/or hydraulic studies to determine cause of drainage problems.)
- [ ] Maintain power during storms by burying power lines, trimming trees and/or purchasing a back-up generator
- [ ] Provide sufficient water supply during drought
- [ ] Identify residents with special needs in order to provide assistance during a ntural hazard event
- [ ] Retrofit critical infrastructure (public water supplies, schools, sewage treatment facilities, bridges, hospitals and other important services) to reduce potential damages
- [ ] Other (please specify)

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

- [ ] Newspaper
- [ ] Television
- [ ] Radio
- [ ] Internet
- [ ] Social Media (Facebook, Twitter, etc.)
- [ ] Schools
- [ ] Mailings
- [ ] Extension Service
- [ ] Public Workshops/Meetings
- [ ] Fire Department/Law Enforcement
- [ ] Public Health Department
- [ ] Municipal/County Offices
- [ ] Other (please specify)

Thank you for your time in assisting with the update of the County's Hazard Mitigation Plan.
Montgomery County Multi-Jurisdictional Natural Hazard Mitigation Advisory Committee

Done

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Montgomery County Emergency Management Agency
October 19 at 11:27 AM ·

Which hazard do you think represents Montgomery County's greatest vulnerability - which hazard concerns you most? Please take a look at this hazard mitigation survey. The county is updating the hazard mitigation plan over the next few months and you get to put your ideas forward in this process:

SURVEYMONKEY.COM

Montgomery County Citizen Questionnaire

Take this survey powered by surveymonkey.com. Create your own surveys for free.

Home | Elected Officials | Departments and Services | Meetings and Financials | Business and Lifestyle | Calendar, Contact and Hours

EMA

- LEPC
- MABAS Division 56
- EMA Search and Rescue
- EMA

EMA Links

- 2017 Severe Weather Preparedness Document
- 2019 Wx Spotter Classes
- EMA Volunteer Application
- FOIA
- National Weather Service
- The Illinois Emergency Management Agency (IEMA)

EMA

Montgomery County EMA Director, Kevin Schott

217-532-9560 / ema@montgomerycountyil.gov

EMA Press Release - Hazard Mitigation Planning Committee Meeting

EMA Hazard Mitigation Citizen Questionnaire

Welcome to the Montgomery County Emergency Management Agency(MCEMA). Our agency was originally created as Civil Defense and later became Emergency Services and Disaster Agency. The name of the department was changed to Montgomery County Emergency Management Agency (MCEMA) in 2005 to more accurately reflect its responsibilities. The agency established within County Government is responsible for coordinating the emergency and disaster mitigation, as well as preparedness, planning, response and recovery efforts of the County and its political subdivisions in conjunction with the State of Illinois, Federal Government, private organizations, businesses, and the public. Our EMA is comprised of many great EMA Volunteers. Our Volunteer Teams are the core of the following teams:

- Damage Assessment
- Drone
- Incident management
- Search & Rescue

EMA Assistants:

Joe Gasparich	**Dan Hough**
joeg@montgomerycountyil.gov	danh@montgomerycountyil.gov

Montgomery County EMA
120 N. Main St.
Hillsboro, IL 62049

APPENDIX D

Frequently Asked Questions

Montgomery County Multi-Jurisdictional Hazard Mitigation Plan Update

1) **What is the Montgomery County Hazard Mitigation Plan?**
The Montgomery County Multi-Jurisdictional Hazard Mitigation Plan evaluates damage to life and property from natural hazards that have impacted the County and identifies projects and activities to reduce these damages. The Plan is considered to be multi-jurisdictional because it includes municipalities and other jurisdictions (townships, fire protection districts, schools, etc.) who want to participate.

2) **What is hazard mitigation?**
Hazard mitigation is any action taken to ***reduce*** the long-term risk to people and property from a natural hazard ***before*** an event occurs.

3) **Why is this Plan being updated?**
The Plan update fulfills federal planning requirements of the Stafford Act as amended by the Disaster Mitigation Act and the Disaster Recovery and Reform Act. While meeting federal requirements, this Plan update also provides these benefits:
   - Funding for mitigation projects and activities ***before*** disasters occur.
   - Funding for projects and activities ***following*** declared disasters.
   - Increased awareness about natural hazards and closer cooperation among the various organizations and political jurisdictions involved in emergency planning and response.

4) **Who is updating this Plan?**
The Montgomery County Multi-Jurisdictional Hazards Mitigation Planning Committee is updating the Plan with assistance from technical experts in emergency planning, environmental matters, and infrastructure. The Committee will include members from education, emergency services, municipal, township and county government, health care, law enforcement, and utilities.

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

More information can be obtained by contacting:

Kevin Schott, Director
Montgomery County Office of Emergency Management
120 North Main Street
Hillsboro, Illinois 62049
(217) 532-9560

APPENDIX E

Media Outlets Serving Montgomery County

The Journal-News (weekly)
www.thejournal-news.net

The Litchfield News Herald (weekly)
(217) 324-2121

Nokomis Free Press-Progress (weekly)
(217) 563-2115

The Raymond News (weekly)
(217) 229-3421

The State Journal-Register (Daily)
https://www.sj-r.com/

STARadio - Quincy
WSMI (1540 AM/106.1 FM
https://wsmiradio.com/

Appendix F

EMA Director,
Kevin Schott

Vol. Dep. Director,
Joe Gasparich

Deputy Director,
Dan Hough

120 North Main
Hillsboro, IL 62049

E.O.C. Phone Mon-Fri 8 am to 4 pm: 217-532-9560
Kevin Schott, EMA Director
(217) 313-4153 or kevins@montgomeryco.com

———————————————————————————————————————

Contact: Kevin Schott
217-313-4153

County Prepares For Natural Disasters

Hillsboro, IL (October 3, 2022) — Montgomery County will update its plan to reduce the damages caused by severe weather such as tornadoes, snow and ice storms, thunderstorms, and floods among other events. The plan is called a Hazard Mitigation Plan and the process to update it will be funded through a grant from the Federal Emergency Management Agency (FEMA).

"The Plan describes the natural hazard events that have impacted the County and identifies activities and projects to reduce the risk to residents, property and infrastructure", said Montgomery County Emergency Management Agency Director, Kevin Schott. "By having an updated hazard mitigation plan, the County and participating jurisdictions will become eligible for federal funds to construct these projects." he added.

The Montgomery County Hazard Mitigation Planning Committee will hold its first meeting on Wednesday, October 19, 2022, at 6:30 P.M. The meeting will be held in the Montgomery County Board Room, 2nd Floor of the Historic Courthouse, 1 Courthouse Square in Hillsboro. The meeting is open to the public.

The Planning Committee includes County, township, municipal, school, fire protection district, and hospital representatives, as well as technical partners and other stakeholders. Meetings of this committee will be conducted over the next year as working sessions so that any interested residents can attend and ask questions. The purpose of these working sessions is to gather and discuss information that will be used to update the Plan.

"This mitigation plan is different from our County's emergency response plan because it focuses on ways to reduce and prevent damages before they occur," added Schott.

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Montgomery County Emergency Management Agency
October 14 at 9:49 AM ·

1st Hazard Mitigation Committee Meeting is this coming Wednesday October 19th at 6:30 PM - this is a great program for our county!

Contact: Kevin Schott
217-313-4153
County Prepares For Natural Disasters

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EMA Director,
Kevin Schott

Vol. Dep. Director,
Joe Gasparich

Deputy Director,
Dan Hough

120 North Main
Hillsboro, IL 62049

E.O.C. Phone Mon-Fri 8 am to 4 pm: 217-532-9560
Kevin Schott, EMA Director
(217) 313-4153 or kevins@montgomerycountyil.com

FOR IMMEDIATE RELEASE

Contact: Kevin Schott
217-313-4153

Reducing Damages Caused by Severe Weather

Hillsboro, IL (January 23, 2023) — The frequency of and damages caused by severe storms and other natural hazards in Montgomery County will be discussed when the Montgomery County Natural Hazards Mitigation Planning Committee meets at the Montgomery County Board Room, 2nd Floor of the Historic Courthouse, 1 Courthouse Square in Hillsboro, at 6:30 p.m. on Wednesday, February 8.

This Committee, comprised of County, township, and municipal representatives as well as technical partners and stakeholders, will meet over the next several months to update the Montgomery County Natural Hazards Mitigation Plan. 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 compile lists of activities and projects to reduce damages caused by these events," said Montgomery County Emergency Management Agency Director, Kevin Schott.

The focus of this effort is on natural hazards — severe thunderstorms with damaging winds or hail, tornadoes, snow and ice storms, floods, drought, and excessive heat.

Interested persons can provide input at these Montgomery County Hazards Mitigation Planning Committee meetings or submit their comments and questions to their appropriate representatives.

Participants to date include the County, Audubon Township, Coffeen, Coffeen Volunteer Fire Department (VFD), Farmersville, Farmersville-Waggoner VFD, Fillmore, Fillmore Community Fire Protection District (FPD), Hillsboro, Irving Township, Litchfield, Nokomis, Nokomis Area FPD, Ohlman, Raymond, Raymond-Harvel Fire Department, Rountree Township, Schram City, Taylor Springs, Waggoner, and Walshville. Jurisdictions who have yet to participate in a committee meeting are encouraged to attend.

"This Plan will be our best resource for determining how to prepare for storms and other natural hazards. After the Plan is updated, comprehensive information will be available in one document to help guide those who are making decisions about how to better protect Montgomery County residents," added Schott.

XXXXXXXXXXXXXXXXXXXX

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Montgomery County Emergency Management Agency
February 6 at 9:32 AM ·

FOR IMMEDIATE RELEASE Montgomery County Hazard Mitigation Plan Update - Stakeholder Meeting.

Contact: Kevin Schott
217-532-9560

Reducing Damages Caused by Severe Weather

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Hillsboro, IL 62049

E.O.C. Phone Mon-Fri 8 am to 4 pm: 217-532-9560
Kevin Schott, EMA Director
(217) 313-4153 or kevins@montgomeryco.com

FOR IMMEDIATE RELEASE

Contact: Kevin Schott
217-313-4153

Reducing Damages Caused by Severe Weather and Other Hazards

Hillsboro, IL (May 8, 2023) — Identifying projects and activities that can protect Montgomery County residents, property, and critical infrastructure from natural hazards while maintaining vital services when severe weather hits will be discussed at the Montgomery County Hazard Mitigation Planning Committee meeting at the at the Montgomery County Board Room, 2nd Floor of the Historic Courthouse, 1 Courthouse Square in Hillsboro, at 6:30 p.m., on Wednesday, May 24.

"Severe weather frequently damages buildings, crops, roads, and other critical infrastructure in this area. Since 2002, the County has been a part of four federal disaster declarations. In addition, there have been at least four fatalities, 22 injuries, and $77.8 million in verified property and crop damages caused by hazard events in the County," said Montgomery County Emergency Management Agency Director, Kevin Schott. "Identifying preventative steps that can be taken to reduce the dollar damages as well as protect public health before a natural hazard event occurs is the goal of this planning process."

The Committee began work in October 2022 to update the County's Natural Hazards Mitigation Plan. Committee meetings are open to the public.

"Other emergency plans are directed at responding after a storm or disaster strikes. With this Plan, we will identify actions that can be taken to reduce damages caused by natural hazards for each participating jurisdiction before they occur. This Plan also helps assure each participating jurisdiction is eligible to receive federal grant money for mitigation projects," added Schott.

Building community safe rooms, retrofitting critical infrastructure to better withstand hazard events, installing back-up power supplies, resolving drainage issues, and developing public information materials are a few of the more frequently encountered mitigation projects in Illinois.

XXXXXXXXXXXXXXXXXXX

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Montgomery County Emergency Management Agency

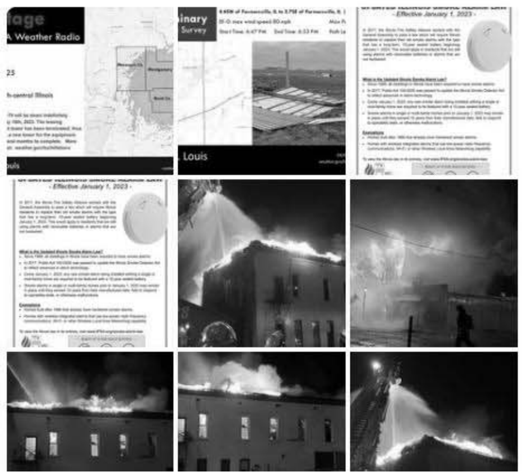
Intro

A page that highlights the services and public information provided by the Montgomery County Illinoi

Page · Government organization

Hillsboro, IL, United States, Illinois

Photos See all photos



Montgomery County Emergency Management Agency
May 17 at 1:50 PM ·

FOR IMMEDIATE RELEASE
Contact: Kevin Schott
217-313-4153

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3

EMA Director,
Kevin Schott

Vol. Dep. Director,
Joe Gasparich

Deputy Director,
Dan Hough

120 North Main
Hillsboro, IL 62049

E.O.C. Phone Mon-Fri 8 am to 4 pm: 217-532-9560
Kevin Schott, EMA Director
(217) 313-4153 or kevins@montgomeryco.com

FOR IMMEDIATE RELEASE

Contact: Kevin Schott
217-313-4153

Protecting Public Health and Property in Montgomery County

Hillsboro, IL (August 7, 2023) -- Projects and activities to prevent injuries and fatalities while maintaining vital services for Montgomery County residents will be the main topic of discussion at the at the Montgomery County Board Room, 2nd Floor of the Historic Courthouse, 1 Courthouse Square in Hillsboro, at 6:30 p.m., on Wednesday, August 23.

The Committee began work in October 2022 to update the County's Natural Hazards Mitigation Plan. This Plan details the past severe weather events that have impacted the County and identifies mitigation projects and activities that can be taken before a severe weather event occurs to protect residents and critical services and infrastructure.

"There has been at least $77.8 million in verified property and crop damages, four fatalities, and 22 injuries caused by severe weather events in the County," according to Kevin Schott, Montgomery County Emergency Management Agency (EMA) Director. "Obtaining FEMA's approval of our updated Plan will make all of the participants eligible to receive federal grant money for mitigation projects and activities."

Projects identified by Committee members at this meeting will become part of the Montgomery County Natural Hazards Mitigation Plan. While the committee 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 winter 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 Schott.

Interested persons can submit questions and comments to the Committee members or directly to the Montgomery County EMA Office.

XXXXXXXXXXXXXXXXX

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Montgomery County Emergency Management Agency
August 17 at 9:48 AM ·

FOR IMMEDIATE RELEASE

Contact: Kevin Schott
217-313-4153

Protecting Public Health and Property in Montgomery County

Hillsboro, IL (August 7, 2023) -- Projects and activities to prevent injuries and fatalities while maintaining vital services for Montgomery County residents will be the main topic of discussion at the at the Montgomery County Board Room, 2nd Floor of the Historic Courthouse, 1 Courthouse Square in Hillsboro, at 6:30 p.m., on Wednesday, August 23.

The Committee began work in October 2022 to update the County's Natural Hazards Mitigation Plan. This Plan details the past severe weather events that have impacted the County and identifies mitigation projects and activities that can be taken before a severe weather event occurs to protect residents and critical services and infrastructure.

"There has been at least $77.8 million in verified property and crop damages, four fatalities, and 22 injuries caused by severe weather events in the County," according to Kevin Schott, Montgomery County Emergency Management Agency (EMA) Director. "Obtaining FEMA's approval of our updated Plan will make all of the participants eligible to receive federal grant money for mitigation projects and activities."

Projects identified by Committee members at this meeting will become part of the Montgomery County Natural Hazards Mitigation Plan. While the committee 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 winter 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 Schott.

Interested persons can submit questions and comments to the Committee members or directly to the Montgomery County EMA Office.

1

The Journal-News

Protecting Health And Property In The County

Posted Thursday, August 17, 2023 12:00 am

Projects and activities to prevent injuries and fatalities while maintaining vital services for Montgomery County residents will be the main topic of discussion at the Montgomery County Hazard Mitigation Planning Committee meeting at 6:30 p.m., Wednesday, Aug. 23, in the Montgomery County Board Room, located on the second floor of the Historic Courthouse in Hillsboro.

The committee began work in October 2022 to update the County's Natural Hazards Mitigation Plan. This plan details the past severe weather events that have impacted the county and identifies mitigation projects and activities that can be taken before a severe weather event occurs to protect residents and critical services and infrastructure.

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Interested persons can submit questions and comments to the committee members or directly to the Montgomery County EMA Office.

Comments

NO COMMENTS ON THIS ITEM PLEASE LOG IN TO COMMENT BY CLICKING HERE (/LOGIN.HTML?REFERER=%2FSTORIES%2FPROTECTING-HEALTH-AND-PROPERTY-IN-THE-COUNTYPROJECTS-AND-ACTIVITIES-TO-PREVENT-INJURIES-AND%2C112095)

OTHER ITEMS THAT MAY INTEREST YOU

Dr. Byers Retiring After 42 Years (/stories/dr-byers-retiring-after-42-years,113626)

Dressed To The Nines, Ready For Witt (/stories/dressed-to-the-nines-ready-for-witt,113627)

Appendix F

EMA Director,
Kevin Schott

Vol. Dep. Director,
Joe Gasparich

Deputy Director,
Dan Hough

120 North Main
Hillsboro, IL 62049

E.O.C. Phone Mon-Fri 8 am to 4 pm: 217-532-9560
Kevin Schott, EMA Director
(217) 313-4153 or kevins@montgomerycountyil.gov

FOR IMMEDIATE RELEASE
Contact: Kevin Schott
217-532-9560

Plan to Protect Public Health and Property in Montgomery County Ready for Public Review

Hillsboro, IL (January 8, 2024) -- The updated Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Plan outlining projects and activities to reduce damages caused by severe weather and other natural hazards will be available for public review and comment starting January 24. The Plan, along with a summary sheet and a comment survey, will be available for review at the Montgomery County EMA Office and on the County's website.

The comment period will remain open through February 7. Public comments received will be used to make any revisions needed before the Plan is submitted to the Illinois Emergency Management Agency-Office of Homeland Security and Federal Emergency Management Agencies.

The Montgomery County Natural Hazards Mitigation Planning Committee has been conducting working meetings open to the public since October 2022. The Committee prepared the Plan with technical assistance from state and federal agencies as well as a consultant specializing in emergency management planning.

The municipalities of Coffeen, Farmersville, Harvel, Hillsboro, Litchfield, Nokomis, Raymond, Schram City, Taylor Springs, Waggoner, and Witt have participated in the planning process. Other participating jurisdictions include Rountree Township, Coffeen Volunteer Fire Department, Fillmore Community Fire Protection District (FPD), Nokomis Area FPD, and Raymond-Harvel Fire Department.

"This Plan describes how the County and the participating jurisdictions have been impacted by severe weather and other hazards and identifies specific mitigation actions that can be taken to reduce damages to people and property before events occur," explained Montgomery County Emergency Management Agency Director, Kevin Schott.

An open-house style public forum will be held at the Montgomery County Board Room, 2nd Floor of the Historic Courthouse, 1 Courthouse Square in Hillsboro, from 5 p.m. to 7 p.m. on Wednesday, January 24. Individuals can come and review the Plan at any time during the forum. Those unable to attend can still review the Plan and provide comments without participating in the public forum.

XXXXXXXXXXXXXXXXX

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Montgomery County Emergency Management Agency
January 10 at 11:01 AM ·

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FOR IMMEDIATE RELEASE
Contact: Kevin Schott
217-532-9560
Plan to Protect Public Health and Property in Montgomery County Ready for Public Review
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5 · 4 shares

APPENDIX G

MONTGOMERY COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN PUBLIC FORUM SUMMARY HANDOUT

JANUARY 24, 2024
5:00 P.M. – 7:00 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 Montgomery County residents. Since 2002, Montgomery County has been included in four major federally-declared disasters and experienced at least $5.5 million in recorded property damages and $76.6 million in recorded crop damages.

In the last 10 years alone (2013 – 2022), there have been 54 excessive heat events, 43 thunderstorms with damaging winds, 27 flash flood events, 19 extreme cold events, 18 tornadoes, 13 severe winter storms, 9 riverine flood events, 8 severe storms with hail one inch in diameter or greater, 2 lightning strike events with verified damages, and one wildfire in the County. While natural hazards cannot be avoided, their impacts can be reduced through effective hazard mitigation planning and implementation.

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

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

Who participated in the update of the County's Natural Hazards Mitigation Plan?
Recognizing the benefits that could be gained from preparing an updated natural hazards mitigation plan, Montgomery County invited all the local government entities within the County to participate. The following jurisdictions chose to participate in the Plan update with the County:

- Coffeen, City of
- Coffeen Volunteer Fire Department
- Farmersville, Village of
- Fillmore Community Fire Protection District
- Harvel, Village of
- Hillsboro, City of
- Litchfield, City of
- Nokomis, City of
- Nokomis Area Fire Protection District
- Raymond, Village of
- Raymond-Harvel Fire Department
- Rountree Township
- Schram City, Village of
- Taylor Springs, Village of
- Waggoner, Village of
- Witt, City of

MONTGOMERY COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

How was the Plan update developed?
The Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Plan update was developed through the Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee. The Committee included representatives from each participating jurisdiction, as well as emergency services, healthcare, and utilities. The Planning Committee met five times between October 2022 and January 2024.

Which hazards are included in the Plan update?
After reviewing the risk assessment, the Planning Committee chose to include the following hazards in the Plan:

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

What is included in the Plan update?
The Plan update is divided into sections that cover the planning process; the risk assessment; the mitigation strategy, including the jurisdiction-specific mitigation action lists; plan maintenance; and adoption. The majority of the Plan update is devoted to the risk assessment and mitigation strategy.

The risk assessment identifies the natural hazards that pose a threat to the County and includes a profile of each 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 analysis that estimates the potential impacts each natural hazard would have on the health and safety of the residents of Montgomery County, as well as the buildings, critical facilities, and infrastructure in the County.

The key component of the mitigation strategy is a list of the projects and activities developed by each participating jurisdiction to reduce the potential loss of life and property damage that results from the natural hazards identified in the risk assessment. These projects and activities are intended to be implemented *before* a hazard event occurs.

What happens next?
Any comments received at today's public forum and during the public comment period will be reviewed and, where applicable, incorporated into the draft Plan update before it is submitted to the Illinois Emergency Management Agency and Office of Homeland Security (IEMA-OHS) and the Federal Emergency Management Agency (FEMA) for review. Once IEMA-OHS and FEMA have reviewed and approved the Plan, it will be presented to the County and each participating jurisdiction for formal adoption. After adopting the Plan update, each participating jurisdiction will be eligible to apply for federal mitigation funds and can begin implementing the mitigation actions identified in the Plan.

APPENDIX H

MONTGOMERY COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

COMMENT SHEET

PLAN COMMENT PERIOD
JANUARY 24, 2024 THRU FEBRUARY 7, 2024

The County's Multi-Jurisdictional Natural Hazard Mitigation Plan evaluates damage to life and property from the natural hazards that occur in the County. This Plan also identifies projects and activities for the County and each participating jurisdiction that will help reduce these damages. This comment sheet should be used to provide feedback on the draft Plan update.

What comments, concerns or questions do you have regarding the draft Plan update?
(Use additional sheets if necessary.)

Please Print Your Name, Address, and Phone Number Below:

Name: ____________________ Phone: ____________

Address: ____________________

____________________ Zip Code: ____________

Comments will be accepted through February 7, 2024

Place
Stamp
Here

Kevin Schott, Director
Montgomery County Emergency Management Agency
120 N. Main St.
Hillsboro, IL 62049

Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Plan Update Comment Survey

The Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Plan evaluates damage to life and property from the natural hazards that occur in the County. This Plan also identifies projects and activities for the County and each participating jurisdiction to help reduce these damages. This comment sheet should be used to provide feedback on the draft Plan.

An asterisk (*) denotes a question that is required for form completion.

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

* 2. Name:

3. Address:

4. City/Village/Town:

5. State/Province:

6. Zip Code:

* 7. Email Address:

8. Phone Number:

Comments will be accepted through February 7, 2024.

Done

Appendix H

APPENDIX I

EMA Director,
Kevin Schott

Vol. Dep. Director,
Joe Gasparich

Deputy Director,
Dan Hough

120 North Main
Hillsboro, IL 62049

E.O.C. Phone Mon-Fri 8 am to 4 pm: 217-532-9560
Kevin Schott, EMA Director
(217) 313-4153 or kevins@montgomerycountyil.gov

To: Bond County EMA: Allan Davis (Bond911@sbcglobal.net)
Christian County EMA: Jeff Stoner (CCEMA@christiancountysheriff.com)
Fayette County EMA: Rachel Ann Denning (fayetteema@fayettecountyillinois.gov)
Macoupin County EMA: Susan Lewis (susan.lewis@macoupincountyil.gov)
Madison County EMA: Fred Patterson (fgpatterson@madisoncountyil.gov)
Sangamon County OEM: William Lee (sangamoncountyoem@co.sangamon.il.us)
Shelby County EMA: Scott McKee (shelbyema@shelbycounty-il.gov)

From: Kevin Schott, Montgomery County EMA Director

Subject: Hazard Mitigation Plan Update

Date: January 8, 2024

The purpose of this memorandum is to inform you that Montgomery County is updating its countywide Natural Hazards Mitigation Plan. Since we share common boundaries, you are invited to review our draft Plan and provide comments during the public comment period, which will run from January 24 through February 7, 2024. Starting January 24, the Plan, along with a summary sheet and a comment survey, can be viewed on the Montgomery County webpage.

A public forum is scheduled for:

Wednesday, January 24, 2024
5 p.m. to 7 p.m.
Montgomery County Board Room,
2nd Floor of the Historic Courthouse,
1 Courthouse Square, Hillsboro

If you have any questions, please contact me at 217-532-9560 or kevins@montgomerycountyil.gov

American Environmental Corp., an emergency management and environmental consulting firm experienced in preparing these plans, is leading our planning process. If you have specific questions about the Plan, please contact Ken Runkle, a consultant team member, at 217-585-9517 or krunkle@aecspfld.com

Runkle, Ken

From: Kevin Schott <kevins@montgomerycountyil.gov>
Sent: Wednesday, January 03, 2024 11:42 AM
To: Alan Davis; Jeff Stoner; fayetteema@fayettecountyillinois.gov; Susan Lewis; Frederick G. Patterson; sangamoncountyoem@co.sangamon.il.us; shelbyema@shelbycounty-il.gov
Cc: Runkle, Ken; Bostwick, Andrea; Joe Gasparich; Dan Hough
Subject: Hazard Mitigation Grant Public meeting invite
Attachments: Adjacent Counties Memo - Montgomery County.docx

Please see attached invite for Jan 24

Kevin Schott
Director
Montgomery County EMA
217-313-4153

APPENDIX J

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County
1956 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
07/28/1956	2:30 PM	Hillsboro	n/a kts	n/a	n/a	n/a	n/a	
10/10/1959	5:45 PM	Taylor Springs	n/a kts	n/a	n/a	n/a	n/a	
09/30/1961	1:46 PM	Farmersville	52 kts	n/a	n/a	n/a	n/a	
05/10/1962	8:23 PM	Butler	n/a kts	n/a	n/a	n/a	n/a	
08/18/1965	4:45 AM	Witt	n/a kts	n/a	n/a	n/a	n/a	
04/20/1966	4:30 PM	Walshville	n/a kts	n/a	n/a	n/a	n/a	
10/10/1969	11:20 PM	Walshville	n/a kts	n/a	n/a	n/a	n/a	
10/11/1969	12:15 AM	Fillmore	n/a kts	n/a	n/a	n/a	n/a	
03/29/1974	1:40 PM	Raymond	n/a kts	n/a	n/a	n/a	n/a	
07/14/1974	8:30 PM	Raymond	n/a kts	n/a	n/a	n/a	n/a	
05/19/1975	4:35 PM	Litchfield	n/a kts	n/a	n/a	n/a	n/a	
03/26/1976	9:30 PM	Nokomis	n/a kts	n/a	n/a	n/a	n/a	
04/10/1978	2:30 PM	Hillsboro	n/a kts	n/a	n/a	n/a	n/a	
09/07/1980	12:00 PM	Irving	n/a kts	n/a	n/a	n/a	n/a	
09/16/1980	5:50 PM	Hillsboro	n/a kts	n/a	n/a	n/a	n/a	
06/15/1982	1:50 PM	Litchfield	n/a kts	n/a	n/a	n/a	n/a	
07/21/1982	5:00 PM	Hillsboro	n/a kts	n/a	n/a	n/a	n/a	
03/15/1984	7:08 PM	Raymond	n/a kts	n/a	n/a	n/a	n/a	
06/23/1985	2:05 PM	Hillsboro	56 kts	n/a	n/a	n/a	n/a	
11/19/1985	3:33 PM	Walshville	52 kts	n/a	n/a	n/a	n/a	
09/29/1986	3:45 PM	Coffeen	57 kts	n/a	n/a	n/a	n/a	
09/29/1986	4:10 PM	Donnellson	57 kts	n/a	n/a	n/a	n/a	
06/02/1987	3:55 PM	Litchfield	n/a kts	n/a	n/a	n/a	n/a	
07/06/1987	3:10 PM	Litchfield	n/a kts	n/a	n/a	n/a	n/a	
03/24/1988	10:49 PM	Irving	n/a kts	n/a	n/a	n/a	n/a	
04/05/1988	7:00 PM	Raymond	52 kts	n/a	n/a	n/a	n/a	
05/09/1990	6:15 PM	Irving	n/a kts	n/a	n/a	n/a	n/a	

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1 Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County 1956 - 2022								
Date(s)	**Start Time**	**Location(s)**	**Magnitude Windspeed (knots)**	**Injuries**	**Fatalities**	**Property Damages**	**Crop Damages**	**Impacts/Event Description**
06/22/1990	8:00 PM	Irving	n/a kts	n/a	n/a	n/a	n/a	
07/01/1991	6:15 PM	Litchfield Nokomis	n/a kts	n/a	n/a	n/a	n/a	
07/02/1992	6:00 PM	Litchfield	n/a kts	n/a	n/a	n/a	n/a	
07/02/1992	7:45 PM	Litchfield	56 kts	n/a	n/a	n/a	n/a	
09/09/1992	6:49 PM	Nokomis	n/a kts	n/a	n/a	n/a	n/a	
08/19/1993	5:55 PM	Litchfield	n/a kts	n/a	n/a	n/a	n/a	
08/19/1993	6:15 PM	Hillsboro	n/a kts	n/a	n/a	n/a	n/a	
08/19/1993	6:35 PM	Hillsboro	n/a kts	n/a	n/a	n/a	n/a	
04/26/1994	8:40 PM	Hillsboro	n/a kts	n/a	n/a	n/a	n/a	
04/26/1994	9:18 PM	Litchfield Hillsboro	n/a kts	n/a	n/a	n/a	n/a	
04/26/1994	9:40 PM	Nokomis	n/a kts	n/a	n/a	n/a	n/a	
11/20/1994	7:40 PM	Hillsboro	n/a kts	n/a	n/a	$200	n/a	
11/27/1994	1:04 PM	Witt	n/a kts	1	n/a	$3,300	n/a	
05/27/1995	5:17 PM	Hillsboro	n/a kts	n/a	n/a	$10,400	n/a	
06/08/1995	7:07 AM	Raymond	n/a kts	n/a	n/a	$300	n/a	
06/08/1995	7:13 AM	Harvel	61 kts	n/a	n/a	n/a	n/a	
07/22/1995	11:30 AM	Walshville	n/a kts	n/a	n/a	$3,300	n/a	
07/22/1995	11:48 AM	Coffeen	n/a kts	n/a	n/a	$8,300	n/a	
07/25/1995	9:15 PM	Raymond	n/a kts	n/a	n/a	$300	n/a	
07/25/1995	9:24 PM	Raymond	n/a kts	n/a	n/a	$200	n/a	
01/18/1996	9:55 AM	Nokomis	50 kts	n/a	n/a	n/a	n/a	
05/25/1996	7:00 PM	Waggoner	55 kts	n/a	n/a	n/a	n/a	
10/22/1996	2:00 PM	Coffeen	50 kts	n/a	n/a	n/a	n/a	
05/22/1998	8:30 AM	Farmersville	55 kts	n/a	n/a	n/a	n/a	
06/14/1998	6:10 AM	Hillsboro	55 kts	n/a	n/a	n/a	n/a	

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County
1956 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
06/14/1998	7:00 PM	Farmersville	60 kts	n/a	n/a	n/a	n/a	
06/18/1998	8:14 PM	Waggoner	52 kts	n/a	n/a	n/a	n/a	
06/18/1998	8:30 PM	Litchfield	52 kts	n/a	n/a	n/a	n/a	
06/18/1998	8:53 PM	Raymond	52 kts	n/a	n/a	n/a	n/a	
06/18/1998	9:00 PM	Butler Farmersville Waggoner	55 kts	n/a	n/a	n/a	n/a	
06/29/1998	5:00 PM	Farmersville	55 kts	n/a	n/a	n/a	n/a	
06/29/1998	5:20 PM	Hillsboro	55 kts	n/a	n/a	n/a	n/a	
07/09/2002	5:50 PM	Nokomis	55 kts	n/a	n/a	n/a	n/a	
07/09/2002	5:55 PM	Coffeen	55 kts	n/a	n/a	n/a	n/a	
07/09/2002	6:00 PM	Fillmore	55 kts	n/a	n/a	n/a	n/a	
05/18/2004	3:35 PM	Litchfield	55 kts	n/a	n/a	n/a	n/a	
05/24/2004	11:34 PM	Litchfield	52 kts	n/a	n/a	n/a	n/a	
05/24/2004	11:35 PM	Raymond	55 kts	n/a	n/a	n/a	n/a	
05/24/2004	11:40 PM	Harvel	55 kts	n/a	n/a	n/a	n/a	
05/24/2004	11:50 PM	Nokomis Witt	55 kts	n/a	n/a	n/a	n/a	
05/30/2004	4:57 PM	Litchfield	70 kts	n/a	n/a	n/a	n/a	
05/31/2004	7:05 PM	Litchfield	61 kts	n/a	n/a	n/a	n/a	
05/31/2004	7:20 PM	Nokomis	55 kts	n/a	n/a	n/a	n/a	
05/31/2004	7:30 PM	Nokomis	55 kts	n/a	n/a	n/a	n/a	
07/05/2004	9:35 AM	Witt	55 kts	n/a	n/a	n/a	n/a	
08/25/2004	5:45 PM	Raymond	55 kts	n/a	n/a	n/a	n/a	
05/11/2005	7:20 PM	Taylor Springs	51 kts	n/a	n/a	n/a	n/a	
05/11/2005	7:27 PM	Litchfield	51 kts	n/a	n/a	n/a	n/a	

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County
1956 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
05/11/2005	7:40 PM	Donnellson Hillsboro Taylor Springs	51 kts	n/a	n/a	$275,000	n/a	property damage figure provided by local insurance agent
05/11/2005	7:45 PM	Coffeen	51 kts	n/a	n/a	$75,000	n/a	property damage figure provided by local insurance agent
06/10/2005	8:15 PM	Litchfield	50 kts	n/a	n/a	n/a	n/a	
06/13/2005	5:10 PM	Litchfield	55 kts	n/a	n/a	n/a	n/a	
06/13/2005	5:30 PM	Butler Raymond	55 kts	n/a	n/a	n/a	n/a	
06/13/2005	6:00 PM	Irving	55 kts	n/a	n/a	n/a	n/a	
06/13/2005	6:15 PM	Nokomis	55 kts	n/a	n/a	n/a	n/a	
05/24/2006	3:05 PM	Farmersville	56 kts	n/a	n/a	n/a	n/a	
05/24/2006	4:00 PM	Nokomis	52 kts	n/a	n/a	n/a	n/a	
06/17/2006	2:28 PM	Litchfield	50 kts	n/a	n/a	n/a	n/a	
08/16/2007	10:20 AM	Farmersville	52 kts	n/a	n/a	n/a	n/a	
08/16/2007	10:30 AM	Litchfield	61 kts	n/a	n/a	n/a	n/a	
05/02/2008	8:15 AM	Farmersville Litchfield	56 kts	n/a	n/a	n/a	n/a	
05/02/2008	8:40 AM	Hillsboro	52 kts	n/a	n/a	n/a	n/a	
07/12/2008	3:35 PM	Hillsboro	52 kts	n/a	n/a	n/a	n/a	
08/05/2008	5:45 PM	Litchfield	61 kts	n/a	n/a	n/a	n/a	
08/05/2008	5:55 PM	Walshville	65 kts	n/a	n/a	n/a	n/a	
05/13/2009	10:54 PM	Honey Bend^ Wenonah^	65 kts	0	0	n/a	n/a	- winds blew a semi over on I-55 near mile marker 56 - winds caused minor damage to the soffits and downspouts of a home and the roof of a machine shed
06/19/2009	5:20 PM	Raymond	52 kts	n/a	n/a	n/a	n/a	several large tree limbs were blown down

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County
1956 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
07/25/2009	12:15 AM	Ohlman	56 kts	n/a	n/a	n/a	n/a	- winds blew down numerous trees and tree limbs as well as power lines - a few trees caused minor damage to a few homes - 2 vehicles sustained moderate damage from the fallen trees and tree limbs
08/19/2009	3:12 PM	Hillsboro	56 kts	n/a	n/a	n/a	n/a	winds blew down numerous large tree limbs and a 30 inch diameter oak tree was snapped off near its base
07/18/2010	8:10 AM	Litchfield	54 kts	n/a	n/a	n/a	n/a	
07/19/2010	12:10 PM	Witt^	52 kts	n/a	n/a	n/a	n/a	winds blew down several large tree limbs
08/20/2010	6:00 PM	Litchfield	60 kts	n/a	n/a	n/a	n/a	- winds caused widespread damage on the north side of the City - numerous trees, tree limbs and power lines were blown down - a couple of homes sustained minor roof damage
02/28/2011	12:00 AM	Litchfield	52 kts	n/a	n/a	n/a	n/a	
04/19/2011	5:15 PM	Raymond^	56 kts	n/a	n/a	n/a	n/a	winds blew part of the roof off a large barn just east of I-55 and just south of IL Rte. 48
05/25/2011	3:05 PM	Waggoner	56 kts	n/a	n/a	n/a	n/a	winds blew down several large trees and power lines
05/25/2011	4:49 PM	Nokomis	52 kts	n/a	n/a	n/a	n/a	winds blew down several trees and power lines as well as numerous large tree limbs
08/16/2012	2:28 PM	Coalton Irving Nokomis Witt	56 kts	n/a	n/a	n/a	n/a	*Irving/Nokomis* - numerous tree limbs and a few power lines were blown down

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County
1956 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
09/05/2012	7:35 AM	Litchfield Raymond	56 kts	n/a	n/a	n/a	n/a	*Litchfield* - several large trees were blown down as well as several power lines *Raymond* - a gutter was torn off of a house - numerous large tree limbs were blown down
09/05/2012	7:40 AM	Hillsboro Irving Schram City Witt	56 kts	n/a	n/a	n/a	n/a	several large trees, numerous tree limbs and several power lines were blown down
09/05/2012	8:15 AM	Coffeen	65 kts	n/a	n/a	n/a	n/a	winds blew down several trees and power lines
10/17/2012	5:25 PM	Litchfield	56 kts	n/a	n/a	n/a	n/a	winds blew down several large trees
04/10/2013	7:45 PM	Litchfield	54 kts	n/a	n/a	n/a	n/a	winds blew down a large tree which knocked down some power lines
04/10/2013	7:55 PM	Butler^	56 kts	n/a	n/a	n/a	n/a	winds caused minor roof damage to a home on Witt Ave. just east of IL Rte. 127
05/30/2013	6:30 PM	Donnellson^ Hillsboro Taylor Springs^	56 kts	n/a	n/a	n/a	n/a	*Taylor Springs area* - winds blew down a large walnut tree *Hillsboro* - several large trees were blown down - a tree fell on top of an unoccupied vehicle causing major damage
05/30/2013	6:39 PM	Honey Bend^	56 kts	n/a	n/a	n/a	n/a	winds blew down several large tree limbs

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County
1956 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
05/31/2013	8:04 PM	Farmersville^	70 kts	n/a	n/a	n/a	n/a	- several outbuildings sustained minor to moderate damage - 5 grain bins were blown off their foundations into a field on Thomasville Trail about ½ mile west of I-55 - several large trees and numerous tree limbs were blown down
11/17/2013	12:25 PM	Nokomis	61 kts	n/a	n/a	n/a	n/a	- winds caused moderate damage to several homes - several homes sustained minor siding damage
05/24/2015	10:04 PM	Coalton Nokomis	56 kts	n/a	n/a	n/a	n/a	numerous trees were damaged in and around Nokomis
06/15/2015	5:17 PM	Irving	56 kts	n/a	n/a	n/a	n/a	winds blew down numerous large tree limbs on the north side of Irving
07/13/2015	6:50 PM	Farmersville Waggoner Honey Bend Litchfield	52 kts	n/a	n/a	n/a	n/a	winds blew down numerous large tree limbs
05/07/2016	3:41 PM	Litchfield Hillsboro	56 kts	n/a	n/a	n/a	n/a	- winds blew down several large trees as well as numerous tree limbs *Lichtfield* - a house in Litchfield had several shingles blown off of it's roof
07/13/2016	3:20 PM	countywide	56 kts	n/a	n/a	n/a	n/a	- numerous trees, tree limbs and power lines were blown down countywide - damage was reported in Waggoner, Litchfield, Hillsboro, Donnellson, and Coffeen *Donnellson* - two grain bins and a shed were destroyed

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County
1956 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
03/07/2017	1:04 AM	Litchfield^	61 kts	n/a	n/a	n/a	n/a	winds snapped off several large tree limbs
03/30/2017	12:40 PM	Raymond	56 kts	n/a	n/a	n/a	n/a	- winds blew down several large tree limbs around town - a couple of homes had a few shingles blown off
04/29/2017	3:45 PM	Farmersville^ Farmersville	65 kts	n/a	n/a	n/a	n/a	*Farmersville area* - winds blew down numerous large trees, tree limbs and power lines - 2 semi trucks were blown over on Interstate 55 between mile markers 72 and 73 - a metal roof of a shed was blown off and several power poles snapped off - a construction trailer was flipped onto it's side *Farmersville* - a large uprooted tree fell onto a house causing moderate damage.
04/29/2017	3:54 PM	Harvel	54 kts	n/a	n/a	n/a	n/a	
04/29/2017	3:55 PM	Litchfield	70 kts	n/a	n/a	n/a	n/a	winds blew down several power lines on the east side of town
06/14/2017	7:44 PM	Litchfield	65 kts	n/a	n/a	n/a	n/a	winds blew down a few power lines around town
06/17/2017	11:30 PM	Raymond	61 kts	n/a	n/a	n/a	n/a	winds blew down several trees and power lines around town
07/10/2017	9:55 PM	Nokomis Nokomis^	61 kts	1	n/a	n/a	n/a	- winds blew over an occupied mobile home with the occupant sustaining minor injuries. - numerous trees, tree limbs and power lines were blown down - a couple of trees fell onto homes causing minor to moderate damage around town

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County
1956 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
07/23/2017	3:05 AM	Litchfield Lake Lou Yaeger Raymond	56 kts	n/a	n/a	n/a	n/a	Thunderstorm winds caused minor damage to buildings at a business on the west side of Litchfield. In Raymond, numerous tree limbs were blown down and some shingles were blown off roofs.
09/04/2017	5:15 PM	Litchfield	50 kts	n/a	n/a	n/a	n/a	
06/28/2018	4:22 PM	Nokomis	52 kts	n/a	n/a	n/a	n/a	winds blew down a power pole in town
07/01/2018	5:35 PM	Witt	52 kts	n/a	n/a	n/a	n/a	wind blew down a tree onto a power line in town
05/23/2019	12:45 AM	Nokomis	56 kts	n/a	n/a	n/a	n/a	winds blew down a large tree onto the corner of a house on Cedar Street causing minor damage
05/29/2019	6:19 PM	Hillsboro	56 kts	n/a	n/a	n/a	n/a	winds blew down a tree onto a power line, knocking out power to portions of the City
06/05/2019	3:28 PM	Raymond Raymond^	56 kts	n/a	n/a	n/a	n/a	winds blew down several power lines on the northeast side of Raymond, as well as numerous tree limbs
06/05/2019	4:00 PM	Witt^ Witt	52 kts	n/a	n/a	n/a	n/a	Thunderstorm winds blew down numerous tree limbs in Witt. One home sustained minor shingle damage.
06/21/2019	11:30 AM	Litchfield	56 kts	n/a	n/a	n/a	n/a	winds blew down numerous large tree limbs
05/28/2020	4:50 PM	Raymond^	56 kts	n/a	n/a	n/a	n/a	winds snapped off a large tree limb and flipped over a large play set
07/15/2020	4:03 PM	Walshville	56 kts	n/a	n/a	n/a	n/a	winds blew down a large tree in town
07/15/2020	4:15 PM	Butler Hillsboro	61 kts	n/a	n/a	n/a	n/a	- winds blew down several trees - some of the trees fell onto road ways briefly blocking them
08/10/2020	3:45 PM	Walshville^	50 kts	n/a	n/a	n/a	n/a	winds blew down several large tree limbs

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1
Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County
1956 - 2022

Date(s)	Start Time	Location(s)	Magnitude Windspeed (knots)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
05/16/2021	9:30 PM	Nokomis Nokomis^	56 kts	n/a	n/a	n/a	n/a	*Nokomis* winds blew down a partially dead tree in the City *Nokomis aera* several large tree limbs were blown down 3 miles east of Nokomis
06/28/2021	2:54 PM	Fillmore^	56 kts	n/a	n/a	n/a	n/a	winds snapped two power poles and knocked down several power lines
08/12/2021	2:30 PM	Nokomis	61 kts	n/a	n/a	$5,000	n/a	several trees were snapped off in town
08/26/2021	1:30 PM	Hillsboro	65 kts	n/a	n/a	$2,000	n/a	winds blew over a large tree on the north side of the City
12/10/2021	10:35 PM	Coffeen Fillmore	61 kts	n/a	n/a	$10,000	n/a	*Coffeen* - winds blew down several trees and caused minor damage to a machine shed *Fillmore* - winds blew down several power lines around town
12/10/2021	10:38 PM	Nokomis	61 kts	n/a	n/a	$1,000	n/a	winds blew down a large tree in town
06/17/2022	4:10 AM	southern portion of county	61 kts	n/a	n/a	$30,000	n/a	numerous trees, tree limbs and power lines were blown down in Litchfield, Hillsboro and Coffeen *Litchfield* Ia large tree branch landed on a house causing moderate roof damage
06/17/2022	4:20 AM	Raymond Witt Nokomis Coalton	61 kts	n/a	n/a	$20,000	n/a	numerous trees, tree limbs and some power lines were blown down

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 1 Severe Storms - Thunderstorms with Damaging Winds Reported in Montgomery County 1956 - 2022								
Date(s)	**Start Time**	**Location(s)**	**Magnitude Windspeed (knots)**	**Injuries**	**Fatalities**	**Property Damages**	**Crop Damages**	**Impacts/Event Description**
06/17/2022	4:28 AM	Farmersville	56 kts	n/a	n/a	$5,000	n/a	- winds blew down numerous large tree limbs around town - some of the limbs briefly blocked streets
08/03/2022	2:24 PM	Farmersville^	61 kts	n/a	n/a	$12,000	n/a	- winds blew a road sign over near the north bound lanes of I-55 about 4 miles north of Farmersville - a semi was blown over on I-55 just north of Farmersville
08/03/2022	3:53 PM	Litchfield	66 kts	n/a	n/a	$10,000	n/a	winds blew down several power lines around town as well as numerous large tree limbs
GRAND TOTAL:				**2**	**0**	**$471,300**	**$0**	

Source: Fenton, Dennis. State Farm Insurance Agent.
Montgomery County Multi-Jurisdictional Natural Hazard Mitigation Planning Committee
Montgomery County Multi-Jurisdictional Natural Hazard Mitigation Planning Committee Member responses to the Natural Hazard Events Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

^ Thunderstorms with damaging winds verified in the vicinity of this location(s).

Table 2
Severe Storms - Hail Events Reported in Montgomery County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Hail Stone Diameter (inches)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
06/07/1982	6:25 PM	Fillmore	1.75 in.	n/a	n/a	n/a	n/a	
07/06/1987	4:30 PM	Litchfield	2.00 in.	n/a	n/a	n/a	n/a	
05/25/1989	12:53 PM	Litchfield	2.50 in.	n/a	n/a	n/a	n/a	
05/06/1993	2:15 PM	Raymond	1.75 in.	n/a	n/a	n/a	n/a	
06/20/1994	3:15 PM	Litchfield	1.00 in.	n/a	n/a	n/a	n/a	
05/12/1998	10:02 PM	Litchfield	1.75 in.	n/a	n/a	n/a	n/a	
05/12/1998	10:16 PM	Hillsboro	1.75 in.	n/a	n/a	n/a	n/a	
06/18/1998	8:53 PM	Raymond	1.00 in.	n/a	n/a	n/a	n/a	
10/29/1998	6:47 PM	Litchfield	1.00 in.	n/a	n/a	n/a	n/a	
05/12/2000	5:00 PM	Litchfield	1.75 in.	n/a	n/a	n/a	n/a	
05/12/2000	5:01 PM	Hillsboro	1.00 in.	n/a	n/a	n/a	n/a	
08/23/2000	8:20 PM	Irving	2.75 in.	n/a	n/a	n/a	$50,000	- numerous crops were destroyed - some roofs and vehicles were damaged
08/23/2000	8:45 PM	Chapman Fillmore	1.75 in.	n/a	n/a	n/a	n/a	- crops were damaged - numerous gardens were virtually destroyed
09/03/2000	2:50 PM	Nokomis	1.75 in.	n/a	n/a	n/a	n/a	
04/24/2002	1:32 PM	Litchfield	1.00 in.	n/a	n/a	n/a	n/a	
04/24/2002	2:07 PM	Coffeen	1.00 in.	n/a	n/a	n/a	n/a	
05/01/2002	12:20 PM	Litchfield	1.75 in.	n/a	n/a	n/a	n/a	
05/01/2002	12:41 PM	Coffeen	1.00 in.	n/a	n/a	n/a	n/a	
05/01/2002	2:12 PM	Farmersville	1.00 in.	n/a	n/a	n/a	n/a	
05/30/2004	3:40 PM	Hillsboro	1.75 in.	n/a	n/a	n/a	n/a	
05/30/2004	3:45 PM	Donnellson	1.25 in.	n/a	n/a	n/a	n/a	
10/18/2004	1:55 PM	Litchfield	1.00 in.	n/a	n/a	n/a	n/a	
10/18/2004	2:05 PM	Litchfield	1.75 in.	n/a	n/a	n/a	n/a	
10/18/2004	5:20 PM	Hillsboro	1.75 in.	n/a	n/a	n/a	n/a	
10/18/2004	5:33 PM	Litchfield	1.75 in.	n/a	n/a	n/a	n/a	

^ Hail event verified in the vicinity of this location(s).

Table 2
Severe Storms - Hail Events Reported in Montgomery County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Hail Stone Diameter (inches)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
03/31/2005	4:45 PM	Nokomis	1.00 in.	n/a	n/a	n/a	n/a	
05/11/2005	7:20 PM	Litchfield	1.00 in.	n/a	n/a	n/a	n/a	
05/11/2005	7:25 PM	Honey Bend	1.00 in.	n/a	n/a	n/a	n/a	
05/11/2005	7:50 PM	Irving	1.00 in.	n/a	n/a	n/a	n/a	
02/16/2006	3:40 PM	Hillsboro	1.50 in.	n/a	n/a	n/a	n/a	
02/16/2006	4:15 PM	Fillmore	1.00 in.	n/a	n/a	n/a	n/a	
04/16/2006	1:45 PM	Taylor Springs	1.00 in.	n/a	n/a	n/a	n/a	
04/30/2006	2:40 PM	Irving	1.00 in.	n/a	n/a	n/a	n/a	
07/18/2006	5:35 AM	Nokomis	1.00 in.	n/a	n/a	n/a	n/a	
07/18/2006	6:40 AM	Litchfield	1.00 in.	n/a	n/a	n/a	n/a	
03/01/2007	11:51 AM	Litchfield	1.00 in.	n/a	n/a	n/a	n/a	
10/18/2007	3:40 PM	Nokomis	1.00 in.	n/a	n/a	n/a	n/a	
02/03/2008	4:25 PM	Litchfield	1.00 in.	n/a	n/a	n/a	n/a	
07/11/2008	4:50 PM	Litchfield	1.50 in.	n/a	n/a	n/a	n/a	
05/13/2009	10:55 PM	Litchfield Donnellson	1.00 in.	n/a	n/a	$25,000	n/a	committee members from Donnellson indicated that hail damaged the roof of the Community Center
04/19/2011	7:26 AM	Van Burensburg	1.00 in.	n/a	n/a	n/a	n/a	
04/22/2011	10:20 AM	Litchfield	1.00 in.	n/a	n/a	n/a	n/a	
05/25/2011	2:04 PM	Taylor Springs	1.00 in.	n/a	n/a	n/a	n/a	
05/28/2011	12:28 PM	Litchfield Lake Lou Yaeger	1.75 in.	n/a	n/a	n/a	n/a	
05/28/2011	1:00 PM	Lake Lou Yaeger	4.50 in.	n/a	n/a	n/a	n/a	
05/28/2011	1:29 PM	Litchfield	1.75 in.	n/a	n/a	n/a	n/a	
05/28/2011	1:35 PM	Butler	2.75 in.	n/a	n/a	n/a	n/a	- hail damaged a number of car windows - several reports of siding and roof damage due to large hail
05/28/2011	1:37 PM	Hillsboro	2.50 in.	n/a	n/a	n/a	n/a	

^ Hail event verified in the vicinity of this location(s).

Table 2
Severe Storms - Hail Events Reported in Montgomery County
1982 - 2022

Date(s)	Start Time	Location(s)	Magnitude Hail Stone Diameter (inches)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
05/28/2011	1:40 PM	Irving	4.50 in.	n/a	n/a	n/a	n/a	hail broke a few car windows
05/28/2011	1:52 PM	Nokomis	1.25 in.	n/a	n/a	n/a	n/a	
06/05/2011	6:08 AM	Litchfield^	1.75 in.	n/a	n/a	n/a	n/a	
03/02/2012	7:03 AM	Coffeen	1.00 in.	n/a	n/a	n/a	n/a	
03/02/2012	7:10 AM	Nokomis	1.00 in.	n/a	n/a	n/a	n/a	
04/28/2012	9:25 PM	Litchfield^	1.75 in.	n/a	n/a	n/a	n/a	
11/17/2013	11:53 AM	Wenonah^	1.00 in.	n/a	n/a	n/a	n/a	
04/29/2017	3:54 PM	Harvel	1.00 in.	n/a	n/a	n/a	n/a	
12/01/2018	4:11 PM	Litchfield Lake Lou Yaeger	1.75 in.	n/a	n/a	n/a	n/a	
05/03/2021	5:55 PM	Farmersville	1.50 in.	n/a	n/a	n/a	n/a	
05/03/2021	6:31 PM	Wenonah^ Ohlman	1.75 in.	n/a	n/a	n/a	n/a	
05/03/2021	7:05 PM	Panama	1.00 in.	n/a	n/a	n/a	n/a	
04/30/2022	5:10 PM	Farmersville^	1.00 in.	n/a	n/a	n/a	n/a	
06/12/2022	9:45 AM	Litchfield	1.00 in.	n/a	n/a	n/a	n/a	
GRAND TOTAL:				**0**	**0**	**$25,000**	**$50,000**	

Source: Montgomery County Multi-Jurisdictional Natural Hazard Mitigation Planning Committee Member responses to the Natural Hazard Events Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

^ Hail event verified in the vicinity of this location(s).

Table 3
Severe Storms - Lightning Events Reported in Montgomery County
1996 - 2022

Date(s)	Start Time	Location(s)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
05/03/1996	10:30 PM	Waggoner^	n/a	n/a	$80,000	n/a	lightning struck a house causing a fire that destroyed the home
07/09/2002	5:45 PM	Hillsboro	1	n/a	$150,000	n/a	a man was treated for burns at a local hospital from the lightning strike
01/03/2006	n/a	Hillsboro	n/a	n/a	$260,000	n/a	lighting struck the communication tower at the Montgomery County Sheriff's Office base station, damaging the tower and disrupting the communication network
08/05/2008	n/a	Hillsboro	n/a	n/a	$3,195	n/a	lightning struck the Fire Department damaging computer and security equipment and radios
06/19/2009	n/a	Hillsboro	n/a	n/a	$9,230	n/a	lightning struck the Fire Department damaging computer and security equipment and radios
04/25/2011	n/a	Raymond^	n/a	n/a	n/a	n/a	lightning struck a transformer damaging the phone and other equipment in the house
08/12/2021	n/a	Hillsboro^	n/a	n/a	$13,498	n/a	a lighning strike damaged the microwave radion link for Montgomery County 911 & Sheriff's radios
09/2022	n/a	Raymond	n/a	n/a	n/a	n/a	a lightning strike damaged the Village's brand new wellhouse microwave link according to committee member records
GRAND TOTAL:			**1**	**0**	**$515,923**	**$0**	

Source: Montgomery County Multi-Jurisdictional Natural Hazard Mitigation Planning Committee Member responses to the Natural Hazard Events Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

^ Lightning event verified in the vicinity of this location(s).

Table 4 Severe Storms - Heavy Rain Events Reported in Montgomery County 2003 - 2022								
Date(s)	**Start Time**	**Magnitude Rainfall (inches)**	**Observed Location(s)[1]**	**Injuries**	**Fatalities**	**Property Damages**	**Crop Damages**	**Impacts/Event Description**
11/17/2003 thru 11/18/2003	7:00 AM	5.00 in.	countywide	n/a	n/a	$100,000	n/a	- property damage figure provided by local insurance agent - very heavy rains fell over a 12 to 24 hour period
01/05/2005	10:00 AM	6.00 in.	countywide	n/a	n/a	$100,000	n/a	- property damage figure provided by local insurance agent - heavy rains fell over a 4 to 5 day period
GRAND TOTAL:				**0**	**0**	**$200,000**	**$0**	

Sources: Fenton, Dennis. State Farm Insurance Agent.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

[1] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

Table 5
Excessive Heat Events Reported in Montgomery County
1995 - 2022

Date(s)	Start Time	Magnitude - Temperature °F Day (Max)	Night (Min)	Heat Index (Max)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
07/12/1995 thru 07/16/1995	n/a	101 °F	71 °F	120 °F	Hillsboro	n/a	n/a	n/a	n/a	- many roads throughout the region experienced buckling - crops withered with the dry weather - there was no widespread loss of livestock although dairy cows produced less milk and cattle/swine/chickens put on less weight
07/28/1995 thru 07/31/1995	12:00 PM	n/a °F	n/a °F	110 °F		n/a	n/a	n/a	n/a	area crops suffered greatly from the hot and dry weather
08/09/1995 thru 08/19/1995	1:00 PM	97 °F	72 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
06/21/1996 thru 06/23/1996	n/a	95 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/29/1996 thru 07/01/1996	n/a	95 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/17/1996 thru 07/18/1996	n/a	95 °F	77 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/05/1996 thru 08/07/1996	n/a	95 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	

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		Day (Max)	Night (Min)	Heat Index (Max)						
06/24/1997 thru 06/25/1997	n/a	94 °F	72 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/02/1997	n/a	93 °F	78 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/13/1997 thru 07/14/1997	n/a	97 °F	72 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/19/1997 thru 07/23/1997	n/a	97 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/26/1997 thru 07/28/1997	n/a	100 °F	73 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/02/1997 thru 08/03/1997	n/a	95 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/16/1997	n/a	94 °F	78 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/24/1998 thru 06/29/1998	n/a	97 °F	73 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/06/1998 thru 07/07/1998	n/a	93 °F	73 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/19/1998 thru 07/22/1998	n/a	97 °F	75 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	

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		Day (Max)	Night (Min)	Heat Index (Max)						
08/23/1998 thru 08/25/1998	n/a	94 °F	72 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
09/06/1998 thru 09/07/1998	n/a	94 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/06/1999 thru 06/08/1999	n/a	93 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/05/1999 thru 07/06/1999	n/a	94 °F	75 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/09/1999	n/a	94 °F	74 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/19/1999 thru 07/27/1999	n/a	99 °F	71 °F	115 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/29/1999 thru 07/31/1999	n/a	100 °F	75 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/10/2000 thru 07/11/2000	n/a	93 °F	75 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/09/2000	n/a	92 °F	76 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/15/2000 thru 08/17/2000	n/a	98 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
06/11/2001 thru 06/14/2001	n/a	93 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/18/2001 thru 06/19/2001	n/a	94 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/07/2001 thru 07/10/2001	11:00 AM	98 °F	70 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/17/2001	11:00 AM	93 °F	71 °F	115 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/21/2001 thru 07/24/2001	n/a	96 °F	72 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/29/2001 thru 08/02/2001	11:00 AM	94 °F	71 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/07/2001 thru 08/09/2001	n/a	96 °F	73 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/21/2001 thru 08/22/2001	n/a	98 °F	71 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
06/02/2002 thru 06/04/2002	n/a	94 °F	72 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	

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1995 - 2022

Date(s)	Start Time	Magnitude - Temperature °F Day (Max)	Night (Min)	Heat Index (Max)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
06/29/2002 thru 07/05/2002	n/a	97 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/08/2002 thru 07/09/2002	11:00 AM	97 °F	69 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/20/2002 thru 07/22/2002	11:00 AM	97 °F	71 °F	115 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/26/2002 thru 08/06/2002	11:00 AM	97 °F	70 °F	115 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/21/2002 thru 08/22/2002	n/a	94 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/03/2003 thru 07/09/2003	n/a	97 °F	68 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/21/2003	n/a	91 °F	76 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/27/2003	n/a	95 °F	73 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/16/2003 thru 08/17/2003	n/a	95 °F	71 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	the heat wave hit as most schools were opening, resulting in many schools reducing their schedule to a half day while a few closed altogether
08/21/2003	n/a	99 °F	74 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
08/26/2003 thru 08/27/2003	n/a	98 °F	72 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/29/2003	n/a	91 °F	75 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/11/2004 thru 06/12/2004	n/a	92 °F	73 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/11/2004 thru 07/13/2004	n/a	96 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/21/2004 thru 07/22/2004	n/a	95 °F	71 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/03/2004 thru 08/04/2004	n/a	91 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/27/2004	n/a	92 °F	74 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/25/2005 thru 06/30/2005	n/a	97 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/16/2005 thru 07/26/2005	n/a	99 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/02/2005 thru 08/04/2005	n/a	96 °F	67 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude - Temperature °F Day (Max)	Magnitude - Temperature °F Night (Min)	Magnitude - Temperature °F Heat Index (Max)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
08/09/2005 thru 08/13/2005	n/a	98 °F	67 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/19/2005 thru 08/20/2005	n/a	96 °F	73 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/21/2006 thru 06/22/2006	n/a	95 °F	76 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/01/2006 thru 07/03/2006	n/a	97 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/17/2006 thru 07/21/2006	12:00 PM	96 °F	71 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/26/2006 thru 08/03/2006	n/a	101 °F	73 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/09/2007	n/a	94 °F	74 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/18/2007 thru 07/19/2007	n/a	94 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/27/2007	n/a	91 °F	75 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/03/2007 thru 08/15/2007	n/a	103 °F	68 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	many schools across the area went to an early dismissal schedule in order to combat the heat

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		Day (Max)	Night (Min)	Heat Index (Max)						
08/19/2007 thru 08/24/2007	n/a	98 °F	73 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/28/2007 thru 08/29/2007	n/a	98 °F	66 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
09/05/2007 thru 09/06/2007	n/a	96 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/06/2008 thru 06/08/2008	n/a	94 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/12/2008 thru 06/13/2008	n/a	93 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/08/2008	n/a	90 °F	76 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/19/2008 thru 07/22/2008	n/a	96 °F	68 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/04/2008 thru 08/06/2008	11:29 AM	95 °F	70 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
06/18/2009 thru 06/19/2009	n/a	95 °F	72 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	

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		Day (Max)	Night (Min)	Heat Index (Max)						
06/21/2009 thru 06/27/2009	11:00 AM	95 °F	67 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/08/2009 thru 08/10/2009	n/a	94 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/20/2010 thru 06/21/2010	n/a	94 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/23/2010	n/a	95 °F	77 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	
06/26/2010 thru 06/28/2010	n/a	95 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/06/2010 thru 07/07/2010	n/a	94 °F	72 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/14/2010 thru 07/17/2010	12:00 PM	94 °F	68 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/21/2010 thru 07/24/2010	n/a	95 °F	70 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/28/2010 thru 07/29/2010	11:13 AM	93 °F	73 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	

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		Day (Max)	Night (Min)	Heat Index (Max)						
08/03/2010 thru 08/05/2010	10:00 AM	100 °F	74 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/09/2010 thru 08/15/2010	12:00 PM	95 °F	74 °F	115 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/19/2010 thru 08/20/2010	n/a	97 °F	67 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/04/2011	n/a	97 °F	73 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/07/2011 thru 06/09/2011	n/a	97 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/01/2011 thru 07/02/2011	12:00 PM	98 °F	71 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/11/2011 thru 07/12/2011	4:00 AM	97 °F	76 °F	115 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/16/2011 thru 08/03/2011	n/a	100 °F	69 °F	115 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/07/2011 thru 08/08/2011	12:00 PM	93 °F	75 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/24/2011	12:00 PM	100 °F	75 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	

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		Day (Max)	Night (Min)	Heat Index (Max)						
08/31/2011 thru 09/03/2011	12:00 PM	100 °F	69 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	
05/25/2012 thru 05/28/2012	n/a	95 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/16/2012 thru 06/21/2012	n/a	94 °F	68 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/28/2012 thru 07/08/2012	12:00 PM	104 °F	67 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/13/2012 thru 07/19/2012	n/a	102 °F	69 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/22/2012 thru 08/05/2012	12:00 PM	104 °F	69 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
06/12/2013 thru 06/13/2013	n/a	95 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/25/2013 thru 06/27/2013	n/a	93 °F	73 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	

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		Day (Max)	Night (Min)	Heat Index (Max)						
07/08/2013 thru 07/10/2013	n/a	94 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/16/2013 thru 07/20/2013	n/a	95 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/26/2013 thru 09/01/2013	n/a	99 °F	69 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
09/08/2013 thru 09/11/2013	n/a	96 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/17/2014 thru 06/20/2014	n/a	93 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/12/2014 thru 07/14/2014	n/a	92 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/22/2014 thru 08/29/2014	n/a	95 °F	69 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
09/04/2014 thru 09/05/2014	n/a	94 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	

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		Day (Max)	Night (Min)	Heat Index (Max)						
06/10/2015 thru 06/13/2015	n/a	93 °F	68 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/13/2015 thru 07/14/2015	12:00 PM	94 °F	74 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/17/2015 thru 07/19/2015	n/a	94 °F	70 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/26/2015 thru 07/29/2015	n/a	96 °F	71 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
09/06/2015 thru 09/08/2015	n/a	94 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/11/2016 thru 06/16/2016	n/a	94 °F	68 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/22/2016 thru 06/23/2016	n/a	94 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/26/2016 thru 06/27/2016	n/a	93 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	

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Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
07/18/2016 thru 07/24/2016	11:00 AM	92 °F	67 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/11/2016 thru 08/13/2016	12:00 PM	94 °F	70 °F	108 °F	Hillsboro	n/a	n/a	n/a	n/a	
09/06/2016 thru 09/08/2016	n/a	92 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/12/2017 thru 06/13/2017	n/a	94 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/10/2017 thru 07/13/2017	n/a	96 °F	71 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/19/2017 thru 07/23/2017	12:00 PM	97 °F	67 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/26/2017 thru 07/27/2017	12:00 PM	93 °F	70 °F	107 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/21/2017	n/a	90 °F	74 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/15/2018 thru 06/20/2018	12:00 PM	95 °F	69 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 5
Excessive Heat Events Reported in Montgomery County
1995 - 2022

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
06/28/2018 thru 07/06/2018	3:00 PM	93 °F	67 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/14/2018	9:00 AM	89 °F	73 °F	108 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/05/2018 thru 08/07/2018	n/a	93 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/26/2018 thru 08/28/2018	3:43 AM	92 °F	73 °F	104 °F	Hillsboro	n/a	n/a	n/a	n/a	
09/05/2018 thru 09/07/2018	n/a	93 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
09/20/2018 thru 09/21/2018	n/a	95 °F	71 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/10/2019	11:00 AM	95 °F	75 °F	108 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/17/2019 thru 07/21/2019	1:30 PM	93 °F	69 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/19/2020	n/a	92 °F	78 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/26/2020 thru 07/27/2020	n/a	91 °F	73 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
08/10/2020	12:00 PM	94 °F	73 °F	105 °F	Hillsboro	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 5
Excessive Heat Events Reported in Montgomery County
1995 - 2022

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
08/24/2020 thru 08/26/2020	n/a	93 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/12/2021 thru 06/13/2021	n/a	95 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/18/2021 thru 06/20/2021	1:00 PM	98 °F	67 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/29/2021	n/a	90 °F	75 °F	111 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/10/2021 thru 08/12/2021	12:00 PM	93 °F	74 °F	112 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/24/2021 thru 08/30/2021	1:00 PM	94 °F	68 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
05/11/2022 thru 05/12/2022	n/a	93 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/12/2022 thru 06/16/2022	n/a	98 °F	69 °F	112 °F	Hillsboro	n/a	n/a	n/a	n/a	
06/21/2022	n/a	96 °F	76 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
06/24/2022 thru 06/25/2022	n/a	93 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 5
Excessive Heat Events Reported in Montgomery County
1995 - 2022

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
		Day (Max)	Night (Min)	Heat Index (Max)						
06/30/2022 thru 07/02/2022	n/a	93 °F	69 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
07/04/2022 thru 07/06/2022	12:00 PM	100 °F	70 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
07/20/2022 thru 07/24/2022	12:00 PM	97 °F	69 °F	110 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/01/2022 thru 08/03/2022	1:00 PM	93 °F	68 °F	109 °F	Hillsboro	n/a	n/a	n/a	n/a	
08/07/2022 thru 08/08/2022	n/a	92 °F	74 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
09/20/2022 thru 09/21/2022	n/a	96 °F	70 °F	n/a °F	Hillsboro	n/a	n/a	n/a	n/a	
GRAND TOTAL:						**0**	**0**	**$0**	**$0**	

Sources: Iowa State University, Iowa Environmental Mesonet, National Weather Service Data, Search for Warnings.
Midwestern Regional Climate Center, cli-MATE.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 6
General Flood Events Reported in Montgomery County
1994 - 2022

Date(s)	Start Time	Water Body	Location(s)	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
				Home	Business	Infra-structure					
05/26/2008	1:12 AM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	
06/06/2008 thru 06/07/2008	10:47 PM	area streams & creeks	southern portion of county				n/a	n/a	n/a	n/a	
12/27/2008 thru 12/28/2008	6:45 PM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	
10/08/2009 thru 10/09/2008	6:04 PM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	
10/30/2009 thru 10/31/2009	1:04 PM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	
07/25/2010	4:32 AM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	
09/03/2010	2:40 AM	area streams & creeks	northern portion of county				n/a	n/a	n/a	n/a	
06/18/2011 thru 06/19/2011	1:06 PM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	
10/02/2014 thru 10/03/2014	11:03 PM	area streams & creeks	northwestern portion of county				n/a	n/a	n/a	n/a	
06/08/2015	7:31 AM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	

[1] An “X” in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 6
General Flood Events Reported in Montgomery County
1994 - 2022

Date(s)	Start	Water	Location(s)	Impacts[1]			Injuries	Fatalities	Property	Crop	Impacts/
12/27/2015 thru 12/30/2015	3:17 AM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	
06/04/2016	1:00 PM	area streams & creeks	central portion of county				n/a	n/a	n/a	n/a	
04/30/2017 thru 05/02/2017	1:10 AM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	
04/30/2019 thru 05/01/2019	10:12 PM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	
08/12/2019 thru 08/13/2019	10:31 AM	area streams & creeks	southern portion of county				n/a	n/a	n/a	n/a	
11/30/2019	6:00 AM	area streams & creeks	southeastern portion of county				n/a	n/a	n/a	n/a	
01/10/2020 thru 01/11/2020	10:39 PM	area streams & creeks	countywide				n/a	n/a	n/a	n/a	
GRAND TOTAL:							**0**	**0**	**$0**	**$0**	

Sources: Iowa State University, Iowa Environmental Mesonet, National Weather Service Data, Search for Warnings.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a general flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 7
Flash Flood Events Reported in Montgomery County
1994 - 2022

Date(s)	Start Time	Location(s)	Impacts[1] Home	Business	Infra-structure	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
04/11/1994 thru 04/12/1994	5:00 PM	countywide	X		X	n/a	1	n/a	n/a	- Numerous homes were damaged and many roads were closed due to flooding. - A man died near White Oak while trying to drive across a flooded roadway when his car went off the road into Horse Creek.
05/09/1995	6:44 PM	northeastern portion of county			X	n/a	n/a	$800	n/a	- As much as 2 to 3 feet of water was over some roads prompting the Highway Department to close sections of IL Rte. 116 around Witt. - A 91 year-old woman had to be rescued at the "broken bridge" between Hillsboro and Irving after she attempted to cross the flood waters and her car got caught in the current.
07/01/1996	4:30 AM	southern portion of county				n/a	n/a	n/a	n/a	
08/04/1998 thru 08/05/1998	4:30 PM	countywide	X	X	X	n/a	n/a	n/a	n/a	- IL Rte. 16 in Witt had to be closed. - One man was rescued from IL Rte. 16 when his truck was swept off the road. Luckily it came to rest on top of a guardrail, enabling firemen to rescue him. - Firefighters in Witt had to use sandbags to keep water out of the firehouse. - The north and south marinas at Glenn Shoals Lake had to be closed on the 5th due to high water. - Numerous basements were flooded across the region.
08/24/2000	12:27 AM	countywide				n/a	n/a	n/a	n/a	

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a flash flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 7
Flash Flood Events Reported in Montgomery County
1994 - 2022

Date(s)	Start Time	Location(s)	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
05/07/2002	3:30 AM	countywide			X	n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #1416)*** Numerous creeks and small streams in the area flooded closing area roads.
05/12/2002 thru 05/13/2002	6:00 PM	countywide			X	n/a	n/a	n/a	n/a	***This event was part of a federally-declared disaster (Declaration #1416)*** IL Rte. 16 was closed in areas east of Irving.
05/27/2004	4:30 PM	countywide			X	n/a	n/a	$1,000	n/a	Flooding was reported along IL Rte. 16 and IL Rte. 127 near Litchfield and Hillsboro.
08/27/2006 thru 08/28/2006	8:20 PM	countywide				n/a	n/a	$1,000,000	n/a	
02/05/2008	5:45 PM	Raymond^ Harvel^			X	n/a	n/a	n/a	n/a	6 to 8 inches of water was over IL Rte. 127 just west of Raymond.
04/10/2008	8:24 AM	countywide				n/a	n/a	$100,000	n/a	
05/25/2008 thru 05/26/2008	9:09 PM	countywide				n/a	n/a	n/a	n/a	
06/03/2008	6:07 AM	countywide			X	n/a	n/a	n/a	n/a	Water was over several roads in the Raymond area including IL Rte. 48 west of the Village.

^ Flash flood event verified in the vicinity of this location(s).

1 An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a flash flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 7
Flash Flood Events Reported in Montgomery County
1994 - 2022

Date(s)	Start Time	Location(s)	Impacts[1] Home	Impacts[1] Business	Impacts[1] Infra-structure	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
06/06/2008	3:38 PM	southern portion of county			X	n/a	n/a	n/a	n/a	- Numerous roads were flooded countywide, especially in the Nokomis, Hillsboro, Litchfield, Witt and Raymond areas. - In Raymond, one person drove into the flood waters at the railroad underpass on IL Rte. 127 just south of IL Rte. 48 and got stuck. The individual managed to get out of his truck and get to dry land on his own. - Montgomery County Highway Department estimated that $1 million in damages resulted from the flooding.
09/14/2008	6:00 AM	countywide				n/a	n/a	$48,585	n/a	***This event was part of a federally-declared disaster (Declaration #1800)*** Public Assistance Figures for Montgomery County totaled 48585. Totals by Jurisdiction: $15,778 Litchfield; $7,828 East Fork Township Road District; $8,437 Irving Township Road District; $4,913 Raymond Road District; $8,436 Montgomery Co. Highway Department; $3,193 North Litchfield Road District.
12/28/2008	9:00 AM	countywide				n/a	n/a	n/a	n/a	
02/11/2009	10:00 AM	countywide				n/a	n/a	n/a	n/a	Montgomery County Highway Department estimated that $100,000 in damages resulted from the flooding.
05/26/2009	1:18 PM	countywide				n/a	n/a	n/a	n/a	
07/11/2009	6:47 AM	southeastern portion of county				n/a	n/a	n/a	n/a	
10/08/2009	8:51 AM	countywide				n/a	n/a	n/a	n/a	
10/30/2009	7:34 AM	countywide				n/a	n/a	n/a	n/a	

^ Flash flood event verified in the vicinity of this location(s).

1 An “X” in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a flash flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 7
Flash Flood Events Reported in Montgomery County
1994 - 2022

Date(s)	Start Time	Location(s)	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
06/14/2010	2:40 PM	countywide			X	n/a	n/a	n/a	n/a	Numerous roads were flooded including IL Rte. 16 between Hillsboro and Witt.
06/27/2010 thru 06/28/2010	7:39 PM	southern portion of county				n/a	n/a	n/a	n/a	
07/11/2010 thru 07/12/2010	8:18 PM	southern portion of county				n/a	n/a	n/a	n/a	
07/24/2010 thru 07/25/2010	9:30 PM	countywide			X	n/a	n/a	n/a	n/a	Numerous roads were flooded including the intersection of IL Rte. 127 and IL Rte. 16. 1 to 2 feet of water was reported at this location.
07/27/2010	1:33 PM	northwestern portion of county				n/a	n/a	n/a	n/a	
09/02/2010 thru 09/03/2010	10:30 PM	northwestern and central portions of county			X	n/a	n/a	n/a	n/a	Several roads were flooded including East 1st Rd. near N. 20th Ave. near Raymond.
04/25/2011 thru 04/26/2011	9:00 PM	southeastern portion of county				n/a	n/a	n/a	n/a	
06/10/2011 thru 06/11/2011	11:14 PM	countyside				n/a	n/a	n/a	n/a	
06/18/2011	3:00 AM	southern portion of county			X	n/a	n/a	n/a	n/a	Numerous roads were flooded including IL Rte. 16 about a mile northeast of Irving and viaducts in Hillsboro and Raymond.

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a flash flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 7
Flash Flood Events Reported in Montgomery County
1994 - 2022

Date(s)	Start Time	Location(s)	Impacts[1] Home	Impacts[1] Business	Impacts[1] Infra-structure	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
07/07/2011 thru 07/08/2011	7:14 PM	countyside				n/a	n/a	n/a	n/a	
04/29/2012	7:54 AM	countyside				n/a	n/a	n/a	n/a	
04/30/2012	4:45 AM	countyside				n/a	n/a	n/a	n/a	
07/10/2013	8:19 AM	southeastern portion of county				n/a	n/a	n/a	n/a	
10/02/2014	11:09 AM	northern portion of county				n/a	n/a	n/a	n/a	
06/08/2015	12:00 AM	countywide			X	n/a	n/a	n/a	n/a	Several roads were flooded including Illinois Route 16 between Irving and Witt. Also, several viaducts were flooded as well.
06/19/2015	10:45 AM	soutern portion of county				n/a	n/a	n/a	n/a	
07/19/2015	4:53 AM	southwestern portion of county				n/a	n/a	n/a	n/a	
12/27/2015	1:30 AM	countywide			X	n/a	n/a	n/a	n/a	Numerous roads were flooded including some county highways.
12/28/2015	8:30 AM	countywide			X	n/a	n/a	n/a	n/a	Another round of heavy rain, between 2 to 4 inches, fell from late in the day on December 27th through December 28th causing additional flash flooding. Numerous roads were flooded including some county highways.
06/04/2016	8:30 AM	central portion of county			X	n/a	n/a	n/a	n/a	Several roads were flooded, including Illinois Route 16 on the northeast side of Nokomis. Two to three feet of water covered the roadway in this location.

^ Flash flood event verified in the vicinity of this location(s).

1 An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a flash flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 7
Flash Flood Events Reported in Montgomery County
1994 - 2022

Date(s)	Start Time	Location(s)	Impacts[1]			Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
			Home	Business	Infra-structure					
08/15/2016	6:59 AM	southern portion of county				n/a	n/a	n/a	n/a	
04/28/2017	3:19 PM	southeastern portion of county				n/a	n/a	n/a	n/a	
04/29/2017 thru 04/30/2017	7:30 PM	countywide			X	n/a	n/a	n/a	n/a	Numerous roads were flooded including Illinois Route 127 in numerous locations.
05/10/2017 thru 05/11/2017	11:33 PM	southwestern portion of county				n/a	n/a	n/a	n/a	
06/10/2018 thru 06/11/2018	7:10 PM	central portion of county			X	n/a	n/a	n/a	n/a	In Nokomis, water was high enough, reaching the bottom of car doors in parts of town. Several roads were closed due to the flooding.
07/01/2018 thru 07/02/2018	7:10 PM	countywide			X	n/a	n/a	n/a	n/a	Numerous roads were flooded including Illinois Route 16 at the railroad viaduct in Hillsboro. Several cars were stranded at this location.
08/17/2018	1:19 AM	countywide				n/a	n/a	n/a	n/a	
09/07/2018	5:31 PM	countywide				n/a	n/a	n/a	n/a	
05/23/2019	3:37 AM	southern portion of county				n/a	n/a	n/a	n/a	
05/29/2019 thru 05/30/2019	6:52 PM	southern portion of county				n/a	n/a	n/a	n/a	
08/12/2019	2:38 AM	southern portion of county				n/a	n/a	n/a	n/a	

^ Flash flood event verified in the vicinity of this location(s).

[1] An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a flash flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 7
Flash Flood Events Reported in Montgomery County
1994 - 2022

Date(s)	Start Time	Location(s)	Impacts[1] Home	Business	Infra-structure	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/ Event Description
09/01/2019	6:33 AM	northwestern portion of county				n/a	n/a	n/a	n/a	
06/22/2020	4:00 PM	northwestern portion of county			X	n/a	n/a	n/a	n/a	Numerous roads in the Farmersville and Waggoner areas. Macoupin Creek is out of its banks in Farmersville.
07/12/2021	6:50 PM	east-central portion of county				n/a	n/a	n/a	n/a	
07/31/2021	8:34 AM	southern portion of county				n/a	n/a	n/a	n/a	
08/26/2021	2:45 PM	southwestern portion of county				n/a	n/a	n/a	n/a	
08/31/2021 thru 09/01/2021	11:37 PM	countywide			X	n/a	n/a	n/a	n/a	Several roads were flooded in Irving and Witt. Also, Coffeen Road, and Filmore Trail were briefly flooded.
07/26/2022	3:15 AM	southwestern portion of county				n/a	n/a	n/a	n/a	
09/04/2022	8:45 AM	eastern portion of county				n/a	n/a	n/a	n/a	
GRAND TOTAL:						**0**	**1**	**$1,150,385**	**$0**	

Sources: Illinois Emergency Management Agency - Office of Homeland Security, Recovery Division, Public Assistance Figures.
Iowa State University, Iowa Environmental Mesonet, National Weather Service Data, Search for Warnings.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Data.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

^ Flash flood event verified in the vicinity of this location(s).

1 An "X" in the columns of Home, Business and Infrastructure indicates impacts occurred to those structure/infrastructure types during a flash flood event. A detailed description of the type and magnitude of the impacts are included in the Impacts/Event Description column if available.

Table 8
Severe Winter Storm Events Reported in Montgomery County
1950 - 2022

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
12/06/1950	n/a	Heavy Snow	6.5 in.					Hillsboro	n/a	n/a	n/a	
11/05/1951 thru 11/06/1951	9:00 PM	Heavy Snow	10.9 in.					Hillsboro	n/a	n/a	n/a	
03/01/1953	11:00 AM	Heavy Snow	5.5 in.					Hillsboro	n/a	n/a	n/a	
03/09/1958	n/a	Heavy Snow	9.0 in.					Hillsboro	n/a	n/a	n/a	
03/03/1960	n/a	Heavy Snow	6.0 in.					Hillsboro	n/a	n/a	n/a	
03/08/1960 thru 03/09/1960	6:00 PM	Heavy Snow	5.0 in.					Hillsboro	n/a	n/a	n/a	
12/11/1960	7:00 AM	Heavy Snow	5.0 in.					Hillsboro	n/a	n/a	n/a	
02/03/1961	n/a	Heavy Snow	6.0 in.					Hillsboro	n/a	n/a	n/a	
01/12/1964 thru 01/13/1964	n/a	Heavy Snow	8.0 in.					Hillsboro	n/a	n/a	n/a	
02/15/1964	9:00 AM	Heavy Snow	5.0 in.					Hillsboro	n/a	n/a	n/a	
02/25/1965	n/a	Heavy Snow	5.0 in.					Hillsboro	n/a	n/a	n/a	
03/04/1965	n/a	Heavy Snow	5.0 in.					Hillsboro	n/a	n/a	n/a	
02/01/1966 thru 02/02/1966	n/a	Heavy Snow	8.0 in.					Hillsboro	n/a	n/a	n/a	

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Table 8
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1950 - 2022

Date(s)	Start Time	Event Type	Magnitude[1] Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)	Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
01/13/1968 thru 01/14/1968	n/a	Heavy Snow	6.5 in.					Hillsboro	n/a	n/a	n/a	
04/05/1971 thru 04/06/1971	9:00 AM	Heavy Snow	7.0 in.					Hillsboro	n/a	n/a	n/a	
12/18/1973 thru 12/20/1973	8:15 PM	Heavy Snow	12.5 in.					Hillsboro	n/a	n/a	n/a	
12/30/1973 thru 12/31/1973	8:00 AM	Heavy Snow	12.0 in.					Hillsboro	n/a	n/a	n/a	
01/09/1974	n/a	Heavy Snow	5.0 in.					Hillsboro	n/a	n/a	n/a	
03/23/1974	10:00 AM	Heavy Snow	6.0 in.					Hillsboro	n/a	n/a	n/a	
02/24/1975	n/a	Heavy Snow	5.0 in.					Hillsboro	n/a	n/a	n/a	
11/26/1975	10:00 AM	Heavy Snow	8.0 in.					Hillsboro	n/a	n/a	n/a	
01/16/1978 thru 01/17/1978	5:00 AM	Heavy Snow	8.0 in.					Fillmore	n/a	n/a	n/a	
03/02/1978	5:00 AM	Heavy Snow	6.0 in.					Fillmore Hillsboro	n/a	n/a	n/a	

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[2] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

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1950 - 2022

Date(s)	Start Time	Event Type	Magnitude[1] Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)	Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
03/06/1978 thru 03/08/1978	2:30 AM	Heavy Snow	20.0 in.					Fillmore Hillsboro	n/a	n/a	n/a	
01/27/1979	4:30 AM	Heavy Snow	8.0 in.					Fillmore	n/a	n/a	n/a	
01/30/1980	12:00 AM	Heavy Snow	6.0 in.					Fillmore Hillsboro	n/a	n/a	n/a	
03/01/1980	12:00 AM	Heavy Snow	8.0 in.					Fillmore Hillsboro	n/a	n/a	n/a	
11/26/1980 thru 11/27/1980	11:00 PM	Heavy Snow	8.0 in.					Fillmore Hillsboro	n/a	n/a	n/a	
02/09/1981 thru 02/10/1981	10:00 PM	Heavy Snow	8.0 in.					Fillmore Hillsboro	n/a	n/a	n/a	
12/17/1981	3:30 PM	Heavy Snow	5.5 in.					Fillmore Hillsboro	n/a	n/a	n/a	
01/29/1982 thru 01/31/1982	2:00 PM	Heavy Snow	18.0 in.					Fillmore Hillsboro	n/a	n/a	n/a	
02/03/1982 thru 02/04/1982	n/a	Heavy Snow	9.5 in.					Fillmore Hillsboro	n/a	n/a	n/a	

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Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
02/09/1982	n/a	Heavy Snow	6.0 in.					Fillmore Hillsboro	n/a	n/a	n/a	
02/24/1984 thru 02/25/1984	5:00 AM	Heavy Snow	13.0 in.					Fillmore	n/a	n/a	n/a	
01/09/1987	6:00 AM	Heavy Snow	9.0 in.					Hillsboro	n/a	n/a	n/a	
01/18/1987 thru 01/19/1987	8:00 PM	Heavy Snow	10.0 in.					Hillsboro	n/a	n/a	n/a	
12/14/1987 thru 12/15/1987	9:00 AM	Winter Storm	7.0 in.	X				Hillsboro	n/a	n/a	n/a	
02/10/1988 thru 02/11/1998	9:00 AM	Heavy Snow	5.5 in.				X	Hillsboro	n/a	n/a	n/a	COOP observer noted that drifting occurred
12/26/1988	8:30 AM	Winter Storm	5.5 in.	X				Hillsboro	n/a	n/a	n/a	
03/05/1989 thru 03/06/1989	n/a	Winter Storm	10.0 in.	X				Hillsboro	n/a	n/a	n/a	
12/21/1990	7:00 AM	Winter Storm	3.0 in.	X	X	X		Hillsboro	n/a	n/a	n/a	
01/09/1993	n/a	Heavy Snow	6.0 in.					Hillsboro	n/a	n/a	n/a	

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[2] Observed Location information was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in the Midwestern Regional Climate Center's cli-MATE data system and NOAA's Storm Events Database.

Table 8 Severe Winter Storm Events Reported in Montgomery County 1950 - 2022													
Date(s)	**Start Time**	**Event Type**	**Magnitude[1]**					**Observed Location(s)[2]**	**Injuries**	**Fatalities**	**Property Damages**	**Impacts/ Event Description**
			Snow (inches)	**Freezing Rain (inches)**	**Ice (inches)**	**Sleet (Inches)**	**Strong Wind (mph)**					
02/15/1993 thru 02/16/1993	3:00 PM	Heavy Snow	7.0 in.				X	Hillsboro	n/a	n/a	n/a	COOP observer noted winds caused the snow to blow
02/24/1993 thru 02/25/1993	11:00 PM	Heavy Snow	10.0 in.				X	Hillsboro	n/a	n/a	n/a	COOP observer noted winds caused the snow to blow
01/16/1994	12:00 AM	Winter Storm	7.0 in.			X		Hillsboro	n/a	n/a	n/a	
01/06/1995	2:00 AM	Ice Storm			0.75 in.				n/a	n/a	n/a	- glaze ice accumulations left roads hazardous - numerous vehicle accidents were reported - schools remained closed in the morning
12/19/1995	n/a	Heavy Snow	6.5 in.					Hillsboro	n/a	n/a	n/a	
01/03/1996	n/a	Heavy Snow	7.0 in.					Hillsboro	n/a	n/a	n/a	
01/08/1997 thru 01/09/1997	6:00 PM	Winter Storm	8.0 in.				X	Hillsboro	n/a	n/a	n/a	- winds caused drifting snow and very cold wind chills - schools closed for several days

[1] An "X" in the snow, freezing rain, ice, sleet and/or strong winds columns indicates the presences of that weather condition during the severe winter storm event.

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Table 8
Severe Winter Storm Events Reported in Montgomery County
1950 - 2022

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
01/15/1997 thru 01/16/1997	11:00 PM	Winter Storm	7.0 in.	X		X		Hillsboro	n/a	n/a	n/a	- numerous auto accidents occurred along with some power outages - most area schools were closed
01/12/1998	2:00 AM	Winter Storm		X				Hillsboro	n/a	n/a	n/a	
12/21/1998 thru 12/22/1998	12:00 AM	Winter Storm	X	X	X	X			n/a	n/a	n/a	- roads across much of the area were covered with a thin coating of ice - vehicle accidents were numerous
01/01/1999 thru 01/02/1999	6:00 PM	Winter Storm	14.0 in.	X	X	X		Hillsboro	n/a	n/a	n/a	transportation across the area came to a stop for much of the holiday weekend
01/13/1999	4:30 AM	Ice Storm			0.25 in.				n/a	n/a	n/a	- some trees and power lines were downed - ice covered roads made travel difficult to impossible - area schools closed through the end of the week (Thursday & Friday)

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Severe Winter Storm Events Reported in Montgomery County
1950 - 2022

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
12/13/2000	6:00 AM	Heavy Snow	10.0 in.					Hillsboro	n/a	n/a	n/a	some schools in rural areas remained closed into the middle of the next week as temperatures remained very cold and a couple minor snow falls kept traveling conditions poor
01/26/2001	1:00 AM	Winter Storm			X	X		Hillsboro	n/a	n/a	n/a	- numerous traffic accidents were reported - most schools across the area were closed
03/25/2002 thru 03/26/2002	6:00 PM	Winter Storm	4.0 in.			1.0 in.			n/a	n/a	n/a	the combination of sleet and snow made for extremely hazardous travel conditions across the area
12/24/2002	6:00 AM	Winter Storm	8.0 in.					Hillsboro	n/a	n/a	n/a	the snow made for difficult travel conditions through Christmas Day
01/25/2004	6:00 AM	Winter Storm	2.0 in.	0.5 in.		2.0 in.		Hillsboro	n/a	n/a	n/a	- transportation was brought to a standstill across the region - many schools were closed into mid-week
12/08/2005	10:00 AM	Winter Storm	5.5 in.					Hillsboro	n/a	n/a	n/a	

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Severe Winter Storm Events Reported in Montgomery County
1950 - 2022

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
03/21/2006	n/a	Heavy Snow	8.0 in.					Hillsboro	n/a	n/a	n/a	
11/29/2006 thru 12/01/2006	8:00 PM	Winter Storm			X	X	X	Hillsboro	n/a	n/a	$455,322	
This event was part of a federally-declared disaster (Declaration #1681) - EMA officials reported that 1 in 4 residents lost power due to the storm - many rural schools were closed for several days due to slick roads and power outages - numerous buildings & vehicles were damaged by falling trees & limbs According to the EMA Director damages sustained for Montgomery County totaled $455,322. Totals by Jurisdiction: $4,194 Coffeen; $6,429 Farmersville; $2,028 Fillmore; $141 Harvel; $9,700 Hillsboro; $3,520 Irving; $15,029 Litchfield; $27,500 Nokomis; $850 Ohlman; $685 Panama; $13,859 Raymond; $2,874 Schram City; $1,932 Taylor Springs; $2,452 Waggoner; $950 Walshville; $2,860 Witt; $4,000 Montgomery Co. 911; $450 Montgomery Co. EMA; $10,536 Montgomery Co. Highway; $173 Montgomery Co. Sheriff; $616 Butler Township; $160 East Fork Township; $1,700 Grisham Township; $115 Hillsboro Township; $1,200 Irving Township; $3,000 South Litchfield Township; $1,560 Witt Township; $1,400 Zanesville Township; $400 Coffeen Volunteer FD; $3,771 Farmersville-Waggoner Volunteer FD; $15,805 Fillmore Community FPD; $18,303 Hillsboro Volunteer FD; $1,467 Irving FPD; $21,874 Litchfield FD; $5,783 Nokomis Area FPD; $4,158 Raymond-Harvel FD; $110 Taylor Springs Volunteer FD; $400 Witt Volunteer FD; $1,028 Hillsboro Area Ambulance Service; $300 Nokomis/Witt Ambulance Service; $56,500 Shelby Electric; $180,000 Rural Electric; $8,664 Hillsboro CUSD #3; $8,027 Litchfield CUSD #12; $8,134 Nokomis CUSD #22; $685 Panhandle CUSD #2.												
01/12/2007 thru 01/14/2007	10:00 PM	Ice Storm			0.50 in.				n/a	n/a	$500,000	- property damage figure provded by local insurance agent - significant tree and limb damage was reported as a result of this storm - many lost power during the storm

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Table 8 Severe Winter Storm Events Reported in Montgomery County 1950 - 2022													
Date(s)	**Start Time**	**Event Type**	**Magnitude[1]**					**Observed Location(s)[2]**	**Injuries**	**Fatalities**	**Property Damages**	**Impacts/ Event Description**
			Snow (inches)	**Freezing Rain (inches)**	**Ice (inches)**	**Sleet (Inches)**	**Strong Wind (mph)**					
02/13/2007	12:00 AM	Heavy Snow	10.0 in.					Hillsboro	n/a	n/a	$9,525	Committee Member records from Coffeen identified $9,525 in emergency cleanup costs and indicated that the snow downed trees and power lines and caused equipment damage
12/15/2007	6:00 AM	Heavy Snow	8.0 in.					Hillsboro	n/a	n/a	n/a	travel was disrupted across the area through the weekend
01/31/2008 thru 02/01/2008	12:00 PM	Heavy Snow	11.0 in.					Hillsboro	n/a	n/a	n/a	
02/11/2008	10:00 AM	Winter Storm		X		X			n/a	n/a	n/a	- numerous auto accidents were report - schools closed early
02/21/2008 thru 02/22/2008	4:00 AM	Sleet				2.0 in.			n/a	n/a	n/a	- numerous auto accidents were reported across the region - most area schools were closed both days
01/26/2009 thru 01/28/2009	9:00 PM	Winter Storm	10.0 in.			X		Hillsboro	n/a	n/a	n/a	

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Date(s)	Start Time	Event Type	Magnitude[1] Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)	Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
01/06/2010 thru 01/07/2010	8:00 PM	Winter Storm	5.0 in.				30 mph	Hillsboro	n/a	n/a	n/a	many rural roads were impassable due to drifting
01/31/2011 thru 02/02/2011	2:00 PM	Winter Storm	6.0 in.			3.0 in.	X	Hillsboro	n/a	n/a	n/a	
01/20/2012	5:00 PM	Winter Storm		X				Hillsboro	n/a	n/a	n/a	- Committee Member records indicated that freezing rain coated area roads, quickly turning to black ice - many accidents were reported along I-55 - 69 travelers (including 2 basketball teams) were sheltered at the Litchfield Middle and High School gyms
02/20/2013	9:00 AM	Winter Storm	8.0 in.	X		X			n/a	n/a	n/a	

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Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
03/24/2013	10:00 AM	Heavy Snow	16.0 in.					Hillsboro	n/a	n/a	n/a	- most area schools were closed on Monday, however overall impacts were minimal - most roads were in good condition by Monday afternoon
01/01/2014 thru 01/02/2014	6:00 PM	Winter Storm	7.0 in.					Hillsboro	n/a	n/a	n/a	
01/05/2014	5:00 AM	Winter Storm	15.0 in.				X	Hillsboro	n/a	n/a	n/a	- strong northerly winds produced snow drifts from 2 to 5 feet tall - all schools and most businesses were closed on the 5th and 6th, with many schools remaining closed for several days due to very cold temperatures and wind chills
02/04/2014	10:00 AM	Winter Storm	10.0 in.					Hillsboro	n/a	n/a	n/a	- travel was very difficult, especially in rural areas - most rural schools were closed for a couple of days

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Severe Winter Storm Events Reported in Montgomery County
1950 - 2022

Date(s)	Start Time	Event Type	Magnitude[1] Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)	Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
02/15/2015 thru 02/16/2015	6:00 PM	Heavy Snow	6.6 in.					Hillsboro Nokomis	n/a	n/a	n/a	
02/20/2015 thru 02/21/2015	8:00 PM	Winter Storm	6.2 in.	X		X		Hillsboro Nokomis	n/a	n/a	n/a	
02/28/2015 thru 03/01/2015	n/a	Heavy Snow	7.2 in.					Nokomis	n/a	n/a	n/a	
01/11/2019 thru 01/13/2019	4:30 PM	Heavy Snow	7.2 in.					Hillsboro Nokomis	n/a	n/a	n/a	
12/15/2019 thru 12/16/2019	10:30 AM	Winter Storm	7.3 in.	X				Nokomis	n/a	n/a	n/a	
02/14/2021 thru 02/15/2021	10:00 PM	Heavy Snow	8.0 in.					Hillsboro Nokomis	n/a	n/a	n/a	
02/02/2022 thru 02/03/2022	1:00 AM	Heavy Snow	10.2 in.			0.25 in.		Nokomis	n/a	n/a	n/a	

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Severe Winter Storm Events Reported in Montgomery County
1950 - 2022

Date(s)	Start Time	Event Type	Magnitude[1]					Observed Location(s)[2]	Injuries	Fatalities	Property Damages	Impacts/ Event Description
			Snow (inches)	Freezing Rain (inches)	Ice (inches)	Sleet (Inches)	Strong Wind (mph)					
12/22/2022	11:00 AM	Winter Storm	2.0 in.				45 mph		n/a	n/a	n/a	- snow combined with gusty northwest winds created extremely hazardous travel with sporadic near-blizzard conditions during the heaviest snowfall - road conditions deteriorated rapidly - several accidents occurred across the County due to slick snow packed roads
GRAND TOTAL:									**0**	**0**	**$964,847**	

Sources: Fenton, Dennis, State Farm Insurance Agent.
Montgomery County Multi-Jurisdictional Natural Hazards Mitigation Planning Committee Member responses to Natural Hazard Events Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

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Table 9
Extreme Cold/Wind Chill Events Reported in Montgomery County
1995 - 2022

Date(s)	Start Time	Magnitude - Temperature °F Low (Min)	High (Max)	Wind Chill (Max)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
01/04/1995	n/a	1 °F	16 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
12/09/1995	n/a	0 °F	12 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/07/1996	n/a	6 °F	14 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/20/1996	n/a	0 °F	14 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/31/1996 thru 02/04/1996	n/a	-17 °F	19 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
12/19/1996	n/a	6 °F	12 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/10/1997 thru 01/13/1997	n/a	-5 °F	9 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/16/1997 thru 01/17/1997	n/a	-3 °F	14 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/28/1997	n/a	-4 °F	10 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/04/1999 thru 01/05/1999	n/a	-11 °F	8 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
12/16/2000 thru 12/17/2000	8:00 PM	0 °F	n/a °F	-30 °F	Hillsboro	n/a	n/a	n/a	
12/22/2000	n/a	-1 °F	14 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/23/2003 thru 01/24/2003	n/a	-1 °F	13 °F	n/a °F	Hillsboro	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 9
Extreme Cold/Wind Chill Events Reported in Montgomery County
1995 - 2022

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
		Low (Min)	High (Max)	Wind Chill (Max)					
01/30/2004 thru 01/31/2004	n/a	-8 °F	15 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/17/2005	n/a	-4 °F	17 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
12/22/2008	3:55 AM	2 °F	19 °F	-24 °F	Hillsboro	n/a	n/a	n/a	
01/15/2009 thru 01/16/2009	9:00 PM	-5 °F	13 °F	-24 °F	Hillsboro	n/a	n/a	n/a	
01/02/2010 thru 01/04/2010	n/a	0 °F	15 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/09/2010	3:55 AM	0 °F	13 °F	-24 °F	Hillsboro	n/a	n/a	n/a	
12/13/2010	12:00 AM	4 °F	16 °F	-24 °F	Hillsboro	n/a	n/a	n/a	
02/02/2011 thru 02/03/2011	n/a	1 °F	20 °F	-25 °F	Hillsboro	n/a	n/a	n/a	
01/06/2014 thru 01/07/2014	6:00 PM	-11 °F	15 °F	-30 °F	Hillsboro	n/a	n/a	n/a	
01/22/2014 thru 01/23/2014	n/a	-1 °F	25 °F	-24 °F		n/a	n/a	n/a	
01/28/2014	3:00 AM	-2 °F	16 °F	-20 °F	Hillsboro	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 9
Extreme Cold/Wind Chill Events Reported in Montgomery County
1995 - 2022

Date(s)	Start Time	Magnitude - Temperature °F			Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
		Low (Min)	High (Max)	Wind Chill (Max)					
02/06/2014 thru 02/07/2014	9:00 PM	-10 °F	18 °F	-24 °F	Hillsboro	n/a	n/a	n/a	
02/10/2014 thru 02/11/2014	n/a	-10 °F	19 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/08/2015	6:00 AM	-1 °F	18 °F	-24 °F	Hillsboro	n/a	n/a	n/a	
02/19/2015	6:00 AM	-3 °F	15 °F	-20 °F	Hillsboro	n/a	n/a	n/a	
02/23/2015	12:00 AM	-2 °F	19 °F	-20 °F	Hillsboro	n/a	n/a	n/a	
01/18/2016	9:00 PM	2 °F	12 °F	-21 °F	Hillsboro	n/a	n/a	n/a	
01/06/2017	n/a	2 °F	13 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
12/27/2017	n/a	-2 °F	10 °F	n/a °F	Hillsboro	n/a	n/a	n/a	
01/01/2018 thru 01/02/2018	6:00 PM	-10 °F	16 °F	-30 °F	Hillsboro	n/a	n/a	n/a	
01/04/2018 thru 01/06/2018	8:00 PM	-5 °F	18 °F	-25 °F	Hillsboro	n/a	n/a	n/a	
01/16/2018	6:00 PM	-2 °F	14 °F	-25 °F	Hillsboro	n/a	n/a	n/a	
01/30/2019 thru 01/31/2019	6:00 PM	-10 °F	19 °F	-40 °F	Hillsboro	n/a	n/a	n/a	
03/04/2019	12:00 AM	-1 °F	19 °F	-20 °F	Hillsboro	n/a	n/a	n/a	
02/07/2021	n/a	1 °F	25 °F	-20 °F	Hillsboro	n/a	n/a	n/a	

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Table 9
Extreme Cold/Wind Chill Events Reported in Montgomery County
1995 - 2022

Date(s)	Start Time	Magnitude - Temperature °F Low (Min)	High (Max)	Wind Chill (Max)	Observed Location(s)[1]	Injuries	Fatalities	Property Damages	Impacts/Event Description
02/13/2021 thru 02/17/2021	6:00 PM	-3 °F	18 °F	-30 °F	Hillsboro	n/a	n/a	n/a	
12/23/2022	12:00 PM	-8 °F	3 °F	-40 °F	Hillsboro	n/a	n/a	n/a	
GRAND TOTAL:						**0**	**0**	**$0**	

Sources: Iowa State University, Iowa Environmental Mesonet, National Weather Service Data, Search for Warnings.
Midwestern Regional Climate Center, cli-MATE.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Cooperative Observation Forms.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.

[1] Observed Location information, if available, was obtained from NWS's COOP Observation Station records as well as other officially-designated sources identified in NOAA's Storm Events Database and the Midwestern Regional Climate Center's cli-MATE data system.

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
Table 10 Tornadoes Reported in Montgomery County 1950 - 2022											
1	01/03/1950	11:55 AM	Chapman^ Fillmore^	F 3	3.0 mi.	130 yd.	3	n/a	$250,000	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Montgomery County southwest of Fillmore and traveled east-northeast lifting off just west of Bingham in Fayette County – total length: 4.0 miles - 4 farm houses were reduced to splinters and several barns were destroyed
2	11/15/1955	3:35 PM	Schram City^	F 1	0.1 mi.	10 yd.	n/a	n/a	$25,000	n/a	
3	04/28/1956	11:30 PM	Litchfield^	F 1	5.0 mi.	33 yd.	n/a	2	$25,000	n/a	- damaged the roofs of 2 farm houses - threw two-ton grain bins 100 yards - overturned a boat with 5 men in it causing 2 of the men to drown
4	08/04/1959	6:15 AM	Raymond Irving	F 2	21.0 mi.	33 yd.	n/a	n/a	$25,000 †	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Macoupin County at Girard and followed an intermittent path to the southeast traveling through Raymond and lifting off at Irving – total length: 26.7 miles - caused light to moderate damage in Raymond and near Irving

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Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
5	10/10/1959	5:15 PM	Walshville^ Coffeen Fillmore	F 2	24.0 mi.	50 yd.	n/a	n/a	$250,000 †	n/a	<u>*Touchdown/Liftoff – Multiple Counties*</u> Touched down in Madison County near Godfrey traveled northeast, crossing southeastern Macoupin County before lifting off at Fillmore in Montgomery County – total length: 48.7 miles - cause damage to trees and a store in Panama, to a home and two farmsteads at Coffeen, while at Fillmore there was wind damage
6	03/06/1961	1:30 AM	Litchfield^ Butler^ Witt^	F 1	30.0 mi.	77 yd.	2	n/a	$300,000	n/a	<u>*Touchdown/Liftoff – Multiple Counties*</u> Touched down in Jersey County just north of Jerseyville and traveled east-northeast through Macoupin County into Montgomery County north of Hillsboro where it changed courses tracking east-southeast through Shelby County and into Cumberland County before lifting off approx. 5 miles southeast of Greenup – total length: 118.3 miles - damaged 150 homes in Litchfield - a woman was injured when she was cut by flying glass - a man was injured when his mobile home was hurled 50 feet - farmsteads suffered damage in Hillsboro

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Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
7	04/02/1964	7:45 PM	Farmersville^	F 2	3.3 mi.	20 yd.	4	n/a	$25,000	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Montgomery County southeast of Farmerville and traveled northeast lifting off just west of Morrisonville in Christian County– total length: 4.0 miles - damaged a farmhouse and outbuilding - ripped the roof off the Lone Elm School while about 25 people were inside – only one person sustained minor injuries - a coalhouse and heavy lumps of coal were carried away as well as hog houses
8	08/10/1974	1:50 PM	Litchfield	F 2	3.0 mi.	20 yd.	n/a	n/a	$2,500	$250	- destroyed a brick garage and chicken house - uprooted a tree while passing through a cemetery - blew lawn chairs and tree limbs into a house

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Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
9	03/20/1976	12:05 PM	Farmersville^	F 3	7.3 mi.	27 yd.	4	n/a	$250,000	n/a	Touchdown/Liftoff – Two Counties Touched down in Montgomery County southwest of Farmerville and traveled east-northeast lifting off northwest of Morrisonville in Christian County– total length: 9.0 miles - caused considerable damage to farm homes, barns and sheds - overturned a tow-truck on I-55 slightly injuring the driver and 2 passengers
10	05/12/1978	4:20 PM	Farmersville^	F 2	6.0 mi.	33 yd.	n/a	n/a	$250,000 †	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Macoupin County at Shipman and traveled northeast lifting off northeast of Farmersville in Montgomery County– total length: 33.9 miles
11	04/13/1987	7:30 AM	Nokomis^	F 1	0.6 mi.	10 yd.	n/a	n/a	$25,000	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Montgomery County east of Nokomis and traveled northeast lifting off northwest of Oconee in Shelby County– total length: 1.0 miles - demolished several farm buildings, including a 2-story barn
12	04/22/1988	5:39 PM	Raymond^	F 0	0.3 mi.	20 yd.	n/a	n/a	n/a	n/a	tornado touched down briefly in an open area outside of the Village

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Table 10 Tornadoes Reported in Montgomery County 1950 - 2022											
Map No.	**Date(s)**	**Start Time**	**Location(s)**	**Magnitude Fujita Scale**	**Length (Miles)[1]**	**Width (Yards)**	**Injuries**	**Fatalities**	**Property Damages**	**Crop Damages**	**Impacts/Event Description**
13	05/12/1990	5:05 PM	Walshville	F 2	0.3 mi.	100 yd.	n/a	n/a	$250,000	n/a	destroyed a 150 ft. long machine shed, grain silos and damaged other structures
14	08/19/1993	5:12 PM	Litchfield^	F 0	0.1 mi.	35 yd.	n/a	n/a	n/a	n/a	tornado touched down near I-55 and IL Rte. 108
15	05/09/1995	5:38 PM	Panama^	F 0	0.3 mi.	40 yd.	n/a	n/a	n/a	n/a	
16	05/09/1995	6:00 PM	Irving^	F 0	0.3 mi.	40 yd.	n/a	n/a	n/a	n/a	
17	05/09/1995	6:15 PM	Nokomis^	F 1	0.8 mi.	70 yd.	n/a	n/a	$8,200	n/a	- tornado struck 3 farms doing significant damage to several outbuildings - one farm lost a machine shed and a grain bin - homes on the farms suffered superficial roof damage
18	02/26/1996	6:15 PM	Farmersville	F 0	0.0 mi.	75 yd.	n/a	n/a	n/a	n/a	the roof of a house was damaged and the porch blown off
19	04/30/1997	2:05 PM	Harvel^	F 0	0.0 mi.	25 yd.	n/a	n/a	n/a	n/a	tornado touched down in an open field
20	05/12/1998	9:16 PM	Irving^	F 0	0.0 mi.	50 yd.	n/a	n/a	n/a	n/a	
21	06/01/1999	5:58 PM	Raymond^ Harvel^	F 3	10.0 mi.	200 yd.	4	1	n/a	n/a	- tornado hit a rest area along I-55 overturning 6 tractor-trailer trucks, killing 1 driver and injuring 4 others - 2 trucks were also overturned just north of the rest area - caused damage at two farms – numerous barns and other outbuildings were destroyed and 1 house severely damaged

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Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
22	06/01/1999	6:11 PM	Harvel^	F 0	2.0 mi.	50 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Montgomery County northwest of Harvel and traveled northeast into Christian County where it intensified to an F1 before lifting off north of Palmer – total length: 13.1 miles - caused damage to trees and crops in Montgomery County
23	06/20/2000	1:40 PM	Donnellson^ Coffeen Chapman^ Fillmore	F 0	10.0 mi.	50 yd.	n/a	n/a	n/a	n/a	- a grain bin was destroyed - trees and power lines were downed
24	04/12/2005	1:07 PM	Waggoner^	F 0	0.0 mi.	40 yd.	n/a	n/a	n/a	n/a	tornado touched down in a field near the rest area on I-55
25	04/02/2006	4:41 PM	Walshville^	F 0	1.0 mi.	50 yd.	n/a	n/a	n/a	n/a	destroyed a shed, caused minor roof damage to a home and downed a couple of trees

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Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
26	04/02/2006	4:50 PM	Hillsboro Schram City Irving^ Witt^ Nokomis^	F 2	20.0 mi.	200 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Multiple Counties* Touched down in Montgomery County on the south side of Hillsboro and traveled northeast, passing through southwest tip of Shelby County before lifting off southwest of Pana in Christian County – total length: 22.8 miles *Hillsboro* - caused a narrow path of sign and window damage at a car dealership and two gas stations - blew metal sheeting into nearby trees at a home improvement store *Irving/Witt Area* - destroyed barns *Nokomis Area* - destroyed a metal shed - caused minor damage to machine shed - toppled and destroyed 2 high tension electric power line tower - destroyed a grain bin

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Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
27	04/02/2006	4:56 PM	Farmersville^	F 1	2.0 mi.	100 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Montgomery County east of Farmersville and traveled north-northeast into Christian County lifting off northwest of Morrisonville – total length: 2.5 miles - machine sheds and barns were heavily damaged at 3 farms along its path in Montgomery County
28	05/24/2006	3:05 PM	Farmersville^	F 1	2.0 mi.	150 yd.	n/a	n/a	$100,000	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Montgomery County northeast of Farmersville and traveled southeast before lifting off west of Morrisonville into Christian County – total length: 3.4 miles - destroyed 1 machine shed; damaged 2 houses, 2 barns and 3 other machine sheds
29	04/05/2010	3:14 PM	Hillsboro^	EF 0	0.2 mi.	10 yd.	n/a	n/a	n/a	n/a	briefly touched down in a field

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Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
30	04/19/2011	5:12 PM	Farmersville	EF 2	3.2 mi.	150 yd.	n/a	n/a	$10,000	n/a	- snapped 3 power poles just west of I-55 - a grain bin originally located just west of I-55 was rolled across the interstate and deposited in a tree line ¼ mile to the east of the interstate - a number of trees were also snapped or uprooted in the vicinity of the grain bin - destroyed/damaged 2 machine sheds *Farmersville* Committee Member identified $10,000 in property damage to ball park bleachers and back stop, stop signs and other signs

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Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
31	04/19/2011	5:17 PM	Honey Bend^	EF 2	3.5 mi.	200 yd.	n/a	n/a	n/a	n/a	- snapped off a dozen power poles on E. 2nd Rd. near intersection with N.17th Ave. - as it traveled along N. 17th Ave. it destroyed several outbuildings, shed and silos and caused minor to moderate damage to a couple of homes just west of I-55 - crossed I-55 knocking down several power lines onto the highway causing it to be shut down for about 4 hours until they could be removed - caused extensive damage to a two story log home just east of I-55 - further east several farmsteads had minor to moderate damage to homes, barns and other outbuildings - a farmstead off of Rugby Rd. sustained extensive damage and a large outbuilding was destroyed - caused minor damage to a home on Shady Ln.

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Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
32	05/31/2013	8:02 PM	Waggoner^	EF 1	4.3 mi.	50 yd.	n/a	n/a	n/a	n/a	- several large trees were blown down ½ mile north of the intersection of CR 100E & 2200N - damaged 1 barn and a few outbuildings on Goby Ave. - severely damaged an outbuilding on Coalfield Ave. - tornado crossed I-55 blowing over 3 tractor trailers - damaged a farmstead on CR 2500N – windows were blown inward on the 2-story farm house and 2 machine sheds were severely damaged - downed large tree branches on E. Waggoner Rd.
33	11/17/2013	11:33 AM	Barnett^	EF 0	1.0 mi.	50 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Macoupin County southeast of Womac and traveled northeast into Montgomery County before lifting off northeast Barnett – total length: 4.0 miles - minor damage to power poles and 1 barn

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Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
34	02/20/2014	4:09 PM	Nokomis^	EF 1	6.3 mi.	50 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Multiple Counties* Touched down in Montgomery County southeast of Nokomis and traveled northeast, crossing the southwest tip of Shelby County into Christian County and then crossing back over into Shelby County, lifting off northwest of Henton – total length: 22.2 miles - caused structural damage to a garage - damaged a barn - blew down a double trussed metal transmission tower - downed several large trees
35	04/27/2016	5:23 PM	Raymond^ Harvel^	EF 0	4.94 mi.	25 yd.	n/a	n/a	n/a	n/a	touched down in open fields with no damage observed
36	03/07/2017	12:57 AM	Litchfield^	EF 0	6.21 mi.	50 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Macoupin County west-southwest of Sawyerville and traveled northeast into Montgomery County lifting off southeast of Litchfield – total length: 12.92 miles - caused minor roof, siding and tree damage

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Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
37	03/07/2017	1:14 AM	Irving^ Witt^ Coalton^	EF 1	7.17 mi.	100 yd.	n/a	n/a	n/a	n/a	- downed large tree limbs and caused the partial removal of metal covering of farm outbuildings - a couple of grain bins, empty, were tossed into fields about 100 to 200 yards, on North 16th Avenue, just west of Witt Trail *Witt area* - one home east of Witt had the chimney blown off - a barn at the same location was pushed such that it ended up leaning about 6 inches off center
38	12/01/2018	4:09 PM	Litchfield^ Raymond^	EF 1	8.03 mi.	75 yd.	n/a	n/a	n/a	n/a	- power poles were snapped just west of Interstate 55, along E 1st Road - caused some damage to farm buildings along N 17th Avenue - several trees were snapped near IL Rte. 108 - the worst damage was along IL Rte. 48 just west of Raymond, IL where a family residence sustained major roof damage and damage to the garage

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Table 10 Tornadoes Reported in Montgomery County 1950 - 2022											
Map No.	**Date(s)**	**Start Time**	**Location(s)**	**Magnitude Fujita Scale**	**Length (Miles)[1]**	**Width (Yards)**	**Injuries**	**Fatalities**	**Property Damages**	**Crop Damages**	**Impacts/Event Description**
39	12/01/2018	4:16 PM	Litchfield^ Lake Lou Yaeger^	EF 2	6.79 mi.	100 yd.	n/a	n/a	n/a	n/a	- a large farm building was destroyed near Illinois Route 16 - tornado crossed to the north of Illinois Route 16, doing damage along Rocky Hollow Trail, this area sustained the worst of the tornadic damage, where several farm buildings were destroyed - a brick family residence sustained major roof damage and suffered a partial loss of its walls along Rocky Hollow Trail as well
40	12/01/2018	4:32 PM	Raymond^	EF 1	1.97 mi.	50 yd.	n/a	n/a	n/a	n/a	- several trees were uprooted along IL Rte. 127 southeast of Raymond - tornado continued northeast, crossing over Blue Grass Creek where it continued to do mainly tree damage - the worst damage was found near Oil Field Road, where a few outbuildings were destroyed - a family residence sustained some minor roof and shingle damage as the tornado crossed Oil Field Road

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Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
41	12/01/2018	4:47 PM	Harvel^	EF 0	0.06 mi.	25 yd.	n/a	n/a	n/a	n/a	*<u>Touchdown/Liftoff – Two Counties</u>* Touched down in Montgomery County east-southeast of Harvel just south of the Christian/Montgomery County line and traveled northeast into Christian County before lifting off southeast of Morrisonville – total length: 3.11 miles - near the intersection of E000 North Rd and N400 East Rd the tornado damaged an outbuilding by knocking out a wall and pushed it off it's foundation
42	04/30/2019	2:52 PM	Donnellson^	EF 0	1.17 mi.	25 yd.	n/a	n/a	n/a	n/a	lifted dust from a field and small branches and leaves from a few trees
43	05/28/2020	4:50 PM	Raymond^ Waggoner^	EF U	2.88 mi.	100 yd.	n/a	n/a	n/a	n/a	
44	07/15/2020	3:58 PM	Walshville^	EF 0	3.21 mi.	75 yd.	n/a	n/a	n/a	n/a	- snapped and uprooted some trees near a residence on Prange Avenue - caused damage to more trees near Sewing and Mt. Olive Trails
45	07/15/2020	4:05 PM	Walshville^	EF 0	0.57 mi.	50 yd.	n/a	n/a	n/a	n/a	mainly causing tree damage, though some minor structural damage to a house west of Durbin Road

[1] The length provided is only for the portion(s) of the tornado that occurred in the County.
^ Tornado touchdown verified in the vicinity of this location(s).
† Property damages sustained as a result of this tornado represent losses sustained in two or more counties. A detailed breakdown by county was not available.

Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
46	07/15/2020	4:18 PM	Farmersville^	EF 0	3.89 mi.	300 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Two Counties* Touched down in Montgomery County northwest of Farmersville and traveled north into Sangamon County lifting off southwest of Divernon – total length: 4.53 miles
47	07/21/2020	3:18 PM	Farmersville^	EF U	0.20 mi.	10 yd.	n/a	n/a	n/a	n/a	tornado occurred over a field, resulting in no observed damage
48	12/10/2021	9:03 PM	Donnellson^ Coffeen Lake^ Fillmore^	EF 1	10.11 mi.	300 yd.	n/a	n/a	n/a	n/a	*Touchdown/Liftoff – Multiple Counties* Touched down in Bond County south of Sorento and traveled northeast, passing through the southeast corner of Montgomery County and the northwest corner of Fayette County before lifting off northwest of Cowden in Shelby County. – total length: 41.54 miles

[1] The length provided is only for the portion(s) of the tornado that occurred in the County.
^ Tornado touchdown verified in the vicinity of this location(s).
† Property damages sustained as a result of this tornado represent losses sustained in two or more counties. A detailed breakdown by county was not available.

Table 10
Tornadoes Reported in Montgomery County
1950 - 2022

Map No.	Date(s)	Start Time	Location(s)	Magnitude Fujita Scale	Length (Miles)[1]	Width (Yards)	Injuries	Fatalities	Property Damages	Crop Damages	Impacts/Event Description
49	03/05/2022	10:57 PM	Waggoner^ Farmersville^	EF 1	3.89 mi.	40 yd.	n/a	n/a	$50,000	n/a	- damaged a one story residence near East 2nd Road and ripped the roof off the garage and the awning off the front porch - a farm building just west of Interstate 55 sustained minor damage - as the tornado crossed Interstate 55, it blew over a semi truck on the highway - some large farm buildings along Morrisonville Avenue and East 4th Road sustained substantial damage
GRAND TOTAL:							**17**	**3**	**$1,845,700**	**$250**	

Sources: Montgomery County Multi-Jurisdictional Natural Hazard Mitigation Planning Committee Member responses to the Natural Hazard Events Questionnaire.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Data.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.
NOAA, National Weather Service, Storm Prediction Center, SVRGIS, Tornadoes (1950-2021) Database.

[1] The length provided is only for the portion(s) of the tornado that occurred in the County.
^ Tornado touchdown verified in the vicinity of this location(s).
† Property damages sustained as a result of this tornado represent losses sustained in two or more counties. A detailed breakdown by county was not available.

Table 11
Drought Events Reported in Montgomery County
1980 - 2022

Year(s)	Start Month	Duration (Months)	Magnitude Drought Intensity Category[1]					Percent Crop Yield Reduction from Previous Year		Designated USDA Primary Natural Disaster Area	Crop Damages	Impacts/Event Description
			D0	D1	D2	D3	D4	Corn	Soybeans			
1983	n/a	n/a						56.1 %	37.3 %	n/a	n/a	All 102 counties in Illinois were proclaimed state disaster areas because of high temperatures and insufficient precipitation beginning in mid-June
1988	June	16						37.5 %	26.5 %	n/a	n/a	Approximately half of all Illinois counties were impacted by drought conditions
2005 - 2006	May	11	X	X	X			24.8 %	10.0 %	No	$388,141 *	
2011	August	3.5	X	X	X			11.3 %	20.4 %	No	$3,956,177 *	
2012 - 2013	June	8	X	X	X	X		47.2 %	3.8 %	Yes	$72,300,000	
GRAND TOTAL:											**$76,644,318 ***	

* Crop Damage figures were obtained from USDA Risk Management Agency and only represent losses sustained by insured crops

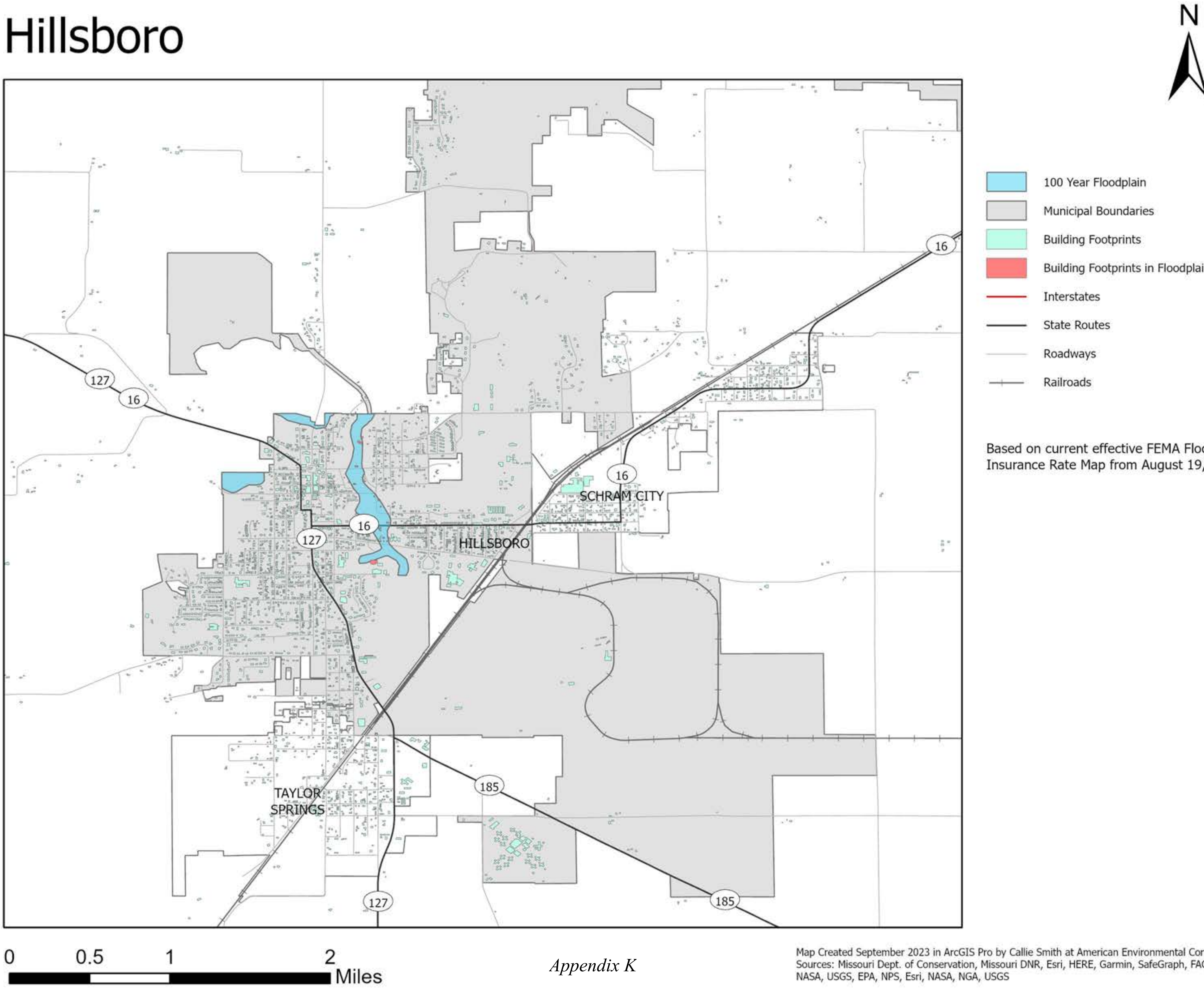
Sources: Illinois State Water Survey, Illinois State Climatologist.
National Drought Mitigation Center, United States Drought Monitor.
NOAA, National Environmental Satellite, Data & Information Service, National Centers for Environmental Information, Storm Events Database.
United States Department of Agriculture, National Agricultural Statistics Service, Quik Stats Lite.

[1] An "X" identifies the level of drought intensity reached by at least a portion of the County during the event, if available.

US Drought Monitor – Drought Intensity Category Descriptions			
D0	abnormally dry	D3	extreme drought
D1	moderate drought	D4	exceptional drought
D2	severe drought		

APPENDIX K

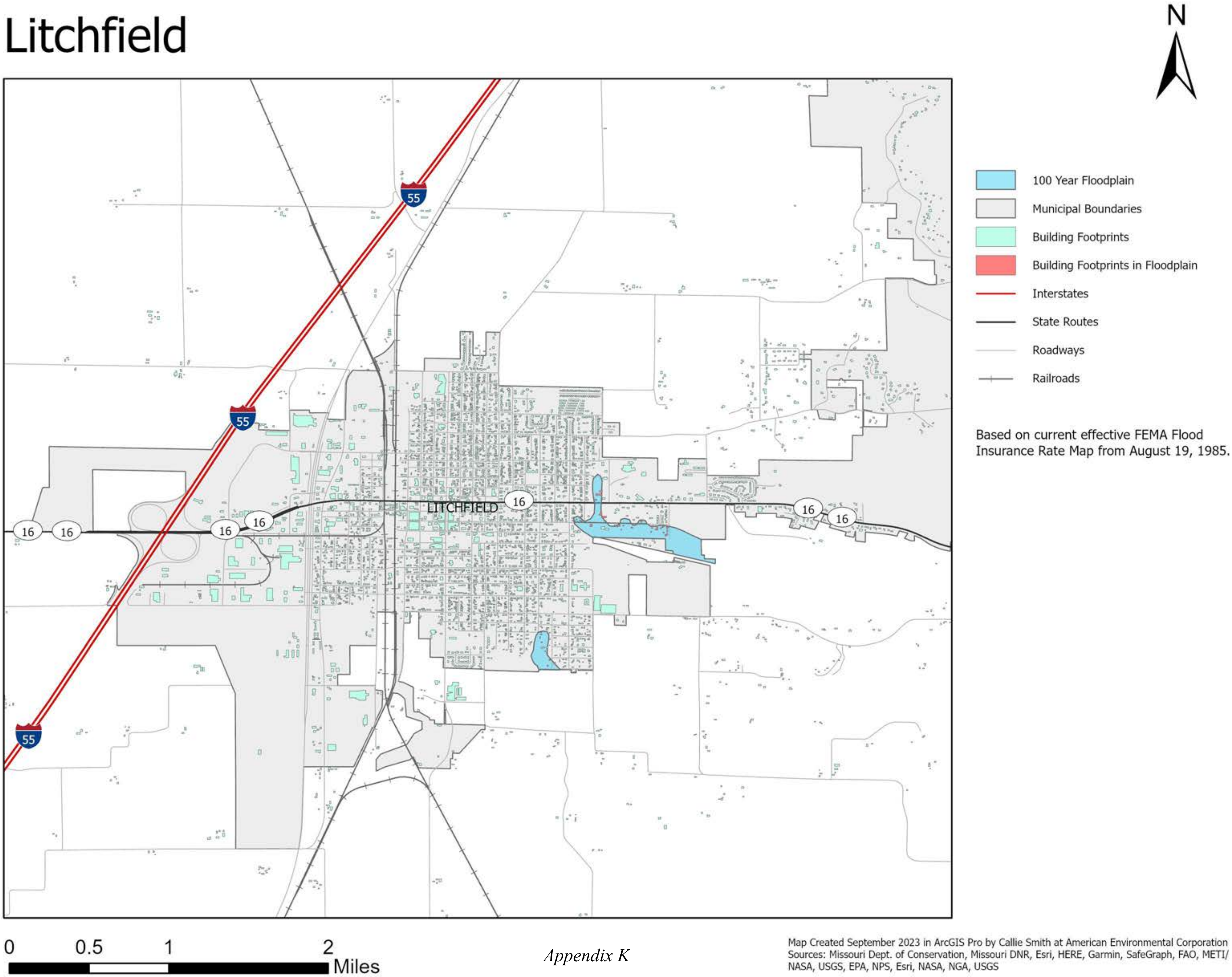
Hillsboro



Based on current effective FEMA Flood Insurance Rate Map from August 19, 1986.

Map Created September 2023 in ArcGIS Pro by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

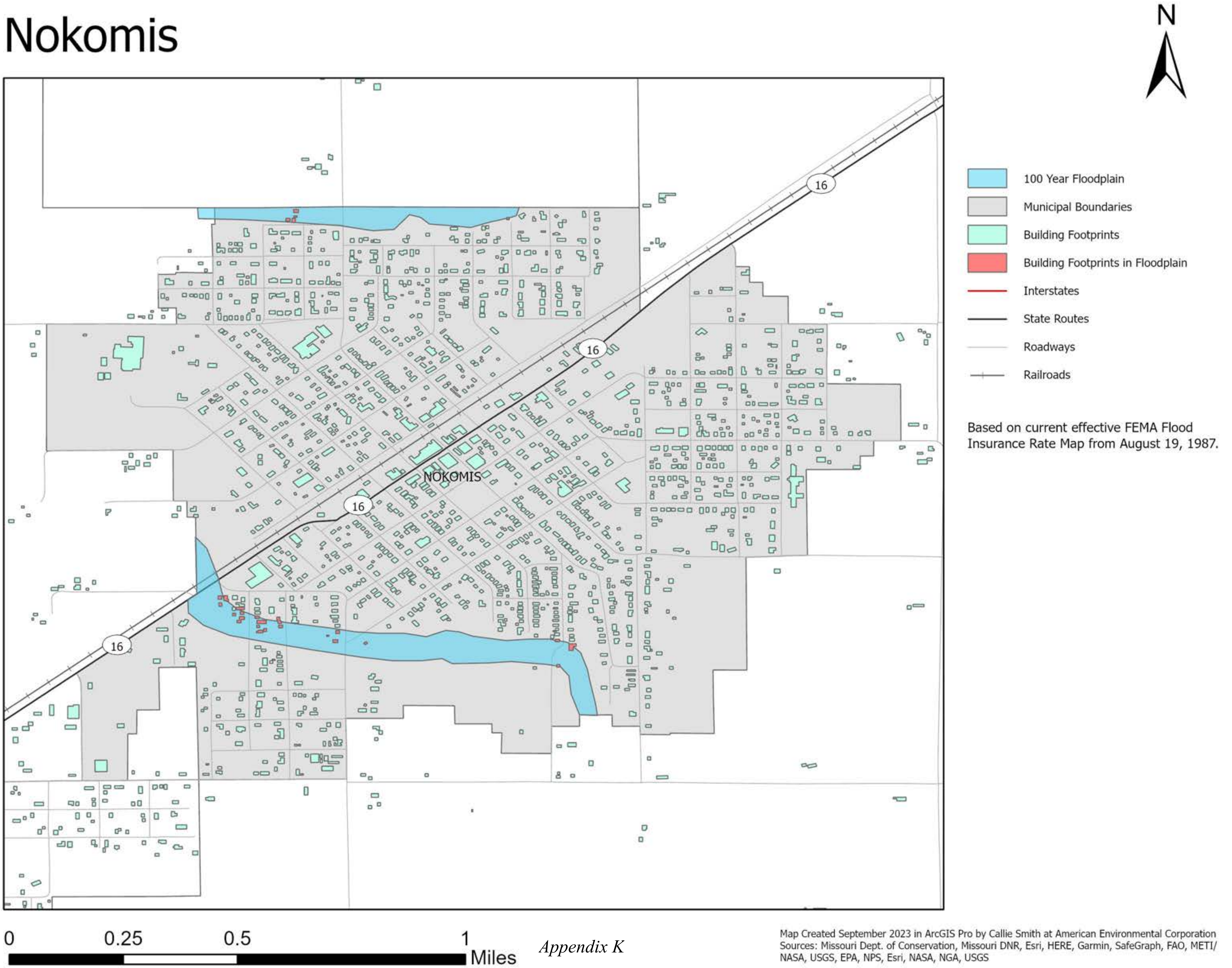
Litchfield



Appendix K

Map Created September 2023 in ArcGIS Pro by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

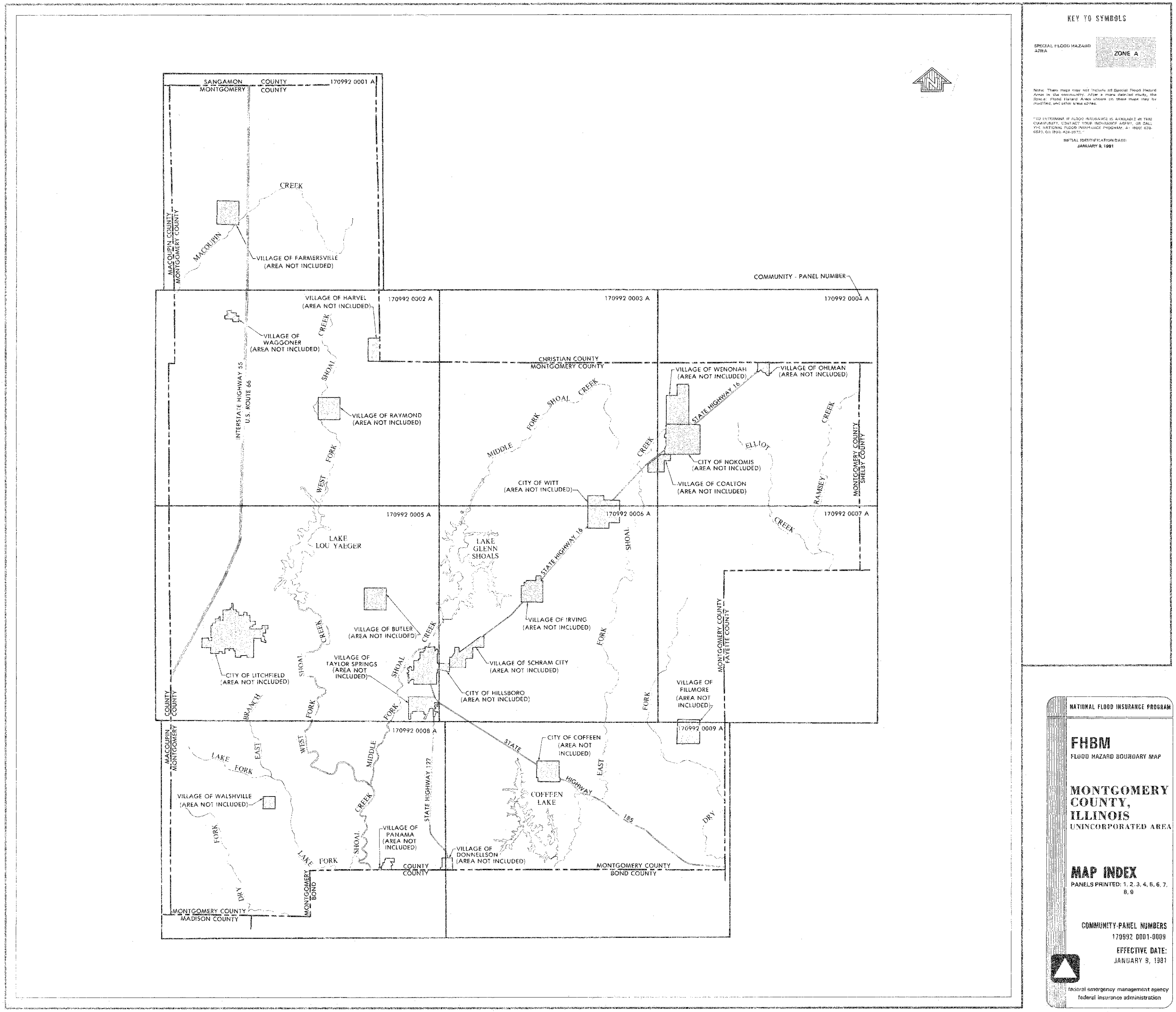
Nokomis



Based on current effective FEMA Flood Insurance Rate Map from August 19, 1987.

Appendix K

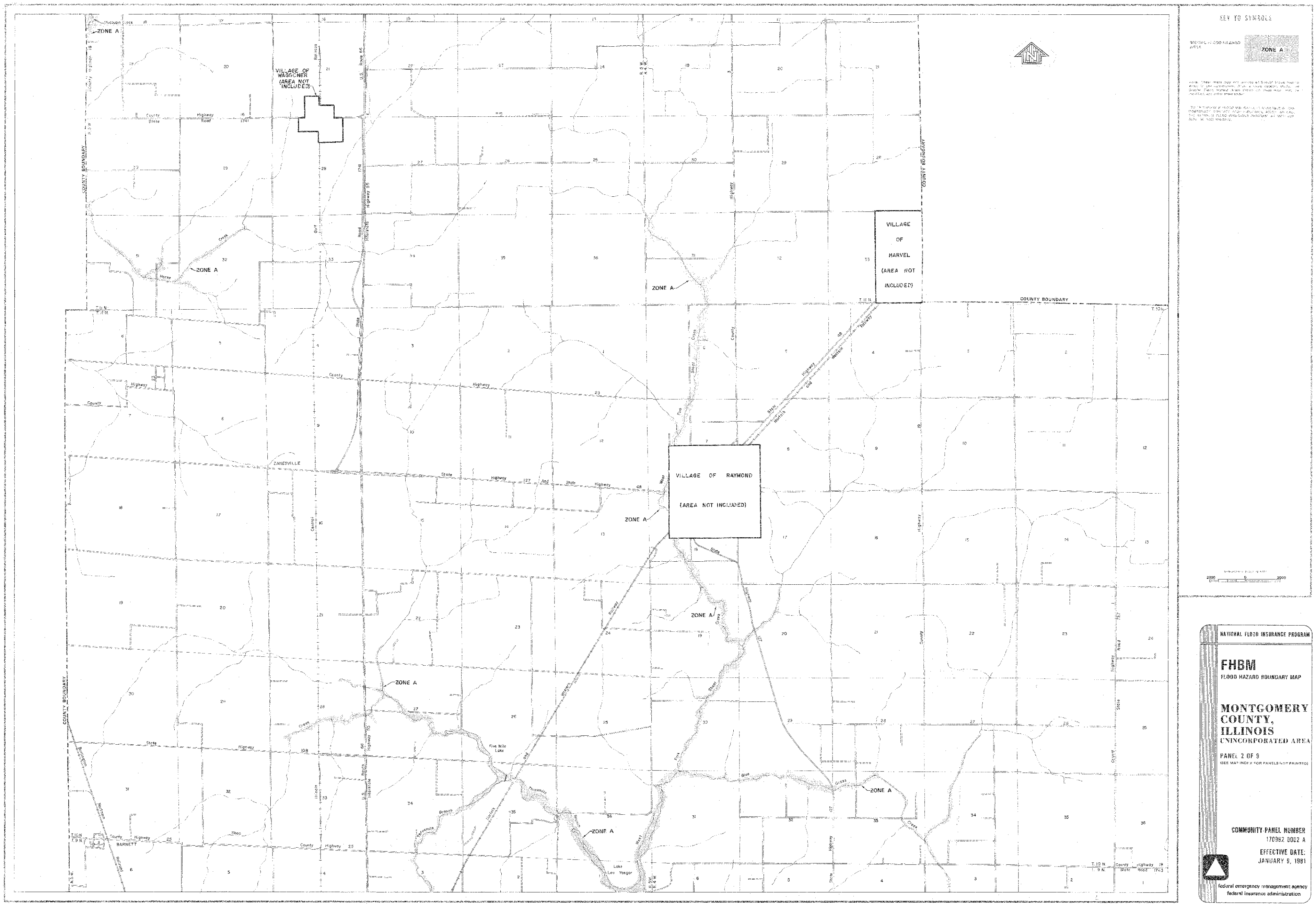
Map Created September 2023 in ArcGIS Pro by Callie Smith at American Environmental Corporation
Sources: Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS


KEY TO SYMBOLS
SPECIAL FLOOD HAZARD AREA
ZONE A
Note: These maps may not include all Special Flood Hazard Areas in the community. After a more detailed study, the Special Flood Hazard Areas shown on these maps may be modified, and other areas added.
"TO DETERMINE IF FLOOD INSURANCE IS AVAILABLE IN THIS COMMUNITY, CONTACT YOUR INSURANCE AGENT, OR CALL THE NATIONAL FLOOD INSURANCE PROGRAM, AT (800) 638-6620, OR (800) 424-8872."
INITIAL IDENTIFICATION DATE:
JANUARY 9, 1981
SANGAMON COUNTY
MONTGOMERY COUNTY
170992 0001 A
MACOUPIN COUNTY
MONTGOMERY COUNTY
CREEK
MACOUPIN
VILLAGE OF FARMERSVILLE (AREA NOT INCLUDED)
COMMUNITY - PANEL NUMBER
VILLAGE OF HARVEL (AREA NOT INCLUDED)
170992 0002 A
170992 0003 A
170992 0004 A
VILLAGE OF WAGGONER (AREA NOT INCLUDED)
CHRISTIAN COUNTY
MONTGOMERY COUNTY
VILLAGE OF WENONAH (AREA NOT INCLUDED)
VILLAGE OF OHLMAN (AREA NOT INCLUDED)
INTERSTATE HIGHWAY 55
U.S. ROUTE 66
SHOAL
CREEK
VILLAGE OF RAYMOND (AREA NOT INCLUDED)
MIDDLE FORK SHOAL CREEK
STATE HIGHWAY 16
CITY OF NOKOMIS (AREA NOT INCLUDED)
VILLAGE OF COALTON (AREA NOT INCLUDED)
ELLIOT
RAMSEY
CREEK
MONTGOMERY COUNTY
SHELBY COUNTY
WEST FORK
CITY OF WITT (AREA NOT INCLUDED)
170992 0005 A
170992 0006 A
170992 0007 A
LAKE LOU YAEGER
LAKE GLENN SHOALS
SHOAL
VILLAGE OF IRVING (AREA NOT INCLUDED)
VILLAGE OF BUTLER (AREA NOT INCLUDED)
VILLAGE OF TAYLOR SPRINGS (AREA NOT INCLUDED)
VILLAGE OF SCHRAM CITY (AREA NOT INCLUDED)
CITY OF LITCHFIELD (AREA NOT INCLUDED)
CITY OF HILLSBORO (AREA NOT INCLUDED)
MONTGOMERY COUNTY
FAYETTE COUNTY
VILLAGE OF FILLMORE (AREA NOT INCLUDED)
BRANCH
FORK
170992 0008 A
170992 0009 A
CITY OF COFFEEN (AREA NOT INCLUDED)
STATE HIGHWAY 185
LAKE FORK
EAST
MIDDLE
STATE HIGHWAY 127
COFFEEN LAKE
VILLAGE OF WALSHVILLE (AREA NOT INCLUDED)
VILLAGE OF PANAMA (AREA NOT INCLUDED)
VILLAGE OF DONNELLSON (AREA NOT INCLUDED)
DRY
MONTGOMERY COUNTY
BOND COUNTY
MONTGOMERY COUNTY
MADISON COUNTY
NATIONAL FLOOD INSURANCE PROGRAM
FHBM
FLOOD HAZARD BOUNDARY MAP
MONTGOMERY COUNTY, ILLINOIS
UNINCORPORATED AREA
MAP INDEX
PANELS PRINTED: 1, 2, 3, 4, 5, 6, 7, 8, 9
COMMUNITY-PANEL NUMBERS
170992 0001-0009
EFFECTIVE DATE:
JANUARY 9, 1981
federal emergency management agency
federal insurance administration

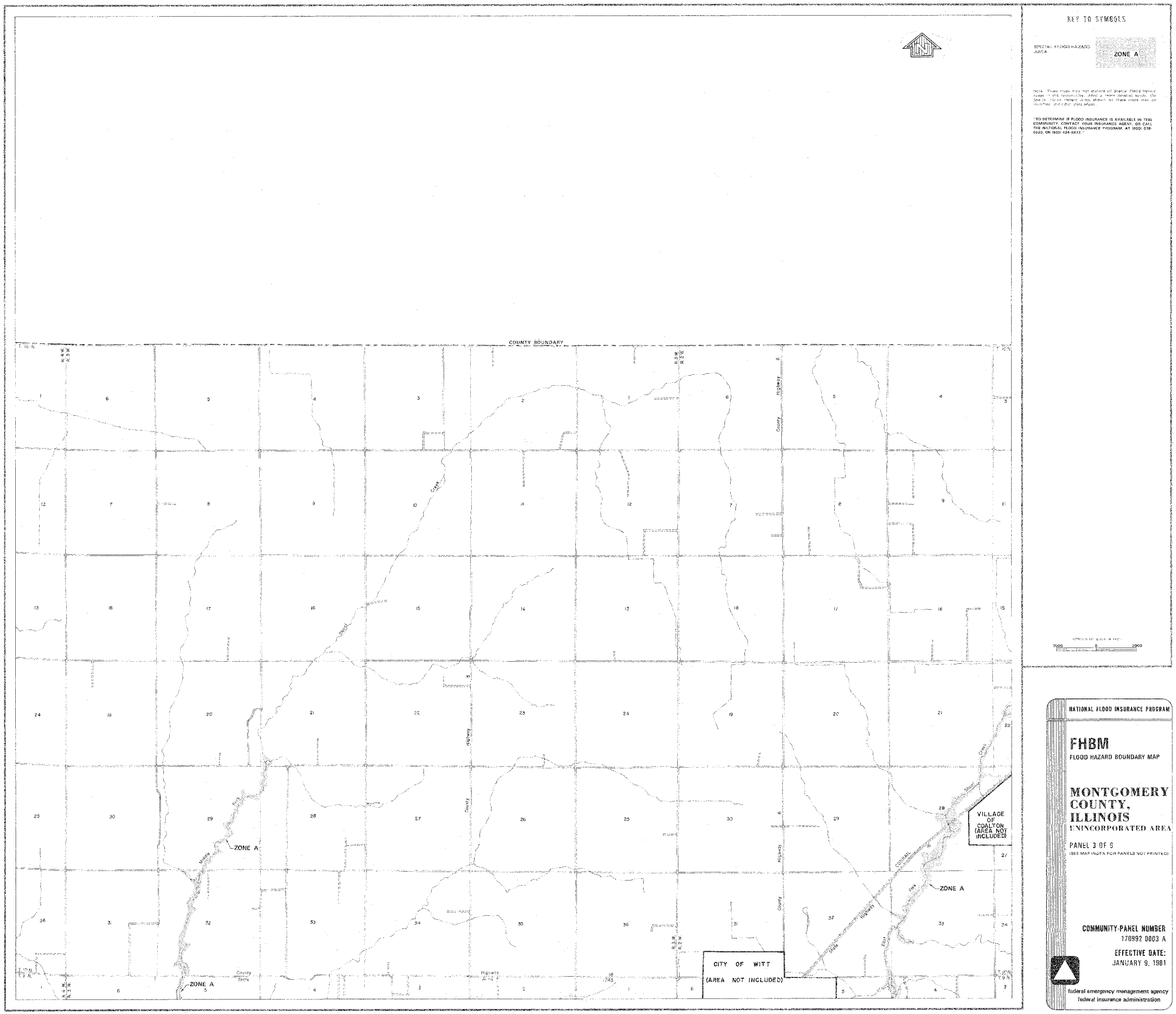
Appendix K


KEY TO SYMBOLS
SPECIAL FLOOD HAZARD AREA
ZONE A
COUNTY BOUNDARY
ZONE A
WHITE OAK
THOMASVILLE
VILLAGE OF FARMERSVILLE (AREA NOT INCLUDED)
NATIONAL FLOOD INSURANCE PROGRAM
FHBM
FLOOD HAZARD BOUNDARY MAP
MONTGOMERY COUNTY, ILLINOIS
UNINCORPORATED AREA
PANEL 1 OF 9
COMMUNITY-PANEL NUMBER
170962 0001 A
EFFECTIVE DATE:
JANUARY 9, 1981
federal emergency management agency
federal insurance administration

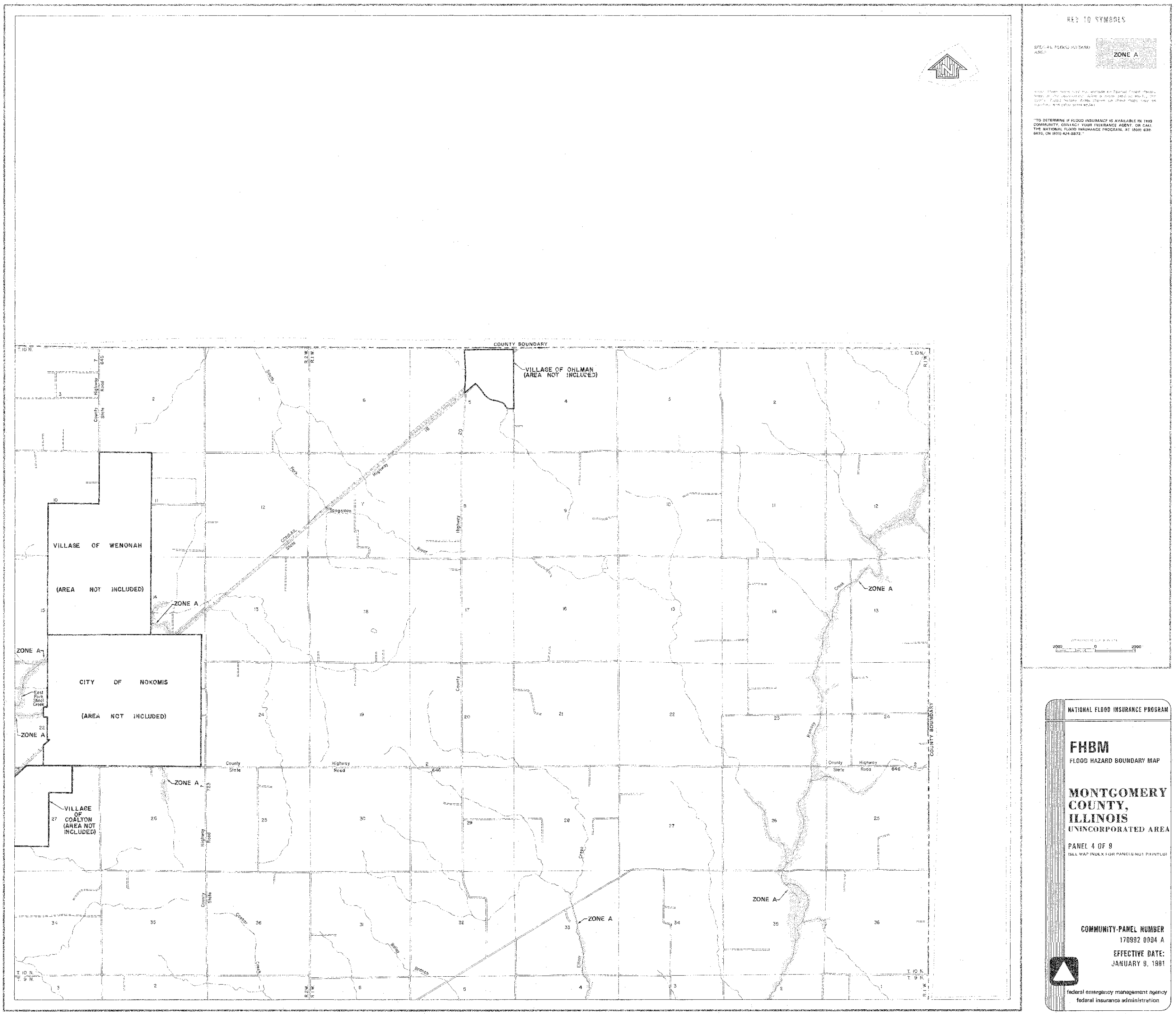
Appendix K


KEY TO SYMBOLS
ZONE A
VILLAGE OF WAGGONER (AREA NOT INCLUDED)
VILLAGE OF HARVEL (AREA NOT INCLUDED)
VILLAGE OF RAYMOND (AREA NOT INCLUDED)
COUNTY BOUNDARY
ZANESVILLE
BARNETT
Five Mile Lake
Lake Lou Yeager
NATIONAL FLOOD INSURANCE PROGRAM
FHBM
FLOOD HAZARD BOUNDARY MAP
MONTGOMERY COUNTY, ILLINOIS
UNINCORPORATED AREA
PANEL 2 OF 9
(SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER
170992 0002 A
EFFECTIVE DATE:
JANUARY 9, 1981
federal emergency management agency
federal insurance administration

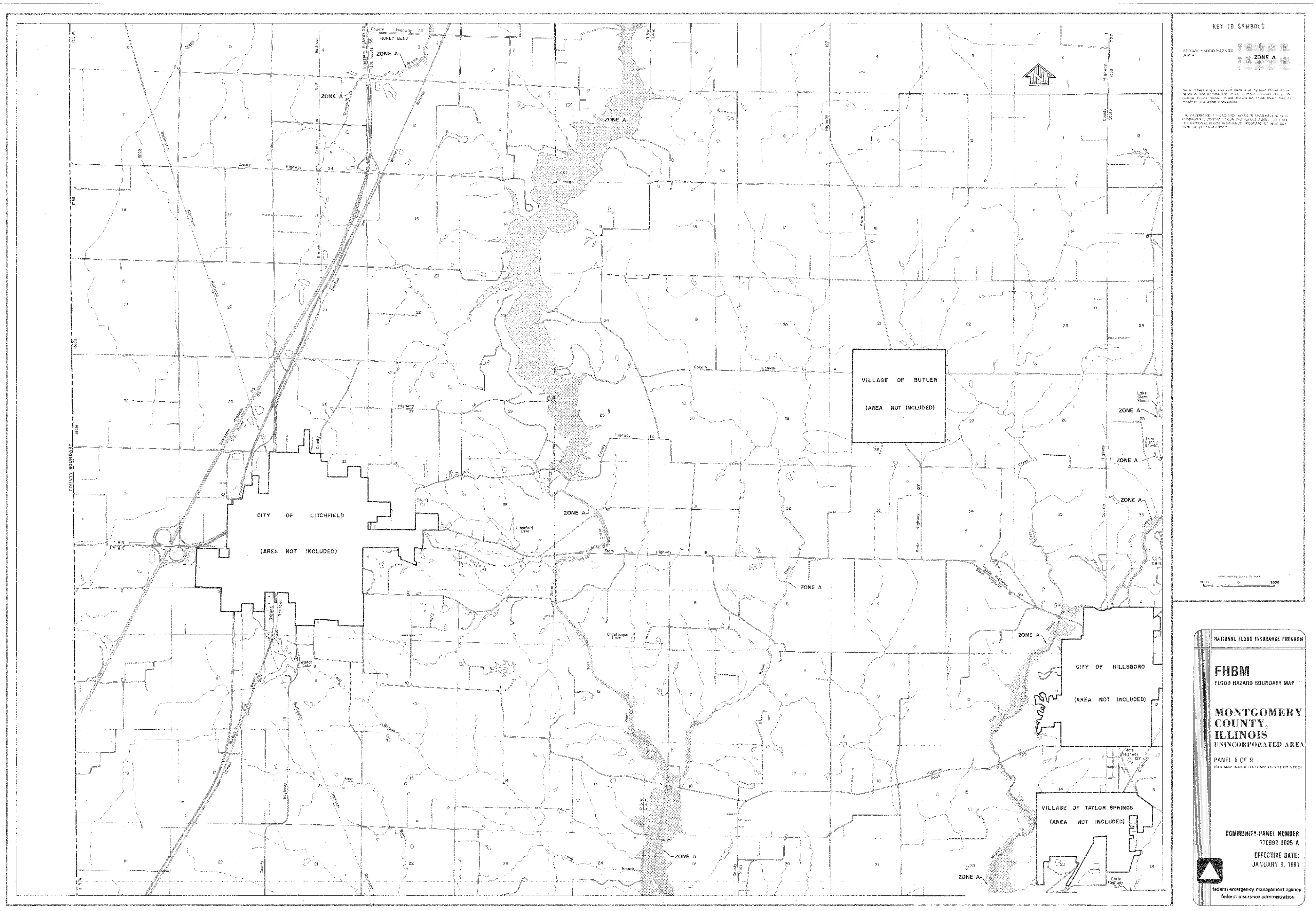
Appendix K


KEY TO SYMBOLS
SPECIAL FLOOD HAZARD AREA
ZONE A
"TO DETERMINE IF FLOOD INSURANCE IS AVAILABLE IN THIS COMMUNITY, CONTACT YOUR INSURANCE AGENT, OR CALL THE NATIONAL FLOOD INSURANCE PROGRAM, AT (800) 638-6620, OR (800) 424-8872."
2000 0 2000
COUNTY BOUNDARY
ZONE A
ZONE A
ZONE A
VILLAGE OF COALTON (AREA NOT INCLUDED)
CITY OF WITT
(AREA NOT INCLUDED)
NATIONAL FLOOD INSURANCE PROGRAM
FHBM
FLOOD HAZARD BOUNDARY MAP
MONTGOMERY COUNTY, ILLINOIS
UNINCORPORATED AREA
PANEL 3 OF 9
(SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER
170992 0003 A
EFFECTIVE DATE:
JANUARY 9, 1981
federal emergency management agency
federal insurance administration

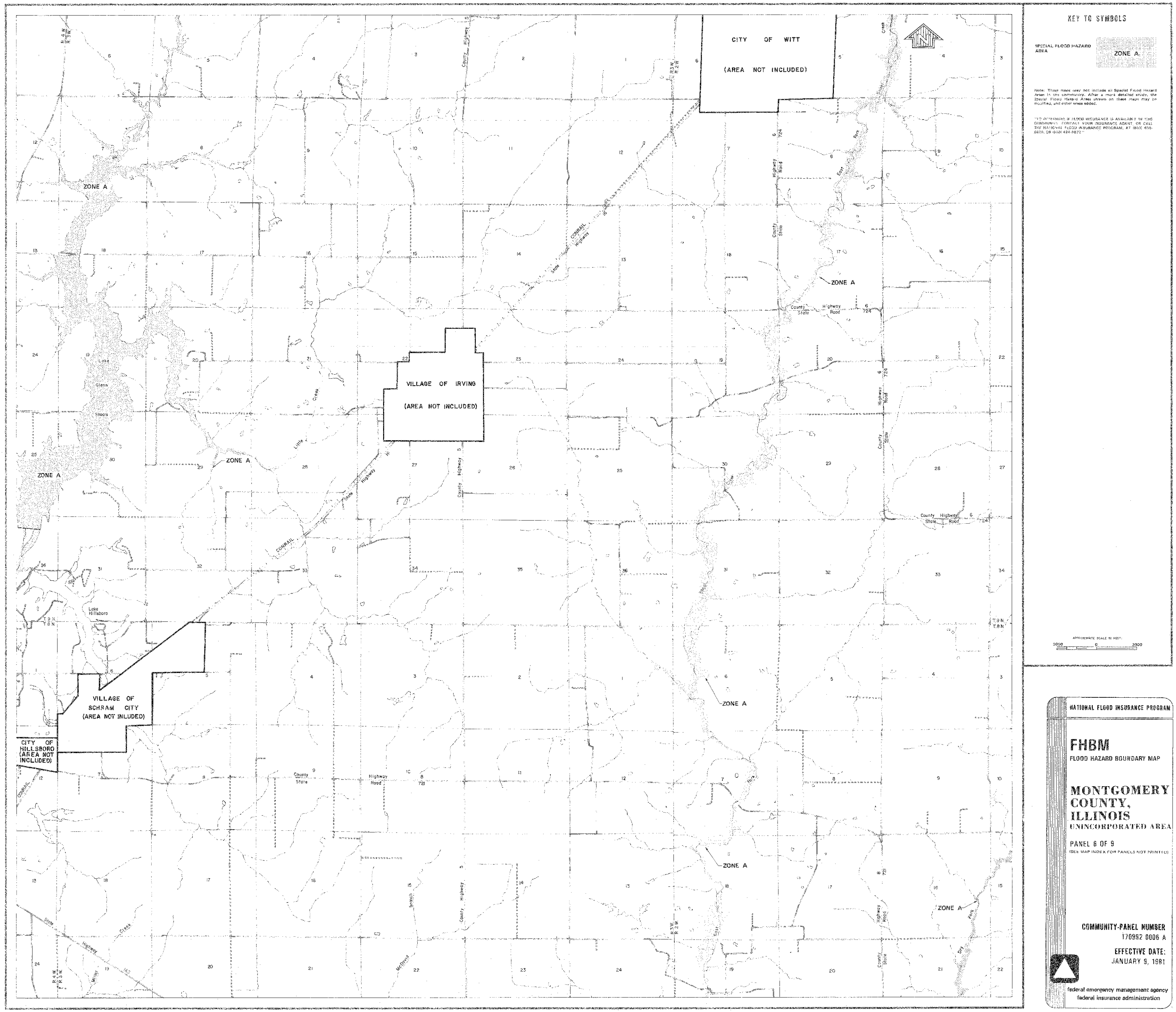
Appendix K


ZONE A
"TO DETERMINE IF FLOOD INSURANCE IS AVAILABLE IN THIS COMMUNITY, CONTACT YOUR INSURANCE AGENT, OR CALL THE NATIONAL FLOOD INSURANCE PROGRAM, AT (800) 638-6620, OR (800) 424-8872."
COUNTY BOUNDARY
VILLAGE OF OHLMAN (AREA NOT INCLUDED)
VILLAGE OF WENONAH (AREA NOT INCLUDED)
CITY OF NOKOMIS (AREA NOT INCLUDED)
VILLAGE OF COALTON (AREA NOT INCLUDED)
ZONE A
County State Highway Road 646
NATIONAL FLOOD INSURANCE PROGRAM
FHBM
FLOOD HAZARD BOUNDARY MAP
MONTGOMERY COUNTY, ILLINOIS
UNINCORPORATED AREA
PANEL 4 OF 9
(SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER
170992 0004 A
EFFECTIVE DATE:
JANUARY 9, 1981
federal emergency management agency
federal insurance administration

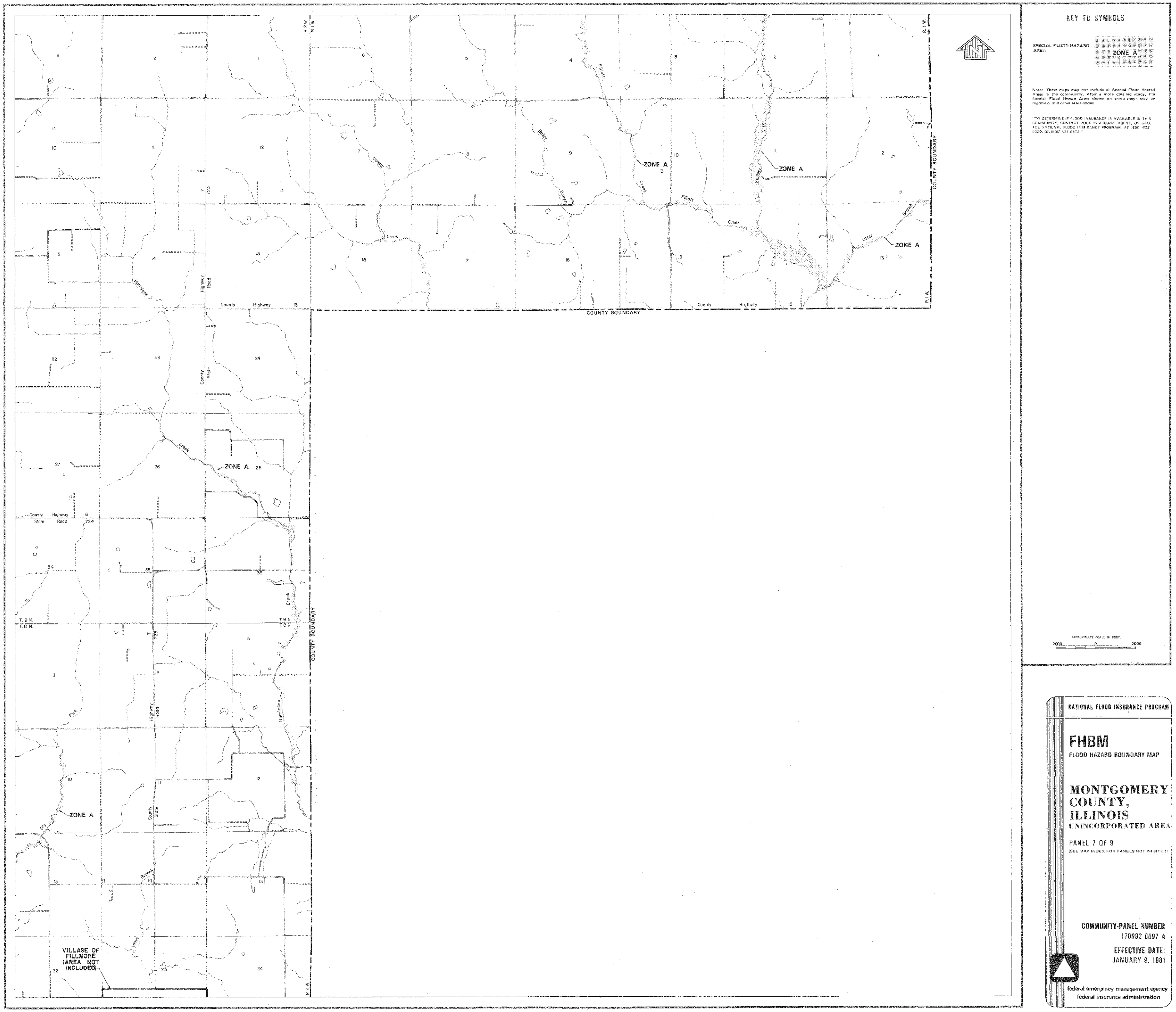
Appendix K


KEY TO SYMBOLS
ZONE A
CITY OF LITCHFIELD
(AREA NOT INCLUDED)
VILLAGE OF BUTLER
(AREA NOT INCLUDED)
CITY OF HILLSBORO
(AREA NOT INCLUDED)
VILLAGE OF TAYLOR SPRINGS
(AREA NOT INCLUDED)
HONEY BEND
COUNTY BOUNDARY
2000 0 2000
NATIONAL FLOOD INSURANCE PROGRAM
FHBM
FLOOD HAZARD BOUNDARY MAP
MONTGOMERY COUNTY, ILLINOIS
UNINCORPORATED AREA
PANEL 5 OF 9
(SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER
170992 0005 A
EFFECTIVE DATE:
JANUARY 9, 1981
federal emergency management agency
federal insurance administration

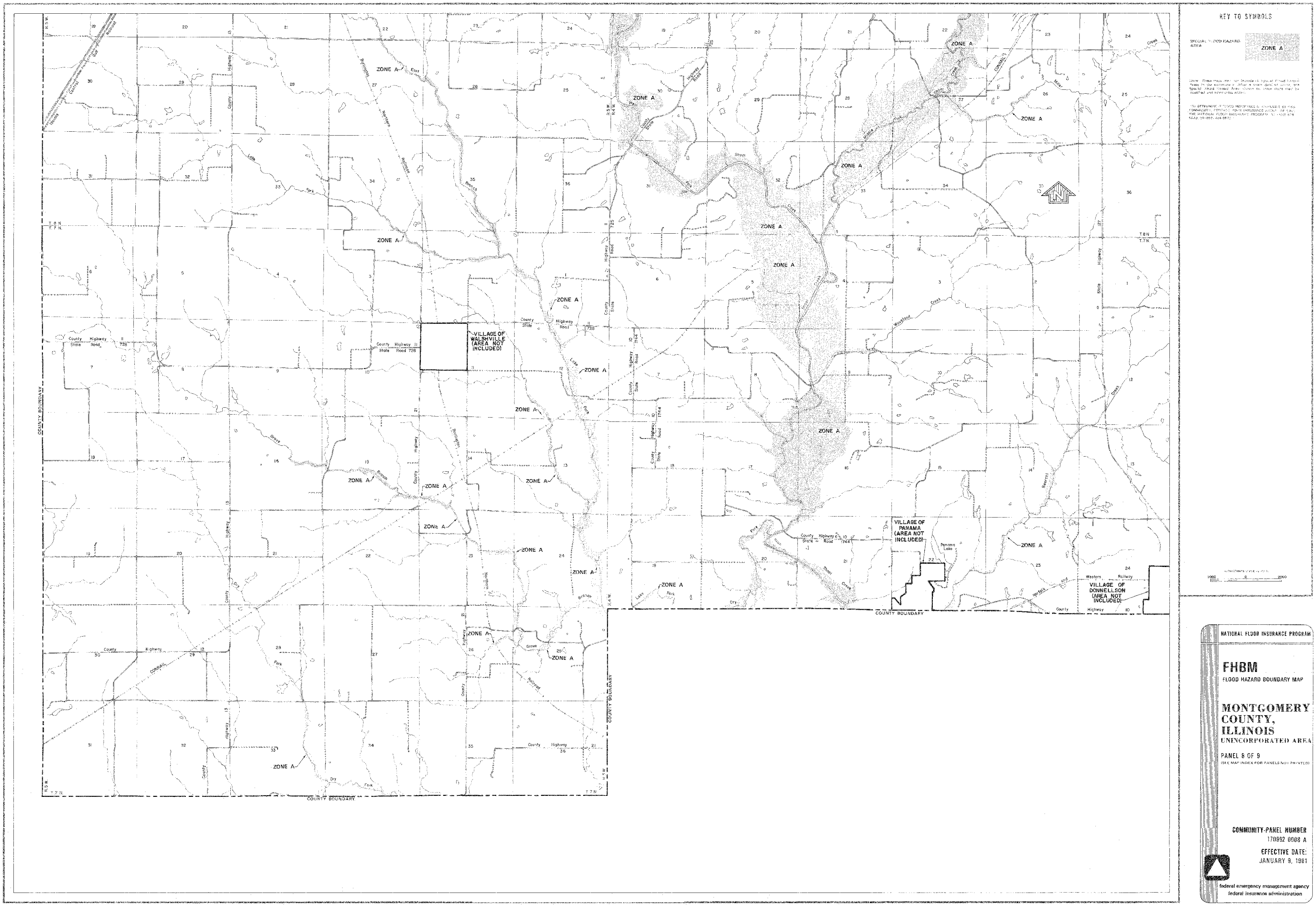
Appendix K


CITY OF WITT
(AREA NOT INCLUDED)
ZONE A
VILLAGE OF IRVING
(AREA NOT INCLUDED)
VILLAGE OF
SCHRAM CITY
(AREA NOT INCLUDED)
CITY OF
HILLSBORO
(AREA NOT
INCLUDED)
CONRAIL
Lake Glenn Shoals
Lake Hillsboro
KEY TO SYMBOLS
SPECIAL FLOOD HAZARD AREA
ZONE A
Note: These maps may not include all Special Flood Hazard Areas in the community. After a more detailed study, the Special Flood Hazard Areas shown on these maps may be modified, and other areas added.
"TO DETERMINE IF FLOOD INSURANCE IS AVAILABLE IN THIS COMMUNITY, CONTACT YOUR INSURANCE AGENT, OR CALL THE NATIONAL FLOOD INSURANCE PROGRAM, AT (800) 638-6620, OR (800) 424-8872."
APPROXIMATE SCALE IN FEET
2000 0 2000
NATIONAL FLOOD INSURANCE PROGRAM
FHBM
FLOOD HAZARD BOUNDARY MAP
MONTGOMERY
COUNTY,
ILLINOIS
UNINCORPORATED AREA
PANEL 6 OF 9
(SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER
170992 0006 A
EFFECTIVE DATE:
JANUARY 9, 1981
federal emergency management agency
federal insurance administration

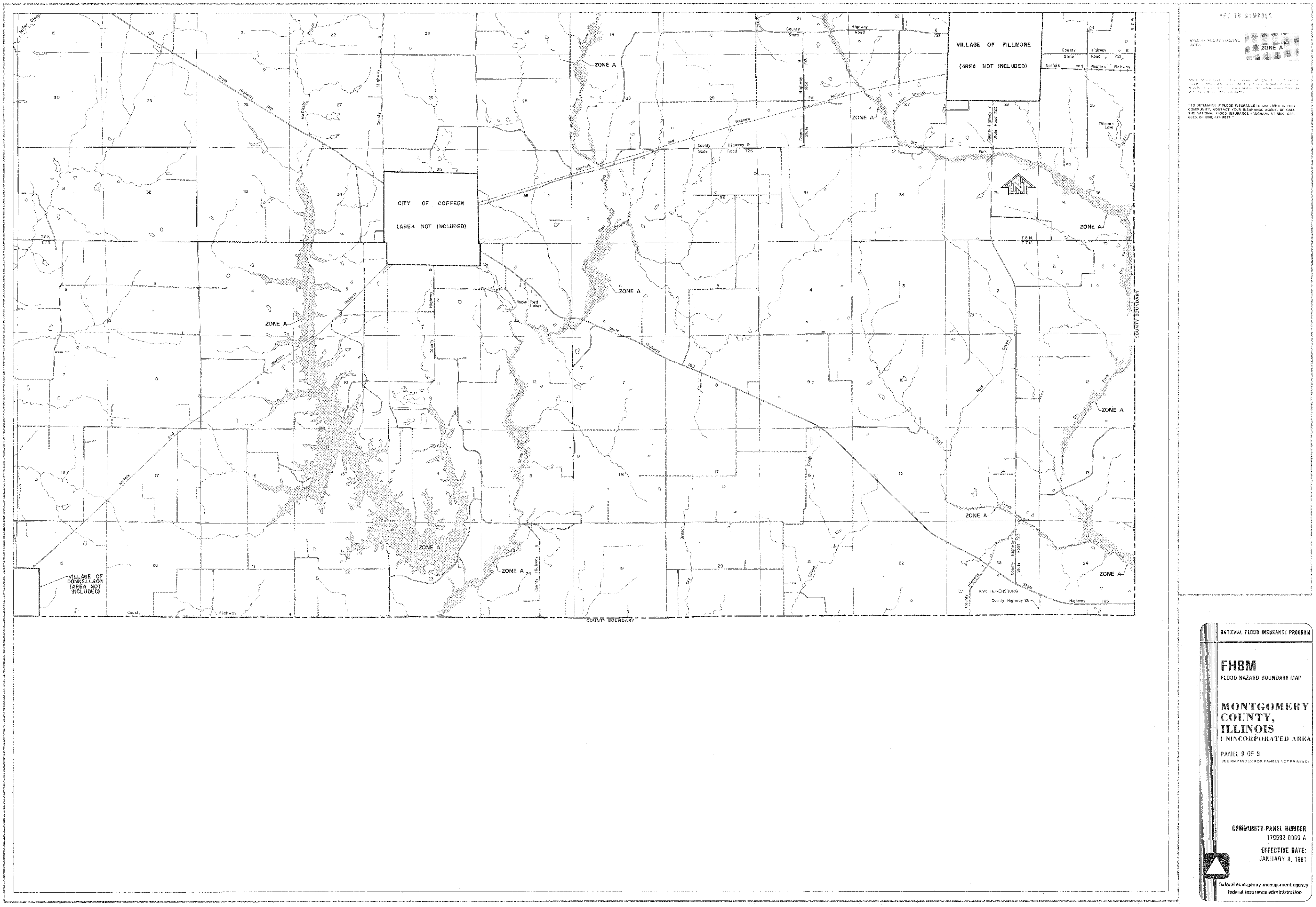
Appendix K


KEY TO SYMBOLS
SPECIAL FLOOD HAZARD AREA
ZONE A
Note: These maps may not include all Special Flood Hazard Areas in the community. After a more detailed study, the Special Flood Hazard Areas shown on these maps may be modified, and other areas added.
"TO DETERMINE IF FLOOD INSURANCE IS AVAILABLE IN THIS COMMUNITY, CONTACT YOUR INSURANCE AGENT, OR CALL THE NATIONAL FLOOD INSURANCE PROGRAM, AT (800) 638-6620, OR (800) 424-8872."
APPROXIMATE SCALE IN FEET
2000
0
2000
NATIONAL FLOOD INSURANCE PROGRAM
FHBM
FLOOD HAZARD BOUNDARY MAP
MONTGOMERY COUNTY, ILLINOIS
UNINCORPORATED AREA
PANEL 7 OF 9
(SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER
170992 0007 A
EFFECTIVE DATE:
JANUARY 9, 1981
federal emergency management agency
federal insurance administration
ZONE A
COUNTY BOUNDARY
County Highway 15
VILLAGE OF FILLMORE (AREA NOT INCLUDED)
Elliott Creek
Otter Branch
T. 9 N.
T. 8 N.

Appendix K


KEY TO SYMBOLS
ZONE A
VILLAGE OF WALSHVILLE (AREA NOT INCLUDED)
VILLAGE OF PANAMA (AREA NOT INCLUDED)
VILLAGE OF DONNELLSON (AREA NOT INCLUDED)
COUNTY BOUNDARY
NATIONAL FLOOD INSURANCE PROGRAM
FHBM
FLOOD HAZARD BOUNDARY MAP
MONTGOMERY COUNTY, ILLINOIS
UNINCORPORATED AREA
PANEL 8 OF 9
(SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER
170992 0008 A
EFFECTIVE DATE:
JANUARY 9, 1981
federal emergency management agency
federal insurance administration

Appendix K



KEY TO SYMBOLS
ZONE A
"TO DETERMINE IF FLOOD INSURANCE IS AVAILABLE IN THIS COMMUNITY, CONTACT YOUR INSURANCE AGENT, OR CALL THE NATIONAL FLOOD INSURANCE PROGRAM"
VILLAGE OF FILLMORE (AREA NOT INCLUDED)
CITY OF COFFEEN (AREA NOT INCLUDED)
VILLAGE OF DONNELLSON (AREA NOT INCLUDED)
ZONE A
State Highway 185
County State Highway 5 Road 726
Norfolk and Western Railway
COUNTY BOUNDARY
VAN BURENSBURG
NATIONAL FLOOD INSURANCE PROGRAM
FHBM
FLOOD HAZARD BOUNDARY MAP
MONTGOMERY COUNTY, ILLINOIS
UNINCORPORATED AREA
PANEL 9 OF 9
(SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER
170992 0009 A
EFFECTIVE DATE:
JANUARY 9, 1981
federal emergency management agency
federal insurance administration

Appendix K

APPENDIX L

DIRECTORY OF COAL MINES IN ILLINOIS

Montgomery County

This directory accompanies the Illinois Coal Mines map or maps for this County.

February 2023

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 77 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 MONTGOMERY COUNTY, ILLINOIS (February 2023)

ISGS INDEX	COMPANY NAME	MINE NAME	MINE NO.	MINE TYPE	METHOD	YEARS OPERATED	SEAM MINED	COUNTY	LOCATION TWP	RGE	SEC
76	SHOAL CREEK COAL CO.	PANAMA	1	SHAFT	RPP	1906-1925	HERRIN	MONTGOMERY	7N	4W	22
76	COSGROVE-MEEHAN COAL CO.	COSGROVE-MEEHAN	5	SHAFT	RPP	1925-1933	HERRIN	MONTGOMERY	7N	4W	22
77	MONTGOMERY COUNTY COAL CO.	TAYLOR SPRING	1	SHAFT	RPP	1908-1912	HERRIN	MONTGOMERY	8N	4W	23
77	PEABODY COAL CO.	PEABODY	15	SHAFT	RPP	1912-1915	HERRIN	MONTGOMERY	8N	4W	23
77	C. & E. I. COAL PROPERTIES	C. & E. I.	15	SHAFT	RPP	1917-1918	HERRIN	MONTGOMERY	8N	4W	23
77	ILLINOIS COAL PROPERTIES	TAYLOR SPRING	15	SHAFT	RPP	1918-1919	HERRIN	MONTGOMERY	8N	4W	23
77	INDIANA & ILLINOIS COAL CORP	INDIANA & ILLINOIS	15	SHAFT	RPP	1919-1923	HERRIN	MONTGOMERY	8N	4W	23
194	PEABODY COAL CO.	NOKOMIS	1	SHAFT	RPP	1906-1915	HERRIN	MONTGOMERY	10N	2W	10
194	C. & E. I. COAL PROPERTIES	C. & E. I.	10	SHAFT		1915-1918	HERRIN	MONTGOMERY	10N	2W	10
194	ILLINOIS COAL PROPERTIES	ILLINOIS	10	SHAFT		1918-1919	HERRIN	MONTGOMERY	10N	2W	10
194	INDIANA & ILLINOIS COAL CORP	INDIANA & ILLINOIS	10	SHAFT		1919-1939	HERRIN	MONTGOMERY	10N	2W	10
195	NOKOMIS COAL CO.	RELIANCE	1	SHAFT	RPP	1913-1922	HERRIN	MONTGOMERY	10N	2W	27
195	ILLINOIS COAL CORP.	ILLINOIS COAL	9	SHAFT		1922-1925	HERRIN	MONTGOMERY	10N	2W	27
195	idle	RELIANCE	1	SHAFT	RPP	1925-1935	HERRIN	MONTGOMERY	10N	2W	27
195	NOKOMIS C C	RELIANCE	1	SHAFT	RPP	1936-1952	HERRIN	MONTGOMERY	10N	2W	27
196	MONTGOMERY COAL CO.	MONTGOMERY		SHAFT	RPP	1897-1904	HERRIN	MONTGOMERY	9N	2W	6
196	DERING COAL CO.	DERING	25	SHAFT		1904-1905	HERRIN	MONTGOMERY	9N	2W	6
196	BURNWELL COAL CO.	BURNWELL	24	SHAFT		1905-1912	HERRIN	MONTGOMERY	9N	2W	6
196	PEABODY COAL CO.	PEABODY	12	SHAFT		1912-1917	HERRIN	MONTGOMERY	9N	2W	6
196	C & E I COAL PROPERTIES	C & E I	12	SHAFT		1917-1918	HERRIN	MONTGOMERY	9N	2W	6
196	ILLINOIS COAL PROPERTIES	ILLINOIS	12	SHAFT		1918-1919	HERRIN	MONTGOMERY	9N	2W	6
196	INDIANA & ILLINOIS COAL CORP	INDIANA & ILLINOIS	12	SHAFT		1919-1925	HERRIN	MONTGOMERY	9N	2W	6
197	KORTKAMP COAL CO.	KORTKAMP		SHAFT	MRP	1904-1912	HERRIN	MONTGOMERY	8N	3W	5
197	PEABODY COAL CO.	PEABODY	11	SHAFT	MRP	1912-1915	HERRIN	MONTGOMERY	8N	3W	5
197	C. & E. I. COAL PROPERTIES	C. & E. I.	11	SHAFT	MRP	1915-1918	HERRIN	MONTGOMERY	8N	3W	5
197	ILLINOIS COAL PROPERTIES	ILLINOIS	11	SHAFT	MRP	1918-1919	HERRIN	MONTGOMERY	8N	3W	5
197	INDIANA & ILLINOIS COAL CORP	INDIANA & ILLINOIS	11	SHAFT	MRP	1919-1924	HERRIN	MONTGOMERY	8N	3W	5
282	MT. OLIVE COAL CO.	MT. OLIVE	5	SHAFT	RPP	1887-1894	HERRIN	MACOUPIN	7N	6W	1

DIRECTORY OF COAL MINES FOR MONTGOMERY COUNTY, ILLINOIS (February 2023)

ISGS INDEX	COMPANY NAME	MINE NAME	MINE NO.	MINE TYPE	METHOD	YEARS OPERATED	SEAM MINED	COUNTY	LOCATION TWP	RGE	SEC
282	CONSOLIDATED COAL & COKE CO.	MT. OLIVE		SHAFT	RPP	1887-1889	HERRIN	MACOUPIN	7N	6W	1
282	MADISON COAL CORP.	MT. OLIVE	5	SHAFT	RPP	1894-1915	HERRIN	MACOUPIN	7N	6W	1
282	MT. OLIVE COAL CO.	MT. OLIVE	5	SHAFT	RPP	1915-1920	HERRIN	MACOUPIN	7N	6W	1
282	MADISON COAL CORP.	MADISON	5	SHAFT	RPP	1920-1934	HERRIN	MACOUPIN	7N	6W	1
282	MT. OLIVE COAL CO.	HOOSIER		SHAFT	RPP	1934-1940	HERRIN	MACOUPIN	7N	6W	1
291	HILLSBORO COAL CO.	HILLSBORO		SHAFT	MRP	1888-1937	HERRIN	MONTGOMERY	8N	4W	12
291	HILLSBORO MINING CO.	HILLSBORO		SHAFT	MRP	1937-1941	HERRIN	MONTGOMERY	8N	4W	12
335	BURNWELL COAL CO.	BURNWELL	22	SHAFT	RPP	1907-1911	HERRIN	MONTGOMERY	10N	2W	32
335	PEABODY COAL CO.	PEABODY	14	SHAFT	RPP	1911-1915	HERRIN	MONTGOMERY	10N	2W	32
335	C & E I COAL PROPERTIES	C & E I	14	SHAFT	RPP	1915-1918	HERRIN	MONTGOMERY	10N	2W	32
335	ILLINOIS COAL PROPERTIES	ILLINOIS	14	SHAFT	RPP	1918-1919	HERRIN	MONTGOMERY	10N	2W	32
335	INDIANA & ILLINOIS COAL CORP	INDIANA & ILLINOIS	14	SHAFT	RPP	1919-1921	HERRIN	MONTGOMERY	10N	2W	32
442	CLOVER LEAF COAL MNG. CO.	CLOVER LEAF	2	SHAFT	RPP	1906-1916	HERRIN	MONTGOMERY	7N	3W	3
442	COFFEEN COAL MNG. CO.	COFFEEN	2	SHAFT	RPP	1916-1920	HERRIN	MONTGOMERY	7N	3W	3
442	CLOVER LEAF COAL CO.	CLOVER LEAF	4	SHAFT	RPP	1920-1924	HERRIN	MONTGOMERY	7N	3W	3
693	PEABODY COAL CO.	PEABODY	10	SLOPE	BRP	1951-1994	HERRIN	CHRISTIAN	13N	4W	10
707	FREEMAN COAL MNG CORP	CROWN	1	SHAFT	RPP	1951-1971	HERRIN	MONTGOMERY	12N	5W	34
714	LITCHFIELD MNG & POWER CO	LITCHFIELD		SHAFT	RPB	1894-1896	LOWELL	MONTGOMERY	9N	5W	32
714	LITCHFIELD MNG & POWER CO	LITCHFIELD		SHAFT	MRP	1896-1904	LITCHFIELD	MONTGOMERY	9N	5W	32
714	ILLINOIS COLLIERIES CO.	ILLINOIS COLLIERIES	7	SHAFT	MRP	1904-1908	LITCHFIELD	MONTGOMERY	9N	5W	32
714	LITCHFIELD COAL CO	LITCHFIELD	7	SHAFT	MRP	1908-1913	LITCHFIELD	MONTGOMERY	9N	5W	32
714	LITCHFIELD COAL MNG. CO.	LITCHFIELD	7	SHAFT	MRP	1920-1925	LITCHFIELD	MONTGOMERY	9N	5W	32
714	LITCHFIELD COAL MNG. CO.	LITCHFIELD		SHAFT	RPB	1920-1925	LOWELL	MONTGOMERY	9N	5W	32
871	TRUAX TRAER COAL CO.	HILLSBORO		SHAFT	RPP	1964-1970	HERRIN	MONTGOMERY	7N	3W	14
871	CONSOLIDATION CC,MIDWEST DIV	HILLSBORO		SHAFT	RPP	1971-1983	HERRIN	MONTGOMERY	7N	3W	14
933	FREEMAN UNITED COAL MNG CO	CROWN	2	SHAFT	RPP	1976-2007	HERRIN	MACOUPIN	12N	6W	23

DIRECTORY OF COAL MINES FOR MONTGOMERY COUNTY, ILLINOIS (February 2023)

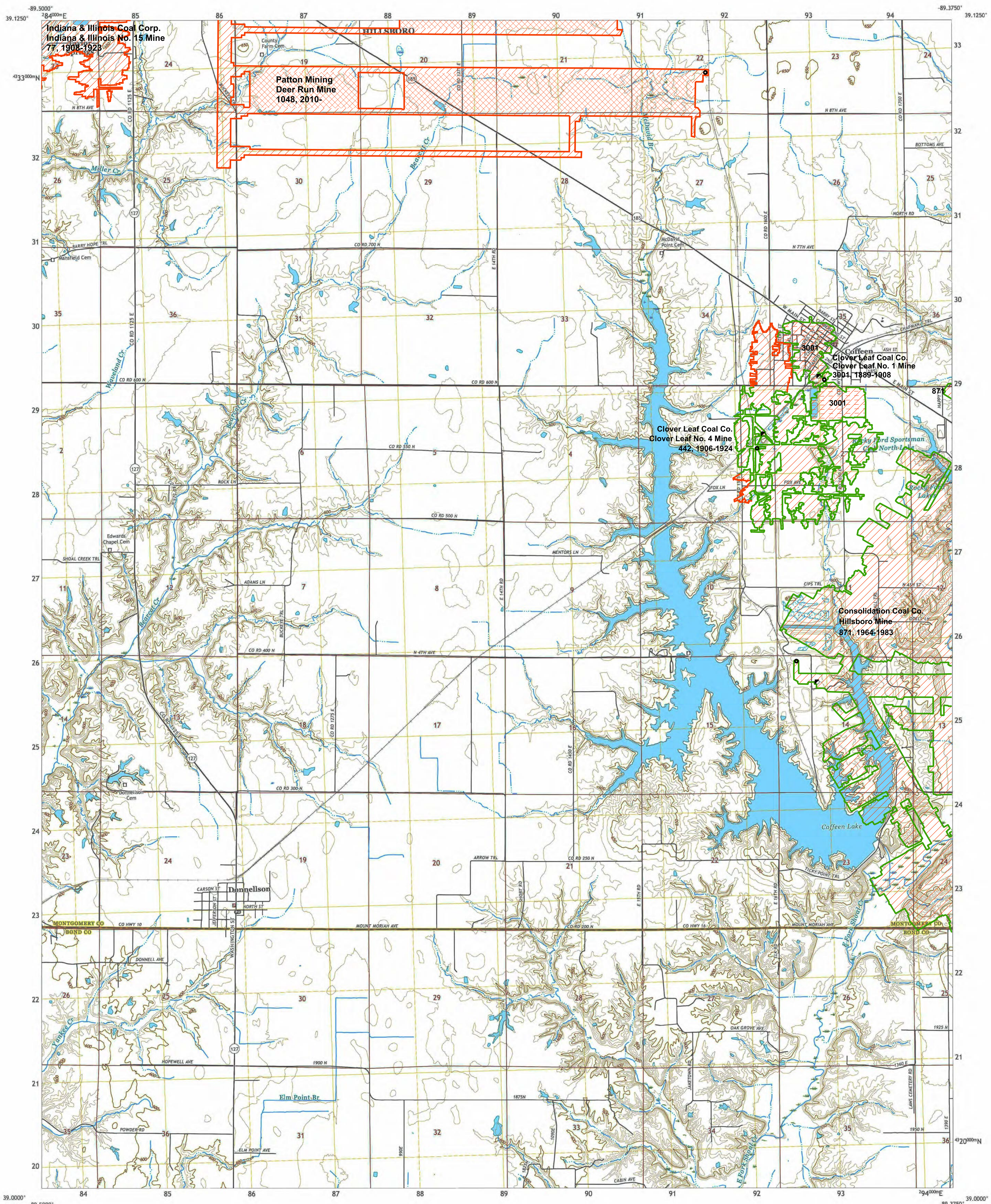
ISGS INDEX	COMPANY NAME	MINE NAME	MINE NO.	MINE TYPE	METHOD	YEARS OPERATED	SEAM MINED	COUNTY	LOCATION TWP	RGE	SEC
996	FREEMAN UNITED COAL MNG CO.	CROWN	3	SHAFT	RPP	1981-2007	HERRIN	MACOUPIN	11N	6W	1
996	SPRINGFIELD COAL CO., LLC	CROWN	3	SHAFT	RPP	2007-2013	HERRIN	MACOUPIN	11N	6W	1
1048	PATTON MINING	DEER RUN		SLOPE	LW	2010-	HERRIN	MONTGOMERY	8N	3W	7
3001	COFFEEN COAL & COKE CO.	COFFEEN		SHAFT	RPB	1889-1901	HERRIN	MONTGOMERY	8N	3W	35
3001	CLOVER LEAF COAL CO.	CLOVER LEAF	1	SHAFT	RPB	1901-1908	HERRIN	MONTGOMERY	8N	3W	35
3002	AMALGAMATED COAL & TIMBER	AMALGAMATED		SHAFT	LW	1869-1873	LOWELL	MONTGOMERY	8N	5W	3
3002	LITCHFIELD COAL CO.	LITCHFIELD		SHAFT	LW	1873-1894	LOWELL	MONTGOMERY	8N	5W	3
3002	LITCHFIELD MNG. & MFG. CO.	LITCHFIELD		SHAFT	LW	1894-1899	LOWELL	MONTGOMERY	8N	5W	3
3003	RAYMOND MINING CO.	RAYMOND		SHAFT	RP	1897-1898	HERRIN	MONTGOMERY	10N	4W	8
3003	JAMISON (WILLIAM) COAL CO.	JAMISON		SHAFT	RP	1898-1899	HERRIN	MONTGOMERY	10N	4W	8
3003	PROGRESSIVE COAL CO.	PROGRESSIVE		SHAFT	RP	1899-1901	HERRIN	MONTGOMERY	10N	4W	8
3003	RAYMOND COAL CO.	RAYMOND		SHAFT	RP	1901-1903	HERRIN	MONTGOMERY	10N	4W	8
3003	MILLER COAL CO.	MILLER		SHAFT	RP	1903-1907	HERRIN	MONTGOMERY	10N	4W	8
3003	HARDIN (H. H.)	HARDIN		SHAFT	RP	1907-1908	HERRIN	MONTGOMERY	10N	4W	8
3003	KELLY (G. I.)	KELLEY		SHAFT	RP	1908-1909	HERRIN	MONTGOMERY	10N	4W	8
3003	RAYMOND COAL CO.	RAYMOND		SHAFT	RP	1909-1910	HERRIN	MONTGOMERY	10N	4W	8
3004	FARMERSVILLE COAL MNG. CO.	FARMERSVILLE	1	SHAFT	RPP	1907-1915	HERRIN	MONTGOMERY	11N	5W	4
3005	FISHER (W. C,)	FISHER		SHAFT		1937-1938	HERRIN	MORGAN	13N	10W	31
3005	FISHER COAL CO.	FISHER		SHAFT		1939-1943	HERRIN	MORGAN	13N	10W	31
3005	FISHER & FISHER	FISHER		SHAFT		1939-1939	HERRIN	MORGAN	13N	10W	31
3006	WAGSTAFF (CHARLES)	WAGSTAFF		SHAFT		1914-1924	HERRIN	MORGAN	13N	10W	30
3006	WAGSTAFF (VIRDEN)	WAGSTAFF		SHAFT		1924-1925	HERRIN	MORGAN	13N	10W	30
3006	MUNCIE (JOHN)	MUNCIE		SHAFT		1926-1926	HERRIN	MORGAN	13N	10W	30
3006	SPENCER & WAGSTAFF	WAGSTAFF		SHAFT		1927-1930	HERRIN	MORGAN	13N	10W	30
3006	WAGSTAFF & SMITH	WAGSTAFF		SHAFT		1931-1939	HERRIN	MORGAN	13N	10W	30

DIRECTORY OF COAL MINES FOR MONTGOMERY COUNTY, ILLINOIS (February 2023)

ISGS INDEX	COMPANY NAME	MINE NAME	MINE NO.	MINE TYPE	METHOD	YEARS OPERATED	SEAM MINED	COUNTY	LOCATION TWP	RGE	SEC
3007	APPLE CREEK COAL & MNG. CO.	APPLE CREEK		SHAFT	RP	1884-1886	HERRIN	MORGAN	14N	9W	36
3007	FRANKLIN COAL & MNG. CO.	FRANKLIN		SHAFT	RP	1884-1884	HERRIN	MORGAN	14N	9W	36
3007	MORGAN COUNTY COAL CO.	MORGAN		SHAFT	RP	1886-1890	HERRIN	MORGAN	14N	9W	36

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

COFFEEN QUADRANGLE
ILLINOIS
7.5-MINUTE SERIES



Coal Mines in Illinois
Coffeen Quadrangle

Montgomery & Bond Counties, Illinois

This map accompanies the Coal Mines Directory for the Coffeen 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

Other Areas Depicted

- Non-Coal Mines

Source of Mine Outline

- Final Mine Map
- Not Final Mine Map
- Undated Mine Map
- Incomplete Mine Map
- Secondary Source Map

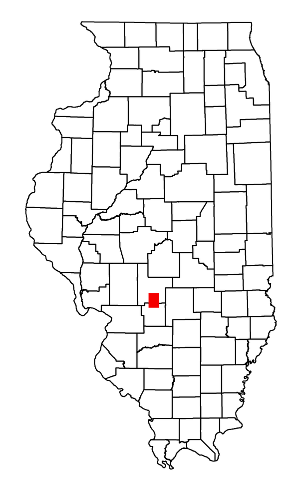
Tipple, Shaft, Slope, Drift Locations

- 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

Other Points Depicted

- Non-Coal Mines

Location



Mine Annotation

(space permitting)
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 https://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.

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid:Universal Transverse Mercator, Zone 16S
This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery....NAIP, July 2019 - July 2019
Roads.... U.S. Census Bureau, 2017
Names....GNIS, 1980 - 2020
Hydrography....National Hydrography Dataset, 2006 - 2018
Contours....National Elevation Dataset, 2018
Boundaries....Multiple sources; see metadata file 2018 - 2019
Public Land Survey System....BLM, 2020
Wetlands....FWS National Wetlands Inventory Not Available

UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard.

COFFEEN, IL
2021

Appendix L

ILLINOIS
Illinois State Geological Survey
PRAIRIE RESEARCH INSTITUTE

Prairie Research Institute
Illinois State Geological Survey
615 E. Peabody Dr.
Champaign, IL 61820

Mine Outlines Compiled by
Jennifer M. Obrad

November 21, 2011
Revised July 2023

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
COFFEEN QUADRANGLE
MONTGOMERY & BOND COUNTIES

Jennifer M. Obrad

2011

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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.

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 COFFEEN QUADRANGLE

Mining near Coffeen took place in the Herrin Coal, which ranged from 5.8 to 8 feet thick. The coal was deep, being 450 feet or more below the surface. The depth contributed to roof difficulties.

Mining began in the Coffeen Quadrangle in 1889, when Clover Leaf No. 1 Mine (mine index 3001) opened. After Clover Leaf No. 4 Mine (mine index 442) closed in 1924, a hiatus in mining activity continued until the Hillsboro Mine (mine index 871) opened in 1964. The Hillsboro Mine closed in 1983, leaving a great deal of coal remaining for future activity.

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.

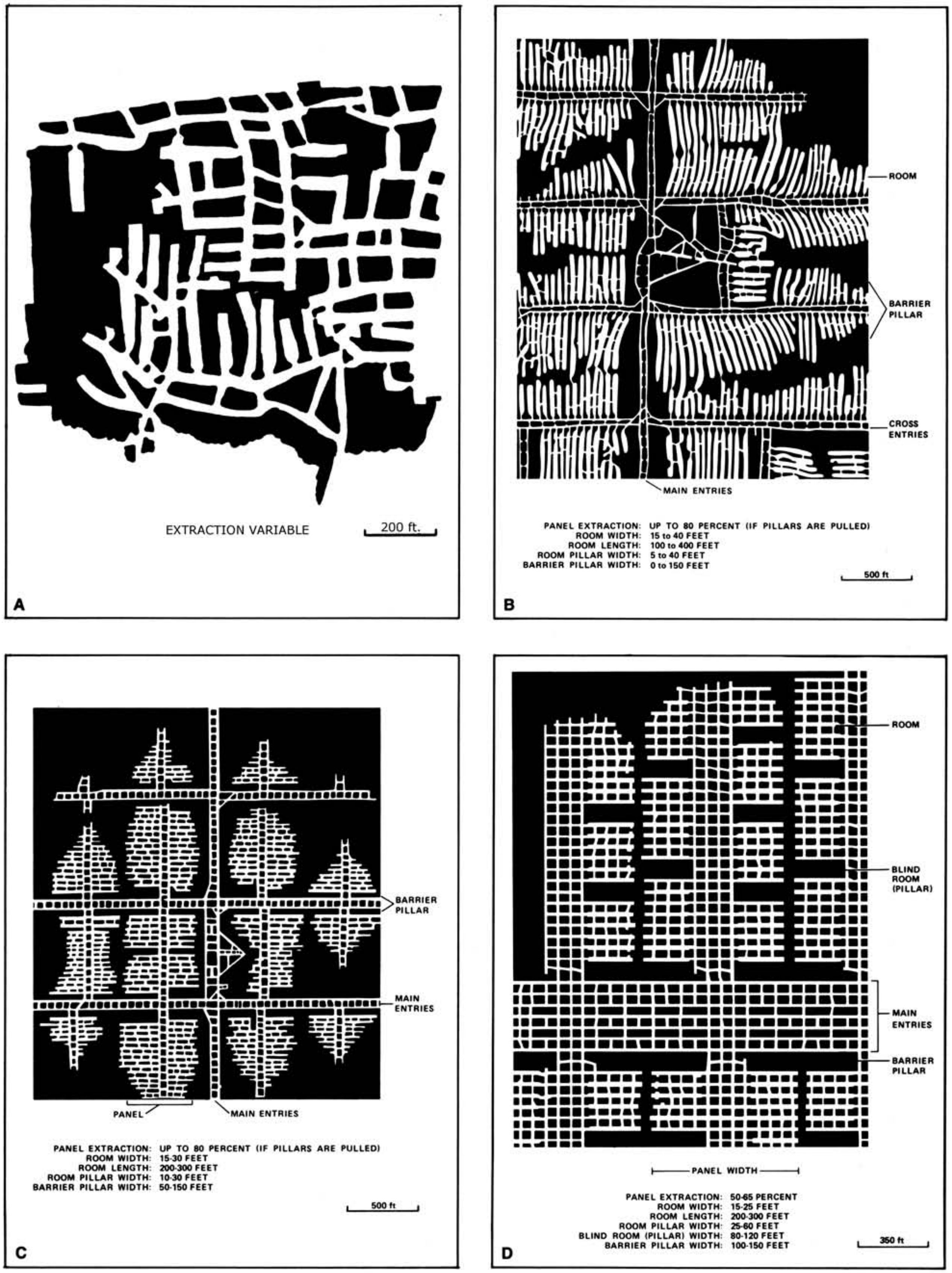


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

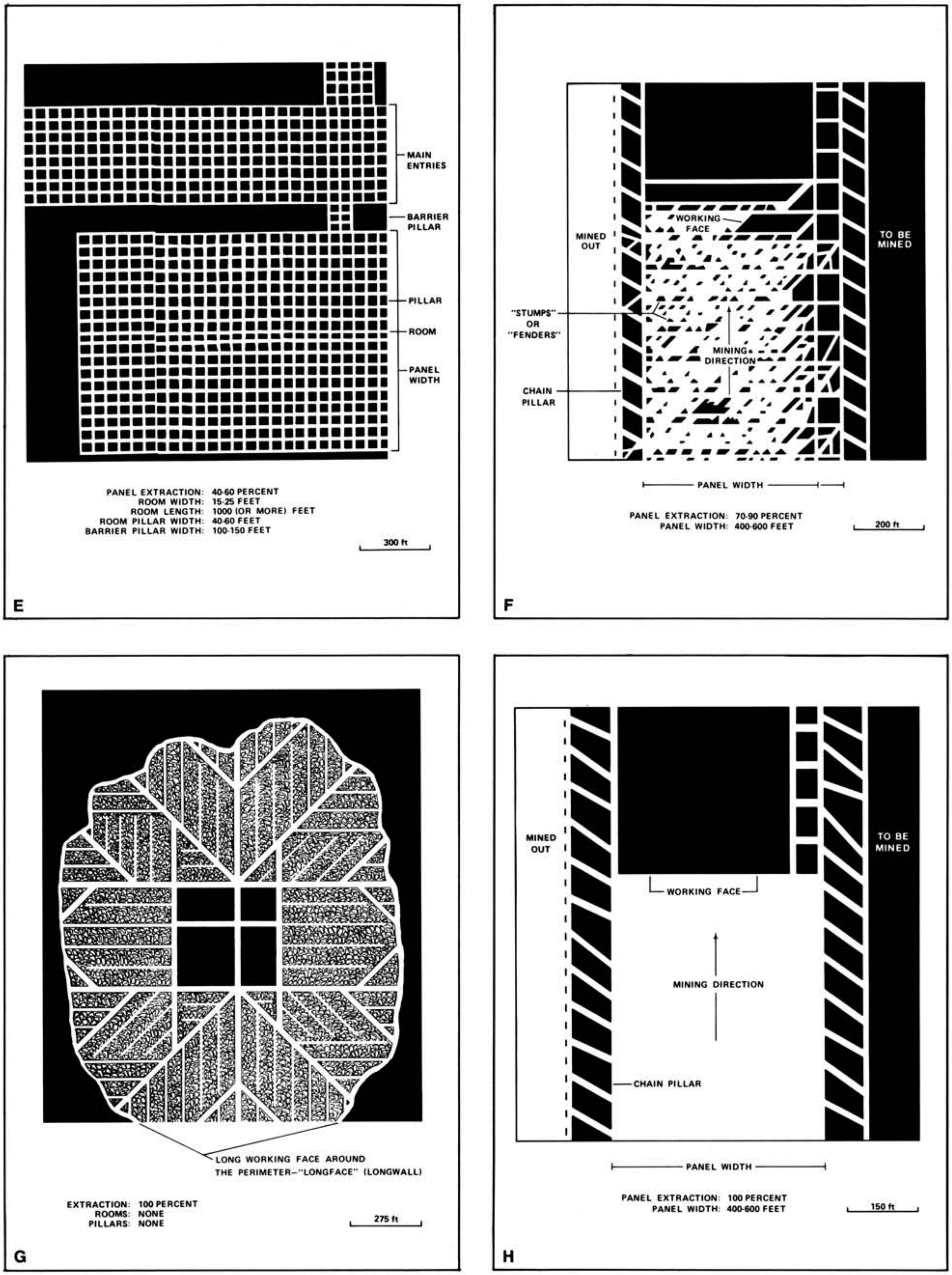


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

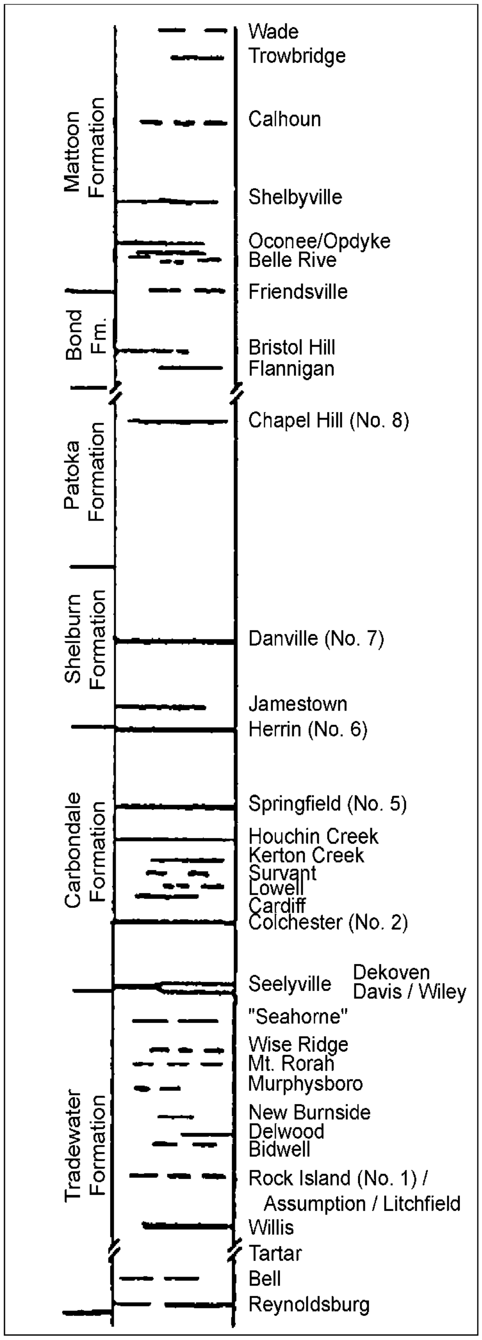


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

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 COFFEEN QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Coffeen 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 77
Indiana & Illinois Coal Corporation, Indiana & Illinois No. 15 Mine

Type: Underground   Total mined-out acreage shown: 441   Production indicates approximately 136 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (9'x16')	Montgomery	8N 4W	23	NW SE NE
Air shaft (9'x16')	Montgomery	8N 4W	23	NW SE NE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	450-471			6.0-8.0	RPP

Geologic Problems Reported: The mine notes indicate this mine was filled with gas and that roof falls were a problem.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Montgomery County Coal Company	Taylor Spring	1908-1912	831,018
Peabody Coal Company	Peabody No. 15	1912-1915 *	692,431
C. & E. I. Coal Properties	C. & E. I. No. 15	1917-1918	279,360
Illinois Coal Properties	Illinois Coal Properties No. 15	1918-1919	247,616
Indiana & Illinois Coal Corporation **	Indiana & Illinois No. 15	1919-1921	490,881
Indiana & Illinois Coal Corporation	Indiana & Illinois No. 15	1921-1923	782,440 ***
			3,323,746

* Idle, temporarily abandoned 1915
** An April 1919 map indicates the mine was operated by Keller Coal Company, probably under a lease agreement.
*** Production after map date

Last reported production: October 1923

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352595	2-15-1921	1:2400	1:3972	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, seam, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Mine type, shaft location, thickness, geologic problems.
Microfilm map, document 352595, reel 03139, frames 434-437 - Shaft locations, mine outline, mining method.

Mine Index 442
Clover Leaf Coal Company, Clover Leaf No. 4 Mine

Type: Underground   Total mined-out acreage shown: 399

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (11'x22')	Montgomery	7N 3W	3	NE SE NE
Air shaft *	Montgomery	7N 3W	3	SW SE NE

* This air shaft was completed in 1913. The mine was connected to Clover Leaf No. 1 Mine (mine index 3001), which sufficed for the initial ventilation and escapeway.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	510-544			6.0-8.0	RPP

Geologic Problems Reported: The roof was a massive black shale, with sandstone above. Rolls were present in the mine. The source map shows many unmined areas within the mine outline. The reason these areas were not mined is not specified in the mine notes or on the source map, but water-bearing sands above the roof shale could contribute to roof problems.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Clover Leaf Coal Mining Company	Clover Leaf No. 2	1906-1916	1,098,726
Coffeen Coal Mining Company	Coffeen No. 2	1916-1920	488,616
Clover Leaf Coal Company **	Clover Leaf No. 4	1920-1924 ***	251,515
			1,838,857

** According to the mine notes, Cosgrove Meehan Coal Company owned or operated the mine.
*** Idle 1922

Last reported production: March 1924

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352580	7-1923	1:2400	1:4800	Not final
State archive, MSHA_412_04	7-14-1915	1:1200	1:1430	Not final
State archive, IL_2441_01	4-1924	1:2400	1:2400	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, mine type, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Shaft location, seam, thickness, geologic problems.
Microfilm map, document 352580, reel 03139, frame 377 - Mine outline (southwest part of mine), geologic problems.
State Archive, MSHA_412, courtesy of Robert Gibson, IDNR - Mine outline (north half), mining method.
State Archive, IL_2441_01, courtesy of Robert Gibson, IDNR - Shaft locations, mine outline (south half), mining method.

Mine Index 871
Consolidation Coal Company, Hillsboro Mine (Consolidation No. 63 Mine)

Type: Underground   Total mined-out acreage shown: 4,897

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Man shaft	Montgomery	7N 3W	14	SW NE NW
Air shaft	Montgomery	7N 2W	18	SE NE NE
Hoist & air shaft	Montgomery	7N 3W	14	NE NW NW

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	500-510			5.83-7.17	RPP

Geologic Problems Reported: Roof problems were widespread, the sites characterized by slickensided fault planes that cut irregularly through the roof shales and claystones. Small clay dikes were also associated with this small-scale faulting. Floor heaving was slight, but had been a larger problem in the past.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Truax-Traer Coal Company	Hillsboro	1964-1970	5,605,812
Consolidation Coal Company	Consolidation No. 63, Hillsboro	1971-1983	21,173,542
			26,779,354

Last reported production: July 1983

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, Coal Section files	2-1-1983	1:12000	1:2170	Final *

* The map date is before mine closure, but the Coal Section has been assured that the workings shown on the map are indeed final. The mined area shown on the accompanying map is the approximate size expected for the reported production. This suggests that the mine outline is complete.

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, mine type, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Shaft location, seam, depth, thickness, geologic problems.
Company map, Coal Section files, 1983 Line Project - Shaft locations, mine outline, mining method.

Mine Index 1048
Patton Mining, Deer Run Mine

Type: Underground Total mined-out acreage shown:

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main slope	Montgomery	8N 3W	7	SE SE SW
Air shaft	Montgomery	8N 4W	13	SE SE NE
Air shaft	Montgomery	8N 3W	19	SW NW NE
Air shaft	Montgomery	8N 3W	15	NE NW SW

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	500			6.5	LW

Geologic Problems Reported: Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Company	Mine Name	Years		Production (tons)
Patton Mining	Deer Run	2010-	*	15,147,514 *
				15,147,514

* Production includes tonnage from 2015, the most recent available Coal Report.

Last reported production:

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 6-462e	3-4-2015	1:4800	1:4800	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, seam, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Company map, document 351418, reel 03136, frame 53 - Slope & shaft locations, mine outline, mining method.

Mine Index 3001
Clover Leaf Coal Company, Clover Leaf No. 1 Mine

Type: Underground   Total mined-out acreage shown: 137

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Montgomery	8N 3W	35	SW SE SW
Air shaft	Montgomery	8N 3W	35	SE SE SW

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	534-562			7.0-8.0	RP

Geologic Problems Reported:

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Coffeen Coal & Coke Company	Coffeen	1889-1900	878,898
Coffeen Coal & Coke Company *	Coffeen	1900-1901	8,000
Clover Leaf Coal Company	Clover Leaf No. 1	1901-1908 **	484,939
			1,371,837

* Under management of Mitchell Coal & Coke Company
** Abandoned as a hoisting shaft, used as escapement for Clover Leaf No. 4 Mine (mine index 442)

Last reported production: 1908

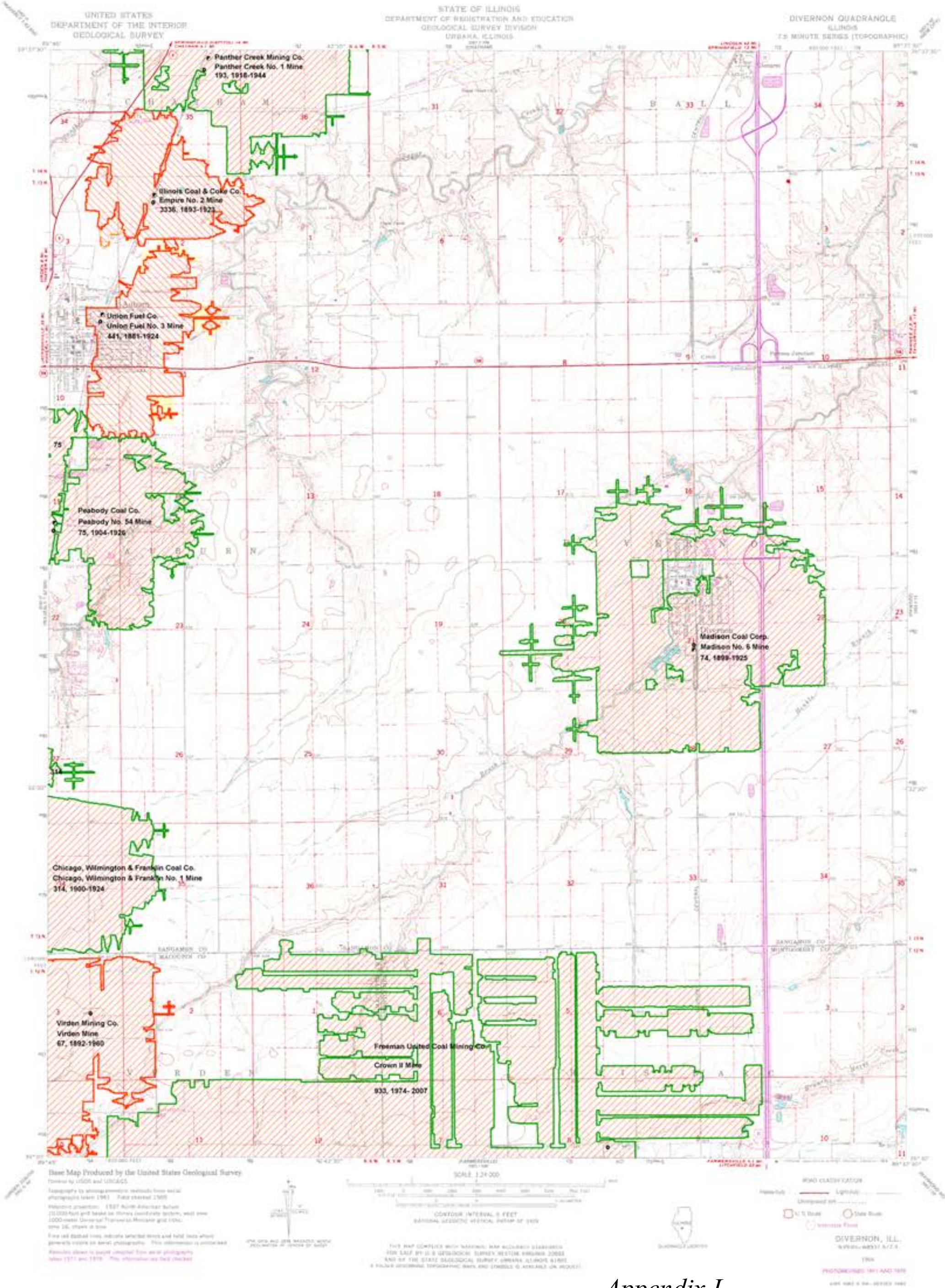
SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352580	7-1923	1:2400	1:4800	Final
State archive, MSHA_412_04	7-14-1915	1:1200	1:1430	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Mine type, shaft location, seam.
Microfilm map, document 352580, reel 03139, frame 377 - Mine outline (south half), mining method.
State Archive, MSHA_412, courtesy of Robert Gibson, IDNR - Shaft locations, mine outline (north half), mining method.

INDEX OF MINES IN THE COFFEEN QUADRANGLE



Coal Mines in Illinois
Divernon Quadrangle

Sangamon, Macoupin & Montgomery Counties, Illinois

This map accompanies the Coal Mines Directory for the Divernon 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. 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. Divernon Quadrangle used as a basemap was projected from the original UTM to Lambert Conformal Conic.

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Coal Section

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Champaign, IL 61820

Mine Outlines Compiled by
Jennifer M. Obrad

October 23, 2008

Appendix L

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
DIVERNON QUADRANGLE
SANGAMON, MACOUPIN & MONTGOMERY COUNTIES

Jennifer M. Obrad & C. Chenoweth

Institute of Natural Resources Sustainability
ILLINOIS STATE GEOLOGICAL SURVEY
2008

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
DIVERNON QUADRANGLE
SANGAMON, MACOUPIN & MONTGOMERY 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.

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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 DIVERNON QUADRANGLE

All mining in the Divernon Quadrangle took place in the Herrin Coal, which was over 6 feet thick. Faults were rare in most of the mines (or at least caused few problems with mining), but sandstone over the coal did cause some problems with mining. In some cases, the coal was eroded under the sandstone, and in other cases, the sandstone contained water that seeped into the mine. Some mines had difficulties with the roof and left up top coal to support the roof and protect the shale from moisture that caused it to slake more readily.

The earliest mining began in 1881 at the Auburn Mine (mine index 441). All the mines in the Divernon Quadrangle operated for many years, ranging from 15 years for Panther Creek No. 1 Mine (mine index 193), which was idle from 1933 to 1942, up to 67 years for the Virden Mine (mine index 67). Mining ended in this area in August 2007, when Crown II Mine (mine index 933) closed.

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.

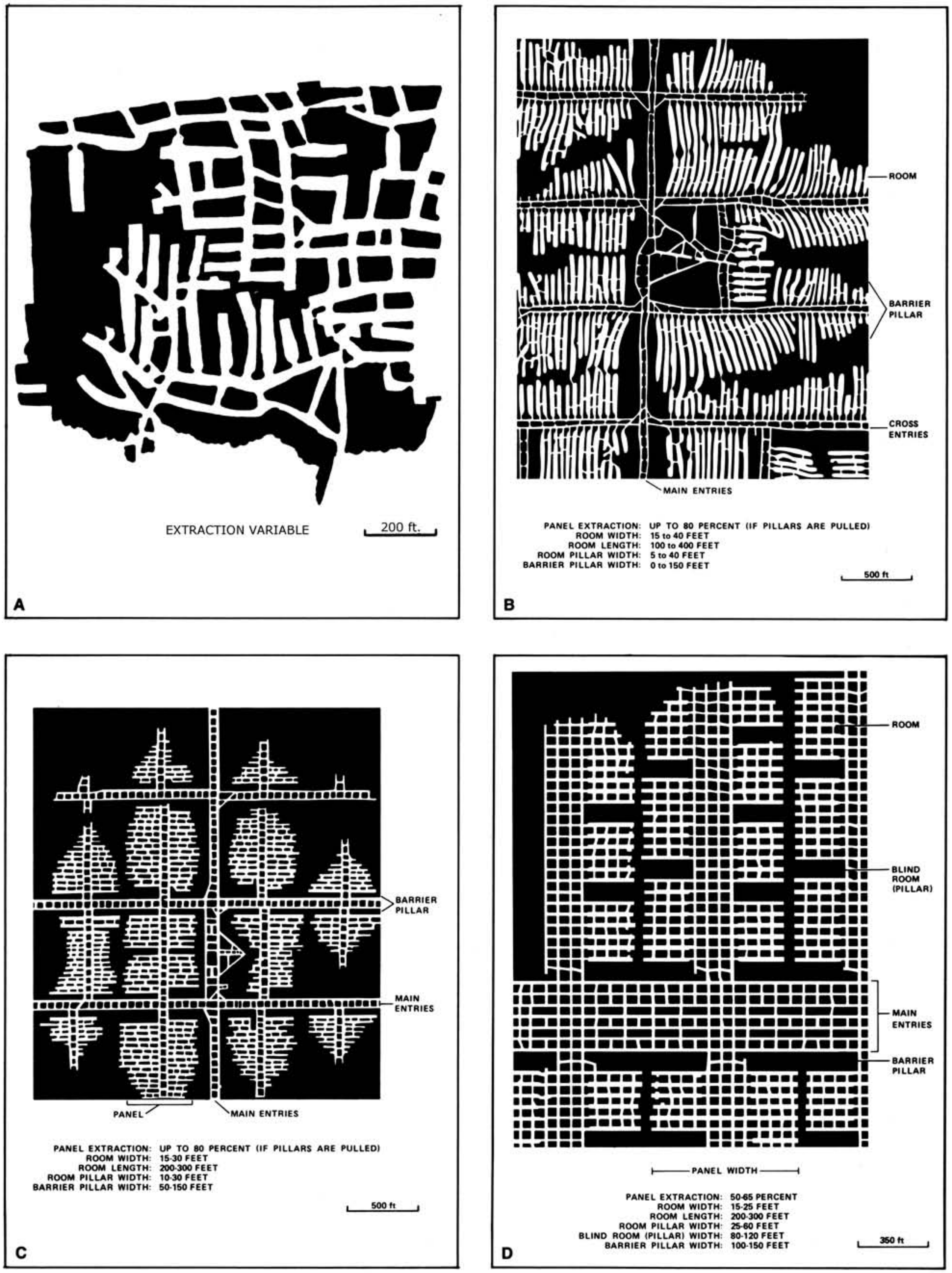


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

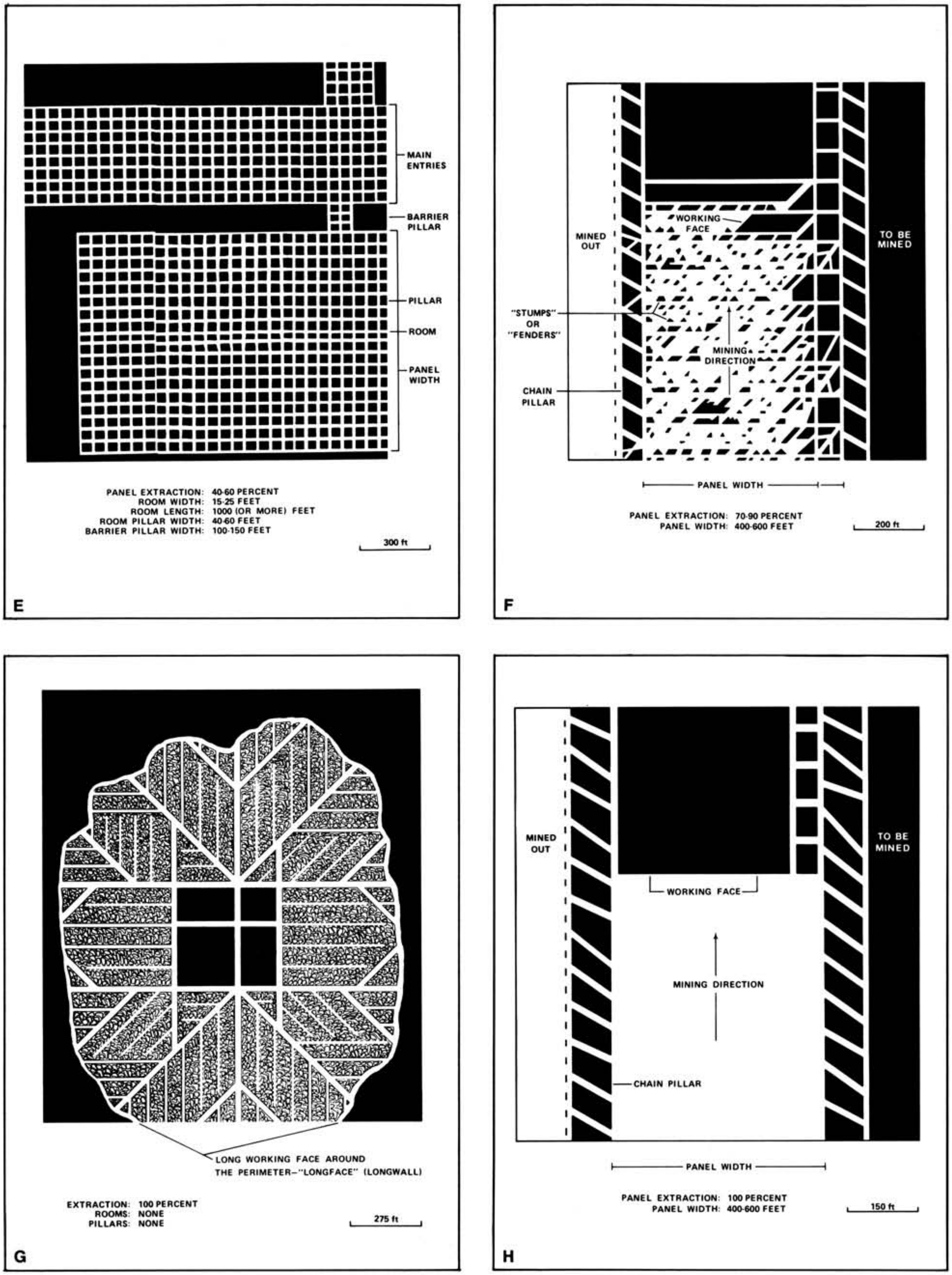


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

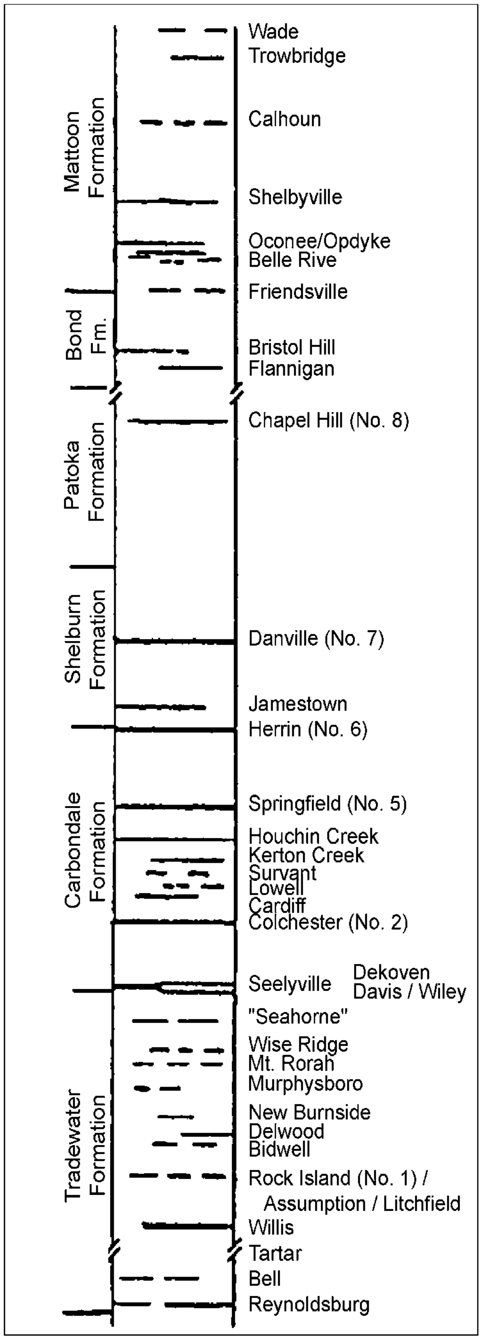


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

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 DIVERNON QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Divernon 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 67
Virden Mining Company, Virden Mine

Type: Underground Total mined-out acreage shown: 1,866 Production indicates approximately 6 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Macoupin	12N 6W	9	NE NW NE
Air shaft	Macoupin	12N 6W	9	NE NW NE
"New" air shaft	Macoupin	12N 6W	3	SE SW NE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Thickness (ft) Max	Thickness (ft) Ave	Mining Method
Herrin	320-330	4.0	8.0	6.0-7.0	RPP

Geologic Problems Reported: Top coal (15 to 18 inches) was left to support the roof because of the clod between the coal and the limestone caprock. The northern part of the mine had a sandstone roof, which resulted in some wet areas. Rolls were present on the western side of the mine, which curtailed development in that direction. Pyrite bands and lenses were present throughout the seam and the mine. The floor heaved in some areas.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Chicago-Virden Coal Company	Chicago-Virden No. 1	1892-1904	2,796,067
Illinois Collieries Company	Illinois Collieries No. 1	1904-1909 *	1,141,110
Glenridge Coal Company	Glenridge No. 1	1909-1913	664,732
Montour Coal Company	Montour No. 402	1913-1918 **	646,361
Pittsburg Coal Company	Pitsburg No. 402	1918-1920	384,787
Illinois Coal & Coke Corporation	Illinois Coal & Coke No. 3	1920-1923	861,467
Illinois Coal Corporation	Empire No. 3	1923-1932 ***	569,768
Virden Coal Company	Virden	1932-1937	309,008
Lincoln Liquidating Company	Lincoln Liquidating	1937-1939	129,606
Virden Mining Company	Virden	1939-1959	2,879,381
Virden Mining Company	Virden	1959-1959	28,833 †
			10,411,120

* Idle 1909
** Idle 1916
*** Idle 1926-1931
† Production after map date
Last reported production: July 1960

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352558	4-1959	1:2400	1:4966	Not final
Microfilm, document 352541	2-28-1938	1:2400	1:4138	Not final
Microfilm, document 352556	7-1-1923	1:2400	1:4303	Secondary source

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth.
Mine notes (Macoupin County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Microfilm map, document 352558, reel 03139, frames 307-314 - Shaft locations, mine outline, mining method.
Microfilm map, document 352541, reel 03139, frames 272-274 - Partial mine outline (west side).
Microfilm map, document 352556, reel 03139, frames 299-304, map of Royal Colliery Mine (mine index 185) - Partial mine outline (southwest part of mine).

Mine Index 74
Madison Coal Corporation, Madison No. 6 Mine

Type: Underground   Total mined-out acreage shown: 1,818

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (9x18)	Sangamon	13N 5W	21	SE NE SW
Air shaft (9x18)	Sangamon	13N 5W	21	SE NE SW

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	312-367	7.0	10.0	7.8-7.9	RPP

Geologic Problems Reported: The mine had a good roof composed of black shale. Some sandstone cut-outs were present in the mine. The coal contained lenses of pyrite. The fireclay floor heaved badly.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Madison Coal Corporation	Madison No. 6	1899-1925	10,957,132
			10,957,132

Last reported production: May 1925

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4103.S33 i5.1-55	5-4-1925	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 (Sangamon County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Sangamon County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Company map, ISGS map library, 4103.S33 i5.1-55, sheets 1-4 - Shaft locations, mine outline, mining method.

Mine Index 75
Peabody Coal Company, Peabody No. 54 Mine

Type: Underground   Total mined-out acreage shown: 1,116

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (8.5x14)	Sangamon	13N 6W	15	SE NE SW
Air shaft (8.5x15.8)	Sangamon	13N 6W	15	SE NE SW

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	301-308	4.5	11.0	7.0-7.5	RPP

Geologic Problems Reported: An overlying sandstone bed cut into the coal in some areas of the mine, but the roof over most of the mine was black shale. Top coal was left to support the roof. Small rolls and slips were also present in the coal. Pyrite balls were found in masses in the coal. The fireclay floor heaved in wet areas of the mine.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Black Diamond Coal Company *	Black Diamond	1904-1915	2,739,895
Springfield District Coal Mining Company	Springfield District No. 4	1915-1918	1,248,341
Springfield District Coal Mining Company	Springfield District No. 54	1918-1924 **	1,896,704
Peabody Coal Company	Peabody No. 54	1924-1926	498,624
			6,383,564

* Owned & operated by Robert Solomon & Sons
** Idle 1922

Last reported production: December 1926

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351223	9-1-1927	1:2400	1:4303	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Sangamon County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Sangamon County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Microfilm map, document 351223, reel 03139, frames 428-431 - Shaft locations, mine outline, mining method.

Mine Index 193
Panther Creek Mining Company, Panther Creek No. 1 Mine

Type: Underground Total mined-out acreage shown: 1,419

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Sangamon	14N 6W	35	NE NW NE
Air shaft	Sangamon	14N 6W	35	SE NW NE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	258-270	4.0	10.0	7.0	RPP

Geologic Problems Reported: One fault was noted, with a displacement of 18 inches. The roof was a black fissile shale under a light gray massive shale. These shales ranged up to 6 feet thick, and made a very bad roof. The coal was deposited on an undulating surface. The thickest coal was in the swags. Pyrite bands and lenses existed in the coal, as well as abundant calcite facings. The blue band was present in this mine as a dark gray shale, generally 2 feet above the floor.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Panther Creek Mining Company	Panther Creek No. 1	1918-1944	7,428,309 *
			7,428,309

* Idle 1933-1942

Last reported production: July 1944

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351240	3-31-1945	1:2400	1:4966	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Sangamon County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Sangamon County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Microfilm map, document 351240, reel 03134, frames 481-484 - Shaft locations, mine outline, mining method.

Mine Index 314
Chicago, Wilmington & Franklin Coal Company, Chicago, Wilmington & Franklin No. 1 Mine

Type: Underground Total mined-out acreage shown: 1,835

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (13.3 x 8.5)	Sangamon	13N 6W	34	NW SW NW
Air shaft (10.7 x 10.7)	Sangamon	13N 6W	34	SW NW NW

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	292-300			7.5-7.8	RPP

Geologic Problems Reported: Top coal (15 inches) was left to support the roof where the black shale was thick. The top coal was reported to have been drawn when abandoning the room. In other places, where the shale was thinner, only 4 to 8 inches of top coal was left, and this top coal was not always recovered. Numerous horizontal pyrite bands were present in the coal, but few pyrite balls were observed. The blue band was about 30 inches above the floor, and consisted of a hard, pyrite-rich clay. The fireclay floor did not heave.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Chicago, Wilmington & Vermilion Coal Co.	C., W. & V. No. 1	1900-1914	5,214,370
Chicago, Wilmington & Franklin Coal Co.	C., W. & F. No. 1	1914-1924	4,668,235
			9,882,605

Last reported production: March 1924

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351226	3-31-1924	1:2400	1:5627	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Sangamon County) - Mine names, mine index, ownership, years of operation, seam.
ENR Document 85/01 - Mining method.
Mine notes (Sangamon County) - Mine type, seam, depth, thickness, geologic problems.
Microfilm map, document 351226, reel 03134, frames 437-442 - Shaft locations, mine outline, mining method.

Mine Index 441
Union Fuel Coal Company, Union Fuel No. 3 Mine

Type: Underground Total mined-out acreage shown: 521 Production indicates approximately 28 acres were mined after the map date. Portions of the eastern part of the mine have an added general area of mining on the accompanying map to indicate where mining may have taken place after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Sangamon	13N 6W	10	NW NE NE
Air shaft	Sangamon	13N 6W	10	NW NE NE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	263-285			6.75	MRP

Geologic Problems Reported: The roof varied in the mine, consisting of sandstone in some areas, with shale in others. The black shale roof ranged from 5 inches to 8 feet, and often had an overlying limestone up to 5 feet thick. Some top coal (10 inches or more) was left to protect the black shale roof, which did not stay up if it was exposed to air. The coal contained shale and pyrite in streaks and bands. The fireclay floor was 3 to 8 feet thick.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Dawson, Poley & Company	Auburn	1881-1883 *	15,392
Auburn Coal & Tile Company	Auburn	1883-1887	47,510
Dennis Noonan	Auburn	1887-1888	11,933
Auburn Cooperative Coal Company	Auburn	1888-1890	21,985
Auburn Coal Company	Auburn	1890-1899	192,579
Chicago-Auburn Coal Company	Chicago-Auburn	1899-1900	18,224
Auburn & Alton Coal Company	Auburn & Alton	1900-1919	1,921,456
Union Fuel Company	Union Fuel No. 3	1919-1922	466,877
Union Fuel Company	Union Fuel No. 3	1922-1924	143,759 **
			2,839,715

* Idle 1883
** Production after map date

Last reported production: February 1924

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 4103.S33 i5.1-1, sheets 1-4	4-1-1922	1:2400	1:4950	Not final
WPA, T13N-R6W	1-25-1924	1:52800	1:52800	Secondary source

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Sangamon County) - Mine names, mine index, ownership, years of operation, seam.
Mine notes (Sangamon County) - Mine type, seam, depth, thickness, geologic problems.
ISGS field notes (Sangamon County) - Depth.
Company map, ISGS map library 4103.S33 i5.1-1, sheets 1-4 - Shaft locations, mine outline, mining method.
WPA map, T13N R6W - General area of mining (northern and eastern parts of the mine).

Mine Index 933
Freeman United Coal Mining Company, Crown II Mine

Type: Underground   Total mined-out acreage shown: 8,244

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Shaft	Macoupin	12N 6W	23	NW NE NW
Slope	Macoupin	12N 6W	23	SE NE NW
Air shaft	Macoupin	12N 5W	8	NW NE SE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	330			6.0-6.67	RPP

Geologic Problems Reported: This mine had a variety of problems. There were numerous slickensides, clay dikes, faults and channels throughout the mine. These features, along with a shale roof that lacked competency and allowed for water seepage, created roof problems. Roof falls were reported.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Freeman United Coal Mining Company	Crown II	1974-2007	41,644,282 *
			41,644,282

Last reported production: August 2007

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, Coal Section digital files	12-18-2007	1:12000	1:12000	Final
Company, Coal Section files, 6-246	1-1-1977	1:4800	1:4800	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Macoupin County) - Mine type, shaft location, seam, mining method, geologic problems.
Company map, Coal Section digital files - Air shaft location, mine outline, mining method.
Company map, Coal Section files, 6-246 - Slope and shaft locations.

Mine Index 3336
Illinois Coal & Coke Corporation, Empire No. 2 Mine

Type: Underground Total mined-out acreage shown: 525

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Sangamon	13N 6W	2	NW NE NW
Air shaft	Sangamon	13N 6W	2	SW NE NW

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Avg	Mining Method
Herrin	280			8.0	MRP

Geologic Problems Reported:

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Sugar Creek Coal Mining Company	Sugar Creek	1893-1895	48,868
Chicago-Virden Coal Company	Chicago-Virden No. 2	1895-1904	1,725,146
Illinois Collieries Company	Illinois No. 2	1904-1910 *	586,539
Lefton Coal Company	Lefton	1910-1913	271,901
Montour Coal Company	Montour	1913-1920 **	65,185
Illinois Coal & Coke Company	Empire No. 2	1920-1923	72,772
			2,770,411

* Idle 1909 & 1910
** Idle or abandoned 1914-1920

Last reported production: 1923

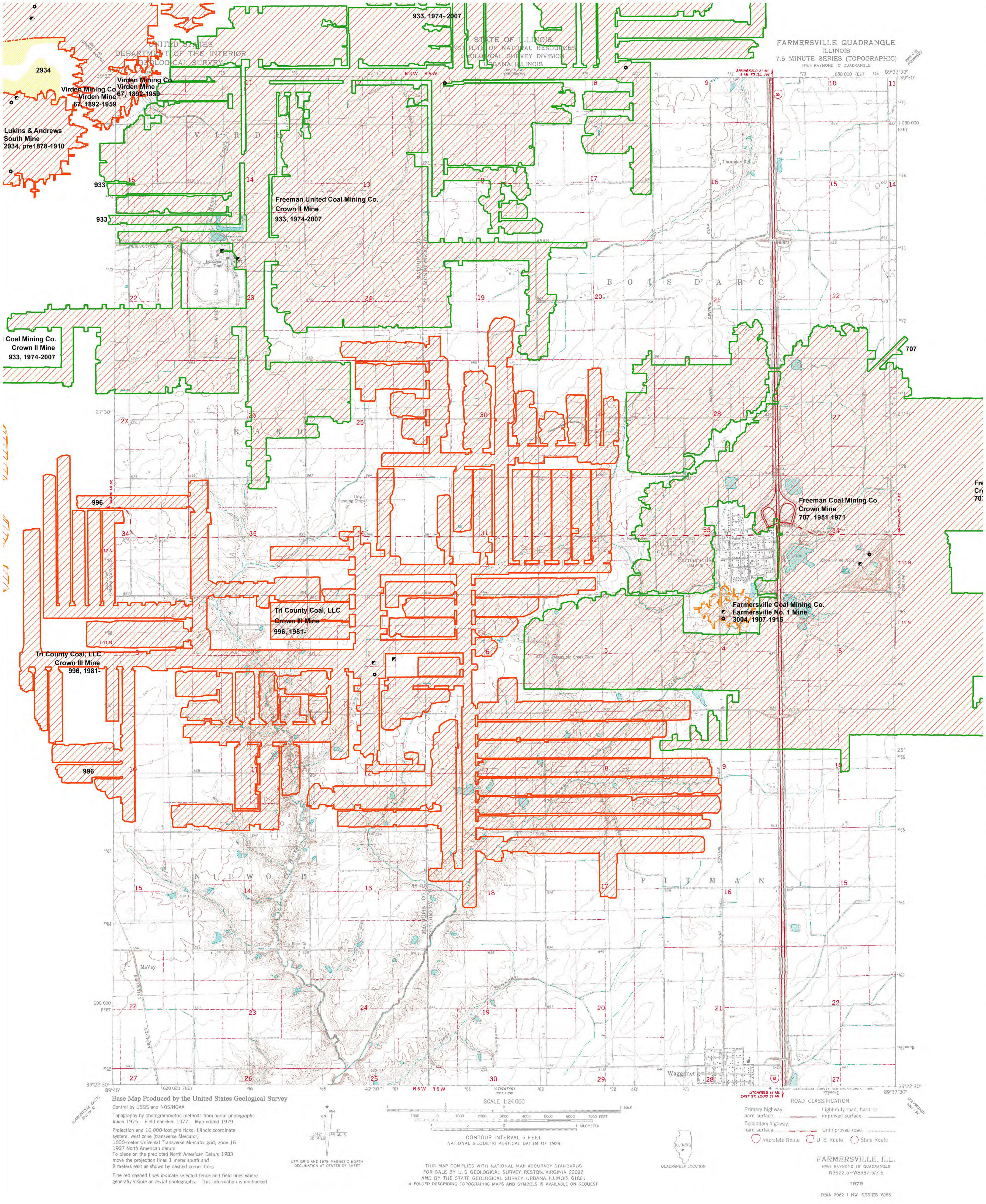
SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 351247	4-1914	1:2400	1:4800	Not final
WPA, T13N R6W & T14N R6W	2-19-1926	1:52800	1:52800	Secondary source

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Sangamon County) - Mine names, mine index, ownership, years of operation, seam.
ENR Document 85/01 - Mining method.
Mine notes (Sangamon County) - Mine type, shaft location, seam, depth, thickness.
Microfilm map, document 351247, reel 03134, frame 497 - Shaft locations, mine outline, mining method.
WPA map, T13N R6W & T14N R6W - Partial outline of southwest part of mine.

INDEX OF MINES IN THE DIVERNON QUADRANGLE



Coal Mines in Illinois
Farmersville Quadrangle

Montgomery & Macoupin Counties, Illinois

This map accompanies the Coal Mines Directory for the Farmersville 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

Other Areas Depicted

- Non-Coal Mines

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

Other Points Depicted

- Non-Coal Mines

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 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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Champaign, IL 61820

Mine Outlines Compiled by
Jennifer M. Obrad

2010; revised 2012; updated 2016

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
FARMERSVILLE QUADRANGLE
MONTGOMERY & MACOUPIN COUNTIES

Jennifer M. Obrad & C. Chenoweth

2010

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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.

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 FARMERSVILLE QUADRANGLE

A great deal of mining by the Freeman Coal Company (later Freeman United Coal Mining Company) took place in the Farmersville Quadrangle. The Herrin Coal was thicker here than in the Virden South Quadrangle to the west. The Freeman mines, Crown No. 1 (mine index 707), Crown II Mine (mine index 933), and Crown III Mine (mine index 996) operated after 1974, and were more prepared to deal with the issues that occur in thick coal in deep mines.

The Farmersville No. 1 Mine (mine index 3004) had thick coal, and was located near town. It is likely that the short operating span (only 8 years, from 1907 to 1915) was due to the lack of railroad connections and an inability to expand their market, with larger mines in Belleville, Collinsville and Mt. Olive to the south and well-established mines in the vicinity of Springfield to the north.

Some fractures and faulting were noted in the Herrin Coal, with displacement of up to 2 feet. A sandstone channel was present in Crown No. 1 Mine (mine index 707) and between Crown No. 1 Mine and Crown III Mine (mine index 996).

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.

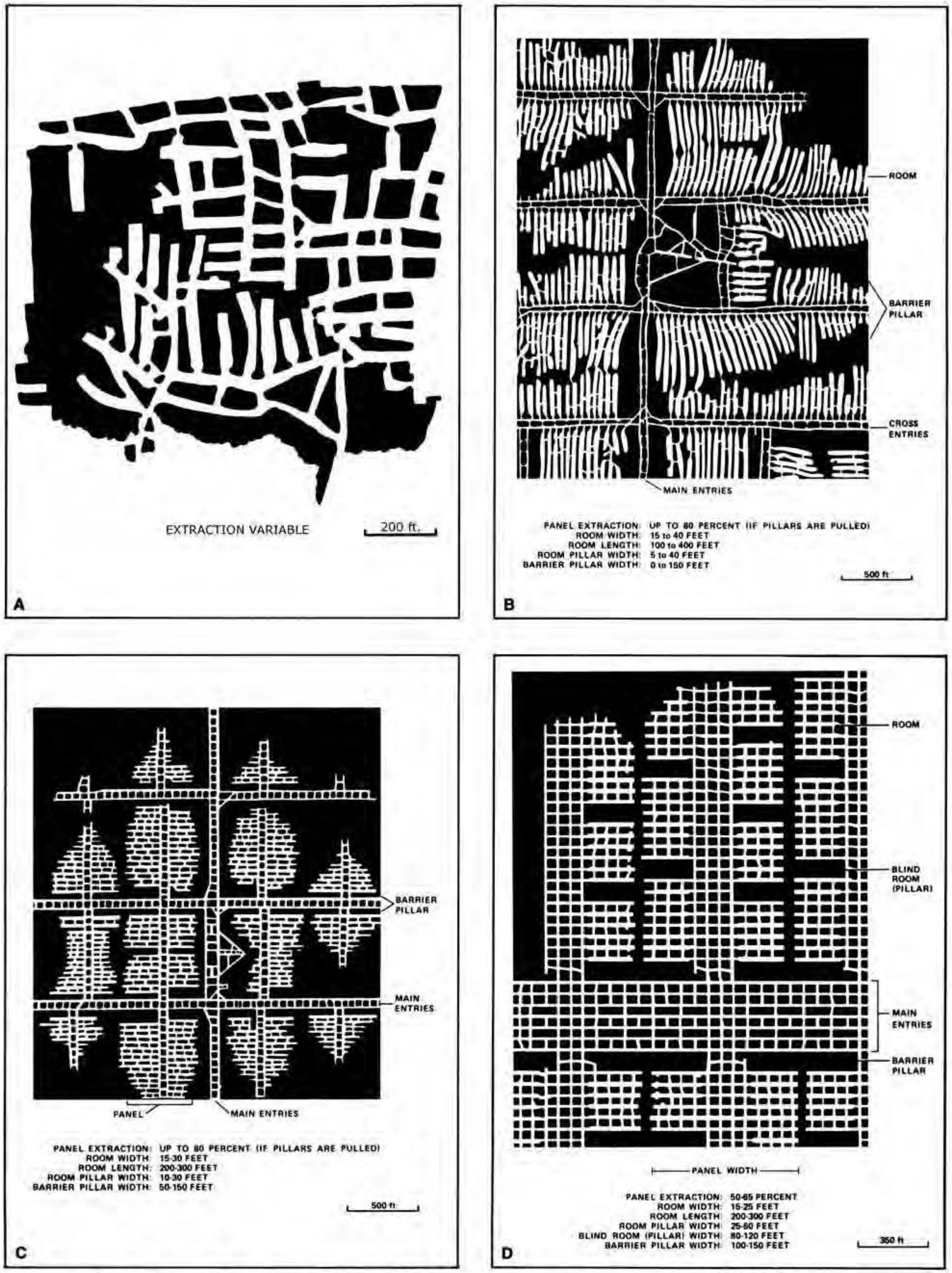


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

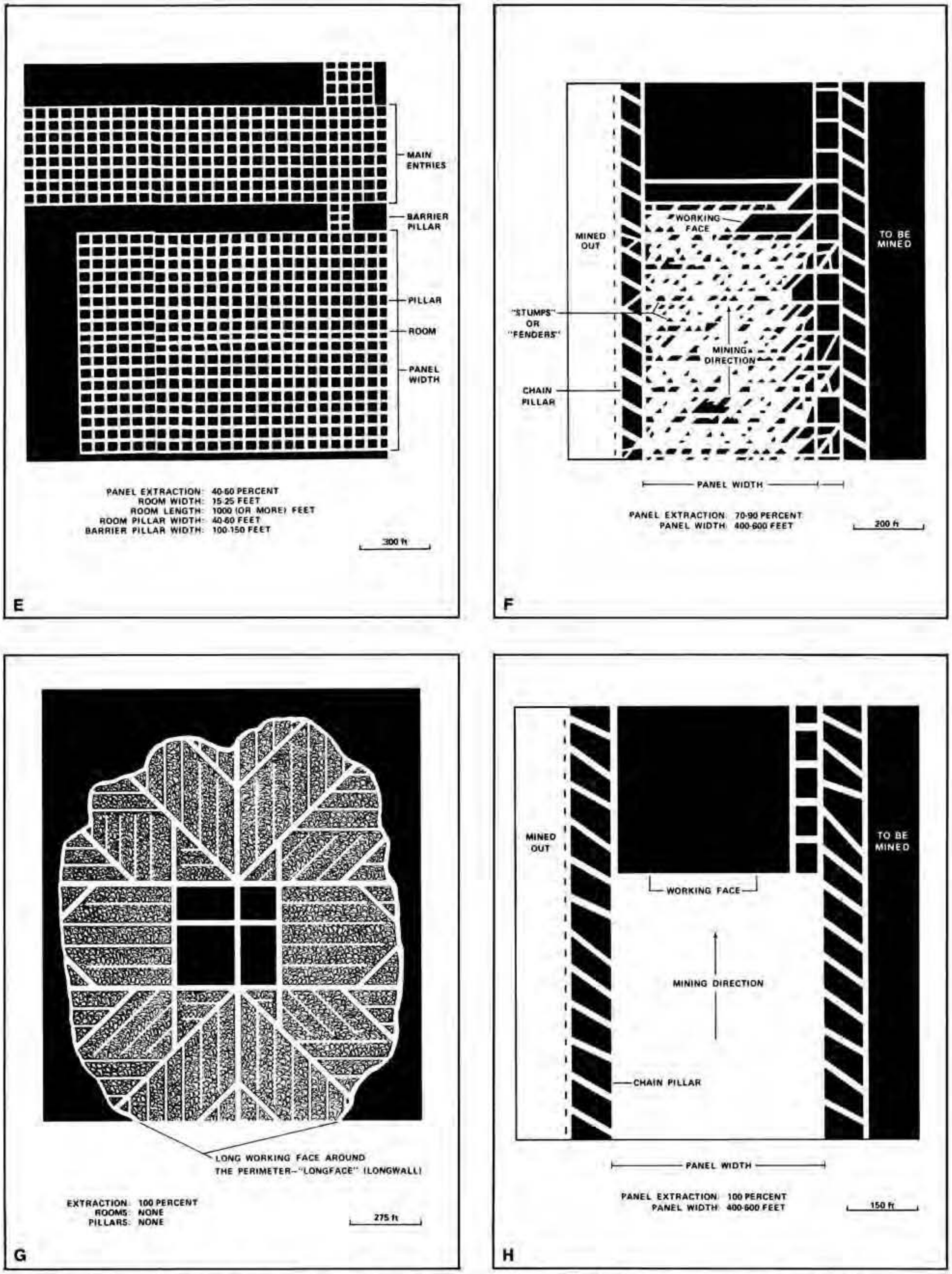


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

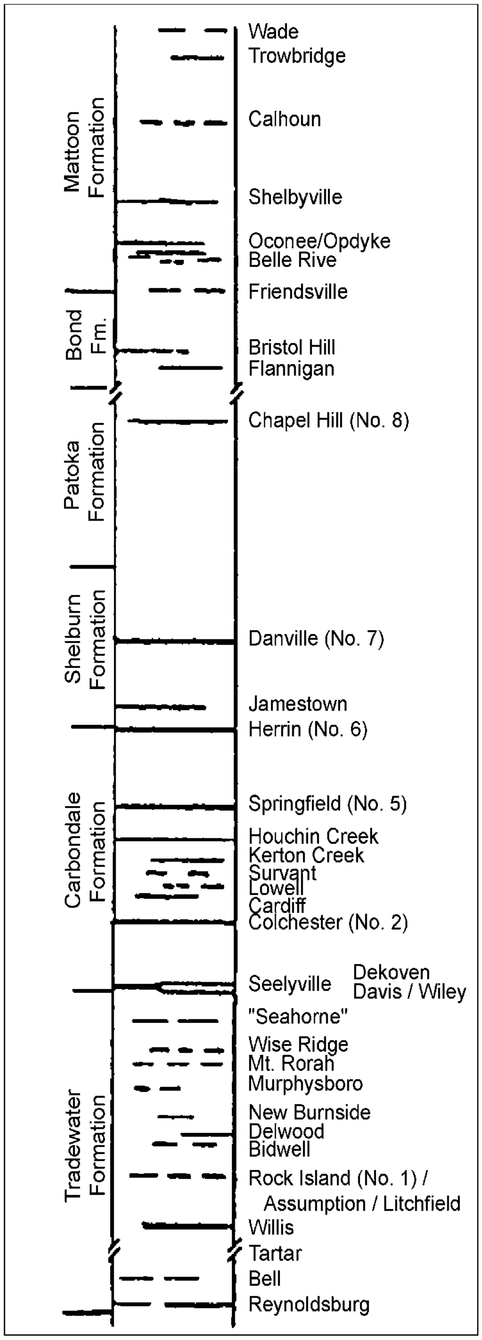


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

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 FARMERSVILLE QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Farmersville 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 67
Virden Mining Company, Virden Mine

Type: Underground   Total mined-out acreage shown: 1,866 Production indicates approximately 6 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Macoupin	12N 6W	9	NE NW NE
Air shaft	Macoupin	12N 6W	9	NE NW NE
"New" air shaft	Macoupin	12N 6W	3	SE SW NE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	320-330	4.0	8.0	6.0-7.0	RPP

Geologic Problems Reported: Top coal (15 to 18 inches) was left to support the roof because of the clod between the coal and the limestone caprock. The northern part of the mine had a sandstone roof, which resulted in some wet areas. Rolls were present on the western side of the mine, which curtailed development in that direction. Pyrite bands and lenses were present throughout the seam and the mine. The floor heaved in some areas.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Chicago-Virden Coal Company	Chicago-Virden No. 1	1892-1904	2,796,067
Illinois Collieries Company	Illinois Collieries No. 1	1904-1909 *	1,141,110
Glenridge Coal Company	Glenridge No. 1	1909-1913	664,732
Montour Coal Company	Montour No. 402	1913-1918 **	646,361
Pittsburg Coal Company	Pitsburg No. 402	1918-1920	384,787
Illinois Coal & Coke Corporation	Illinois Coal & Coke No. 3	1920-1923	861,467
Illinois Coal Corporation	Empire No. 3	1923-1932 ***	569,768
Virden Coal Company	Virden	1932-1937	309,008
Lincoln Liquidating Company	Lincoln Liquidating	1937-1939	129,606
Virden Mining Company	Virden	1939-1959	2,879,381
Virden Mining Company	Virden	1959-1959	28,833 †
			10,411,120

* Idle 1909
** Idle 1916
*** Idle 1926-1931
† Production after map date
Last reported production: July 1960

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352558	4-1959	1:2400	1:4966	Not final
Microfilm, document 352541	2-28-1938	1:2400	1:4138	Not final
Microfilm, document 352556	7-1-1923	1:2400	1:4303	Secondary source

Annotated Bibliography (data source, brief description of information)
Coal Reports - Production, ownership, years of operation, depth.
Mine notes (Macoupin County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Microfilm map, document 352558, reel 03139, frames 307-314 - Shaft locations, mine outline, mining method.
Microfilm map, document 352541, reel 03139, frames 272-274 - Partial mine outline (west side).
Microfilm map, document 352556, reel 03139, frames 299-304, map of Royal Colliery Mine (mine index 185) - Partial mine outline (southwest part of mine).

Mine Index 707
Freeman Coal Mining Corporation, Crown Mine

Type: Underground   Total mined-out acreage shown: 7,266

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Montgomery	12N 5W	34	NE SW SE
Air shaft	Montgomery	12N 5W	34	SW NE SE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	354			7.0	RPP

Geologic Problems Reported: All areas except the southeast portion of the mine were affected by fractures. The fractures trended northwest-southeast, and displacement ranged from a few inches to about 2 feet. These fractures were interpreted as faulting rather than compactional slips. Coal was eroded in the area of a sandstone channel in the western part of the mine. The channel halted expansion northward in westernmost part of the mine, but in the northern part of the mine, an entry was driven through the channel. In the southern part, the Crown III Mine (mine index 996) worked eastward to the channel.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Freeman Coal Mining Company	Crown	1951-1971	36,419,077
			36,419,077

Last reported production: November 1971

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 6-398	11-24-1971	1:12000	1:12000	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, seam, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Montgomery County) - Mine type, geologic problems.
Company map, Coal Section files, 6-398 - Shaft locations, mine outline, mining method, geologic problems.

Mine Index 933
Freeman United Coal Mining Company, Crown II Mine

Type: Underground   Total mined-out acreage shown: 8,244

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Shaft	Macoupin	12N 6W	23	NW NE NW
Slope	Macoupin	12N 6W	23	SE NE NW
Air shaft	Macoupin	12N 5W	8	NW NE SE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	330			6.0-6.67	RPP

Geologic Problems Reported: This mine had a variety of problems. There were numerous slickensides, clay dikes, faults and channels throughout the mine. These features, along with a shale roof that lacked competency and allowed for water seepage, created roof problems. Roof falls were reported.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Freeman United Coal Mining Company	Crown II	1974-2007	41,644,282
			41,644,282

Last reported production: August 2007

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, Coal Section digital files	12-18-2007	1:12000	1:12000	Final
Company, Coal Section files, 6-246	1-1-1977	1:4800	1:4800	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Macoupin County) - Mine type, shaft location, seam, mining method, geologic problems.
Company map, Coal Section digital files - Air shaft location, mine outline, mining method.
Company map, Coal Section files, 6-246 - Slope and shaft locations.

Mine Index 996
Springfield Coal Company, LLC, Crown III Mine

Type: Underground Total mined-out acreage shown: 6,770

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Slope	Macoupin	11N 6W	1	NW NE SE
Man / material shaft	Macoupin	11N 6W	1	NW NW SE
Air shaft	Macoupin	11N 6W	1	SW NW SE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	366			6.0-7.5	RPP

Geologic Problems Reported: Geologic problems are not reported for active mines.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Freeman United Coal Mining Company	Crown III	1981-2007 *, **	29,367,673
Springfield Coal Company, LLC	Crown III	2007-2008 **	1,407,552
Tri County Coal, LLC	Crown III	2009-2013	5,330,670
			36,105,895

* Mining began in 1978, but no production was reported until 1981. Idle May 1982 to January 1985, and 1988 through 1990.
** The mine was closed August 30, 2007 and re-opened September 4, 2008 under new ownership. However, the 2007 Coal Report listed all 2007 production under the old ownership.

Last reported production: 2013

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company	1-1-2010	1:12000	1:12000	Not final
Company, 1-42-21	1-1-1983	1:4800	1:4800	Not final
Company	1-1-2012	1:12000	1:12000	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
Mine notes (Macoupin County) - Mine type, shaft location, seam, depth, thickness.
Company map, Coal Section files (digital file) - Mine outline, mining method.
Company map, Coal Section files, 1-42-21 - Slope & shaft locations.
Company map, Coal section files - Mine outline, mining method.

Mine Index 3004
Farmersville Coal Mining Company, Farmersville No. 1 Mine

Type: Underground   Total mined-out acreage shown: 58

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Montgomery	11N 5W	4	SW NW NE
Air shaft	Montgomery	11N 5W	4	SW NW NE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Thickness (ft) Max	Thickness (ft) Ave	Mining Method
Herrin	360-375			7.5-9.5	RPP

Geologic Problems Reported:

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Farmersville Coal Mining Company	Farmersville No. 1	1907-1915	372,781
			372,781

Last reported production: January 1915

SOURCES OF DATA

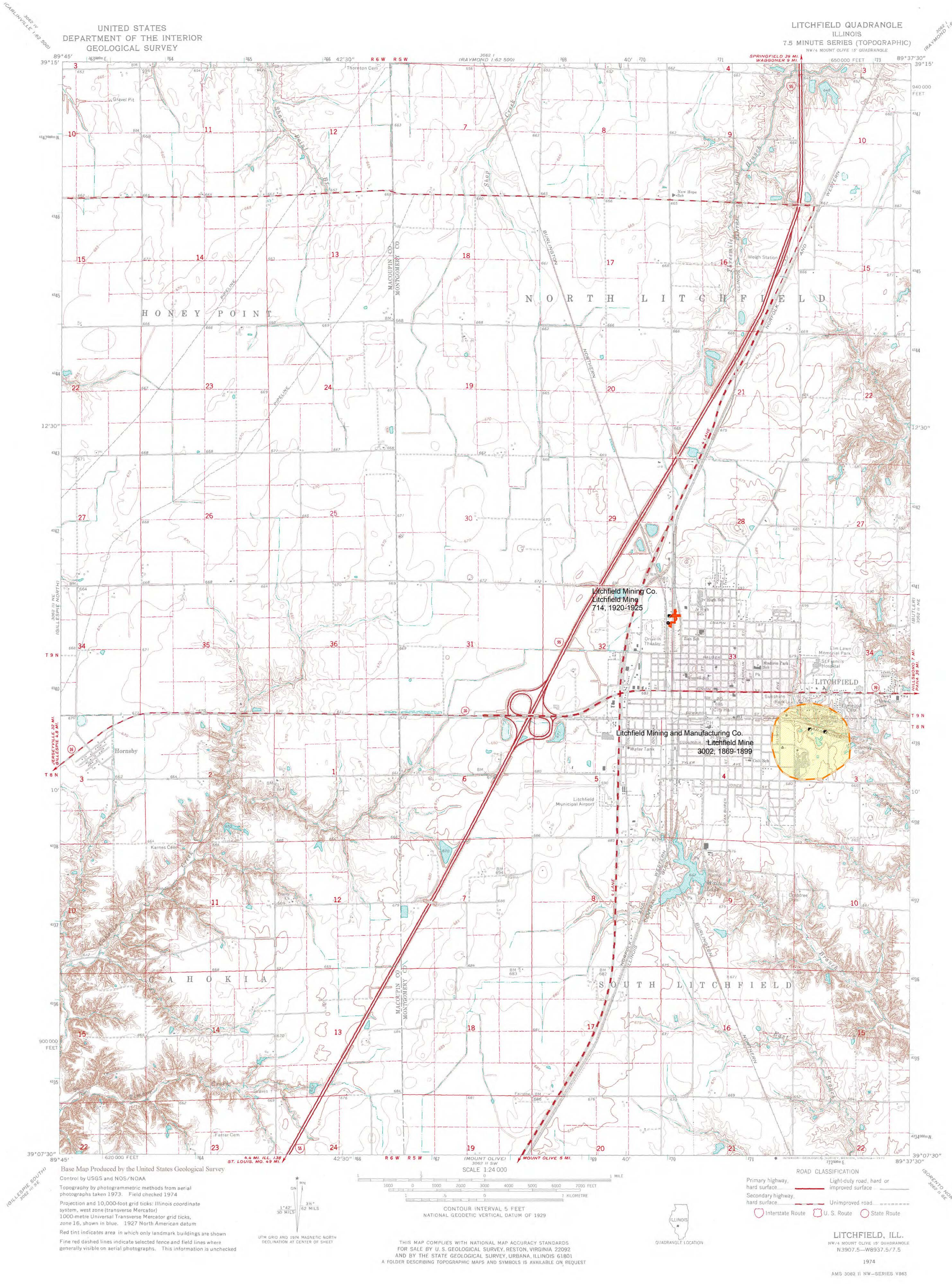
Source Map	Date	Original Scale	Digitized Scale	Map Type
Coal Section files, 6-398	11-24-1971 *	1:12000	1:12000	Secondary source

* The survey date for the Farmersville No. 1 Mine was shown as 8-23-1915, which would be a final map.

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Mine type, shaft location, seam, thickness.
Coal Section files, 6-398, map of Crown No. 1 Mine (mine index 707) - Shaft locations, mine outline, mining method.
Company map, microfilm, document 352582, reel 03139, frame 382 - Shaft type.

INDEX OF MINES IN THE FARMERSVILLE QUADRANGLE



Coal Mines in Illinois
Litchfield Quadrangle

Montgomery & Macoupin Counties, Illinois

Survant Coal

This map accompanies the Coal Mines Directory for the Litchfield Quadrangle and map of mines in the Litchfield Coal, Litchfield 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

Other Areas Depicted

- Non-Coal Mines

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

Other Points Depicted

Non-Coal Mines

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.

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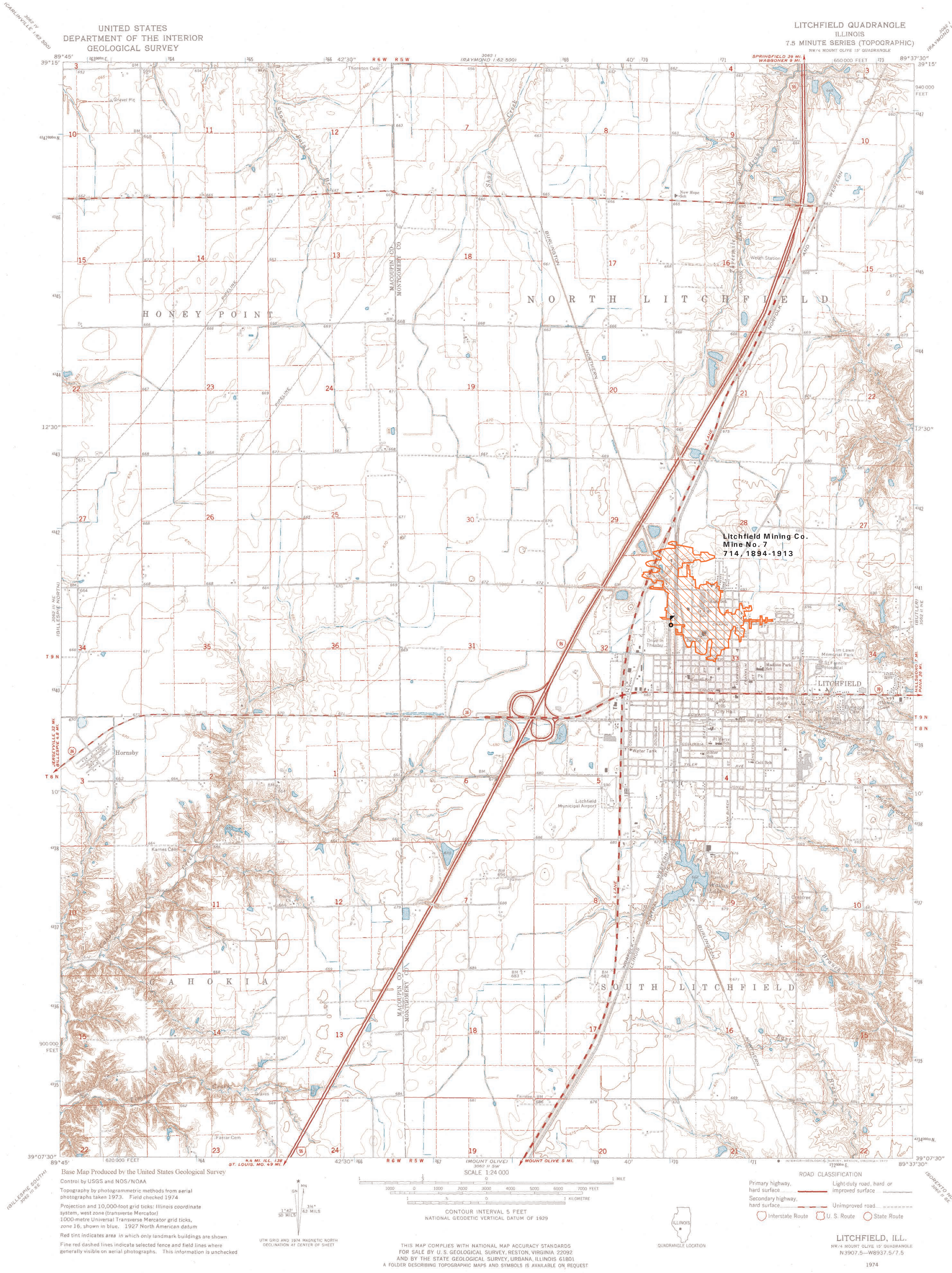
Mine Outlines Compiled by
Melisa L. Borino

2002, Revised 2004 & 2022



COAL MINES IN ILLINOIS
LITCHFIELD QUADRANGLE
MONTGOMERY & MACOUPIN COUNTIES, ILLINOIS
LITCHFIELD COAL

This map accompanies the Coal Mines Directory for the Litchfield Quadrangle and maps of mines in the Lowell Coal, Litchfield 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 mine, method unknown
- General area of mining
- Surface mine

SOURCE OF MINE OUTLINES

- Final mine map
- Not a final map
- Undated map
- Incomplete map
- Secondary source map

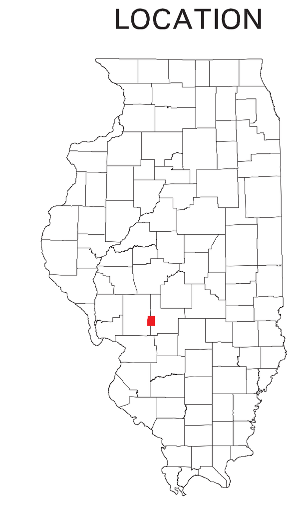
TIPPLE, SHAFT, SLOPE, DRIFT LOCATIONS

- Strip mine tipple; active - abandoned
- Mine shaft; active - abandoned
- Mine slope; active - abandoned
- Mine drift; active - abandoned
- Air shaft
- Uncertain location
- Uncertain type of opening

MINE ANNOTATION
(space permitting)

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 or 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. Litchfield quadrangle used as a basemap was projected from the original UTM to Lambert Conformable Conic.

Illinois State Geological Survey
Coal Section

Illinois State Geological Survey
615 E. Peabody Drive
Champaign, IL 61820

Mine outlines compiled by Melisa L. Borino

January 18, 2002
Revised June 14, 2004

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
LITCHFIELD QUADRANGLE
MONTGOMERY & MACOUPIN COUNTIES

Melisa L. Borino

Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
2002
REVISED 2004, 2022

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
LITCHFIELD QUADRANGLE
MONTGOMERY & MACOUPIN COUNTIES

2002
REVISED 2004

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Cover photo Track-mounted duckbill loading machine at a Peabody Coal Company mine, ca. 1915.

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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) 244-2420.

Printed by authority of the State of Illinois/2004

CONTENTS

INTRODUCTION

Coal has been mined in 73 counties of Illinois. More than 4,500 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.

The directory serves as a key to the accompanying mine map and provides basic information on the coal mines. 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.

MINING IN THE LITCHFIELD QUADRANGLE

The area around Litchfield presents challenges for anyone wishing to mine coal. The Walshville channel, contemporaneous with Herrin Coal deposition, renders most of the southeastern third of the quadrangle lacking in the Herrin Coal. The remainder of the quadrangle has Herrin Coal, which is split and has unfavorable roof conditions. The Springfield Coal is less than 28 inches thick over the entire quadrangle. Therefore, mining in the Litchfield Quadrangle had to take advantage of seams that are less known in character and extent, the Survant (formerly Lowell) and Litchfield Coals. Because these coals are deeper than the other coals of the region, they are more expensive to mine. The Survant Coal was 500 to 540 feet deep and the Litchfield Coal was over 650 feet deep. Both varied in thickness, the Survant generally between 3.5 to 4.5 feet thick, and the Litchfield ranging up to 6 feet thick. However, neither coal had the large extent of thick coals that the Staunton-to-Carlinville area of Macoupin County encountered.

In spite of these conditions, both mines in the Litchfield Quadrangle operated for over 15 years. The mine under the northwest part of the town, mine index 714, operated in both seams. Mining began in the Survant Coal, but rolls with thin coal, a sandstone parting, and boney coal near the bottom of the seam caused difficulties with profitable mining. The shaft was deepened and the Litchfield Coal was mined. Difficulties soon arose with the lower seam as well. The coal was eroded to the west, and thinned to the east and north. In addition, the coal dipped to the east to an adverse grade for mining. When this mine re-opened in 1920, another attempt was made to mine the Survant Coal, but the mine closed after 5 years. The mine to the southeast of the town of Litchfield operated in the Survant Coal. Geologic problems encountered by this company are unknown.

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.

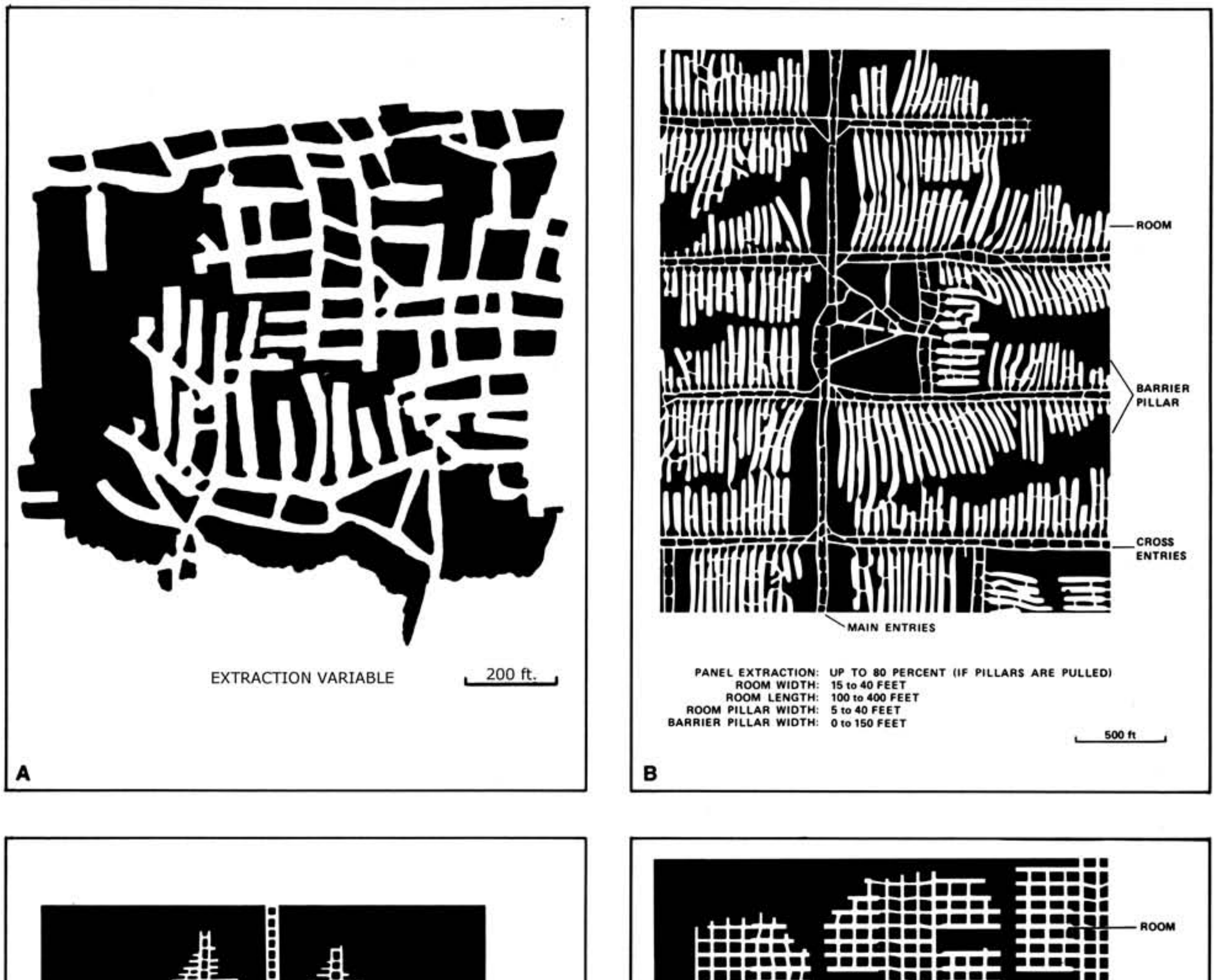


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

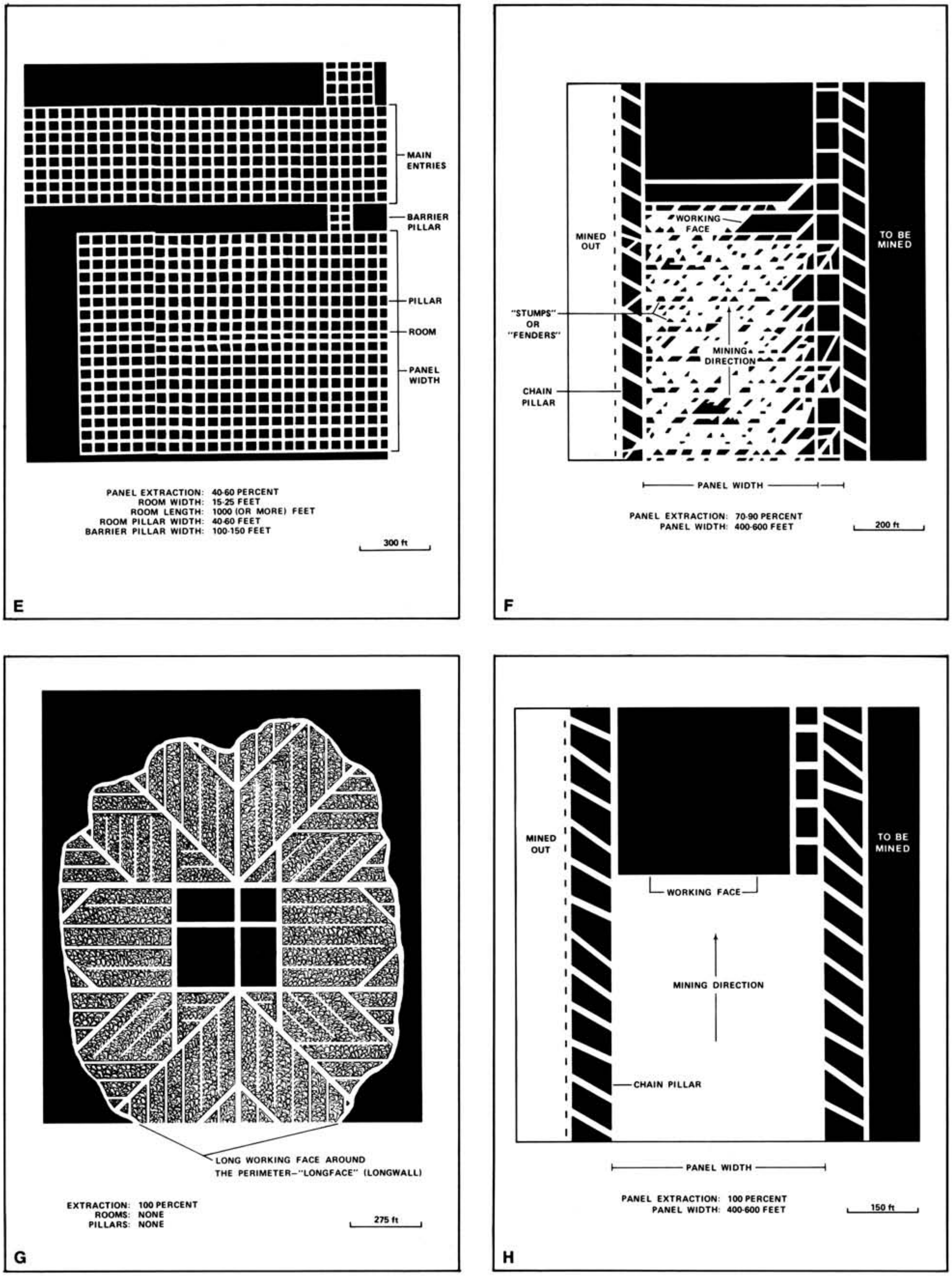


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

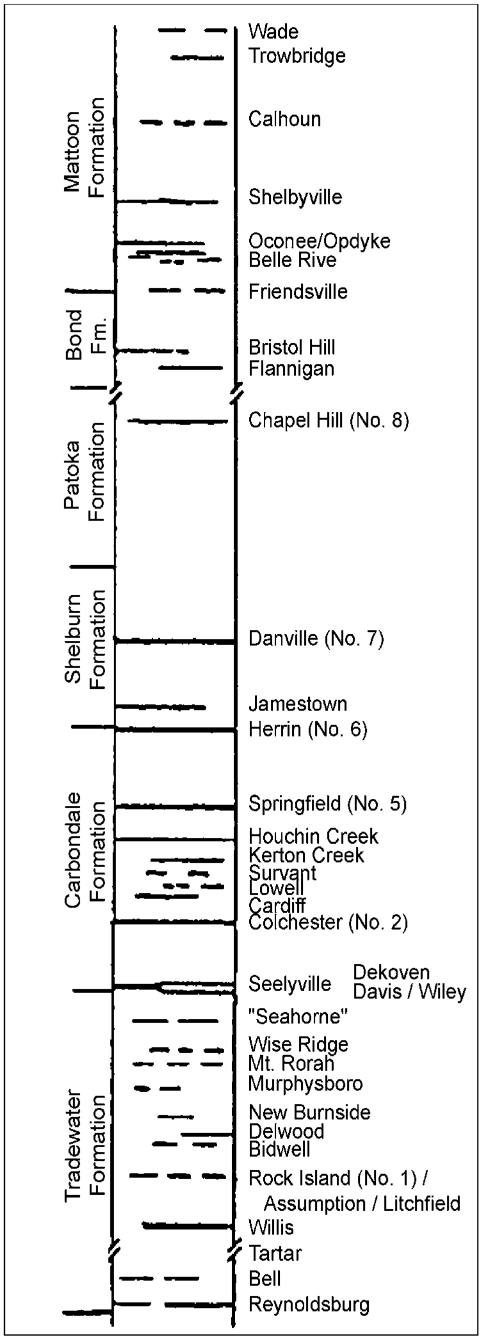


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

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, 185 p.

Nelson, W. J., 1987, The Hornsby District of Low-Sulfur Herrin Coal in Central Illinois (Christian, Macoupin, Montgomery, and Sangamon Counties): Illinois State Geological Survey, Circular 540, 40p.

Treworgy, C. G., C. P. Korose, C. A. Chenoweth, D. L. North, 1999, Availability of the Springfield Coal for Mining in Illinois: Illinois State Geological Survey, Illinois Minerals 118, 43 p.

Treworgy, C. G., C. P. Korose, C. A. Chenoweth, D. L. North, 2000, Availability of the Springfield Coal for Mining in Illinois, Map Sheet 2, Underground Mining: Illinois State Geological Survey Open File Series 2000-1 [map], 2 sheets, scale 1:500,000, plus inset maps.

Treworgy, C. G., C. P. Korose, C. L. Wiscombe, 2000, Availability of the Herrin Coal for Mining in Illinois: Illinois State Geological Survey, Illinois Minerals 120, 54 p.

Treworgy, C. G., C. P. Korose, C. L. Wiscombe, 2000, Availability of the Herrin Coal for Mining in Illinois, Map Sheet 3, Underground Mining: Illinois State Geological Survey Open File Series 2000-10 [map], 3 sheets, scale 1:500,000, plus inset maps.

PART II DIRECTORY OF MINES IN THE LITCHFIELD QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Litchfield Quadrangle is provided. The summary is arranged numerically by mine index number, which is shown on the map and in the mine listing. Consult Part I for a complete explanation of the data listed in the summary sheet.

Mine Index 714
Litchfield Mining Company, Litchfield Mine

Type: Underground Total mined-out acreage shown: 2, Lowell Coal; 212, Litchfield Coal. Production indicates that an additional 2 acres were mined in the Lowell Coal and an additional 40 acres were mined in the Litchfield Coal.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Montgomery	9N 5W	32	SE NE NE
Air/escape shaft (6'x10')	Montgomery	9N 5W	32	NE SE NE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Survant (formerly Lowell)	535	2.0	8.0	4.3-7.0	RPB
Litchfield	684-690			4.7-6.33	MRP

Geologic Problems Reported: The Survant Coal had a boney layer near the bottom of the seam and a sandstone parting in the middle of the seam. The coal was less than 24 inches thick near rolls. The Litchfield Coal contained erosional features near the shaft to the west, and gas was encountered. The coal thinned to the east as well and to the north. Mining proceeded to the south, where unmarketable bone coal was encountered.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Litchfield Mining & Power Company *	Litchfield	1894-1904	589,118
Illinois Collieries Company	Illinois Collieries No. 7	1904-1908	273,787
Litchfield Coal Company	Litchfield No. 7	1908-1909	21,082
Litchfield Coal Company	Litchfield No. 7	1909-1913	159,814 **
Litchfield Mining Company	Litchfield	1920-1923 ***	15,056
Litchfield Mining Company	Litchfield	1923-1925	16,394 **
			1,075,251

* Sunk by Carbon Coal & Manufacturing Company. Originally operated in a thick upper seam, but in the first year, this seam did not prove satisfactory and the shaft was deepened to the lower seam (Litchfield) and the upper seam (Lowell) was abandoned. Production cannot be split among the seams as only total production was reported.
** Production after map date (159,814 tons in Litchfield Coal; 16,394 tons in Lowell Coal)
*** Abandoned 1913-1919; idle 1922
Last reported production: 1925

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352585	5-1909	1:4800	1:5628	Not final
Company, 4103.M62 i5.1-3	3-12-1923	1:1200	1:1200	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, mine type, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Shaft location, seam, depth, thickness, geologic problems.
Microfilm map, document 352585, reel 03139, frame 394 - Shaft locations, mine outline (Lowell Coal), mining method.
Company map, ISGS map library, 4103.M62 i5.1-3 - Shaft location, mine outline (Litchfield Coal), mining method.

Mine Index 3002
Litchfield Mining & Manufacturing Company, Litchfield Mine

Type: Underground Total mined-out acreage shown: 191 The known production of this mine indicates about 65 acres were mined; production prior to 1881 is unknown.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Shaft *	Montgomery	8N 5W	3	NW NW NW
Shaft *	Montgomery	8N 5W	3	NE NW NW

* The mine notes indicate the third shaft was in operation in 1897. This later shaft is probably one of those shown; the location of one of the earlier shafts is unknown.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Survant (formerly Lowell)	500-520			3.5-4.0	LW **

** Some HER was performed 1883-1885, preparatory to abandoning the mine. By changing to longwall mining method under Richardson, the mine stayed open. The older part of the mine was RP.

Geologic Problems Reported:

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
[Litchfield Coal Company] ***	Litchfield	1869-1882	unknown
Litchfield Coal Company †	Litchfield	1882-1894	168,959.3
Litchfield Mining & Manufacturing Company	Litchfield	1894-1899	48,062
			217,021.3

*** According to *The History of Montgomery County*, this shaft was sunk in late 1869 and the second shaft was sunk in 1878. The mine notes indicate that Amalgamated Coal & Timber Company operated this mine sometime during this period.
† Leased to Joseph Richardson, 1885

Last reported production: 1899

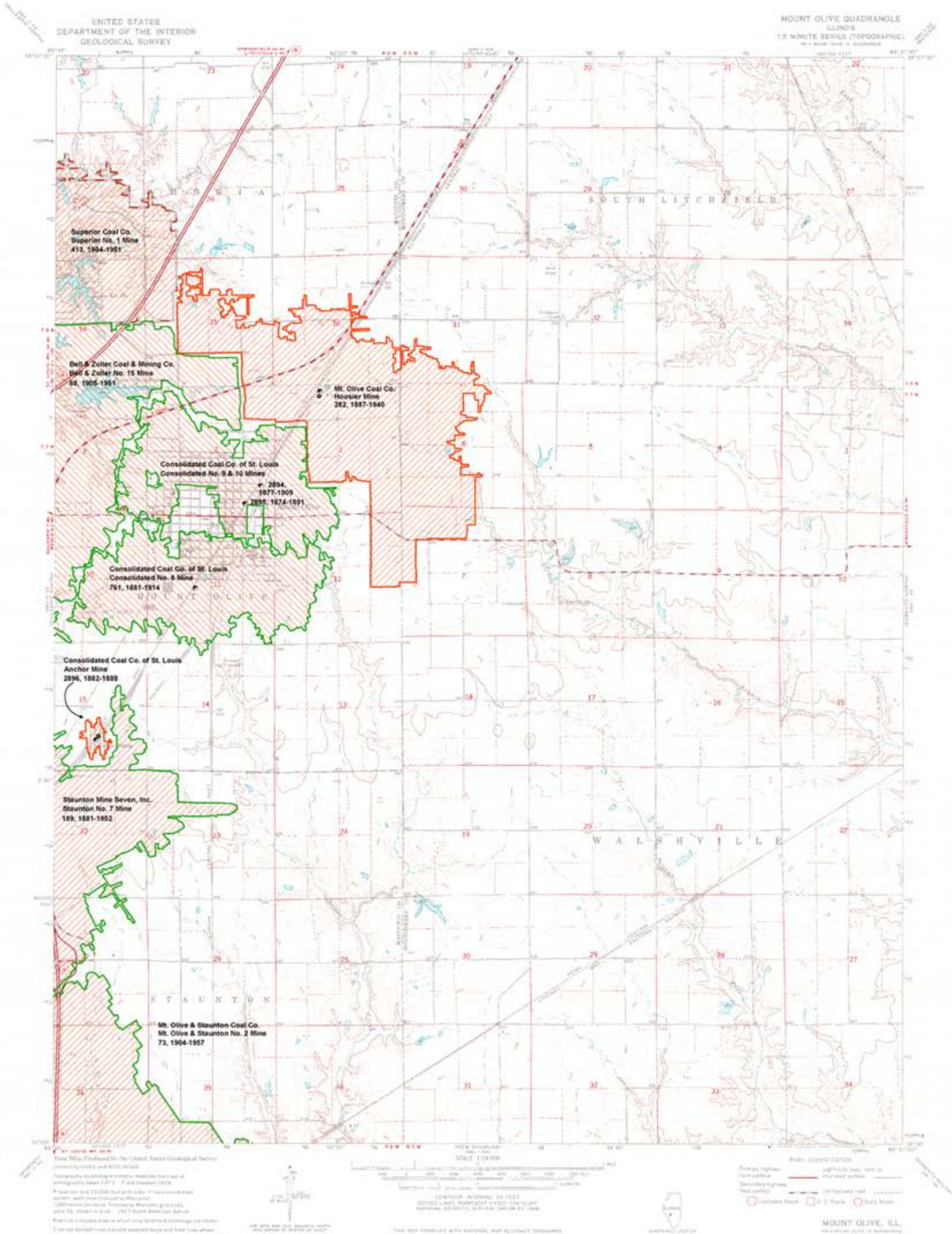
SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Federal Land Bank Report	3-1934	1:49082	1:49082	Secondary source

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, mine type, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Shaft locations, seam.
Federal Land Bank Report (Montgomery County) - General area of mining, shaft locations.
Bateman, Newton and Paul Selby, editors, 1918, Historical Encyclopedia of Illinois and History of Montgomery County, Volume II: Munsell Publishing Company, Chicago, Illinois, 1195 p.

INDEX OF MINES IN THE LITCHFIELD QUADRANGLE



Coal Mines in Illinois
Mount Olive Quadrangle

Macoupin & Montgomery Counties, Illinois

This map accompanies the Coal Mines Directory for the Mount Olive 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. Mount Olive 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
Melisa L. Borino

February 8, 2002
Revised June 14, 2004

Appendix L

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
MOUNT OLIVE QUADRANGLE
MACOUPIN COUNTY

Melisa L. Borino & Cheri Chenoweth

Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
2002
REVISED 2004

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
MOUNT OLIVE QUADRANGLE
MACOUPIN COUNTY

2002
REVISED 2004

ILLINOIS STATE GEOLOGICAL SURVEY
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Natural Resources Building
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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/2004

CONTENTS

INTRODUCTION

Coal has been mined in 73 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.

The directory serves as a key to the accompanying mine map and provides basic information on the coal mines. 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.

MINING IN THE MOUNT OLIVE QUADRANGLE

The mines in the Gillespie South Quadrangle operated for long periods, with only two of the ten operating for less than 20 years. The longest-running mine was the Staunton No. 7 Mine (mine index 189), which operated for over 70 years. The four Superior Coal Company mines operated between 36 and 48 years each, and were among the most productive mines in the state during World War I. Employment at these mines was fairly stable during the Great Depression in spite of frequent idling of the mines, the result of an agreement between the Superior Coal Company and the unions to share out the work among the men instead of layoffs.

The coal thickness in the Mount Olive Quadrangle ranged from below 5 feet thick to over 9 feet thick. Depths ranged from 290 to about 350 feet.

The roof conditions described in several mines were similar. Below the persistent, competent limestone was a crumbly gray shale, then a green and brown shale. Below that was a lenticular limestone that ranged from 0 to 12 inches thick, with a light gray shale (usually referred to as “clod”) and below that a massive black shale. The clod and dark gray shale did not hold very well. Some mines left 14 to 22 inches of top coal to help keep the roof up, but some roof falls went to the upper limestone. Leaving the top coal protected the shale from the changes in humidity and other effects of weathering, and slowed the deterioration. Most of these mines operated prior to roof bolting (the earliest roof bolting was in this area in 1947, in Staunton No. 7 Mine, mine index 189), and timbering was used to keep the roof up. In another area, limestone protrusions (sometimes referred to as bosses) extended down into the coal seam. They were inferred to be derived by pressure, as the black shale and coal below was usually shattered with pinwheel slips around the protrusions.

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.

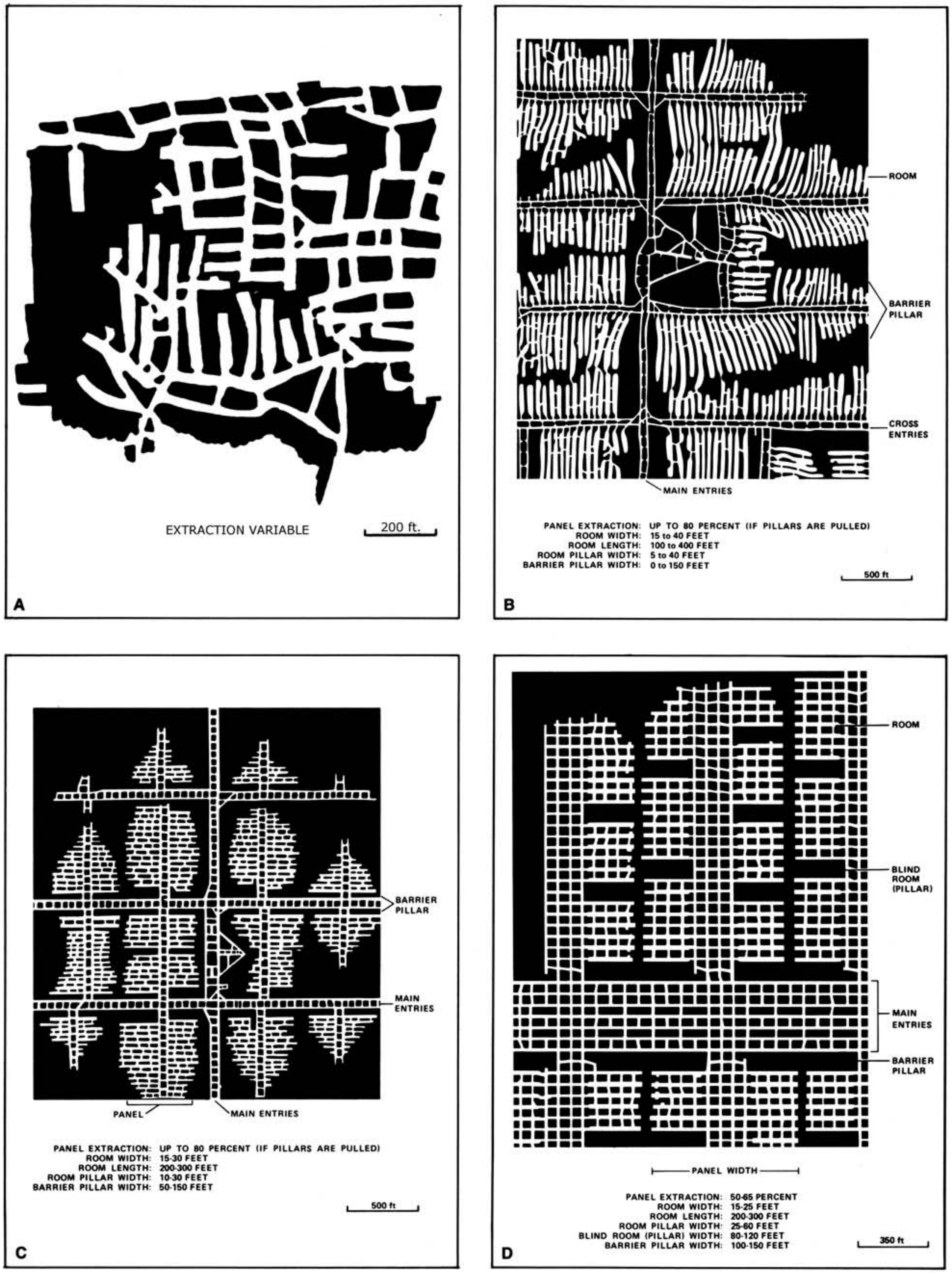


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

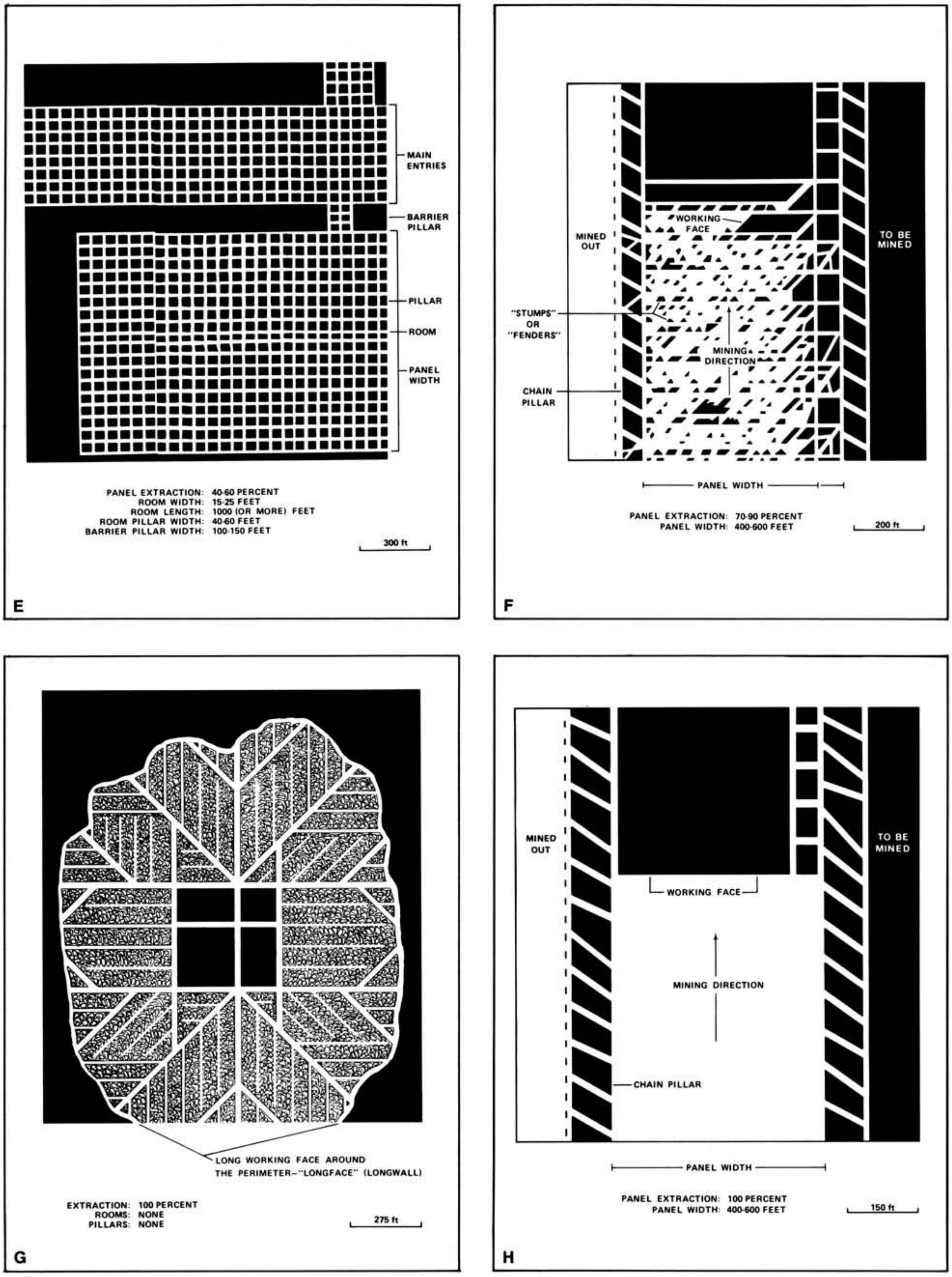


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

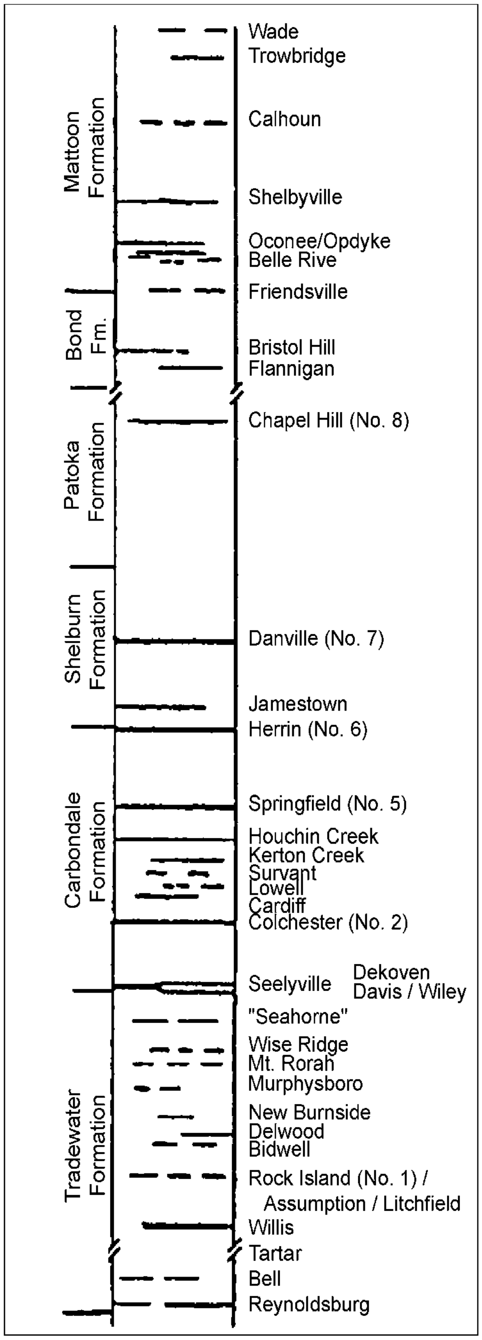


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

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, 185 p.

PART II DIRECTORY OF MINES IN THE MOUNT OLIVE QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Mount Olive 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 68
Bell & Zoller Coal & Mining Company, Bell & Zoller No. 15 Mine

Type: Underground   Total mined-out acreage shown: 4,093

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (8.83' x 15.5')	Macoupin	7N 6W	9	NE NW NE
Air shaft (8.83' x 15.5')	Macoupin	7N 6W	9	SE NW NE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	387	7.0	8.75	7.5-7.67	MRP *

* RPP around the outer portions of the mine, the interior is MRP.

Geologic Problems Reported: Portions of the black shale roof (a minimum of 2 to 4 inches) were rotten, and were overlain by 2 inches of clod. The clod was dark gray and hard when fresh, but after exposure and oxidation, it became lighter and crumbled in the hand. The roof conditions in the north part of the mine were very good; in the south part, there was some soapstone. Limestone protrusions into the seam caused some difficulty with mining. Some slips were present in the black shale, especially around the protrusions. The shale was very hard to keep up and sooner or later was taken down up to the limestone cap rock. Coal balls were present, but few in number. Squeezes were noted in the NE 1/4 of section 9 (1911 and 1924), and NW 1/4 of section 4 (1938).

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Consolidated Coal Company of St. Louis	Consolidated No. 15	1905-1951	27,476,356
Bell & Zoller Coal & Mining Company	Bell & Zoller No. 15	1951-1951	45,835
			27,522,191

Last reported production: May 1951

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352568	5-11-1951	1:4800	1:9269	Final
Company, 4103.M34 i5.1-13	5-1-1942	1:4800	1:4800	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, shaft sizes.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Macoupin County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Microfilm map, document 352568, reel 03139, frames 331-334 - Shaft locations, mine outline, mining method.
Company map, ISGS map library 4103.M34 i5.1-13 - Shaft locations.
Company map, ISGS map library, Old Ben Coal Co. archive collection - Geologic problems.

Mine Index 73
Mt Olive & Staunton Coal Company, Mt. Olive & Staunton No. 2 Mine

Type: Underground   Total mined-out acreage shown: 5,465

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Madison	6N 6W	10	150 FNL, 100 FWL
Air shaft	Madison	6N 6W	10	NW NW NW

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	293-325	5.0	8.0	6.5-7.0	RPP

Geologic Problems Reported: Some small faults were present, with displacement of 3 feet. Roof rolls sometimes cut the coal thickness down to 4 feet. Some gas was present near the roof. The floor clay heaved slightly.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Mt. Olive & Staunton Coal Company	Mt. Olive & Staunton No. 2	1904-1957	32,519,272
			32,519,272

Last reported production: June 1957

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352386	3-1-1965	1:4800	1:4800	Final
Company, 4102 i5.1-89	1-1-1924	1:15840	1:15840	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, mine type, seam, depth, thickness.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Macoupin County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Microfilm map, document 352386, reel 03139, frames 23-26 - Shaft locations, mine outline, mining method.
Company map, ISGS map library, 4102 i5.1-89 - Mine outline (west part of mine).

Mine Index 189
Staunton Mine Seven, Inc., Staunton No. 7 Mine

Type: Underground   Total mined-out acreage shown: 3,607

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Macoupin	7N 6W	21	SW SW SE
Air shaft	Macoupin	7N 6W	21	SE SW SE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	350-355	5.0	7.5-8.0	6.67-7.5	RPP

Geologic Problems Reported: Occasional rolls were present. The roof was dark gray or black shale with 6 to 24 inches of clod above it. A 3-inch band of limestone occurred above the clod, separated from the main limestone caprock by a 1-inch clay seam. Some of the shale was severely fractured and contained many slips, making a treacherous roof. Some rooms had to be abandoned due to inability to keep the roof up. The 1935 source map showed bad top and squeezed areas in the NE of section 28 and NW of section 27, bad top in NW and SW of section 22, and caved areas in SW section 22 and NE of section 21 (all T7N-R6W). This mine was the site of one of the earliest experiments in roof bolting in 1947, which proved very effective. The coal contained pyrite lenses (up to 1 inch wide) and calcite and gypsum stringers above the blue band.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Williamson, Townsend & Company	Williamson & Townsend	1881-1882	18,000
Ellsworth Coal Company	Ellsworth No. 7	1882-1886	131,249
Consolidated Coal Company of St. Louis	Consolidated No. 7	1886-1896	1,246,276
B. Hebenstreit	Consolidated No. 7	1896-1897	101,035
Consolidated Coal Company of St. Louis	Consolidated No. 7	1897-1951 *	17,302,596
Bell & Zoller Coal & Mining Company	Bell & Zoller No. 7	1951-1951	140,025
Staunton Mine Seven, Inc.	Staunton No. 7	1951-1952	33,572
			18,972,753

* Idle 1911-1913, 1931-1934

Last reported production: February 1952

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352570	2-19-1952	1:4800	1:9931	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Macoupin County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Microfilm map, document 352570, reel 03139, frames 341-343 - Shaft locations, mine outline, mining method.
Company map, ISGS map library, Old Ben Coal Co. archives (6-15-1935) - Shaft locations, geologic problems.

Mine Index 282
Mt. Olive Coal Company, Hoosier Mine

Type: Underground   Total mined-out acreage shown: 1,604 Production indicates an additional 9 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Macoupin	7N 6W	1	NW NE NW
Air shaft	Macoupin	7N 6W	1	NW NE NW

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	420-435			7.5-8.4	RPP

Geologic Problems Reported: The roof conditions were generally considered excellent. Some areas of the mine had a limestone roof, and bosses protruded 6 to 8 inches down into the coal. Radiating slips surrounded these protrusions, giving a pinwheel effect. In other areas, the roof was 18 inches of black shale and it was difficult to keep up. The lower half was typically sheety and tough, but the upper half was not tough or sheety and disintegrated on short exposure, frequently allowing all the black shale to come down. The floor was about 6 feet of fire clay, which was soft and heaved. This made it difficult to close off entries. A gob and pillar fire was reported in 1950 that had been burning since about 1900. The firewall was shifted out from the fire, but adjacent entries were full of smoke, heat and sulfur. The mine was eventually closed due to this fire.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Consolidated Coal & Coke Co. of Mt. Olive	Mt. Olive	1887-1889	19,210
Mt. Olive Coal Company	Mt. Olive	1889-1894	788,413
Madison Coal Corporation	Madison No. 5	1894-1915	4,753,959
Mt. Olive Coal Company	Mt. Olive No. 5	1915-1920	1,259,782
Madison Coal Corporation	Madison No. 5	1920-1934 *	3,047,920
Mt. Olive Coal Company	Hoosier	1934-1940	636,746
Mt. Olive Coal Company	Hoosier	1940-1940	60,118 **
			10,566,148

* Idle 1932 & 1933
** Production after map date

Last reported production: December 1940

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352545	5-1-1940	1:2400	1:5297	Not final (incomplete)
Company, 4103.M34 i5.1-10	4-21-1931	1:2400	1:2400	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Macoupin County) - Mine type, shaft location, seam, thickness, geologic problems.
Microfilm map, document 352545, reel 03139, frame 280 - Mine outline (east part of mine).
Company map, ISGS map library, 4103.M34 i5.1-10 - Mine outline, shaft locations, mining method.

Mine Index 413
Superior Coal Company, Superior No. 1 Mine

Type: Underground Total mined-out acreage shown: 19,046 The boundaries between this mine, Superior No. 2 (mine index 503), Superior No. 3 (mine index 66), and Superior No. 4 (mine index 188) could not be distinguished. The acreage reported is the total for all four mines. About 50 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (9'x17')	Macoupin	8N 6W	29	1100 FSL, 1200 FEL, NW
Air shaft	Macoupin	8N 6W	29	NW SE NW

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	320-348	6.5	9.0	7.0-7.5	RPP

Geologic Problems Reported: The clay lamina in the upper bench were a detriment as it was next to impossible to pick out much of this material. These upper clay band horizons changed gradually to stony pyrite lenses. There were some facings of pyrite and calcite, of minor importance as an ash constituent. Some gas was present in pockets in the roof shale. Roof rolls were present over the entire mine. A great thickness of soapstone was present immediately above the coal. The soapstone was fractured, slipped and very difficult to hold. The coal underneath much of this soapstone was very thinly laminated. Thus, although sometimes left as roof, it served very poorly. The coal was thickest under the thickest areas of soapstone. For instance, where the soapstone was 28 feet thick, the coal was 9 feet thick. A squeeze occurred in the southeast part of the mine. Coal balls were common in some parts of the mine.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Superior Coal Company	Superior No. 1	1904-1951	30,220,349
			30,220,349

Last reported production: May 1951

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352567	undated	1:4800	1:7945	Undated
Microfilm, document 352576	undated	1:4800	1:7945	Undated
Microfilm, document 352574	10-29-1953	1:4800	1:7945	Final
Microfilm, document 352573	8-7-1953	1:4800	1:7945	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Macoupin County) - Mine type, shaft location, seam, depth, thickness, geologic problems.
Microfilm map, document 352567, reel 03139, frames 329-330 - Shaft locations, mine outline (east, northeast, north central), mining method.
Microfilm map, document 352576, reel 03139, frames 358-363, map of Superior No. 4 (mine index 188) - Mine outline (west, southwest).
Microfilm map, document 352574, reel 03139, frames 351-354, map of Superior No. 3 (mine index 66) - Mine outline (west, north).
Microfilm map, document 352573, reel 03139, frames 347-350, map of Superior No. 2 (mine index 503) - Mine outline (southeast, south central).

Mine Index 761
Consolidated Coal Company of St. Louis, Consolidated No. 8 Mine

Type: Underground   Total mined-out acreage shown: 816

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Macoupin	7N 6W	11	NW NE SW
Air shaft *	Macoupin	7N 6W	2	SW SE SE

* The air shaft for Consolidated No. 8 was the main shaft for Consolidated No. 9 (mine index 2895, closed in 1891), and was also used as an air shaft for Consolidated No. 10 (mine index 2894). This point is shown as a main shaft on the accompanying map.

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	400-440		9.0	7.5-8.0	MRP

Geologic Problems Reported: A large squeeze occurred north of the main shaft in the W ½ NE 11-T7N-R6W, and another occurred in the S ½ SE 10-T7N-R6W. Two areas caved, both in the SW 12-T7N-R6W. A fire was also indicated on one of the source maps, in the SW NE SE 10-T7N-R6W.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
South Mt. Olive Coal Company	South Mt. Olive	1881-1883	51,252
Ellsworth Coal & Mining Company	Ellsworth No. 8	1883-1886	165,810
Consolidated Coal Company of St. Louis	Consolidated No. 8	1886-1914	5,643,086
			5,860,148

Last reported production: March 31, 1914

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Old Ben Archive Collection	3-31-1914	1:2400	1:2400	Final
Old Ben Archive Collection	3-31-1914	1:2400	1:2400	Incomplete (final)

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Macoupin County) - Mine type, shaft location, seam, depth, thickness.
Old Ben Archive Collection, ISGS map library (Final) - Mine outline, air shaft information, geologic problems.
Old Ben Archive Collection, ISGS map library (Incomplete) - Mine outline (west extensions), geologic problems.
Old Ben Archive Collection, ISGS map library - Geologic problems.

Mine Index 2894
Consolidated Coal Company of St. Louis, Consolidated No. 10 Mine

Type: Underground   Total mined-out acreage shown: 730 The boundary between this mine and Consolidated No. 9 (mine index 2895) could not be distinguished. The acreage reported is for both mines.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Macoupin	7N 6W	2	NE SE SE
Air shaft *	Macoupin	7N 6W	2	SW SE SE

* The air shaft for Consolidated No. 10 was the main shaft for Consolidated No. 9 (mine index 2895, closed in 1891), and was also used as an air shaft for Consolidated No. 8 (mine index 761). This point is shown as a main shaft on the accompanying map.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	420-431			8.0	MRP

Geologic Problems Reported:

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Keiser	Keiser	1877-1879	45,000 *
Mt. Olive Coal Company	Mt. Olive	1881-1883	225,000
Ellsworth Coal & Mining Company	Ellsworth No. 10	1883-1886	444,443
Consolidated Coal Company of St. Louis	Consolidated No. 10	1886-1909	4,114,761
			4,829,204

* Production and ownership prior to 1878 are unknown. The Coal Report of 1882 indicates 20 acres were mined. According to the *History of Macoupin County*, A. J. and C. J. Keiser, the owners of Mt. Olive Coal Company, sunk a shaft in 1877 that appears to correspond best to this mine.

Last reported production: 1909 (The source map states the mine was abandoned September 1, 1909.)

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352553	9-1-1909	1:2400	1:5131	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Macoupin County) - Mine type, shaft location, seam, depth, thickness.
Microfilm map, document 352553, reel 03139, frames 293-294 - Shaft locations, mine outline, mining method.
History of Macoupin County, 1911, S. J. Clarke Publishing Company, Chicago, Illinois, 727 p. - Ownership, years of operation.

Mine Index 2895
Consolidated Coal Company of St. Louis, Consolidated No. 9 Mine

Type: Underground   Total mined-out acreage shown: 730 The boundary between this mine and Consolidated No. 10 (mine index 2894) could not be distinguished. The acreage reported is for both mines.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Macoupin	7N 6W	2	500 FSL, 4100 FWL

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Thickness (ft) Max	Thickness (ft) Ave	Mining Method
Herrin	416			8.0	MRP

Geologic Problems Reported:

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Mt. Olive Coal & Mining Company	Mt. Olive	1874-1883	180,000 *
Ellsworth Coal & Mining Company	Ellsworth No. 9	1883-1886	51,000 **
Consolidated Coal Company of St. Louis	Consolidated No. 9	1886-1891	**
			231,800

* Years of operation, production, and ownership prior to 1881 unknown; the *Atlas of Macoupin County* (1875) shows a shaft at this location. According to the *History of Macoupin County*, A. J. and C. J. Keiser, the owners of Mt. Olive Coal Company, sunk a shaft in 1874 that appears to correspond best to this mine.

** Production after 1884 included in production from No. 10 Mine (mine index 2894)

Last reported production: 1891

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352553	9-1-1909	1:2400	1:5131	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, mine type, depth, thickness.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
Mine notes (Macoupin County) - Shaft location, seam, thickness.
Microfilm map, document 352553, reel 03139, frames 293-294 - Shaft locations, mine outline, mining method.
Atlas of Macoupin County and the State of Illinois, published by Warner & Beers, Chicago, 1875 - Years of operation.
History of Macoupin County, 1911, S. J. Clarke Publishing Company, Chicago, Illinois, 727 p. - Ownership, years of operation.

Mine Index 2896
Consolidated Coal Company of St. Louis, Anchor Mine

Type: Underground   Total mined-out acreage shown: 25

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Macoupin	7N 6W	15	NW SW SE
Air shaft	Macoupin	7N 6W	15	SW NW SE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	380-382			6.5-7.5	RPB

Geologic Problems Reported:

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Anchor Coal Company	Anchor	1882-1886	117,241
Consolidated Coal Company of St. Louis	Anchor	1886-1888	27,333
			144,574

Last reported production: March 1888

SOURCES OF DATA

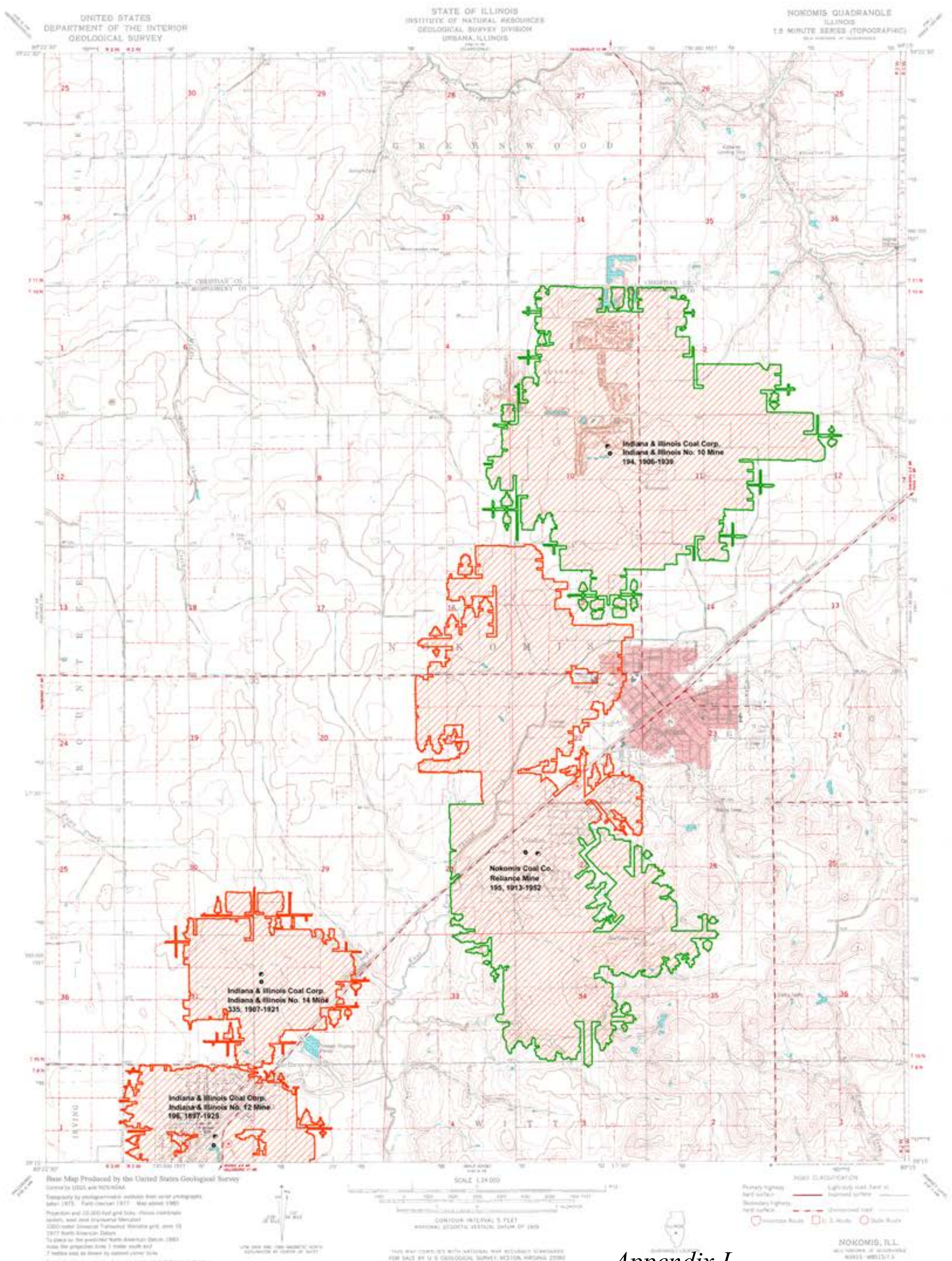
Source Map	Date	Original Scale	Digitized Scale	Map Type
Old Ben Archive Collection	1886	1:2400	1:2400	Not final
WPA, T7N-R6W	circa 1938 *	1:12000	1:37689	Secondary source

* The mine outline is dated 1888, and matches the outline on the Old Ben Archive Collection source map, which suggests that the outline may be final. In addition, the mined area shown on the accompanying map is the approximate size expected for the production reported. This suggests that the mine outline is complete.

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, depth, thickness.
Directory of Illinois Coal Mines (Macoupin County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Macoupin County) - Mine type, shaft location, seam.
Old Ben Archive Collection, ISGS map library - Shaft locations, mine outline, mining method.
WPA map, T7N-R6W - Shaft locations, mine outline.

INDEX OF MINES IN THE MOUNT OLIVE QUADRANGLE



Appendix L

Coal Mines in Illinois
Nokomis Quadrangle

Montgomery & Christian Counties, Illinois

This map accompanies the Coal Mines Directory for the Nokomis 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

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Mine Outlines Compiled by
Jennifer M. Obrad

October 26, 2011

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
NOKOMIS QUADRANGLE
MONTGOMERY & CHRISTIAN COUNTIES

Jennifer M. Obrad

2011

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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.

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 NOKOMIS QUADRANGLE

The Herrin Coal seam was mined in the Nokomis Quadrangle. This seam lies 500-650 feet in depth in this area, and the mines reported thicknesses of 6 to 8.5 feet of Herrin Coal. The first mine opened in 1897, opened by the Montgomery Coal Company (mine index 196). Mining continued in this quadrangle until 1952, when the last mine, Nokomis Coal Company, Reliance Mine (mine index 195), closed.

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.

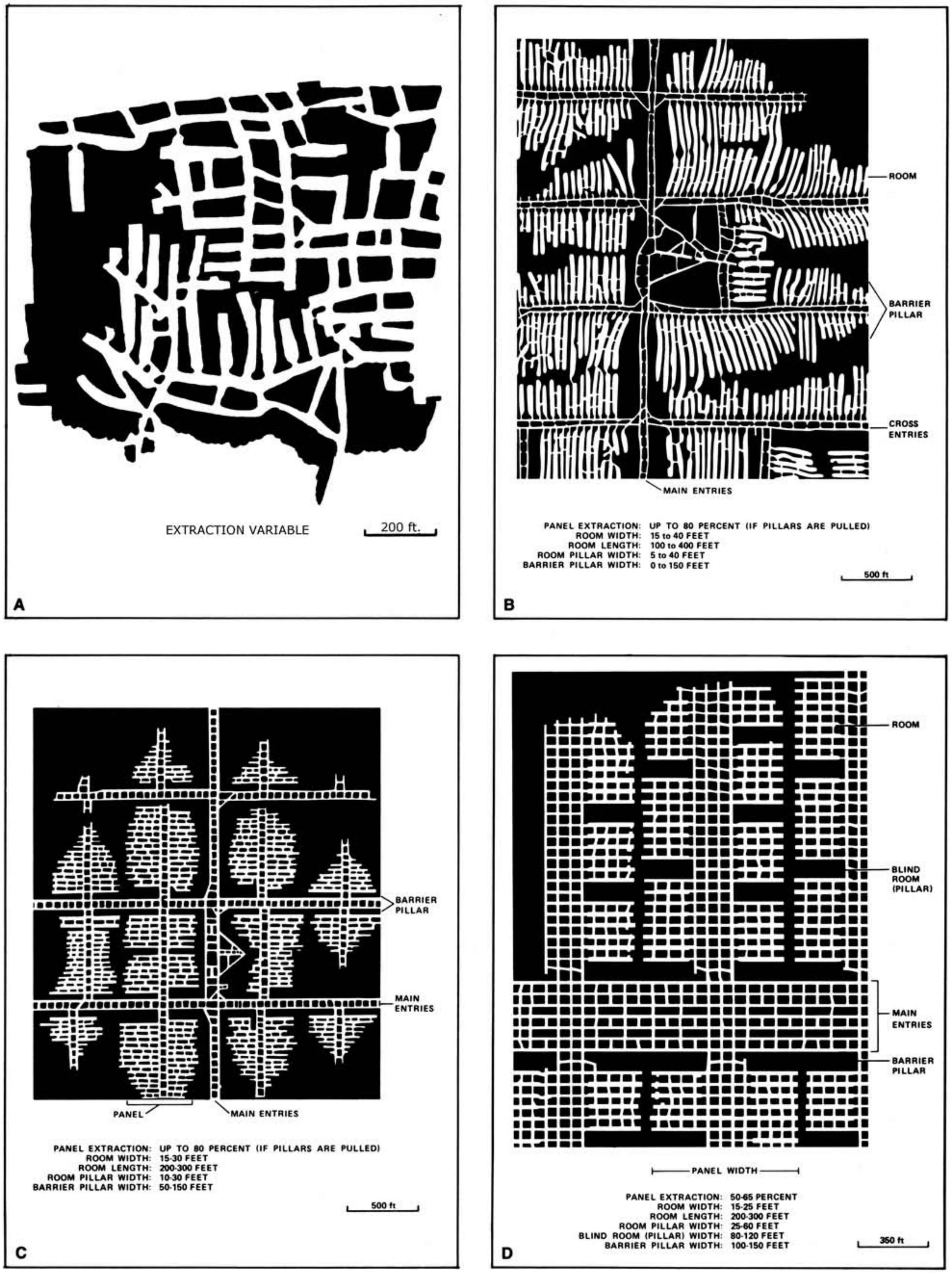


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

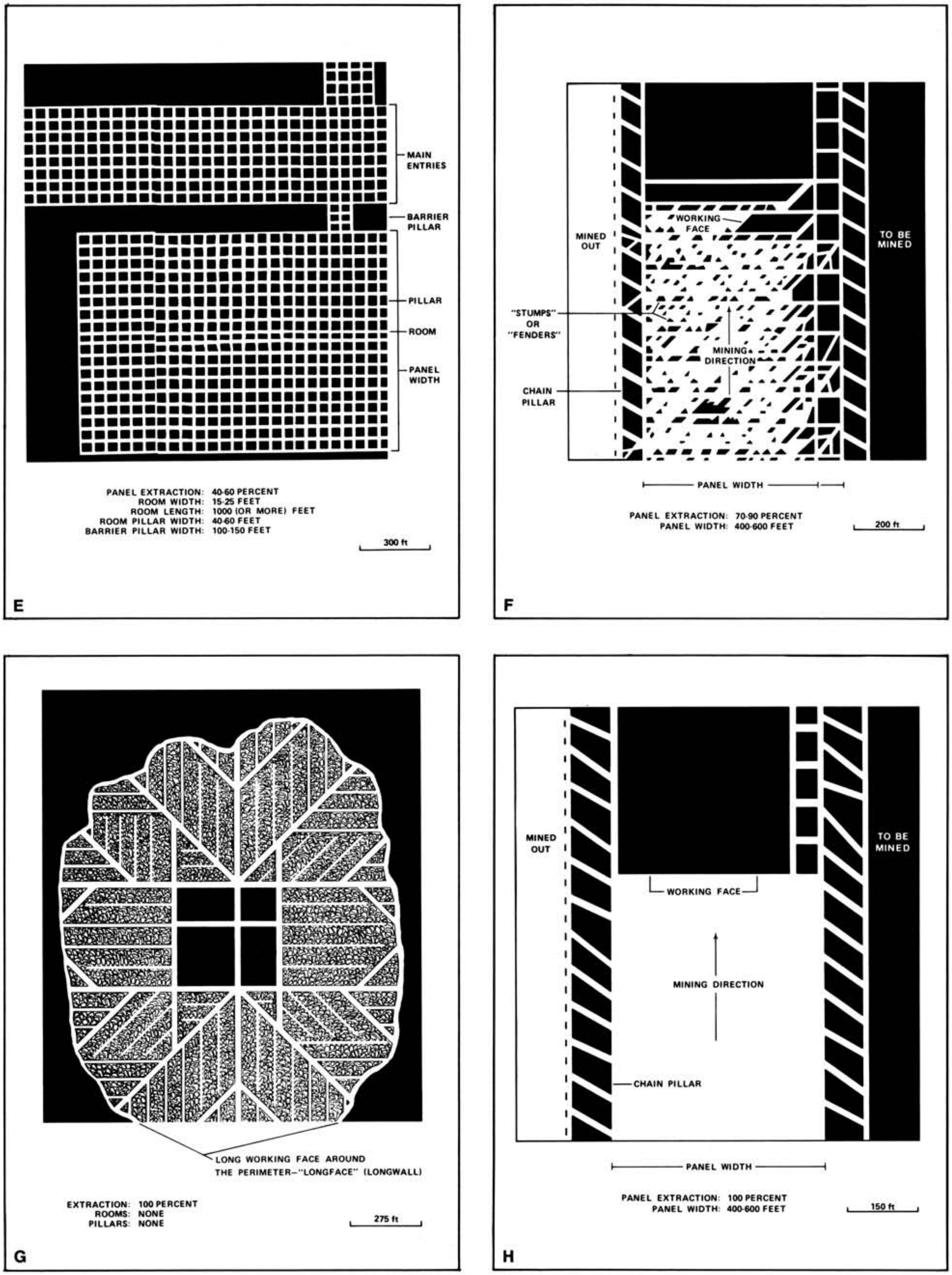


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

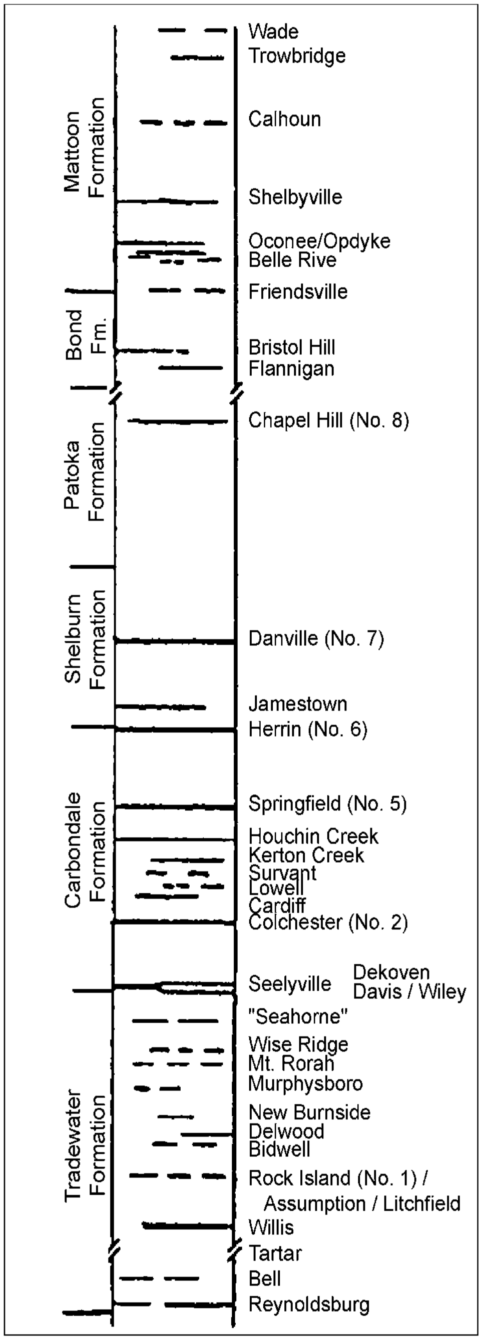


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

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 NOKOMIS QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Nokomis 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 194
Indiana & Illinois Coal Corporation, Indiana & Illinois No. 10 Mine

Type: Underground Total mined-out acreage shown: 2,381

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (10'x26.67')	Montgomery	10N 2W	10	SE NW NE
Air/escape shaft (10'x15')	Montgomery	10N 2W	10	NW SE NE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Thickness (ft) Max	Thickness (ft) Ave	Mining Method
Herrin	635-646			7.0-8.5	RPP

Geologic Problems Reported: Two areas of faulting were noted on the source map, one in NW NE NW 3-T10N-R2W and the other in W ½ NW NW 2-T10N-R2W. Top coal (18 to 24 inches) was left to support the black shale roof. The coal had a few small slips that had little effect on mining; the floor clay also had slips. The underclay heaved on the north side of the mine.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Peabody Coal Company	Peabody No. 10, Nokomis	1906-1915	1,425,958
C. & E. I. Coal Properties	C. & E. I. No. 10	1915-1918	1,971,447
Illinois Coal Properties	Illinois Coal Properties No. 10	1918-1919	495,248
Indiana & Illinois Coal Corporation	Indiana & Illinois No. 10	1919-1939	10,309,789
			14,202,442

Last reported production: April 1939

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352583	6-1-1939	1:2400	1:5462	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, shaft sizes, seam, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Mine type, shaft location, depth, thickness, geologic problems.
Microfilm map, document 352583, reel 03139, frames 384-387 - Shaft locations, mine outline, mining method geologic problems.

Mine Index 195
Nokomis Coal Company, Reliance Mine

Type: Underground   Total mined-out acreage shown: 2,966

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft (11.42'x17.42')	Montgomery	10N 2W	27	SE SW NW
Air shaft (11.42'x17.42')	Montgomery	10N 2W	27	NW SW NW

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	638-659	7.0	9.0	7.5-8.5	RPP

Geologic Problems Reported: A squeeze in SW NE 21-T10N-R2E caused the abandonment of a panel. Other panels in the area are labeled “approximate”, and it is possible that squeezes in this part of the mine prevented surveying.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Nokomis Coal Company	Nokomis No. 1	1913-1922	4,524,108
Illinois Coal Corporation	Illinois Coal No. 9	1922-1935 *	1,491,286
Nokomis Coal Company	Reliance	1936-1952	11,841,498
			17,856,892

* Idle 1925-1935

Last reported production: July 1952

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
State Archive, MSHA_422	6-1944	1:1244	1:2400	Not final **
State Archive, IL_1758	6-1-1954	1:2400	1:2400	Final
State Archive, MSHA_432	6-1-1947	1:2400	1:2400	Not final **

** The most recent mining took place in the southern portion of the mine. Although the northern portions are from maps dated before mine closure and are coded “not final” on the accompanying map, the outline is considered to be a final mine outline, and tonnage and the area mined after the map date were not calculated.

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, shaft sizes, seam, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation..
Mine notes (Montgomery County) - Mine type, shaft location, seam, depth, thickness.
State Archive, MSHA_422, courtesy of Robert Gibson, IDNR - Mine outline (north half), mining method, geologic problems.
State Archive, IL_1758, courtesy of Robert Gibson, IDNR - Shaft locations, mine outline (south half).
State Archive, MSHA_432, courtesy of Robert Gibson, IDNR - Partial outline (north half).

Mine Index 196
Indiana & Illinois Coal Corporation, Indiana & Illinois No. 12 Mine

Type: Underground Total mined-out acreage shown: 741 Production indicates approximately 13 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Montgomery	9N 2W	6	NE NW SE
Air shaft	Montgomery	9N 2W	6	SE NW SE

GEOLOGY

		Thickness (ft)			Mining
Seam(s) Mined	Depth (ft)	Min	Max	Ave	Method
Herrin	549-568			6.0-8.0	RPP

Geologic Problems Reported: At least one roll was seen in this mine. The roof was clod, up to 1.5 inches thick, with black shale above. An unknown thickness of top coal was left to keep the roof shale up. The coal contained a few small slips, with maximum displacement of 6 inches. The underclay heaved in some places.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Montgomery Coal Company	Montgomery	1897-1904	629,599
Dering Coal Company	Dering No. 25	1904-1905	161,313
Burnwell Coal Company	Burnwell No. 24	1905-1912	1,789,673
Peabody Coal Company	Peabody No. 12	1912-1917 *	442,736
C. & E. I. Coal Properties	C. & E. I. No. 12	1917-1918	509,684
Illinois Coal Properties	Illinois Coal No. 12	1918-1919	162,094
Indiana & Illinois Coal Corporation	Indiana & Illinois No. 12	1919-1923	802,318
Indiana & Illinois Coal Corporation	Indiana & Illinois No. 12	1923-1925 **	79,797 ***
			4,577,214

* Idle 1915-1917
** Idle 1924
*** Production after map date

Last reported production: February 1925

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352586	1-27-1923	1:2400	1:4966	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Mine type, seam, depth, geological problems.
Microfilm map, document 352586, reel 03139, frames 395, 396 - Shaft locations, mine outline, mining method.
State Archive, MSHA_434, courtesy of Robert Gibson - Shaft locations.

Mine Index 335
Indiana & Illinois Coal Corporation, Indiana & Illinois No. 14 Mine

Type: Underground Total mined-out acreage shown: 723 Production indicates approximately 50 acres were mined after the map date.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Montgomery	10N 2W	32	NW SW NW *
Air shaft	Montgomery	10N 2W	32	NW SW NW *

* There were no shaft locations shown on the source map. The workings shown on the source map were examined and points were placed at the most likely locations for both the main shaft and the air shaft based on the configuration of the workings and the surface buildings.

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	576			8.0-8.5	RPP

Geologic Problems Reported: Occasional pockets of gas were found in the coal.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Burnwell Coal Company	Burnwell No. 22	1907-1911	775,675
Peabody Coal Company	Peabody No. 14	1911-1915	1,502,833
C. & E. I. Coal Properties	C. & E. I. No. 14	1915-1918	1,859,438
Illinois Coal Properties	Illinois No. 14	1918-1919	303,438
Indiana & Illinois Coal Corporation	Indiana & Illinois No. 14	1919-1920	142,173
Indiana & Illinois Coal Corporation	Indiana & Illinois No. 14	1920-1921	309,327 **
			4,892,884

** Production after map date

Last reported production: April 1921

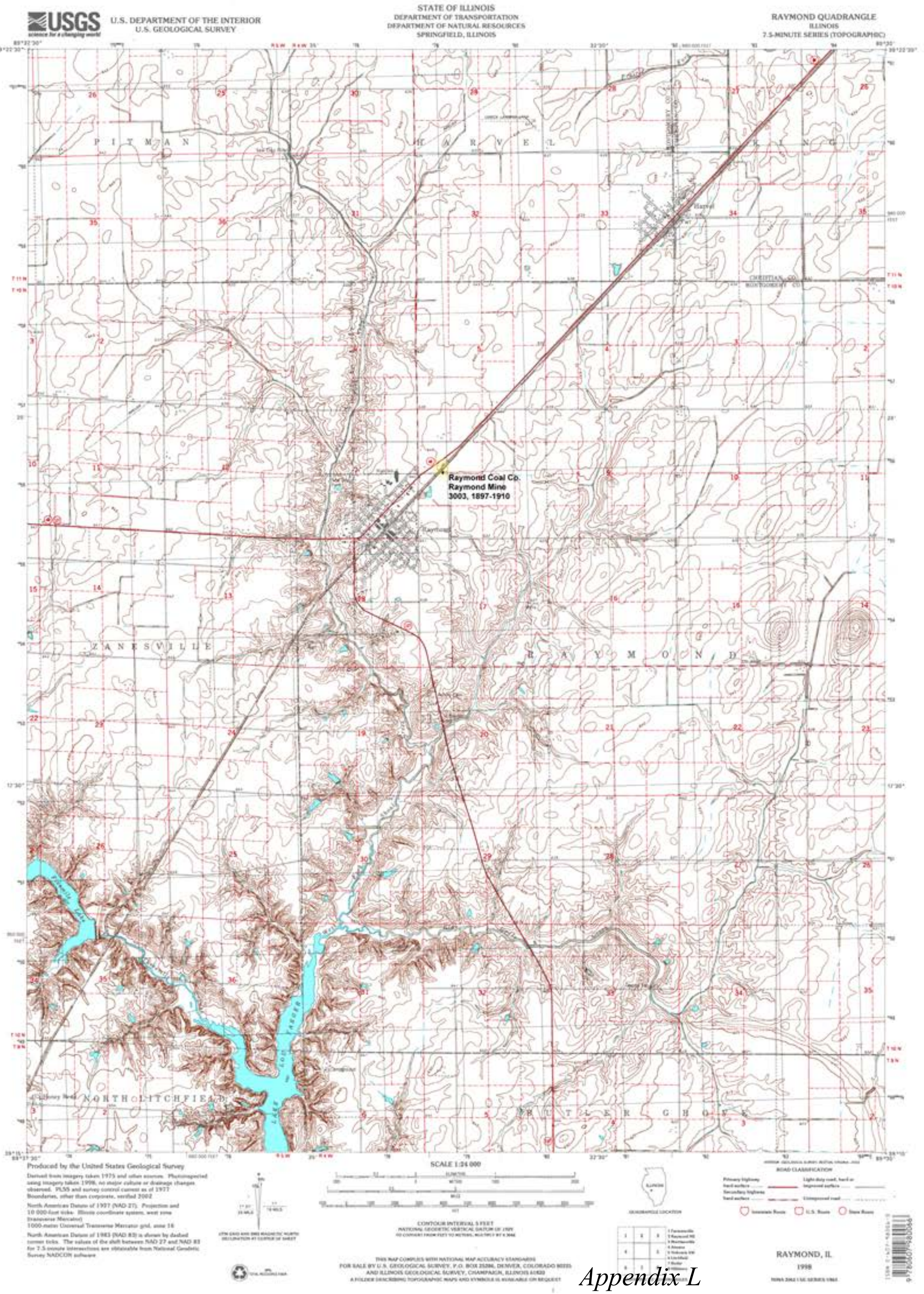
SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Microfilm, document 352587	4-1920	1:2400	1:4634	Not final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, mine type, seam.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Shaft location, depth, thickness, geologic problems.
Microfilm map, document 352587, reel 03139, frames 397-400 - Shaft locations, mine outline, mining method.

INDEX OF MINES IN THE NOKOMIS QUADRANGLE



Appendix L

Coal Mines in Illinois Raymond Quadrangle

Montgomery & Christian Counties, Illinois

This map accompanies the Coal Mines Directory for the Raymond 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
Alan R. Myers

November 17, 2010

DIRECTORY OF COAL MINES IN ILLINOIS
7.5-MINUTE QUADRANGLE SERIES
RAYMOND QUADRANGLE
MONTGOMERY & CHRISTIAN COUNTIES

Alan R. Myers & C. Chenoweth

2010

Institute of Natural Resource Sustainability
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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.

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 RAYMOND QUADRANGLE

The Raymond Mine (mine index 3003) operated from 1897 to 1910. No maps have been found, but the size estimated from production is approximately 10 acres. The coal was thin, just over 3 feet thick, and at over 400 feet deep, required a substantial capital investment to access.

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.

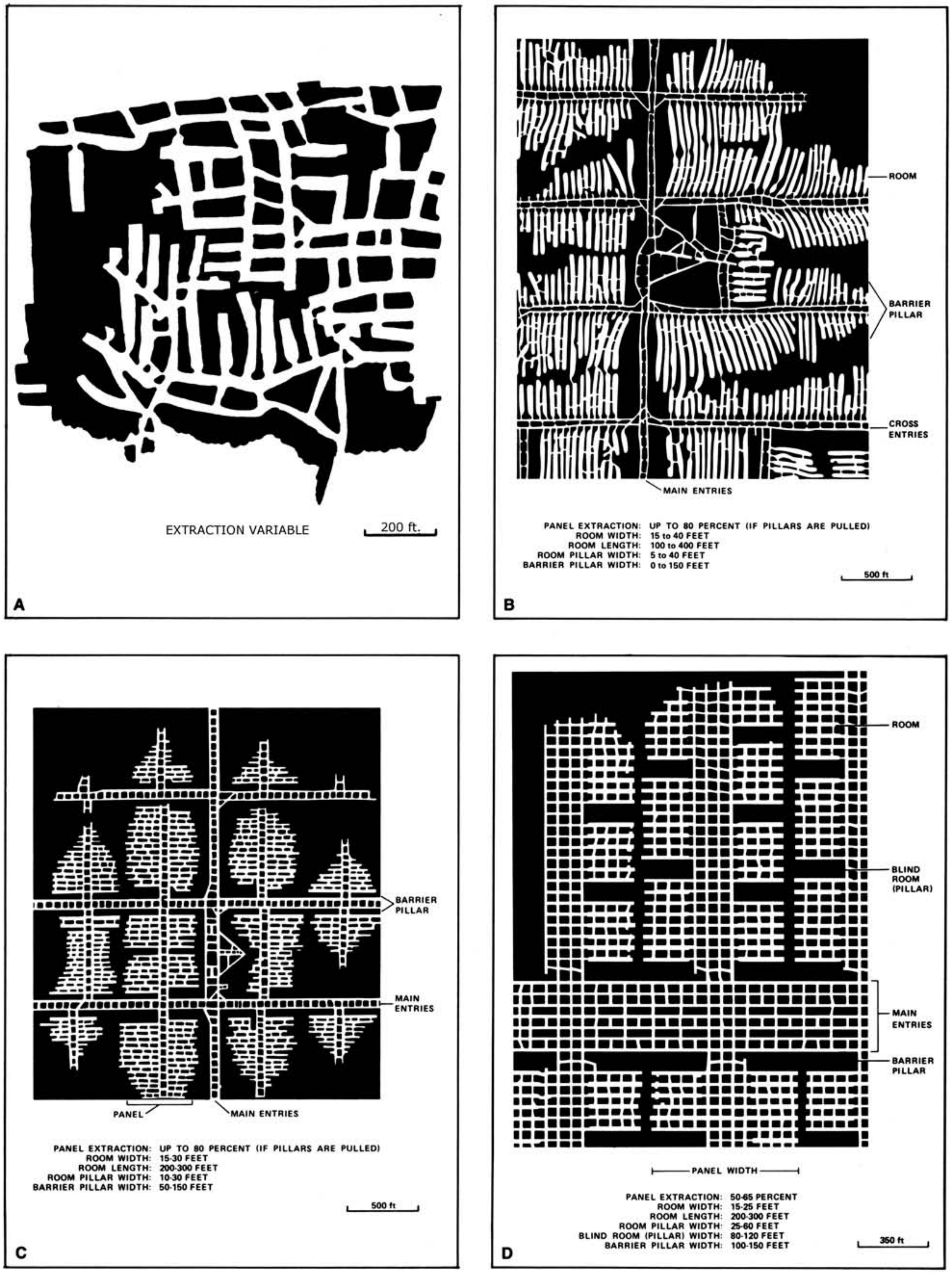


Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

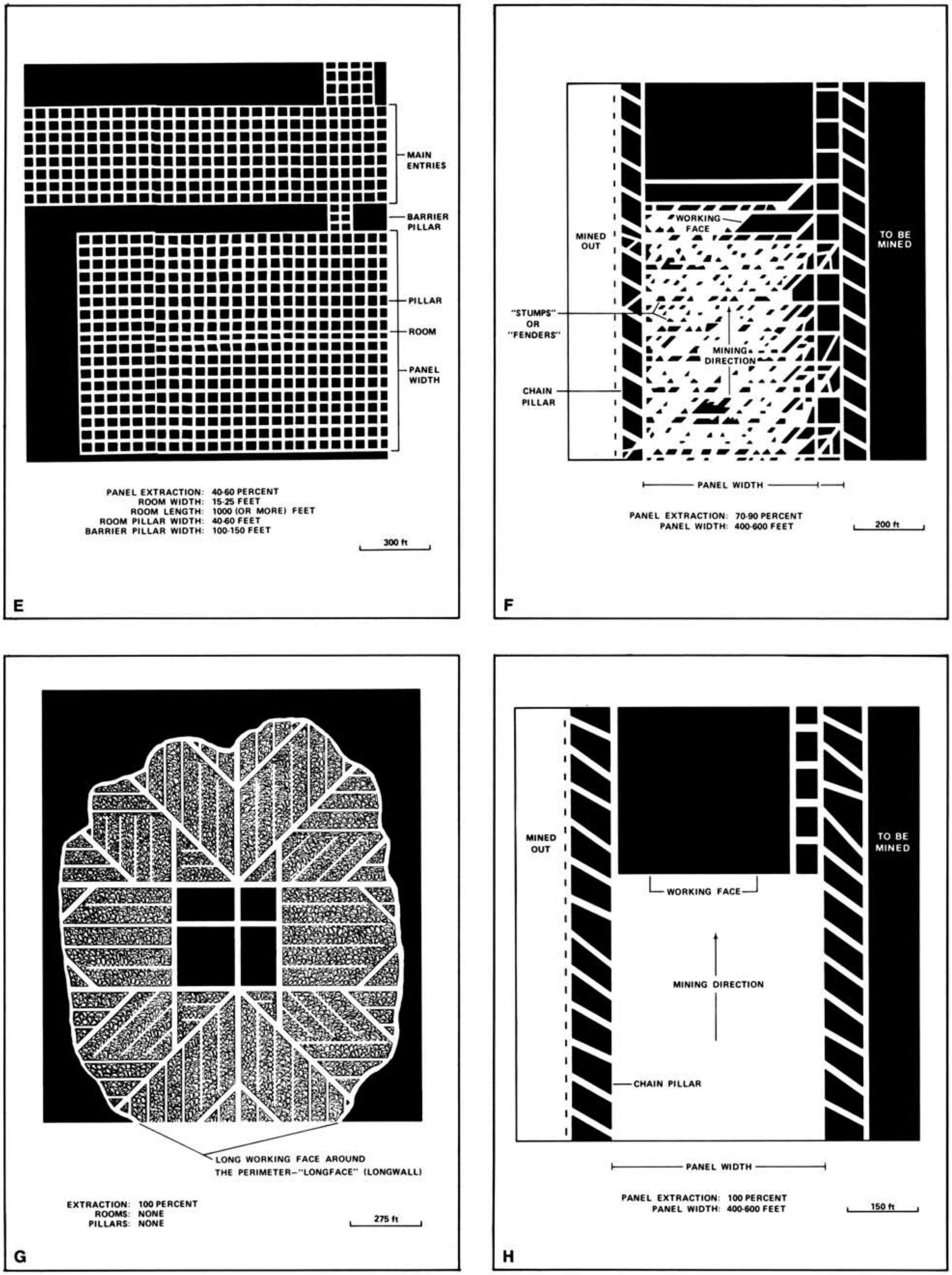


Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

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.

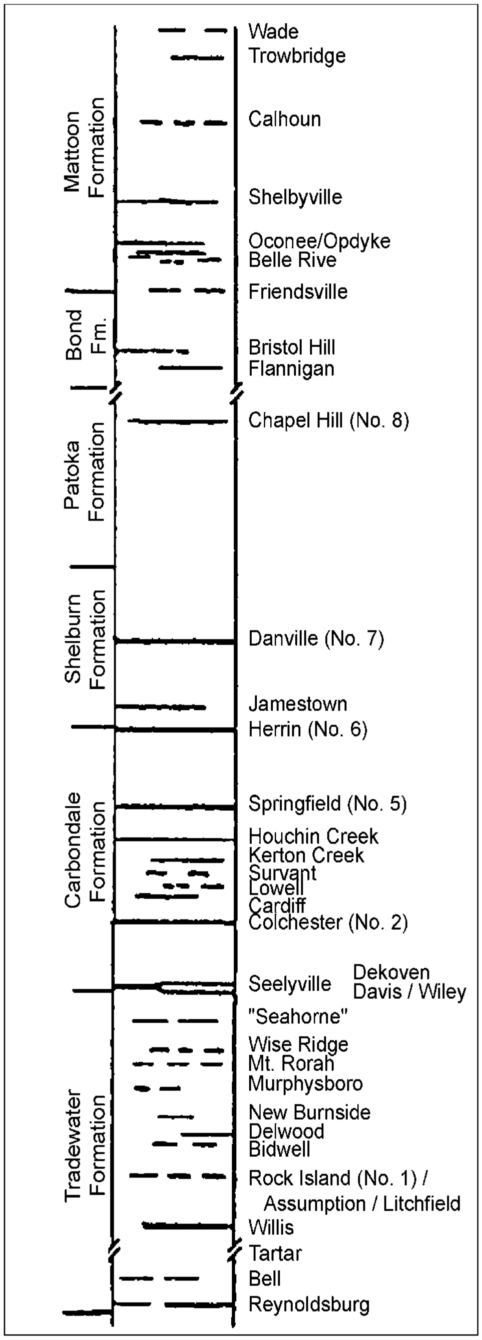


Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

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 RAYMOND QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Raymond 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 3003
Raymond Coal Company, Raymond Mine

Type: Underground   Total mined-out acreage shown: None; production indicates approximately 10 acres were mined, which is shown on the accompanying map as a general area of mining.

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Montgomery	10N 4W	8	SE SW NW

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	424-444			3.25	RP

Geologic Problems Reported:

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Raymond Mining Company	Raymond	1897-1898	4,000
William Jamison & Company	Litchfield	1898-1899	4,290
Progressive Coal Company	Progressive	1899-1901	4,213
Raymond Coal Company	Raymond	1901-1903	12,093
Miller Coal Company	Miller No. 1	1903-1907	13,250
H. H. Hardin	Hardin	1907-1908	500
G. I. Kelly	Kelly	1908-1909	6,000
Raymond Coal Company	Raymond	1909-1910	6,520
			50,866

Last reported production: 1910

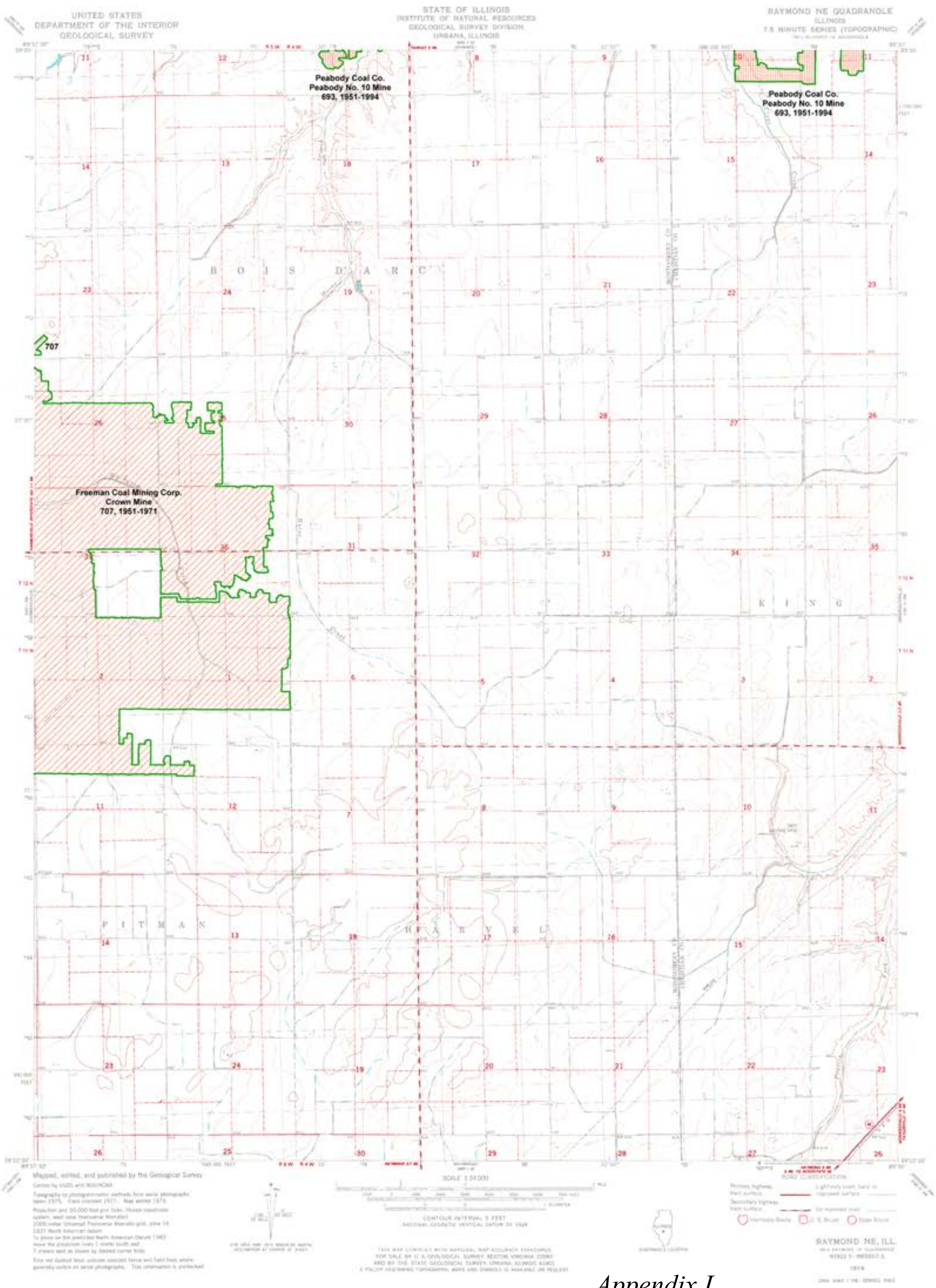
SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Federal Land Bank Report	3-26-1933	1:152064	1:152064	Secondary source

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, mine type, seam, depth, thickness, mining method.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
Mine notes (Montgomery County) - Shaft location.
Federal Land Bank Report (Montgomery County) - Shaft location.

INDEX OF MINES IN THE RAYMOND QUADRANGLE



Appendix L

Coal Mines in Illinois
Raymond NE Quadrangle

Montgomery & Christian Counties, Illinois

This map accompanies the Coal Mines Directory for the Raymond NE Quadrangle. Consult the directory for a complete explanation of the information shown on this map.

Mining Method

- Room & Pillar (RP)
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- Blind Room & Pillar (BRP)
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- 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
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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.

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Mine Outlines Compiled by
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November 12, 2010

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7.5-MINUTE QUADRANGLE SERIES
RAYMOND NE QUADRANGLE
MONTGOMERY & CHRISTIAN COUNTIES

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2010

Institute of Natural Resource Sustainability
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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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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 RAYMOND NE QUADRANGLE

Mining in the Raymond NE Quadrangle has taken place as two mines extended their workings into the area. There are no shafts within the quadrangle boundaries. Peabody No. 10 Mine (mine index 693) extended in from the north, and the Crown Mine (mine index 707) extended into the quadrangle from the west. The Crown Mine closed in 1971 and Peabody No. 10 Mine closed in 1994.

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.

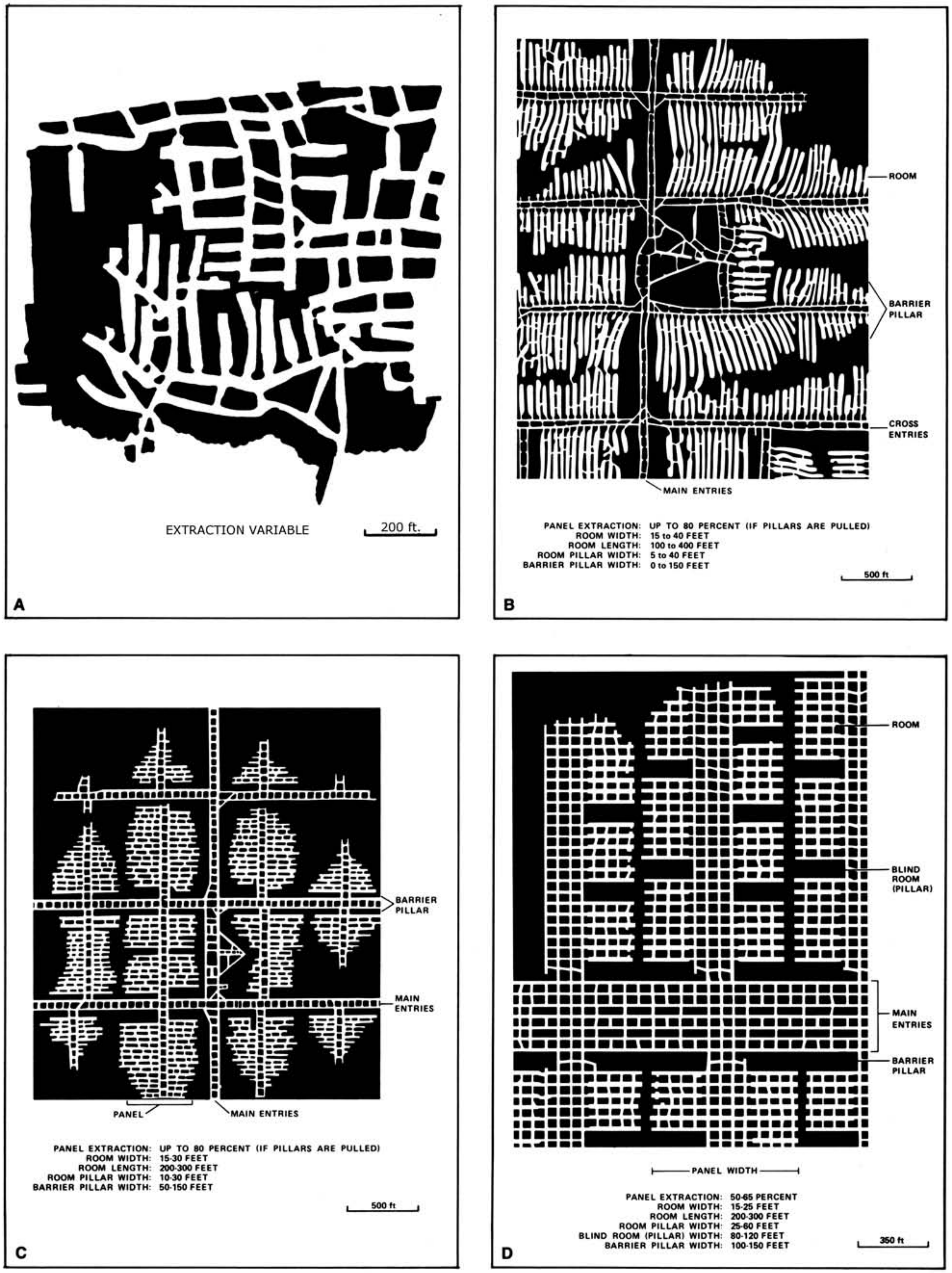

Figure 1 Mining methods: (A) room-and-pillar basic (RPB), (B) modified room and pillar (MRP), (C) room-and-pillar panel (RPP), (D) blind room and pillar (BRP).

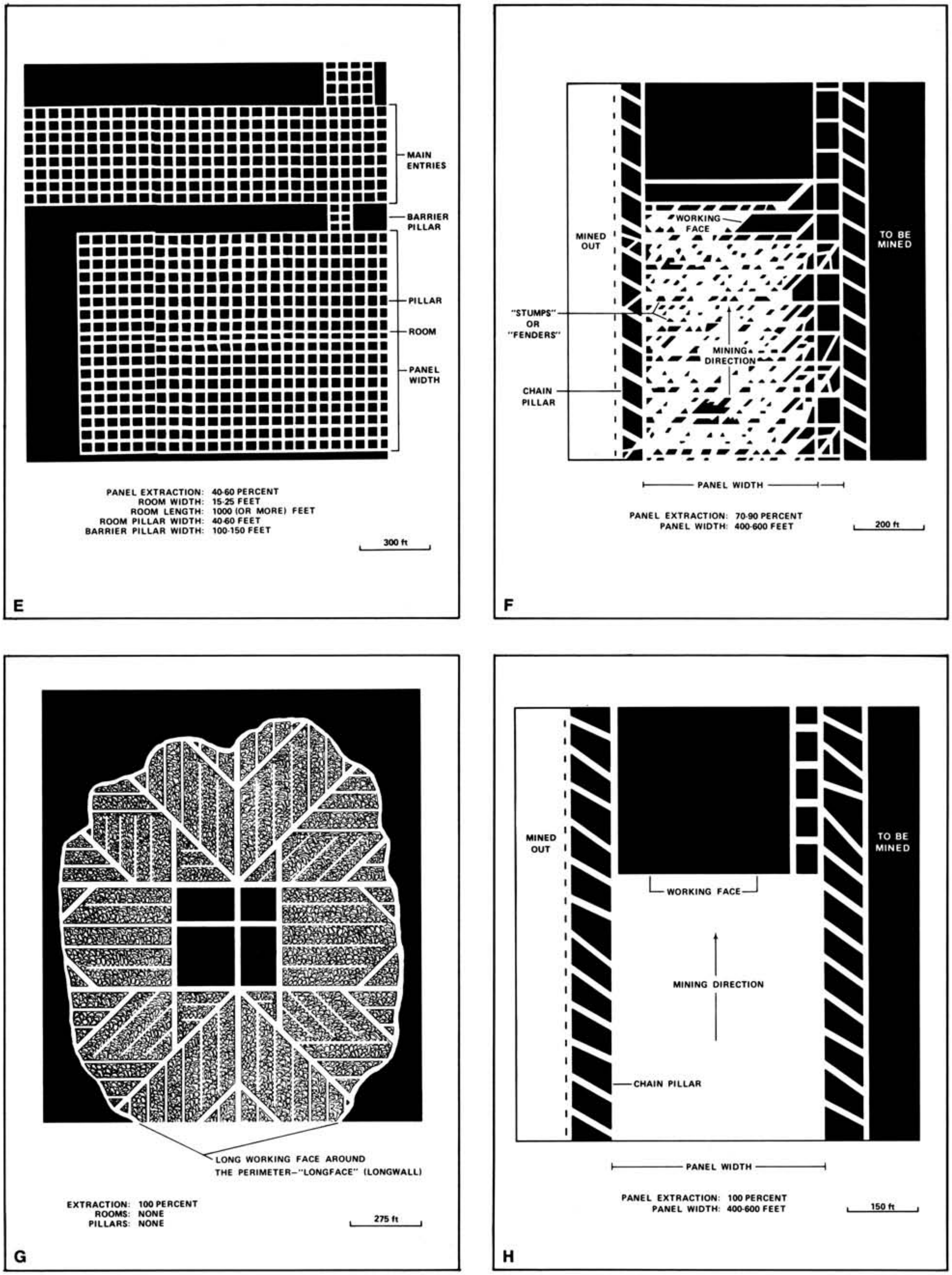

Figure 1 *(cont.)* Mining methods: (E) checkerboard room and pillar (CRP), (F) high extraction retreat (HER), (G) early (pre-1960) longwall, (H) post-1959 longwall

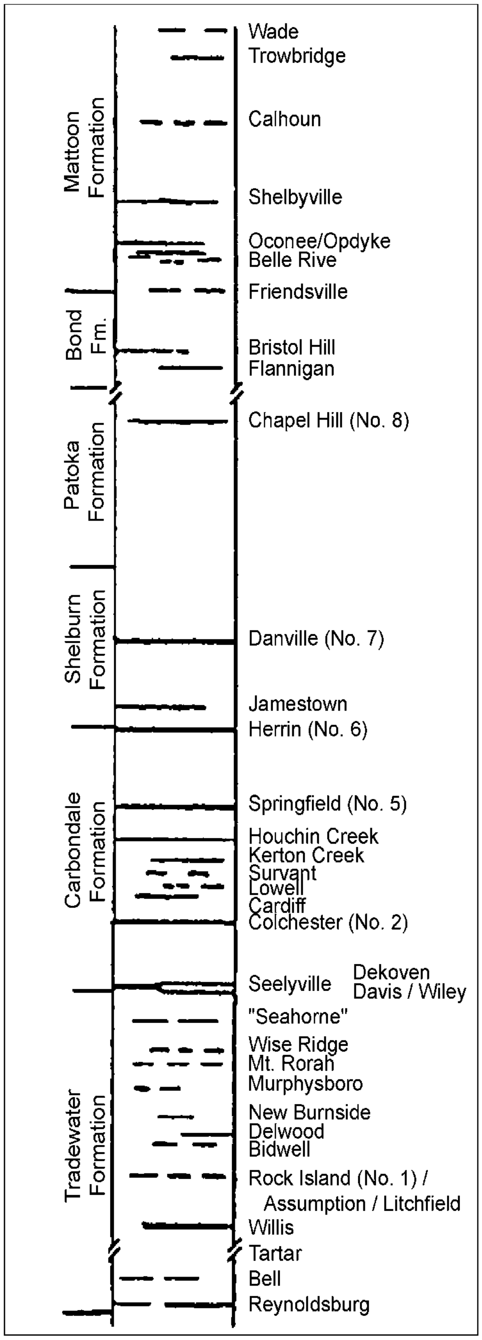

Figure 2 Generalized stratigraphic section, showing approximate vertical relations of coals in Illinois.

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 RAYMOND NE QUADRANGLE

MINE SUMMARY SHEETS

A summary sheet on the geology and production history of each mine in the Raymond NE 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 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.
ENR Document 85/01 - Mining method.
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 707
Freeman Coal Mining Corporation, Crown Mine

Type: Underground   Total mined-out acreage shown: 7,266

SHAFT, SLOPE, DRIFT or TIPPLE LOCATIONS

Type	County	Township-Range	Section	Quarters-Footage
Main shaft	Montgomery	12N 5W	34	NE SW SE
Air shaft	Montgomery	12N 5W	34	SW NE SE

GEOLOGY

Seam(s) Mined	Depth (ft)	Thickness (ft) Min	Max	Ave	Mining Method
Herrin	354			7.0	RPP

Geologic Problems Reported: All areas except the southeast portion of the mine were affected by fractures. The fractures trended northwest-southeast, and displacement ranged from a few inches to about 2 feet. These fractures were interpreted as faulting rather than compactional slips. Coal was eroded in the area of a sandstone channel in the western part of the mine. The channel halted expansion northward in westernmost part of the mine, but in the northern part of the mine, an entry was driven through the channel. In the southern part, the Crown III Mine (mine index 996) worked eastward to the channel.

PRODUCTION HISTORY

Company	Mine Name	Years	Production (tons)
Freeman Coal Mining Company	Crown	1951-1971	36,419,077
			36,419,077

Last reported production: November 1971

SOURCES OF DATA

Source Map	Date	Original Scale	Digitized Scale	Map Type
Company, 6-398	11-24-1971	1:12000	1:12000	Final

Annotated Bibliography (data source, brief description of information)

Coal Reports - Production, ownership, years of operation, seam, depth, thickness.
Directory of Illinois Coal Mines (Montgomery County) - Mine names, mine index, ownership, years of operation.
ENR Document 85/01 - Mining method.
Mine notes (Montgomery County) - Mine type, geologic problems.
Company map, Coal Section files, 6-398 - Shaft locations, mine outline, mining method, geologic problems.

INDEX OF MINES IN THE RAYMOND NE QUADRANGLE

Appendix M

Plan Maintenance Checklist

We are in the process of conducting our annual evaluation/status update for our Multi-Jurisdictional Hazard Mitigation Plan. Please review the following tasks and complete and return this checklist along with the necessary forms. If you have any questions, please let us know.

Jurisdiction: ____

Prepared By: ____

Title: ______________________________ Date: ________________

TASK 1: DAMAGE INFORMATION

Has your jurisdiction sustained any natural hazard-related damages to critical facilities and infrastructure within the last year?

☐ Yes ☐ No ☐ Don’t Know

If Yes, please complete and return the attached critical facilities damages questionnaire.

TASK 2: STATUS OF EXISTING PROJECTS/ACTIVITIES

Please look over the attached Mitigation Action Tables for your jurisdiction and determine whether any of the mitigation projects/activities listed have been completed or are in progress (in the planning stages.)

Does your jurisdiction have any mitigation projects/activities in progress (in the planning stages) or completed?

☐ Yes ☐ No

If Yes, please fill out and return the attached Mitigation Action Progress Report for each project/activity that has been completed or is in progress.

Has your jurisdiction undergone any changes in priorities within the last 12 months that would impact the implementation of the listed mitigation projects/activities?

☐ Yes ☐ No

If yes, please detail the changes in priorities.

____

____

____

Plan Maintenance Checklist

TASK 3: IDENTIFICATION OF NEW PROJECTS/ACTIVITIES

Are there any new mitigation projects/activities your jurisdiction would like to see add to the Plan? (Remember, only projects included in the Plan are potentially eligible for federal mitigation projects funding.)

☐ Yes ☐ No

If yes, please complete and return the attached New Mitigation Project Form.

TASK 4: JURISDICTION EVALUATION

Have there been any significant changes in development in your jurisdiction within the last 12 months (i.e. expansion of existing businesses, siting of new businesses, new subdivision development, or expansion of existing subdivisions, demolition of businesses/residents to create green spaces, etc.)

☐ Yes ☐ No

If yes, please specify the type of development changes.

____

____

Has your jurisdiction adopted any new/updated policies, plans, regulations, or reports (i.e., comprehensive plans, building codes, zoning ordinance, etc.) that could be incorporated into this Plan?

☐ Yes ☐ No

If yes, please provide the name of the policy, plan, regulation, or report and its purpose.

____

____

Were any components of the Hazard Mitigation Plan (i.e., mitigation actions, vulnerability analyses, etc.) integrated into any new/updated policies, plans, regulations, or reports (i.e., comprehensive plans, building codes, zoning ordinance, etc.)?

☐ Yes ☐ No

If yes, please provide the name of the policy, plan, regulation, or report and what component(s) of the hazard mitigation plan were integrated.

____

____

Plan Maintenance Checklist

TASK 4: JURISDICTION EVALUATION CONTINUED…

Do any new critical facilities or infrastructure need to be added to your jurisdiction's Critical Facilities Survey?

☐ Yes ☐ No

If yes, please provide the name and address of the facility.

____

____

What are your plans for sharing information on the Plan and its annual progress with your jurisdiction and constituents (i.e., informal presentation at board/council meeting, posting update to social media or website, etc.)?

____

____

Critical Facilities Damage Questionnaire

Supplemental information about ***damages to critical infrastructure/facilities*** (i.e., government buildings, schools, communication towers and radio equipment, water & sewer treatment facilities, hospitals, medical centers, etc.) that have ***taken place*** in the participating jurisdictions and County is needed for the risk assessment/vulnerability analysis portion of the Plan. If you could take a moment and think about the critical infrastructure damages caused by past natural hazard occurrences and provide any available information in the form below, it would be greatly appreciated.

Please complete <u>one record</u> for <u>each natural hazard event that damaged a critical facility</u>. Do not combine multiple events on one record. Additional forms are located on the back of this page. Please return the completed form(s) to Andrea or Zak. Thank you!

Jurisdiction: ______________________________

Prepared By: ______________________________ Date: ______________

1.) Date of Event (month/day/year if possible)**:** ______________

2.) Critical Facility Damaged: ______________________________

3.) Type of Hazard:

☐ thunderstorm (straight-line winds)
☐ hail
☐ lightning strike
☐ heavy rain
☐ flood
☐ tornado
☐ snow storm
☐ ice storm
☐ extreme cold
☐ drought
☐ excessive heat
☐ landslide
☐ sinkhole
☐ mine subsidence
☐ earthquake
☐ levee failure
☐ dam failure

4.) Types of Damages: ______________________________

____

5.) Estimate of Damages: $ ______________________________

Mitigation Action Progress Report

As part of the Plan Maintenance "monitoring" phase, the implementation status of each project and activity listed in the Plan for the participating jurisdictions needs to be identified.

1) Please review the Mitigation Action Tables provided for your jurisdiction to determine whether any of the projects/activities listed have been ***"Completed"*** or are ***"In Progress"*** (in the planning stages.)
2) For each project or activity that is ***"Completed"*** or "***In Progress"***, please fill out the following Progress Report.

Jurisdiction: ______________________________

Prepared By: ______________________________

Title: ____________________ Date: ____________________

Progress Report Period	From Date:	To Date:
Project/Activity Description		
Responsible Agency		

Project Status	☐ In Progress
	  ☐ Approved by Council/Board
	  ☐ Included in Capital Improvement Plan/Slated for Construction & Implementation
	  ☐ Grant Completed & Submitted
	  ☐ Letting/Contractor Selected
	  ☐ Notice to Proceed Issued
	  ☐ Construction Underway
	    ☐ Anticipated Completion Date: ____________
	  ☐ Other (please specify): ____________
	☐ Completed
	☐ Project Delayed
	☐ Project Cancelled	

SUMMARY OF PROJECT PROGRESS FOR THIS REPORT PERIOD

What was accomplished during this reporting period for this project?

Were any obstacles, problems or delays encountered?	☐ Yes	☐ No	☐ Don't Know
If Yes, please describe:			

If the project was delayed, is it still relevant?	☐ Yes	☐ No	☐ Don't Know
If Yes, should the project be changed/revised?			

Other comments:

New Hazard Mitigation Projects Form
Multi-Jurisdictional Hazard Mitigation Plan

Participating Jurisdiction ______________________________

Prepared by: ______________________________

Title ______________________________ Date: ______________

	Project Description	**Position/Organization Responsible for Implementation & Administration of the Project** *(i.e. Mayor / City Council; Public Works Director; Fire Chief / Board of Trustees)*	**Time Frame to Complete the Project** *(i.e. 1 year; 5 years; 2-5 years)*
1.			
2.			
3.			
4.			

APPENDIX N