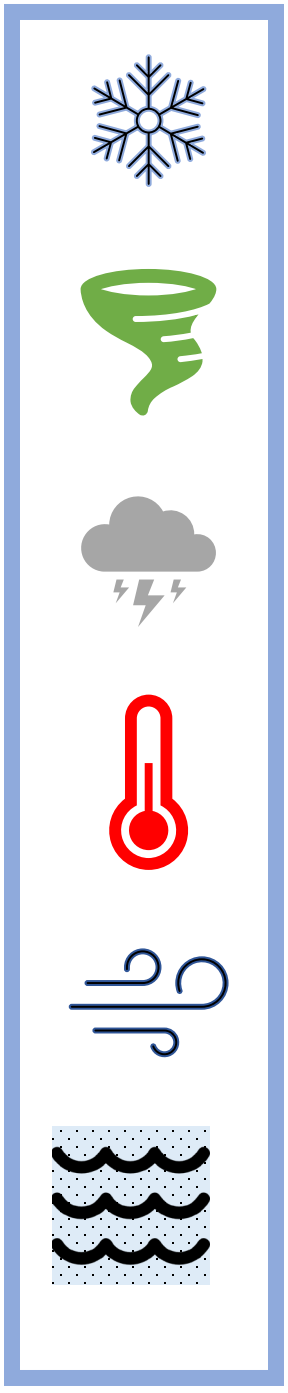
2023 Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan



Basco

Carthage

Dallas City

Ferris

Hamilton

Hancock County

LaHarpe

Nauvoo

Pontoosuc

Warsaw

West Point

2023 Hancock County Multi-jurisdictional Natural Hazards Mitigation Plan

Plan Author: University of Illinois Extension

With Assistance from: Illinois State Water Survey

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July 2023

The preparation of this report was financed through a Hazard Mitigation Grant Program Planning Grant from the Federal Emergency Management Agency and by Hancock County.

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INTRODUCTION

Communities look to protect the health, safety, and welfare of their citizens. Related to natural hazard events historically meant responding to the needs of the community after an event occurs. Mitigation looks to reduce the need for response by permanently removing people and structures from harm's way when a known area of impact can be identified (such as a floodplain) or significantly reducing the impact from a known risk (such as a tornado). This Plan provides an assessment of the risks to Hancock County from natural hazard events and a comprehensive range of mitigation projects to lessen the impact of these hazards on communities.

Hancock County and the participating incorporated jurisdictions within the county recognize the reality of disaster loss reduction begins with thoughtful mitigation. Often restricted by funding, personnel and timing, mitigation can be challenging in rural counties, especially without planning. The Hancock County Natural Hazard Mitigation Plan, under the leadership of the Hancock County Emergency Services and Disaster Agency, is on its third version of multi-jurisdictional hazard mitigation planning, the first completed after the devasting Mississippi river floods of the summer of 2008.

Hancock County contracted with University of Illinois Extension to update the Multijurisdictional Natural Hazard Mitigation Plan. Additionally, Illinois State Water Survey conducted an updated HAZUS Assessment as part of the risk assessment process. Commencing at the end of the COVID Pandemic, preplanning and planning meetings were conducted from the Summer of 2022 through the Summer of 2023. It was determined that the plan would utilize the newest FEMA Planning Policy OMB Collection #1660-0062, released April 19, 2022, to take effect April 19, 2023. This change included discussions on climate change, vulnerable populations, and nature-based mitigation solutions.

The Steering Committee for the 2023 Multi-Jurisdictional Natural Hazard Mitigation Plan for Hancock County, working together, crafted a useable, practical plan with many low to no cost projects that can be accomplished in the span of the 5 years of the plan. Due to the ongoing COVID Pandemic during the planning process, the committee choose to limit the planning process to 4 meetings in person, with community project consultations held via Zoom. No outside focus groups were scheduled due to similar concerns during the fall of 2022.

Augusta, Bentley, Bowen, and Elvaston, all villages within Hancock County, opted out of participating in the 2023 Hancock County Natural Hazard Mitigation Plan. Numerous outreach attempts were made to these communities, but they either declined to participate or failed to respond.

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CHAPTER 1 – The Planning Process

From the onset of the 2023 planning process, the steering committee recognized the severe weather events are increasing in number and intensity, and the communities look to protect the health, safety, and welfare of their citizens. This plan provides an assessment of the risks to Hancock County from natural hazard events, including potential changes in the climate and weather patterns, and a comprehensive range of mitigation projects to lessen the impact of these hazards on communities.

With the potential availability of mitigation grant funding from the Federal Government, communities included mitigation projects that would not otherwise be financially possible. The preparation of this plan follows the guidelines to make participating communities eligible to apply for mitigation grant funding through both Pre-Disaster Mitigation (PDM) and Building Resilient Infrastructure and Communities (BRIC) grants through the Federal Emergency Management Agency (FEMA) awarded to the Illinois Emergency Management Agency for subawards. Other funding streams are also noted as potential sources of funding to implement project requiring external resources.

Nature-based Mitigation Discussions. The planning process for the third iteration of Hancock County's third Multijurisdictional Natural Hazard Mitigation Plan began in the summer of 2022, with two meetings tied to looking at the current mitigation plan goals and strategies and a specific look at potential nature-based mitigation strategies and infrastructure potentials for the county. These discussions incorporated maps, potential nature-based strategies, and potential funding for projects. The first discussion was held on May 31, 2022, with a follow-up meeting held on June 21, 2022.

These discussions included specific types of projects that could be utilized, especially for storm ground water mitigation projects. As a part of this process, a demonstration rain garden was completed in Nauvoo with training and design provided by University of Illinois Extension and materials provided by an Extension Disaster Education Network (EDEN) Grant. These meeting agendas are attached as **Attachment 1**.

Nature based mitigation ideas were incorporated into three of the eleven participating jurisdictional project grids. This appears to be a direct result of a better understanding of the types of projects considered "nature based" as well as the recognition that the practicality, cost, and maintenance of these installations was feasible for small communities.

Inherent in the nature-based solutions conversation was the recognition that **climate change** is making an impact on the weather patterns and potential for increased vulnerability to disasters. Hancock County participants recognized that these impacts were more likely to

impact **vulnerable** populations within the county, especially the elderly populations and those living below the poverty level. The discussion of these topics resulted in the inclusion of county level projects to reduce potential risks to these populations.

Dam/Levee Risk and Mitigation Discussion. As part of the planning process, the planning committee was provided with a list of dams from the national dam inventory during the first planning meeting. The dams/levees in the county, according to the inventory are:

Dams in Hancock County
(https://nid.sec.usace.army.mil/#/dams/search/sy=@countyState:Hancock,%20Illinois&viewType=map&resultsType=dams&advanced=false&hideList=false&eventSystem=false)

Horton Lake Dam
Hazard Potential Classification: High
Emergency Action Plan: Yes
Owner Name: ILLINOIS DEPARTMENT OF NATURAL RESOURCES
Primary Purpose: Recreation

Rocky Run Lake Dam
Hazard Potential Classification: Significant
Emergency Action Plan: No
Owner Name: HUNT-LIMA DRAINAGE DISTRICT
Primary Purpose: Flood Risk Reduction

Little Rocky Run Lake Dam
Hazard Potential Classification: Significant
Emergency Action Plan: No
Owner Name: HUNT-LIMA DRAINAGE DISTRICT
Primary Purpose: Flood Risk Reduction

LaHarpe Reservoir Dam
Hazard Potential Classification: Significant
Emergency Action Plan: No
Owner Name: CITY OF LAHARPE
Primary Purpose: Recreation

Jennifer Creek Reservoir Dam
Hazard Potential Classification: Low
Emergency Action Plan: No
Owner Name: HUNT-LIMA DRAINAGE DISTRICT
Primary Purpose: Flood Risk Reduction

Augusta Lake Dam
Hazard Potential Classification: Low
Emergency Action Plan: No
Owner Name: MR. STECKLER, N. LANSING, R. LANSING
Primary Purpose: Recreation

Hiland Lake Dam
Hazard Potential Classification: Low
Emergency Action Plan: No
Owner Name: LARRY HILAND
Primary Purpose: Recreation

Limkemann Pond Dam
Hazard Potential Classification: Low
Emergency Action Plan: No
Owner Name: ROGER LIMKEMANN
Primary Purpose: Recreation

Thomas Lake Dam
Hazard Potential Classification: Low
Emergency Action Plan: No
Owner Name: LOREN THOMAS
Primary Purpose: Recreation

Musick Pond Dam
Hazard Potential Classification: Low
Emergency Action Plan: No
Owner Name: MARVIN MUSICK
Primary Purpose: Recreation

Carthage Lake 2 Dam
Hazard Potential Classification: Low
Emergency Action Plan: No
Owner Name: CITY OF CARTHAGE
Primary Purpose: Recreation

Lake Linda Dam
Hazard Potential Classification: Low
Emergency Action Plan: No
Owner Name: UNKNOWN
Primary Purpose: Recreation

Levees in Hancock County
(https://levees.sec.usace.army.mil/#/levees/search/in=@county%20state:Hancock,%20Illinois&viewType=map&resultsType=systems&advanced=true&hideList=false&eventSystem=false)

Brooks Levee No. 1
Location: Hancock, Illinois

Brooks Levee No. 2
Location: Hancock, Illinois

Elbus Levee
Location: Hancock, Illinois

Hunt-Lima D&LD
Location: Adams, Hancock, Illinois

Hunt-Lima D&LD - Jenifer Creek Diversion Dam
Location: Hancock, Illinois

Hunt-Lima D&LD - Rocky Run Dam and Little Rocky Run Dam
Location: Hancock, Illinois

Miller-Elbus Levee
Location: Hancock, Illinois

Swain Levee
Location: Hancock, Illinois

Van Horn Levee*
Location: Hancock, Illinois

Discussion during the meeting reached consensus that no significant risk was posed by any dams or levees. After thought and re-evaluation, however, two of the jurisdictions felt that dams owned by the municipality might need attention, and thus included the studies in the mitigation action section. Levees, however, are not considered a significant threat for the county but the committee members.

2023 Plan Update Meetings. As the planning process moved into specific plan updates, a meeting schedule was developed, press releases scheduled and invitations to jurisdictions made by both e-mail and phone calls. The public was invited to all the mitigation planning

sessions, via press releases and community notifications. **Attachment 2** Shows the original meeting schedule developed as well as topics to be discussed at each meeting.

As with most planning projects, weather and scheduling conflicts arose which extended the timeframe of the planning process. This additional time allowed jurisdictions to consider potential projects for inclusion into the plan that may not have been included in the original condensed timeframe.

Planning meetings were held on the following dates and locations:

Meeting 1- August 23, 2022, 4 PM, 1006 Wabash Avenue, Carthage, Illinois

Meeting 2 – September 22, 2022, 4:30 PM, 1006 Wabash Avenue, Carthage, Illinois

Meeting 3- November 1, 2022, 4:30 PM, 1006 Wabash Avenue, Carthage, Illinois

Meeting 4 and Public Plan Review – July 26, 2023, 4-6 PM, Board Room, Hancock County Courthouse, Carthage, Illinois

Agendas and notes for the above referenced meetings are included as **Attachment B**. In addition to the planning meetings, each participating jurisdiction scheduled and met with Illinois Extension Contributors to determine projects to be included. These meetings were held via Zoom, with the summary notes included in **Attachment C.** These meetings allowed for time for each jurisdiction to discuss their specific needs and their specific capabilities as a community.

Jurisdictional Participation in Plan Development. The criteria that would constitute satisfactory jurisdictional participation in the planning process were established at the first meeting of the Hancock County Multi-Jurisdictional Natural Hazards Mitigation Plan Task Force. The participating Jurisdictions all met the requirements.

- Attend a minimum of 2 meetings
- Submit a list of relevant community documents
- Confirm hazards that affect the community
- Confirm the list of critical facilities submitted by HAZUS
- Develop projects/action items for Plan
- Meet with facilitators to identify projects for the community
- Develop and prioritize mitigation actions for the community
- Review and comment on draft plan

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Community Participation in Planning Process. Press releases were sent to all local media for each of the planning meeting, with the public invited to attend each meeting. Additionally, radio interviews for the local Extension Office promoted the meetings. Neighboring Counties as well as the public were also invited to the final meeting reviewing the draft plan for comment. In addition, the plan was posted on both the Hancock County Website (https://www.hancockcounty-il.gov/) and the Illinois Extension Hancock County Website (https://extension.illinois.edu/abhps) for public comment. Press releases were sent out to local media with the links to both sites to encourage public comment.

A final meeting was held for both planning committee members and the community on July 26, 2023, at the County Courthouse in Carthage. The presentation included the changes made from the 2018 plan as well as the additions of climate change information, nature-based solutions as mitigations options, and the need for projects to assist vulnerable populations.

Attached in Appendix 1 are copies of press releases, attendance logs and summaries of each meeting. Public engagement continues to be challenging, especially as media segmentation becomes more diverse. Social media posts may be added to the informational posts for future update meetings as well as planning processes within the county.

Existing Plans, Studies, and Report Reviews. As part of the planning process, each participating jurisdiction was asked to complete a plan document review. Participating jurisdictions indicated participation in the plans and activities summarized in the following table. Plans available within Hancock County are generally dated and limited to the larger communities.

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Figure 1.0: Jurisdictional Plan and Activity Review.

Type of Plan/ Actions	Basco	Carthage	Dallas City	Ferris	Hamilton	Hancock County	La Harpe	Nauvoo	Plymouth	Pontoosuc	Warsaw	West Point
Comprehensive Plan		X						X			X	
Subdivision Ordinance		X					X	X				
Zoning Ordinance		X			X			X			X	
Building Codes		X			X			X			X	
Land Use Plan		X						X				
Existing Land Use Map		X				X		X				
Flood Ordinance		X	X		X			X			X	
Flood Insurance Rate Map*		X	X		X	X	X	X		X	X	
Repetitive Flood Loss List		X				X					X	
Elevation Certificates for Bldgs.											X	
Capital Improvement Plan		X										
Historic Preservation Ordinance		X					X					
Storm Water Management Plan			X				X				X	
Hazard Mitigation Plan							X	X		X	X	
Emergency Management Plan		X	X		X	X	X	X				
Drainage Ordinance							X				X	
Critical Facilities Map		X				X					X	
Hazard Vulnerability Analysis												
Infrastructure Map		X					X	X		X		
Topographic Map		X				X		X		X		
Community Website		X	X		X	X	X	X				
Community Action												
Siren/Call System		X	X		X		X	X			X	
Weather Radio						X	X	X				
Storm Spotters		X	X		X	X	X	X			X	
Local Weather Station		X										
Watershed Repairs					X							
Road Treatment	X	X	X	X	X	X	X	X		X	X	X

Local Capability Assessment. Hancock County Jurisdictions are extremely rural, with limited capabilities of engaging in large scale structural mitigation actions without significant technical assistance and project management guidance. Hamilton, Carthage and Nauvoo are the largest communities within the county and do have staff that could potentially assist in project

implementation on a small scale, but for large scale projects would need to include a contracted management team. Communities in Hancock County have limited capacity within city/village government to engage in grant writing or management. This is especially true for large scale mitigation projects requiring detailed documentation. Projects requiring a great deal of management and coordination can be accomplished with regional engineering firms or Regional Planning Councils contracted to assist.

The local capability assessment included the existing plan status from participating jurisdictions, documents and regulations that are currently in place or planned to mitigate some of the devastating effects of natural disasters. As with many rural communities, many of the parties responsible for implementing the mitigation plans have multiple roles in addition to mitigation. Local capabilities also may be directly impacted by lack of availability of state and federal assistance in implementing structural mitigation projects.

Many of the projects identified within the planning process include awareness and community coordination, which is within the capability of the jurisdictions participating in the multijurisdictional natural hazard mitigation plan update. Through regular "mayors" meetings, hosted by the Hancock County Economic Development Corporation and University of Illinois Extension, awareness and coordination projects can be implemented, and emergency services throughout the county partner on emergency response and coordination activities. These existing networks enhance local capabilities to enhance awareness and collaboration projects that mitigate risks within the county.

State Capability Assessment. The Illinois Emergency Management Agency (IEMA) updated the Illinois Natural Hazard Mitigation Plan (INHMP) in 2018, and an updated version is expected to be adopted in the fall of 2023. This plan outlines broad mitigation goals that provide the basis for local mitigation plans. A review of participating state agencies capacity is included in the 2018 INHMP. IEMA also provides critical technical assistance through trained mitigation staff. In the draft of the 2023 Illinois State Natural Hazard Mitigation Plan, the reorganization of the IEMA Recovery Division, to include mitigation staff, as well as adding regional mitigation planners is outlined. This enhancement of capabilities at IEMA, together with their state agency partners, will enhance the agency's ability to not only assist with mitigation, but work directly with communities to recover from a disaster in a more resilient fashion.

Through IEMA Staff, technical assistance is provided through direct consultation, training webinars, site visits, plan reviews and more. Additionally, through members of the Illinois Interagency Mitigation Advisory Group (IMAG), funded projects within Illinois are reviewed objectively to ensure the mitigation goals of the State Plan are being met. IEMA Staff also can work with local jurisdictions to see if any of the outlined mitigation projects would be eligible for Federal Emergency Management Agency (FEMA) funding or may be a potential fit for other federal funding streams.

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HANCOCK COUNTY DEMOGRAPHIC OVERVIEW

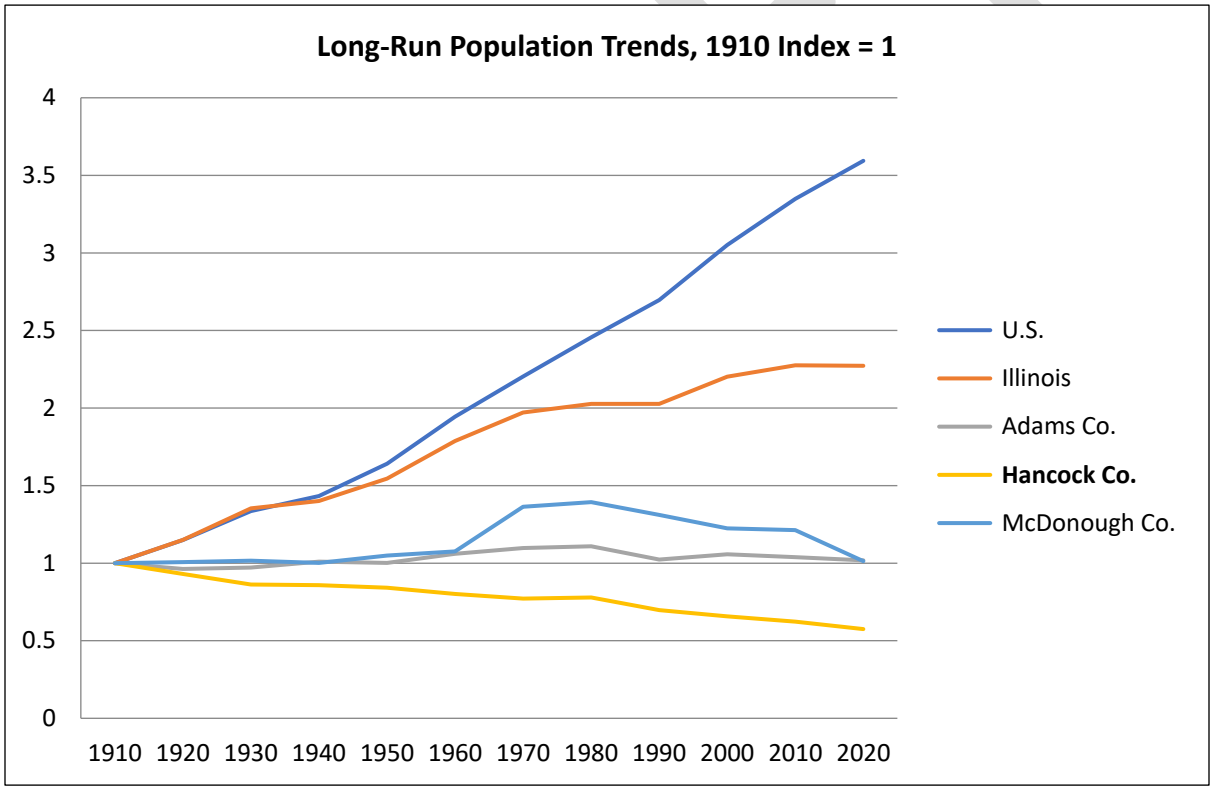
The following data is presented to provide an overview of Hancock County. All data are benchmarked against two near neighbors, Adams and McDonough counties, and when appropriate the State of Illinois and the nation.

POPULATION TRENDS

Long-Run Population Trend

The population in Hancock County has decreased every decade since 1900, except for 1970 to 1980 which saw a slight increase. In 1900 the county had a population of 32,215 and by 2020 the county population had shrunk to 17,620, a decrease of 45 percent. In comparison, Hancock's two near neighbors, Adams and McDonough counties, saw slight increases in population over this time period but have experienced downward trends since 1980 (see figure 1.1).

Figure 1.1: Long-Run Population Trend



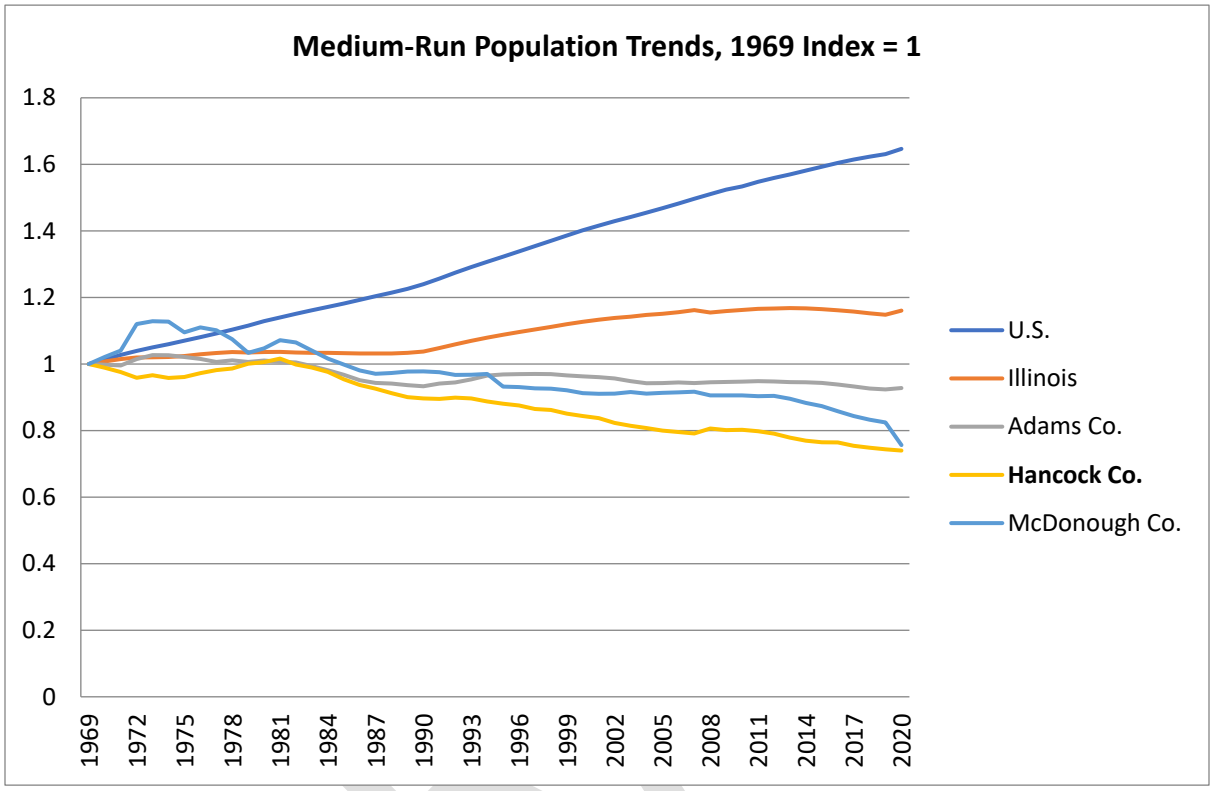
Source: U.S. Census Bureau, Decennial Census 1910-2020

Medium-Run Population Trend

The population in Hancock County declined from 23,812 in 1969 to 17,620 in 2020, a loss of about 26 percent. The population trend over this time period was generally a slow steady decline. Similarly, Hancock's nearest neighbors McDonough and Adams counties both also saw shrinking populations over

the same time period, though the percentage of population lost was less in these two counties than in Hancock (see figure 1.2 below). Conversely, both the state of Illinois and the nation grew in population of this time period.

Figure 1.2: Medium-Run Population Trend



Source: U.S. Census Bureau, Population Estimates Series

Age of the Population

Hancock County has an older population than its two near neighbors, the state, and the nation. It is estimated that 21 percent of Hancock's population is under the age of 18. This is the lowest percentage among all benchmark areas except for McDonough County. Conversely, Hancock County has the highest percentage of persons over 65 years of age amongst all benchmark areas (see figure 1.3).

Figure 1.3: Population Under 18 and Over 65

2020 Estimated Percentage of Population Under 18 and Over 65

	U.S.	Illinois	Adams Co.	**Hancock Co.**	McDonough Co.
Under 18	22.4%	22.5%	22.7%	**21.0%**	17.1%
Over 65	16.0%	15.7%	20.2%	**23.6%**	17.8%

Source: U.S. Census Bureau, American Community Survey, 2020.

Racial Make-up of the Population

Hancock County's population is predominantly white, and non-Hispanic. Whites comprise an estimated
94.7 percent of the population. Non-Hispanics of any race make up 95.1 percent of the total population.
Hancock County is similar, but slightly less racially and ethnically diverse, than its two neighbors Adams and McDonough counties (see figures).

Figure 1.4: Population – Racial Make-up

2020 Racial Make-up

	U.S.	Illinois	Adams Co.	**Hancock Co.**	McDonough Co.
White	61.6%	61.4%	89.5%	**94.7%**	85.7%
Black	23.4%	14.1%	3.8%	**0.4%**	5.6%
Other	26.0%	24.5%	6.7%	**4.9%**	8.7%

2020 Hispanic Population

	U.S.	Illinois	Adams Co.	**Hancock Co.**	McDonough Co.
Hispanic or Latino	18.7%	18.2%	2.0%	1.8%	3.5%
Not Hispanic or Latino	81.3%	81.8%	98.0%	98.2%	96.5%

Source: U.S. Census Bureau, Decennial Census 2020.

INCOME

Median Household and Per Capita Income

In 2020 the estimated median household income in Hancock County was $55,818. This was higher estimated median household income than both Adams County at $55,052, and McDonough County at $43,591. In terms of per capita income, Hancock is estimated to be higher than McDonough County but lower than Adams County. The 2020 per capita income estimate for Hancock County was $30,405. The figures for Adams and McDonough counties were $31,035 and $25,219 respectively. All three counties trailed U.S. and Illinois State averages in both measures. The estimated median household income for the U.S. in 2020 was $64,994, while the per capita income was estimated at $35,384. Illinois' 2020 estimated median household income was $68,428 and the per capita income was estimated at $37,306.

Poverty Rate

In 2020, an estimated 13 percent of Hancock County's population lived below the poverty line. The poverty rate among children under 18 was 23.3 percent. Hancock County's total population in poverty estimates exceeded all benchmark areas except McDonough County where 20.5% of the population was estimated to be living in poverty. Hancock County's 2020 estimated child poverty rate exceeded comparable figures against all benchmark areas (see figure 1.5).

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Figure 1.5: Poverty Status

2020 Estimated Poverty Status

	U.S.	Illinois	Adams Co.	**Hancock Co.**	McDonough Co.
Population in Poverty	12.8%	12.0%	12.5%	**13.0%**	20.5%
Children in Poverty	17.2%	15.9%	17.4%	**23.3%**	12.9%

Source: U.S. Census Bureau, American Community Survey, 2020.

HOUSING AND HOUSEHOLDS

Household Types

Married couple families are the largest household-type group in Hancock County. While this is also the largest group in all of the benchmark areas, a greater proportion of Hancock County households are married couples. Conversely, Hancock County has a low percentage of households with their own children present with only McDonough County having a lower estimated percentage (see figure 1.6).

Figure 1.6: Household Types

2020 Estimated Households by Type and Presence of Own Children

	U.S.	Illinois	Adams Co.	**Hancock Co.**	McDonough Co.
Total Households	122,354,219	4,884,061	27,199	**7,542**	11,573
Average Household Size	2.60	2.54	2.36	**2.33**	2.32
Married-Couple Families	58,807,003	2,301,114	13,643	**4,107**	4,670
Pct. of Total Households	48.1%	47.1%	50.2%	**54.5%**	40.4%
Male Householder, No Wife	5,956,017	224,181	1,076	**225**	319
Pct. of Total Households	4.9%	4.6%	4.0%	**3.0%**	2.8%
Female Householder, No Husband	15,086,810	591,120	2,679	**553**	766
Pct. of Total Households	12.3%	12.1%	9.8%	**7.3%**	6.6%
Non-Family Households	42,504,389	1767,646	9,801	**2,657**	5,818
Pct. of Total Households	34.7%	36.2%	36.0%	**35.2%**	50.3%
Households with Own Children	33,410,645	1,323,108	6,816	**1,639**	2,337
Pct. of Total Households	27.3%	27.1%	25.1%	**21.7%**	20.2%

Source: U.S. Census Bureau, American Community Survey, 2016 and 2020.

Owner Occupancy Rates

Hancock County has a high rate of owner occupancy. In 2020, an estimated 81.6 percent of occupied housing units were owner occupied. This owner occupancy rate was higher than all benchmark areas (see figure 1.7).

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Figure 1.7: Occupancy Rates

2020 Estimated Owner vs Renter Occupancy Rates

	U.S.	Illinois	Adams Co.	**Hancock Co.**	McDonough Co.
Owner Occupied	64.4%	66.3%	71.6%	**81.6%**	63.4%
Renter Occupied	35.6%	33.7%	28.4%	**18.4%**	36.7%

Source: U.S. Census Bureau, American Community Survey, 2020.

Housing Type

Detached single-family homes are the predominant housing type in Hancock County. In 2020, an estimated 82.7 percent of housing units in Hancock County were detached single family homes.

Hancock County had a higher proportion of detached single-family homes than all benchmark areas (see figure 1.8).

Figure 1.8: Housing Units

2020 Estimated Housing Units by Units in Structure

	U.S.	Illinois	Adams Co.	**Hancock Co.**	McDonough Co.
1-unit, detached	61.6%	58.8%	75.2%	**82.7%**	64.6%
1-unit, attached	5.8%	5.7%	3.3%	**0.8%**	4.1%
2 units	3.6%	5.7%	5.0%	**3.5%**	3.0%
3 or 4 units	4.4%	6.5%	5.1%	**3.7%**	5.1%
5 to 9 units	4.7%	6.4%	2.8%	**1.3%**	6.3%
10 to 19 units	4.5%	3.8%	1.0%	**0.5%**	4.1%
20 or more units	9.0%	10.6%	3.3%	**1.0%**	7.2%
Mobile home	6.2%	2.5%	4.1%	**6.5%**	5.6%
Boat, RV, van, etc.	0.1%	0.0%	0.0%	**0.0%**	0.0%

Source: U.S. Census Bureau, American Community Survey, 2020.

Age of Structures

The median year that a structure was built in Hancock County was 1962. The dominant year that structures in Hancock County were built was 1939 or earlier. Hancock County's building stock is older than all benchmark areas (see figure 1.9).

Figure 1.9: Age of Structures - County

2020 Estimated Median Year and Dominant Year Structures Built

	U.S.	Illinois	Adams Co.	**Hancock Co.**	McDonough Co.
Median Year Built	1978	1969	1965	1962	1967
Dominant Year Built	1970-1979	1939 or Earlier	1939 or Earlier	1939 or Earlier	1939 or Earlier

Source: U.S. Census Bureau, American Community Survey, 2020.

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SELECTED DATA FOR PARTICIPATING JURISDICTIONS

The following data covers selected demographics for jurisdictions in Hancock County, which are participating in this mitigation plan.

Land Area and Population

Most of the villages and cities in Hancock County lost population between 2010 and 2020 according to
Census estimates (see figure 1.10).

Figure 1.10: Land Area and Population - Municipalities

Land Area and Population

	Land Area (Sq Miles)	2010 Population	2020 Population
Augusta	0.713	587	553
Basco	0.227	98	80
Bentley	0.141	35	30
Bowen	0.431	494	464
Carthage	2.440	2,605	2,490
Dallas City	2.375	945	805
Elvaston	0.797	165	147
Ferris	1.957	156	127
Hamilton	3.748	2,951	2,753
La Harpe	1.355	1,235	1,175
Nauvoo	3.382	1,149	950
Plymouth	0.589	505	436
Pontoosuc	1.409	146	99
Warsaw	6.617	1,607	1,510
West Point	0.168	178	140

Source: U.S. Census Bureau, Decennial Census 2010 and 2020.

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Age of the Population

In general, villages and cities in Hancock County have older populations than the state of Illinois and the
U.S. Many of Hancock County's communities have a higher proportion of the population under the age of 18, and a higher proportion of the population over the age of 65 than the state and nation (see figure 1.11).

Figure 1.11: Population Under 18 and Over 65 – Municipalities

2020 Percentage of Population Under 18 and Over 65

	Pct Under 18	Pct Over 65
U.S.	*22.4%*	*16.0%*
Illinois	*22.5%*	*15.7%*
Augusta	26.9%	17.9%
Basco	15.3%	14.1%
Bentley	16.7%	27.8%
Bowen	32.4%	8.9%
Carthage	17.7%	25.1%
Dallas City	25.2%	19.4%
Elvaston	23.8%	17.9%
Ferris	18.3%	33.5%
Hamilton	23.4%	20.4%
La Harpe	19.4%	30.4%
Nauvoo	25.4%	28.7%
Plymouth	18.6%	32.2%
Pontoosuc	28.4%	22.9%
Warsaw	24.9%	21.9%
West Point	35.6%	12.8%

Source: U.S. Census Bureau, Decennial Census 2020 and American Community Survey 2020.

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Age of Structures

Most of the villages and cities in Hancock County have older building stock. All of the municipalities except for Pontoosuc have structures which are generally older than state and national averages (see figure 1.12).

Figure 1.12: Age of Structures - Municipalities

2020 Estimates of Median Year and Dominant Year Structures Built

	Median Year Built	Dominant Year Built
U.S.	1978	1970-1979
Illinois	1969	1939 or Earlier
Augusta	1956	1939 or Earlier
Basco	1939	1939 or Earlier
Bentley	1939	1939 or Earlier
Bowen	1950	1939 or Earlier
Carthage	1960	1939 or Earlier
Dallas City	1952	1939 or Earlier
Elvaston	1950	1939 or Earlier
Ferris	1958	1939 or Earlier
Hamilton	1964	1939 or Earlier
La Harpe	1965	1939 or Earlier
Nauvoo	1963	1939 or Earlier
Plymouth	1948	1939 or Earlier
Pontoosuc	1973	1970-1979
Warsaw	1968	1939 or Earlier
West Point	1941	1939 or Earlier

Source: U.S. Census Bureau, American Community Survey, 2020

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CHAPTER 2– Risk Assessment

HAZARD VULNERABILITIES AFFECTING HANCOCK COUNTY

While risk is a relative concept, after reviewing historical weather data, the HAZUS data provided by Illinois State Water Survey, and the county risk rankings included in the 2023 Illinois Natural Hazard Mitigation Plan (June 2023 posted draft), only slight modifications were made for individual jurisdictions. For example, the communities along the Mississippi River increased their risk of riverine flooding to high, while those communities not along a major stream or river reduced the risk to low.

Additional changes by jurisdiction included increasing the dam/levee failure to low from very low for the two communities with dams. Due to the rural nature of the county, committee members also felt that the risk from ice storms was medium, especially for power outages associated with ice storms. It was feared that long term power outages may put vulnerable populations at risk. While there was general agreement that the risk of an earthquake impacting Hancock County and its jurisdictions is low, evacuation routes from impacts south of the county, in the New Madrid Fault Zone, may impact the county.

Flash Flooding was also discussed at length, after recent heavy rain events were experienced in both Eastern Illinois (Gibson City) and Southern Illinois (St. Clair County). While the committee agreed that the day-to-day risk was low, the long-term risk was in the medium (if not high) ranges, due to aging infrastructure and the predictions of increased, heavy rains. This recognition did not alter the jurisdictional risk assessments for flash flooding but did inform the conversations regarding nature-based solutions to stormwater management.

Wind, tornado, and hail were risks that were discussed as inevitable and left at the medium risk for all jurisdictions. Lightning, however, was elevated to low from very low, based upon the potential for strikes on farms, sports fields, and to water systems. A lightning strike took out wells of one of the larger rural water systems in 2017, making the risk to infrastructure apparent. Wildfire was not considered a significant risk based the risk assessments or historical data, so the risk was left at very low for all jurisdictions.

While there was discussion regarding the risk on pandemic, and jurisdictions recognized the risk, it was agreed that the rural nature of the county did reduce the necessity of close quarter transmission of communicable diseases for the most part. This led to the agreement of keeping the risk of pandemic low for all jurisdictions. Drought, cold wave, heat wave, landslide and mine subsidence were all considered universally low as well.

The following table illustrates the final risk levels for each jurisdiction, with the county wide risk levels remaining the same as the 2023 Illinois Natural Hazard Draft Plan. As can be seen, none of the risks identified as considered to be a very high risk, with most risks being rated as very low or low.

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Figure 2.0: Hancock County Jurisdictional Risk Assessment

Jurisdiction	Drought	Earthquake	Cold Wave	Heat Wave	Dam/ Levee	Flash Flooding	Riverine Flooding	Landslide	Mine Subsidence	Pandemic	Hail	Lightning	Wind	Tornado	Wildfire	Ice Storm	Winter Storm
Hancock County*	L	VL	L	L	VL	M	M	VL	L	L	M	VL	M	M	VL	L	M
Basco	L	VL	L	L	VL	M	L	VL	L	L	M	L	M	M	VL	M	M
Carthage	L	VL	L	L	L	M	L	VL	L	L	M	L	M	M	VL	M	M
Dallas City	L	VL	L	L	VL	M	H	VL	L	L	M	L	M	M	VL	M	M
Ferris	L	VL	L	L	VL	M	L	VL	L	L	M	L	M	M	VL	M	M
Hamilton	L	VL	L	L	VL	M	H	VL	L	L	M	L	M	M	VL	M	M
LaHarpe	L	VL	L	L	L	M	VL	VL	L	L	M	L	M	M	VL	M	M
Nauvoo	L	VL	L	L	VL	M	H	VL	L	L	M	L	M	M	VL	M	M
Pontoosuc	L	VL	L	L	VL	M	H	VL	L	L	M	L	M	M	VL	M	M
Warsaw	L	VL	L	L	VL	M	H	VL	L	L	M	L	M	M	VL	M	M
West Point	L	VL	L	L	VL	M	L	VL	L	L	M	L	M	M	VL	M	M
Annual % Risk	10	>1	100	100	NH	60+	95	>1	NH	1	100	100	100	35	>1	50+	100

* From 2023 Illinois Natural Hazard Mitigation Plan

Table Key

VL=VERY LOW
L=LOW
M-MEDIUM
H=HIGH
VH=VERY HIGH

Annual Probability of Hazards (% Risk)

While historical weather data can give an overview of the past events on each of the hazards that impact Hancock County, recent weather pattern changes and extreme weather events associated with climate change make historical data less predictive of future events. Some events such as extreme temperature, lighting, wind, and winter storms are assumed to be 100% probable each year, based on historical data alone. Other hazards, such as earthquake, landslide and wildfire are not considered a practical risk at this time for the county based upon geology of the region as well as vegetation, so the annual probability for these hazards remains at less than 1%. Other probabilities were calculated based upon historical probabilities. Two

hazards, Flash Flood and Ice Storms, were elevated with a + sign, to acknowledge changing weather patterns that might increase the risk of these hazards.

Repetitive Loss/National Flood Insurance Program (NFIP) Participation

All participating jurisdictions with identified floodplains within Hancock County maintain compliance. These jurisdictions are Hancock County, Carthage, Dallas City, Hamilton, Nauvoo, Pontoosuc, and Warsaw. One of the ongoing concerns is repetitive loss properties, of which the county has a total of 25, according to FEMA. These properties are split with four on the unincorporated parts of the county, one in Carthage, seven in Dallas City, and the remaining thirteen in Pontoosuc.

The mitigation of these properties would greatly reduce the potential cost of riverine flooding in the county and continues to be a priority. While buyouts are generally the most practical type of mitigation for these properties, in some instances elevation or flood proofing may also be considered. The key to reaching the goal of zero repetitive loss properties is the availability of financial resources to acquire or retrofit the properties.

FEDERAL DISASTER DECLARATIONS HISTORY SINCE 1981

Most of the federally declared disasters that Hancock County has been a part of since 1981 have been flood events.

FEMA DR#735 – Hancock County was one of several counties that were a part of this 1985 disaster, which was the result of flooding, severe storms, and ice jams. This disaster also affected counties along the Kankakee, Wabash, and Illinois rivers.

FEMA DR #871 – Hancock County was one of thirty Illinois counties that were a part of this 1990 declaration. Heavy rain in May and June caused widespread flooding across the state.

FEMA DR #997 – This 1993 known as the Great Flood of 1993 prompted a disaster declaration encompassing thirty-nine Illinois counties.

FEMA DR#1112 – Flooding in 1996 resulted in a federal disaster declaration for several central and southern Illinois counties, including Hancock County.

FEMA DR #1368 – In April of 2001 heavy flooding devastated ten Illinois counties. In May a federal disaster was declared for the ten counties affected, including Hancock County. In all over $1.2 million in federal and state disaster assistance was extended to residents of the ten counties. Disaster housing grants accounted for $506,000 while the Small Business Administration (SBA) made $711,000 in low interest in disaster loans. 45 families in Hancock County were approved for disaster housing grants which totaled $33,392.

FEMA DR#1416 – This May 2002 disaster declaration was the result of several tornadoes, severe storms, and flooding. Nearly two thirds of the state's counties were a part of this declaration which encompassed all of central and southern Illinois, including Hancock County. Disaster assistance for this event topped $10.3 million.

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FEMA DR#1469 – Flooding was again the cause of this May 2003 declaration. This disaster included sixteen counties in west central and southern Illinois. A total of $4,535,866 in grants and low-interest disaster loans were approved for those affected by the disaster.

FEMA DR#1771 – The flooding of June 2008 caused massive damage across the state. In total eighteen Illinois counties, including Hancock, were part of this disaster declaration. Individual assistance extended in this disaster is more than $15 million.

FEMA DR#1960 – The major winter storm that ran from January 31 until February 3, 2011, affected 65 Illinois Counties, and committed $96,905,253 in federal assistance. This major winter storm crippled the transportation across the state and caused major overtime costs for any jurisdiction providing snow removal.

FEMA DR#4116 - Hancock County received a Public Assistance Declaration for damage to public infrastructure damaged from severe storms and flooding that occurred between April 16 and May 5, 2013. Disaster assistance from FEMA topped $396 million for the counties affect by the event.

FEMA DR#4461 – Hancock County received a Public Assistance Declaration for damage that resulted from severe storms and flooding between February 24 to July 3, 2019. Twenty-eight Illinois counties, predominantly located in the Mississippi River, Rock River, and Illinois River Valleys were included in this declaration.

FEMA DR#4489 – Presidential declaration of a major disaster associated with COVID Pandemic. Declaration issued on March 26, 2020 and ended on May 11, 2023. Both Individual and Public Assistance was provided.

DROUGHT

(Source: Illinois Natural Hazard Mitigation Plan, 2023)

Drought is a normal and a recurrent feature of climate, however, it is only a temporary feature of climate. Drought characteristics vary from one region to another, rather drought occurs almost everywhere. All societies are vulnerable to this natural hazard; drought can affect vast territorial regions and large population numbers. A drought may not have a distinct start, and its termination may be difficult to recognize. Weather conditions, soil moisture, runoff, water table conditions, water quality and stream flow are all natural factors that are important in determining drought. High temperature, high wind and low relative humidity can significantly aggravate its severity. Droughts originate from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group or environmental sector. Operational definitions help people identify the beginning, end and degree of severity of a drought. The National integrated Drought Information System (NIDIS) operational definitions for droughts:[i]

- Meteorological Drought: A period of well-below-average precipitation that spans from a few months to a few years.
- Agricultural Drought: A period when soil moisture is inadequate to meet the demands

for crops to initiate and sustain plant growth.

- Hydrological Drought: A period of below-average stream flow and/or depleted reservoir storage (i.e., stream flow, reservoir and lake levels, ground water).
- Socioeconomic Drought: This definition deals with the supply and demand of water. Some years there is an ample supply of water and in other years there is not enough to meet human and environmental needs.
- Snow Drought: A period of abnormally little snowpack for the time of year, resulting in either a dry snow drought, below-normal cold-season precipitation, or a warm snow drought, a lack of snow accumulation despite near-normal precipitation. Often caused by warm temperatures and precipitation falling as rain rather than snow or unusually early snowmelt.
- Flash Drought: A rapid onset or intensification of drought often set in motion by lower-than-normal rates of precipitation, along with abnormally high temperatures, winds, and radiation.

Generally, drought is associated with a sustained period (which differs for each drought impact) of significant below average water or moisture supply. The degree of precipitation deficiency, the duration and the size of the affected area determine the severity of the drought. A drought can ruin agriculture- and tourism-based local economies, and increase the risk of fire, flash flood and possible landslides/debris flow. Statewide meteorological droughts are also further subdivided into specific lengths of occurrence:

- A 3-month drought exists if the state average for rainfall is less than or equal to 60 percent of the mean.
- A 6-month drought exists if the state average for rainfall is less than or equal to 70 percent of the mean.
- A 12-month drought exists if the state average for rainfall is less than or equal to 80 percent of the mean.

One-month precipitation deficits on a statewide or regional basis do not usually constitute droughts, although there may be significant impacts on agriculture depending on the time in the growing season and on soil moisture conditions. Agricultural and hydrologic droughts have different lag times in relation to the timing of precipitation, and their intensities do not correlate exactly with one another. Agricultural droughts typically trigger the availability of several USDA emergency assistance programs. Hydrologic droughts reduce run-off and river, lake and groundwater levels. Normally, such droughts are preceded by several months of below-normal precipitation and develop more slowly than a meteorological or agricultural drought. Noticeably reduced water levels may occur within one or two months of the start of a drought, but sometimes as much as three to twelve months after a precipitation deficit begins. Low river levels may result in navigation blockages and emergency dredging.
Drought can impact Hancock County in many ways, including crop damage, livestock water supplies, drinking water issues, and barge traffic congestion.

Hancock County was one of several counties affected by the drought of 2005-06. This drought started in June of 2005 and continued through March of 2006. The drought affected Bureau,

Carroll, Hancock, Henderson, Henry, Jo Daviess, McDonough, Hancock, Putnam, Rock Island, Stephenson, Warren, and Whiteside counties. In total the drought did $228.5 million in crop damage.

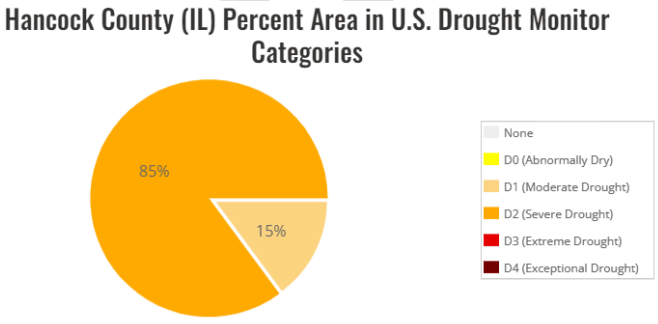
During June of 2012, Hancock County was determined to be in drought, according to the Illinois State Water Survey based upon accumulated precipitation falling 10-14 inches below normal for the previous 12 months.[ii] This severe drought was alleviated in Hancock County by rain events in mid-June. According to NOAA's National Centers for Environmental Information, Hancock County came out of the Drought by September of 2012.[iii]

However, the LaHarpe water system was identified by the Illinois State Water Survey as one of three water systems across the state that experienced the most tangible threats due to the 2012 drought. By December 2012, the water level in the reservoir (LaHarpe Lake) had fallen to 5.4 feet below full pool, corresponding to a 55 percent loss of storage in the lake. An alternative identified was to interconnect with the Dallas Rural Water District (DRWD) but immediate connection was not constructed for another year due to alleviation of drought conditions and increasing water levels in LaHarpe Lake. There appeared to be limitations to the amount of water that could be supplied by the DRWD, suggesting that it would not become a primary water source for LaHarpe. An additional suggested solution to lessen the community's vulnerability to drought was to establish a flow intake on the main stem of the La Moine River or LaHarpe Creek.[iv]

The longest duration of drought in Illinois lasted 55 weeks beginning on April 6, 2021, and ending on April 19, 2022. The 2021 growing season drought in northern Illinois was, by some measures, as severe as those in 2012 and 1988. For example, the six-month period from March to September in 2021 was the driest on record in Rockford, half an inch drier than the same period in 1988 and over 2 inches drier than in 2012.

At the writing of this document, much of Illinois and the Midwest have been experiencing drought conditions. As of July 4, 2023, the U.S. Drought Monitor reported that 85% of Hancock County was in a Severe Drought and 15% in a Moderate Drought.

Figure 2.1: Percent Area of Hancock County in US Drought Monitor Categories, July 4, 2023.



Source: US Drought Monitor website: https://droughtmonitor.unl.edu/DmData/DataGraphs.aspx

Figure 2.2: Drought Monitor Categories and Associated Impacts.

Drought Monitor Categories		Impacts
	D0 – Abnormally Dry	• Soil moisture declines; lawns turn brown
	D1 – Moderate Drought	• Row crops and pasture show drought stress • Fireworks are banned • Trees show drought stress; wildlife eat more crops
	D2 – Severe Drought	• Row crop and vegetable conditions are poor; hay yield is low; corn is baled for feed • Outdoor burn bans are implemented • Lawns go dormant; weeds grow faster • Farmers are stressed; agriculture industry is hurting • Power plant intake is compromised • Water levels in wells, ponds, rivers, and lakes are low; streamflow is below average; voluntary water conservation is requested
	D3 – Extreme Drought	• Disease kills deer; fish are stressed • Vegetation is stressed • Well and reservoir levels are very low
	D4 – Exceptional Drought	• Feed prices are high; crop loss is widespread; livestock are culled • Wildlife are severely stressed; fish kills occur in lakes and rivers

Figure 2.3: Droughts in Hancock County 1970 to Present

LOCATION	BEGIN DATE	END DATE	EVENT TYPE	PROPERTY DAMAGE	CROP DAMAGE
HANCOCK CO.	6/15/2005	6/30/2005	Drought	0.00K	0.00K
HANCOCK CO.	7/1/2005	7/31/2005	Drought	0.00K	9.170 M
HANCOCK CO.	8/1/2005	8/31/2005	Drought	0.00K	3.830 M
HANCOCK CO.	9/1/2005	9/30/2005	Drought	0.00K	0.00K
HANCOCK CO.	10/1/2005	10/31/2005	Drought	0.00K	0.00K
HANCOCK CO.	11/1/2005	11/30/2005	Drought	0.00K	0.00K
HANCOCK CO.	12/1/2005	12/31/2005	Drought	0.00K	0.00K
HANCOCK CO.	1/1/2006	1/31/2006	Drought	0.00K	0.00K
HANCOCK CO.	2/1/2006	2/28/2006	Drought	0.00K	0.00K
HANCOCK CO.	3/1/2006	3/31/2006	Drought	0.00K	0.00K
HANCOCK CO.	9/1/2011	9/30/2011	Drought	0.00K	0.00K
HANCOCK CO.	10/1/2011	10/31/2011	Drought	0.00K	0.00K
HANCOCK CO.	7/17/2012	7/31/2012	Drought	0.00K	0.00K
HANCOCK CO.	8/7/2012	8/28/2012	Drought	0.00K	0.00K
HANCOCK CO.	11/1/2012	11/12/2012	Drought	0.00K	0.00K
HANCOCK CO.	9/3/2013	9/17/2013	Drought	0.00K	0.00K

Source: NOAA NCEI Storm Events Database, https://www.ncdc.noaa.gov/stormevents/. Retrieved June 5, 2023. Note: 1 - "HANCOCK" in all capital letters refers to an unspecified location within Hancock County

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EXTREME TEMPERATURES

(Source: Illinois Natural Hazard Mitigation Plan, 2023)

Cold

A cold wave is a weather phenomenon that occurs when a cold air mass moves into an area and brings unusually cold temperatures for an extended period of time.[v] Typically, a cold wave is defined as a rapid and significant drop in temperature over a 24-hour period, with the resulting temperatures significantly lower than the average for the time of year.[vi]

Cold waves can be accompanied by other severe weather conditions, such as blizzards, ice storms, and strong winds, which can lead to dangerous and life-threatening situations. Very cold temperatures, usually in the single digits or below zero, which combined with the wind can cause frostbite or a potentially deadly condition known as hypothermia.

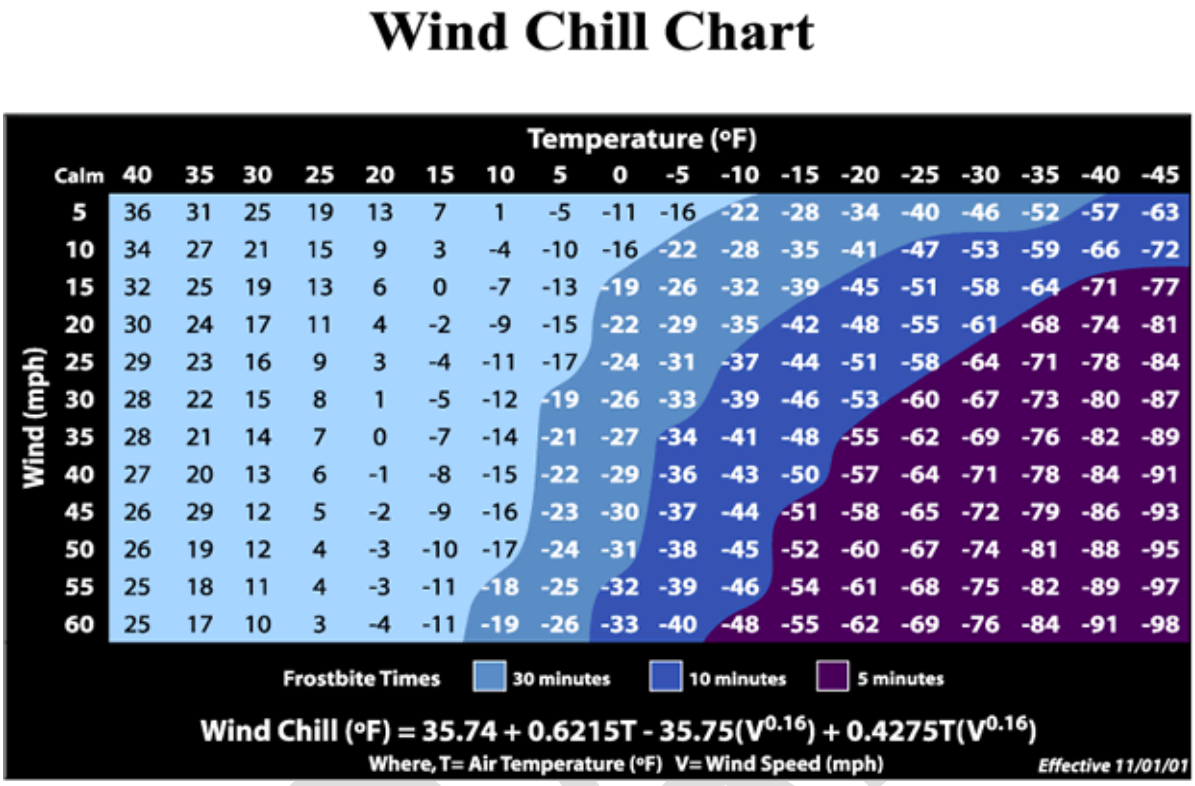
The National Weather Service (NWS) uses the following terms for cold wave related terms shown in the figure below:

Figure 2.4: Cold Wave Terms. Source: NWS

	Definition
Cold Wave	A rapid fall in temperature within 24 hours and extreme low temperatures for an extended period.
Wind Chill Warning	Dangerously cold wind chill values are expected or occurring.
Wind Chill Watch	Dangerously cold wind chill values are possible.
Wind Chill Advisory	Seasonably cold wind chill values but not extremely cold values are expected or occurring.
Hard Freeze Warning	Temperatures are expected to drop below 28°F for an extended period of time, killing most types of commercial crops and residential plants.
Freeze Warning	Temperatures are forecasted to go below 32°F for a long period of time, killing some types of commercial crops and residential plants.
Freeze Watch	A potential for significant, widespread freezing temperatures within the next 24-36 hours.
Frost Advisory	Areas of frost are expected or occurring, posing a threat to sensitive vegetation.

The NWS Wind Chill Temperature 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.

Figure 2.5: Wind Chill Chart. Source: NWS



The NWS will issue a wind chill advisory or warning in Illinois for the following wind chill conditions:

- North of I-80: Advisory for -20 to -30 degrees; Warning for colder than -30 degrees
- Between I-80 and I-64: Advisory for -15 to -25 degrees; Warning for colder than -25 degrees
- South of I-64: Advisory for -10 to -25 degrees; Warning for colder than -25 degrees

Heat

Extreme heat events occur as a result of above normal temperatures, which often coincide with high relative humidity, which increase the likelihood of heat disorders with prolonged exposure or strenuous activity. The National Weather Service (NWS) uses the following definitions can be used to differentiate different heat related terms[vii]:

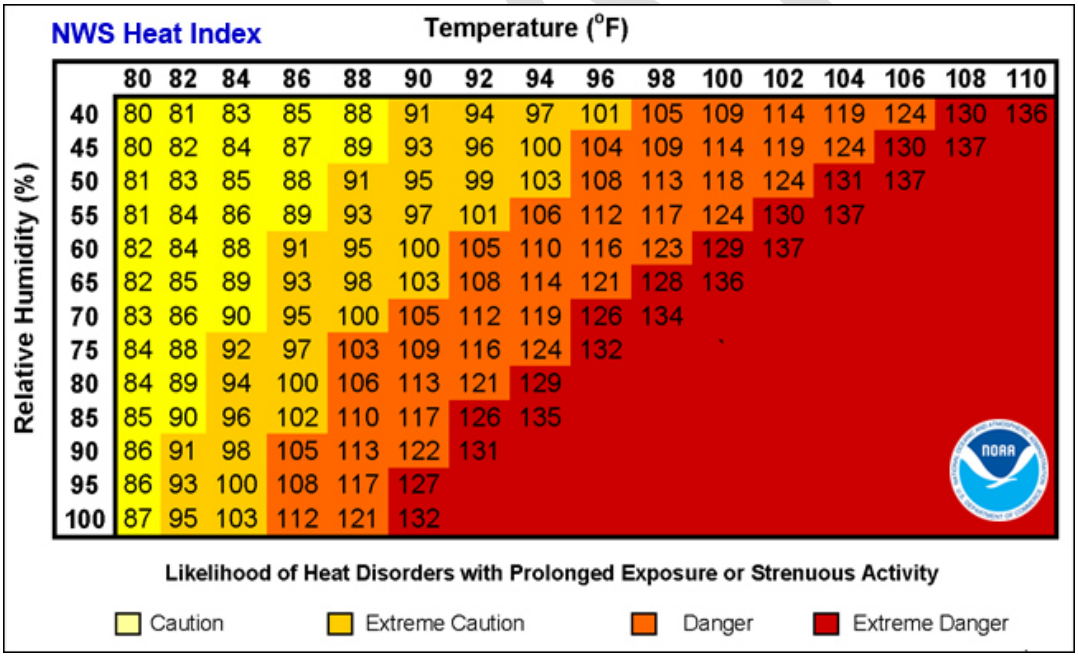
- **Excessive Heat**: Excessive heat occurs from a combination of high temperatures (significantly above normal) and high humidities. At certain levels, the human body cannot maintain proper internal temperatures and may experience heat stroke.
- **Heat Wave:** A period of abnormally and uncomfortably hot and unusually humid weather. Typically, a heat wave lasts two or more days.

- **Heat Index**: The Heat Index (HI) or the "Apparent Temperature" is an accurate measure of how hot it really feels when the Relative Humidity (RH) is added to the actual air temperature.

Extreme heat for a region are temperatures that hover 10 degrees or more above the average high temperature for several days to several weeks. The definitions do vary by region; however, a heat wave is defined as a period of at least three consecutive days above 90°F. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility.

The heat index is a measure of how hot it feels combining both temperature and relative humidity. As relative humidity increases, a given temperature can feel even hotter. The figure below displays NOAA's National Weather Service Heat Index chart.[viii] The heat index chart helps to identify the apparent temperature; locate the temperature across the top of the chart and the relative humidity down the left side of the chart and the intersect is the apparent temperature.

Figure 2.6: Heat Index Chart. Source: NWS



The National Weather Service issues heat warnings when the heat index exceeds given local thresholds. The table below shows the potential heat disorders people may face based on the heat index classification.[ix]

Figure 2.7: Heat Index Effects on the Body.

Classification	Heat Index	Effect on the body
Extreme Danger	125°F or higher	Heat stroke highly likely.
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity.
Extreme Caution	90 °F -103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity.
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity.

Extreme heat is a combination of high temperatures and high humidity. Conditions of extreme heat are dangerous and can cause injury and death. The Heat Index is apparent temperature or a measure of how it feels when temperature and humidity are combined. It is the result of biometeorological studies and takes into account body size, core and body surface temperatures, clothing, the skin's resistance to heat and moisture transfer away from the body. The Heat Index assumes an average-sized adult with clothing in the shade with a 5-mph wind. Being in the full sun or in an area with little air movement can increase the apparent temperature.

What makes extreme heat dangerous? The body cools itself by sweating because the evaporation of moisture has a cooling effect. High humidity reduces this evaporation and hinders the body's effort to cool itself. The dew point temperature is a useful measure of the moisture content of the atmosphere. During summer in Illinois, dew point temperatures in the 50s are generally comfortable. Most people begin to feel the humidity when dew point temperatures are in the 60s. Dew point temperatures in the 70s are rare and cause significant discomfort.

Effects of extreme heat:

- **Heat cramps:** muscular pains and spasms due to heavy exertion. They usually involve the abdominal muscles or legs. It is thought that the loss of water from heavy sweating causes the cramps.
- **Heat exhaustion:** occurs when people exercise heavily or work in a warm, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to vital organs. This results in mild shock.
- **Heatstroke/Sunstroke:** LIFE THREATENING. The victim's temperature control system stops working as the body quits producing sweat. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly.

The following Figure includes all the extreme temperature entries for Hancock County in the NCDC/NOAA database that were registered between 1993 to present. It should be noted that these temperature extremes affected an area larger than just Hancock County.

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Figure 2.8: Temperature Extremes in Hancock County 1993 to Present

LOCATION	BEGIN DATE	END DATE	EVENT TYPE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
HANCOCK CO.	1/30/1996	1/31/1996	Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	2/1/1996	2/4/1996	Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	1/10/1997	1/12/1997	Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	1/17/1997	1/19/1997	Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	7/25/1997	7/27/1997	Heat	0	0	0.00K	0.00K
HANCOCK CO.	7/19/1999	7/31/1999	Heat	0	0	0.00K	0.00K
HANCOCK CO.	8/31/2000	8/31/2000	Heat	0	0	0.00K	0.00K
HANCOCK CO.	12/1/2000	12/31/2000	Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	12/16/2000	12/17/2000	Extreme Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	12/21/2000	12/22/2000	Extreme Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	12/23/2000	12/24/2000	Extreme Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	2/2/2007	2/5/2007	Extreme Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	1/14/2009	1/16/2009	Extreme Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	7/4/2012	7/7/2012	Excessive Heat	0	0	0.00K	0.00K
HANCOCK CO.	8/26/2013	8/30/2013	Heat	0	0	0.00K	0.00K
HANCOCK CO.	1/5/2014	1/7/2014	Extreme Cold/Wind Chill	0	0	0.00K	0.00K
HANCOCK CO.	1/29/2019	1/31/2019	Extreme Cold/Wind Chill	0	0	0.00K	0.00K

Source: NOAA NCEI Storm Events Database, https://www.ncdc.noaa.gov/stormevents/. Retrieved June 5, 2023. Note: 1 - "HANCOCK" in all capital letters refers to an unspecified location within Hancock County

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EARTHQUAKES

(Source: Illinois Natural Hazard Mitigation Plan, 2023)

Although there have been over 560 earthquakes in Illinois during the last two centuries, only very few of them have caused any damage (Modified Mercalli Intensity of VI or higher) or injuries. Larger earthquakes in the New Madrid region have caused more damage in Illinois than earthquakes originating in Illinois. The risk of probable damage from future earthquakes can be estimated based on the historical record of past earthquakes. Petersen et al., 2008 and colleagues at the USGS have created maps for building codes of the largest probable ground shaking that have a low probability of being exceeded over a 50-year period. They have plotted intensity information as numerical values of ground shaking, or accelerations. These values can be converted to Modified Mercalli Intensities using the conversion values. These USGS maps only show the estimate of shaking on the top of bedrock. Shaking will be modified by the overlying soils.

For most of Illinois, the risk is dominated by the possibility of large earthquakes recurring in the New Madrid Seismic Zone, south of Illinois. In this scenario, the maximum accelerations in the southern-most counties of Illinois exceed 60 percent of gravity, or Modified Mercalli Intensity IX. Although the risk decreases to the north, there is a 2 % probability during the next 50 years that an acceleration greater than 10 percent of gravity (Modified Mercalli Intensity VI) could be exceeded in any of the southern half of Illinois. Because of the record of minor to moderate earthquakes in northern Illinois, west of Chicago, the risk of damaging earthquake motions increases in the western suburbs of Chicago. But if magnitude 4 to 5 earthquakes occur near or under Chicago as early events have been located, damage could occur to weak, old structures through other parts of the city.

There is no record of significant earthquake damage in Hancock County. The HAZUS section of this report looks at specific risks to Hancock County by seismic activity. As part of the risk assessment process, the steering committee did recognize the need to be a potential shelter site for earthquake victims from southern Illinois should either the New Madrid or Wabash Fault experience a significant event.

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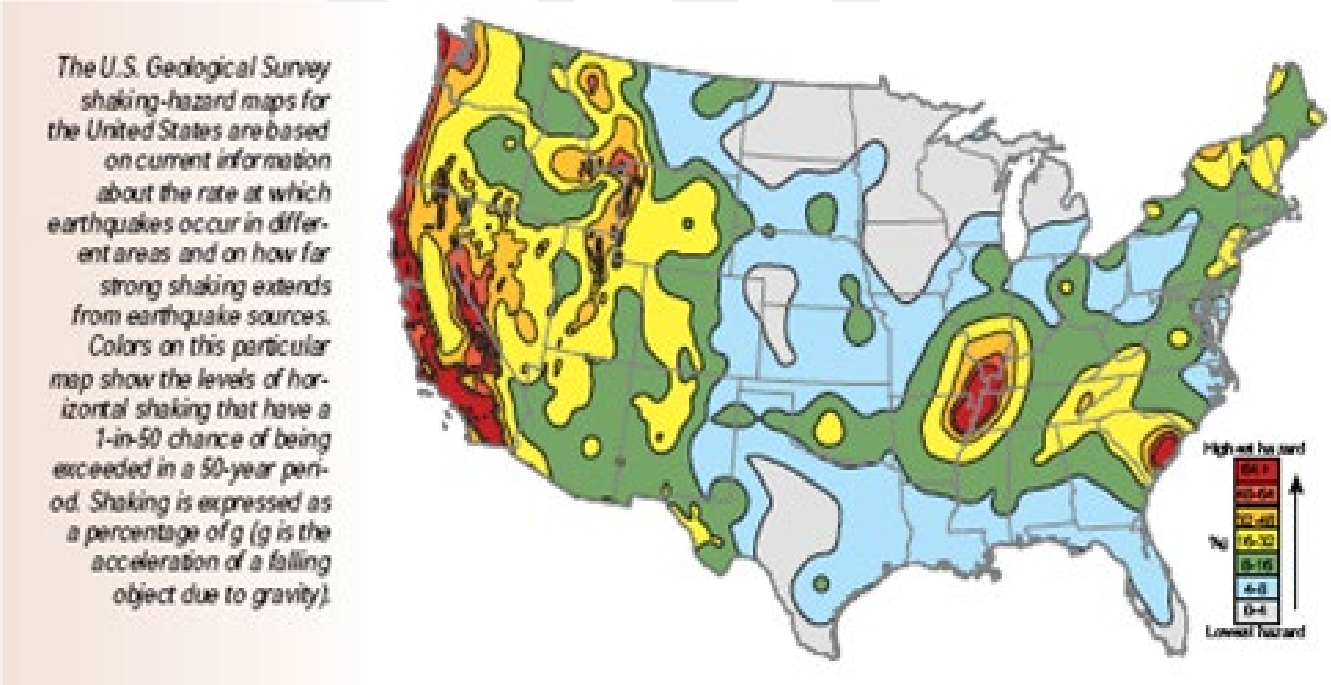
Figure 2.9: Earthquake Intensity and Associated Damage

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest,especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

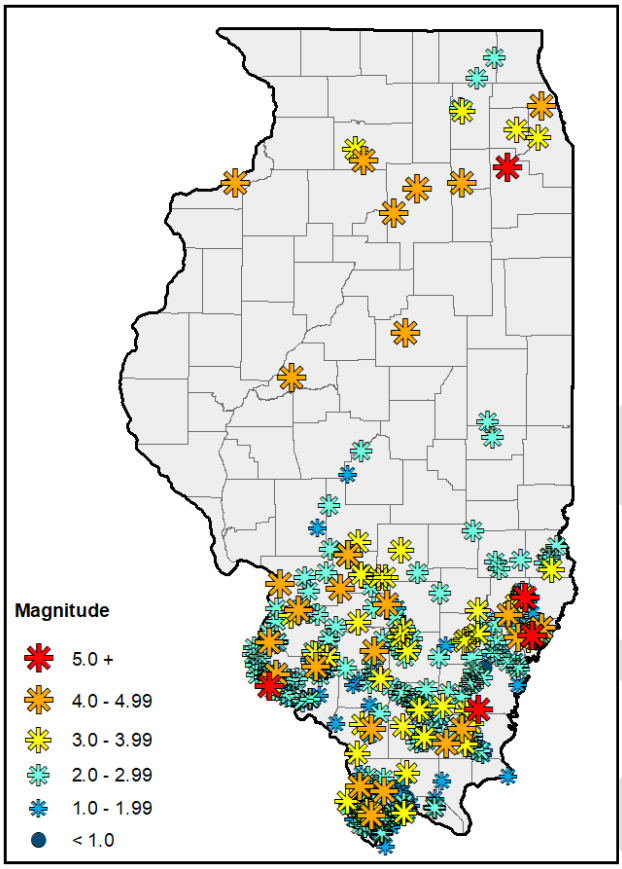
Source: Illinois State Mitigation Plan, 2023.

Figure 2.10: Shaking Hazard Map



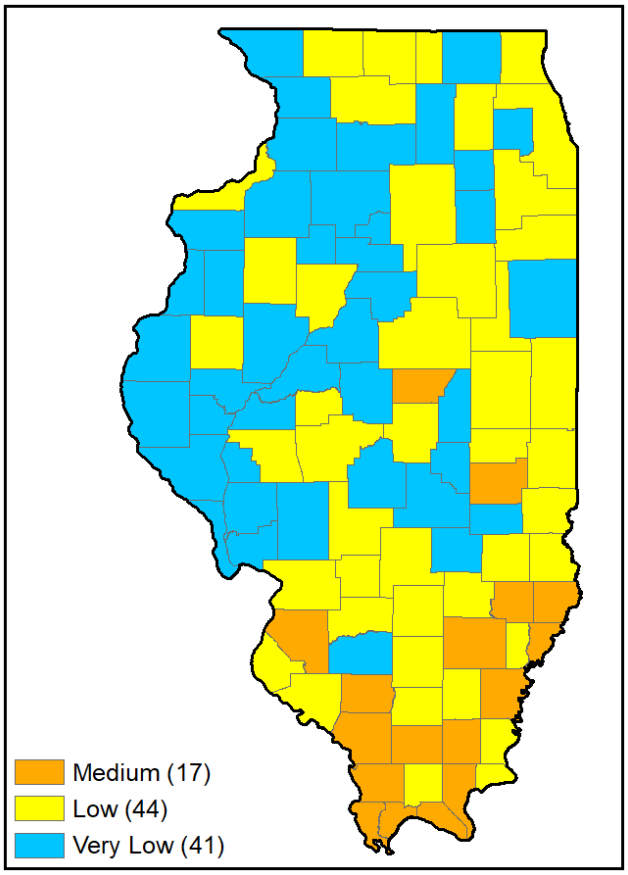
Source: USGS

Figure 2.11: Earthquakes with Epicenters in Illinois, 1795-2023



Source: USGS

Figure 2.12: Earthquake Risk Ranking, Illinois Counties



Source: Illinois State Hazard Mitigation Plan, 2023

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FLOOD

(Source: Illinois Natural Hazard Mitigation Plan, 2023)

The most common hazard in the United States is flooding with thousands of events occurring each year. Flooding occurs along the coast, rivers, lakes, small streams, gullies, creeks, and in typically dry streambeds. Many factors can lead to flooding including heavy and/or prolonged periods of rainfall, snowmelt, soil saturation, ground freeze, severe wind events, and inadequate drainage systems. Ponding can occur in low lying ground. Street flooding and basement flooding are often associated with overwhelmed storm water systems. Loss of life and property can result when people build structures and develop in flood hazard areas.

The standard definition of a flood is "A general and temporary condition of partial of complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land." A simpler definition is too much water in the wrong place. Since water circulates from clouds to the soil to streams to rivers to the oceans and returns to the clouds, a scientific definition of a flood is an imbalance in the "hydrological system" with more water flowing through the system than the system can draw off.

Floods are not all alike:

- **Riverine Floods**: Develop slowly, sometimes over a period of days or weeks.
- **Flash Floods**: Develop quickly, sometimes in just a few minutes. Usually, flash floods are the result of intense storms dropping large amounts of rain within a brief period.
- **Overland Floods**: Occurs outside a defined river or stream (e.g., ponding in a low-lying area).
- **Aquifer Flood**: Water is expelled from a subterranean geologic formation to the surface causing flooding in the immediate area.
- **Subterranean Flood**: Water floods into tunnels that are normally dry.
-

Snow melt filling rivers too quickly, heavy rainfall associated with slow-moving, low-pressure, or frontal storm systems or storm surge create excess water. This water accumulates and overflows onto adjacent lands not normally covered by water. These floods can occur any time of the year, any time of the day or night and in any part of the country. Flooding can be local, impacting a neighborhood or community, or very large, affecting entire river basins and multiple states. The severity of floods is determined by the amount of rainfall or other water source, duration, typography, ground cover, frozen soil, wet or saturated soil that can't hold any more water, full reservoirs, high rivers or stream levels, ice-covered rivers, or urbanizations (lots of buildings, parking lots and roads). Many scientists believe that global warming causes extremes in weather that have increased flooding. Human activity influences the frequency and severity of floods.

In 2017, Hunt-Lima Drainage and Levee District filed a petition is circuit court seeking authority to levy an additional $30 per acre per year for the duration of 20 years to fund the cost of a levee reconstruction project. The project cost was estimated to be $12,957,000 and the benefit would be $42,355,000. Several landowners in the district objected to the levy of an additional assessment that, if approved, would subject each acre to a total assessment of $60. The objecting landowners owned 11% of the property within the district. Initial designs that included raising the height of the levee were denied by the US Army Corps of Engineers and the Illinois Department of Natural Resources. The design that ultimately received permit and regulatory approval uses levee widening and berm reshaping techniques.

Both sides brought in outside experts and an amended benefit calculation of $19,232,000 and a project cost of approximately $16,491,000. The court recognized that the district had proven by a preponderance of evidence

that the project benefits exceeded the costs. It was also determined that the project was necessary and advisable given the condition of the levy. [x]

Figure 2.13: Flooding Events in Hancock County, 1993 to Present

LOCATION	BEGIN DATE	END DATE	EVENT TYPE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
COUNTYWIDE	2/20/1997	2/24/1997	Flash Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	4/8/1997	4/30/1997	Flood	0	0	0.00 K	0.00 K
COUNTYWIDE	5/23/1998	5/24/1998	Flood	0	0	0.00 K	0.00 K
HAMILTON	4/8/1999	4/8/1999	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	6/2/2000	6/28/2000	Flood	0	0	0.00 K	0.00 K
CARTHAGE	6/26/2000	6/26/2000	Flood	0	0	0.00 K	0.00 K
NIOTA	7/4/2000	7/4/2000	Flood	0	0	0.00 K	0.00 K
COUNTYWIDE	7/4/2000	7/4/2000	Flood	0	0	0.00 K	0.00 K
WARSAW	7/11/2000	7/11/2000	Flash Flood	0	0	0.00 K	0.00 K
CARTHAGE	7/31/2000	7/31/2000	Flood	0	0	0.00 K	0.00 K
COUNTYWIDE	2/24/2001	2/24/2001	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	4/15/2001	4/30/2001	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	5/1/2001	5/24/2001	Flood	0	0	0.00 K	0.00 K
CARTHAGE	8/22/2001	8/22/2001	Flood	0	0	0.00 K	0.00 K
AUGUSTA	8/22/2001	8/22/2001	Flood	0	0	0.00 K	0.00 K
CARTHAGE	10/21/2001	10/21/2001	Flood	0	0	0.00 K	0.00 K
CARTHAGE	10/21/2001	10/21/2001	Flood	0	0	0.00 K	0.00 K
COUNTYWIDE	5/12/2002	5/12/2002	Flash Flood	0	0	0.00 K	0.00 K
CARTHAGE	5/12/2002	5/12/2002	Flash Flood	0	0	0.00 K	0.00 K
COUNTYWIDE	6/11/2002	6/11/2002	Flash Flood	0	0	0.00 K	0.00 K
CARTHAGE	6/13/2002	6/13/2002	Flash Flood	0	0	0.00 K	0.00 K
NAUVOO	6/13/2002	6/13/2002	Flash Flood	0	0	0.00 K	0.00 K
LA HARPE	6/13/2002	6/13/2002	Flash Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	5/21/2003	5/28/2003	Flood	0	0	1.000 M	0.00 K
HAMILTON	7/8/2003	7/8/2003	Flash Flood	0	0	100.00 K	20.00 K
HANCOCK CO.	5/27/2004	5/31/2004	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	6/1/2004	6/30/2004	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	8/27/2004	8/28/2004	Flood	0	0	0.00 K	3.00 K
HANCOCK CO.	9/16/2004	9/16/2004	Flood	0	0	0.00 K	5.00 K
HANCOCK CO.	10/23/2004	10/25/2004	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	10/26/2004	10/28/2004	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	11/1/2004	11/5/2004	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	12/7/2004	12/9/2004	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	1/4/2005	1/4/2005	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	1/12/2005	1/15/2005	Flood	0	0	0.00 K	0.00 K
HANCOCK CO.	2/14/2005	2/15/2005	Flood	0	0	0.00 K	0.00 K
LA HARPE	6/22/2007	6/22/2007	Flash Flood	0	0	0.00 K	0.00 K

LA HARPE	6/22/2007	6/22/2007	Flash Flood	0	0	0.00 K	0.00 K
LA HARPE	6/22/2007	6/22/2007	Flood	0	0	0.00 K	0.00 K
LA HARPE	6/22/2007	6/22/2007	Flash Flood	0	0	0.00 K	0.00 K
DALLAS CITY	6/23/2007	6/23/2007	Flood	0	0	0.00 K	0.00 K
WARSAW	4/1/2008	4/30/2008	Flood	0	0	0.00 K	0.00 K
HAMILTON	4/25/2008	4/25/2008	Flash Flood	0	0	0.00 K	0.00 K
TIOGA	5/1/2008	5/6/2008	Flood	0	0	0.00 K	0.00 K
NIOTA	6/1/2008	6/30/2008	Flood	0	0	0.00 K	0.00 K
SUTTER	12/27/2008	12/27/2008	Flash Flood	0	0	0.00 K	0.00 K
DALLAS CITY	4/30/2009	4/30/2009	Flood	0	0	0.00 K	0.00 K
DURHAM	5/1/2009	5/3/2009	Flood	0	0	100.00 K	0.00 K
DALLAS CITY	5/15/2009	5/15/2009	Flash Flood	0	0	0.00 K	0.00 K
DURHAM	5/15/2009	5/19/2009	Flood	0	0	250.00 K	0.00 K
WARSAW	6/1/2009	6/1/2009	Flash Flood	0	0	0.00 K	0.00 K
NIOTA	8/27/2009	8/27/2009	Flash Flood	0	0	0.00 K	0.00 K
DALLAS CITY	5/13/2010	5/13/2010	Flash Flood	0	0	0.00 K	0.00 K
BURNSIDE	5/13/2010	5/16/2010	Flood	0	0	250.00 K	0.00 K
NAUVOO	6/12/2010	6/12/2010	Flash Flood	0	0	10.00 K	0.00 K
BURNSIDE	6/14/2010	6/17/2010	Flood	0	0	250.00K	0.00 K
AUGUSTA	6/22/2010	6/22/2010	Flash Flood	0	0	100.00 K	0.00 K
NAUVOO	6/22/2010	6/28/2010	Flood	0	0	250.00K	0.00 K
BURNSIDE	6/22/2010	6/26/2010	Flood	0	0	250.00K	0.00 K
BENTLEY	7/7/2010	7/7/2010	Flash Flood	0	0	0.00 K	0.00 K
LA HARPE	7/19/2010	7/20/2010	Flash Flood	0	0	0.00 K	0.00 K
BURNSIDE	7/20/2010	7/23/2010	Flood	0	0	150.00 K	0.00 K
DALLAS CITY	7/25/2010	7/31/2010	Flood	0	0	125.00 K	0.00 K
HAMILTON	8/13/2010	8/13/2010	Flash Flood	0	0	0.00 K	0.00 K
HAMILTON	6/5/2011	6/5/2011	Flash Flood	0	0	25.00 K	0.00 K
WARSAW	6/14/2011	6/14/2011	Flash Flood	0	0	250.00 K	0.00 K
ELVASTON	6/15/2011	6/15/2011	Flash Flood	0	0	100.00 K	0.00 K
CARTHAGE	6/15/2011	6/15/2011	Flash Flood	0	0	0.00 K	0.00 K
BURNSIDE	6/15/2011	6/16/2011	Flood	0	0	125.00 K	0.00 K
LA HARPE	4/17/2013	4/18/2013	Flood	0	0	250.00 K	0.00 K
BURNSIDE	4/18/2013	4/21/2013	Flood	0	0	0.00 K	0.00 K
DALLAS CITY	4/18/2013	4/29/2013	Flood	0	0	0.00 K	0.00 K
BURNSIDE	5/5/2013	5/5/2013	Flood	0	0	0.00 K	0.00 K
NAUVOO	5/29/2013	5/31/2013	Flood	0	0	0.00 K	0.00 K
HAMILTON	6/1/2013	6/9/2013	Flood	0	0	0.00 K	0.00 K
HAMILTON	7/2/2014	7/14/2014	Flood	0	0	0.00 K	0.00 K
BOWEN	6/26/2015	6/26/2015	Flash Flood	0	0	0.00 K	0.00 K
NAUVOO	7/11/2015	7/11/2015	Flash Flood	0	0	0.00 K	0.00 K
WEST PT	7/11/2015	7/11/2015	Flash Flood	0	0	0.00 K	0.00 K
HAMILTON	7/10/2017	7/10/2017	Flash Flood	0	0	0.00 K	0.00 K

DALLAS CITY	10/9/2018	10/18/2018	Flood	0	0	0.00 K	0.00 K
NAUVOO	3/18/2019	3/31/2019	Flood	0	0	0.00 K	0.00 K
NAUVOO	4/5/2019	4/16/2019	Flood	0	0	0.00 K	0.00 K
HAMILTON	4/30/2019	4/30/2019	Flood	0	0	0.00 K	0.00 K
HAMILTON	5/1/2019	5/11/2019	Flood	0	0	0.00 K	0.00 K
HAMILTON	5/6/2019	5/7/2019	Flash Flood	0	0	0.00 K	0.00 K
DISCO	5/19/2019	5/31/2019	Flood	0	0	0.00 K	0.00 K
NAUVOO	5/22/2019	5/31/2019	Flood	0	0	0.00 K	0.00 K
CARTHAGE	5/25/2019	5/25/2019	Flash Flood	0	0	0.00 K	0.00 K
PLYMOUTH	5/25/2019	5/25/2019	Flash Flood	0	0	0.00 K	0.00 K
WARSAW	6/1/2019	6/13/2019	Flood	0	0	0.00 K	0.00 K
HAMILTON	6/6/2019	6/6/2019	Flash Flood	0	0	0.00 K	0.00 K
AUGUSTA	7/11/2021	7/11/2021	Flash Flood	0	0	0.00 K	0.00 K
DENVER	5/31/2022	5/31/2022	Flash Flood	0	0	0.00 K	0.00 K

Source: NOAA NCEI Storm Events Database, https://www.ncdc.noaa.gov/stormevents/. Retrieved June 5, 2023. Note: 1 - "HANCOCK" in all capital letters refers to an unspecified location within Hancock County

LANDSLIDE

(Source: Illinois Natural Hazard Mitigation Plan, 2023)

A landslide is a term used to describe the movement of soil, rock, and organic materials down a slope under the effects of gravity and also the landform that results from such movement. Landslides can be further categorized by the mode of slope movement, including falls, topples, slides, spreads, and flows, which are further explained in the table below.[xi] Debris flows, also known as mudflows or mudslides and rock falls are some of the most common types of landslides. United States Geological Survey uses the definitions below:

Figure 2.14: Landslide Types

Landslide Type	Definition	Velocity of Travel	Triggering Mechanism
Falls	Abrupt, downward movements of rock or earth, or both, that detach from steep slopes or cliffs	Very rapid – Extremely Rapid	Undercutting of slope by natural processes such as streams/ rivers/differential weathering, human activities, and earthquake shaking or other intense vibration.
Topples	The forward rotation out of a slope of a mass of soil or rock around a point or axis below the center of gravity of the displaced mass	Extremely Slow – Extremely Rapid	Sometimes caused by gravity, vibration, undercutting, differential weathering, excavation, or stream erosion.
Slides	A downslope movement of a soil or rock mass occurring on surfaces of rupture or on relatively thin zones of intense shear strain	Extremely Slow – Moderately Fast	Intense and sustained rainfall or snowmelt, rapid drops in river level.
Lateral Spreads	Occurs on gentle slopes or flat terrain, where a stronger upper layer of rock or soil undergoes extension and moves above an underlying weaker layer	Slow - Moderate	Liquefaction of lower weak layer.
Flows	A mass movement in which loose soil, rock and sometimes organic matter combine with water to form a slurry that flows downslope	Rapid – Extremely Rapid	Commonly caused by intense surface-water flow due to heavy precipitation or rapid snowmelt.

Source: ISGS

Most landslides have multiple causes that occur when downward acting forces, such as gravity, exceed the strength of the earth materials found within the slope. Landslides can be initiated by rainfall, snowmelt, changes in water level, stream erosion, changes in ground water, earthquakes, volcanic activity, disturbance by human activities, or any combination of these factors.

Illinois does not have a state-wide reporting system for landslides. The Illinois State Geological Survey (ISGS) had received some reports from individuals in the Illinois Department of Transportation (IDOT), Illinois Division of Highways, Natural Resource Conservation Service, Universities and ISGS staff.[xii] An inventory based on this type of submitted information was published in 1985.[xiii] The ISGS has also performed a few systematic landslide inventories along rivers; part of the Illinois River by LaSalle/Peru, and part of the Ohio and Mississippi Rivers in southern Illinois by aerial studies.[xiv] [xv]

The ISGS maintains a database which is being updated using the original forms, archived site reports performed by ISGS staff, ISGS picture and slide collection and new events added through review of imagery and field observations. To date, there are about 1,218 individual landslides reported in 57 counties with some details and 221 additional landslides located by an aerial study.[xvi] Nearly 25 percent are classified as related to human activity, most associated with cutting into slopes for roadways. In Illinois, there have been two known deaths associated with landslides, one in 1928 and the second in 1995.

According to HAZUS risk assessment data from the 2023 Illinois State Natural Hazard Mitigation Plan, Hancock County is a "very low" risk for landslides.

PANDEMIC

(Source: Illinois Natural Hazard Mitigation Plan, 2023)

According to the World Health Organization, a pandemic involves the worldwide spread of a new infectious disease.

Pandemics occur when new diseases or viruses develop the ability to spread rapidly. Humans may have little or no immunity against a new virus. Usually, a new virus cannot spread between animals and people, but it can easily spread if it mutates, and a pandemic may result. Seasonal flu epidemics generally occur because of a viral subtype that is already circulating among people.

According to the United States Centers for Disease Control and Prevention (CDC), the expected number of people with a disease that is usually present in a community is referred to as the baseline or endemic level of the disease. The CDC uses the following definitions to describe the extent of infectious diseases[xvii]:

- **Endemic**: Constant presence and/or usual prevalence of a disease or infection agent in a population within a geographic area.
- **Hyperendemic**: The persistent, high levels of disease occurrence.
- **Cluster**: Aggregation of cases grouped in place and time that are suspected to be greater than the number expected even though the expected number may not be known.
- **Epidemic**: An increase, usually sudden, in the number of cases of a disease above what is normally expected.
- **Outbreak**: The same as epidemic, but over a much smaller geographical area.
- **Pandemic**: Epidemic that has spread over several countries or continents, usually affecting many people.

Communicable diseases, also known as infectious diseases, are illnesses caused by an infectious agent or its toxins that occurs through the direct or indirect transmission of the infectious agent or its products from an infected individual or via an animal, vector or the inanimate environment to a susceptible animal or human host.[xviii] Signs and symptoms vary depending on the organism causing the infection. Hand washing and adequate personal hygiene practices can help prevent the spread of many communicable diseases. In any given year, a communicable disease can lead to an epidemic or outbreak within Illinois.

Examples of communicable diseases common in Illinois include, but are not limited to, Diphtheria, E. Coli, HIV/AIDS, Influenza, Measles, Mumps, Pneumococcal Disease, Rubella, Severe Acute Respiratory Syndrome (SARS), various Sexually transmitted diseases (STDs), Tuberculosis, Viral Hepatitis, West Nile Virus, and Whooping Cough.

The most recent pandemic, declared by the World Health Organization (WHO) in March 2020,[xix] was caused by a coronavirus, SARS-CoV-2.[xx] According to USA Facts, since the declaration of the health emergency in 2020, there have 5,174 COVID-19 cases and 51 deaths among Hancock County residents.[xxi]

SEVERE STORMS / HAIL

(Source: Federal Emergency Management Agency)

All thunderstorms are dangerous. Every thunderstorm produces lightning. In the United States an average of 300 people are injured and 80 people are killed each year by lightning. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms.

Facts about thunderstorms:

- Thunderstorms may occur singly, in clusters, or in lines.
- Some of the most severe occur when a single thunderstorm affects one location for an extended time.
- Thunderstorms typically produce heavy rain for a brief period, anywhere from 30 minutes to an hour.
- Warm, humid conditions are highly favorable for thunderstorm development.
- About 10% of thunderstorms are classified as severe – one that produces hail at least ¾ of an inch in diameter, has winds of 58 miles per hour or higher, or produces a tornado.

Facts about lightning:

- Lightning's unpredictability increases the risk to individuals and property.
- Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall.
- "Heat lightning" is actually lightning from a thunderstorm too far away for thunder to be heard.
- Most lightning deaths and injuries occur when people are caught outdoors in the summer months during the afternoon and evening.

Facts about hail:

- As a thunderstorm grows, updrafts will push water droplets into a region of the atmosphere which is below the freezing temperature. These water droplets collide with other droplets just before freezing, which is why some hailstones can grow to several inches in diameter. The stronger the updraft associated with a thunderstorm, the larger the hail associated with the storm will be.

The National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center keeps a database of all severe weather events. Regarding severe storms the database keeps records of thunderstorm and high

wind events, hail events, and tornados. According to the NCDC the Storm Events database keeps record of all thunderstorm and wind events, as well as hail events from 1955 forward. However, the lack of damage inducing thunderstorm and high wind events before 1997 and the lack of any events before 1970 call into question the completeness of this data. The tornado events are reportedly tracked back to 1950.

The following tables displays all the damage or injury inducing high wind and thunderstorm events in Hancock County that are listed in the NCEI Storm Events Database.

Figure 2.15: High Wind Events in Hancock County 1993 to Present

LOCATION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROPS DAMAGE
HANCOCK	10/29/1996	17:10	52 kts.	0	0	0.00 K	0.00 K
HANCOCK	4/6/1997	8:00	52 kts.	0	0	100.00 K	0.00 K
HANCOCK	4/30/1997	16:05	44 kts.	0	0	0.00 K	0.00 K
HANCOCK	9/29/1997	11:00	52 kts.	0	0	0.00 K	0.00 K
HANCOCK	11/9/1998	4:00	50 kts.	0	0	0.00 K	0.00 K
HANCOCK	2/25/2001	2:00	47 kts.	0	0	0.00 K	0.00 K

Source: NOAA NCEI Storm Events Database, https://www.ncdc.noaa.gov/stormevents/. Retrieved June 5, 2023. Note: 1 - "HANCOCK" in all capital letters refers to an unspecified location within Hancock County

Figure 2.16: Thunderstorm Events Resulting in Injuries or Damage in Hancock County 1993 to Present

LOCATION	BEGIN DATE	BEGIN TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
BOWEN	8/18/1993	18:10	0 kts.	0	0	0.50 K	0.00 K
HAMILTON	8/28/1993	03:25	0 kts.	0	0	0.50K	0.00 K
ELVASTON	4/7/1998	15:45		0	0	0.50 K	0.00 K
COUNTYWIDE	7/26/1999	19:00		0	0	12.00 K	0.00 K
LA HARPE	4/20/2000	03:20		0	0	15.00 K	0.00 K
HAMILTON	5/8/2000	20:06		0	0	1.00 K	0.00 K
COUNTYWIDE	6/13/2000	22:25		0	0	5.00 K	0.00 K
CARTHAGE	7/5/2000	14:15		0	0	0.25 K	0.00 K
CARTHAGE	7/31/2000	17:45		0	0	6.00 K	0.00 K
NAUVOO	6/1/2001	17:15		0	0	40.00 K	0.00 K
WARSAW	7/5/2003	21:15	52 kts.	0	0	50.00 K	5.00 K
HAMILTON	7/5/2003	21:18	52 kts.	0	0	50.00 K	5.00 K
DALLAS CITY	7/8/2003	12:57	52 kts.	0	0	50.00 K	5.00 K
AUGUSTA	7/9/2003	20:43	52 kts.	0	0	40.00 K	5.00 K
NAUVOO	7/18/2003	06:00	70 kts.	0	0	3.500 M	40.00 K
HAMILTON	7/18/2003	06:05	70 kts.	0	1	60.00 K	20.00 K
CARTHAGE	7/18/2003	06:15	70 kts.	0	0	60.00 K	10.00 K
BENTLEY	7/18/2003	06:20	70 kts.	0	0	60.00 K	20.00 K

NAUVOO	8/26/2003	16:35	52 kts.	0	0	0	5.00 K
BOWEN	8/28/2003	16:00	55 kts.	0	0	10.00 K	2.00 K
NAUVOO	5/23/2004	02:18	52 kts.	0	0	5.00 K	0.00 K
HAMILTON	5/24/2004	20:13	65 kts.	0	0	10.00 K	20.00 K
NAUVOO	5/30/2004	13:35	70 kts.	0	0	10.00 K	0.00 K
CARTHAGE	8/27/2004	00:55	59 kts.	0	0	5.00 K	10.00 K
CARTHAGE	8/28/2004	00:55	59 kts.	0	0	3.00 K	3.00 K
NAUVOO	6/8/2005	12:00	52 kts.	0	0	3.00 K	0.00 K
NAUVOO	9/8/2005	15:10	56 kts.	0	0	10.00 K	0.00 K
SUTTER	3/30/2006	20:30	52 kts.	0	0	.50 K	0.00 K
NIOTA	6/3/2008	08:13	52 kts.	0	0	5.00 K	0.00 K
SUTTER	7/27/2008	18:40	61 kts.	0	0	5.00 K	0.00 K
CARTHAGE	7/27/2008	19:00	56 kts.	0	0	5.00 K	0.00 K
DURHAM	6/21/2010	17:01	52 kts.	0	0	1.00 K	0.00 K
WARSAW	8/20/2010	16:20	56 kts.	0	0	10.00 K	0.00 K
HAMILTON	8/20/2010	16:40	56 kts.	0	0	10.00 K	0.00 K
BOWEN	6/10/2011	17:50	52 kts.	0	0	5.00 K	0.00 K
HAMILTON	6/27/2011	00:30	61 kts.	0	0	250.00 K	0.00 K
WARSAW	6/27/2011	00:38	56 kts.	0	0	5.00 K	0.00 K
CARTHAGE	6/27/2011	00:45	65 kts.	0	0	250.00 K	0.00 K
BENTLEY	6/27/2011	00:45	61 kts.	0	0	250.00 K	0.00 K
PLYMOUTH	6/27/2011	00:46	61 kts.	0	0	5.00 K	0.00 K
BOWEN	6/16/2012	17:48	70 kts.	0	0	75.00 K	0.00 K

Source: NOAA NCEI Storm Events Database, https://www.ncdc.noaa.gov/stormevents/. Retrieved June 5, 2023.

The following table displays the number of hail events in Hancock County that are listed in the NCEI Storm Events Database.

Figure 2.17: Number of Hail Events by Jurisdiction 1993 to Present

Jurisdiction	Number of Hail Events
Unspecified – Hancock County	17
Augusta	14
Basco	1
Bentley	7
Bowen	8
Burnside	1

Carthage	14
Dallas City	10
Elvaston	2
Ferris	3
Fountain Green	8
Hamilton	13
La Harpe	7
Nauvoo	9
Niota	2
Plymouth	12
Pontoosuc	NA
Sutter	2
Warsaw	7
West Point	1

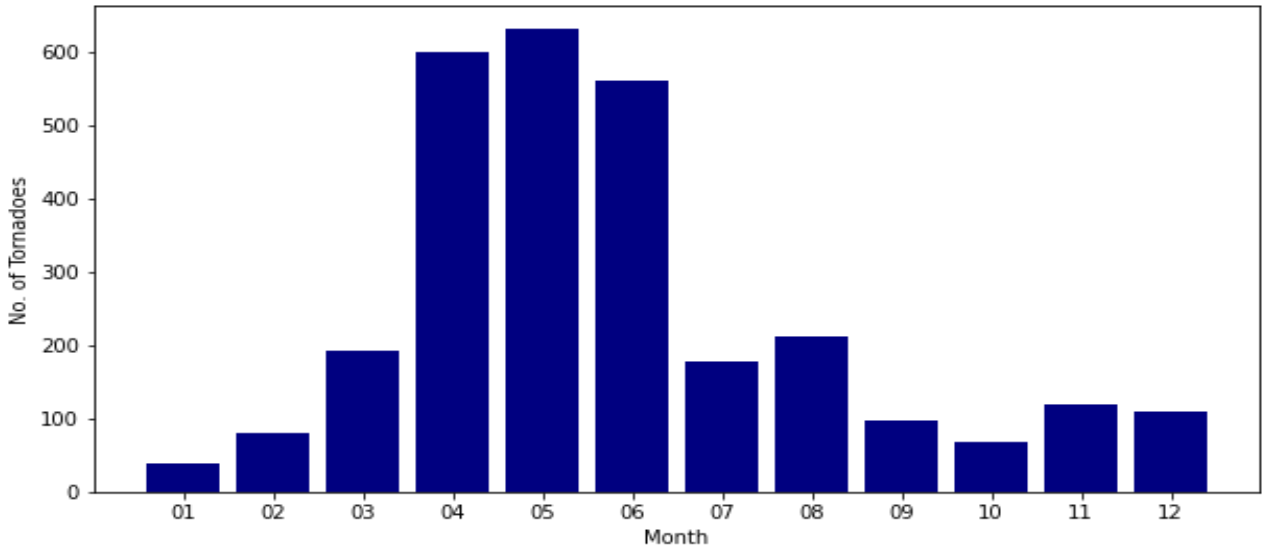
Source: NOAA NCEI Storm Events Database, https://www.ncdc.noaa.gov/stormevents/. Retrieved June 5, 2023.

TORNADO

(Source: Illinois Natural Hazard Mitigation Plan, 2023)

A tornado is a violently rotating column of air extending from the base of a thunderstorm to the ground. Typically spawned by thunderstorms or other warm, humid, and windy weather, tornadoes generally move southwest to northeast but can quickly change direction at any time.[xxii] Although tornadoes can occur at any time of day, half of all tornadoes in Illinois form between the hours of 3 p.m. and 7 p.m. They are particularly deadly when they occur at night, when many people are asleep, and are unable to hear sirens or receive alerts. In Illinois, the peak tornado season runs from March through June (see figure 2.18 below), but tornadoes can occur during any month.[xxiii]

Figure 2.18: Number of Tornadoes in Illinois by Month (1950-2021)



The Enhanced Fujita (EF) scale replaced the Fujita Scale on February 1, 2007. EF ratings are assigned to tornadoes based on their estimated wind speeds and infrastructure damage (see figure 2.19 below).

Figure 2.19: Enhanced Fujita Scale. Source: NWS

EF Rating	Wind Speeds	Expected Damage
EF-0	65-85 mph	'Minor' damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.
EF-1	86-110 mph	'Moderate' damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.
EF-2	111-135 mph	'Considerable' damage: roofs torn off well constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.
EF-3	136-165 mph	'Severe' damage: entire stories of well constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.
EF-4	166-200 mph	'Extreme' damage: Well constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.
EF-5	> 200 mph	'Massive/incredible' damage: Well constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.

Since 1950, the NCEI Storm Events Database has recorded 2,885 tornadoes with a rating of F/EF-0 or above in Illinois. Fifty tornadoes had a rating of F/EF-4 or F/EF-5 (see table below). Six EF-4 tornadoes have occurred since 2010. Since 1996, tornadoes in Illinois have resulted in $3,050,175,000 in property damage, making it the costliest hazard for the state.

Figure 2.20: Number of Tornadoes across the Enhanced Fujita and Fujita Scale (1950-2021).

Enhanced Fujita/ Fujita Scale	Number of Tornadoes	Number of Fatalities	Number of Injuries
F/EF-0	1,248	2	26
EFF/F-1	951	13	244
F/EF-2	484	61	850
EF/ F-3	152	57	925
F/EF-4	47	113	2,137
F/EF-5	3	30	356

The following table displays all of the damage or injury inducing tornado events in Hancock County that are listed in the NCEI Storm Events Database.

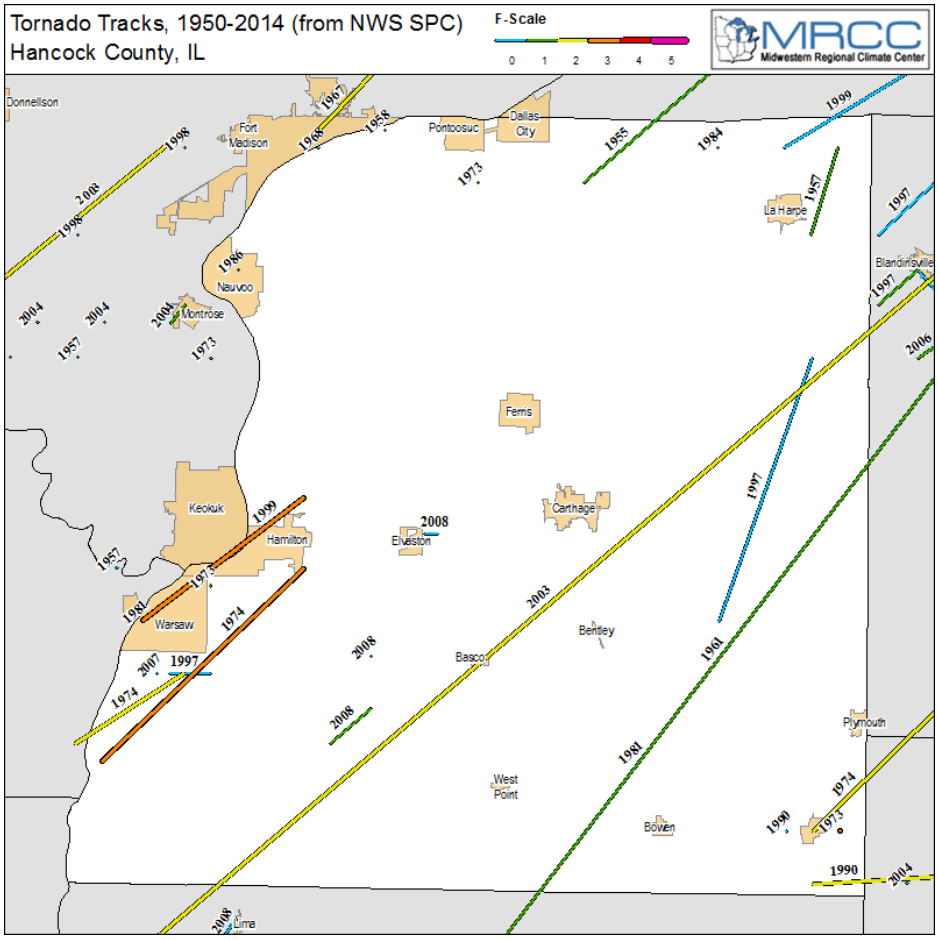
Figure 2.21: Tornados Causing Injuries or Property Damage 1970 to Present

LOCATION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
HANCOCK CO.	4/13/1974	18:40	F3	0	0	2.500 M	0.00 K
HANCOCK CO.	4/13/1974	19:00	F2	0	10	2.500 M	0.00 K
HANCOCK CO.	6/21/1981	19:14	F1	0	0	2.500 M	0.00 K
HANCOCK CO.	6/21/1981	19:47	F1	0	0	2.50 K	0.00 K
HANCOCK CO.	4/29/1984	20:50	F0	0	0	0.03 K	0.00 K
HANCOCK CO.	6/30/1986	1:40	F1	0	1	25.00 K	0.00 K
HANCOCK CO.	3/8/1990	15:15	F2	0	0	250.00 K	0.00 K
HANCOCK CO.	6/16/1990	16:00	F1	0	0	25.00K	0.00 K
NIOTA	5/13/1995	15:18	F4	0	7	10.000 M	0.00 K
WARSAW	4/30/1997	12:50	F0	0	0	400.00 K	0.00 K
WARSAW	4/30/1997	12:52	F0	0	0	400.00 K	0.00 K
WARSAW	4/30/1997	12:54	F1	0	0	400.00 K	0.00 K
WARSAW	4/8/1999	17:35	F3	0	0	15.000 M	0.00 K
TIOGA	5/10/2003	17:49	F2	0	0	400.00 K	0.00 K
WARSAW	6/2/2007	19:45	EF0	0	0	5.00 K	0.00 K
SUTTER	4/10/2008	17:30	EF1	0	0	100.00 K	0.00 K
BASCO	4/10/2008	17:33	EF0	0	0	20.00 K	0.00 K
ELVASTON	4/10/2008	17:35	EF0	0	0	30.00 K	0.00 K

Source: NOAA NCEI Storm Events Database, https://www.ncdc.noaa.gov/stormevents/. Retrieved June 5, 2023. Note: 1 - "HANCOCK" in all capital letters refers to an unspecified location within Hancock County

Information about tornado activity in Illinois is posted at the Illinois State Climatologist Web site https://www.isws.illinois.edu/statecli/tornado/ilmaps.htm. The map below shows tornado tracks through Hancock County between 1950 – 2014. These included a 1995 F4 tornado that originated in Niota and struck Dallas City, Raritan, and rural areas of Hancock County before moving into Warren County, two F3s in 1973 and 1974, and another F3 in 1999 that touched down near Warsaw and moved through Hamilton resulting in significant damage to over 150 homes and businesses with a cost of $10 million.

Figure 2.22: Tornado tracks in Hancock County 1950 - 2014



Source: Illinois State Climatologist website. https://www.isws.illinois.edu/statecli/tornado/ilmaps.htm

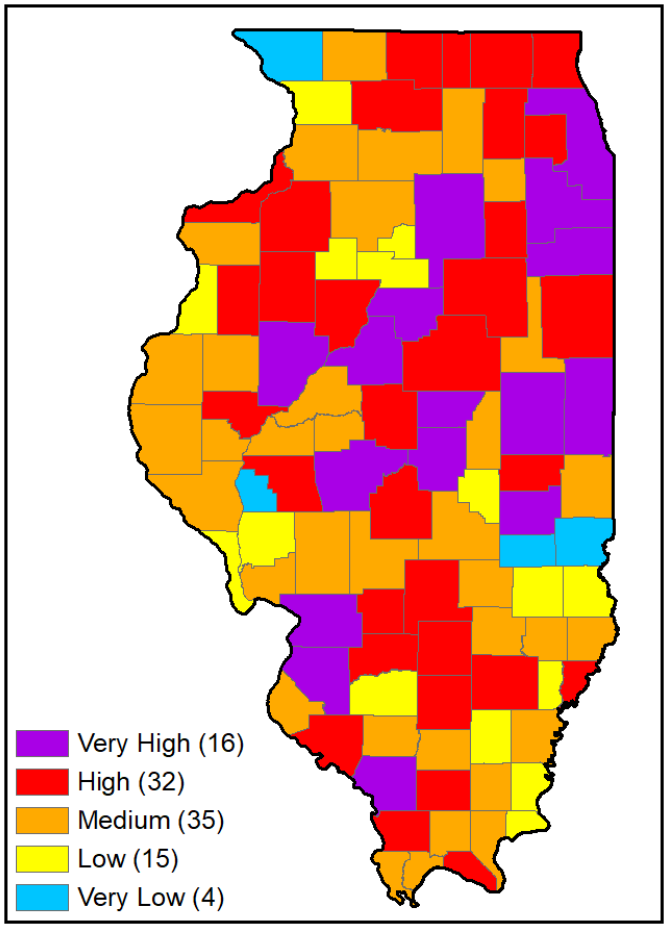


Figure 2.23: Tornado Risk Rankings by County -Source: INHMP, 2023

According to the risk assessment conducted by the ISWS for the 2023 Illinois State Natural Hazard Mitigation Plan, Hancock County is at medium risk for tornadoes. Only four counties in Illinois have a very low risk for tornadoes. More heavily populated counties are at higher risk due to impacts across larger populations and built infrastructure.

WINTER STORMS

(Source: Illinois Natural Hazard Mitigation Plan, 2023)

Winter storms in Hancock County consist of snow and ice and at times result in blizzard conditions. Winter storms can produce flooding, storm surge, closed highways, blocked roads, downed power lines and hypothermia. Snowfalls are generally measured in inches but at times have reached over one foot. Blowing snow reduces visibility and is the cause of many vehicle accidents. A heavy snowstorm is one that produces at least 6" of snow within 48 hours.

A blizzard is a winter storm with sustained winds or frequent gusts of 35 mph or greater and considerable falling or blowing snow reducing visibility to less than ¼ mile for three hours or longer. Drifting is a major concern with roadways being blocked and buildings and driveways becoming inaccessible.

Freezing rain and sleet create slippery roadways and sidewalks causing dangerous conditions and can weigh down tree limbs and power lines causing damage and power outages. Freezing rain is rain that freezes when it hits the ground, trees, power lines and buildings, creating a coating of ice. Sleet is rain that turns to ice pellets before reaching the ground and creates slippery conditions.

The National Weather Service uses the following terms when talking about winter weather threat to the public:[xxiv]

- **Winter Weather Advisory:** Snow, blowing snow, ice and/or sleet is expected to produce potentially dangerous travel conditions within the next 12 to 36 hours.
- **Winter Storm Watch:** Issued for potentially significant winter weather, including heavy snow ice, sleet, and/or blowing snow within the next day or two. Now is the time to prepare!
- **Winter Storm Warning:** Indicates heavy snow, blowing snow, sleet or a combination of winter weather hazards are expected to cause a significant impact to life or property. Stay indoors and adjust travel plans.
- **Snow Squall Warning:** Sudden whiteout conditions with near zero visibility and flash freezing of road surfaces resulting in potentially life-threatening conditions for travelers.
- **Blizzard Warning:** Strong winds (35 mph or greater) will produce blinding snow and near zero visibility, resulting in potentially life-threatening conditions –particularly for travelers. Blizzards can occur with minimal accumulations of snow.
- **Ice Storm Warning:** Heavy accumulations of ice are expected to cause a significant impact to life or property, resulting in hazardous travel conditions, tree damage and extended power outages.

The type of precipitation that can occur during the winter can range from snow to rain, as depicted the figure below. Most precipitation that forms in wintertime clouds starts out as snow because the top layer of the storm is usually cold enough to create snowflakes.

Figure 2.24: Winter Precipitation. Source: NWS

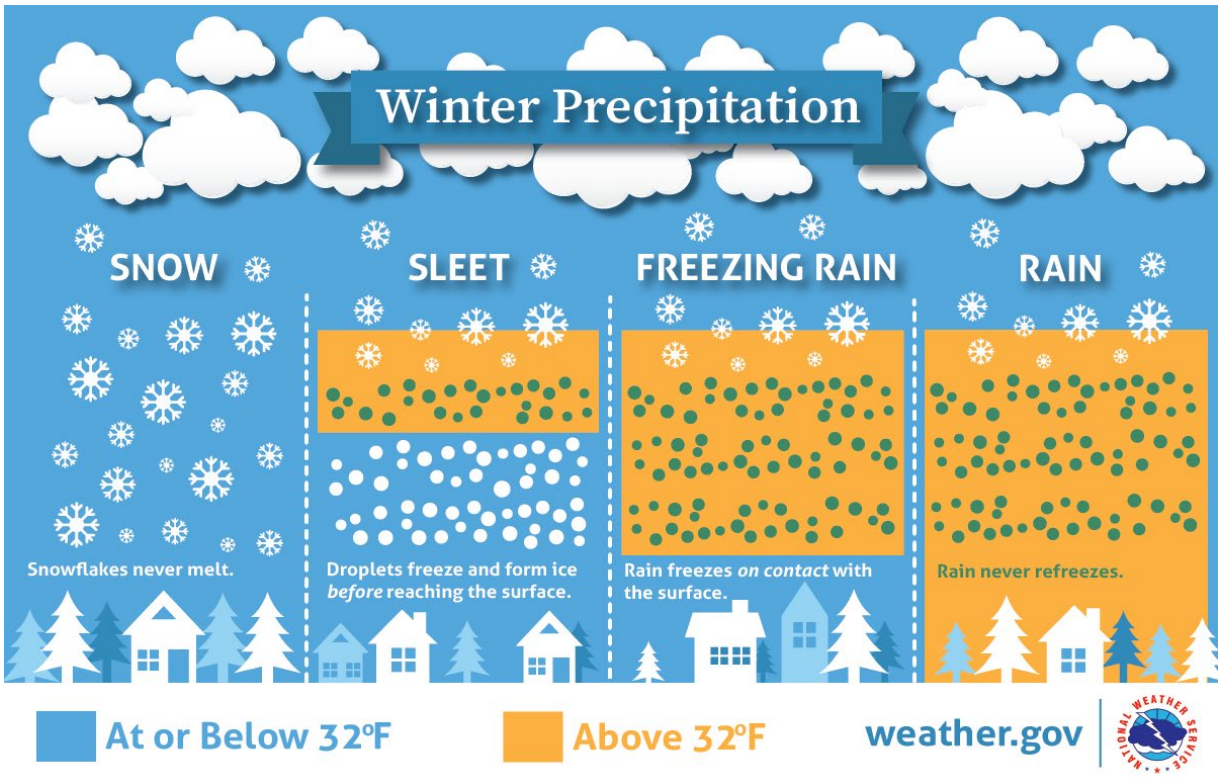
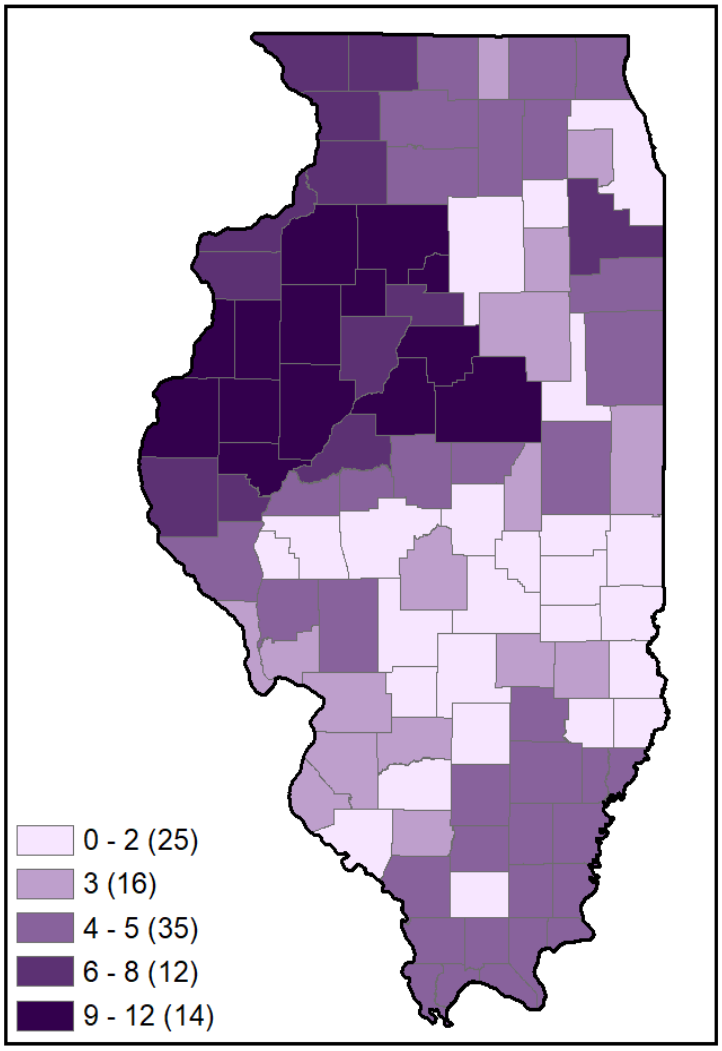


Figure 2.25: Ice Storm Events by County. Source: NCEI



An ice storm is a storm which results in the accumulation of at least ¼ inches of ice on exposed surfaces. An ice storm can be caused by sleet or freezing rain.[xxv] The National Weather Service uses the following definitions to define sleet and freezing rain:[xxvi]

- **Sleet** occurs when snowflakes only partially melt when they fall through a shallow layer of warm air. These slushy drops refreeze as they next fall through a deep layer of freezing air above the surface, and eventually reach the ground as frozen rain drops that bounce on impact.

- **Freezing rain** occurs when snowflakes descend into a warmer layer of air and melt completely. They instantly refreeze upon contact with anything that that is at or below 32°F, creating a glaze of ice on the ground, trees, power lines, or other objects.

It is not uncommon to have freezing rain and sleet together. Another common hazard associated with ice storms is black ice. Black ice is a deadly driving hazard, defined as patchy ice on roadways or other transportation surfaces that cannot easily be seen.[xxvii] Bridges and overpasses are particularly dangerous as they freeze before other road surfaces.

A winter storm is a combination of heavy snow, blowing snow and/or dangerous wind chills. Precipitation falls as snow when the air temperature remains below freezing throughout the atmosphere. The National Weather Service (NWS) uses the following terms when talking about snow:[xxviii]

- **Snow Flurries:** Light snow falling for short durations. No accumulation or light dusting is all that is expected.
- **Snow Showers:** Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- **Snow Squalls:** Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant. Snow squalls are best known in the Great Lakes Region.
- **Blowing Snow:** Wind-driven snow that reduces visibility and causes significant drifting. Blowing snow may be snow that is falling and/or loose snow on the ground picked up by the wind.
- **Blizzards:** Winds over 35mph with snow and blowing snow, reducing visibility to 1/4 mile or less for at least three hours.

According to Illinois Emergency Management Agency's 2021 Winter Weather Preparedness Guide, there has not been a winter without at least one winter storm in the past century in Illinois.

The average snowfall ranges from 27 inches of snow in Rockford and Chicago to only 6 to 10 inches in the southern tip of Illinois.[xxix] Using NCEI data of storm event report for winter storms in Illinois, the figure on this page shows the number of events by county since 1996.

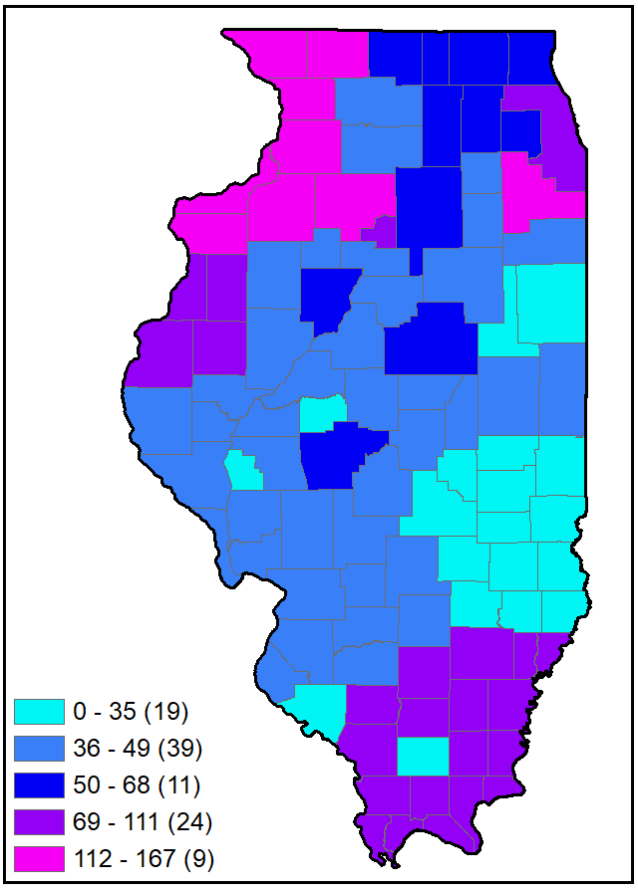


Figure 2.26: Winter storm events by county. Source: NCEI

From 1993 through 2023, there were 118 blizzard, winter weather, snow or ice events in Hancock County or 3.9 per year. The following table displays the number of winter storms that have occurred in Hancock County since 1995.

Figure 2.27: Blizzard, Winter Storm, Snow, and Ice Events in Hancock County 1993 to Present

LOCATION	BEGIN DATE	END DATE	EVENT TYPE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
HANCOCK CO.	1/18/1996	1/18/1996	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	11/14/1996	11/14/1996	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/27/1996	12/28/1996	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/9/1997	1/10/1997	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/15/1997	1/17/1997	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/24/1997	1/24/1997	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	2/3/1997	2/4/1997	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	4/10/1997	4/12/1997	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	12/9/1997	12/10/1997	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	12/24/1997	12/24/1997	Heavy Snow	0	0	0.00 K	0.00 K

HANCOCK CO.	1/8/1998	1/8/1998	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	3/8/1998	3/9/1998	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	12/30/1998	12/30/1998	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/1/1999	1/3/1999	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	3/5/1999	3/5/1999	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	3/8/1999	3/8/1999	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/15/1999	12/15/1999	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/16/1999	12/17/1999	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/19/1999	12/20/1999	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/23/1999	12/23/1999	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/3/2000	1/4/2000	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/17/2000	1/17/2000	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/29/2000	1/30/2000	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	2/17/2000	2/18/2000	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/1/2000	12/31/2000	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	12/1/2000	12/1/2000	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	12/10/2000	12/11/2000	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/13/2000	12/13/2000	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	12/15/2000	12/16/2000	Ice Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/18/2000	12/19/2000	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	12/20/2000	12/20/2000	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	12/28/2000	12/29/2000	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	1/26/2001	1/27/2001	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	1/28/2001	1/29/2001	Ice Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	2/8/2001	2/9/2001	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/30/2002	1/31/2002	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	3/1/2002	3/3/2002	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/2/2003	1/2/2003	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/15/2003	1/16/2003	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	2/14/2003	2/15/2003	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	11/24/2004	11/24/2004	Heavy Snow	0	0	5.00 K	0.00 K
HANCOCK CO.	1/5/2005	1/5/2005	Ice Storm	0	0	10.00K	0.00 K
HANCOCK CO.	12/8/2005	12/8/2005	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	1/20/2006	1/20/2006	Ice Storm	0	0	5.00 K	0.00 K
HANCOCK CO.	2/16/2006	2/16/2006	Winter Weather	0	0	1.00K	0.00 K
HANCOCK CO.	3/21/2006	3/21/2006	Winter Weather	0	0	2.00K	0.00 K
HANCOCK CO.	11/30/2006	11/30/2006	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/1/2006	12/1/2006	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/12/2007	1/15/2007	Ice Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/20/2007	1/21/2007	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/6/2007	2/6/2007	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/12/2007	2/13/2007	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	2/16/2007	2/17/2007	Winter Weather	0	0	0.00 K	0.00 K

HANCOCK CO.	2/24/2007	2/24/2007	Ice Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/1/2007	12/1/2007	Ice Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/6/2007	12/6/2007	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/10/2007	12/11/2007	Ice Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/15/2007	12/15/2007	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/22/2007	12/23/2007	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/28/2007	12/28/2007	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/31/2007	12/31/2007	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	1/29/2008	1/29/2008	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	1/31/2008	1/31/2008	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/1/2008	2/1/2008	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/3/2008	2/3/2008	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/6/2008	2/6/2008	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/25/2008	2/26/2008	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/28/2008	2/28/2008	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	11/30/2008	11/30/2008	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/16/2008	12/16/2008	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/18/2008	12/19/2008	Ice Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	2/20/2009	2/21/2009	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/7/2009	12/9/2009	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/25/2009	12/27/2009	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	1/6/2010	1/7/2010	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/25/2010	1/25/2010	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/8/2010	2/9/2010	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/21/2010	2/22/2010	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	3/20/2010	3/20/2010	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/12/2010	12/12/2010	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/24/2010	12/25/2010	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	1/10/2011	1/11/2011	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	1/17/2011	1/17/2011	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/1/2011	2/2/2011	Blizzard	0	0	0.00 K	0.00 K
HANCOCK CO.	2/24/2011	2/25/2011	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/27/2011	2/27/2011	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	1/12/2012	1/12/2012	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/20/2012	12/20/2012	Blizzard	0	0	0.00 K	0.00 K
HANCOCK CO.	2/21/2013	2/22/2013	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	2/26/2013	2/27/2013	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	3/24/2013	3/24/2013	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	12/13/2013	12/14/2013	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/21/2013	12/22/2013	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	1/4/2014	1/6/2014	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/1/2014	2/1/2014	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	2/4/2014	2/5/2014	Winter Storm	0	0	0.00 K	0.00 K

HANCOCK CO.	2/17/2014	2/17/2014	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	3/1/2014	3/2/2014	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	11/15/2014	11/15/2014	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	1/5/2015	1/5/2015	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/1/2015	2/1/2015	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/4/2015	2/4/2015	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	2/25/2015	2/26/2015	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/28/2015	12/28/2015	Ice Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/24/2017	12/24/2017	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	4/1/2018	4/1/2018	Heavy Snow	0	0	0.00 K	0.00 K
HANCOCK CO.	4/8/2018	4/9/2018	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	11/25/2018	11/26/2018	Blizzard	0	0	0.00 K	0.00 K
HANCOCK CO.	1/11/2019	1/13/2019	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/18/2019	1/19/2019	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	10/30/2019	10/31/2019	Winter Weather	0	0	0.00 K	0.00 K
HANCOCK CO.	1/17/2020	1/18/2020	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	4/16/2020	4/17/2020	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/1/2021	1/1/2021	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/1/2022	1/1/2022	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	1/14/2022	1/15/2022	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	2/17/2022	2/17/2022	Winter Storm	0	0	0.00 K	0.00 K
HANCOCK CO.	12/22/2022	12/24/2022	Winter Storm	0	0	0.00 K	0.00 K

Source: NOAA NCEI Storm Events Database, https://www.ncdc.noaa.gov/stormevents/. Retrieved June 5, 2023. Note: 1 - "HANCOCK" in all capital letters refers to an unspecified location within Hancock County

WILDFIRE

(Source: Illinois Natural Hazard Mitigation Plan, 2023)

A wildfire is an unplanned wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, and escaped prescribed fire projects.[xxx] Wildfires can occur in Illinois under certain conditions, such as during periods of drought or when dry, windy weather patterns occur. Wildfires can start naturally or be caused by human activities such as campfires, fireworks, or power lines. Wildfires can vary in size and severity. The National Wildfire Coordinating Group (NWCG) uses the following sizes for classifying fires.[xxxi]

Figure 2.28: Fire Class Size

Fire Size Class	Size
Class A	one-fourth acre or less
Class B	more than one-fourth acre, but less than 10 acres
Class C	10 acres or more, but less than 100 acres
Class D	100 acres or more, but less than 300 acres
Class E	300 acres or more, but less than 1,000 acres
Class F	1,000 acres or more, but less than 5,000 acres
Class G	5,000 acres or more

The Wildland-Urban Interface (WUI) is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels.[xxxii] This interface can be found in rural, suburban, and urban areas where homes and businesses are located near or within natural areas such as forests, grasslands, or wetlands. The WUI is often characterized by an abundance of highly flammable vegetation, which can act as fuel for the fire. When a wildfire enters the WUI, it can ignite homes and other structures, putting people's lives at risk and causing significant damage to property.

The WUI is also a contributing factor for communities at risk for wildfires. Wildfires can start naturally or be caused by human activities. Once a fire starts, it can spread quickly in dry and windy conditions, and if it reaches the WUI, it can have devastating consequences.

Illinois is among the US states with the fewest wildfires and fewest acres burned every year.[xxxiii] However, Illinois is not immune to wildfires, having experienced seven damaging ones since 2007. The figure on this page shows fires reported within 1km of the Illinois state boundary since 1992.

Hancock County is at very low risk of wildfires; however, with enhanced and prolonged drought conditions, the threat of wildfires increases.

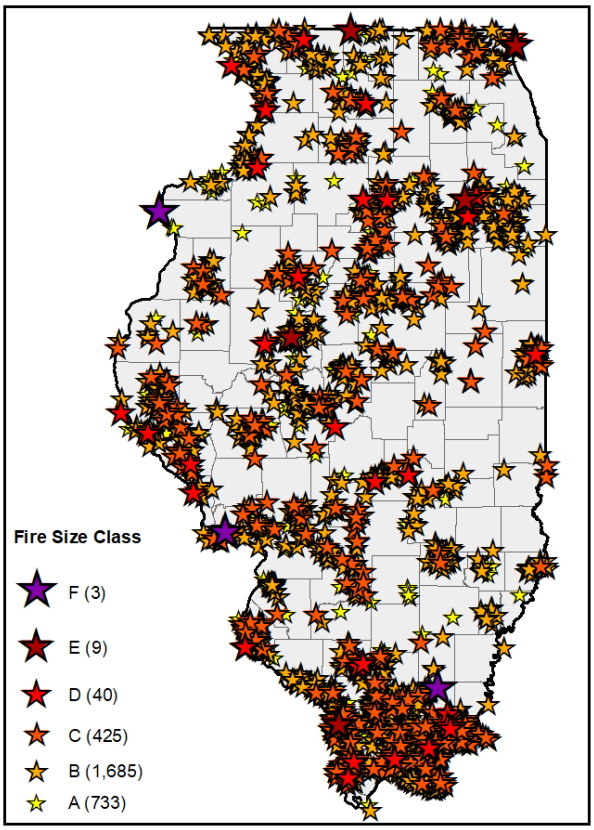


Figure 2.29: Reported Fires within I KM of State. Source: Forest Service Research Data Archive

HAZUS

Hazus[1] is a geographic information system (GIS)-based natural hazard risk analysis tool developed and freely distributed by FEMA. It is a loss and risk assessment software package built on GIS technology. The information generated can be used for planning emergency response actions and prioritizing mitigation efforts to reduce risk. Hazus output will provide a baseline for evaluating success in reducing natural hazard risk exposure when conducting future assessments.

The Hazus assessment is highly data dependent. The accuracy of the analyses depends on several important datasets including essential facilities, building structure information, and general building stock inventories. Hancock County's Hazus analyses included the creation of a building inventory using the Hancock County assessor's data and an update of the essential facilities database. Risks and losses due to flood hazards were modeled using the Hazus methodology of a Level 2, or advanced, analysis. The earthquake hazard was modeled using Hazus Level 1 methodology. Losses due to a simulated tornado scenario were modeled by a separate methodology using the asset information prepared for Hazus.

Essential Facilities

Essential facilities are buildings and infrastructure that provide necessary services to the public and would cause harm if they were destroyed or damaged. Examples of essential facilities include hospitals, emergency operation centers, police and fire departments, schools, and utility centers (such as for electricity or water). There are 110 identified essential facilities in Hancock County. A listing of these facilities can be found in **Appendix E**.

FEMA stipulates those essential facilities should not be in a floodplain when possible. If an essential facility must be in a floodplain, it should be designed with higher flood protection standards and have a flood evacuation plan. For Hancock County, one essential facility was identified as being in an approximate Zone A 1% annual chance floodplain represented on the FEMA Flood Insurance Rate Map (FIRM) for the unincorporated community of Niota.[2] This facility is a fire department station located on Arbor St. in Niota. The location of the facility is shown in Figure 2.30 on the following page.

Essential facility data are an example of site-specific information used in Hazus for analysis. This data was first compiled from the Hazus statewide database for Illinois and included schools, medical care facilities, emergency operation centers, police stations, fire stations, and potable/wastewater facilities. This data was used as a starting point with the intent for it to be updated for the *2023 Hancock County Multi-Jurisdictional Hazard Mitigation Plan*.

The planning team was asked to help with updating the essential facilities at the September 27th, 2022 risk assessment meeting held in Carthage Illinois. Additional categories were added to the essential facilities based on the expertise of local stakeholders. New categories included places of large assembly, vulnerable populations, and other community identified structures. These updates and corrections to the Hazus data tables were completed before performing the risk assessment. Locations of essential facilities were confirmed using community feedback and internet mapping services such as Google Maps and Google Street View. The updated Hazus inventory contributed to the Level 2 analysis, which improved the accuracy of the risk assessment.

[1] FEMA Hazus 5.1 Software. Released October 29, 2021.
https://www.fema.gov/flood-maps/products-tools/hazus
[2] Flood Insurance Rate Map 17067C0150E. Effective date 10/16/2009. Federal Emergency Management Agency (FEMA)

Figure 2.30: 1% Annual Chance Flood Boundary and Essential Facilities at Risk

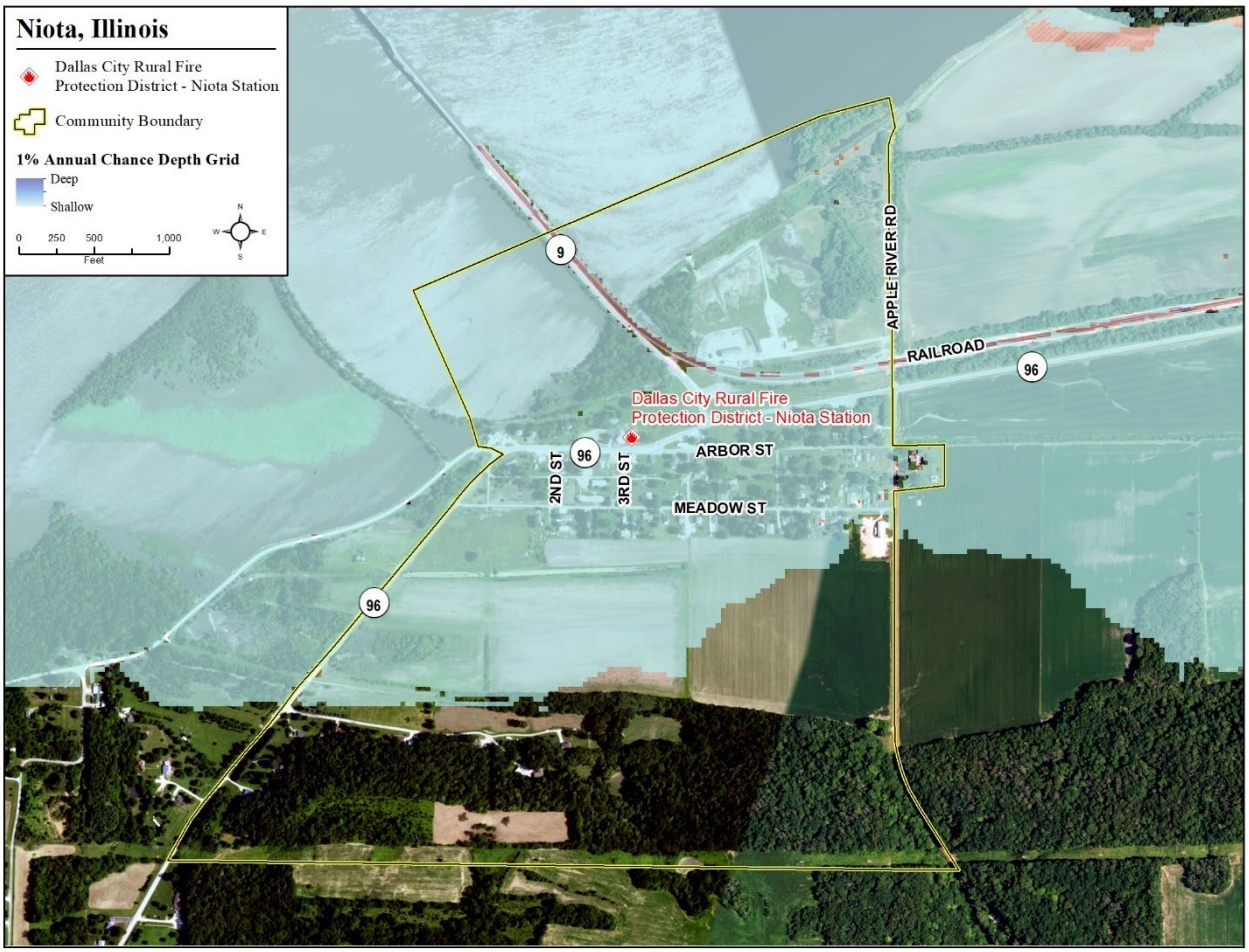


Figure 2.31 identifies the essential facilities that were used for the analysis. A complete list of the essential facilities and community maps displaying the essential facilities are included in Appendix E.

Figure 2.31: Essential facilities.

Facility	Number of Facilities
Ambulance Service	4
Emergency Operation Centers	1
Fire Stations	13
Medical Care Facilities	8
Police Stations	9
Schools	22
Vulnerable Populations	2
Places of Large Assembly	11
Potable Water Facilities	18
Waste Water Facilities	8
Community Identified Facilities	14

County Building Inventory

A structure-based asset inventory, or building inventory, was compiled for use in the flood and tornado risk assessments. This includes structures located within the 0.2% annual chance (500-year) floodplain for the Hazus flood analysis, and structures within the City of Carthage for the GIS-based tornado analysis.

The building inventory was created using GIS parcel data containing 2021 county assessor's data provided by Hancock County[3], and building footprints developed by Microsoft Corporation.[4] The building footprints that intersected the 0.2% annual chance flood depth grid developed for the riverine flood risk analysis were converted to points and spatially joined to the parcel polygons to capture the structure attributes. The locations of the points were verified using aerial photography. These features were then classified into several different occupancy classes that are compatible with Hazus. Hazus Occupancy Classes gives a brief explanation of these classes.

[3] Hancock County Illinois Tax Assessor Data. Received August 11, 2022, from Hancock County

[4] Microsoft Building Footprints. Retrieved in 2018, from https://www.microsoft.com/en-us/maps/building-footprints

Tornado GIS Analysis

GIS-overlay modeling was used to estimate the potential impacts of an F3 tornado moving through Hancock County. A hypothetical tornado track was created that begins southwest of the City of Carthage and travels approximately 2.9 miles on a northeasterly path through Carthage ending northeast of the city.

Description of Analysis

As stated above, the scenario for this analysis is a Fujita Scale F3 tornado moving through the City of Carthage. See Figure 2.33 below for a map of this scenario. Hazus software was not used for this analysis, however, similar GIS-based methodology was used to estimate potential damage based on current structure values located in the path of the simulated tornado track.

Estimates of dollar losses for structures located in the tornado's path were determined through this analysis. Estimates for injuries/loss of life, shelter needs, and damage to infrastructure are not included. In order to estimate the potential damages, GIS was used to create four different buffer zones around the tornado track. Each zone represents a different Fujita scale wind intensity from F3 to F0 based on their proximity to the center of the track. A damage percentage is assigned to each zone, with the most intense damage occurring within the center of the tornado path and decreasing amounts of damage away from the center. These percentages are listed in Figure 2.32 below. This methodology of creating buffers was based on the publication titled "A Study of the GIS Tools Available During Tornado Events and Their Effectiveness for Meteorologists, First Responders and Emergency Managers" presented at the American Meteorological Society Cloud Physics Conference in 2006[5].

Once these zones were created, they were overlaid on top of points derived from the Hancock County GIS parcel database. Each point represents an existing structure and is attributed with an estimate of the R.S. Means replacement cost value of the structure. A count of the structures that fell within each tornado damage zone is listed in Figure 2.34. Depending on which damage zone each of these points were located in, the estimated replacement cost of the structure was multiplied by the percentage listed in Figure 2.32 to give an estimate of the dollar losses that may result in such an event. This includes the structure loss only and does not include an estimate of the contents of the buildings. These loss estimates are listed in Figure 2.36.

Figure 1.32: Tornado Damage Zones

Zone	Range (Feet)	Damage Percentage
1 (F3)	0-330	0.8
2 (F2)	331-660	0.5
3 (F1)	661-1320	0.1
4 (F0)	1321-2640	0

[5] Hubbard, S.A. and MacLaughlin, K. A Study of the GIS Tools Available During Tornado Events and Their Effectiveness for Meteorologists, First Responders and Emergency Managers. Conference publication, American Meteorological Society Cloud Physics Conference. 2006.

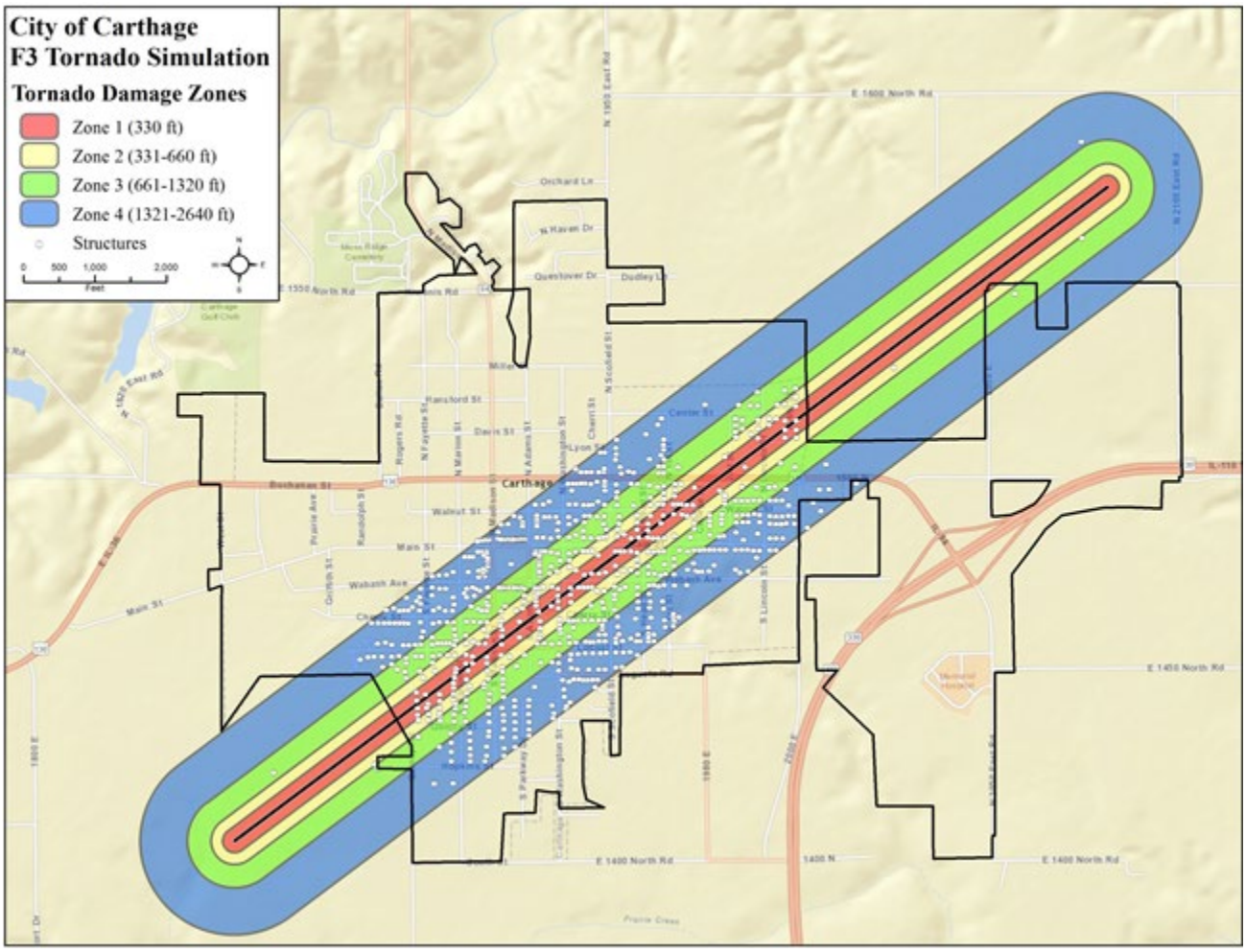


Figure 2.33: Tornado Damage Zones

A total of 322 structures located in Zones 1-3 were damaged in this scenario. Five of these structures were essential facilities. Four essential facilities fell within Zone 4. These facilities are listed in Figure 2.35

Figure 2.34: Structure Count in Each Tornado Damage Zone

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	71	68	137	239
Commercial	1	7	34	59
Industrial	0	0	1	0
Agriculture	0	0	1	1
Government	0	4	2	5
Religion	0	2	2	6
Education	2	0	0	1
Total	**74**	**81**	**177**	**311**

Figure 2.35: Essential Facilities Located in Tornado Path

Essential Facilities	Facility Class	Damage Zone	City
Legacy Theater	Place of Large Assembly	Zone 1	Carthage
Carthage Clipper Fire Department	Fire Facility	Zone 2	Carthage
Hancock County Health Department	Medical Facility	Zone 2	Carthage
Carthage Police Department	Police Facility	Zone 3	Carthage
Memorial Support Services	Medical Facility	Zone 3	Carthage
Emergency Service and Disaster Agency	Emergency Operation Center	Zone 4	Carthage
Hancock County Ambulance Service	Ambulance Service	Zone 4	Carthage
Carthage Middle School	School Facility	Zone 4	Carthage
Royal Academy	School Facility	Zone 4	Carthage

Damage to, or loss of, these essential facilities can result in a large negative impact on the community during a disaster. The loss of a healthcare center can reduce the capacity to treat those injured during an event. The loss of schools can have impacts such as reduced options for temporary shelter, as schools are often used in this capacity, and can increase the amount of time it takes to restore a level of normalcy to the community.

Economic Losses

The total structure loss estimate for this event is $46,410,194. Residential losses are the largest contributor to loss estimates followed by commercial. Zone 1 shows the highest loss totals as the structures in this zone were subject to the highest simulated wind damage.

Figure 2.36. Structure Loss Estimates by Occupancy

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$17,101,557	$8,997,077	$3,745,748	$0
Commercial	$262,181	$3,792,692	$3,378,877	$0
Industrial	$0	$0	$87,878	$0
Agriculture	$0	$0	$36,833	$0
Governmental	$0	$2,768,222	$226,621	$0
Religion	$0	$2,037,496	$459,872	$0
Education	$3,515,140	$0	$0	$0
Total	**$20,878,878**	**$17,595,487**	**$7,935,829**	**$0**
Total Losses	**$46,410,194**			

Riverine Flooding

Hazus Analysis

Flood Risk Assessment

The flood risk assessment conducted for Hancock County combines the GIS-based technology of Hazus with the updated structure asset inventory, essential facilities, and flood hazards to provide a solid, consistent framework to quantify the county's risk.

The impact of five separate flood events was analyzed including the 10%, 4%, 2%, 1%, and 0.2% annual chance floods. An average annualized loss (AAL) value is then calculated using the values from the five flood events listed above. AAL represents the estimated long-term value of losses averaged on an annual basis. This value can be useful for estimating the potential flood losses over a defined period of time.

Depth Grids

To represent the flood hazard, flood depth grids were created for each of the five flood events in Hancock County. Depth grids consist of a grid of equal-sized cells that cover the spatial extent of a given flood event. Each one of these cells has a flood depth value associated with it for the annual chance event being represented. Depth grids are calculated by subtracting ground elevations from flood elevation grids. Ground elevations take the form of a GIS raster Digital Elevation Model (DEM) or Digital Terrain Model (DTM). The Water Surface Elevation (WSE) grids are created by using flood elevations at cross-sections along the studied river or stream. A more detailed description of the source for each of these grids is included in the paragraphs below.

The Mississippi River along the western border of Hancock County presents the county's greatest flood hazard. Depth grids for the Mississippi River were provided by the U.S. Army Corps of Engineers – Rock Island District[6] (USACE-RI). The WSE grids were created from cross sections based largely on the 2004 Upper Mississippi River System Flow Frequency Study (UMRSFFS) UNET hydraulic models[7]. Ground elevations were determined from 2017 LiDAR data developed for Hancock County by the IL Height Modernization Program.

For areas outside of the Mississippi River floodplain, Hazus was used to create the flood depth grids for all five flood recurrence intervals, derived from the United States Geological Survey (USGS) 1/3 ArcSecond seamless digital elevation model (DEM)[8] with a 10-meter cell size. This seamless DEM is kept up to date with current topographic data through the USGS 3DEP[9] program. For Hancock County this is the 2017 LiDAR data.

Building Exposure

Three hundred ninety-one structures were identified to be at a high risk of flooding in Hancock County. For this risk assessment, "high risk" structures are those that are located within the 0.2% annual chance (500-year)

[6] Mississippi River Depth Grids. 2019. U.S. Army Corps of Engineers, Rock Island.
[7] Upper Mississippi River System Flow Frequency Study Final Report. January 2004, U.S. Army Corps of Engineers, Rock Island.
[8] National Elevation Dataset 1/3 ArcSecond DEM. Accessed Sept. 2022, U.S. Geological Survey. https://www.usgs.gov/publications/national-elevation-dataset
[9] 3D Elevation Program (3DEP). U.S. Geological Survey. https://www.usgs.gov/3d-elevation-program

floodplain. Estimates of the structure counts and total exposure by replacement cost value of the structures are detailed in figure 2.37 below.

Figure 2.37: High-risk building exposure (structure replacement cost value and content cost).

	1% Annual Chance Flood (100yr)		0.2% Annual Chance Flood (500yr)	
Community Name	**Count**	**Total Exposure**	**Count**	**Total Exposure**
Carthage, City of	18	$12,286,788	25	$20,276,030
Dallas City, City of	12	$7,760,200	16	$15,272,700
Elvaston, Village of	6	$2,333,000	6	$2,333,000
Hamilton, City of	4	$1,288,700	12	$18,023,600
Nauvoo, City of	1	$476,300	1	$476,300
Niota, CDP	51	$31,084,900	56	$33,486,200
Pontoosuc, Village of	69	$22,346,200	77	$24,427,700
Warsaw, City of	9	$11,278,100	12	$14,503,800
Hancock County Unincorporated Areas (Excluding Niota CDP)	93	$52,061,700	186	$113,758,000
Total	**263**	**$140,915,888**	**391**	**$242,557,330**

Economic Loss Due to Flooding

A Hazus flood loss analysis was performed using the structure-based asset inventory to investigate the impact of the five analyzed flood events. The results are listed by community and by occupancy class in Figure 2.38 and Figure 2.39

Figure 2.38: Total flood losses by community (2022 USD).

	10% Annual Chance Flood (10yr)		4% Annual Chance Flood (25yr)		2% Annual Chance Flood (50yr)		1% Annual Chance Flood (100yr)		0.2% Annual Chance Flood (500yr)		Average Annualized Loss (AAL)	
Community Name	**Count**	**Total Losses**	**Count**	**Total Losses**	**Count**	**Total Losses**	**Count**	**Total Losses**	**Count**	**Total Losses**	**Count**	**Total Losses**
Carthage, City of	9	$725,600	12	$964,600	12	$1,045,100	18	$2,491,700	25	$4,784,400	25	$127,190
Dallas City, City of	6	$153,200	7	$328,800	9	$709,800	12	$1,046,900	16	$2,872,800	16	$55,090
Elvaston, Village of	5	$210,300	5	$241,000	6	$298,500	6	$325,300	6	$500,200	6	$26,370
Hamilton, City of	0	$0	2	$3,000	2	$5,400	4	$13,600	12	$562,000	12	$3,710
Nauvoo, City of	0	$0	1	$25,800	1	$53,800	1	$75,700	1	$125,800	1	$3,270
Niota, CDP	33	$3,620,800	42	$5,346,100	45	$7,010,500	51	$8,728,300	56	$11,226,700	56	$573,590
Pontoosuc, Village of	41	$1,671,400	56	$2,178,400	62	$2,694,400	69	$3,636,500	77	$6,407,700	77	$248,940
Warsaw, City of	1	$95,200	5	$162,700	8	$358,100	9	$1,639,700	12	$4,467,700	12	$56,330
Hancock County Unincorporated Areas (Excluding Niota CDP)	60	$6,381,300	71	$8,264,600	82	$9,968,900	93	$12,164,000	186	$48,754,500	186	$1,073,800
Total	**155**	**$12,857,800**	**201**	**$17,515,000**	**227**	**$22,144,500**	**263**	**$30,121,700**	**391**	**$79,701,800**	**391**	**$2,168,290**

Flooding events can be extreme and devastating, leading to millions of dollars of losses during a flood event. Looking at the flood risk faced on an annual basis by using the average annualized losses shows on average how much it costs per year to keep properties unprotected from floods or in the floodplain.

Structure counts only include buildings that returned flood losses in the analysis. Some structures were not shown to be damaged despite being located within the floodplain such as structures that are elevated above the water elevation of the flood event being analyzed.

Figure 2.39: Total flood losses by occupancy (2022 USD).

	10% Annual Chance Flood (10yr)		4% Annual Chance Flood (25yr)		2% Annual Chance Flood (50yr)		1% Annual Chance Flood (100yr)		0.2% Annual Chance Flood (500yr)		Average Annualized Loss (AAL)	
Community Name	**Count**	**Total Losses**	**Count**	**Total Losses**	**Count**	**Total Losses**	**Count**	**Total Losses**	**Count**	**Total Losses**	**Count**	**Total Losses**
Residential	112	$5,956,700	148	$8,466,900	164	$10,773,000	185	$14,430,300	226	$24,894,800	226	$958,430
Commercial	20	$1,165,800	23	$4,483,400	24	$5,386,000	33	$8,374,500	49	$12,529,300	49	$517,080
Industrial	2	$384,500	2	$692,000	2	$911,100	2	$1,137,900	3	$1,454,700	3	$71,850
Agricultural	15	$1,907,200	22	$2,463,100	31	$3,399,000	37	$4,261,400	106	$36,685,200	106	$465,350
Governmental	5	$601,500	5	$917,600	5	$1,171,000	5	$1,401,900	5	$1,774,800	5	$95,600
Religious	0	$0	0	$0	0	$0	0	$0	1	$1,813,500	1	$10,880
Educational	1	$463,700	1	$492,000	1	$504,400	1	$515,700	1	$549,500	1	$49,100
Total	**155**	**$10,479,400**	**201**	**$17,515,000**	**227**	**$22,144,500**	**263**	**$30,121,700**	**391**	**$79,701,800**	**391**	**$2,168,290**

Earthquake

While Illinois is not known for large, damaging events like those seen in the western US, earthquakes do occur in the state with some regularity. This is due to the state's proximity to the New Madrid Seismic Zone and the Wabash Valley Seismic Zone.[10],[11] There is usually at least one measurable earthquake in Illinois per year, typically in the southern portion of the state. Luckily, damaging earthquakes in Illinois are much less frequent, with minor damage from earthquakes reported about once every 20 years, and serious damage from earthquakes occurring once every 70-90 years.[12]

Looking to the future, an Illinois State Geological Survey earthquake fact sheet states "The likelihood of a damaging earthquake (magnitude 6.3 or greater) occurring somewhere in the central US within the next 15 years is 40 to 63% and 86 to 97 % within the next 50 years." Also, the United States Geological Survey prepared state-based seismic hazard maps in 2014. This map shows peak ground accelerations having a 2% probability of being exceeded in 50 years. While the highest hazard area in Illinois are the southernmost counties, Hancock County is shown in dark tan, a lower hazard category.[13]

[10] ISGS. (1995). "Earthquake Occurrence in Illinois". https://isgs.illinois.edu/sites/default/files/files/qk-fct-occur.pdf
[11] ISGS. (1996). "Wabash Valley Earthquakes". https://isgs.illinois.edu/sites/default/files/files/eq-fct-wabash.pdf
[12] ISGS. (1995). "Damaging Earthquakes in Illinois". https://isgs.illinois.edu/sites/default/files/files/qk-fct-damag.pdf
[13] USGS. "2014 Seismic Hazard Map for Illinois". Retrieved April 22, 2021, from https://www.usgs.gov/media/images/2014-seismic-hazard-map-illinois

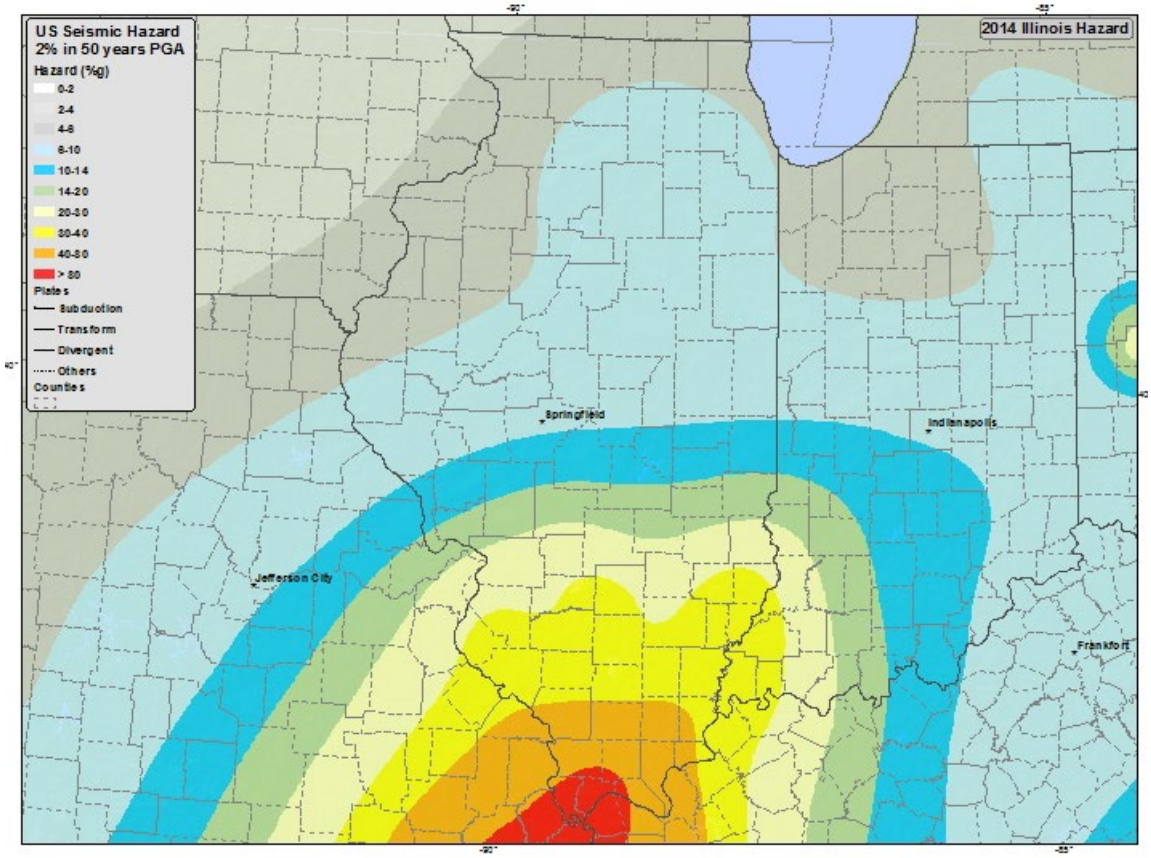


Figure 1.40: 2014 Illinois Seismic Hazard Map. Source: USGS

According to the United States Geological Survey/National Earthquake Information Center (USGS/NEIC) ComCat Earthquake catalog, which includes databases of earthquakes from 1900–present, there have been 4 recorded earthquakes in a 160 kilometer radius of the approximate center of Hancock County.

All four recorded earthquakes have been under magnitude 3. The strongest earthquake within this 160 km radius was a magnitude 2.9 event that occurred 6 kilometers south southwest of Stoutsville, Missouri on February 8, 2004. The most recent was a magnitude 2.6 that occurred 4 kilometers southwest of Madison, Missouri on December 5th, 2022.

Hazus Analysis

For planning purposes, this scenario involves a Hazus Level 1 analysis of a theoretical moment magnitude 5 earthquake with an epicenter located in Hancock County at latitude 40° 25’19.918” N, and longitude 91° 9’ 1.434” W. This locates the epicenter within Section 13, Township 5 North, Range 7 West, immediately to the northwest of the City of Carthage. Depth of origin used in the analysis was 10 kilometers below the surface. The magnitude of the earthquakes is measured using the Moment Magnitude (M) scale.

Building Damage

The Hazus General Building Stock data was used for this analysis. The assessor's data was not used because it was not in the scope of the project to create a UDF inventory for every structure in Hancock County. Hazus estimates that about 1,431 buildings will be at least moderately damaged. This is over 14% of the total number of buildings in the region. An estimated 69 buildings will be damaged beyond repair. Figure 2.41 below summarizes the expected damage by general occupancy for the buildings in the region. Figure 2.42 summarizes the expected damage by general building type.

Figure 2.41: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	173.6	2.6	62.3	3.3	62.9	6.0	26.4	8.4	4.7	6.7
Commercial	273.0	4.2	105.8	5.6	99.1	9.5	41.7	13.3	10.5	15.0
Education	17.6	0.3	7.2	0.4	7.4	0.7	3.0	1.0	0.9	1.3
Government	21.6	0.3	9.1	0.5	9.7	0.9	3.5	1.1	1.0	1.4
Industrial	66.9	1.0	23.2	1.2	21.4	2.0	8.7	2.8	1.9	2.7
Other Residential	418.8	6.4	184.4	9.7	197.9	18.9	72.5	23.0	13.4	19.3
Religion	54.5	0.8	16.8	0.9	13.1	1.3	5.3	1.7	1.3	1.9
Single Family Residential	5542.0	84.4	1493.2	78.5	635.3	60.7	153.4	48.8	36.0	51.7
Total	6568.0	100	1902.0	100	1046.9	100	314.5	100	69.7	100

Figure 2.42: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	4853.8	73.9	1214.6	63.9	367.7	35.1	39.1	12.5	2.1	3.0
Steel	159.4	2.4	55.2	2.9	76.1	7.3	38.3	12.2	8.4	12.0
Concrete	103.4	1.6	33.9	1.8	33.1	3.2	12.6	4.0	1.9	2.7
Precast	56.1	0.9	15.4	0.8	21.4	2.1	12.0	3.8	1.6	2.3
Reinforced Masonry	20.2	0.3	4.3	0.2	6.0	0.6	3.3	1.0	0.4	0.5
Unreinforced Masonry	1124.9	17.1	446.5	23.5	370.9	35.4	144.6	46.0	44.1	63.2
Manufactured Housing	250.2	3.8	132.1	7.0	171.7	16.4	64.6	20.6	11.4	16.3
Total	**6568.0**	**100**	**1902.0**	**100**	**1046.9**	**100**	**314.5**	**100**	**69.7**	**100**

Economic Loss

The total economic loss estimated for the earthquake is $366.77 million U.S. dollars, which includes building and lifeline-related losses based on the region's available inventory. The following sections provide more detailed information about these losses.

Building-Related Losses

Building losses are broken into two categories: direct building losses and business interruption losses. Direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. Business-interruption losses are those associated with the inability to operate a business because of the damage sustained during the earthquake. Business-interruption losses also include temporary living expenses for those people displaced from their homes because of the earthquake.

Total building-related losses were $169.34 million; 16% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 53% of the total loss. Figure 2.43 below provides a summary of the losses associated with building damage.

Figure 2.43: Building-Related Economic Loss Estimates
(Millions of U.S. Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0	0.4295	3.9376	0.0941	0.6651	5.1263
	Capital-Related	0	0.1828	3.3573	0.0572	0.2749	3.8722
	Rental	1.741	0.8438	2.0121	0.0377	0.2963	4.9309
	Relocation	6.136	0.8756	3.1657	0.2335	3.2492	13.66
	Subtotal	**7.877**	**2.3317**	**12.4727**	**0.4225**	**4.4855**	**27.5894**
Capital Stock Losses							
	Structural	10.3757	1.7314	4.8136	0.6858	10.5111	28.1176
	Non-Structural	40.3976	7.9244	12.9317	2.2436	12.9512	76.4485
	Content	16.2593	2.2969	7.2335	1.5231	8.8216	36.1344
	Inventory	0	0	0.2004	0.2176	0.6356	1.0536
	Subtotal	**67.0326**	**11.9527**	**25.1792**	**4.6701**	**32.9195**	**141.7541**
	Total	**74.9096**	**14.2844**	**37.6519**	**5.0926**	**37.405**	**169.3435**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Figure 2.44 & 2.45 provide a detailed breakdown of the expected lifeline losses.

Figure 2.44: Transportation System Economic Losses (Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	752.8984	0	0
	Bridges	471.2527	2.6413	0.56
	Tunnels	0	0	0
	Subtotal	**1224.1511**	**2.6413**	
Railways	Segments	153.7054	0	0
	Bridges	230.0509	0.3828	0.17
	Tunnels	0	0	0
	Facilities	0	0	0
	Subtotal	**383.7563**	**0.3828**	
Bus	Facilities	0	0	0
	Subtotal	**0**	**0**	
Port	Facilities	13.2174	0.9645	7.3
	Subtotal	**13.2174**	**0.9645**	
Airport	Facilities	0	0	0
	Runways	0	0	0
	Subtotal	**0**	**0**	
	Total	**1621.1248**	**3.9886**	

Figure 2.45 Utility System Economic Losses (Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0	0	0
	Facilities	147.852	6.5369	4.42
	Distribution Lines	108.4247	1.3327	1.23
	Subtotal	**256.2767**	**7.8696**	
Waste Water	Pipelines	0	0	0
	Facilities	2691.5964	184.5777	6.86
	Distribution Lines	65.0548	0.6695	1.03
	Subtotal	**2756.6512**	**185.2472**	
Natural Gas	Pipelines	0	0	0
	Facilities	0	0	0
	Distribution Lines	43.3699	0.2294	0.53
	Subtotal	**43.3699**	**0.2294**	
Oil Systems	Pipelines	0	0	0
	Facilities	0	0	0
	Subtotal	**0**	**0**	
Electrical Power	Facilities	0	0	0
	Subtotal	**0**	**0**	
Communication	Facilities	0.666	0.0878	13.18
	Subtotal	**0.666**	**0.0878**	
	Total	**3056.9638**	**193.434**	

CHAPTER 3– Mitigation Strategy

Hancock County Jurisdictions, after having reviewed the risks to their communities as well as the capabilities within county, city, and village government, choose to keep the spirit of the goals incorporated into the 2018 plan, with specific additions to address climate change, natural based mitigation solutions and vulnerable populations. All these additions fell within the existing goal areas, but more pointed objectives were developed to convey the heightened focus upon these factors.

While the substance of the five goals remains the same from the 2018 Hancock County Mitigation Plan, and reflects the values of the county, additional clarifying language was included in four of the five goals. This was undertaken for greater understanding of the types of actions that would fit within the goal area. The objectives were also reviewed considering new planning objectives. While most objectives remain the same, two new objectives were added. In Goal 1, objective 1.c. from the previous plan was removed (Increase *awareness about insurance availability for catastrophic hazard*s) as the committee felt that this objective had been met, and replacing it with a specific object that focused on identifying and addressing the needs of vulnerable populations within the county. The final change was adding objective 3.c. to highlight the consideration of nature-based solutions, especially for storm water management.

Progress on existing goals, objectives and actions has been limited due to many factors, including the global pandemic, limited public resources, and the changes in local media. Action items are noted as to new or ongoing within the action item grids, with discussion of accomplishments and challenges included in narrative form after each action item grid.

Goal 1. **Protect Life and Property**

The top priority of the Hancock County Planning Committee was to develop, implement, and maintain projects that protect the life and property of county residents, these types of projects can be enhancements to warning and alert systems; structural retrofits for flood and wind protection; better response systems for emergency services; or ordinances and building codes that will make buildings safer for occupants.

> ***Objective 1.a.*** Implement procedures and actions that will protect life and property in the event of a natural hazard. This includes making homes, businesses, infrastructure, and other types of property less prone to natural hazard damage.
>
> ***Objective 1.b.*** Identify areas that have been repeatedly damaged in natural hazards and suggest alternative locations or other actions that might limit that susceptibility.
>
> ***Objective 1.c.*** Identify vulnerable populations who may be at increased risk from natural hazards and develop programs and actions to mitigate these risks.
>
> ***Objective 1.d.*** Encourage procedures designed to minimize risk by supporting development plans that take natural hazards into account.

Goal 2. Increase Public Awareness

Developing and implementing projects that increase the public's awareness of natural hazards and how to prepare for them are becoming more challenging as media becomes more segmented and diverse. Tradition sources of local information such as newspapers and local radio stations are no longer widely available. Developing projects that will get information on preparedness and family recovery efforts are needed to ensure the communities of Hancock County are as prepared as possible for natural hazards that may impact the county.

Objective 2.a. Design and implement natural hazard education programs for the citizens of Hancock County.

Objective 2.b. Create natural hazard mitigation resources (brochures, websites, etc.) for the public

Goal 3. Utilize Nature Based Mitigation Systems

Encouraging the use of nature-based solutions to reduce the impacts of disasters has been part of the Hancock County Mitigation Strategy since the completion of the original mitigation plan was developed after the floods of 2008. Including features such as Rain Gardens, permeable paving projects, and the use of bioswales are receiving more and more interest and encouragement within the county. As a rural area, Hancock County jurisdictions also recognize the value of natural resources and encourage mitigation projects that enhance and protect these resources while mitigating specific risks.

Objective 3.a. Preserve Natural Resources in such a way that they serve natural hazard mitigation purposes.

Objective 3.b. Encourage the implementation of natural hazard mitigation planning with watershed protection, land use planning, and other planning issues.

Objective 3.c. Consider replacing/enhancing traditional infrastructure with nature based solutions.

Goal 4. Create and Maintain Partnerships for Mitigation

While Hancock County and its incorporated jurisdictions are small, by encouraging partnerships in communications and planning amongst governmental agencies, private organizations, and businesses, as well as residents expands the capacity of all entities. By focusing on projects that mitigate risks through cooperation and partnerships, the projects will reach beyond hazard mitigation to create a greater sense of community.

Objective 4.a. Develop communication and coordination systems for the various agencies potentially involved in natural hazard mitigation.

Objective 4.b. Maintain and improve communication and cooperation between residents, government, and the private sector

Objective 4.c. Incorporate natural hazard mitigation into community plans and regulations

Goal 5. Coordinate Emergency Services and Protect Critical Facilities

Projects that enhance the coordination amongst the various emergency services within the county, as well as protect critical facilities are encouraged through this goal. With limited resources, both human and structural projects that protect existing assets are critical. Such projects would also include coordination projects with resources from neighboring counties and communities.

Objective 5.a. Create policies that ensure the protection of critical facilities like clinics, police stations, and fire departments.

Objective 5.b. Ensure that different emergency agencies coordinate with one another.

Each mitigation action included in the action section is noted as to which goal and objective it addressed, its priority level and whether it is a new objective or continuing.

MITIGATION ACTIONS – PRIORITIES AND IMPLEMENTATION

At the third meeting of the planning committee, a presentation and discussion on types of mitigation was the largest part of the meeting. The presentation included project examples within all 9 of the categories of mitigation. The participants were then asked to not only sign up for the community project conferences, but also to consider their individual jurisdiction risks and capabilities. For smaller jurisdictions, participants were encouraged to think about what could be done to mitigate risks with low to no cost projects.

The projects were prioritized within the county by using the following simplistic method. This methodology was continued from the previous plan due to the limited number of projects generally accomplished during the planning horizon. Many of the projects are continued from the previous plan due to lack of funding or local resources. Additionally, the global pandemic took priority during half of the duration of the previous plan. It is important to recognize that the implementation of all actions is desirable regardless of prioritized order.

Project Prioritization Methodology
Priority A projects permanently eliminate property damages and/or eliminate or reduce injuries and deaths in a specific area OR have a high probability to systematically reduce property damages, injuries and deaths across a wide area. Priority A projects address the most significant natural hazards – extreme heat, flood, severe storm, tornado, and winter storm.

Priority B projects reduce property damages in a specific area OR have the potential to reduce property damages, injuries and deaths across a wide area OR educate the public on disaster preparedness and mitigation. Priority B projects address the most significant natural hazards – extreme heat, flood, severe storm, tornado, and winter storm.

Priority C projects eliminate or reduce property damages, injuries and deaths from the less significant natural hazards OR educate the public on disaster preparedness and mitigation related to the less significant natural hazards – dam failure, drought, earthquake and mine subsidence.

Priority J projects can "just be done" without requiring outside funding and are able to be implemented within one year of Plan adoption. These can be one-time projects or ongoing projects and may address any hazard.

Benefit/Cost Analysis

A benefit/ analysis will be needed for any of these projects to be implemented within Hancock County. Benefit/Cost Analysis will be performed at the time of project submission. The committee assigned preliminary benefit/cost assessments to each identified project, using general terms of ***high***, ***medium***, and ***low*** related to both the cost and benefit. A ***high*** rating on cost means it is unlikely the jurisdiction could accomplish the project without outside funding, while a ***high*** rating on benefit relates to how well the project would mitigate the situation. A ***low-cost*** rating, conversely, means that is likely the jurisdiction can accomplish the project without outside funding. For those projects identified as having a medium benefit and/or cost the assumption is that it will have some impact on reducing impact of disasters, but that some additional funding may be needed to accomplish the project.

Action Changes since the 2018 Hancock County Natural Hazard Mitigation Plan

For a variety of reason, significant changes were made to the action items included for each jurisdiction in the plan. Perhaps the greatest change agent for the action items was the addition of community consultations to the planning process. These meetings allowed each jurisdiction time to talk through their own priorities and determine what actions should be deleted as either impractical, unnecessary, or completed. It also allowed them to talk about what specific challenges they face in mitigation and develop new specific actions for their community. A summary of these meetings is included in the appendix.

Over the past five years there has been little economic or building development activity in the hazard prone areas of the jurisdictions (i.e., Flood Plains) that alter the vulnerability of the communities. Eventual buyouts of the severe/repetitive loss have the potential to impact the flood risk for those jurisdictions included in any buyout offering when it occurs.

Action Items Deleted

The following action items were completed from the 2018 Hancock County Natural Hazard Mitigation Plan, with their status noted with the item deleted.

> Continue Multi-Jurisdictional Long-Term Recovery / Mitigation Committee to coordinate and guide long term recovery efforts and mitigation activities within the county. Responsibilities will include but are will not be limited to: 1) Host annual Mitigation Plan Meeting as required by FEMA; 2) Meet quarterly to review progress, identify new funding streams and projects being initiated within the county; 3) coordinate and lead the long term economic recovery of the county from the floods of 2008. **Status**: This function was wrapped into the monthly mayor meetings facilitated by the Economic Development Council, which the ESDA Coordinator attends.

Educate public and disseminate information regarding all hazards to population through town hall meetings, presentations to groups, and displays **Status**: This action was deleted due to lack of staffing within the county to coordinate.

Maintain and educate Storm Spotter program volunteers. **Status:** This action was deleted as it has been completed.

Educating Public on earthquake damage, and what to look for in case of earthquake. **Status:** This action was deleted due to the low risk of earthquake damage in the county.

Assess # of CPR First Aid trainers and develop an ongoing training schedule designed to increase the # of CPR/First Aid Trained Individuals. **Status**: Deleted and deferred to the Medical Reserve Corps. (MRC)

Establish a county wide early warning system for natural hazards. **Status:** Deleted due to the more precise natural of severe weather warnings and the advent of cell phone alerts.

Identify and implement an improved emergency response communication system Status: Completed

Update NIMS Training for elected and appointed officials. **Status**: Substantially completed, with reminders provided from ESDA to Jurisdictions after municipal elections.

Encourage the use of NOAA all-hazard radios in residences and business throughout unincorporated area. Status: Completed, and also switch to cell phone alerts.

Develop a list of water source locations and water hauling services to address ag water needs. **Status:** Completed and maintained by Farm Bureau.

Develop and distribute (to officials) a map of hazardous material storage, confinement structures, and other potentially volatile items for response and recovery purposes. **Status:** Deleted due to challenges in identifying privately owned hazardous materials.

Create a large animal emergency response team with specific training in animal health, animal relocation, and epidemiology to work with emergency responders when there is a significant animal emergency and local Establish animal management system. **Status**: Deleted due to the decreasing number of large livestock outside of corporate entities.

Develop a Release of information to be included in Home Health Care informational packets for Home Health Agencies to provide information to emergency responders regarding home bound/venerable populations in the event of a disaster/power outage. **Status:** Deleted and deferred to the Medical Reserve Corps. (MRC)

Work with institutions and large facilities to develop appropriate evacuation protocol that will reduce the likelihood that individuals will be unaccounted for in the evacuations of facilities. **Status**: Deleted and deferred to residential facilities.

Establish and maintain a Comprehensive Plan for the county, incorporating mitigation activities and Brownfield assessment into the planning. **Status:** Deleted due to lack of funding and jurisdictional staffing.

Establish policies and procedures for documenting volunteer hours in disaster response. Status: Completed.

Adopt building regulations that require wind-resistant and earthquake-resistant construction measures for critical facilities that house vulnerable populations or that house volatile liquids or hazardous waste. Status: Deleted due to numerous jurisdictions and lack of risk of earthquakes.

Establish and implement inspection and maintenance policies and procedures for the levee system throughout the county. **Status**: Deleted and deferred to drainage district personnel.

Identify and prioritize needed improvements to county-maintained roads that flood in heavy rainstorms, blocking or impairing road use and through access by vehicular traffic. **Status:** Completed and maintained by highway department.

New action items were added to address vulnerable populations, nature-based mitigation solutions and the impact of climate change. All the new action items are denoted in the project type as new, while action items that were kept are noted as continuing.

Community Profiles and Mitigation Actions Grids

Participating Jurisdictions*

Basco

Carthage

Dallas City

Ferris

Hamilton

Hancock County

LaHarpe

Nauvoo

Pontoosuc

Warsaw

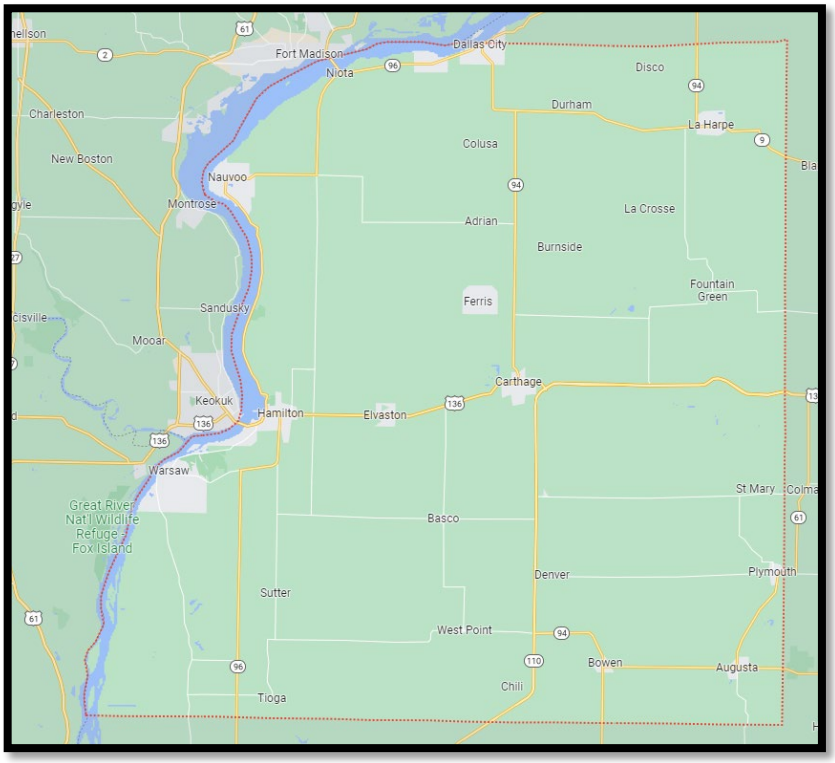
West Point

*Augusta, Bowen, and Niota chose not to participate in the Hancock County Multi-Jurisdictional Natural Hazard Mitigation Plan update for 2023.

Overview

The following section represents individual sections for each participating jurisdiction including their community profiles, maps and project/action items based upon their individual community conferences. These sections are designed to be usable sections for participating jurisdictions to utilize in grant applications and other funding requests indicating the actions they have included in the plan.

Many of the participating jurisdictions have limited capacity, as stated earlier, due to both aging and declining populations, as well as the rural nature of the county. These community profiles can give them quick reference to demographic and economic data related to their community quickly, and partnered with the mitigation actions they have outlined, an asset in requesting assistance for multiple funding sources that could potential be utilized in mitigation.



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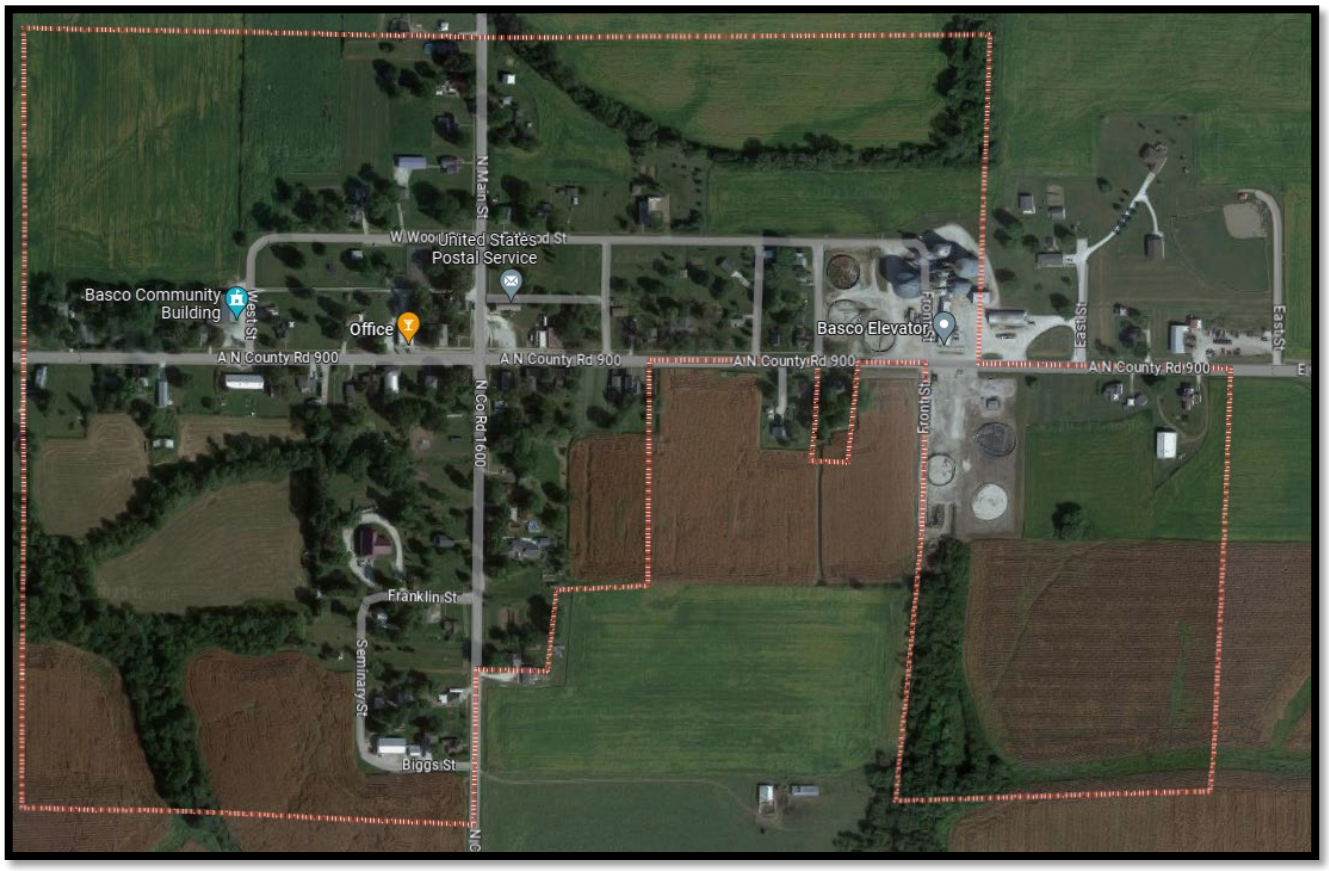
All Jurisdictions – Collaborative Mitigation Actions

As a rural county, Hancock County works collaborative on many projects, including in the realm of health services, social services, emergency management, and communications. As can be seen from the following table, most of the items fall within these collaborative categories. Many of the projects also fall in the category of Emergency Management Coordination and Planning.

. Goal	Project Type	Hazard Type	Possible Funding	Project Description	Priority	Contact/Lead	Proposed Schedule	B/C
2 a & b	Coordination /Education Continued	All	Local	Develop a disaster education "map" indicating what current disaster related educational programs are being delivered within Hancock County by what group; identify gaps in educational delivery; and identify potential programs to fill these gaps	J	ESDA; Health Dept; Extension	2023-2028 ongoing	H/L
2a	Coordination /Education Continued	All	Local	Develop and conduct a citizen awareness campaign regarding protection from natural hazards	J	ESDA Director / Public Health Dept / Extension / Red Cross	2023-2028 ongoing	H/L
2 a & b	Coordination /Education Continued	All	Local	Provide information to local cable and public radio and television stations regarding emergency warning and public service announcements	J	ESDA Director / Public Health Dept / Extension / Red Cross	2023-2028 ongoing	H/L
2 a & b	Coordination /Education Continued	All	Local	Distribute information regarding hazards and safety procedures to all school districts annually	J	ESDA Director / Public Health Dept / Extension / Red Cross	2023-2028 ongoing	H/L
4a	Coordination /Education Continued	All	Local	Educate employees, officials and community volunteers on the protocol developed for emergency situations.	J	All Participating Jurisdictions and Agencies	2023-2028 ongoing	H/L

1a & c	Coordination /Education Continued	All	Local	Continue public education campaign to inform residents on what to do and where to go in the event of an emergency.	B/C	ESDA/Local Governments	2023-2028 ongoing	H/L
1a & C	Emergency Management Continued	All	Funding Search	Assess current placement of portable defibrillators throughout the county and fill gaps; encourage countywide training on their usage; map locations	B/C	Emergency Response Agencies	2023-28 Ongoing	H/M
4a	Emergency Management	All	Local	Adopt policies and procedures delineating chain of command for emergency situations.	B/C	ESDA/Local Government	2025-2028	H/L
1b	Policy Continued	All	Local Funding Search	Identify and permanently mark roadways that flood frequently with appropriate signage.	B	County Highway Department / Village & City Public Works / Township Highway Commissioners	2025-2028	M/M
1a and c	Policy/Social Service Continued	All	Local	Establish “Check In” policy and procedure for vulnerable populations in extreme weather and/or power outages	B	Social Service Agencies and County Health dept	2023-28 and ongoing	H/L
1.c.	Policy Continued	All	Local	Maintain NFIP Participation Status for NFIP participating jurisdiction; adopt or amend floodplain management regulations to comply with NFIP requirements and review periodically		County Board / City Councils / Village Boards	Ongoing	H/L

Basco, Illinois



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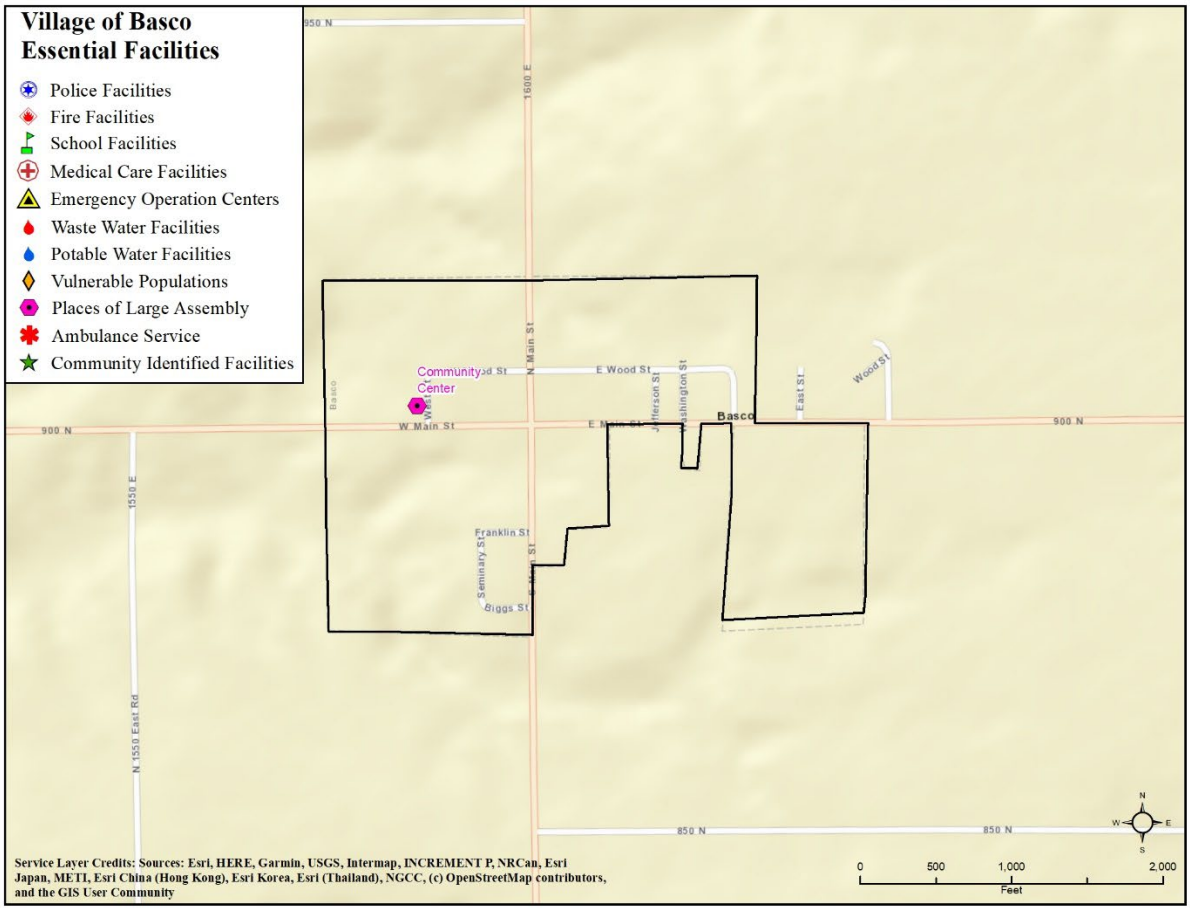
Basco Demographics

2020 Population	80
% under 18 years	15.3%
% over 65 years	14.1%
Median HH Income	$40,313
Poverty Rate	16.5%

Basco Mitigation Projects

Goal	Project Type	Hazard Type	Possible Funding	Project Description	Priority	Contact/ Lead	Proposed Schedule	Benefit/ Cost
1.c.	C New	Wind/ Severe Storms	FEMA	Identify and retrofit existing Building with a backup generator to serve as heating and cooling center.	H	City	2-5 YRS	H/H



Carthage, Illinois

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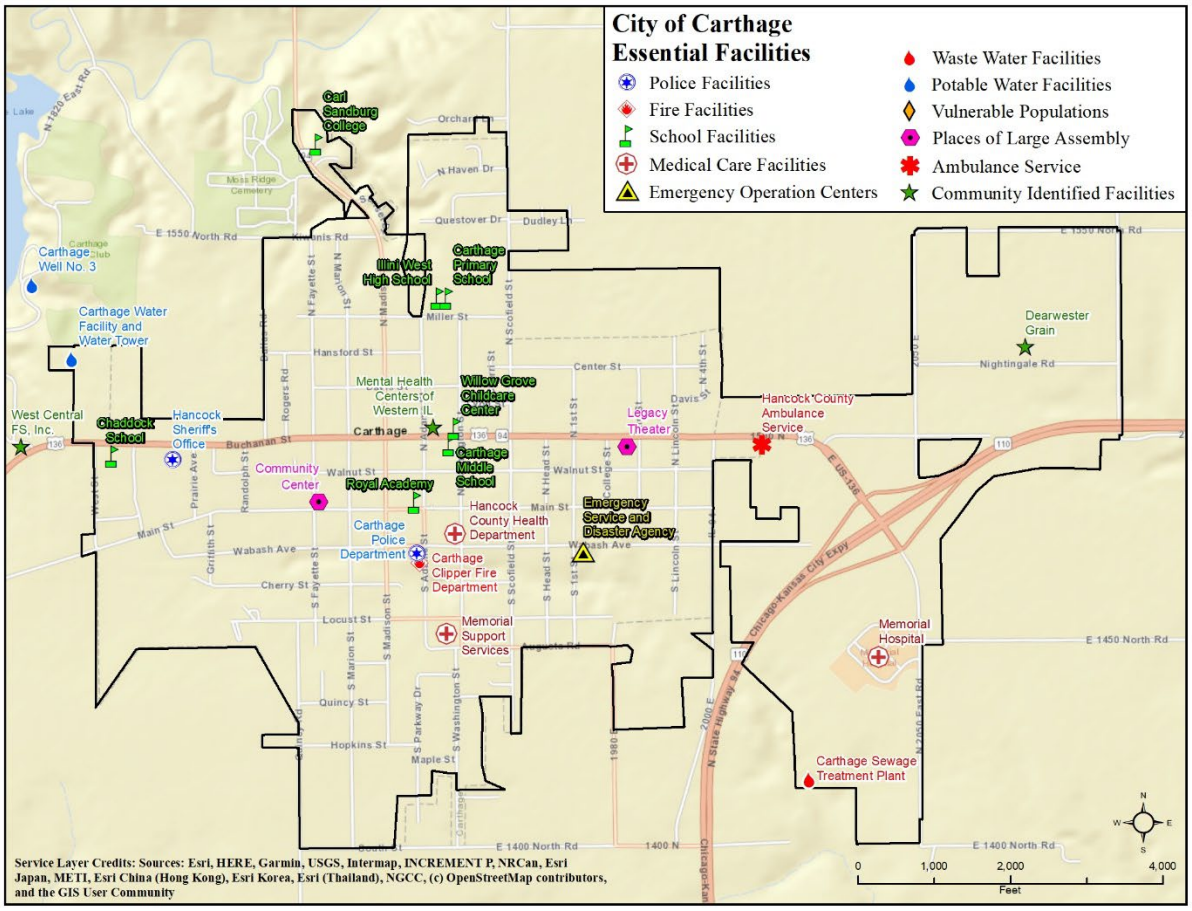
Carthage Demographics

2020 Population	2,490
% under 18 years	17.7%
% over 65 years	25.1%
Median HH Income	$70,563
Poverty Rate	12.6%

Carthage Mitigation Projects

Goal	Project Type	Hazard Type	Possible Funding	Project Description	Priority	Contact/ Lead	Proposed Schedule	Benefit/ Cost
1.c.	C New	Wind/ Severe Storms/ Tornado	FEMA	Retrofit senior center with a backup generator and wind hardening to serve as tornado shelter and heating and cooling center.	M	City	2-5 YRS	H/H
1.a.	P New	Wind	Local	Update building codes to include the use of Hurricane Straps on modular buildings.	M	City	1-3 YRS	M/M
3.b. & c.	P New	Flooding	Local	Create policies and procedures that encourage nature-based mitigation solutions in new construction and infrastructure repair and improvement. (i.e., rain gardens, permeable surfaces, bioswales)	M	City	Ongoing	M/L
3.a.	C Continue	Flooding	DNR/ FEMA/ EPA	Clean up, defoliate and dredge (if necessary) Prairie Creek to reduce flooding risk.	H	Emergency Mgr	1-2 YRS	H/L
1.d.	C New	Dam Failure	DNR/ FEMA/ Other	Contract an engineering study to determine maintenance needs on Carthage Lake Dam and fund the identified repairs	H	City	1-3 YRS	M/M


City of Carthage
Essential Facilities
Police Facilities
Fire Facilities
School Facilities
Medical Care Facilities
Emergency Operation Centers
Waste Water Facilities
Potable Water Facilities
Vulnerable Populations
Places of Large Assembly
Ambulance Service
Community Identified Facilities
Carl Sandburg College
Carthage Well No. 3
Carthage Water Facility and Water Tower
Illini West High School
Carthage Primary School
Willow Grove Childcare Center
Mental Health Centers of Western IL
Carthage
Carthage Middle School
Hancock County Ambulance Service
Legacy Theater
Dearwester Grain
West Central FS, Inc.
Chaddock School
Hancock Sheriff's Office
Community Center
Royal Academy
Hancock County Health Department
Carthage Police Department
Carthage Clipper Fire Department
Emergency Service and Disaster Agency
Memorial Support Services
Memorial Hospital
Carthage Sewage Treatment Plant
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
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Feet

Dallas City, Illinois

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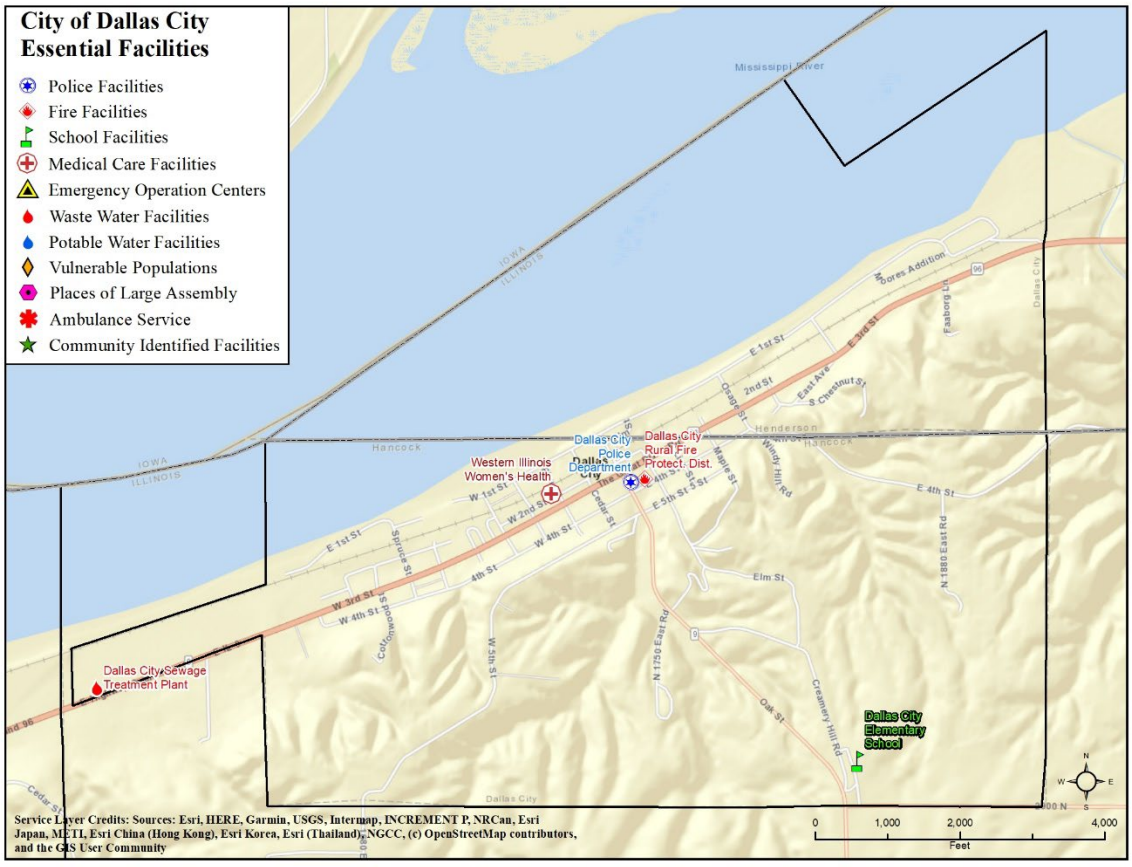
Dallas City Demographics

2020 Population	805
% under 18 years	25.2%
% over 65 years	19.4%
Median HH Income	$47,857
Poverty Rate	14.7%

2023-28 Dallas City Mitigation Projects

Goal	Project Type	Hazard	Possible Funding	Project Description	Priority	Contact/ Lead	Proposed Schedule	Benefit/ Cost
1.b	C Continue	Flood	FEMA/HUD	Facilitate and support property buyouts for properties with repetitive loss histories.	H	Village Board	3-5 YRS	H/H
1.d.	C new	Flood	DNR/FEMA	Dredge Mississippi River frontage to reduce shoreline flooding and improve river access.	H	Village Board	3-5 YRS	H/H



Ferris, Illinois

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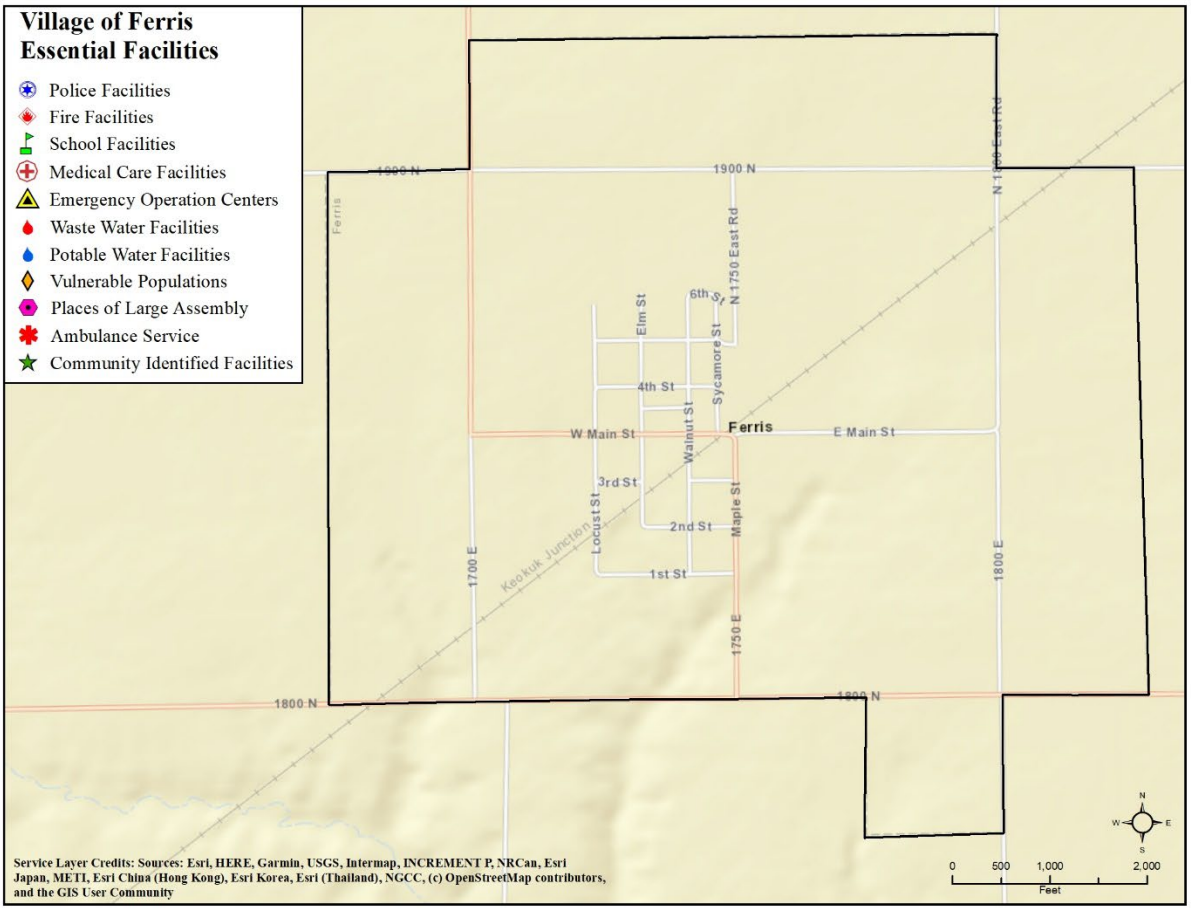
Ferris Demographics

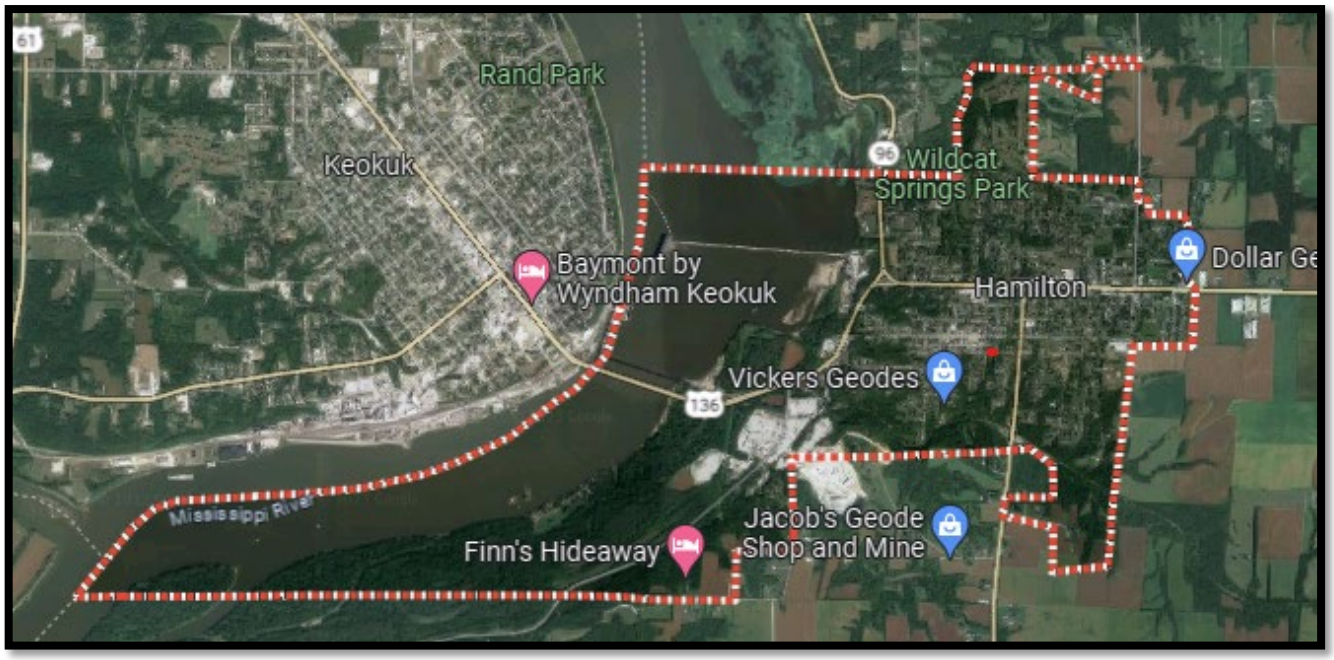
2020 Population	127
% under 18 years	18.3%
% over 65 years	33.5%
Median HH Income	$43,750
Poverty Rate	17.7%

Ferris Mitigation Projects

Goal	Project Type	Hazard Type	Possible Funding	Project Description	Priority	Contact/ Lead	Proposed Schedule	Benefit/ Cost
1.a. & c	C New	ALL	FEMA	Identify Location for and create a wind resistant storm shelter equipped with a backup generator to serve as a storm shelter, heating and cooling center.	H	City	2-5 YRS	H/H
1.d.	P New	Wind/ Ice/ Severe Storms	Local	Trim trees on municipal property to reduce risk to power lines and infrastructure	M	City	Ongoing	H/L
1.a.	C New	ALL	USDA, Local	Replace siren system and develop a procedure for remote activation.	M	City	1-3 YRS	M/M


Village of Ferris
Essential Facilities
Police Facilities
Fire Facilities
School Facilities
Medical Care Facilities
Emergency Operation Centers
Waste Water Facilities
Potable Water Facilities
Vulnerable Populations
Places of Large Assembly
Ambulance Service
Community Identified Facilities
1900 N
1750 East Rd
6th St
Elm St
Sycamore St
4th St
W Main St
Ferris
E Main St
Walnut St
3rd St
Locust St
Maple St
2nd St
1st St
1700 E
1800 E
1750 E
1800 N
Keokuk Junction
N
W
E
S
0
500
1,000
2,000
Feet
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Hamilton, Illinois



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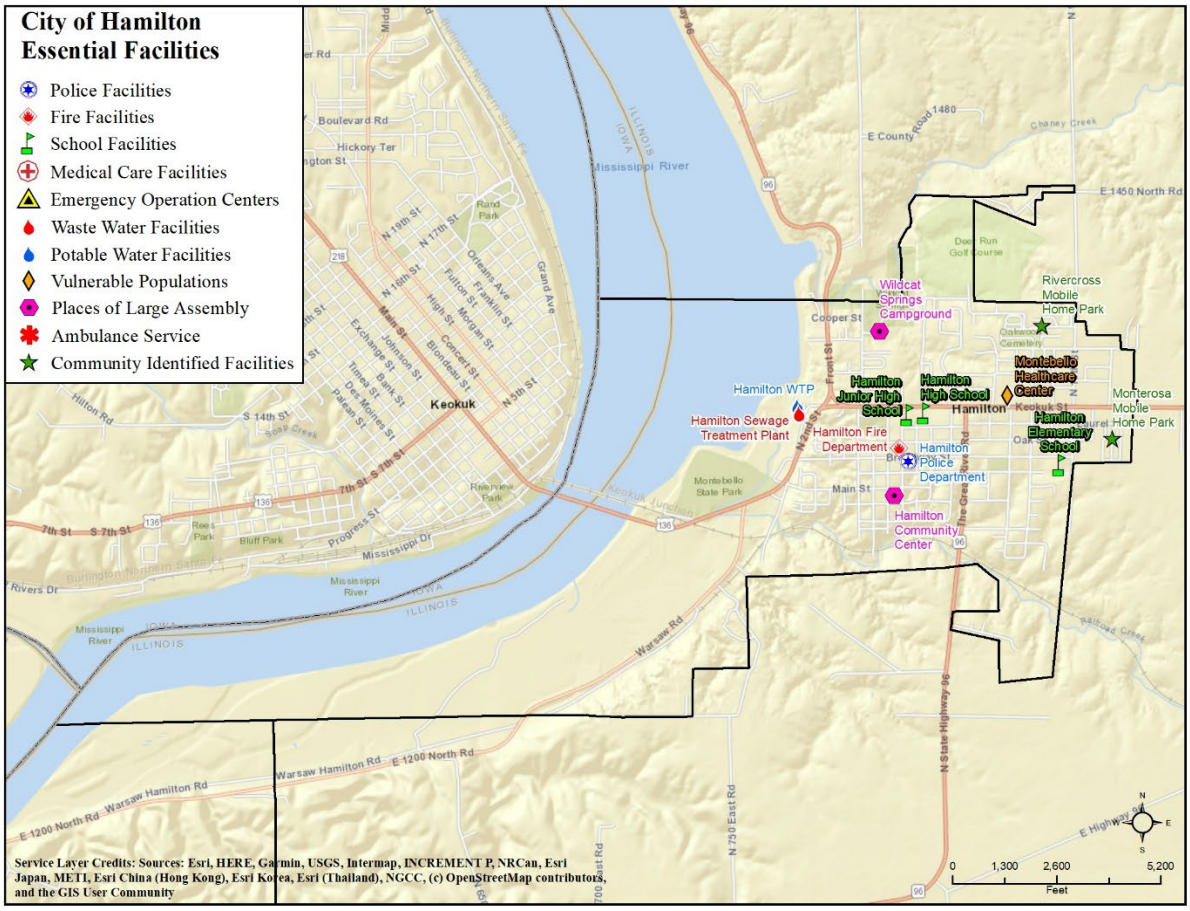
Hamilton Demographics

2020 Population	2,753
% under 18 years	23.4%
% over 65 years	20.4%
Median HH Income	$49,566
Poverty Rate	10.4%

Hamilton Mitigation Projects

Goal	Project Type	Hazard Type	Possible Funding	Project Description	Priority	Contact/ Lead	Proposed Schedule	Benefit/ Cost
1 a. & d	C New	Flooding	FEMA	Dredge and defoliate small streams that contribute to flooding intensity	H	City	2-5 YRS	H/H
1.c	C New	Wind/ Severe Storms	FEMA	Retrofit assisted living center with a backup generator to serve as heating and cooling center.	M	City	2-5 YRS	H/H
1.a.	C New	Wind/ Tornado/ Severe Storm	FEMA, Local	Include storm shelter with generator in designs and construction of new Police Department Building.	M	City	5-8 YRS	M/M
1.c.	E New	All	Local	Encourage citizens to use emergency warning notices on their cell phones as well as the purchase of weather radios.	M	City	Ongoing	M/L
4.b.	P New	All	Local	Develop and implement policies and procedures to establish and implement chain of command in emergency situations	H	Emergency Mgr	1-2 YRS	H/L
1.b.	C Continue	Flood	FEMA, IDOT, Local	Elevate approach of Hwy 136 at Keokuk Bridge	H	City	2-5 YRS	H/H


City of Hamilton
Essential Facilities
Police Facilities
Fire Facilities
School Facilities
Medical Care Facilities
Emergency Operation Centers
Waste Water Facilities
Potable Water Facilities
Vulnerable Populations
Places of Large Assembly
Ambulance Service
Community Identified Facilities
Keokuk
Hamilton
Hamilton WTP
Hamilton Sewage Treatment Plant
Hamilton Fire Department
Hamilton Police Department
Hamilton Junior High School
Hamilton High School
Hamilton Elementary School
Montebello Healthcare Center
Hamilton Community Center
Wildcat Springs Campground
Rivercross Mobile Home Park
Monterosa Mobile Home Park
Montebello State Park
Mississippi River
IOWA
ILLINOIS
Warsaw Rd
Warsaw Hamilton Rd
E 1200 North Rd
N State Highway 96
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
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Feet

Hancock County, Illinois

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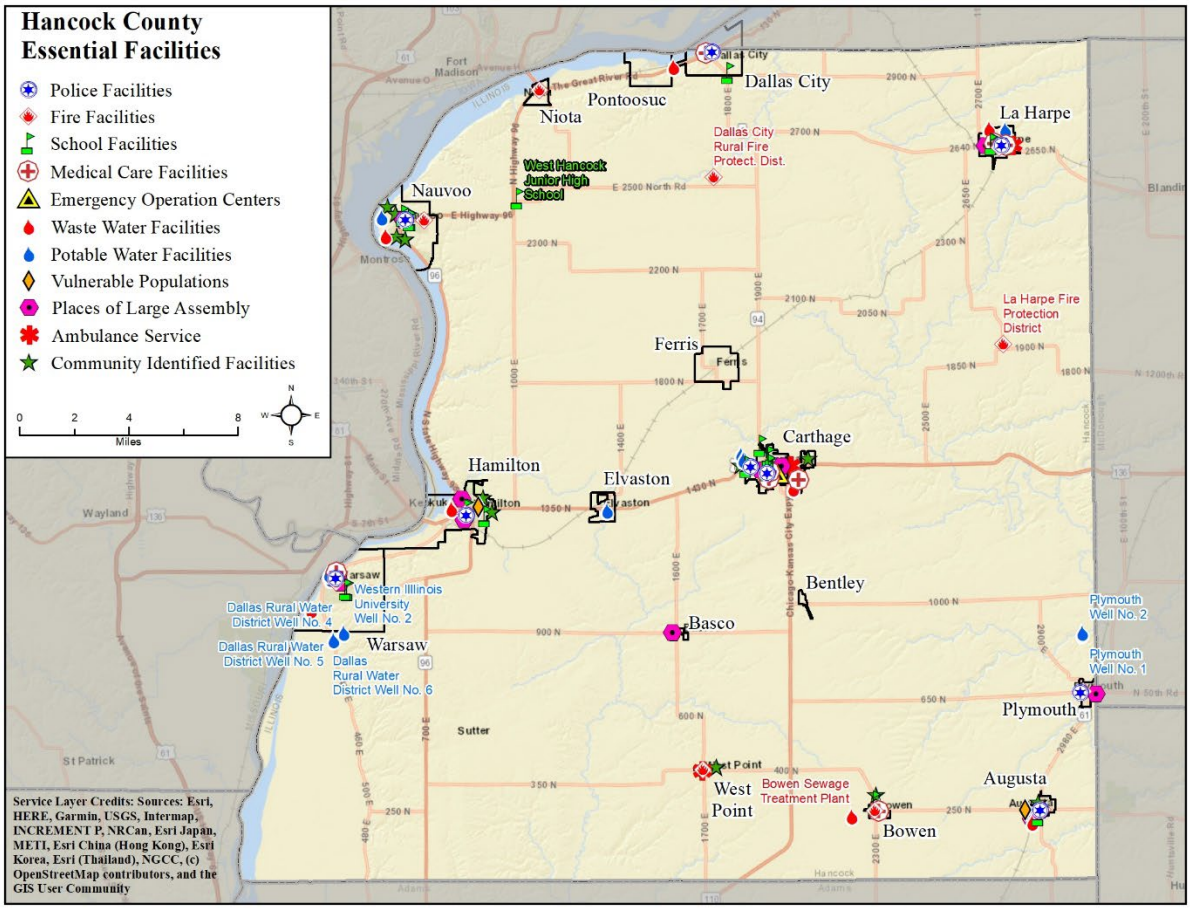
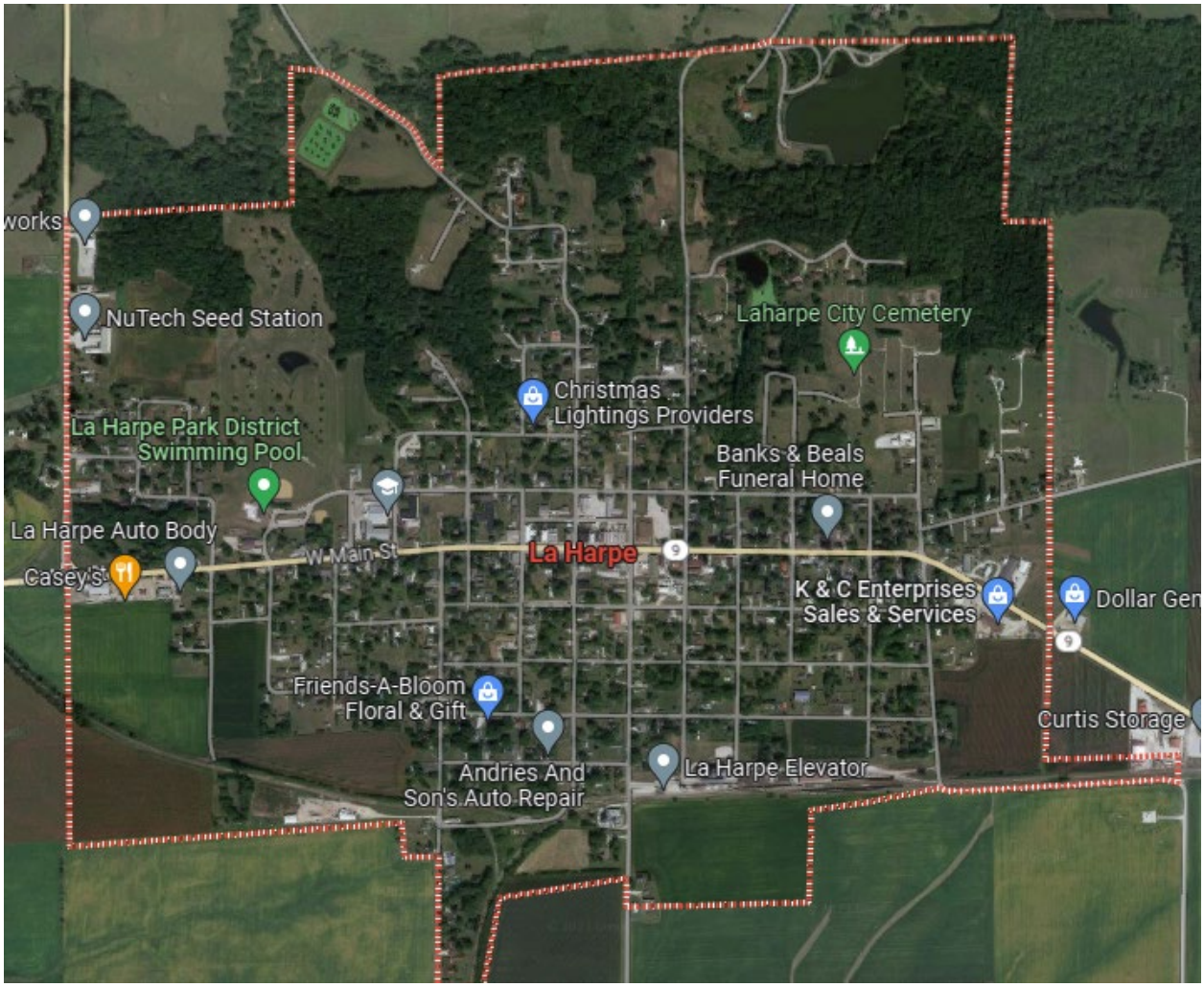
Hancock County Mitigation Projects

Goal	Project Type	Hazard Type	Possible Funding	Project Description	Priority	Contact/ Lead	Proposed Schedule	Benefit/ Cost
5.a.	Emergency Management New	All	Funding Search /Local	Obtain a backup generator for Sheriff's Department	A	ESDA/ Sheriff	2023-2025	M/M
1.a.	Coordination / Construction New	All	Local/ HHS	Poll the 20 Senior Living Facilities in Hancock County to see who has backup generators and determine how to assist in ensuring all facilities are covered for emergency power	A	ESDA	2024-2028	H/M
1.b.	Construction Continued	All	FEMA	Facilitate buyouts of repetitive loss and severe repetitive loss properties when funding is available	B	ESDA/ County Board	Ongoing when available Funding	H/H
5.a.	Emergency Management New	All	FEMA/ Local	Create access to emergency power for diesel fuel pumps needed to fuel emergency response vehicles	A	ESDA	2023-2025	H/M
1.a.	Coordination New	All	Local/ Funding Search	Secure and distribute back up cell phone chargers	B	ESDA/ Local NGO's	2025-2028	M/M
1.a.	Coordination	All	Local/ HHS	Reinstate Vial of Life Program to identify location of medical information and develop training for first responders to look for "Vial"	B	ESDA/ Local NGO's	2023-2025	H/L

2.a.	Education New	All	Local	Create and implement a Disaster Prep Kit Program/Project	B	ESDA/Local NGO's/Illinois Extension	2023-2024	H/L



LaHarpe, Illinois



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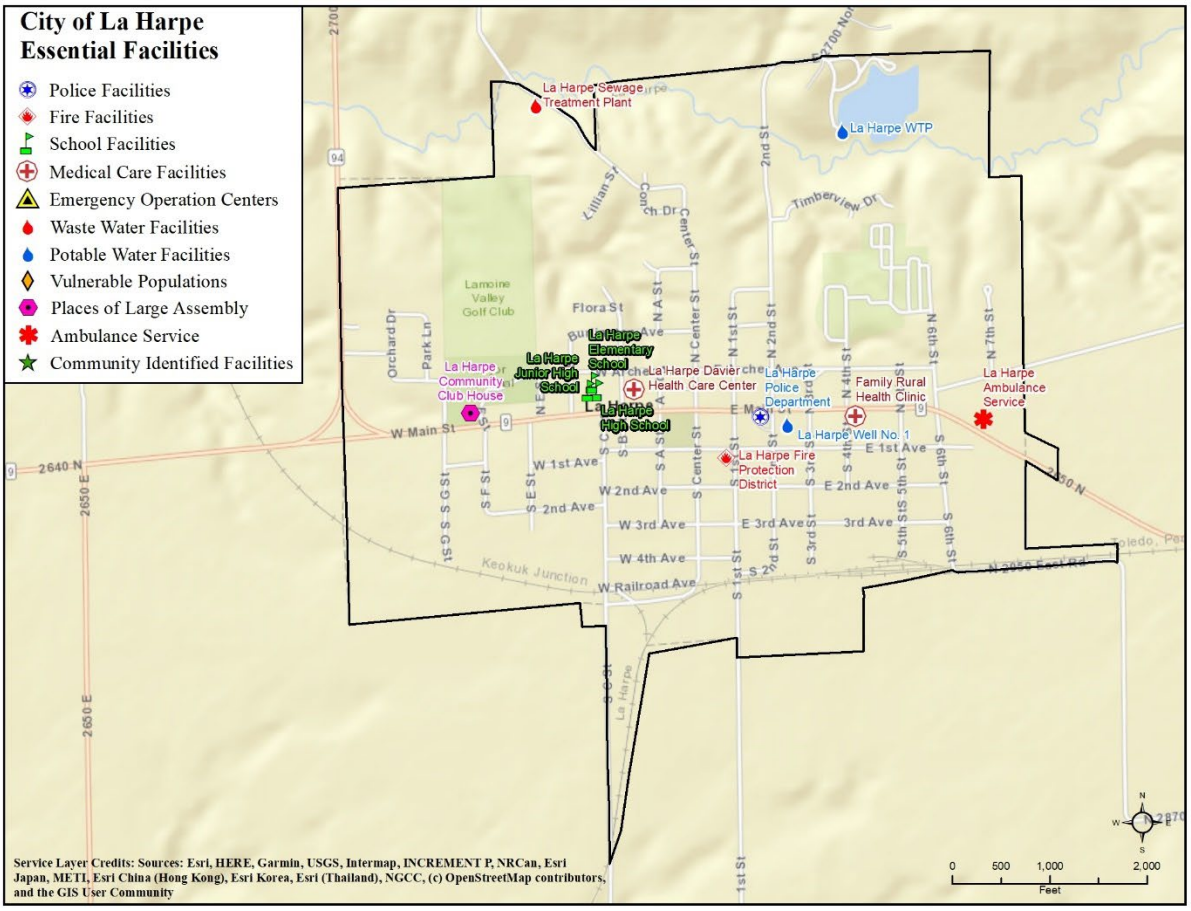
La Harpe Demographics

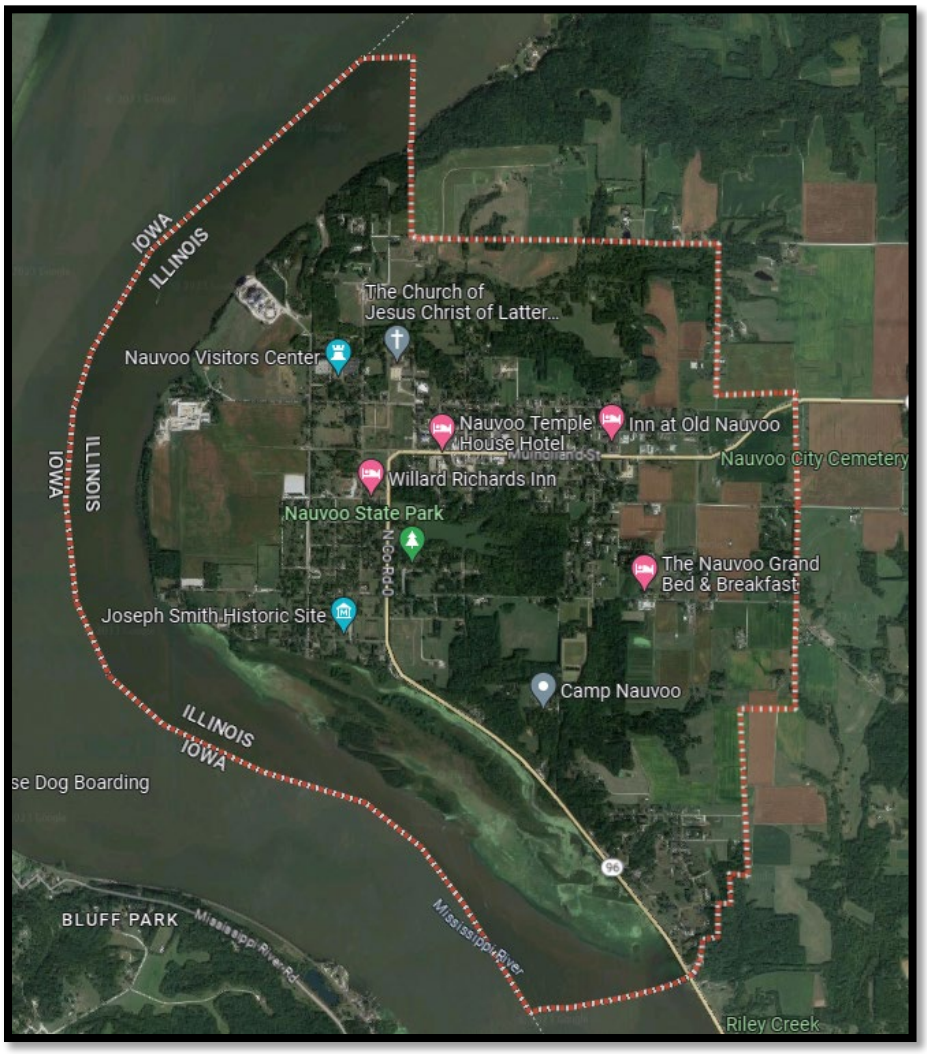
2020 Population	1,175
% under 18 years	19.4%
% over 65 years	30.4%
Median HH Income	$37,361
Poverty Rate	11.9%

LaHarpe Mitigation Projects

Goal	Project Type	Hazard Type	Possible Funding	Project Description	Priority	Contact/ Lead	Proposed Schedule	Benefit/ Cost
3.c.	C New	Flood/ ground water manag ement	FEMA, EPA, local	Investigate and facilitate the use of nature-based solutions to alleviate storm water issues. (i.e., Permeable Pavers, bioswales, rain gardens, etc.) **Potential sites**: Park District Golf Course, Main Street in-fill lot, sidewalk repairs and replacements.	H	City	2-5 years	H/H
1.d.	P New	Dam failure	DNR/ FEMA	Commission an Engineering study for dam on LaHarpe Reservoir to determine any needed repairs to protect sanitary district.	H	City	2-5 YRS	H/H
1.a.	C New	All Hazard	USDA/ Local	Siren/early warning system needs to be developed.	M	C	2-5 years	M/M


City of La Harpe
Essential Facilities
Police Facilities
Fire Facilities
School Facilities
Medical Care Facilities
Emergency Operation Centers
Waste Water Facilities
Potable Water Facilities
Vulnerable Populations
Places of Large Assembly
Ambulance Service
Community Identified Facilities
La Harpe Sewage Treatment Plant
La Harpe WTP
Lamoine Valley Golf Club
La Harpe Community Club House
La Harpe Elementary School
La Harpe Junior High School
La Harpe High School
La Harpe Davier Health Care Center
La Harpe Police Department
Family Rural Health Clinic
La Harpe Ambulance Service
La Harpe Well No. 1
La Harpe Fire Protection District
Flora St
W Main St
W 1st Ave
W 2nd Ave
W 3rd Ave
W 4th Ave
E 1st Ave
E 2nd Ave
E 3rd Ave
3rd Ave
W Railroad Ave
Keokuk Junction
Timberview Dr
Lillian St
Orchard Dr
Park Ln
N Center St
S Center St
2nd St
1st St
2640 N
2650 E
2650 E
0 500 1,000 2,000
Feet
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Nauvoo, Illinois



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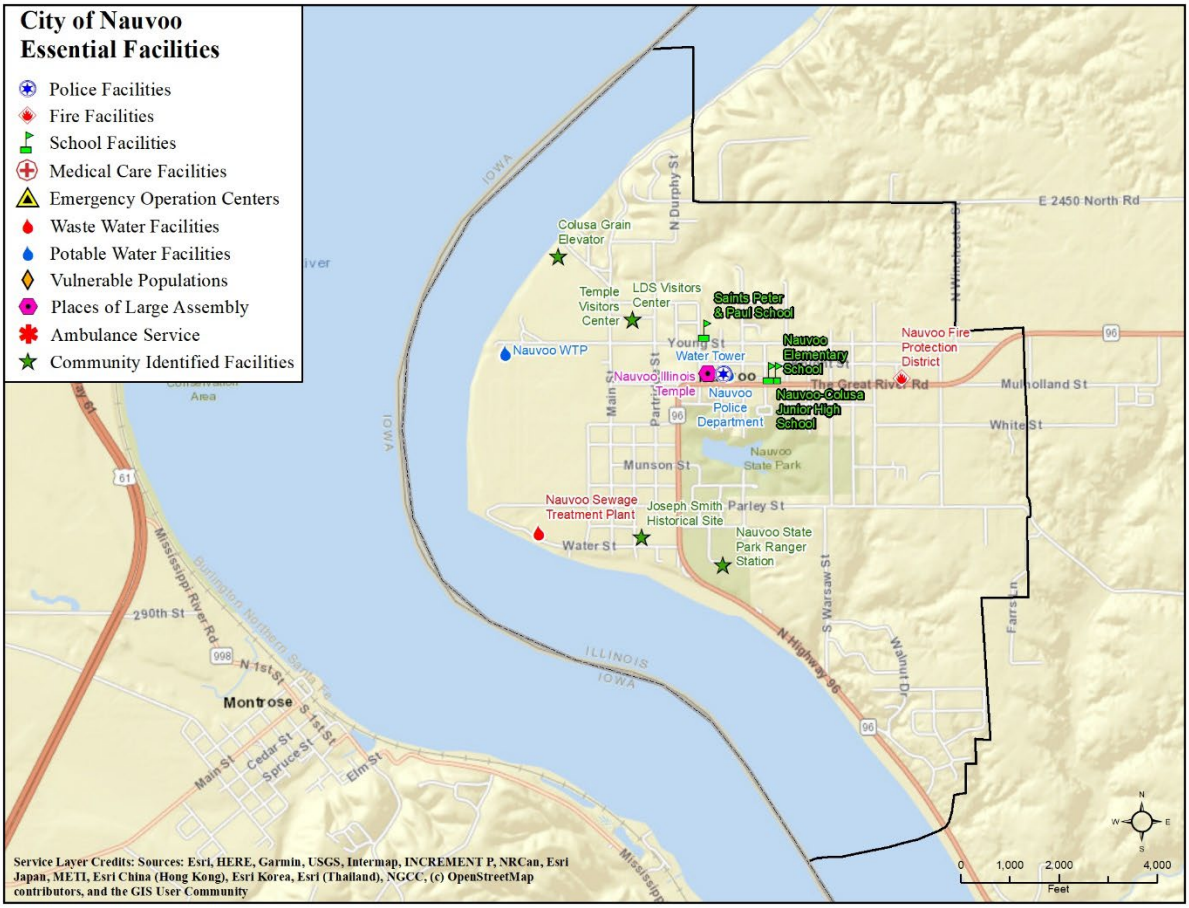
Nauvoo Demographics

2020 Population	950
% under 18 years	25.4%
% over 65 years	28.7%
Median HH Income	$50,938
Poverty Rate	30.2%

2023-28 Nauvoo Mitigation Projects

Goal	Project Type	Hazard	Possible Funding	Project Description	Priority	Contact/Lead	Proposed Schedule	Benefit/ Cost
1.a.	C New	Flood	DNR/ HUD/ FEMA	Fund a study and a construction project that permanently Keeps flood water out of the municipal Water Supply.	H	City	3-5 YRS	H/H
1.a. & 5.a	C New	ALL	FEMA/ Local	Obtain and install a backup generator for new City Hall	H	City	1-3 YRS	M/H
1.a.	C New	ALL	FEMA/ USDA	Upgrade, update or replace outdoor warning systems with ability for remote activation	H	City	1-3 YRS	M/H
1.a.	C New	ALL	FEMA/ Local	Work with LDS Leaders to develop a severe weather shelter with signage for summer tourist populations.	H	City/LDS Officials	1-5 YRS	H/H
5. a. & 5.b.	E/ R New	ALL	Local	Provide training and coordination for a local CERT Team to be developed.	H	Emergency Manager	1-3 YRS	H/L
1.c.	PR Continues	ALL	Local	Identify Vulnerable Populations and develop an intake system for emergency notification, check in and assistance.	M	Emergency Manager and Social Service Community	2-5 YRS	H/L


City of Nauvoo
Essential Facilities
Police Facilities
Fire Facilities
School Facilities
Medical Care Facilities
Emergency Operation Centers
Waste Water Facilities
Potable Water Facilities
Vulnerable Populations
Places of Large Assembly
Ambulance Service
Community Identified Facilities
IOWA
ILLINOIS
Colusa Grain Elevator
Temple Visitors Center
LDS Visitors Center
Saints Peter & Paul School
Nauvoo WTP
Young St Water Tower
Nauvoo Elementary School
Nauvoo Illinois Temple
Nauvoo Police Department
Nauvoo-Colusa Junior High School
Nauvoo Fire Protection District
The Great River Rd
Mulholland St
White St
Munson St
Nauvoo State Park
Nauvoo Sewage Treatment Plant
Joseph Smith Historical Site
Parley St
Water St
Nauvoo State Park Ranger Station
N Durphy St
N Winchester St
E 2450 North Rd
Main St
Partridge St
S Warsaw St
N Highway 96
Walnut Dr
Farris Ln
61
96
998
290th St
Mississippi River Rd
Burlington Northern Santa Fe
N 1st St
S 1st St
Montrose
Cedar St
Spruce St
Elm St
Main St
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
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Feet

Pontoosuc, Illinois

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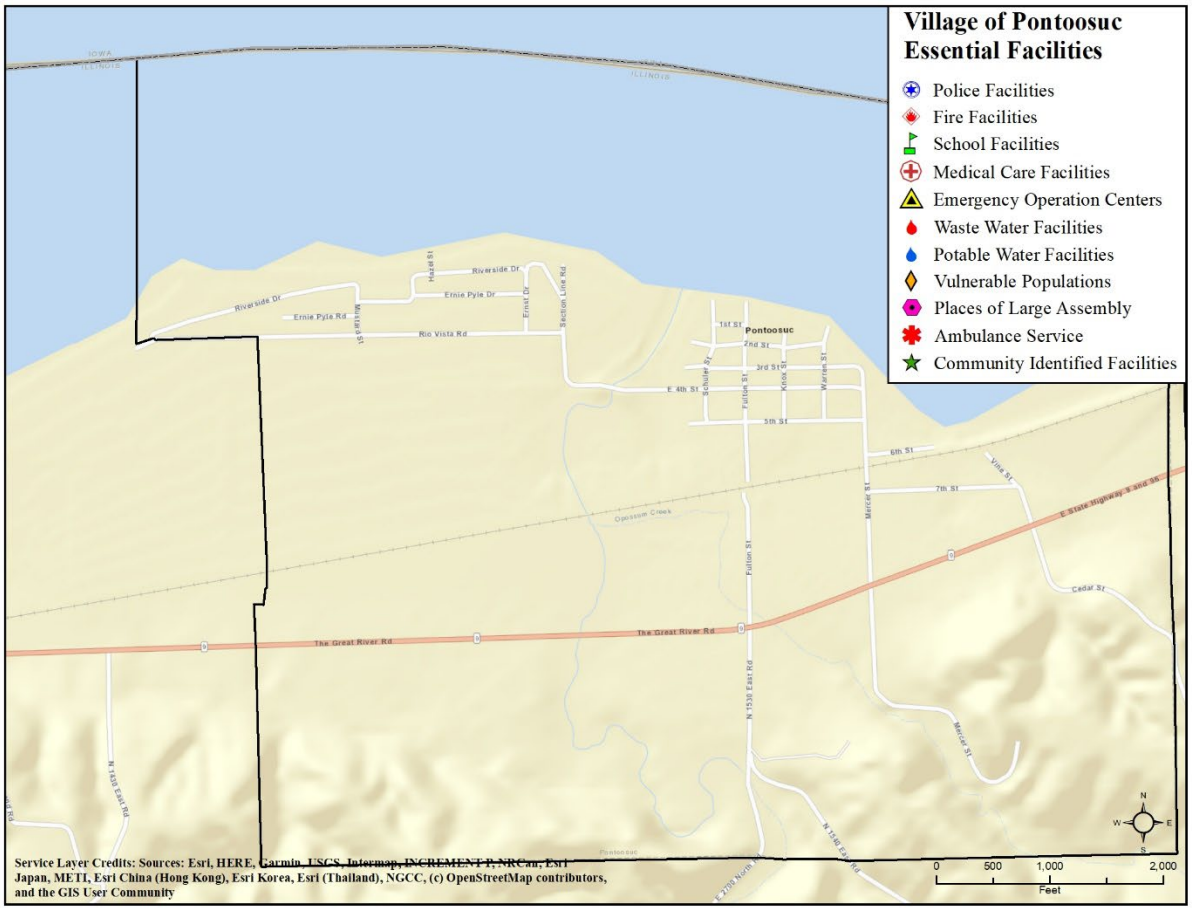
Pontoosuc Demographics	
2020 Population	99
% under 18 years	28.4%
% over 65 years	22.9%
Median HH Income	$42,500
Poverty Rate	5.5%

Pontoosuc Mitigation Projects

Goal	Project Type	Hazard Type	Possible Funding	Project Description	Priority	Contact/ Lead	Proposed Schedule	Benefit/ Cost
1.a.	C Continued	ALL	FEMA	Identify Location for and create a wind resistant storm shelter equipped with a backup generator to serve as a storm shelter.	H	City	2-5 YRS	H/H
1.b.	C continues	Flood	FEMA	Facilitate buyout process for repetitive loss properties within jurisdictional Limits	M	City	Ongoing	H/H
1.d.	C New	ALL	FEMA, IDOT, Local	Replace and upgrade bridge over Spillman Creek which is deteriorating, and weight limit restrictions make portions of town inaccessible to emergency vehicles.	M	City	1-3 YRS	M/M
1.a.	E New	All	Local	Encourage citizens to use emergency warning notices on their cell phones as well as the purchase of weather radios.	M	All	Ongoing	M/L


Village of Pontoosuc
Essential Facilities
Police Facilities
Fire Facilities
School Facilities
Medical Care Facilities
Emergency Operation Centers
Waste Water Facilities
Potable Water Facilities
Vulnerable Populations
Places of Large Assembly
Ambulance Service
Community Identified Facilities
Pontoosuc
Riverside Dr
Ernie Pyle Rd
Rio Vista Rd
Ernie Pyle Dr
Section Line Rd
1st St
2nd St
3rd St
E 4th St
5th St
6th St
7th St
Fulton St
Marcel St
Vine St
Cedar St
The Great River Rd
N 1530 East Rd
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
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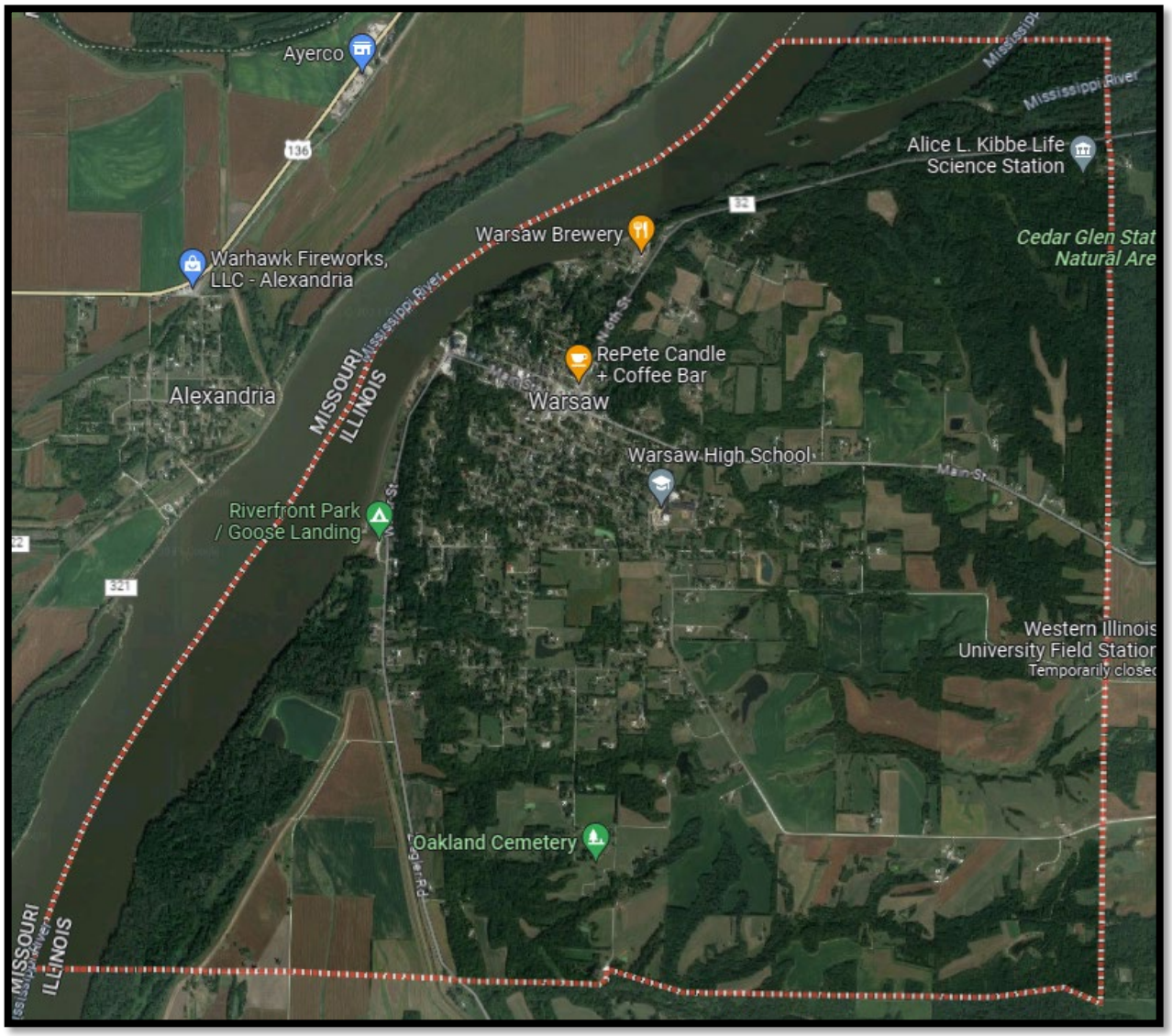
Feet

Warsaw



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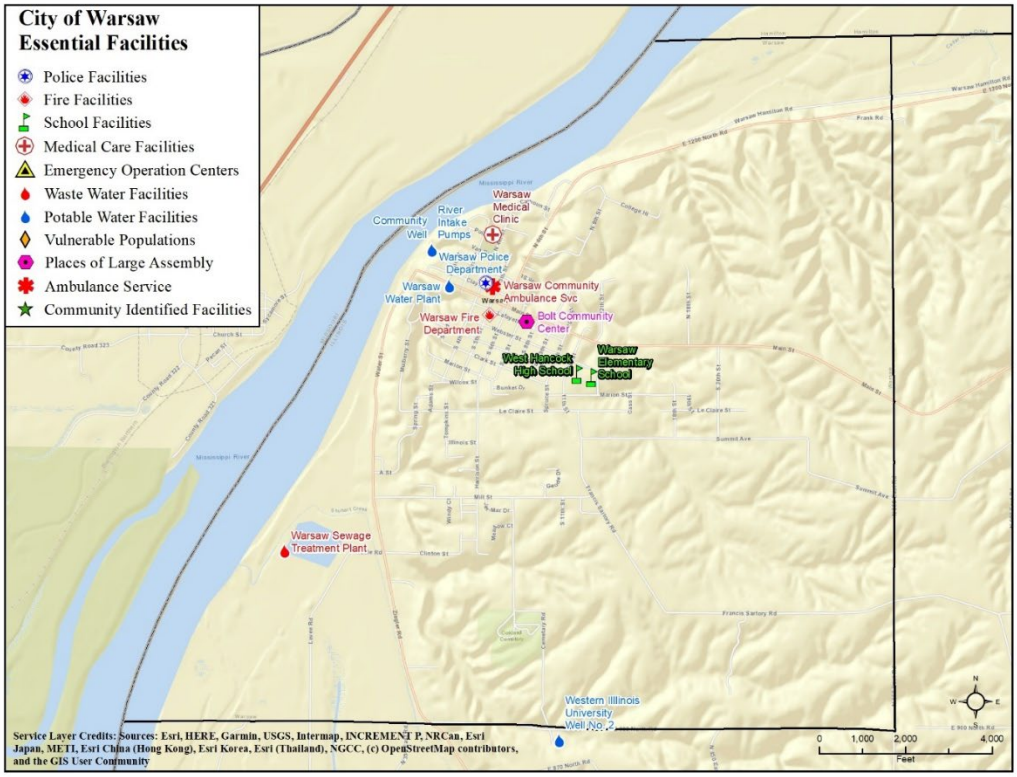
Warsaw Demographics

2020 Population	1,510
% under 18 years	24.9%
% over 65 years	21.9%
Median HH Income	$53,920
Poverty Rate	10.1%

Warsaw Mitigation Projects

Goal	Project Type	Hazard Type	Possible Funding	Project Description	Priority	Contact/ Lead	Proposed Schedule	Benefit/ Cost
1.b.	C Continue	Flood	FEMA	Facilitate the elevation and/or buyout of repetitive loss properties in the floodplain.	H	City	2-5 years	H/H
1.a.	C New	Wind /Severe Storms	FEMA	Identify and retrofit existing Building with a backup generator to serve as a severe storm, heating and cooling center.	H	City	2-5 YRS	H/H
1.b.	C New	Flood	FEMA/ IDOT/ County	Elevate roadway along waterfront (Water Street) to reduce frequent overtopping.	H	City	1-4 years	H/H
1.a.	C New	All Hazard	USDA/ Local	Upgrade existing siren, add second siren and capacity to fire station generator	M	C	2-5 years	M/M


City of Warsaw
Essential Facilities
Police Facilities
Fire Facilities
School Facilities
Medical Care Facilities
Emergency Operation Centers
Waste Water Facilities
Potable Water Facilities
Vulnerable Populations
Places of Large Assembly
Ambulance Service
Community Identified Facilities
Community Well
River Intake Pumps
Warsaw Medical Clinic
Warsaw Police Department
Warsaw Water Plant
Warsaw Community Ambulance Svc
Warsaw Fire Department
Bolt Community Center
West Hancock High School
Warsaw Elementary School
Warsaw Sewage Treatment Plant
Western Illinois University Well No 2
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
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Feet

West Point, Illinois

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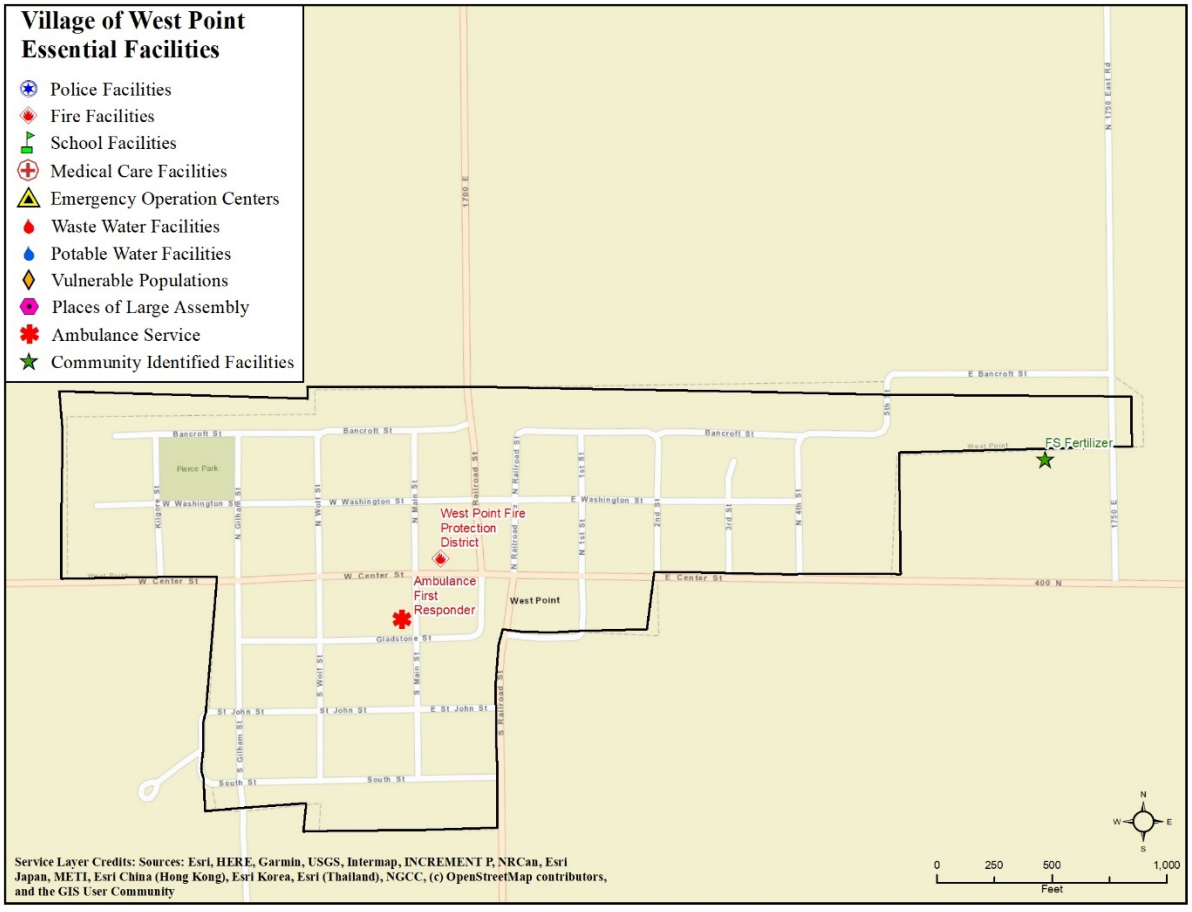
West Point Demographics

2020 Population	140
% under 18 years	35.6%
% over 65 years	12.8%
Median HH Income	$49,167
Poverty Rate	42.0%

West Point Mitigation Projects

Goal	Project Type	Hazard Type	Possible Funding	Project Description	Priority	Contact/ Lead	Proposed Schedule	Benefit/ Cost
	C	Wind/ Severe Storm/ Heat	FEMA	Identify and retrofit existing Building with a backup generator to serve as a severe storm, heating and cooling center.	H	Village	2-5 Yrs	H/H



CHAPTER 4 – Monitoring, Evaluating, Maintenance Strategy

Plan Maintenance and Implementation

The Hancock County Hazard Mitigation Plan will be maintained and implemented though existing channels. The Hancock County Emergency Services Coordinator will be responsible for the record keeping and maintenance of the plan. There are currently regular meetings held with all municipal ESDA Coordinators attending, and maintenance will become a regular agenda item. One such meeting will be designated as the annual meeting of the planning committee. At that that time the Hancock County ESDA Director will facilitate discussion surrounding the progress of established goals from the FEMA approved plan, assist with the identification of new and emerging project ideas from each of the communities, and facilitate discussion of new issues that may have arisen of the past year that affect the plan.

As mitigation projects are being implemented, the Jurisdiction(s) involved will provide updates both to annual meetings of the committee and to the public through press releases, media, and when possible public meetings. Additionally, press releases will be encouraged with the progress made on the mitigation actions each years, and the ESDA Coordinator will make an annual report to the Hancock County Board as to the progress on the mitigation actions status for evaluation purposes. The report will include 1) the number of actions completed, 2) actions in progress, and 3) actions dropped and the reason dropped. These reports will be compiled for use in the next plan update.

Records of these annual meetings will be maintained within the Hancock County ESDA office, and compiled for plan updates within the five-year update time frame. In addition to maintaining records for the plan updates, the ESDA Director will also serve as a resource for the participating jurisdictions to identify potential funding streams for identified projects within the plan, and referring communities to resources and assistance to moving projects from plan to completion.

In accordance with FEMA Guidelines and the current Hancock County flood plain maps, the communities of Hamilton, Warsaw, Nauvoo, La Harpe, Dallas City and Pontoosuc, as well as Hancock County, participate in the National Flood Insurance Program (NFIP). Maintaining active status in NFIP will be a portion of the plan maintenance strategy. Jurisdictions with flood plains within their boundaries adopting the plan are required to maintain active status to continue to be covered by the plan. This continued participation will be monitored by the ESDA Director.

The ESDA Director will also offer and provide assistance and guidance to each jurisdiction in additional planning processes, ensuring that the components of newly developed plans and ordinances are consistent with the components of the Multi-Jurisdictional Hazard Mitigation Plan. This will provide a resource for jurisdictions in planning activities such as comprehensive planning, strategic planning, or other plans that may be developed by participating jurisdictions, should these plans impact potential hazards or mitigation activities.

APPENDICES

Appendix A- Planning Meeting Agendas

APPENDIX B : Meeting Minutes

APPENDIX C : Power Points

APPENDIX D : Press Releases

APPENDIX A – Planning Meeting Agendas

Pre-Planning Meeting #1

Hancock County Pre-Mitigation Planning Scoping Meeting
May 31, 2022 5:30 pm
Marine Bank and Trust
2nd Floor Banquet Room
410 Buchanan Street, Carthage, IL

Session objectives

- Identify goals, motivations, and barriers for hazard mitigation planning, focused on water resources and flooding
- Discuss community resiliency and using nature-based infrastructure implementation as a strategy for natural hazard mitigation, specifically flooding
- Review existing plans and ordinances to identify opportunities and barriers for updates

Agenda

- Welcome / Introductions -
  - Frame connection to FEMA hazard mitigation planning process (ex: flow chart, timelines)

- County discussion -
  - Community hazard identification through maps, worksheets, and group discussion
  - Current Mitigation Plan Goals and Strategies

- Break

- Existing plan and ordinance review –

- Next steps & Conclusion -

Pre-Planning Meeting #2

Hancock County Mitigation Scoping Meeting II
538 Wabash Avenue
Carthage, Illinois 62321

June 21, 2022
4 PM

Welcome / Introductions	Carrie McKillip Illinois Extension
Introduction to Nature Based Mitigation/Infrastructure	Lisa Merrifield Illinois Extension
Community discussion summary	Carrie McKillip

Discuss and prioritize future strategies

Potential Nature Based Strategies

- Incorporate maps and tabletop discussion

Prioritize strategies, NBS Location recommendations, and next steps

Conclusion and Mitigation Planning Schedule

Meeting 1- August 23, 2022
4 PM
1006 Wabash Avenue
Carthage, Illinois

Welcome and Introductions

Why Mitigation Planning?
- Hancock County Previous Plans
- New Focuses

Meeting Schedule

Public Participation

Review and update Plan Goals

Community Profiles and Historical Weather Data

Disaster Planning Integration Toolkit – Assessment and County Report

Dams and Levees of Concern in Hancock County
- Addition into the Plan

Next meeting September 27, 4 PM, Same Place

Meeting 2- September 27, 2022
4:30 PM
1006 Wabash Avenue
Carthage, Illinois

Welcome and Introductions

Risk Assessment
- HAZUS
- Community Survey

Identifying Vulnerable Populations

Repetitive Loss Strategy Discussion

Community Profiles

Historical Weather Data

Dams and Levees of Concern in Hancock County

Next meeting November 1, 2022 4:30 PM, Same Place

Meeting 3- November 1, 2022
4:30 PM
1006 Wabash Avenue
Carthage, Illinois

Welcome and Introductions	Carrie
Mitigation Presentation	Carrie
Review of Existing Projects Listed in Plan	Carrie
Schedule Community Meetings	

Next meeting TBD – January/February 2023

Meeting 4 and Public Meeting - July 26, 2023
4:00-6:00 PM
Hancock County Board Room
Hancock County Courthouse
Carthage, Illinois

Welcome and Introductions

Summary of Planning Process

New Elements for Planning
- Climate Change
- Nature Based Solutions
- Vulnerable Populations

New Action Items Included

Next Steps
- Corrections and Crosswalk Completion
- IEMA Submission
- Corrections from IEMA
- FEMA Submission
- FEMA Approval
- Jurisdictional Adoption

Questions?

APPENDIX B : Meeting Minutes

Meeting 1- August 23, 2022
4 PM
1006 Wabash Avenue
Carthage, Illinois

Welcome and Introductions

Staff: Carrie McKillip, Russell Medley

Why Mitigation Planning?
Hancock County Previous Plans
New Focuses

Why mitigation planning – protecting life and property, funding opportunities, and building resilience.
Understand hazards – tornadoes, winter storms, severe storms, straight line winds. FEMA also wants to focus on building local community resilience.

Meeting Schedule
August 23, 2022
September 27, 2022
November 1, 2022
Meeting 4 - TBD

Jurisdictional meetings – November and December 2022. Discussion with each jurisdiction about projects to include. Online via Zoom/Teams/Skype. Multiple representatives from each jurisdiction. Focus on each jurisdiction's specific risks. Identify at least one FEMA fundable project per jurisdiction.

Public Participation – In person, Online, Meetings vs. Information
How do we get public participation? Radio? Newspapers? Community website links? Church groups?

Survey?

Review and update Plan Goals
2018 (slides in presentation)
1. Protect life and property
Objective 1a. – remain the same
Objective 1b. – issues in Dallas City (FEMA telling residents they are not in the floodplain).
Objective 1c. – remain the same
Objective 1d. – remain the same (Max asked about grant funds through FEMA for pervious surface/rain garden project)
2. Public awareness
Objective 2a. – remain the same. Example - Vial of Life, Extension programs, Red Cross programs.
Objective 2b. – remain the same. Extension can provide brochures and resources.
3. Natural systems
Objective 3a. – remain the same
Objective 3b. – remain the same
4. Partnerships and implementation
Objective 4a. – remain the same
Objective 4b. – remain the same
Objective 4c. – remain the same
5. Emergency services
Objective 5a. – remain the same
Objective 5b. – remain the same

Community Profiles and Historical Weather Data
Community profiles will be updated with 2020 census data and vulnerability by census track.

Disaster Planning Integration Toolkit – Assessment and County Report

Dams and Levees of Concern in Hancock County
Addition into the Plan
Still trying to get information from FEMA and DNR about what they exactly want regarding dams and levees. Many of dams and levees are owned by DNR so we need to ask about whether they have plans in place that address disaster events.

Next meeting September 27, 4 PM, Same Place

Meeting 2- September 27, 2022
4:30 PM
1006 Wabash Avenue
Carthage, Illinois

Welcome and Introductions

Staff: Carrie McKillip, Russell Medley, Brad McVay (Illinois State Water Survey)

Risk Assessment
HAZUS
Essential Facilities Mapping
Community Survey Distribution

HAZUS is a GIS based software (we will look at flood, earthquake, tornado) used to track risks.

More likely to see big rain events. These might affect what is considered a 1% Flood Event. Might come faster/sooner. Stormwater flooding will become more likely in the future (engineering your way out of a big rain events is not possible).

Flood: Brad was asked about wave action causing damage to structures (will review technical manuals). It was also noted that Elvaston is too far from the river to have damaged structures. There is the possibility of stream flooding in the City of Carthage.

Earthquake: 5.0 located in the center of Hancock County - $366 million damage
Tornado: Scenario – F3, moving NE across Carthage.

Identifying Vulnerable Populations

- Loss of jobs and population in Hancock County.
- Under age of 5 and over the age of 65 – more vulnerable and need more protections
- Poverty – deep poverty and residents who are both in deep poverty and over the age of 65.

Repetitive Loss Strategy Discussion
Jack has requested repetitive loss data from IEMA. Strategy in Hancock County focused on buyouts (over 40 houses bought out in Pontusec).

Other strategies include elevating homes.

Community Profiles and Historical Weather Data

By next meeting, each community will have updated demographics and historical weather data (countywide).

If there is a project that you think you MIGHT do, put that in the plan or FEMA will not fund through mitigation project funds.

Dams and Levees of Concern in Hancock County

Dams that we need to talk to IDNR about:

- Carthage Lake Dam
- Horton Lake Dam
- LaHarpe
- Hunt Lima

Levees:

- LaMoine River Levees – Ag levees
- Niota has levees (Ameren might have maintained the levee until it was turned over to the Niota Levee District). Not showing on National Database.
- There might be levees on Bear Creek by Basco – might be in Adams County

Create campaign

Next meeting November 1, 2022 4:30 PM, Same Place

Meeting 3- November 1, 2022
4:30 PM
1006 Wabash Avenue
Carthage, Illinois

Welcome and Introductions **Carrie**

Carrie McKillip, Russell Medley (University of Illinois Extension)
Harmony Fierke-Gmazel, Noah Jones (Michigan State University Extension)

Michigan State Extension is working on creating a Hazard Mitigation Guidebook for rural communities in Michigan.

There are 15 jurisdictions in Hancock County.

Mitigation Presentation **Carrie**

Carrie presented the community handouts: jurisdictional profiles (demographics), 2018 project grids, and DPIT report for Hancock County. The DPIT report can be used when developing community plans, infrastructure or policy.

The major focus of the meeting will be on the jurisdictional project grids set up in 2018. The 2018 plan was sorted by jurisdictional projects. Carrie also handed out a form for communities to fill out for the upcoming plan update.

Mitigation is the ongoing effort to lessen the impact of disasters on people and property.

- Building codes
- Promoting sound land use
- Structural retrofits
- Flood proofing retrofits
- Flood insurance (NFIP)
- Acquisition
- Informing the public
- Stormwater Infrastructure
- Detention and retention basins

Building codes:

- What are your greatest risks?
    - Earthquakes
    - Severe wind (tornado/derecho)
    - Stormwater (nature-based solutions and green infrastructure)

Promoting sound land use

- Ag land, industrial land, residential, wetlands/nature preserves
- Mitigate stormwater by utilizing wetlands or open space

- Turn riverfront areas into/back into wetlands

Structural retrofits

- Seismic protection for existing structures
- Wind resistant retrofits
- Examples: strapping for modular and manufactured homes to protect from wind

Flood proofing retrofits

- Elevation
- Wet flood proofing – allow water to enter uninhabited parts of the house (1st floor)
- Relocation – move house out of floodplain
- Dry flood proofing – seal house to prevent water from entering
- Levees and floodwalls around house
- Demolition – tear down house and rebuild/buy elsewhere or rebuild to heightened standards

Flood insurance

- Building codes
- Flood mapping
- Zoning
- Base flood elevations should match building codes/zoning

Acquisition

- Buy outs

Informing the public

- Public awareness campaigns
    - Social media
    - PA announcements on radio

Hancock County Mitigation Plan Focus Groups

11-21-22

Nauvoo

3 pm

Nauvoo used to have their own EDSA person but that collapsed. The Nauvoo Fire Protection District ended up taking over.

Dan used to be Fire Chief and moved to the trustee side. Two ambulance out of Fire District. Cover Nauvoo and Dallas City. The county only has two ambulances for the entire county.

Will send the natural disaster assessment form to Carrie.

Project Grid

- Building codes adopted to 2015 edition (the state adopted the 2015 adoption) – can be removed.
- No new trailer home parks so no new shelters built. A new shelter has been constructed in one trailer park.
- Storm shelters in the city. During a storm, they city goes down to the RV parks used by the Church of Latter Day Saints at the state park. The state park uses a shower facilities and the LDS use another shower facility for a shelter.
- Need to have signs for shelters for pedestrians.
- New city hall should be following a 2015 building codes. No storm shelter included. No generator back up plan. Not sure if the building is built to current tornado wind standards. (include designated storm shelter for tourists – pull numbers for tourists during summer). There is space beneath the stage at the LDS building that could be used for safe space.
- Fire department/protection district has generator back up plan.
- The new city hall needs a back up generator. (two to three year turnaround)
- Flood protection – not riverine but stormwater is an issue. Only one building really impacted by river flooding (LDS building). Use a portable generator to de-water building.
- Project: create permanent solution to keep flood waters out of municipal water?

Keep Nauvoo in the policy and procedures section.

Protect life and reduce risk: upgrade disaster shelters. Update, upgrade or replace outdoor warning system (allow police to set them off and add another – currently have 5), identify vulnerable populations and develop public intake system.

Educate public: create CERT Team

Top priority: get a backup generator in new village hall.

Hancock County

- Sheriff's office needs back-up generator
- Hickory Grove (assisted living/senior living) – back up generator?
- 20 senior living facilities in Hancock County – need to poll them to see who has back up generators.
- Buy outs
- Why is Dallas City not in the floodplain?
- Back up power for fuel pumps - diesel fuel for emergency vehicles
- Back up cell phone chargers
- Citizen's awareness program regarding natural hazards
- Hospitals and schools should be joining these meetings
- Reinstate Vial of Life program
- Create Disaster Prep Kit program/project

Ferris

- Storm shelter
- Back-up generator
- Tree trimming/removal for utility line protection
- Civil defense sirens (who turns them on – issue in Hancock County)
- City hall – metal siding/roofs

Pontoosuc

- Storm shelter
- Back-up generator
- City hall – metal siding/roofs
- Flooding – buyouts
- Bridge over creek is deteriorating (Spillman Creek) – there is an application into the state but it is being delayed. (limited to 5 tons…cannot get an ambulance over it).

Maybe need to invest in weather radios for all households instead of installing outdoor warning sirens.

Teach people to get warnings through cell phones

Both Ferris and Pontoosuc will stay in all of the coordination projects.

12-5-22

Dallas City

- Dredge river frontage for both pleasure usage docking and reduce flooding
- Continue to look for buyout dollars

12-12-22

Hamilton

Hamilton will remain in all coordination projects.

- Elevate highway at bridge- Route 136 (project underway by State). 2022-2027.
- Dredging and defoliation of small streams and straightening of streams. (Remove straightening of streams).
- Review and update building codes (need to check)
- Storm shelters (need to check)
- NFIP designation
- Might look at community rating system program. If you participate, it does lower flood insurance rates for the community. Assistance provided by EPA Region V and IL DNR. https://www.fema.gov/floodplain-management/community-rating-system
- Does Hamilton have wind-resistant structure?
- Does Hamilton have heating and cooling centers?
- Are there back-up generators? There is a newer assisted living center there and Hamilton might consider including a back-up generator there. That can be included as a mitigation strategy.
- There is talk for a new police department building. Could include storm shelter, generator and heating and cooling center.
- City boundaries are in Mississippi River and that is why Hamilton is in NFIP.
- Early warning system – might need cell phone notification system. Is there a system to turn on weather alert system without going into public safety building?
- NIMS training for staff? (Need to check…contact Jack).
- NOAA all hazard radios – get information to Jack.
- Adopting policies and procedures to follow chain of command for emergencies.
- Where are hazardous materials are located/stored in Hamilton? (need to check)
- Are there any roadways that flood?
- Brownfields?

Basco

- Find existing building to create shelter

January 12, 2023

Carthage

Carthage will remain in all countywide coordination projects.

- Updated building codes for tornado/hurricane straps on modular homes.
- Do not allow mobile home parks in the city limits so do not need to focus on requiring storm shelters.
- Detention pond policy and nature-based solution. Need to come up with a maintenance policy or policy language for nature-based solution implemented. Does the city have an infrastructure project that can be funded through FEMA? Add to Carthage plan.
- Is there a need for a wind resistant structure in Carthage? Mayor says no. Suggest making an existing building wind resistant (city owned building – Senior Center that currently serves as a warming center.
- Add generator to building above. (Email address of building to Carrie – 301 Main St., Carthage).
- Prairie Creek clean-up/defoliation (may not be eligible for FEMA funding but might be fundable through EPA or DNR).
- Lake Dam – needs maintenance; might need an engineering study to determine what maintenance needs to be done on dam and spillway.
- Public education – disaster preparedness.
- Carthage does have a community alerts page on Facebook (not owned by city); working to get a city website established.
- Carthage has sirens and phone notifications.

January 18, 2023

Warsaw

Warsaw will remain in all countywide coordination projects.

- Buyouts and elevations should be added (from previous plan).
- Have silting in the harbor area. Add something about monitoring silt build up in Harbor.
- Does have storm shelters but might need to check for wind resistant structures. Will add Fire Department or Bott Community Center as potential sites for wind resistant storm shelter sites.
- Roadway along waterfront needs to be raised above flood levels. Warsaw Water Street. FEMA would not fund it because it is a collector road and they do not work with collector roads (Recommended 6 feet increase – not from flood base elevation).
- Community does have a siren (on Fire Department) but looking to upgrade one and add another siren ($80,000). Looking to expand generator capacity as part of the project (in Fire Station).
- Fire Department and City Hall have generators.

LaHarpe

LaHarpe will remain in all countywide coordination projects.

- LaHarpe does have a couple of sites that are classified as wind resistant structures.
- Nature-based solutions. Permeable pavers, bioswales, rain garden. Sidewalks along Main Street. City Council though they needed approval through the state. City has torn down a couple of buildings. City did apply for grant funding for demolition but did not follow through on the paperwork. Main Street site – open site. Can be an option for a rain garden. Area has current stormwater issue. Permeable pavers on sidewalk (is there an issue with regards to sidewalk design next to State Routes.

- Park has pond that dries up in summer. Could be site for rain garden. Work with park board to develop a nature-based solution plan to address issues in park.
- Dam on LaHarpe Reservoir – engineering study to determine if dam is safe. (Reservoir not used anymore. Drinking water comes from groundwater wells), but if dam breaks it could impact the sanitary system. There also is a pond or lake that should be investigated. When pond or lake (by Murder Hill) gets flooded, water flows into the floodplain.
- Early warning system/sirens needed (received 65% funding but city council would not come up with the final 35%).
- Wetlands restoration at golf course (owned by Park District).

Jurisdictional Participation Record/Attendance

Hancock County Jurisdictional Meeting Participation			Pre Plan 1	Pre Plan 2	Mtg 1	Mtg 2	Mtg 3	Mtg 4	Community Conference
Basco	James Damron								x
Carthage	Jim Nightingale		x	x	x	x			x
Dallas City	Kevin Six								x
Ferris	Charles Voss								x
Hamilton	Justin D. Hobby								x
Hancock County	Jack Curfman		x	x	x	x	x		x
LaHarpe	Max Owsley		x	x	x				x
Nauvoo	Dan Gallaher								x
Pontoosuc	Bob Durand								x
Warsaw	Mike Heisler								x
West Point	Phillip McDowell								x

APPENDIX C : Power Points

Meeting 1 PowerPoint

HANCOCK COUNTY NATURAL HAZARD MITIGATION PLANNING 2023

MEETING 1- AUGUST 23, 2022

Illinois Extension

Why Mitigation Planning?

- Protecting Life and Property
- Funding Opportunities
- Building Resilience

2

Committee Meetings

Meeting 1- August 23, 2022

Meeting 2- September 27, 2022

Meeting 4- TBD

Participation-

Each Jurisdiction is required to participate in at least 2 of the scheduled meetings to be included in the plan

Jurisdictional Meetings- November and December

- Discussion with each jurisdiction about projects to include
- On-line via Zoom, Teams or Skype
- Can schedule when multiple representatives from jurisdictions can participate
- Focus on each jurisdiction's specific risks
- At least one FEMA fundable project

Illinois Extension

Public Input:

In person? On-line?

Meetings vs. Information?

2018 Goals

Goal 1. Protect Life and property

Goal 2. Public Awareness

Goal 3. Natural Systems

Goal 4. Partnerships and Implementation

6/23/2

Goal 1. Protect Life and property

- ***Objective 1.a.*** Implement procedures and actions that will protect life and property in the event of a natural hazard. This includes making homes, businesses, infrastructure, and other types of property less prone to natural hazard damage.
- ***Objective 1.b.*** Identify areas that have been repeatedly damaged in natural hazards and suggest alternative locations or other actions that might limit that susceptibility.
- ***Objective 1.c.*** Increase awareness about insurance availability for catastrophic hazards.
- ***Objective 1.d.*** Encourage procedures designed to minimize risk by supporting development plans

Goal 2. Public Awareness

- ***Objective 2.a.*** Design and implement natural hazard education programs for the citizens of Hancock County
- ***Objective 2.b.*** Create natural hazard mitigation resources (brochures, websites, etc.) for the public

Goal 3. Natural

Objective 3.a. Preserve Natural Resources in such a way that they serve

Objective 3.b. Encourage the implementation of natural hazard mitigation planning with watershed protection, land use planning, and

Goal 4. Partnerships and Implementation

- ***Objective 4.a.*** Develop communication and coordination systems for the various agencies potentially involved in natural hazard mitigation.
- ***Objective 4.b.*** Maintain and improve communication and cooperation between residents, government, and the private sector
- ***Objective 4.c.*** Incorporate natural hazard mitigation into community plans and regulations

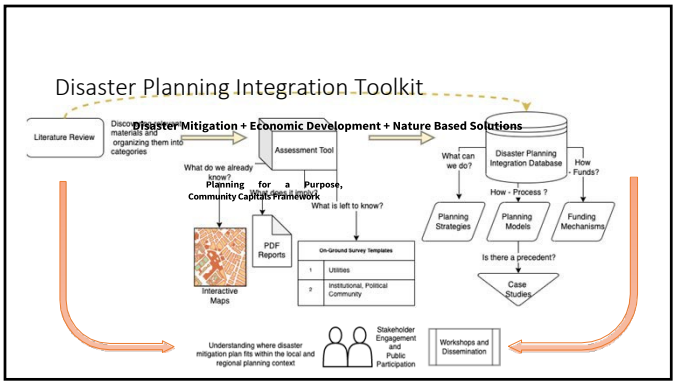
Goal 5. Emergency Services

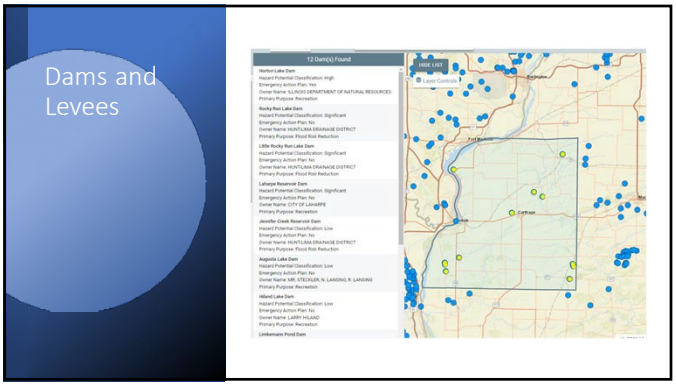
- ***Objective 5.a.*** Create policies that ensure the protection of critical facilities like clinics, police stations, and fire departments.
- ***Objective 5.b.*** Ensure that different emergency agencies coordinate with one another.

Community Profiles and Weather Data

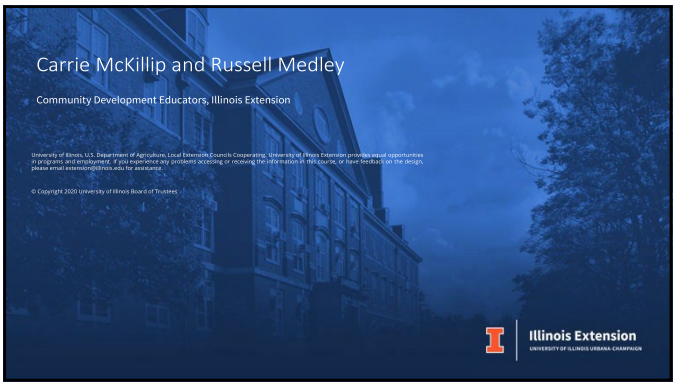
WILL BE UPDATED WITH

INCLUDE WEATHER EVENTS


Disaster Planning Integration Toolkit
Literature Review
Assessment Tool
Disaster Planning Integration Database
Disaster Mitigation + Economic Development + Nature Based Solutions
What do we already know?
Planning for a Purpose,
Community Capitals Framework
What is left to know?
What can we do?
How - Process ?
How - Funds?
Planning Strategies
Planning Models
Funding Mechanisms
Interactive Maps
PDF Reports
On-Ground Survey Templates
Utilities
Institutional, Political Community
Is there a precedent?
Case Studies
Understanding where disaster mitigation plan fits within the local and regional planning context
Stakeholder Engagement and Public Participation
Workshops and Dissemination


Dams and Levees


Next Meeting
• Risk Assessment
• Vulnerable Populations
• Repetitive Loss Strategy
• Plan Grid Collection


Carrie McKillip and Russell Medley
Community Development Educators, Illinois Extension
Illinois Extension

1

6/23/2023

Meeting 2 PowerPoint

Hancock County
Natural Hazard
Mitigation Planning
2023

Meeting 2- September 27, 2022

Illinois Extension

Committee Meetings

Meeting 1- August 23, 2022

Meeting 2- September 27, 2022

Meeting 3- November 1, 2022

Meeting 4- TBD

Participation-
Each Jurisdiction is required to participate in at least 2 of the scheduled meetings to be included int the plan.

RISK ASSESSMENT

Brad McVay, GISP, CFM
Illinois State Water Survey
Prairie Research Institute

Overview

- Hazus Overview
- Flood Risk Analysis
- Earthquake Analysis
- Tornado Analysis
- Essential Facilities

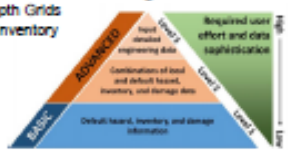
Hazus Overview

- Hazus is a GIS-based natural hazard risk analysis tool developed by FEMA
  - Analyzes risk for 4 different natural hazards
    - Flood, Earthquake, Hurricane, and Tsunami
  - Estimates Loses
    - Economic and Social

HAZUS

Three levels of Hazus Analysis

- Three Levels
  - Level 2.5 for Flood
- 2 data sets that we are adding to Hazus
  - Flood Depth Grids
  - Building Inventory



Updated Analysis

- Flood
  - Level 2.5 analysis
  - Updated Flood Depth Grids
    - Incorporated 2017 LiDAR
    - Mississippi River Flow Frequency Study
    - Hazus
  - Structure Specific Analysis
    - Updated building inventory

Annual Chance Flood

- Emphasis on Annual Chance Flood
  - "Year" flood can be misleading
- The 1% Annual Chance Flood = 100 year flood.
  - This flood will not necessarily only happen once every 100 years.
  - There is a 1% chance of this flood occurring any given year.
- Ottawa: 1996, 2008, 2013, possibly 2018

Flood Depth Grids

- GIS raster grid representing the extent of a given flood event
  - Cells represent depth
- 5 Annual Chance Flood Events
  - 10% (10 year)
  - 4% (25 year)
  - 2% (50 year)
  - 1% (100 year)
  - 0.2% (500 year)

Flood Depth Grids

- Based on 2017 LiDAR
- Mississippi River
  - Developed by the Rock Island office of the US Army Corps of Engineers
- Remainder of the County
  - Generated in Hazus
    - No Detailed Studies

Uncertainty of Models

- Studies have been completed in Northeastern Illinois
  - Frequency and severity of extreme rainfall is changing and is expected to continue to change throughout the coming century.
  - Today's climate models underestimate the historical and projected trends in heavy rainfall, resulting in underestimation of projected extremes
  - The potential for more intense and more frequent extreme precipitation should be considered given the long life-cycles of land use planning and infrastructure decisions.
- The 1% ACF today might not be so in the future

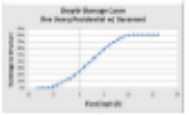
Building Inventory

- User Defined Facility Analysis
  - In Hazus
- Identify structures within the 0.2% (500yr) floodplain.
  - This will exclude most outbuildings
    - Detached Garage, Shed, etc...
- Using a combination of Assessors Data, Parcel data, and building footprints.

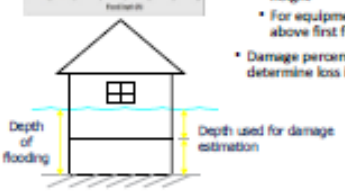
Building Inventory

- Structure Value
  - Building Replacement Cost
    - RSMeans Construction
  - Content Cost
    - Estimate of the cost of the contents of the structure. Created by multiplying the building cost by a CCF based on occupancy
- Occupancy Class
- Square Footage
- Year Built
- Number of Stories
- Foundation Type
- Estimated First Floor Height

Depth-Damage Curves

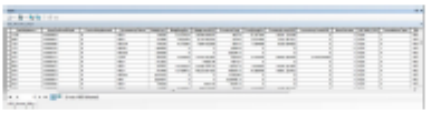


- Percentage of damage is calculated for each structure based on the depth of flooding.
  - Based on Occupancy
  - For buildings, first floor height
  - For equipment, height above first floor
- Damage percentage is used to determine loss in USD



Analysis Output

- Building Loss
- Content Loss
- Business Inventory Loss
- Percent Damaged for Structures
- Losses are for each flood event



Average Annualized Loss

- Estimated long-term value of losses averaged on an annual basis
- Useful for estimating potential flood losses over a defined period of time
- Better to look at these results over a longer period of time.
  - These are not losses that you would expect any given year, but an average of the damages over a period of years
  - Look at it over 30 years as opposed to 1.
    - Add up the values over 30 years, not just 1.

Hazus Flood 1% (100yr) Results

	1% Annual Chance	
Community Name	Count	Total Losses
Dallas City	10	$520,100
Elvaston	0	$224,000
Hamilton	10	$13,700
La Harpe	1	$0
Niavano	1	$156,800
Pontoosuc	84	$3,795,000
Warsaw	8	$1,462,800
Hancock County Unincorporated Areas	158	$20,366,100
Total	369	$26,388,000

Hazus Flood 0.2% (500yr) Results

	0.2% Annual Chance	
Community Name	Count	Total Losses
Dallas City	23	$2,100,500
Elvaston	0	$488,800
Hamilton	13	$562,200
La Harpe	1	$0
Niavano	1	$125,800
Pontoosuc	75	$6,331,700
Warsaw	12	$4,381,000
Hancock County Unincorporated Areas	256	$59,969,400
Total	381	$73,978,200

Hazus Earthquake

- Level 1 Analysis
- Intensity measured using the Moment Magnitude (M) scale
- MM 5 with an epicenter at the approximate center of Hancock County

Hazus Earthquake

- Building Damage Estimates
  - 1,431 at least moderately damaged
  - 69 buildings damaged beyond repair
- Estimated Economic Loss
  - $366.77 million
  - Building losses
  - Business interruption losses

Photo from Illinois State Geological Survey

Tornado Analysis

- Simulated F3 Tornado Event
- 2.9 Mile track NE through City of Carthage
- 4 Damage Zones
  - Each Zone represents a different Fujita scale rating
  - Damages are to the building value of the structures

Zone	Range (feet)	Damage Percentage
1 (F3)	0-530	60%
2 (F2)	531-660	50%
3 (F1)	661-1320	10%
4 (F0)	1321-3640	0%

- Uses similar methodology for the building inventory as the one generated for the Flood Analysis

Tornado Results (Preliminary)

- Structures Impacted
  - Zone 1
    - Structures: 72
    - Damages: $6,897,600
  - Zone 2
    - Structures: 81
    - Damages: $7,576,100
  - Zone 3
    - Structures: 175
    - Damages: $2,422,200
  - Zone 4
    - Structures: 606
    - Damages: $0
  - Total Damages: $16,895,900

Essential (Critical) Facilities

- Police
- Fire
- Medical Care
- Schools
- EOCs
- Ambulance Service
- Potable Water Facilities
  - WTP, Wells, Water Towers
- Waste Water Facilities
- Vulnerable Populations
- Places of Large Assembly
- Other

Essential (Critical) Facilities

- Spreadsheet that contains the Name and Address of the essential facilities by type
- Please update and add in missing addresses.

POPULATION

Overview of Historical Trends

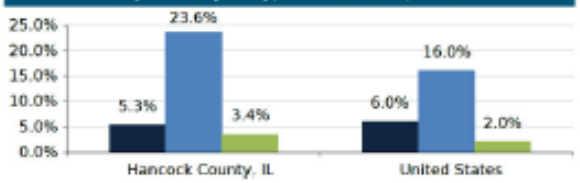
According to the U.S. Census Bureau, Hancock County, IL is designated as a Micropolitan Statistical Area.

	1970	2000	2020	Change 2000-2020
Population	23,547	20,240	17,423	-2,725
Employment (full & part time jobs)	8,388	10,352	8,619	-1,733
Personal income (thousands of 2020 $s)	$511,676	$773,226	$917,368	144,142

Population and personal income are reported by place of residence, and employment by place of work on this page.

Vulnerable Populations

Hancock County vs. United States

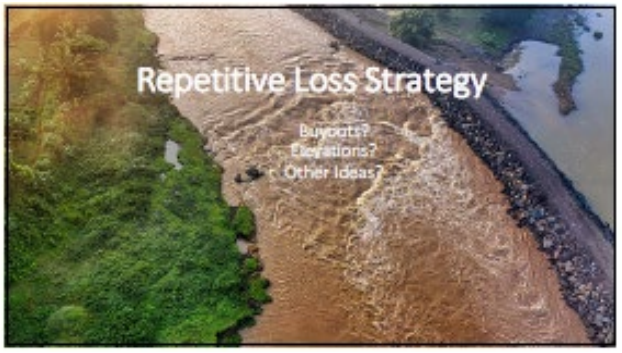


Individuals in Poverty

	Hancock County, IL	United States
Total population for whom poverty status is determined, 2020*	17,605	318,564,128
People in poverty	2,296	40,910,126
People in "deep-poverty"**	853	18,466,877
Both in poverty and over 65	208	4,756,167
Percent of Total, 2020*		
People in poverty	13.0%	12.8%
People in "deep-poverty"**	4.8%	5.8%
Both in poverty and over 65	1.2%	1.5%
Change in Percentage Points, 2010*-2020*		
People in poverty	0.4	-1.9
People in "deep-poverty"**	-1.6	-0.2
Both in poverty and over 65	0.2	0.3

For example, if the value is 3% in 2010* and 4.5% in 2020*, the reported change in percentage points is 1.5.

** Deep-poverty is defined by the Census as earning less than half of the Federal poverty level.



Community Profiles and Weather Data

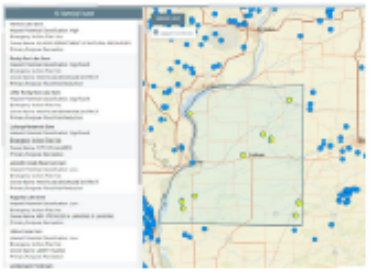
WILL BE UPDATED WITH 2020 CENSUS DATA

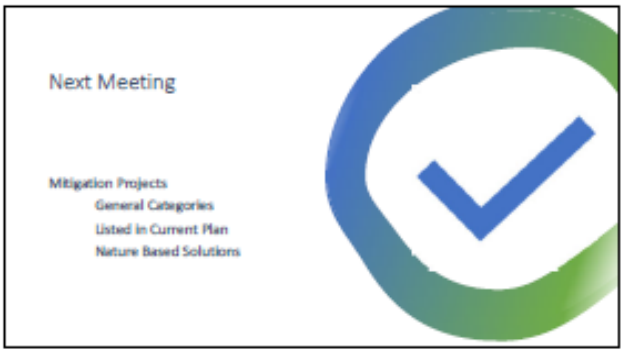
INCLUDE WEATHER EVENTS SINCE 2018 PLANNING

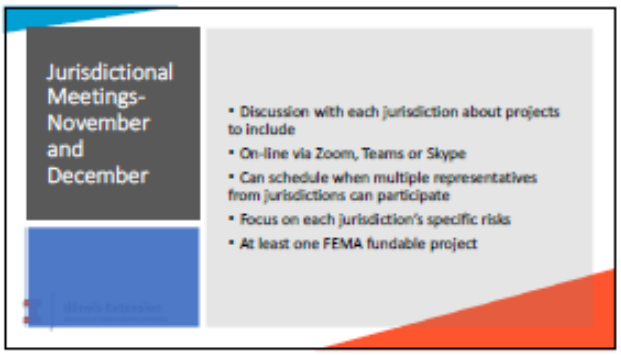
Dams and Levees –

Collection of Existing Plans

County Response Integration

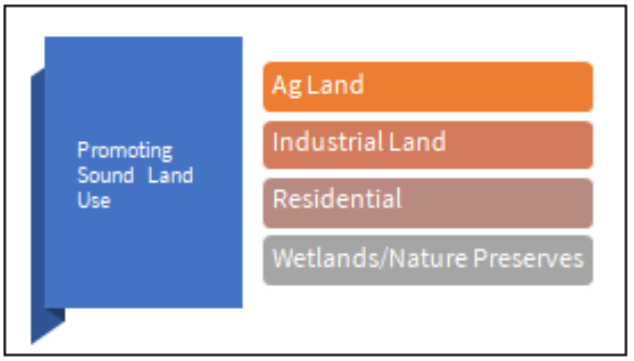


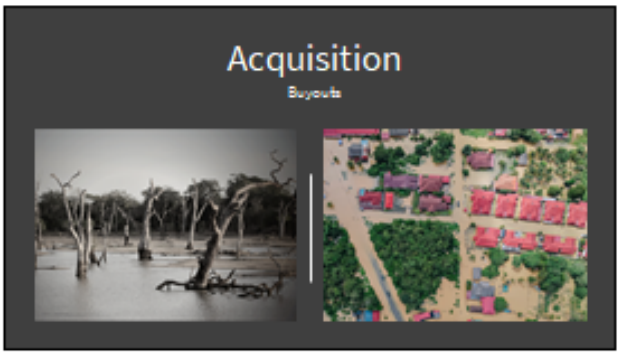




Meeting 4 – Public Meeting PowerPoint

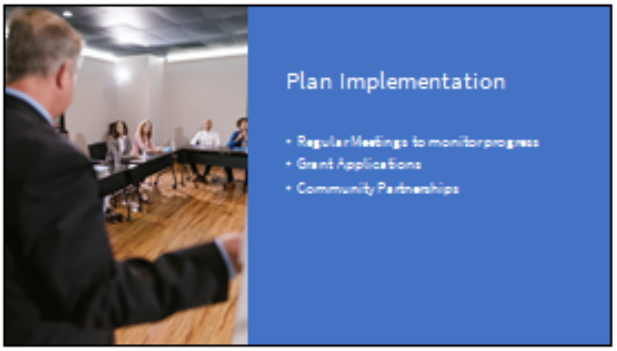
Meeting 3 PowerPoint

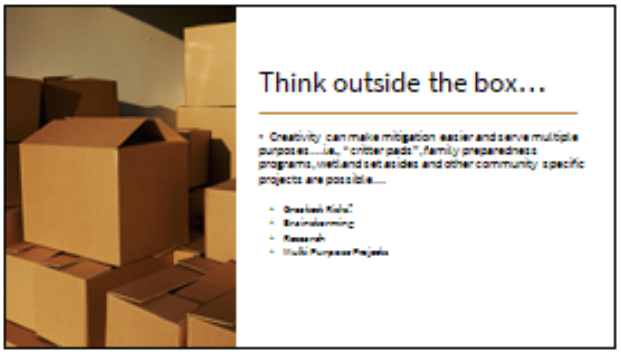


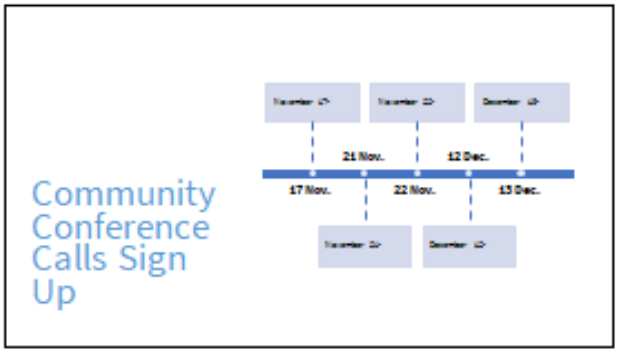

Acquisition
Buyouts

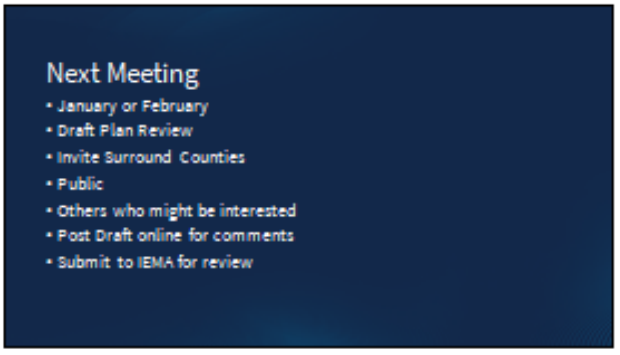

Informing the Public

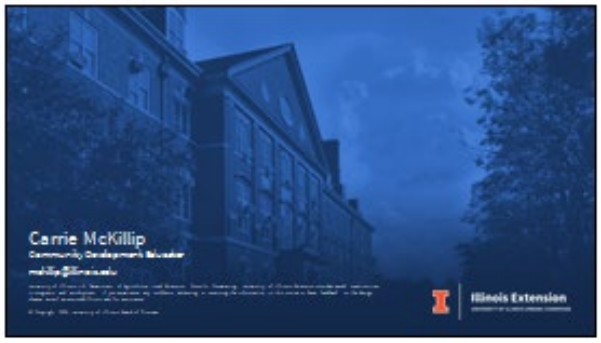

Storm Water Infrastructure
Detention/Retention Ponds
Filtration Strips
Rain Gardens


Plan Implementation
• Regular Meetings to monitor progress
• Grant Applications
• Community Partnerships


Think outside the box…
• Creativity can make mitigation easier and serve multiple purposes…..ie., "critter pads", family preparedness programs, wetland set asides and other community specific projects are possible….


Community Conference Calls Sign Up
21 Nov.
12 Dec.
17 Nov.
22 Nov.
13 Dec.


Next Meeting
• January or February
• Draft Plan Review
• Invite Surround Counties
• Public
• Others who might be interested
• Post Draft online for comments
• Submit to IEMA for review



Meeting 4- Public Meeting Power Point

APPENDIX D : Press Releases

Meeting 1 Press Release

FOR Immediate Release:

Hancock County to begin the Natural Hazard Mitigation Plan Update

Carthage, Il. Hancock County is in the process of updating the Multi-Jurisdictional Natural Hazard Mitigation Plan. According to Jack Curfman, Hancock County ESDA Coordinator, the current plan, adopted in 2018, will be expiring in 2023. "The Federal Emergency Management Agency (FEMA) requires that each jurisdiction has an approved Natural Hazards Mitigation Plan to be eligible for several funding streams, ". Curfman went on to say, "By beginning the process now, we will not have any lapse in coverage." The county has received a grant from FEMA, through the Illinois Emergency Management Agency (IEMA) to hire University of Illinois Extension to work with the planning Committee to update the plan.

The first of four planning meetings is scheduled for **August 23, 2022, at 4pm**. The meeting will be held at the Hancock County Emergency Management Office **at 1006 Wabash Ave., Carthage, Illinois**. According to University of Illinois Educator Carrie McKillip, there will be four planning meetings as well as opportunities for the public to provide input to the plan. "As part of the planning process, the committee will work to provide several opportunities for public input into the plan. Public meetings and online opportunities will allow residents of all jurisdictions in the county to weigh in on the best way to reduce the impact of natural disasters on the county."

McKillip also indicated that each incorporated jurisdiction in the county will have the opportunity to participate in the process and submit projects for the plan. Additionally, McKillip mentioned that other public and nonprofit organizations are also encouraged to participate. She explained that schools, hospitals, health departments and social service agencies can all submit mitigation projects to reduce the impact of disasters. It is also important to keep in mind that many mitigation activities do not cost anything! By having a family or office emergency plan you can reduce the risk to your family and co-workers. McKillip also indicated that Illinois Extension has many educational programs that can assist the community, organizations, and families in becoming more disaster resilient.

For more information regarding the Hancock County Hazard Mitigation Planning Process, contact Jack Curfman at esda@hancockcounty-il.gov or Carrie McKillip at mckillip@illinois.edu. For information regarding Illinois Extension Programs, contact the Hancock County Extension Office at (217)357-2150 or uie-abhps@illinois.edu .

Meeting 2 Press Release

FOR Immediate Release:

Hancock County Natural Hazard Mitigation Plan Committee to look at Community Risks

Carthage, Il. Hancock County is in the process of updating the Multi-Jurisdictional Natural Hazard Mitigation Plan. According to Jack Curfman, Hancock County ESDA Coordinator, the current plan, adopted in 2018, will be expiring in 2023. "The Federal Emergency Management Agency (FEMA) requires that each jurisdiction has an approved Natural Hazards Mitigation Plan to be eligible for several funding streams, ". Curfman went on to say, "By beginning the process now, we will not have any lapse in coverage." The county has received a grant from FEMA, through the Illinois Emergency Management Agency (IEMA) to hire University of Illinois Extension and Illinois State Water Survey to work with the planning Committee to update the plan.

The 2nd of four planning meetings is scheduled for **September 27, 2022, at 4:30 pm**. The meeting will be held at the Hancock County Emergency Management Office **at 1006 Wabash Ave., Carthage, Illinois**. According to University of Illinois Educator Carrie McKillip. This meeting will focus on assessing the risks in each community. "As part of the planning process, each participating Jurisdiction will have the opportunity to look at the risks they feel they are most likely to experience and rate the risk from that hazard." McKillip also mentioned that the Illinois State Water Survey will also be present to discuss flood risks and vulnerabilities within each jurisdiction.

McKillip also indicated that each incorporated jurisdiction in the county will have the opportunity to participate in the process and submit projects for the plan. McKillip also encouraged other public and nonprofit organizations are also encouraged to participate. She explained that schools, hospitals, health departments and social service agencies can all submit mitigation projects to reduce the impact of disasters. It is also important to keep in mind that many mitigation activities do not cost anything! By having a family or office emergency plan you can reduce the risk to your family and co-workers. McKillip also indicated that Illinois Extension has many educational programs that can assist the community, organizations, and families in becoming more disaster resilient.

For more information regarding the Hancock County Hazard Mitigation Planning Process, contact Jack Curfman at esda@hancockcounty-il.gov or Carrie McKillip at mckillip@illinois.edu. For information regarding Illinois Extension Programs, contact the Hancock County Extension Office at (217)357-2150 or uie-abhps@illinois.edu .

Meeting 3 Press Release

FOR Immediate Release:

Mitigation Planning Continues in Hancock County

Carthage, Il. On November 1, 2022 at 4:30 PM, **at 1006 Wabash Ave., Carthage, Illinois** the Hancock County Emergency Services Coordinator, Jack Curfman, will host the third meeting of the Hancock County Multijurisdictional Natural Hazard Mitigation Plan Update Committee. This project, facilitated by University of Illinois Extension, will allow participating jurisdictions to access mitigation funding streams from FEMA. According to Carrie McKillip, Illinois Extension Community Development Educator, this access will be increasingly important. "As more and more catastrophic weather events happen across the country, it is even more import for jurisdictions to look at ways they can reduce their risk as well as build resiliency," McKillip noted.

The planning process, funded by FEMA through the Illinois Emergency Management Agency (IEMA), requires that plans be updated every five years. Each jurisdiction is encouraged to think strategically about what they can do to reduce the risks to life and property from natural hazards. Additionally, McKillip mentioned that other public and nonprofit organizations are also encouraged to participate. She explained that schools, hospitals, health departments and social service agencies can all submit mitigation projects to reduce the impact of disasters by talking with their local jurisdiction representative.

Of special interest in this plan update is the new focus FEMA is placing on nature-based mitigation solutions as well as the impact of climate change on natural disasters and communities impacted. Types of nature-based solutions include rain gardens, such as the demonstration rain garden that was recently completed in Nauvoo as part of a Rainscaping Training by Illinois Extension, and funded by the Extension Disaster Education Network (EDEN). Other possible projects include permeable pavers, bioswales and other natural solutions. Of course traditional mitigation projects are also considered, and many of the mitigation projects considered are low and no cost education, coordination and preparedness projects.

For more information regarding the Hancock County Hazard Mitigation Planning Process, contact Jack Curfman at esda@hancockcounty-il.gov or Carrie McKillip at mckillip@illinois.edu. For information regarding Illinois Extension Programs, contact the Hancock County Extension Office at (217)357-2150 or uie-abhps@illinois.edu .

Meeting 4 and Public Meeting

APPENDIX E : Essential Facilities

Police Facilities

Name of Facility	Location
Augusta Police Department	Augusta
Carthage Police Department	Carthage
Hancock Sheriff's Office	Carthage
Dallas City Police Department	Dallas City
Hamilton Police Department	Hamilton
La Harpe Police Department	La Harpe
Nauvoo Police Department	Nauvoo
Plymouth Police Department	Plymouth
Warsaw Police Department	Warsaw

Fire Facilities

Name of Facility	Location
Augusta Fire Protection District	Augusta
Bowen Fire Department	Bowen
Carthage Clipper Fire Department	Carthage
Dallas City Rural Fire Protect. Dist.	Colusa
Dallas City Rural Fire Protect. Dist.	Dallas City
La Harpe Fire Protection District	Fountain Green
Hamilton Fire Department	Hamilton
La Harpe Fire Protection District	La Harpe
Nauvoo Fire Protection District	Nauvoo
Dallas City Rural Fire Protect. Dist.	Niota
Tri-County Fire Protection District	Plymouth
Warsaw Fire Department	Warsaw
West Point Fire Protection District	West Point

Medical Facilities

Name of Facility	Location
Bowen Family Practice	Bowen
Hancock County Health Department	Carthage
Memorial Hospital	Carthage
Memorial Support Services	Carthage
Western Illinois Women's Health	Dallas City
Family Rural Health Clinic	La Harpe
La Harpe Davier Health Care Center	La Harpe
Warsaw Medical Clinic	Warsaw

School Facilities

Name of Facility	Location
Southeastern Junior/Senior High School	Augusta
Southeastern Elementary School	Bowen
Carthage Primary School	Carthage
Carthage Middle School	Carthage
Chaddock School	Carthage
Carl Sandburg College	Carthage
Illini West High School	Carthage
Royal Academy	Carthage
Willow Grove Childcare Center	Carthage
Dallas City Elementary School	Dallas City
Hamilton Elementary School	Hamilton
Hamilton Junior High School	Hamilton
Hamilton High School	Hamilton
West Hancock Junior High School	Hancock County
La Harpe Elementary School	La Harpe
La Harpe Junior High School	La Harpe
La Harpe High School	La Harpe
Nauvoo Elementary School	Nauvoo
Nauvoo-Colusa Junior High School	Nauvoo
Saints Peter & Paul School	Nauvoo
Warsaw Elementary School	Warsaw
West Hancock High School	Warsaw

Emergency Operations Center

Name of Facility	Location
Emergency Service and Disaster Agency	Carthage

Ambulance Services

Name of Facility	Location
Hancock County Ambulance Service	Carthage
La Harpe Ambulance Service	La Harpe
Warsaw Community Ambulance Svc	Warsaw
Ambulance First Responder	West Point

Vulnerable Populations

Name of Facility	Location
Hancock County Shelter Care Home	Augusta
Montebello Healthcare Center	Hamilton

Places of Large Assembly

Name of Facility	Location
Augusta Senior Citizens Club	Augusta
Hancock County Fair Grounds	Augusta
Community Center	Basco
Community Center	Carthage
Legacy Theater	Carthage
Hamilton Community Center	Hamilton
Wildcat Springs Campground	Hamilton
La Harpe Community Club House	La Harpe
Nauvoo Illinois Temple	Nauvoo
Plymouth Community Center	Plymouth
Bolt Community Center	Warsaw

Potable Water Facilities

Name of Facility	Location
Community Well	Bowen
Carthage Water Facility and Water Tower	Carthage
Carthage Well No. 3	Carthage
Water Pumping Station	Elvaston
Hamilton WTP	Hamilton
Plymouth Well No. 1	Hancock County
Plymouth Well No. 2	Hancock County
La Harpe Well No. 1	La Harpe
La Harpe WTP	La Harpe
Nauvoo WTP	Nauvoo
Water Tower	Nauvoo
Community Well	Warsaw
Dallas Rural Water District Well No. 4	Warsaw
Dallas Rural Water District Well No. 5	Warsaw
Dallas Rural Water District Well No. 6	Warsaw
River Intake Pumps	Warsaw
Warsaw Water Plant	Warsaw
Western Illinois University Well No. 2	Warsaw

Waste Water Facilities

Name of Facility	Location
Augusta Sewage Treatment Plant	Augusta
Bowen Sewage Treatment Plant	Bowen
Carthage Sewage Treatment Plant	Carthage

Dallas City Sewage Treatment Plant	Dallas City
Hamilton Sewage Treatment Plant	Hamilton
La Harpe Sewage Treatment Plant	La Harpe
Nauvoo Sewage Treatment Plant	Nauvoo
Warsaw Sewage Treatment Plant	Warsaw

Community Identified Facilities

Name of Facility	**Location**
Augusta Farmers Co-op	Augusta
Chem Gro Inc	Bowen
Ursa Farmers Co-op	Bowen
Dearwester Grain	Carthage
Mental Health Centers of Western IL	Carthage
West Central FS, Inc.	Carthage
Monterosa Mobile Home Park	Hamilton
Rivercross Mobile Home Park	Hamilton
Colusa Grain Elevator	Nauvoo
Joseph Smith Historical Site	Nauvoo
LDS Visitors Center	Nauvoo
Nauvoo State Park Ranger Station	Nauvoo
Temple Visitors Center	Nauvoo
FS Fertilizer	West Point

APPENDIX F : HAZUS Occupancy Classes

Replacement cost values were determined using R.S. Means (2018) construction cost estimates taken from the Hazus 5.1 database. This value serves as the building cost, or value, of the structure. Content cost, or the value of the contents of the structure, was estimated by multiplying the building cost value by a content cost factor (CCF) based on its occupancy class. CCF and RS Means values are shown in the tables below. All values were converted to 2021 U.S. dollars using the Consumer Price Index developed by the Bureau of Labor Statistics of the United States Department of Labor.

Hazus Occupancy Class Description				
Occupancy Code	**Occupancy Description**	**Sub-Category**	**SqFt Cost (2018 USD)**	**Content Cost Factor (CCF)[1]**
Residential				
RES1	Single Family Dwelling	Refer to RES1 Cost		0.5
RES2	Manufactured Housing	Manufactured Housing	$48.86	0.5
RES3A	Multi-Family Dwelling – small	Duplex	$124.25	0.5
RES3B	Multi Family Dwelling – small	Triplex/Quads	$109.66	0.5
RES3C	Multi-Family Dwelling – medium	5-9 units	$201.33	0.5
RES3D	Multi Family Dwelling – medium	10-19 units	$187.75	0.5
RES3E	Multi-Family Dwelling – large	20-49 units	$188.48	0.5
RES3F	Multi Family Dwelling – large	50+ units	$174.53	0.5
RES4	Temp. Lodging	Hotel, medium	$182.28	0.5
RES5	Institutional Dormitory	Dorm, medium	$199.63	0.5
RES6	Nursing Home	Nursing home	$215.91	0.5
Commercial				
COM1	Retail Trade	Dept Store, 1 st	$114.47	1
COM2	Wholesale Trade	Warehouse, medium	$120	1
COM3	Personal and Repair Services	Garage, Repair	$139.88	1
COM4	Professional/ Technical/Business Service	Office, Medium	$176.29	1
COM5	Banks	Bank	$261.33	1
COM6	Hospital	Hospital, Medium	$302.35	1.5
COM7	Medical Office/Clinic	Med. Office, medium	$226.54	1.5
COM8	Entertainment & Recreation	Restaurant	$227.53	1
COM9	Theaters	Movie Theatre	$190.95	1

COM10	Parking	Parking garage	$80.59	0.5
Industrial				
IND1	Heavy	Factory, small	$133.03	1.5
IND2	Light	Warehouse, medium	$120	1.5
IND3	Food/Drugs/Chemicals	College Laboratory	$180.47	1.5
IND4	Metals/Minerals Processing	College Laboratory	$180.47	1.5
IND5	High Technology	College Laboratory	$180.47	1.5
IND6	Construction	Warehouse, medium	$120	1
Religious				
REL1	Church	Church	$190.53	1
Agriculture				
AGR1	Agriculture	Warehouse, medium	$120	1
Government				
GOV1	General Services	Town Hall, small	$149.83	1
GOV2	Emergency Response	Police Station	$254.23	1.5
Education				
EDU1	Schools/Libraries	High School	$201.63	1
EDU2	Colleges/Universities	College Classroom	$171.05	1.5

[1]Content Cost Factor is a multiplier applied to Building Cost to estimate the Content Cost of a structure

Single Family Residential RS Means Square Foot Cost				
Description	**Height Class**	**Average Base Cost (2018 USD)**	**Finished Basement Cost (2018 USD)**	**Unfinished Basement Cost (2018 USD)**
Economy	1 story	$97.61	$26.45	$9.55
Economy	2 story	$104.04	$15.20	$6.30
Economy	3 story	$104.04	$15.20	$6.30
Economy	Split level	$96.69	$15.20	$6.30
Average	1 story	$116.66	$32.80	$11.25
Average	2 story	$122.75	$21.05	$7.40
Average	3 story	$127.94	$16.65	$5.80
Average	Split level	$113.66	$21.05	$7.40
Custom	1 story	$159.51	$53.65	$21.65
Custom	2 story	$163.95	$30.90	$12.90
Custom	3 story	$168.69	$22.55	$9.60
Custom	Split level	$153.15	$30.90	$12.90
Luxury	1 story	$188.84	$59.00	$22.65
Luxury	2 story	$194.94	$34.55	$13.85
Luxury	3 story	$201.09	$25.50	$10.40

Luxury	Split level	$181.61	$34.55	$13.85

[i] Drought Basics. (n.d.). Drought.Gov. Retrieved April 16, 2023 from https://www.drought.gov/what-is-drought/drought-basics.
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