Winnebago County Multi-Jurisdictional Hazard Mitigation Plan

WINNEBAGO COUNTY MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN

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INTRODUCTION AND BACKGROUND

The Winnebago County Multi-Jurisdictional hazard mitigation plan which includes the cities of Buffalo Center, Forest City, Forest City Community Schools, Lake Mills, Lake Mills Community Schools, Leland, North Iowa Community Schools, Rake, Scarville, and Thompson plus the unincorporated areas of Winnebago County was prepared by Emergency Manager Andy Buffington along with the elected officials of the various municipalities of Winnebago County and the public.

Citizens and public organizations have participated in the process. This effort will be sustainable over the long term because it enjoys grassroots support that stems from a sense of local and individual ownership. Through HLSEM's Scope of Work, the Cities and County of Winnebago County participated fully in the preparation of the plan. Once this plan is approved, the Cities and County of Winnebago County will be eligible for future mitigation assistance from FEMA and will be able to more effectively carry out mitigation activities to lessen the adverse impact of future hazards within the county.

Basis for planning authority

The basis for authority to create a natural hazard mitigation plan lies in Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U.S.C 5165. This act was enacted under Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000), P.L. 106-390. Section 104 is the legal basis for FEMA's Interim Final Rule for 44 CFR Parts 201 and 206, published in the Federal Register on February 26, 2002.

Plan Purpose

The purpose of the Winnebago County Multi-Jurisdictional Hazard Mitigation Plan is to substantially and permanently reduce the county's vulnerability to natural hazards. The plan is intended to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property and the natural environment. This can be achieved by increasing public awareness, documenting resources for risk reduction and loss-prevention, and identifying activities to guide the community towards the development of a safer, more sustainable community.

Plan Organization

The Winnebago Multi-Jurisdictional Hazard Mitigation plan is developed and organized within the rules and regulations established under the 44 CFR 201.6. The plan contains a mitigation action listing, a discussion on the purpose and methodology used to develop the plan, a profile on the cities and county of Winnebago, as well as the hazard identification and vulnerability assessment of natural and manmade hazards. In addition, the plan offers a discussion of the community's current capability to implement the goals, objectives and strategies identified herein. To assist in the explanation of the above-identified contents there are several appendices included which provide more detail on specific subjects. This plan is intended to improve the ability of the County and Cities to handle hazards and will document valuable local knowledge on the most efficient and

effective ways to reduce loss.

The plan was developed by Andy Buffington, Winnebago County Emergency Management Coordinator. A complete list of the participating jurisdictions can be found in Appendix IV of this plan. The jurisdictions that fall under this plan are unincorporated Winnebago County, City of Buffalo Center, City of Forest City, City of Lake Mills, City of Leland, City of Rake, City of Scarville, City of Thompson, the Forest City Community School District, the Lake Mills Community School District and the North Iowa Community School District. The following resources were used to compile data and complete this plan include State of Iowa Hazard Mitigation Plan, National Climatic Data Center (NCDC), SHELDUS, US Census data, Winnebago County Assessor's Office, FEMA floodplain maps, zoning ordinances and comprehensive plan, and critical facilities in participating jurisdictions. These resources were used to compile information on community background information, vulnerability analysis, development of mitigation goals, critical facilities, hazard identification and profiles and historical weather events.

The unincorporated areas of the county were represented by the county supervisors since they are elected from those areas to represent the people living in the unincorporated areas of Winnebago County. The Winnebago County EMA also represented the people living in the unincorporated areas of the county. There were two meetings held in each city to assess each city's information. Each community was required to select at least one mitigation action.

Meetings were held on the following dates, times and places:

- 01 May, 2024, 5:00pm Leland City Hall
- 13 May, 2024, 6:30pm Forest City Community Schools District Office
- 10 June, 2024, 6:00pm Buffalo Center City Hall
- 17 June, 2024, 7:00pm Lake Mills City Hall
- 1 July, 2024, 6:00 p.m. Forest City City Hall
- 8 July, 2024, 5:30 p.m. Thompson City Hall
- 08 July, 2024, 7:00 p.m. Rake City Hall
- 15 July, 2024, 6:00pm North Iowa Community Schools – Media Center
- 05 August, 2024, 6:30pm Scarville City Hall
- 12 August, 2024, 5:00pm Lake Mills Community Schools
- 19 August, 2024, 7:00pm Lake Mills City Hall
- 17 September, 2024 10:00am Winnebago County Courthouse
- 02 June, 2025 7:00 p.m. Forest City City Hall
- 09 June, 2025 5:00 p.m. Lake Mills Community Schools
- 16 June 2025 5:00 p.m. Leland City Hall
- 16 June 2025 7:00 p.m. Lake Mills City Hall
- 07 July 2025 6:30 p.m. Scarville City Hall
- 14 July 2025 5:30 p.m. Thompson City Hall
- 15 July 2025 7:00 p.m. Rake City Hall
- 21 July 2025 6:00 p.m. North Iowa Community Schools – Media Center
- 11 August 2025 6:30 p.m. Forest City Community Schools District Office
- 12 August 2025 9:30 a.m. Winnebago County Courthouse.

- 10 November 2025 7:00 p.m. Buffalo Center City Hall

Appendix III contains the meeting agenda and meeting minutes. The discussion during meeting one was Hazard Mitigation Explanation, the planning process, community evaluation, and explanation of the Hazard Analysis Risk Assessment or HARA, identification. Meeting two, which happened in each jurisdiction consisted of a reexamination of the hazard list to determine if a particular hazard that was identified on the county level pertained to each community, each hazard's score was also reevaluated and changed accordingly to each community's situation, prioritization of hazards identified during the first meeting and identification of critical facilities. A discussion on the current mitigation measures, selection of new mitigation measures, and the process in choosing the prioritization of the mitigation measures and the prioritization of the mitigation measures were conducted by a vote of the people present at each meeting. After mitigation measures were decided on, each person had three votes that they used to determine which mitigation measure their respective community should focus on. The top vote getter was the number one mitigation measure and the next vote getter would be the second mitigation measure and so on down the list. The third meeting was held in each participating jurisdiction as a review of the plan and to note any changes or make clarifications to the plan.

Public was involved in the planning process by being invited to the planning meetings with postings at the city halls and/or in local newspapers and social media sites. Meetings were held in each community that participated in the planning process. This garnered a lot more involvement and provided an opportunity for public comment. On June 11, 2025 a notice was posted and the draft plan was made available on the County website and various social media sites indicating a 30-day public comment period after a review meeting for each community. Neighboring jurisdictions also sent the draft mitigation plan for distribution and comment. There were no comments received by the county, or during the Supervisors' meeting when the plan was approved.

COMMUNITY PROFILE

History

Winnebago County, located in the northernmost tier of counties in Iowa and midway east and west. The first settlers of Winnebago County were various Native American tribes. By the middle of the nineteenth century, the US Government had designated the area as a "neutral ground" between warring Indian tribes. To this day it is common to find Indian artifacts throughout the County. Winnebago County was initially part of an immense area known as Fayette County. In 1850 the Iowa Legislature designated 50 new counties, including Winnebago. County governmental affairs were still handled by Polk County, however. Through the early years Winnebago County's governmental affairs passed from Polk County, to Boone County, to Webster County, until 1857. At this time the first election of County officers was held and Winnebago County became responsible for its own governmental affairs.

Winnebago County initially was divided into only two townships, Pleasant Township and Forest Township. The number and size of townships varied for a few years until 1889, when

the existing twelve townships were designated. The first white settler in Winnebago County was George Thomas. He settled in Center Township, just north of Rice Lake. By 1866 a flour mill and saw mill had been built in the area and soon many other mills were added. The City of Lake Mills soon developed in this area. Forest City was the first town to be platted and incorporated in Winnebago County. The City was platted in 1856 and incorporated in 1878. The City of Lake Mills was the next to be officially platted in 1869 and incorporated in 1880. These were followed by Leland, Buffalo Center, Thompson, Scarville, and Rake. There were also smaller towns that existed at one time but have now declined or disappeared entirely, such as, Norman, Mount Valley, Neil Spur, Ratna, Tweten, Delano, and Vinje.

Education has always been an important part of life for Iowans. The first school in Winnebago County was established in Forest City in 1857. By 1866 there were 7 school houses in the County with an enrollment of 170 students. By 1916, just 50 years later, there were 81 rural schools and 11 town schools, with a combined enrollment of 3,530. As of 2011, there are three consolidated school districts serving the students of Winnebago County; Forest City Community School District, Lake Mills Community School District, and North Iowa Community School District. In addition, Waldorf University in Forest City was organized in 1903 and continues to offer two, four and graduate degree programs.

Other important “first” for Winnebago County include the first newspaper to be published. This was the Winnebago Press, now the Forest City Summit, first published I 1867. The first bank was operated out of a general store by Robert Clark and his son until it became the Winnebago County Bank in 1876. Finally, the first church to be organized was the American Methodist Episcopal Church, organized in the Maben Hotel in Forest City in 1858. This was to be the first of many churches that are now in existence. Residents of Winnebago County are proud of its heritage and through the work of the Winnebago Historical Society, continue to preserve the history of their County.

FIGURE 1 – Location of Winnebago County

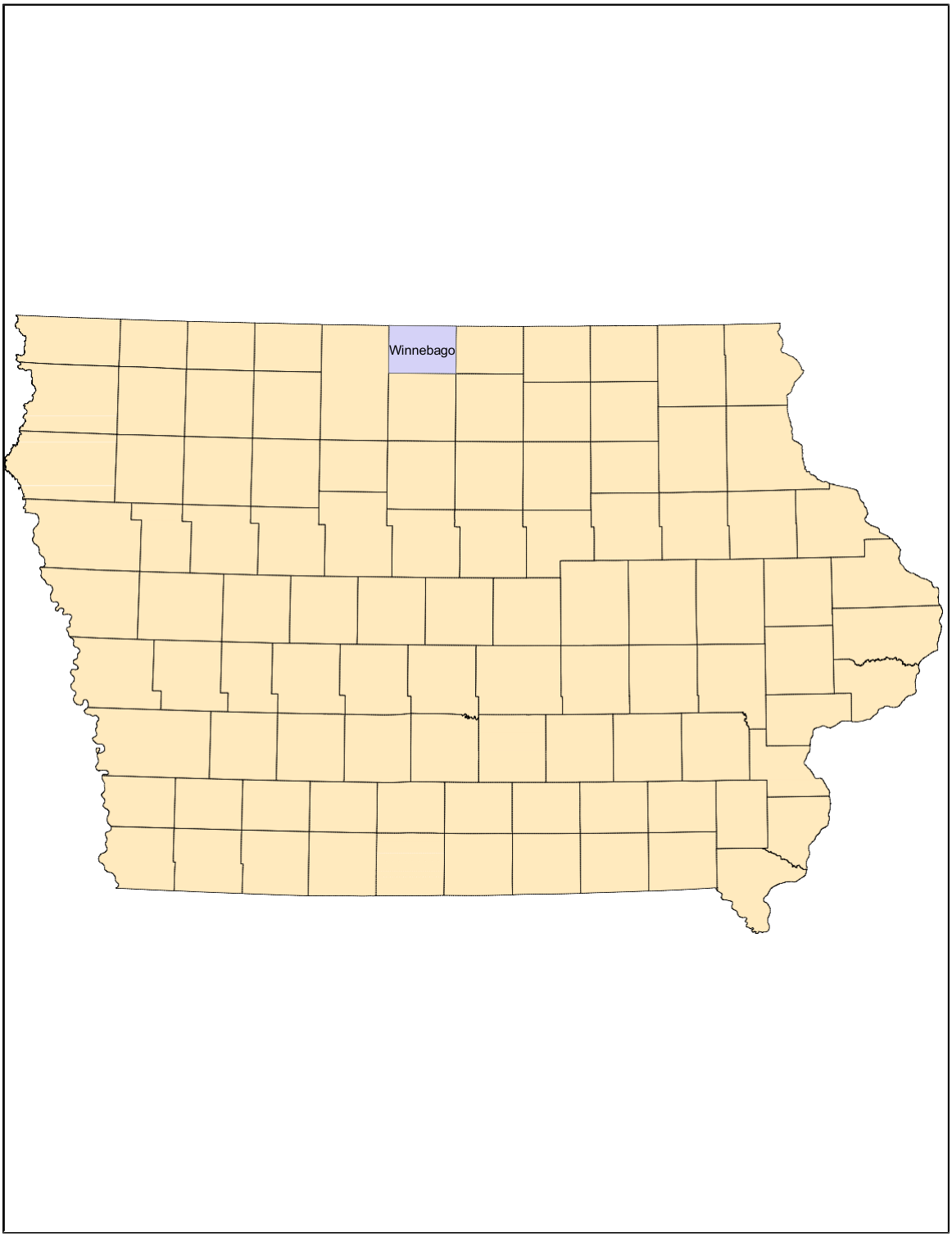


FIGURE 2 – Winnebago County Cities

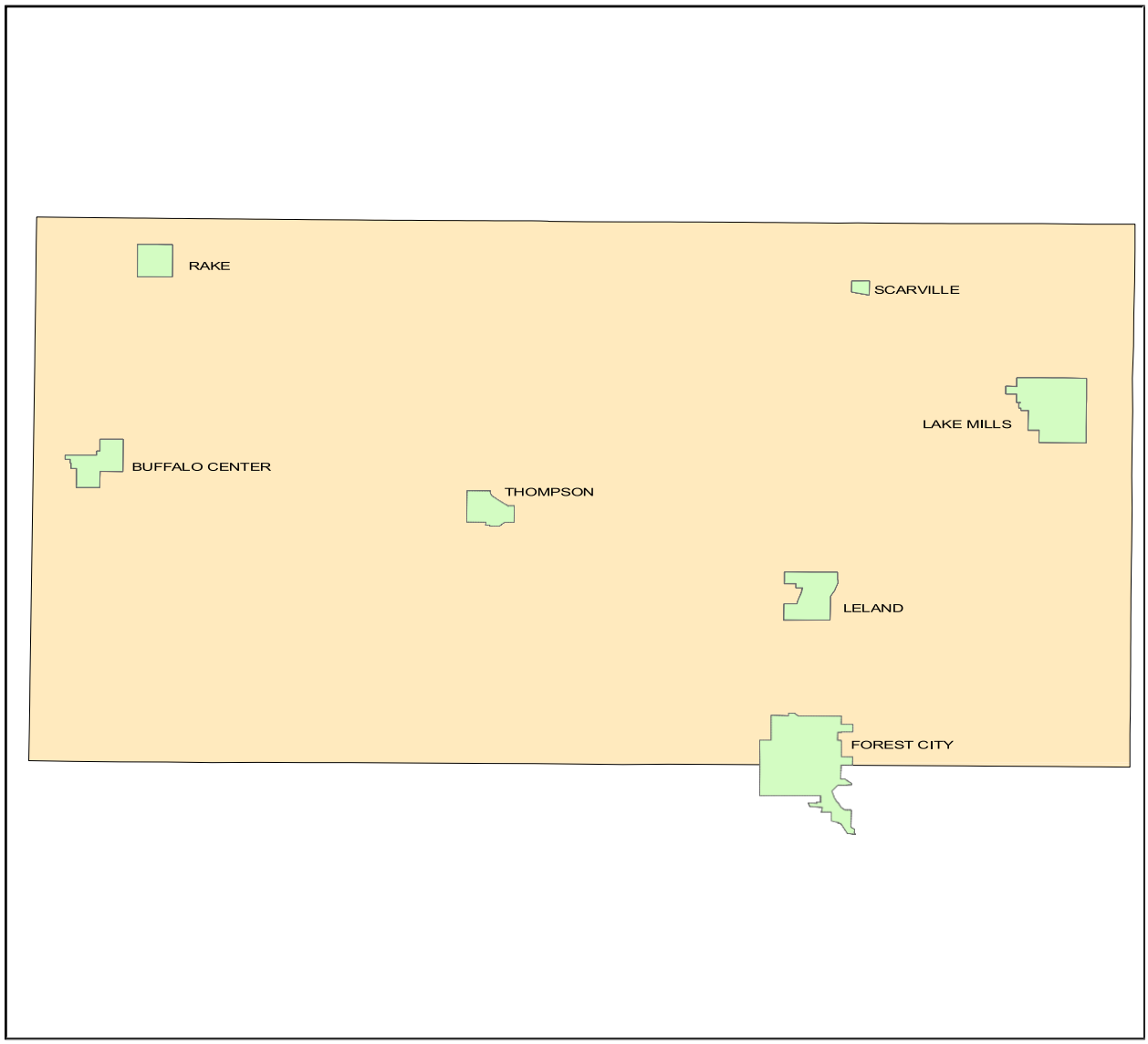
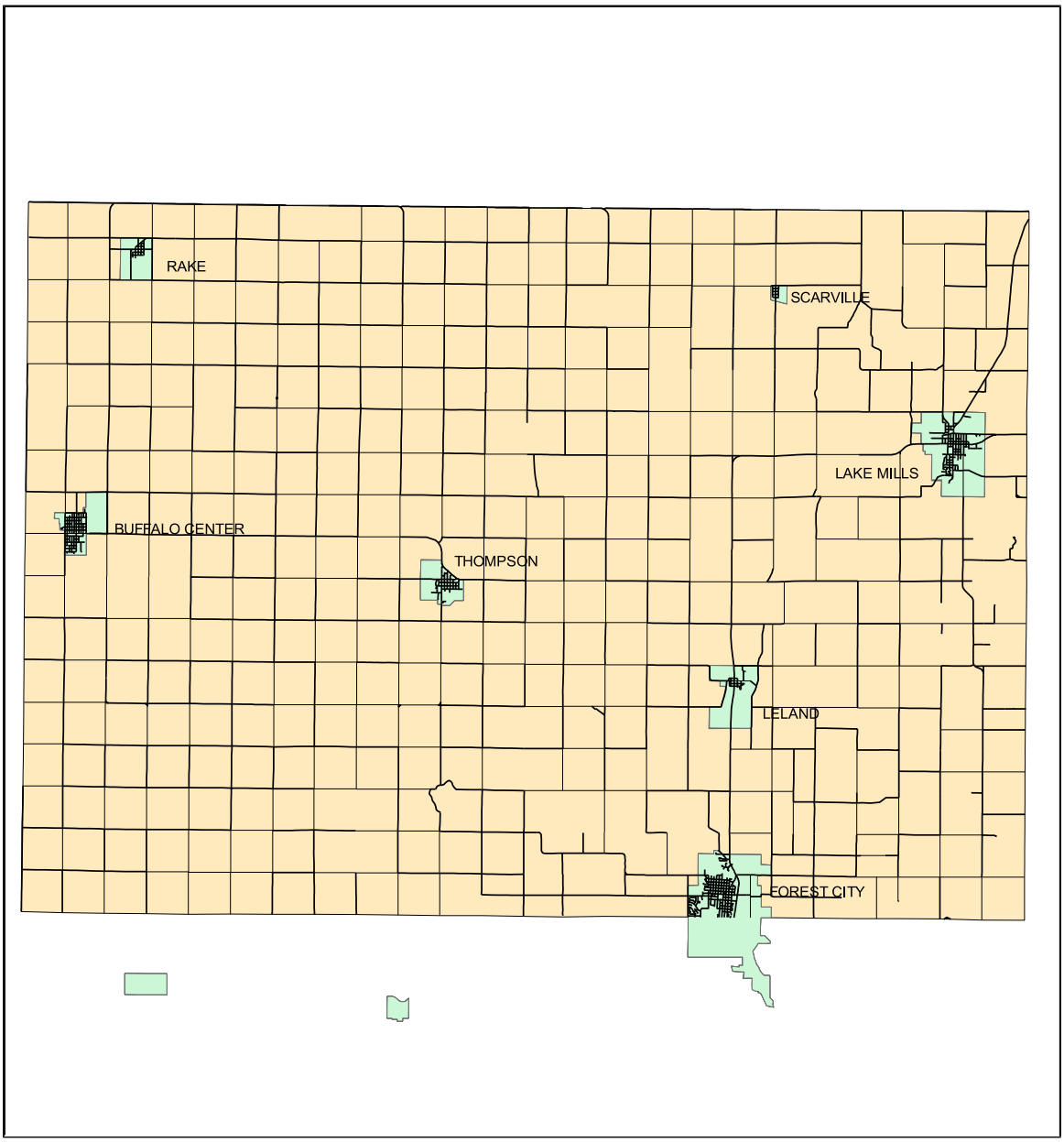


FIGURE 3 – Winnebago County Cities and Roadways



Public Water Supplies

The water that is used by the public water suppliers (PWS) in Winnebago County comes from wells. Treatment of this water also occurs using the following methods:

- Softening
- Iron Removal
- Disinfection
- Stabilization
- Fluoride addition
- Chlorination

PWS in Winnebago County utilize elevated and surface storage for treated water. The cities located in Winnebago County provide wastewater systems that are either treatment plants or open air lagoons that drain into the rivers in the county as allowed through rules and regulations by the Iowa Department of Natural Resources (IDNR).

Storm water systems are varied throughout the county from surface ditches to storm drains.

Climate

The climate in Winnebago County is described as sub-humid and continental with cold winters and hot and humid summers. The average winter temperature is seventeen degrees Fahrenheit, with an average snowfall of thirty-seven inches. The average summer temperature is seventy-four degrees Fahrenheit, with an average annual rainfall of thirty inches.

Soils

The soils that are found within the Winnebago County area are well suited to the production of corn and soybeans. These soils are found in upland areas and are nearly level to moderately sloping. Drainage for these soils is moderate to poor; this should be taken into consideration when developing land areas for recreational, residential and commercial purposes.

Waterways

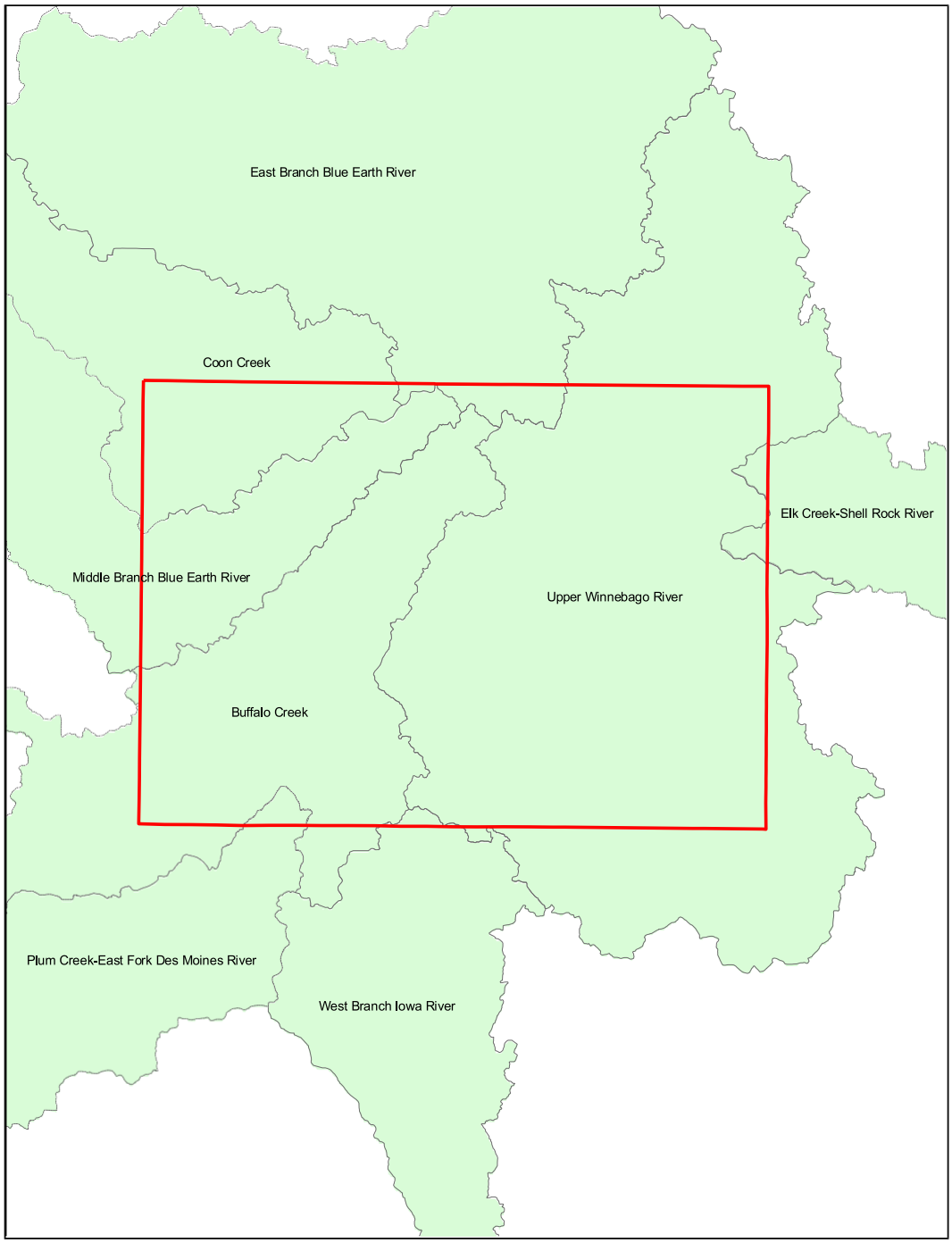
The primary waterway features in Winnebago County are the North Buffalo Creek and Winnebago River. These waterways and resultant floodplain areas are included as a map in Appendix I of this plan.

Water Shed Information

The land area that drains water to a river, lake or ocean is called a watershed. Lakes, rivers and wells often affect the flow, water level and level of pollutants in the watershed. The Environmental Protection Agency's Office of Water, along with state agencies and local groups have been stressing the importance of water quality and improving watershed health. Addressing the whole health of the watershed instead of focusing on point source pollution tends to be more successful at maintaining good health of the watershed. Pollution from a sewage treatment plant might be reduced significantly after a new technology is installed, yet the local river and watershed still suffer from runoff pollution. Watershed management offers a stronger organization that is able to uncover

the many problems that plague a watershed. Watershed management is able to determine what actions and resources are needed to protect and restore the watershed.

FIGURE 4 – <u>Watershed Map of Winnebago County</u>



Land Use

Winnebago County has several highways and county roads the major highways include US Highway 69 which runs north and south through the cities of Forest City, Leland, and Lake Mills. Iowa Highway 9 runs east to west through the cities of Forest City, Thompson, and Buffalo Center. County highways that run north and south include R16, R20, R34, R50, R60, R72, and R74. County highways that run east and west include A16, A30, A38, A42, and A44.

The county does have current zoning ordinances for industrial, commercial, agricultural and residential development. Citizens wishing to have their property rezoned can do so by following procedures set by the county. Once P&Z Board approval is obtained, the rezoning issue must be approved by the Board of Supervisors. Persons wishing to build new structures in the County must obtain a building permit from the Planning and Zoning office. This permit must also be approved by the Zoning Administrator.

There are few constraints to development and growth for Winnebago County. Most of the land in the County is farmland and, if acquired from the owner, can be used for development. Any additional development will proceed according to the zoning ordinance, comprehensive development plan and building permit restrictions and will proceed in an orderly and rational manner.

Future Development

Winnebago County may incorporate the recommendations of this plan before the development of future buildings. Future development will be placed outside any known flood plain. Future development will also be governed by the comprehensive plan and the zoning ordinance and the comprehensive plan will include the recommendations of this plan in order to prevent any development in hazardous areas. Development in SFHA will not occur in the county or in the cities without serious discussion and deliberation.

COMMUNITY DEVELOPMENT INFORMATION

Community Zoning and Regulations

One tool the county uses to manage development and growth is the Winnebago Comprehensive Land Use Plan and the county's zoning ordinance. These two working documents function in conjunction with one another. Winnebago County has developed the Comprehensive Plan to continually adjust it over the years to meet the changing needs of the community and support county ordinances. The zoning ordinance provides the citizens of Winnebago County with a set of rules and regulations that promote a safe and healthy environment through land use controls. This document and accompanying maps also designate and allow different types of development to occur throughout various sections of the community. These designations are based on several factors such as past development, placement of infrastructure, anticipated future needs, barriers to development such as flood plains, rivers, creeks, and other topographical conditions, and areas that are more suitable for development. There are roughly six different types of zoning classifications which most Iowa counties are comprised of, including:

1. Agriculture
2. Agricultural Development
3. Conservation
4. Manufactured Housing
5. Commercial (retail)
6. Light Industrial
7. Heavy Industrial

The zoning ordinance is administered and interpreted by the zoning administrator and planning and zoning board and provides the Board of Supervisors with recommendations related to zoning changes and development issues raised by citizens of the community. The Board of Supervisors must review all recommendations and then make a decision either for or against the recommendation. There is also a zoning board of adjustment that authorizes variances to the strict interpretation of the zoning ordinance, hears appeals of decisions of the zoning administrator, and approves conditional use permits. There have been several amendments to the code by the county representatives since it was developed.

National Flood Insurance Program

Winnebago County has identified special flood hazard areas by the Federal Emergency Management Agency (FEMA). Winnebago County does have a FEMA issued Flood Insurance Rate Maps (FIRM) with an effective date of 6/19/2020. Winnebago County's community ID number issued by FEMA is #190915. Copies of selected FIRMS are located in Appendix I of this plan. Regularly updating the zoning codes, Winnebago County plans to continue to prevent development within the floodplains. The recommendation of the plan is to continue participation in the NFIP

TABLE 1 – NFIP Status of Jurisdictions

Requirement: §201.6(c)(3)(ii): *[The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.*			
Jurisdictions	CID #	Effective Map Date	NFIP Participating
Winnebago County (Unincorporated)	190915	06/19/2020	Yes
Buffalo Center	190559	-	No
Forest City	190283	10/27/2022	Yes
Lake Mills	190604	-	No
Leland	190529	12/15/2022	Yes
Rake	190530	-	No
Scarville	190531	06/19/2020	Yes
Thompson	190666	06/19/2020	Yes

TABLE 2 – Repetitive Loss Properties by Jurisdiction

Requirement §201.6(c)(2)(ii): *[The risk assessment]* ***must*** *also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.*						
Jurisdiction	RL Total	RL Insured	RL Losses Total	RL Losses Insured	RL Payments Total	RL Payments Insured
Buffalo Center	-	-	-	-	-	-
Forest City	-	-	-	-	-	-
Lake Mills	-	-	-	-	-	-
Leland	-	-	-	-	-	-
Rake	-	-	-	-	-	-
Scarville	-	-	-	-	-	-
Thompson	-	-	-	-	-	-
Winnebago County (Unincorporated)	-	-	-	-	-	-

POPULATION AND DEMOGRAPHICS

Population Profile

The population in Winnebago County in 1990 was 12,122; by the 2000 Census the population had declined to 11,723, by the 2010 Census the population again declined to 10,866 and in the 2020 Census the reported population in Winnebago County was 10,679. Rural areas of the state are losing population even though the State of Iowa in general is gaining population. The trend is reflective of a migration from rural agricultural areas to larger urban areas, with smaller communities near large urban areas experiencing growth. Winnebago County has an aging population with a median age of 42.3 years. The following table (4) gives the population of the unincorporated portion of Winnebago County. The table (3) that follows gives the general characteristics of the entire county, incorporated and unincorporated areas.

TABLE 3 – General Characteristics of Winnebago County

	Number	Percent	U.S.
Total Population	10,679	100%	-
Male	5,312	49.5%	49.7%
Female	5,367	50.5%	50.3%
Median Age (years)	42.3	-	38.8
Under 5 years	547	5.1%	-
18 years and over	7,749	94.9%	-
65 years and over	2,383	22.3%	-
One Race	10,259	96.1%	-
White	9,665	90.5%	-
Black	214	2%	-
American Indian and Alaska Native	22	0.2%	-
Asian	98	0.9%	-
Native Hawaiian and Pacific Islanders	3	-	-
Some other race	257	2.4%	-
Two or more races	420	3.9%	-

Source: 2020 U.S. Census Unincorporated and Incorporated data

TABLE 4 – Population of Unincorporated Winnebago County

	Number	Percent
Total Population	2,390	22.4%

Source: 2020 US Census Unincorporated Data

Winnebago County population projections through Woods and Poole Economics data predicts that, based on current trends, the county population of 10,679 will decrease to 10,243 by the 2030 Census.

TABLE 5 - Population Statistics of Winnebago County

Jurisdiction	Population
Winnebago County	10,679
Buffalo Center	857
Forest City	4,285
Lake Mills	2,143
Leland	249
Rake	186
Scarville	74
Thompson	495

Source: US Census 2020

Age Distribution

Age distribution is an important factor to future projects because county officials must know the diversity of the population that they are trying to protect from future hazards. The table below shows the age distribution of Winnebago County in the year 2020.

TABLE 6 - Population Age Distribution

Age Group	# Of Persons	Percent	Age Group	# Of Persons	Percent
Under 5	547	5.1%	45-54 years	1,115	10.5%
5-14 years	1,285	12%	55-64 years	1,567	14.6%
15-24 years	1,478	13.8%	65-74 years	1,308	12.3%
25-34 years	1,115	10.4%	75-84 years	702	6.6%
35-44 years	1,189	11.2%	Over 85 years	373	3.5%

Source: 2020 U.S. Census Unincorporated and Incorporated Data

Winnebago County has a high percentage of its population in the 45 to 64 age group. This percentage is proportional to the percentage of school age children. This can be attributed to the migration of families back to Iowa to raise their children in a family friendly environment. A lower cost of living can also be attributed to this trend

Income Characteristics

Residents sometimes travel outside the county to earn an income. There are many income opportunities within Winnebago County as well. The median income of all households in Winnebago County was $62,853, according to the American Community Survey 2022 estimates. This means one-half of all households earned more than

$62,853 and one-half earned less. Table 7 below summarizes the income distribution for households in the County, Cities and State.

TABLE 7 – Income Distribution

	County	Buffalo Center	Forest City	Lake Mills	Leland	Rake	Scarville	Thompson
Less than $10,000	63	4	33	14	0	0	0	0
$10,000 to $14,999	108	2	45	6	0	3	0	0
$15,000 to $24,999	161	3	112	46	8	7	0	14
$25,000 to $34,999	502	57	137	78	17	7	0	18
$35,000 to $49,999	1,199	70	548	218	25	15	14	41
$50,000 to $74,999	1,037	74	421	196	18	4	1	29
$75,000 to $99,999	426	22	88	81	7	1	6	40
$100,00 or more	315	24	120	29	7	4	0	8
Total	3,811	256	1,504	668	82	41	21	150
Median Income	47,846	47,000	46,853	47,586	45,417	40,375	43,750	51,000

Source: US Census Bureau-American Community Survey(ACS) 5yr estimates-In 2022 inflation adjusted dollars

HOUSING INFORMATION

General Housing Information

Housing is a basic, fundamental and critical infrastructure needs to a community. Housing is vital to the strength, survival and prosperity to the community. The largest investment residents of a community undertake is in their housing and is an important component when establishing a style which the community uses to display to the outside world. Housing ought to be affordable, located in non-hazardous areas, needs to be maintained and support those on fixed incomes, e.g. elderly. Renter and owner occupied housing must be maintained to properly protect the residents within during inclement weather.

The 2020 U.S. Census reported 5,197 total housing units in Winnebago County. The average household size is 2.36 persons within the county; the State of Iowa 2.40 persons per household; and the United States, 3.13 persons per household.

According to the 2020 U.S. Census there were a total of 2,216 family households and 2,296 non-family households. A family household consists of a householder and one or more other persons living in the same household who are related to the householder by birth, marriage or adoption. A non-family household is a single person household or one in which the householder is living with non-relatives only. The following table shows housing occupancy in Winnebago County, according to the 2020 U.S. Census.

TABLE 8 - Housing Occupancy

Subject	Winnebago County	Iowa	United States
Total Units	5,197	1,407,819	138,432,751
Occupied Units	4,533	1,273,941	122,354,219
Vacancy Rate	12.8%	9.5%	11.6%
Owner Occupied	3,525	906,967	78,801,376
Renter Occupied	1,008	366,974	43,552,843

Source: 2020 U.S. Census Unincorporated and Incorporated Data

Value of Housing

The reported, 2018-2022 ACS, median value of owner-occupied housing units in Winnebago County, was $96,200. One-half of the homes in Winnebago were valued above $96,200 and the other one-half were valued under $96,200. The median value for the State of Iowa was $153,900. The increase over the past ten year time period can be attributed to declining interest rates and the large number of low down payment mortgage options that began appearing during the first part of the decade. These financial factors had a positive effect on demand for real estate which resulted in climbing house values.

Community Valuations

Forming a dollar estimate to the potential losses during a disaster the county uses county valuations. The Winnebago County participants recognized that some hazards would cause more damage than others. An average valuation is calculated for each structure identified by the Winnebago County Assessor's Office. Large and small area potential hazard damages can be determined by this method. Tables 9-13 below summarize the valuation of Winnebago County. Religious and Non-Profit Valuation does not have a separate table due to no breakdown by cities and unincorporated areas in the Winnebago County Tax Abstract Assessment.

TABLE 9 – Valuation of Winnebago County, Iowa

	Current Valuation (2024)	Average Valuation
Residential Valuation (Land and Buildings)	$625,575,192	$144,910
Commercial Valuation (Land and Buildings)	$114,590,371	$303,953
Industrial Valuation (Land and Buildings)	$177,233,940	$10,425,526
Agricultural Valuation (land, dwellings and buildings)	$522,178,127	-
Religious and Non-Profit Valuation	$68,771,515	-
Total Valuation	$1,508.349,145	-

Source: Winnebago County Assessor's Office, 2024 Incorporated and Unincorporated Data

TABLE 10 – Residential Valuation (dwellings only)

Jurisdiction	Residential Valuation	Number of Dwellings	Average Valuation
Buffalo Center	$45,253,760	430	$105,241
Forest City	$158,941,111	1,324	$120,046
Lake Mills	$101,148,246	792	$127,712
Leland	$9,617,990	115	$83,635
Rake	$4,593,490	100	$45,935
Scarville	$1,763,950	37	$47,674
Thompson	$14,458,530	256	$56,479
Unincorporated Winnebago County	$125,966,659	707	$178,171

Source: Winnebago County Assessor's Office, 2024

TABLE 11 – Commercial Valuation

Jurisdiction	Commercial Valuation	Number of Commercial Units	Average Valuation
Buffalo Center	$9,620,550	74	$130,007
Forest City	$32,711,266	104	$314,531
Lake Mills	$17,416,791	88	$197,918
Leland	$2,946,010	15	$196,401
Rake	$12,736,230	23	$553,749
Scarville	$6,050,365	4	$1,512,591
Thompson	$4,215,430	30	$140,514
Unincorporated Winnebago County	$28,893,729	39	$740,865

Source: Winnebago County Assessors Office, 2024

TABLE 12 – Industrial Valuation

Jurisdiction	Industrial Valuation	Number of Industrial Units	Average Valuation
Buffalo Center	$3,460	0	$3,460
Forest City	$2,012,940	1	$2,012,940
Lake Mills	$11,632,860	7	$1,661,837
Leland	$380,450	2	$190,225
Rake	$0	0	$0
Scarville	$0	0	$0
Thompson	$795,380	0	$795,380
Unincorporated Winnebago County	$162,398,850	7	$23,199,836

Source: Winnebago County Assessors Office, 2024

TABLE 13 – Agricultural Valuation

Jurisdiction	Agricultural Valuation (land and structures, not	Acres	Dwellings	Agricultural Dwelling Valuation
Buffalo Center	$576,481	303.810	0	$0
Forest City	$458,255	307.420	6	$507,490
Lake Mills	$1, 213,506	899.270	5	$1,088,270
Leland	$789,810	611.620	0	$0
Rake	$620,416	309.960	2	$237,120
Scarville	$165,334	98.260	0	$0
Thompson	$489,641	287.370	3	$291,510
Unincorporated Winnebago County	$432,080,024	228,011.410	540	$83,660,270

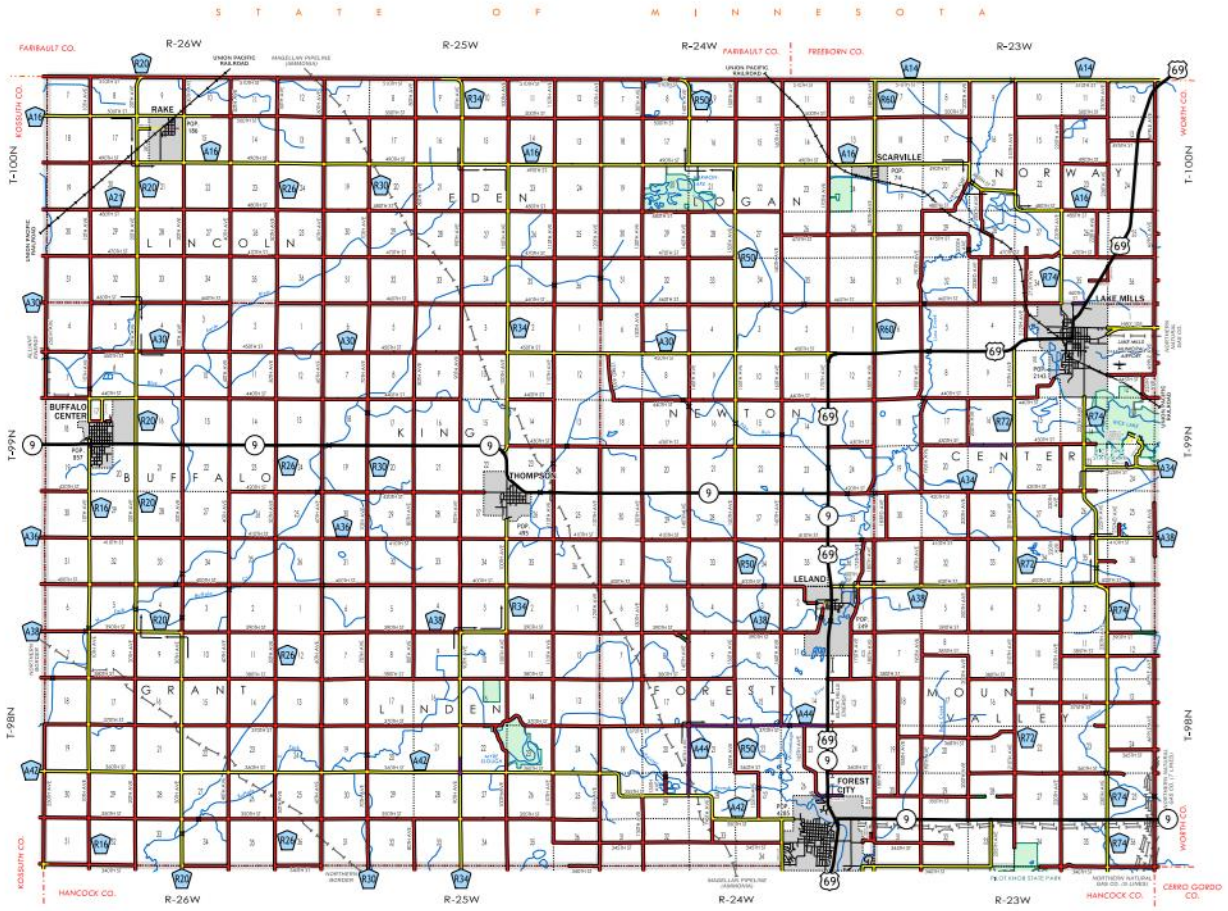
Source: Winnebago County Assessors Office, 2024

TRANSPORTATION SERVICES

Streets and Highways

Winnebago County has several highways and county roads the major highways include US 69 travels north and south through the east central portion of the county and through the cities of Forest City, Leland, and Lake Mills. Iowa Highway 9 travels east to west through the south-central portion of the county and through the cities of Forest City, Thompson and Buffalo Center. The rest of roads in the county are county highways that include the north south routes of R16, R20, R34, R50, R60, and R74. The county highways that travel east to west include A16, A30, A38, A42, and A44.

Figure 5 – Streets and Highways of Winnebago County



Railways

The railways that traverse Winnebago County include the UP (Union Pacific). These railways provide services to haul grain, chemicals, farm equipment and ethanol from the producers of these materials in Winnebago County. The railways go through the towns of Lake Mills and Scarville. The Iowa Northern Railway operates a rail line, owned by North Central Iowa Corridor, LLC, that extends from Belmond into the very southern portion of Winnebago County in Forest City.

Waterways

There are currently no commercial or private services offered along the Winnebago River, which runs thru the county.

Air Service

The Mason City Municipal Airport is located between Clear Lake and Mason City on Hwy. 122, which offers passenger service. The Mason City Municipal Airport is located approximately 26 miles from Forest City. The 6,500 feet of hard surfaced runways allows commercial and freight service to land. National and International air travel can be obtained by going south to Des Moines or north to Minneapolis. Forest City has a municipal airport that is a general aviation airport. There are no commercial offered services at this airport. The airport does have two runways one is 5,800 feet and the other is 2,700 ft.

Transit Services

Public transit is available to Winnebago County through Winnebago County Public Transit which runs on a door-to-door basis five days a week from 8:00 am to 5:00 pm, no holidays. The system can deliver riders to any one of the other seven counties in the region, which includes Kossuth, Cerro Gordo, Worth, Floyd, Franklin, Mitchell and Hancock Counties. In order to ride, reservations must be scheduled 24 hours in advance by calling the dispatch center at 641-585-2435.

MULTI-JURISDICTIONAL RISK ASSESSMENT

The risk assessment identifies how people properties and structures will be damaged due to a hazardous event. If the hazard can harm structures and people they are considered vulnerable. Finding weak points in the system include identifying building types that are vulnerable to damage and anticipating the loss in high-risk areas. This will help the community to decide what mitigation efforts are required or should be undertaken and how to implement the selected activities.

Because of similar characteristics in the topography and geography of the participating communities of Winnebago County Unincorporated and the communities of Buffalo Center, Forest City, Lake Mills, Leland, Rake, Scarville, and Thompson some risks were considered on a county-wide basis. Weather related hazards, such as thunderstorm, lightning, hailstorms, tornado, extreme heat, windstorms and severe winter storm, generally impact the entire planning area. Hazards such as flooding (river and flash) impact various jurisdictions differently. Those differences are covered in the hazard profile and vulnerability assessment and analysis sections. On page 57, Table 22 is a Hazard Identification by Jurisdiction which indicates with a checkmark the hazards identified for each participating jurisdiction.

In making their hazard analysis and risk assessment, the participants considered the following factors:

Probability
Magnitude/Severity
Warning Time
Duration

In an effort to make this process more representative of each community's stance on each of the hazards a different approach was taken from what has occurred in the past. At the initial meeting in each community all participants were given both a hard copy of the Hazard Analysis/Risk Assessment for as well as the identical form in electronic format. The belief that this will be a more comprehensive picture of the group stems from the idea that during these meetings it is usually one or a small group that makes decisions while others either do not care or feel they cannot speak differently from the others in the group. Once the forms were collected, either physically or electronically, all of the submissions were recorded and an average of the submitted scores were calculated. Then each of the scores were weighted as described below.

The tables that follow define each factor and the rating scale the participants used to assess the risk to the community. The participants scored each of the four factors on a scale of 1-4 using the definition of each factor. The score is calculated by using the following formula: (Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10) = Final Hazard Assessment Score.

This score can be used to help the participants to prioritize future mitigation activities.

Probability: reflects the likelihood of the hazard's occurring again in the future, considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year.		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is possibility of its occurrence.
2	Occasional	Between 11% and 20% probability in any given year (up to 1 in 5 chance of occurring, history of events is greater than 10% but less than 20%. or the event that could possibly occur.
3	Likely	Between 21% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33%, or the event is likely to occur
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely, or the event is highly likely to occur.

Magnitude/ Severity: Assessment of severity in terms of injuries and fatalities, personal property, and infrastructure and the degree and extent with which the hazard affects the jurisdiction.		
Score		**Description**
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	11% to 25% of property severely damaged, shutdown of facilities and services for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	26% to 50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or injuries/illnesses that result in permanent disability
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

Warning Time: Rating of the potential amount of warning time that is available before the hazard occurs.	
Score	**Description**
1	More than 24 hours warning time
2	12 to 24 hours warning time
3	6 to 12 hours warning time
4	Minimal or no warning (Up to 6 hours warning)

Duration: A measure of the duration of time that the hazard will affect the jurisdiction.	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

HAZARD ANALYSIS

In order to properly identify mitigation strategies and projects, hazards that affect the county must be identified. The following lists the potential hazards to the county that were identified by the participants. This section also discusses previous occurrences of the hazards, the populations most at risk and the areas of the county most at risk. By identifying the hazards and quantifying the risks, the county can better assess current mitigation strategies, develop future mitigation strategies and identify needed mitigation projects.

The participants identified and discussed twenty-three hazards that have either impacted Winnebago County or have a potential to impact the county. The committee's guidance was directed by FEMA requirements and regulations, Iowa Homeland Security and Emergency Management guidelines and the participants. The hazards that were not identified by the committee are at the end of this section along with their reason as to not include it.

The hazard analysis identifies potential hazards that could affect the County for the purposes of mitigation planning. The importance of mitigation is to reduce long-term risks of damage or threats to the safety and wellbeing of the citizens of Winnebago County. In some cases, the hazards that are identified for mitigation will not include all of the same hazards identified for preparedness, response or recovery.

The potential hazards that were presented and discussed by the Winnebago participants are:

- Animal/Plant/Crop Disease
- Dam Failure
- Drought
- Earthquake
- Expansive Soils
- Extreme Heat
- Flash Flood
- Grass or Wild land Fire
- Hailstorm
- Hazardous Materials
- Human Disease
- Infrastructure Failure
- Landslide
- Levee Failure
- Radiological
- River Flooding
- Severe Winter storm
- Sinkholes
- Terrorism
- Thunderstorms & Lightning
- Tornado
- Transportation Incident
- Windstorm

These hazards have been defined and discussed at length on the following pages. The discussion includes probability, magnitude/severity, warning time, and duration. The results of the scoring are also included below in the participants' assessment.

The following hazards were picked by the Winnebago County Hazard Mitigation Planning participants to be analyzed and profiled, they are as follows:

- Animal, Plant, Crop Disease
- Drought
- Extreme Heat
- Flash Flood
- Grass or Wild land Fire
- Hailstorm
- Hazardous Materials
- Human Disease
- Infrastructure Failure
- River Flooding
- Severe Winter Storm
- Terrorism
- Thunderstorms and Lightning
- Tornado
- Transportation Incident
- Windstorm

These hazards have been defined and discussed at length on the following pages. The hazards are listed for the entire county unless indicated in that hazards profile the jurisdiction the hazard affects more. The results of the scoring are also included below in the participants' assessment. The source of the historical occurrence came from the National Climatic Data Center (NCDC) website that is hosted by the National Oceanic and Atmosphere Administration (NOAA). The scoring activity by the participants was based on each member's subject matter expertise, knowledge of the community, studies of previous

events, historical information on damages, and other written resource materials. These are all the hazards that were discussed by the committee.

Animal/Plant/Crop Disease

An outbreak of disease that can be transmitted from animal to animal or plant to plant represents an animal/crop/plant disease.

The disease outbreak will likely have a significant economic implication or public health impact. The crop/plant pest infestation will likely have severe economic implications, cause significant crop production losses, or significant environmental damage.

Hazard	Animal/Plant/Crop Disease	Score
Probability	Each year the Iowa Department of Agriculture and Land Stewardship (IDALS) conducts numerous animal disease investigations. IDALS, along with Iowa's universities and industries to conduct regular crop/plant pest surveillance. The Winnebago HM Committee determined that an animal/plant/crop disease event has a occasional probability of occurring.	1.77
Magnitude/ Severity	With the increase in the movement of animals, animal products, plants, crops, and crop products have the potential to spread or introduce disease and pests to previous non-infested areas. Diseases/pests can also be introduced naturally by weather patterns. New strains of viruses and diseases that are not currently present in the county have the potential to devastate the current population of animals, crops and plants due to low immunity. The impact will vary by disease/pest and the type of animal/crop/plant infected/infested. Should the disease/pest have public health implications, the economic and social impact would be even greater. The severity will vary by disease/pest. The types of animals, crops, or plants affected will also significantly influence the severity.	1.63
Warning Time	If the diseases/pests are highly infectious (many animals that are infected with disease can be transmitting disease before they show clinical signs), by the time they are discovered, they will likely have spread across the state or nation. This will put us at a severe disadvantage during response and recovery.	1.78

Duration	Response and recovery from serious infestation or disease are lengthy, with many producers likely to never be able to return to business, in addition, crop infestations/animal diseases can reoccur, causing repeated losses in subsequent years.	3.6
	Final Weighted Score	1.92

Drought

Drought is defined as a period of prolonged lack of precipitation for weeks at a time producing severe dry conditions. There are four types of drought conditions relevant to Iowa:

1. Meteorological drought, which refers to precipitation deficiency;
2. Hydrological drought, which refers to declining surface and groundwater supplies;
3. Agricultural drought, which refers to soil moisture deficiencies; and
4. Socioeconomic drought, which refers to when physical water shortages begin to affect people.

The highest occurrence of drought conditions with recorded events in Iowa is associated with agricultural and meteorological drought as a result of either low soil moisture or a decline in recorded precipitation.

Droughts can be localized or widespread and last from a few weeks to years. A prolonged drought can have a serious impact on a community's water supply and economy. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged by loss of crops and/or livestock. While droughts are generally thought to occur during extreme heat events, they can and do occur during the winter months.

According to the National Climactic Data Center (NCDC), Winnebago County has had five reported drought periods from 2001-2023.

TABLE 14 – Droughts in Winnebago County

Drought Period	Geographic Impact	Monetary Impact

8/1/2001	Adair, Adams, Appanoose, Audubon, Black Hawk, Boone, Bremer, Butler, Calhoun, Carroll, Cass, Cerro Gordo, Clarke, Crawford, Dallas, Davis, Decatur, Emmet, Franklin, Greene, Grundy, Guthrie, Hamilton, Hancock, Hardin, Humboldt, Jasper, Kossuth, Lucas, Madison, Mahaska, Marion, Marshall, Monroe, Palo Alto, Pocahontas, Polk, Poweshiek, Ringgold, Sac, Story, Tama, Taylor, Union, Wapello, Warren, Wayne, Webster, **Winnebago**, Worth, Wright	$578.9 million
8/1/2003	Adair, Adams, Appanoose, Audubon, Black Hawk, Boone, Bremer, Butler, Calhoun, Carroll, Cass, Cerro Gordo, Clarke, Crawford, Dallas, Davis, Decatur, Emmet, Franklin, Greene, Grundy, Guthrie, Hamilton, Hancock, Hardin, Humboldt, Jasper, Kossuth, Lucas, Madison, Mahaska, Marion, Marshall, Monroe, Palo Alto, Pocahontas, Polk, Poweshiek, Ringgold, Sac, Story, Tama, Taylor, Union, Wapello, Warren, Wayne, Webster, **Winnebago**, Worth, Wright	$645.2 million

7/1/2012	Adair, Adams, Appanoose, Audubon, Black Hawk, Boone, Bremer, Butler, Calhoun, Carroll, Cass, Cerro Gordo, Clarke, Crawford, Dallas, Davis, Decatur, Emmet, Franklin, Greene, Grundy, Guthrie, Hamilton, Hancock, Hardin, Humboldt, Jasper, Kossuth, Lucas, Madison, Mahaska, Marion, Marshall, Monroe, Palo Alto, Pocahontas, Polk, Poweshiek, Ringgold, Sac, Story, Tama, Taylor, Union, Wapello, Warren, Wayne, Webster, **Winnebago**, Worth, Wright	$2.385 billion
6/15/2021- 04/01/2024	Boone, Butler, Bremer, Black Hawk, Cerro Gordo, Calhoun, Carroll, Dallas, Emmet, Franklin, Grundy, Greene, Guthrie, Hardin, Hancock, Hamilton, Humboldt, Jasper, Kossuth, Madison, Mahaska, Marshall, Marion, Monroe, Palo Alto, Pocahontas, Polk, Poweshiek, Sac, Story, Tama, Union, Wapello, **Winnebago,** Worth, Webster, Wright	$Unk

Drought is a normal part of climate fluctuations. Climatic variability can bring dry conditions to the region up to years at a time. Research and observations of the El Nino/La Nina climatic events are resulting in more predictable climatic forecasts. A drought would likely affect most of Winnebago County if not the whole State of Iowa and the Upper Midwest as a whole. Because of their dependence on precipitation and water, the agricultural community would be the most adversely effected, but the entire state would likely feel some impact. The participants evaluated the probability of future droughts in Winnebago County in the order of magnitude of between -3.0 to -3.9 Palmer drought severity index (severe drought

event) at between 11% and 20% in any given year.

Since 2001 Winnebago County has suffered $12.65 million dollars in property damage losses and $62.35 million dollars in crop losses. That number will likely rise throughout 2024 due to the recent drought in 2023 and 2024 and those losses have not been established at this point.

Hazard	Drought	Score
Probability	According to the National Climatic Data Center, Winnebago County has had 4 periods of drought from 1980-present. These drought periods occurred both in August. While some may have been more severe than others, agricultural areas were impacted much more than the metropolitan areas where impacts were indirect. Drought is part of normal climate fluctuations. Climatic variability can bring dry conditions to the area for up to years at a time. Observations from the El Nino/La Nina climatic events are resulting in more accurate and predictable climatic forecasts.	2.61

Magnitude/ Severity	Those dependent on rain would be the most vulnerable to a drought. This means that agriculture, agribusiness, and consumers (if the drought lasted long enough or impacted a large area) would be impacted. A drought limits the ability to produce goods and provide services. Because citizens draw their drinking water from surface water and groundwater sources, a prolonged severe drought may impact all citizens if there were to be a dramatic drop in the stream flow coupled with the drop in the water table. Fire suppression can also become a problem due to the dryness of the vegetation and possible lack of water. A drought would likely affect most of Winnebago County if not the whole state of Iowa as a whole. Due to the dependence on precipitation and water the agricultural community would be impacted the most. The agricultural areas would be most adversely impacted, but the entire state would likely feel at least some impact. Few if any health impacts to people in the affected area because of secondary sources of water. Drought in the US seldom results directly in the loss of life. Health impacts would be more significant on livestock without auxiliary water supplies. Property losses would be limited to livestock and crops to the agricultural community. Facilities would not be impacted. Infrastructure could be affected in areas of expansive soils due to drying soils, lower water levels around dams, etc. Delivery of services would be limited to source water delivery and those services that consume large amounts of water. Drought can lead to large and damaging impacts to the agricultural economy. Because of Iowa's reliance on the agricultural economy, the economic and financial impacts would certainly ripple out into other sectors. Rural areas can be especially affected by long-term drought. If restrictions are put on manufacturers that use large amounts of water, the local economy can be impacted that way as well.	2.23

Warning Time	Drought warning is based on a complex interaction of many different variables, water uses, and consumer needs. Drought warning is directly related to the ability to predict the occurrence of atmospheric conditions that produce the physical aspects of drought, primarily precipitation and temperature. There are so many variables that can affect the outcome of climatic interactions, and it is difficult to predict a drought in advance. In fact, an area may already be in a drought before it is even recognized. While the warning of the drought may not come until the drought is already occurring the secondary effects of a drought may be predicted and warned against weeks in advance.	1.17
Duration	According to Winnebago County's and Iowa's drought history, most droughts that affect the areas occur for at least a month at a time.	3.61
	Final Weighted Score	2.38

Extreme Heat

Conditions for extreme heat are defined by summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. Extreme heat includes temperatures in excess of 100 degrees Fahrenheit (including the heat index) for at least three successive days of 90+ degrees Fahrenheit. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees. The heat index is a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is added to the actual air temperature. Exposure to full sunshine can increase the heat index by at least 15 degrees. Heatstroke, sunstroke, cramps, exhaustion, and fatigue are possible with prolonged exposure and/or physical activity due to the body's inability to dissipate heat. Urban areas are particularly at risk because of air stagnation and large quantities of heat absorbing materials such as streets and buildings. Extreme heat can also result in distortion and failure of structures and surfaces such as roadways and railroad tracks.

According to the National Climatic Data Center (NCDC), Winnebago County has experienced 4 extreme heat events in 1995, 2001, 2011, 2016 and 2019. These events also occurred over much of the state of Iowa and caused 4 deaths and $3.8 million in property damages. These deaths were in other areas of the state and did not occur in Winnebago County. However even though there were only two reported events members recalled that every summer there seems to be at least 3 consecutive days of 90+ degree weather.

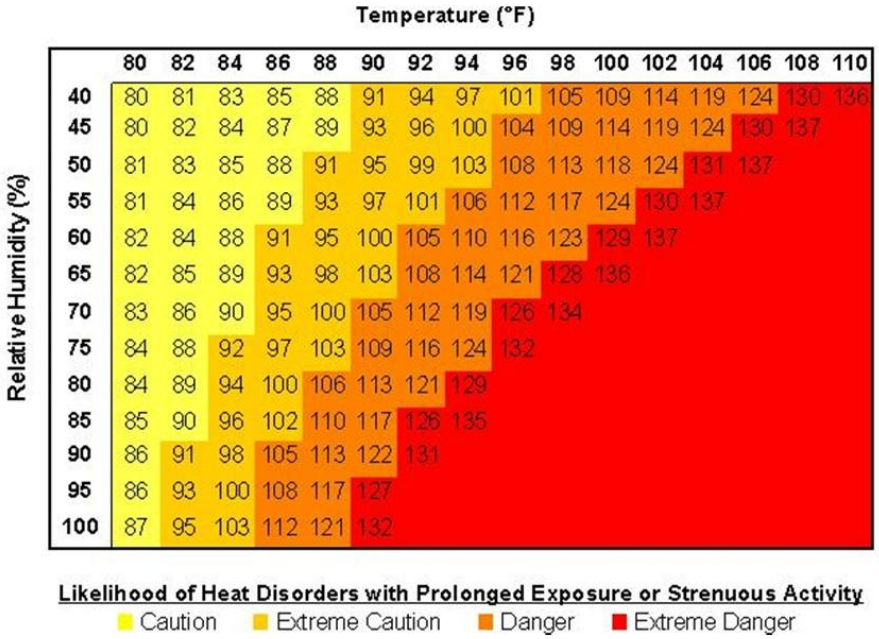
The Hazard Mitigation Committee evaluated the probability of extreme heat in Winnebago County. The discussion focused on historical information and personal experiences by the committee and with dealing with extremely high temperatures.

Hazard	Extreme Heat	Score
Probability	Based on historical information, Winnebago County can experience at least a period of 3 consecutive 90+ degree days in any given year. The committee determined that there is a greater than 33% chance of this occurring in any given year.	2.93
Magnitude/ Severity	Elderly persons, small children, chronic invalids, those on certain medications or drugs (especially tranquilizers and anticholinergic), and persons with weight and alcohol problems are particularly susceptible to heat reactions. Healthy individuals working outdoors in the sun and heat are vulnerable as well. Individuals and families with low budgets as well as inner city dwellers can also be susceptible due to poor access to air- conditioned rooms. All of Winnebago County will likely be impacted by extreme heat, but urban areas of the county pose special risks. The stagnant atmospheric conditions of the heat wave trap pollutants in urban areas and add to the stresses of hot weather. Livestock and other animals are adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well. Economic costs in transportation, agriculture, production, energy, and infrastructure. These direct costs could impact many other economic sectors indirectly.	1.95
Warning Time	As with other weather phenomena, periods of extreme heat are predictable within a few degrees within 3 days or so. Variations in local conditions can affect the actual temperature within a matter of hours or even minutes. The National Weather Service will initiate alert procedures when the heat index is expected to exceed 105 degrees Fahrenheit for at least two consecutive days.	1.31
Duration	The definition of an extreme heat event is an occurrence of 90+ degree weather for a minimum of 3 days. The participants evaluated this hazard as likely to occur and last at less than 1 week.	3.02
	Final Weighted Score	2.4

Sources for Extreme Heat	
National Climatic Data Center	www.ncdc.noaa.gov
Extreme Heat Guide Book	http://www.aclink.org/PublicHealth/health_topics/pdf_files/ExtremeHeat2.pdf

FEMA	http://www.fema.gov/hazard/heat/index.shtm

FIGURE 6 – Heat Index



Flash Flood

A flash flood is an event that occurs with little or no warning. Water levels rise at an extremely fast rate. Flash flooding occurs due to intense rainfall over a short period of time; flash flood can also be the result of rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding events occur due to slow moving thunderstorms, or multiple thunderstorms over the same area in short time duration. Flash flooding is an extremely dangerous form of flooding which can reach full peak in only a few minutes and allows little or no time for protective measures to be implemented. Flash flood waters move at very fast speeds and can move boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding often results in higher loss of life, both human and animal, than slower developing river and stream flooding.

Floods are the most common and widespread of all-natural disasters except fire. The latest significant event to affect Winnebago County occurred in June of 2008. This event resulted in a Presidential Disaster Declaration due to widespread personal and physical property losses. The NCDC lists 12 flash flooding/urban or small stream flooding event from 1998-2018.

As farmland is converted to roads and parking lots, it loses its ability to absorb rainfall. Urbanization increases runoff two to six times over what would occur on natural terrain. Portions of the county are developed with significant amounts of

impervious surfaces, as more development occurs in the watersheds; the amount of runoff produced also increases. If measures are not taken to reduce the amount of runoff, flash floods will continue to occur and may possibly increase.

In certain areas, aging storm sewer systems were not designed to carry the capacity currently needs to handle the increased storm runoff. This combined with rainfall trends (that are moving upwards) and rainfall extremes (that are patterning higher), flash floods will continue to occur and may possibly increase.

The participants concluded it is highly likely that a flash flood will affect Winnebago County in any given year.

Hazard	Flash Flood	Score
Probability	The probability of flash floods and floods in Winnebago County are nearly a yearly occurrence. These floods occur on open land affecting croplands and grasslands. Some county roads will get covered and the county will have to direct traffic around the washout. Floods are the most common and widespread of all-natural disasters except fire. Winnebago County has had 12 flash flood events from 1998-2018.	2.14

Magnitude/ Severity	Flash floods occur in all 50 states in the US. Particularly at risk are those in low-lying areas; close to dry creek beds or drainage ditches; new water; or downstream from a dam, levee, or storage basin. People and property in areas with insufficient storm sewers and other drainage infrastructure can also be put at risk because the drains cannot rid the area of the runoff quickly enough. Nearly half of all flash flood fatalities are auto-related. Motorists often try to traverse water-covered roads and bridges and are swept away by the current. Six inches of swiftly moving water can knock persons off their feet and only two feet of water can float a full-sized automobile. Recreational vehicles and mobile homes located in low-lying areas can also be swept away by the water. Areas in a floodplain, downstream from a dam or levee, or in low-lying areas can certainly be impacted. People and property located in areas with narrow stream channels, saturated soil, or on land with large amounts of impermeable surfaces are likely to be impacted in the event of a significant rainfall. Unlike areas impacted by a river/stream flood, flash floods can impact areas a good distance from the stream itself. Flash flood prone areas are not particularly those areas adjacent to rivers and streams. Streets can become swift moving rivers, and basements can become deathtraps because flash floods can fill them with water in a manner of minutes. Flash floods can quickly inundate areas thought to be out of flood-prone areas. Loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage and loss and interruption of business are common impacts from flash flooding.	1.97
Warning Time	Flash floods are somewhat unpredictable, but there are factors that can point to the likelihood of flood's occurring in the area. Flash floods occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. Knowledge of the watershed characteristics, modeling, monitoring, and warning systems increase the predictability of flash floods. Depending on the location in the watershed, warning times can be increased. The NWS forecasts the height of flood crests, the data, and time the flow is expected to occur at a particular location.	2.92

Duration	The response to the effects of flash flooding is short in duration due to the nature of the hazard.	2.47
	Final Weighted Score	2.24

Grass or Wild-land Fire

A grass or wild-land fire is an uncontrolled fire that threatens life and property in either a rural or a wooded area. Grass and wild-land fires can occur when conditions are favorable, such as during periods of drought when natural vegetation would be drier and subject to combustibility.

No event that has been reported has been a historically significant wildfire; due to the nature of this hazard the participants determined that the probability in any given year is occasional (10-20%) due to the amount of fires reported and the low amount of historically significant wild-land fires as determined and maintained by the National Interagency Fire Center (none are on record since the first recorded event in 1804).

Hazard	Grass or Wild-land Fire	Score
Probability	The committee determined that the probability in any given year is highly likely. The committee was working with undocumented sources of information from the volunteer fire departments and their own memories. The reports that were received from the committee members were that the fire departments respond to at least 2-3 grass fires a year and they are extinguished fairly rapidly.	1.91
Magnitude/ Severity	While wildfires have proven to be most destructive in the Western US, they have become an increasingly frequent and damaging phenomenon nationwide. People choosing to live in wild-land settings are more vulnerable to wildfires, and the value of exposed property is increasing at a faster rate than population. Winnebago County is less vulnerable to wild-land fire because of the extremely large percentage of land that is developed. Grass fires are often easily contained and usually occur during the harvest months. Most fires are contained in the highway and rail right-of-way ditches and are less than a few acres in size.	1.78
Warning Time	As mentioned above, most grassfires occur without warning and travel at a moderate rate. This situation depends upon conditions at the time such as moisture, wind, and land cover. However, methods for forecasting the probability of occurrence of conditions most suitable for wild-fires to occur has increased with the use of the national wild-land significant fire potential outlook issued by the National Interagency Fire Center and the NOAA Storm Prediction Center.	3.33

Duration	The majority of Winnebago County wildfires occur in short duration in areas of brush and forest lands with approximately half of the fires being prescribed as controlled burns supervised by trained experts.	2.09
	Final Weighted Score	2.1

Hailstorm

Hailstorms are an outgrowth of a severe thunderstorm in which pellets or irregularly shaped lumps of ice greater than 1 inch in diameter fall with rain. Hail is produced in many strong thunderstorms by strong rising currents of air carrying water droplets to a height where freezing occurs, the ice particles grow in size until they are too heavy to be supported by the updraft and fall back to earth. Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops; pets and livestock are particularly vulnerable to hail.

According to the NCDC, Winnebago County experienced 100 hailstorms from 1961-2022. Zero injuries and zero deaths resulted from these hailstorms in Winnebago County. The storms caused $1,928,000 in property damage and $1,126,000 in crop damage. NCDC website data lists events by place in the county and one event may be counted several times if the event affected a large area of the County. Based on historical information Winnebago County can expect to have 1.5 hailstorms a year. The participants determined that it is highly likely to experience a hailstorm in any given year.

Hazard	Hailstorm	Score
Probability	Data on probability and frequency of occurrence of hailstorms is limited, but research indicated that any given point in Winnebago County can expect on average 1.5 hailstorms in a year.	2.78
Magnitude/ Severity	Agricultural crops such as corn and beans are particularly vulnerable to hailstorms stripping the plant of its leaves. Hail can also do considerable damage to vehicles and buildings. Hail only rarely results in loss of life directly although injuries can occur. The land area affected by individual hail events is not much smaller than that of parent thunderstorm, an average of 15 miles in diameter around the center of the storm. Damage to property, facilities, and infrastructure is usually limited to broken windows and damaged roofs.	2.22

Warning Time	Forecasting hailstorms as with their parent thunderstorms, and forecasting the conditions suitable for developing storms with the potential to create hail is becoming quite accurate due to the advancement in Doppler Radar and other technologies operated by the National Weather Service and the local TV stations weather departments.	3.29
Duration	The occurrence of hailstorms is a short term weather phenomena and usually is limited to less than 6 hours per event.	1.49
	Final Weighted Score	2.57

TABLE 15 – Hail Scale

Diameter Size	Description
¼”	Pea Size
¾”	Penny Size
7/8”	Nickel Size
1”	Quarter Size
1 ¼”	Half Dollar
1 ½”	Walnut or Ping Pong Ball Size
1 ¾”	Golf Ball Size
2”	Hen Egg Size
2 ½”	Tennis Ball Size
2 ¾”	Baseball Size
3”	Teacup Size
4”	Grapefruit Size
4 ½”	Softball Size

Hazardous Materials

Hazardous Materials covers a fixed hazardous material release, transportation hazardous material release, pipeline transportation release, and the accidental release of flammable or combustible, explosive, toxic, noxious, corrosive, oxidizable, an irritant or radioactive substances or mixtures that can pose a risk to life, health or property possibly requiring evacuation.

A fixed hazardous material release is an accidental release of chemical substances or mixtures, which presents a danger to the public health or safety, during production or handling at a fixed facility. A hazardous substance is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in ever-increasing types and quantities, each year, over 1,000 new synthetic chemicals are introduced, and as many as 500,000 products pose physical or health hazards and can be defined as “hazardous materials”. Hazardous substances are

categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous material incidents generally affect a localized area and the use of planning and zoning can minimize the area of impact.

During the period of September 1, 2001 – September 1, 2011 there have been 95 fixed facility incidents in Winnebago County according to the Iowa Department of Natural Resources (IDNR). Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agricultural, and domestic activities. This situation is made worse by the density of people and hazardous materials in Iowa.

The planning committee determined the probability that an occurrence of a hazardous material incident is unlikely to occur or there is less than 10% probability of a high impact incident in any given year. A high impact occurrence is one defined as an environmental emergency by the EPA. An environmental emergency is a sudden threat to the public health or the well-being of the environment, arising from the release or potential release of hazardous materials.

A pipeline that transports hazardous materials can pose as a hazardous material incident in the occurrence of a rupture of the pipeline. The pipeline rupture can possibly require evacuation of the surrounding area. An underground pipeline incident can be caused by the following: environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak to a large rupture where an explosion is possible.

Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those near to the pipelines.

According to the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration, there has been 0 significant incidents in Winnebago County from 2001-2025.

Hazard	Hazardous Materials	Score
Probability	The planning committee determined the probability that a high impact occurrence of a hazardous material incident is less than 10% in any given year. A high impact occurrence is one defined as an environmental emergency by the EPA. An environmental emergency is a sudden threat to the public health or the well-being of the environment, arising from the release of hazardous materials.	1.56

Magnitude/ Severity	A hazardous materials accident can occur almost anywhere, so any area is considered vulnerable to an accident. People, pets, livestock, and vegetation in close proximity to facilities producing, storing, or transporting hazardous substances are at higher risk. Populations downstream, downwind, and downhill of a released substance are particularly vulnerable. Depending on the characteristics of the substance released, a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. Occupants of areas previously contaminated by a persistent material may also be harmed either directly or through consumption of contaminated food and water. Facilities are required to have an off-site consequence plan that addresses the population of the surrounding area. Responding personnel are required to be trained to HAZMAT Operations Level to respond to the scene, and those personnel that come into contact with the substances released are required to have HAZMAT Technician level training. Most of the hazardous materials incidents are localized and are quickly contained or stabilized by the highly trained fire departments and hazardous materials teams. Depending on the characteristic of the hazardous material or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer. Specialized training is needed to respond to these types of incidents. If inadequately trained personnel attempt to respond, the impacts could be the same as those for the general public exposed to the toxic materials. Proper training and equipment greatly reduce the risk to response personnel.	2.12

Warning Time	When managed properly under regulations, hazardous materials pose little risk. However, when handled improperly or in the event of an accident, hazardous materials can pose a significant risk to the population. Hazardous materials incidents usually occur very rapidly with little or no warning. Even if reported immediately, people in the area of the release have very little time to be warned and evacuated. During some events, sheltering in-place is the best alternative to evacuation because the material has already affected the area and there is no time to evacuate safely. Public address systems, television, radio, and the NOAA Weather Alert Radios are used to disseminate emergency messages about hazardous materials incidents.	3.73
Duration	Response to a hazardous materials release is generally limited to the immediate effects of a release of dangerous materials and their threat to life and property. However, due to the laws surrounding hazardous materials and the duty of the public to inform and protect citizens from the effects of hazardous materials in their vicinity, response is expanded for environmental emergencies.	2.35
	Final Weighted Score	2.13

Human Disease

An incident related to human disease is defined as a medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, and insect infestation). Public health action to control infectious diseases in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and TB). Disease control resulted from improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. Scientific and technologic advances played a major role in each of these areas and are the foundation for today's disease surveillance and control systems. Scientific findings have contributed to a new understanding of the evolving relationship between humans and microbes.

The Centers for Disease Control (CDC) has a list of notifiable infectious diseases at the national level, the latest data that was available was for the year 2009. A notifiable disease is one for which regular, frequent, and timely information regarding individual cases is considered necessary for the prevention and control of the disease. There are 86 notifiable diseases which include the variations of one disease, as an example Hepatitis (Hepatitis, viral, acute; Hepatitis A, acute; Hepatitis B, acute; Hepatitis B virus, perinatal infection; Hepatitis C, acute; and Hepatitis, viral chronic; Chronic Hepatitis B; and Hepatitis C virus infection).

The Iowa Department of Public Health tracks epidemiological statistics in Iowa. Winnebago Public Health works to protect the citizens of Winnebago County from infectious diseases and preserves the health and safety of the citizens through disease surveillance, investigation of suspect outbreaks, education and consultation to county, local, and health agencies. Winnebago Public Health also works to reduce the impact of communicable diseases and to reduce or eliminate the morbidity associated with these diseases. Programs that the agency runs guides community based prevention planning, monitoring current infectious disease trends, provide early detection and treatment for infected persons, and ensure access to health care for refugees in Iowa. While vaccines are available for many diseases, citizens remain vulnerable to other diseases known and unknown.

A pandemic human disease is defined as a disease that has spread around the world to many people. The word, "pandemic", means that a disease has caused illness in a person on nearly every continent. Many diseases throughout the history of the world have been pandemic. Examples are HIV/AIDS/Influenza. A pandemic will have wide spread economic and societal implications for our state. Response and recovery to a pandemic will likely be lengthy.

From 1900-2000, there were three influenza pandemics, all about 30 years apart. This seems to follow the same trend with the next occurrence to affect Iowa and Winnebago County beginning in 2009 with the H1N1 influenza virus causing 659 hospitalizations across the state and lab confirmed 41 H1N1 deaths across the state. Typically people who become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors. Approximately 24% of Winnebago's population is considered high risk

Hazard	Human Disease	Score
Probability	From 1900-2000, there were three influenza pandemics, all about 30 years apart. This seems to follow the same trend with the next occurrence to affect Iowa and Winnebago County beginning in 2009 with the H1N1 influenza virus causing 659 hospitalizations across the state and lab confirmed 41 H1N1 deaths across the state. Typically people who become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors. Approximately 25% of Winnebago's population is considered high risk. The committee determined that there was a less than 10% probability of a human disease incident in any given year. Winnebago Public health works to protect the citizens of the county from infectious diseases and preserve the health and safety of Iowans through disease surveillance, investigation of suspect outbreaks, education and consultation to county, local and public/private health agencies. Historically pandemics occur every 30 years.	1.73

Magnitude/ Severity	Public health agencies work to reduce the impact of communicable diseases within the county. Programs guide community-based prevention planning, monitor current infectious disease trends, prevent transmission of infectious diseases, provide early detection and treatment for infected persons, and ensure access to health care for refugees in Winnebago County. While vaccines are available for many diseases that occur, citizens remain vulnerable to known and unknown diseases. Due to the high mobility of our society, these diseases can move rapidly across the county, state and nation within a matter of days and weeks. Many of the diseases on the national notification list result in serious illness if not death. Some diseases are treatable, in others only the symptoms are treatable. Influenza (flu) happens every year in nearly all the countries in in the world. It spreads through a population for a few months and then will disappear or move to another area of the world. Influenza usually occurs in the fall and winter months. Typically people who usually become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors. Approximately 25% of Winnebago's citizens are at high risk.	1.94
Warning Time	The private practitioner is the first line of defense and will undoubtedly be the first to witness the symptoms of human disease incidents. The Winnebago Public Health Department along with Iowa Department of Public Health and the US Centers for Disease Control monitor reports submitted by doctors, hospitals, and labs to identify patterns. The public health departments and the CDC are proactive in providing information to the health care community on medical concerns. Conditions related to scope and magnitude can escalate quickly and area resources can be drained of personnel, medications, and vaccinations rather quickly.	1.71
Duration	Response to highly infectious diseases occurs continuously, although the direct effects of a pandemic influenza can occur for months at a time as evident with the H1N1 influenza in August of 2009	3.36
	Final Weighted Score	1.96

Infrastructure Failure

Communication failure is the widespread breakdown or disruption of normal communication capabilities. Communication failure includes major telephone outages, loss of local government radio facilities, long-term interruption of electronic broadcast services, emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication media as well. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service.

Disruptions and failures can range from localized and temporary to widespread and long- term. If switching stations are affected, the outage could be more widespread. Thus, the planning committee supports developing interoperability throughout the county and state.

No widespread communication failures have occurred in Winnebago County. Local incidents; due to weather conditions, equipment failure, excavation incidents, or traffic accidents have been reported, the outages were usually resolved in a timely manner.

Widespread communication losses are unlikely due to backup systems and redundant system designs. Local communication failures are likely to affect small areas of a county.

The planning committee evaluated the probability that a serious communication failure in Winnebago County would be occasionally or between 10% and 20% in any given year.

An extended interruption of service either electric, petroleum, or natural gas, which by an actual or impending acute shortage of usable energy could create a potential health problem for the population and possibly mass panic. International events could potentially affect supplies of energy producing products while local conditions could affect distribution of electricity, petroleum, or natural gas. The magnitude and frequency of energy shortages are associated with international markets. Local and state events such as ice storms can disrupt transportation and distribution systems; if disruptions are long lasting, public shelters may need to be activated to provide shelter from extreme cold or extreme heat. Stockpiles of energy products eliminate short disruptions but can increase the level of risk to the safety of people and property near the storage site.

The energy crisis of the 1970s had significant impact on many consumers in Winnebago County. High inflation and unemployment were associated with the excessive dependence on foreign oil during the early and mid-1970s. An energy shortage of that magnitude has not affected Iowa in recent years. Only when free market forces cease to provide for the health, welfare, and safety of the citizens can governments can take appropriate actions to limit the effects of an energy shortage.

The federal government has a strategic petroleum reserve to supplement the fuel supply during energy emergencies. Shortages, especially electrical shortages, can be unpredictable with immediate effects. Natural events, human destruction, price escalation, and national security energy emergencies can cause unavoidable energy

shortages. The planning committee evaluation the probability of an energy transportation

failure to occur in Winnebago County to be between 10% and 20% probability in any given year.

The collapse (all or partial) of any public or private structure including roads, bridges, towers, buildings, and etc., is considered a structural failure. Infrastructure failures can be due to the failure of structural components or due to the overload of a structure.

Natural events such as snow can cause a failure, heavy rains and flooding can undercut a bridge abutment or washout a road. Building codes and their enforcement can guarantee that a structure will hold-up under normal conditions. Annual or semi-annual inspections will alert stakeholders to weak points in the structure that need to be addressed. The level of damage depends on a number of factors including but not limited to the following: size, number of occupants, time of day, day of the week, amount of traffic, amount and type of products stored, etc.

There have been a few structural failures in Winnebago County; there is no collection of this type of incident, except from the personal experiences of the planning committee.

Civil structures may fail in a variety of ways. The unprecedented growth in technology has resulted in a host of problems related to complex structures, special materials, and severe operational and environmental loads, such as fire, excessive vibrations, explosion, high-energy piping failures, missiles, and earthquakes. With the exceptions of misuse, accidental or environmental loads, the causes of failure may be found in deficiencies of design, detailing, material, workmanship, or inspection. With the aging structures in the country along with problems with new materials discussed above, structural failures will continue to occur. Efforts to inspect and maintain these structures will lessen the probability of a failure, but not guarantee that it will not happen in the future. Internal weaknesses can be hidden from inspectors and not be realized until it is too late.

The planning committee has evaluated the probability of structural failures will in occur in Winnebago County is less than 10% in any given year.

A structural fire is an uncontrolled fire in populated areas that threatens life and property and is beyond normal day-to-day response capability. Structural fires present a far greater threat to life and property and the potential for much larger economic losses. Modern fire codes and fire suppression requirements in new construction and building renovations, coupled with improved fire-fighting equipment, training, and techniques lessen the chance and impact of a major urban fire. Most structural fires occur in residential structures, but the occurrence of a fire in a commercial or industrial facility could affect more people and pose a greater threat to those new the fire or

fighting the fire because of the volume or type of the material involved. Structural fires are almost a daily occurrence in some communities. Nearly all are quickly extinguished by on-site personnel or local fire departments. There have been 1,535 deaths in Iowa from fires between the year 1974-1977 and 1980-2002. From 2006 through April of 2010, there have been 167 recorded fire fatalities in the state of Iowa. Fire prevention efforts have gone to non-residential fires and the results have been highly effective. Even with an increase in the prevention efforts in residential fires, both residential and non-residential fires will continue to occur. During colder months, clogged chimneys and faulty furnaces and fireplaces can increase the probability of structural fires. The planning committee determined that infrastructure failure would have between 20% and 33% probability of occurring in any given year

Hazard	Infrastructure Failure	Score
Probability	No widespread communications failures have occurred in Winnebago County. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported, but outages have usually been resolved in a timely manner. Communication losses are unlikely due to backup systems and redundant system designs. Local communications failures are likely to affect cities of Winnebago County and small areas of the county. Energy failures happen in the county due to equipment failures, weather conditions, excavation incidents, etc. Local and regional electric and gas utilities maintain the transmission lines and are responsible for providing the energy. They have been proactive in the past 5-10 years in hardening their facilities to ensure proper transmission of energy. There has been no record of structural failures in Winnebago County. Structural fires are a yearly occurrence in some communities. Nearly all are quickly extinguished by on-site personnel or local fire departments. Fire prevention efforts have gone to non-residential fires and the results have been highly effective. Even with an increase in the prevention efforts in residential fires, both residential and non-residential fires will continue to occur. During colder months, clogged chimneys and faulty furnaces and fireplaces can increase the probability of structural fires.	1.55

Magnitude/ Severity	Most communication systems that are highly necessary have backup and redundant designs to provide continuity of service. Most communications failures would be limited to localized areas. In the event of a widespread communications failure, only portions of Iowa would be impacted, but this is highly unlikely due to the support of other jurisdictions and secondary communications devices. Because Iowa is almost entirely dependent on out-of-state resources for energy, Iowans must purchase oil, coal, and natural gas from outside sources. World and regional fuel disruptions are felt in Iowa. It is likely that increasing prices will occur as market mechanisms are used to manage supply disruptions. This will disproportionately affect the low- income population because of their lower purchasing power. Agricultural, industrial, and transportation sectors are also vulnerable to supply, consumption, and price fluctuations. In Iowa, petroleum represents 97% of transportation fuel. Individual consumers such as commuters are also vulnerable. The effects of an energy shortage would be felt throughout the state. Because the distribution systems are very developed, local shortages can quickly be covered. There are many buildings in Iowa that are very old or which may become hazardous in the event of an earthquake, fire, high winds, or other natural events. All bridges are vulnerable to the effects of the elements and the deterioration that results. Increases in the amount and weight of traffic they are expected to support increase their vulnerability to failure. The impacts of the failed structure would be contained to the immediate area and adjacent properties. This could be as small as the house and yard of a fallen chimney, or the area could be relatively extensive if the structure that failed was a multi-story building of a downtown high-rise or a tall communication tower. Dam and levee failures would affect a much larger area and are discussed as separate hazards. Older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Combustible building materials obviously are more vulnerable than structures constructed of steel or concrete. Structures without early detection devices are more likely to be completely destroyed before containment by response agencies. Structures in areas served by older, smaller, or otherwise inadequate water distribution infrastructure such as water mains and hydrants are also at significant risk. Problems vary from region to region, often because of climate, poverty, education, and demographics. The fire death risk for the elderly and children under 5 years is more than two times that of the average population. With modern training, equipment, fire detection devices, and building regulations and inspections, most fires can be quickly contained and limited to the immediate structure involved. Certain circumstances, such as the involvement of highly combustible materials or high winds, can threaten a larger area. The age and density of a particular neighborhood can also make it more vulnerable to fire due to the spreading of fire from neighboring structures.	2.06

Warning Time	A communications failure would likely occur with little or no warning. It is usually impossible to predict a communications failure. Some communications may be shut down for periodic maintenance and the users are typically given prior notice to the out of service shutdown. The IDNR Energy Bureau monitors domestic and international energy situations and has developed a plan to deal with an energy crisis. Signs of an energy shortage can be seen sometimes be recognized months in advance but energy disruptions happen suddenly and unexpectedly. The actual failure of the structure would likely occur suddenly with little or no warning. Fires typically start with little to no warning and alert devices can allow time for responders to contain the fire.	3.19
Duration	With the exception of structural fires which are largely handled by local response personnel, the response to the hazards of communications failure, energy failure, and structural failure are widespread in nature and are likely to require outside resources to assist the county and local jurisdictions in emergency response.	2.6
	Final Weighted Score	2.09

River Flooding

River flooding is a rising or overflowing of a tributary or body of water that covers adjacent land, not usually covered by water, when the volume of water in a stream exceeds the channels capacity. Floods are the most common and widespread of all natural disasters, except fire. Most communities may experience some kind of flooding after spring rains, heavy thunderstorms, winter snow thaws, waterway obstructions, or levee or dam failures.

Floodwaters can be extremely dangerous; the force of six inches of swiftly moving water can knock people off their feet and two feet of water can float a car. Floods can be slow or fast-rising but generally develop over a period of days. Flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers or watershed areas.

The National Flood Insurance Program (NFIP) Repetitive Loss Properties report identifies properties vulnerable to multiple flood losses. There are no Repetitive Loss Properties located in Winnebago County as of December 2010.

The Floods of 2008 and the ongoing recovery from the losses associated with it as well as the devastating flooding that occurred in 1993 continuously stress the importance of mitigation against river flooding in the State of Iowa and Winnebago County.

The most recent serious flooding event in June 2008 resulted in a Presidential declared disaster for Winnebago County. Given the history of river flooding in Iowa and Winnebago County, it is likely that there will be many minor events in any given year and a high likelihood that a major flooding event requiring federal assistance will occur in the next 5 years.

The planning committee determined that the probability of a river flood in Winnebago County is highly likely in any given year.

Hazard	River Flooding	Score
Probability	The floods of 1993 and 2008 are still fresh in the minds of Winnebago County citizens. Flooding has been a regular and frequent hazard in Winnebago County. Winnebago County has been involved in 5 Presidential Disaster Declarations related to flooding since 1953. The county could possibly be involved in 5 more but data was not sufficient to know exactly if the county was in the declaration. Given the history of this hazard, it is likely that there will be many minor events each year and a high likelihood that a major flood event will happen in the next 5 years.	2.06

Magnitude/ Severity	The vulnerability from river flooding is quite delineated. Much work in the area of flood hazard mapping has allowed may communities to restrict development in the hazardous areas. The Federal Emergency Management Agency has delineated the probable extent of the 1% chance flood hazard area in many areas of the county and those maps are located in Appendix I. These maps depict the areas that have at least a 1% chance of flooding occurring on these areas in any given year. Much of the areas are parkland, agricultural areas, or conservation land, but residential and commercial areas are impacted by river flooding as well. Flooding impacts include potential loss of life. River flooding does not have as high of risk as does flash flooding because of the slower onset of the river flood. Personal property can be extensively damaged and destroyed by swift moving water. Facilities and infrastructure can be scoured around and degrading its structural integrity. The severity of the floods in Winnebago county have been limited to the areas directly involved or approximately 10% to 25% of the property has been severely damaged.	1.7

Warning Time	There is a river gage on the Winnebago River in Leland that provides for an early flood warning system. River flooding usually develops over the course of several hours or even days depending on the basin characteristics and the position for the particular reach of the stream. The National Weather Service provides flood forecasts for Iowa. Flood warnings are issued over emergency radio and television messages as well as the NOAA Weather Radio. People in the paths of river floods may have time to take appropriate actions to limit harm to themselves and their property.	1.65
Duration	The response to the effects of river flooding in Winnebago County are extensive and require many days to adequately respond to the needs of the citizens of the County.	2.85
	Final Weighted Score	1.94

Severe Winter Storm

Severe winter weather conditions that affect day-to-day activities can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold. Winter storms are common during the months of October through April.

The various types of severe winter weather can cause considerable damage. Heavy snows can immobilize transportation systems, down trees and power lines, collapse buildings, and the loss of livestock and wildlife. Blizzard conditions are winter storms lasting at least three hours with sustained winds of 35 mph or more, reduced visibility of ¼ mile or less, and white out conditions. Heavy snows of more than six inches in a 12 hour period or freezing rain greater than ¼ inch accumulation causing hazardous conditions in the community can slow or stop the flow of vital supplies as well as disrupting emergency and medical services.

Loose snow begins to drift when wind speed reaches a critical speed of 9-10 mph under freezing conditions. The potential for drifting is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind.

Ice storms have resulted in fallen trees, broken tree limbs, downed power lines and utility poles, fallen communications towers, and impassable transportation routes. Severe ice storms have caused total electric power outages over large areas of Iowa and rendered assistance unavailable to those in need due to impassable roads.

Since 1993, Winnebago County has had 49 severe winter storm events from 1993 to 2011. These events have caused 3 deaths, 0 injuries and $22,672,000 in property damage. This damage is not limited to just Winnebago County but other areas of the State of Iowa. The deaths did not occur in Winnebago County.

Winnebago County has been presidentially declared a Major Disaster for winter storms twice since 1990. Winnebago County can experience 2-3 severe winter storms in any given year.

Hazard	Severe Winter Storm	Score
Probability	Since 1993, Winnebago County has had 49 severe winter storm events from 1993 to 2011. These events have caused 3 deaths, 0 injuries and $22,672,000 in property damage. This damage is not limited to just Winnebago County but other areas of the State of Iowa. The deaths did not occur in Winnebago County.	3.18
Magnitude/ Severity	Hazardous driving conditions due to snow and ice on highways and bridges lead to many traffic accidents. The leading cause of death during winter storms is transportation accidents. The leading cause of death during winter storms is transportation accidents. Emergency services such as police, fire, and ambulance are unable to respond due to road conditions. Emergency needs of remote or isolated residents for food or fuel, as well as for feed, water and shelter for livestock are unable to be met. People, pets, and livestock are also susceptible to frostbite and hypothermia during winter storms. Winter storms are quite vast and would likely impact not only Winnebago County but the Northern Iowa region as a whole. Certain areas may experience local variations in storm intensity and quantity of snow or ice. IDOT, county road departments, and local public works agencies are responsible for the removal of snow and treatment of snow and ice with sand and salt on the streets and highways of Winnebago County.	2.27

Warning Time	The National Weather Service (NWS) has developed effective weather advisories that are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public up to days in advance. Notifications made by the National Weather Service include winter storm watch, winter storm warning, blizzard warning, winter weather advisory, and frost/freeze advisory.	2.06
Duration	Severe winter storms in Iowa and the response to these declared events are tied to multiple storms necessitating large expenses to cities for snow removal and road service. The associated losses and dangers of electrical outages to rural areas further compounds the duration of responding to major storm events.	2.79
	Final Weighted Score	2.7

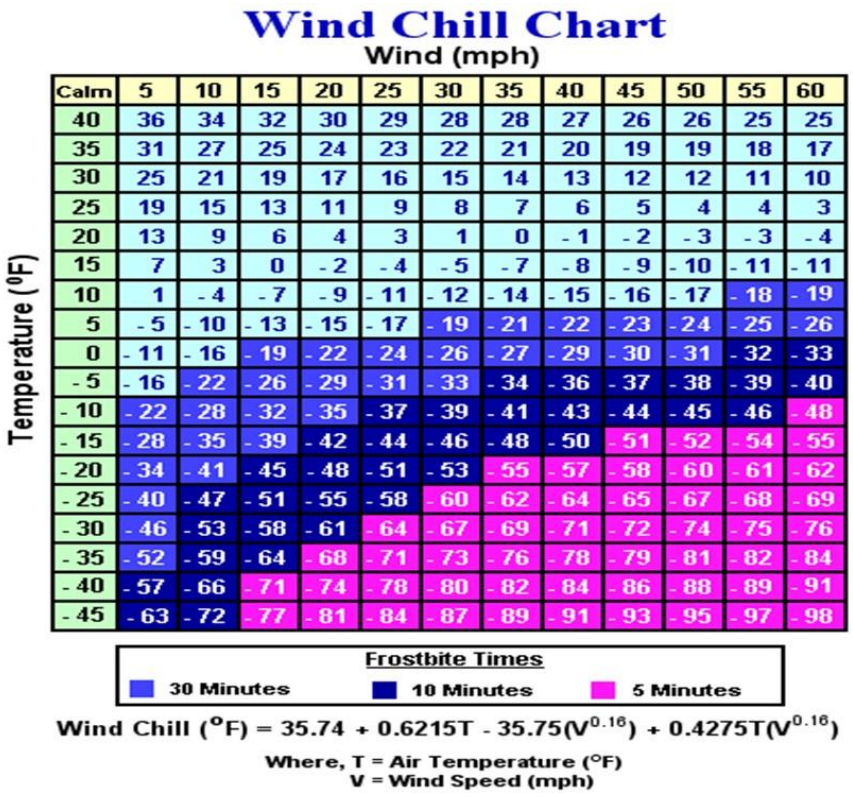
TABLE 16 – <u>Winter Storm Notifications</u>

Winter Weather Advisory	Used when snow...or a mixture of precipitation such as snow, sleet, freezing rain or drizzle is expected, but will not reach warning criteria. Issued for snowfall amounts of less than 4". Forecast amounts would be 1-2", 1-3", 2-4", or perhaps 3". If only freezing rain or freezing drizzle is expected, then the product would be issued as a Freezing Rain or Freezing Drizzle advisory.
Freezing Rain Advisory	Used when freezing rain is expected to coat surfaces with up to one quarter of an inch of ice.
Wind Chill Advisory	Issued when wind chill temperatures are expected to range from -10F to -24F, with a minimum wind speed of 10 mph.
Winter Storm Watch	Issued if there is a threat for heavy snow or sleet, significant accumulations of freezing rain or freezing drizzle, or any combination of these. Issued for the second and third periods of a forecast, i.e. 12 to 36 hours in advance of the event. Not issued for the fourth period of a forecast unless confidence is high. The definition of heavy snow in Iowa is 4" or more in 12 hours, or 6" or more in 24 hours.

Winter Storm Warning	Issued if there is a high probability that severe

	winter weather will occur, such as heavy snow or sleet, significant accumulations of freezing rain or freezing drizzle, or any combination of these. Issued normally for the first period forecast, i.e. less than or equal to 12 hours in advance of the event. A winter storm warning may be extended into the second period of the forecast if necessary.
Ice Storm Warning	Issued when ice accumulations are expected to exceed one quarter of an inch on exposed surfaces.
Blizzard Warning	Issued for winter storms with sustained winds or frequent gusts of 35 mph or greater and considerable falling and/or blowing snow reducing visibilities to 1/4 mile or less. These conditions should last for 3 hours or longer.
Wind Chill Warning	Issued when wind chill temperatures are expected to reach -25°F or colder, with a minimum wind speed of about 10 mph.

FIGURE 7 – <u>Wind Chill Index</u>



Terrorism

Enemy attack is an incident that would cause massive destruction and extensive casualties. An all-out war would affect the entire population. Some areas would experience direct weapons' effects: blast, heat, and nuclear radiation; others would experience indirect weapons' effect, primarily radioactive fallout.

The federal government monitors the international political and military activities of other nations and would notify the State of Iowa of escalating military threats.

Winnebago County authorities would be notified by the State of Iowa. There have been no enemy attacks on or in Winnebago County in modern times. The only history of enemy attack dates back to the days of settlement. An enemy attack is still a possibility due to international conflicts and the large number of conventional and nuclear weapons in existence throughout the world.

It is however unlikely that Winnebago County would be a primary target during an enemy attack on the United States. The US federal government monitors global situations and provides for the security from international attacks. Enemy attack/war has changed in recent years due to world events.

The planning committee determined enemy attack is unlikely in any given year.

Mass demonstrations, or direct conflict by large groups of citizens, as in marches, protest rallies, riots, and non-peaceful strikes are examples of public disorder. These are the assembling of people in a manner that substantially interferes with public peace and constitutes a threat and with the use of unlawful force against another person, or causing property damage or attempting to interfere with, disrupting, or destroying the government, political subdivision, or group of people. Vandalism is usually initiated by a small number of individuals and limited to small target group or institution. Most events are within the capacity of local law enforcement.

Large-scale civil disturbances rarely occur; when they do they are usually an offshoot or the result of one or more following events: 1. Labor disputes where there is a high degree of animosity between the participating parties; 2. High profile/controversial laws or other governmental actions; 3. Resource shortages caused by a catastrophic event; 4.

Disagreements between special interest groups over a particular issue or cause; or 5. A perceived unjust death or injury to a person held in high esteem or regard by a particular segment of society.

The potential for large-scale civil disturbances are rare especially in a rural county the potential is always there for an incident to occur.

The planning committee determined that a serious public disorder in Winnebago County is unlikely in any given year.

Use of biological agents against persons or property in violation of the criminal laws of the US and State of Iowa for the purposes of intimidation, coercion, or ransom can be described as biological terrorism. Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point of line sources such as munitions, covert deposits and moving sprayers. These agents pose a viable threat from hours to years depending on the substance used and the conditions for which it exists. Depending on the agent used and the effectiveness of the deployment of the agent, contamination can be spread thru wind and water. Infections could also spread from human to human, animal to animal, or human to animal and vice versa.

Winnebago County does not have any history of attacks but the planning committee could not rule out a future incident. The planning committee determined that the probability of a biological terrorism event is unlikely in any given year.

Causing intentional harm to an agricultural product or vandalism of an agricultural/animal related facility is agro-terrorism. Activities could include the following examples: animal rights activists who release mink or labanimals; disgruntled employees who intentionally contaminate bulk milk tanks or poison animals; eco- terrorists who destroy crops/facilities; theft of agricultural products, machinery, or chemicals; or criminals who vandalize agricultural facilities.

Incidents such as this have occurred in the state of Iowa. Winnebago County has not experienced any of these incidents. There are however cases of theft of agricultural machinery, products, and chemicals on a yearly basis within the county.

The planning committee determined that a serious agro-terrorism event is unlikely in Winnebago County in any given year.

Chemical terrorism involves the use or threat of chemical agents against persons or property in violation of the criminal laws of the US and the State of Iowa for the purposes of intimidation, coercion, or ransom. Liquid/aerosol or dry contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles/containers; or munitions. Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists. Contamination can be carried out of the initial target area by persons, vehicles, water, water and wind.

Chemicals may be corrosive or otherwise damaging over time if not mitigated.

Winnebago County has experienced releases of anhydrous ammonia by persons engaged in illegal drug manufacturing.

The planning committee determined that chemical terrorism event is unlikely in Winnebago County in any given year.

Use of conventional weapons and explosives against persons or property in violation of the criminal laws of the US and the State of Iowa for purposes of intimidations, coercion, or ransom is conventional terrorism. Hazard affects are instantaneous; additional secondary devices may be used, lengthening the time duration of the hazard until the attack sit is determined to be clear. The extent of damage is determined by the type and quantity of explosive. Effects are generally static other than cascading consequences, incremental structural failures, etc. Conventional terrorism can also include tactical assault or sniping from remote locations

Winnebago County has had one incident involving a pipe bomb that was used in an attempted murder case in 2006. Unfortunately, there will never be a way to totally eliminate all types of these clandestine activities. If person or persons are inclined to cause death and destruction, they are usually capable of finding a way to carry out their plans.

The planning committee determined that the probability of a high impact conventional terrorism event occurring in Winnebago County in any given year to be unlikely.

Electronic attack using one computer system against another in order to intimidate people or disrupt other systems is a cyber attack. Cyber terrorism may last from minutes to days depending upon the type of intrusion, disruption, or infection. Generally, there are no direct effects on the built environment, but secondary effects may be felt depending upon the system being terrorized. Inadequate security can facilitate access to critical computer systems allowing them to be used to conduct attacks.

Cyber-security and critical infrastructure protection are among the most important national security issues facing our country today, and they will only become more challenging in the years to come. Recent attacks on our infrastructure components have taught us that security has been a relatively low priority in the development of computer software and internet systems. These attacks not only have disrupted electronic commerce, but have also had a debilitating effect on public confidence in the internet.

The planning committee determined the probability that a serious electronic attack in Winnebago County is unlikely in any given year.

Radiological terrorism involves the use or threat of radiological agents against persons or property in violation of the criminal laws of the US and the State of Iowa for the purposes of intimidation, coercion, or ransom. Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions. Radiological terrorism will consist of detonation of a nuclear device underground, at the surface, in the air, or at high altitude.

There is no history of radiological terrorism in Winnebago County. The threat is relatively low, but it is technically feasible for a person or group of persons to construct a radiological weapon and use it for terrorist purposes.

Hazard	Terrorism	Score
Probability	The State of Iowa has experienced acts of terrorism; however one act has occurred in Winnebago County in 2006, which is attributed to conventional terrorism. Internationally, such acts have, unfortunately, become quite commonplace, as various religious, ethnic, and nationalistic groups have attempted to alter and dictate political and social agendas. Persons and groups who have threatened violence and are inclined to cause death and destruction, are usually capable of carrying out their plans. Due to the rural nature of Winnebago County and that the county is located in the breadbasket of the world; there is an increased risk to agro-terrorist activity. Law enforcement agencies respond to barricaded subject calls and deliver high risk warrants against armed persons. Protecting the computer systems of the county shall remain a high priority due to the increase of cyber-terrorism whether it is directed to the county or not. Destructive civil disturbances are rare; the potential is always there for an incident to occur. This is even more true today, where television, radio, and internet provides the ability to instantly broadcast information in real time to the entire community. This spread of information can easily devolve a situation from peaceful to violent.	1.35

Magnitude/ Severity	Since targets of attacks will include civilian and government facilities, the entire community is considered vulnerable to direct and indirect impacts. The entire county would likely to be impacted in some way, areas near government facilities, transportation, communications, and fuel facilities would experience the largest impacts. A full-scale attack is unlikely in the near future, however a limited attack could take place that could potentially threaten the target areas. Given the tremendous destructive capability of even one nuclear device or the detonation of said nuclear device at a high altitude over the middle of the country causing an EMP wave that destroys all electronics would be far worse than anything ever experienced in this country. Innocent people are often the victims of terrorist activity targeted at certain organizations and activities. Based on the method of delivery, the general public is vulnerable to bioterrorism. There are many factors in terrorism that geographic extent is hard to determine due to agent used, effectiveness of delivery, spread by air, water, or human and animal vectors. Our society highly networked and interconnected. An attack could be launched from anywhere on earth and could cause impacts as small as a computer lab to as large as the world wide web. Duration of exposure to the effects of radiological terrorism, distance from the source of radiation, and the amount of shielding between source and target determine exposure to radiation. Initial effects will be localized to site of attack; depending on meteorological conditions, subsequent behavior of radioactive contaminants may be dynamic. Radiological terrorism, the severity of an incident would primarily be isolated to the impact point and areas that are downwind from the impact. Civil disturbances are often difficult for local communities to handle. There is a fine line between the Constitutional right of individuals and groups to assemble and air their grievances and the overall needs of the community to provide essential services, ensure personal safety of citizens, prevent property damage, and facilitate normal commerce. Fortunately, most demonstrations and large public gatherings are held in peaceful, responsible manner. However, there never seems to be a shortage of groups whose primary objective is to disrupt normal activities and perhaps even cause injury and property damage.	2.27

	Civil unrest often results in injuries, deaths, and property damage. Perhaps even more tragic has been the lingering, negative impact and loss of investment in the communities ravaged by the uprisings. Many riot areas do not fully recover from the damage, destruction, and negative image brought on by such events. Looting, burning, and sniping can occur during severe civil disturbances. Fires can sometimes burn uncontrolled because firefighters and equipment are unable to respond due to resistance from rioters.	
Warning Time	Acts of terrorism can be immediate and often come after little or no warning. There are occasions when terrorists have warned the targeted organization beforehand, but often the attack comes without previous threat. Terrorists threaten people and facilities through "bomb threats" and other scare tactics. Even if it is a shallow threat, precautions must be taken to ensure the safety of the people and property involved.	3.36
Duration	The response to all sources of terrorism are extensive and will result in the need for outside resources and response from Federal agencies in both the investigation of a crime scene and in the response to the direct threats to life and property.	1.98
	Final Weighted Score	1.99

Thunderstorms and Lightning

Thunderstorms are common in Winnebago County and can occur singly, in clusters, or in lines. Thunderstorms result in heavy rains, winds reaching or exceeding 58 mph, producing a tornado, or dropping surface hail at least 1.00 inch in diameter. They are created from a combination of moisture, rapidly raising warm air, and a lifting mechanism such as clashing warm and cold air masses.

Between 1961 and September of 2022, at least 85 severe thunderstorm events have impacted Winnebago County, causing $1,964,000 in property damage and $126,600 in crop damage. Because thunderstorms occur singly, in clusters, or in lines, it is possible that several thunderstorms may affect the same area over the course of a few hours and only be listed as one occurrence. It is highly possible that more than 85 severe thunderstorm events have happened since 1961.

Most thunderstorms produce only thunder, lightning, and rain; severe storms, however, can produce tornadoes, straight-line winds and microburst's above 58 mph, lightning, hailstorms, and flooding. The National Weather Service (NWS) considers a thunderstorm severe if it produces hail at least 1-inch in diameter, wind meeting or exceeding 58mph, or tornadoes.

Straight-line winds can often exceed 60 mph, are common occurrences, and are often mistaken for tornadoes. A number of thunderstorms have caused other hazards such as flash flooding, river flooding, and tornadoes.

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt", this flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches temperatures approaching 50,000 degrees Fahrenheit in a split second, this rapid heating, expansion, and cooling of air near the lightning bolt creates thunder. Winnebago County has experienced 5 reported lightning events between 1997 and 2002, causing $210,000 in property damage.

However with an average of 25 million lightning strikes in the US in any given year, there are probably more than 5 events that happened in Winnebago County.

The participants determined that thunderstorms and lightning events affect Winnebago County more than 33% probability in any given year or as highly likely.

Hazard	Thunderstorms and Lightning	Score
Probability	Between 1961 and September of 2022, at least 85 severe thunderstorm events have impacted Winnebago County. Because thunderstorms occur singly, in clusters, or in lines, it is possible that several thunderstorms may affect the same area over the course of a few hours and only be listed as one occurrence. It is highly possible that more than 85 severe thunderstorm events have happened since 1961. Winnebago County has experienced 5 reported lightning events between 1997 and 2002, causing $210,000 in property damage. However with an average of 25 million lightning strikes in the US in any given year, there are probably more than 5 events that happened in Winnebago County. The State of Iowa experiences between 30 and 50 thunderstorm days per year on average. With Iowa's and Winnebago County's location located in the interior of the US, there is a very high likelihood that a few of these thunderstorms will become severe and cause damage. Due to the humid continental climate that Iowa experiences, ingredients of a severe thunderstorm is usually available (moisture to form clouds and rain, relatively warm and unstable air that can rise rapidly, and weather fronts and convective systems that lift air masses).	3.22

Magnitude/ Severity	Those in unprotected areas, mobile homes, or automobiles during a storm are at risk. Sudden strong winds often accompany a severe thunderstorm and may blow down trees across roads and power lines. Lightning presents the greatest immediate danger to people and livestock during a thunderstorm. It is the second most frequent weather-related killer in the US with nearly 100 deaths and 500 injuries each year. (Floods and flash floods are the number one cause of weather related deaths in the US. Livestock and people who are outdoors, especially under a tree or other natural lightning rods, in or on water, or on or near hilltops are at risk from lightning. Hail can be very dangerous to people, pets, and livestock if shelter is not available. Flash floods and tornadoes can develop during thunderstorms as well. People who are in automobiles or along low-lying areas when flash flooding occurs and people who are in mobile homes are vulnerable to the impacts of severe thunderstorms. Severe thunderstorms can be quite expansive with areas of localized severe conditions. Most severe thunderstorm cells are 5 to 25 miles wide with a larger area of heavy rain and strong winds around the main cell. Most non-severe thunderstorms have a lifespan of 20 to 30 minutes, while thunderstorms last longer than 30 minutes. Like tornadoes, thunderstorms and lightning can cause death, serious injury, and substantial property damage. The power of lightning's electrical charge and intense heat can electrocute people and livestock on contact, split trees, ignite fires, and cause electrical failures. Thunderstorms can also bring large hail that can damage homes and businesses, break glass, destroy vehicles, and cause bodily harm to people, pets, and livestock. High winds can damage trees, homes, mobile homes, and businesses and can knock vehicles off of the road. Straight-line winds are responsible for most thunderstorm damage. One or more severe thunderstorms occurring over a short period (especially saturated ground) can lead to flooding and cause extensive power and communication outages as well as agricultural damage.	2.18
Warning Time	Some thunderstorms can be seen approaching, while other hit without warning. The NWS issues severe thunderstorm watches and warnings as well as statements about severe weather and localized storms. These messages are broadcast over NOAA Weather Alert Radios and area TV and radio stations. Advances in weather prediction and surveillance have increased warning times. The resolutions of radar and Doppler radar have increased the accuracy of storm location and direction. Weather forecasting and severe weather warnings issued by the NWS usually provide residents and visitors alike adequate time to prepare. Isolated problems arise when warnings are ignored.	2.82
Duration	The immediate response related to severe thunderstorm and lightning events are more aptly associated with the cascading effects of multiple events occurring over a short amount of time in the case of flash and river flooding, and in particularly severe thunderstorm events in the case of tornadoes. Response to thunderstorm events is relatively minor in scope.	1.91
	Final Weighted Score	2.72

Tornado

A tornado is a violently rotating column of air, in contact with the ground, either pendant from a cumuliform cloud or underneath a cumuliform cloud, or often (but not always) visible as a funnel cloud. A tornado is an extremely violent local storm. A tornado is most commonly associated with a cumulonimbus cloud and can occur with heavy rainfall, lightning and hail. The vortex of the tornado usually rotates cyclonically although on rare occasions they have been observed to rotate anti-cyclonically. Wind speeds have been observed to as low as 40 mph to as high as 300 mph. Wind speeds are estimated on the basis of wind damage using the Enhanced Fujita scale or EF scale. Tornadoes occur most commonly in the Midwest region of the United States but can occur anywhere.

In the US, Iowa is ranked third in the number of tornadoes per 10,000 square miles. Between 1961 and 2021 there have been 22 tornado events in Winnebago County causing 5 injuries, $9,248,000 in property damage, and $21,550 in crop damage.

The participants determined that the probability that a damaging tornado will occur in Winnebago County is likely in any given year.

Hazard	Tornado	Score
Probability	In the US, Iowa is ranked third in the number of tornadoes per 10,000 square miles. Between 1961 and 2021 there have been 22 tornado events in Winnebago County causing 5 injuries, $9,248,000 in property damage, and $21,550 in crop damage. On average Winnebago County has a 35% chance in any given year to experience a tornado. However, the participants determined that a severe damaging tornado will likely occur in Winnebago County in any given year.	2.48

Magnitude/ Severity	Those most at risk from tornadoes include people living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to twisters. The elderly, very young, and physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the path of destruction. People who may not understand watches and warnings due to language barriers are also at risk. Generally the destructive path of a tornado is only a couple hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile wide. Normally a tornado will stay on the ground for no more than 20 minutes; however, one tornado can touch ground several times in different areas. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows; all the way to complete destruction and disintegration of well-constructed structures, infrastructure, and trees. Tornadoes can impact many critical services, mainly electrical power. Buried services are not as vulnerable, but can be affected by their system components that are above ground. Whole towns have been known to be "wiped off the map." Economic impacts can result from direct damages to facilities or business disruption from the lack of critical services such as power, gas, or water. Currently the severity of tornadoes is measured by intensity based upon the Enhanced Fujita Scale. The severity of a tornado is measured by using 5 different factors. 1. The size of the tornado, with an EF-5 tornado being the most severe. 2. The amount of time a tornado stays on the ground. 3. The time of day will determine the number of people in vehicles. 4. The location within the county the tornado hits. The density of the population at the point of impact.	2.86
Warning Time	Tornadoes strike with an incredible velocity. Wind speeds may exceed 300 mph and the storm can travel across the ground at more than 70 mph. These winds can uproot trees and structures and turn harmless objects	3.32
Duration	The response to a tornado event is tied to responding to the immediate threat to life and property immediately following the tornado event and in the shelter of affected families and individuals.	2.26
	Final Weighted Score	2.69

FIGURE 8 – Tornado Activity in the US

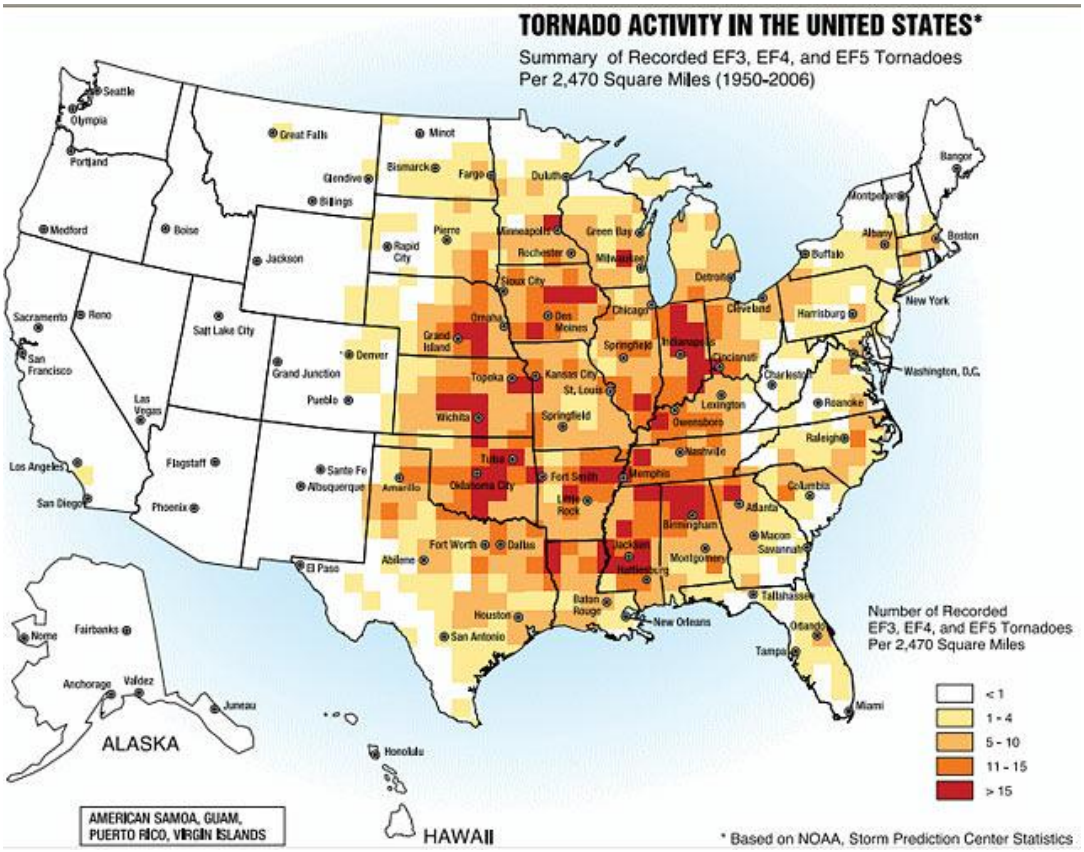


TABLE 17 – Enhanced Fujita Scale

EF Number	3-Second Gust(mph)	Description of Damage
0	65-85	**Light damage**. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
1	86-110	**Moderate damage**. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
2	111-135	**Considerable damage**. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
3	136-165	**Severe damage**. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
4	166-200	**Devastating damage**. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
5	Over 200	**Incredible damage**. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

TABLE 18 – Fujita Scale used prior to February 2007

Scale	Wind Speed (MPH)	Typical Damage
F-0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F-1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F-2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F-3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F-4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F-5	261+	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

Transportation Incident

This hazard encompasses the following hazards: air transportation incident, highway transportation, railway transportation, and waterway incident. This includes a transportation accident involving any mode of transportation that directly threatens life and which results in property damage and/or death(s)/injury(s) and/or adversely impacts a community's capabilities to provide emergency services.

An air transportation incident may involve a military, commercial, or private aircraft. Air transportation is playing a more prominent role in transportation as a whole; airplanes, helicopters, and other modes of air transportation are used to transport passengers, goods, services for business and recreation. A variety of circumstances can result in an air transportation incident; mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fire can all lead to an incident at or near the airport. Air transportation incidents can occur in remote unpopulated areas, residential areas, or downtown business districts, incidents involving military, commercial, or private aircraft can also occur while the aircraft is on the ground.

Winnebago County has 3 airports that are listed, Friesenborg Larson Airport near Buffalo Center and is listed as a private airport, Rake Airport near Rake and is listed as a private airport and Lake Mills Muni Airport near Lake Mills and is listed as a public airport. These airports are all grass strip airports; according to aerial photos no evidence of the two private airports could be found. Forest City Municipal Airport is located in Hancock County but is located in Forest City Corporate Limits that is a general aviation airport. There are no commercial offered services at this airport. The airport does have two paved runways one is 5,800 feet and the other is 2,700 ft. Anywhere in Winnebago County could experience a significant air transportation incident; the most likely scenarios exist near airports.

According to the National Transportation Safety Board there was one non-fatal incident at the Lake Mills Airport in 1992. There have been 3 non-fatal incidents and 1 fatal incident at the Forest City airport. These incidents occurred in 1985, 1987, 2010, and 2011. There has been one non-fatal incident at the Buffalo Center airport in 1999.
More and more people are utilizing air travel now than in the past; the trend of increasing numbers of people flying is likely to continue as will the crowdedness of airports and the skies above Iowa. Despite the increase in the number of people using air travel, incidents that require response personnel and involve casualties are likely to continue to decrease in number due to increases in the quality of training, equipment, and safety. Proper land- use near the airport will also decrease the chance that people and property on the ground will suffer significant impacts in the event of an air transportation accident.

The participants determined that a serious air transportation incident in Winnebago County as unlikely in any given year.

A highway transportation incident can be single or multi-vehicle requiring responses exceeding normal day-to-day capabilities. An extensive surface transportation network exists in Iowa; local residents, travelers, business, and industry rely on this network on a daily basis. Hundreds of thousands of trips a day are made on the streets, roads, and highways of Winnebago County. The design capacity of the roadway if exceeded has the potential for increasing the occurrences of a serious highway incident. Weather conditions play a major role in the ability of traffic to flow safely in and through the county as does the time of day and day of week and time of the year (planting and harvest). Incidents involving busses and other high-occupancy vehicles could trigger a response that exceeds the normal day-to-day capabilities of local response agencies.

Between 2004 and 2008 (latest data available) in Winnebago County there were 387 vehicle crashes, 4 were fatal, 20 were classified as major, 59 were classified as minor, 65 possible/unknown, and 239 property damage only. Out of these 387 crashes there were 199 injuries, 4 fatalities, 23 major injuries, 81 minor injuries, and 91 possible or unknown injuries.

Although traffic engineering, inspection of traffic facilities, land use management of adjacent areas to roads and highways, and the readiness of local response agencies has increased, highway incidents continue to occur. As the volume of traffic on Iowa streets, highways, and interstates increase, the number of traffic accidents will increase. The combination of large numbers of people on the road, unpredictable weather conditions, potential mechanical

problems, and human error create the potential for a transportation accident.

The participants evaluated the probability of a serious highway transportation incident occurring in Winnebago County is likely to occur in any given year.

A railway transportation incident is a train accident that directly threatens life and/or property or adversely impacts a community's capabilities ability to provide emergency services. Railway incidents may include derailments, collisions, and highway/rail crossing accidents. Train incidents can result from a variety of causes; human error, mechanical failure, faulty signals, and/or problems with the track. Results of an incident can range from minor "track hops" to catastrophic hazardous material incidents and even human/animal casualties. With the many miles of track in Iowa, vehicles must cross the railroad tracks at numerous at-grade crossings.
According to the Federal Railroad Administration Office of Safety Analysis there have been 2 incidents; one in 2009 causing an injury and one in 2011 not causing any injuries or deaths. With street and highway crossings the probability of an incident is more likely to happen. Derailments are also possible, while a major derailment would occur less frequently.

The participants determined the probability of a severe railroad accident (causing loss of life and/or release of hazardous materials) to be occasional to occur in any given year.

A waterway incident is an accident involving any water vessel that threatens life and/or adversely affects a community's capability to provide emergency services. Waterway incidents will primarily involve pleasure craft on rivers and lakes. In the event of an incident involving a water vessel, the greatest threat would be drowning, fuel spillage, and/or property damage. Water rescue events would largely be handled by first responding agencies. Waterway incidents may also include events in which a person, persons, or object falls through the ice on partially frozen bodies of water.

There have been no disasters causing waterway incidents in Iowa and Winnebago County. There have been search and rescue events involving a single person or small boats with only a few people on board. There are no navigable waterways in Winnebago County that are used for commercial purposes.

The participants determined the probability of a serious waterway incident in Winnebago County is unlikely in any given year.

Hazard	Transportation Incident	Score
	Winnebago County has 3 airports that are listed, Friesenborg Larson Airport near Buffalo Center and is listed as a private airport, Rake Airport near Rake and is listed as a private airport and Lake Mills Muni Airport near Lake Mills and is listed as a public airport. These airports are all grass strip airports; according to aerial photos no evidence of the two private airports could be found. Forest City Municipal Airport is located in Hancock County but is located in Forest City Corporate Limits that is a general aviation airport. There are no commercial offered services at this airport. The airport does have two paved runways one is 5,800 feet and the other is 2,700 ft. Anywhere in Winnebago County could experience a significant air transportation incident; the most likely scenarios exist near airports. According to the National Transportation Safety Board there was one non-fatal incident at the Lake Mills Airport in 1992. There have been 3 non-fatal incidents and 1 fatal incident at the Forest City airport. These incidents occurred in 1985, 1987, 2010, and 2011. There has been one non-fatal incident at the Buffalo Center airport in 1999.	1.5
Probability	More and more people are utilizing air travel now than in the past; the trend of increasing numbers of people flying is likely to continue as will the crowdedness of airports and the skies above Iowa. Despite the increase in the number of people using air travel, incidents that require response personnel and involve casualties are likely to continue to decrease in number due to increases in the quality of training, equipment, and safety. Proper land-use near the airport will also decrease the chance that people and property on the ground will suffer significant impacts in the event of an air transportation accident. Between 2004 and 2008 (latest data available) in Winnebago County there were 387 vehicle crashes, 4 were fatal, 20 were classified as major, 59 were classified as minor, 65 possible/unknown, and 239 property damage only. Out of these 387 crashes there were 199 injuries, 4 fatalities, 23 major injuries, 81 minor injuries, and 91 possible or unknown injuries. Although traffic engineering, inspection of traffic facilities, land use management of adjacent areas to roads and highways, and the readiness of local response agencies has increased, highway incidents continue to occur. As the volume of traffic on Iowa streets, highways, and interstates increase, the number of traffic accidents will increase. The combination of large numbers of people on the road, unpredictable weather conditions, potential mechanical problems, and human error create the potential for a transportation accident.	

	According to the Federal Railroad Administration Office of Safety Analysis there have been 2 incidents; one in 2009 causing an injury and one in 2011 not causing any injuries or deaths. With street and highway crossings the probability of an incident is more likely to happen. Derailments are also possible, while a major derailment would occur less frequently. There have been no disasters causing waterway incidents in Iowa and Winnebago County. There have been search and rescue events involving a single person or small boats with only a few people on board. There are no navigable waterways in Winnebago County that are used for commercial purposes.	
Magnitude/ Severity	People aboard airplanes are the most vulnerable. Statistics from the National Transportation Safety Board and the airline industry show that the majority (over 75%) of airplane crashes and accidents occur during the takeoff or landing phases of a flight. As a result, developed areas adjacent to the airports and in airport flight paths are particularly vulnerable to this hazard. For areas away from the airport, a smaller percentage of the population would be directly in the area of impact. Because of the infrequency of aircraft in the skies above areas away from the airport, these areas would not be considered as vulnerable. A mentioned above, most accidents occur during takeoffs and landings. Accordingly, the spatial extent of the majority of incidents would occur on airport grounds or adjacent areas. Compared to many other hazards, an air transportation accident would occupy a relatively small area. The extent to which the impacts would be felt would depend on the materials involved. For example, if a cargo plan transporting volatile or hazardous materials were involved in an accident, the area of concern would be significantly larger than the area for an accident involving a small personal aircraft carrying stable materials. Users of surface transportation systems are the most vulnerable. Travelers, truckers, delivery personnel, and commuters are at risk at all times that they inhabit the roadway. Certain times of the day, week, and year the number of vehicles and people on the roadway are significantly higher. This is also true after major public events; sports, concerts, etc. Pedestrians are less vulnerable but not immune from the impacts of a highway incident. Highway incidents are usually contained to areas on the roadway or directly adjacent to the roadway. Very few highway incidents affect areas outside the traveled portion of the road and the right-of-way. Extensive segments of the transportation system can be impacted during significant weather events, such as a large snowstorm, when multiple separate	1.51

	accidents occur. The area of impact can extend beyond the localized areas if the vehicle(s) involved transporting hazardous materials. People and property near railway lines, crossings, sidings, switching yards, and loading/unloading points are more at risk. Those away from railways and facilities are vulnerable only to large-scale incidents including those in which hazardous material are involved. The railways that traverse Winnebago County include the UP (Union Pacific). These railways provide services to haul grain, chemicals, farm equipment and ethanol from the producers of these materials in Winnebago County. The railways go through the towns of Lake Mills and Scarville. There is a railway spur that ends in Forest City that is no longer active. Harmful products may contaminate streams, rivers, lakes, and entire watersheds. If this would happen a large portion of the community or county could be affected. The ability of response personnel to contain the product on-scene usually limits the area affected. Passengers of watercraft are vulnerable to a waterway incident. The maximum extent of a waterway incident would be limited. Impacts would not extend beyond the initial incident scene. The only exception would be during a search and rescue event that could expand downstream. In the case of a hazardous material being released to the waterway the extent could expand rapidly.	
Warning Time	The amount of warning time for a transportation incident could vary from tens of minutes to a few seconds. Operators of aircraft, vehicles, trains, and watercraft are affected by the road conditions and weather. There is not enough ample warning time attributed to these hazards.	2.58
Duration	Instances of transportation incidents, particularly rail, air and waterway related hazards are likely to create more intensive response and resources to protect life and safety of those affected.	1.48
	Final Weighted Score	1.73

Windstorm

Windstorms can be described as extreme winds associated with severe winter storms, severe thunderstorms, downburst, and very steep pressure gradients. Windstorms, other than tornadoes, are experienced in all regions of the United States. It is difficult to separate the various wind components that cause damage from other wind-related natural events that often occur with or generate windstorms.

Although Iowa does not experience direct impacts from hurricanes, the state is no stranger to strong, damaging winds. Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide and the duration of the event could range from hours to days. These events can produce straight line winds in excess of 64 knots causing some power outages, property damage, impaired visibility, and crop damage.

Windstorms occur in Winnebago County. Historically, windstorm events are associated with severe thunderstorms and blizzards. It is often difficult to separate windstorms and tornado damage when winds get above 64 knots.

The NWS has developed a windstorm warning system similar to other events such as, tornado, winter storm, and thunderstorm. Watches are issued when conditions are favorable for windstorms to develop and they come 12 to 24 hours in advance.

Advisories are issued when existing or imminent windstorms cover part or all of the area and pose a mere inconvenience. Windstorm warnings are issued when existing or imminent high winds cover part or all of the forecast area and pose a threat to life and property.

According to NCDC data there are no reports of strong wind events, although as mentioned above it is hard to separate wind events from thunderstorms and tornados.

The participants determined that the probability of a windstorm event in Winnebago County as highly likely to occur in any given year.

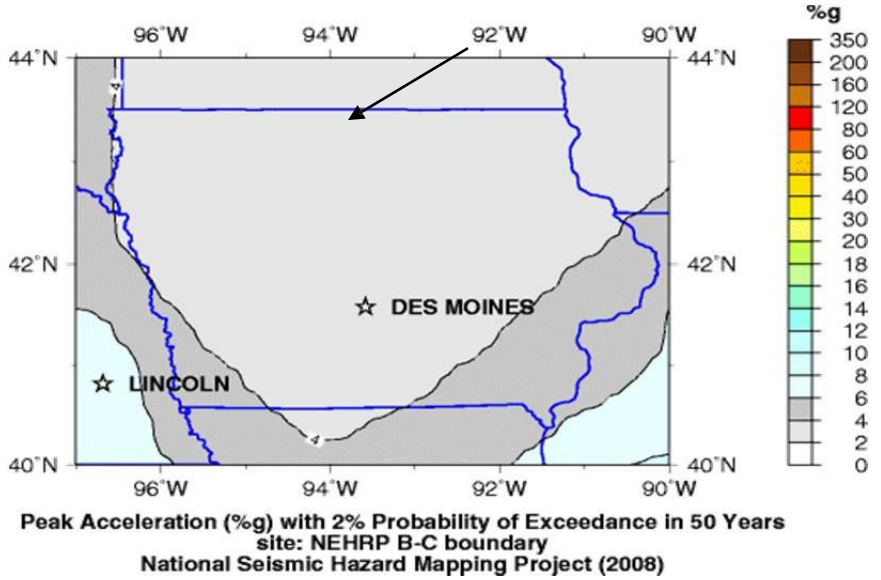
Hazard	Windstorm	Score
Probability	Windstorms occur in Winnebago County. Historically, windstorm events are associated with severe thunderstorms and blizzards. It is often difficult to separate windstorms and tornado damage when winds get above 64 knots. According to NCDC data there are no reports of strong wind events, although as mentioned above it is hard to separate wind events from thunderstorms and tornados.	2.77

Magnitude/ Severity	Those most at risk from windstorms include living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to wind storms, particularly tornadoes. The elderly, very young, and the physically and mentally handicapped are most vulnerable because of the lack of mobility to seek shelter or escape the path of destruction. People who may not understand watches and warnings due to language barriers are also at risk. Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide and several hundred miles long. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. Disruption of critical services can also affect operations. Employees may be affected and unable to attend work-related issues. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows; all the way to complete destruction of well-constructed structures, infrastructure, and trees. Windstorms can affect many critical services, especially electrical power. Buried services are not as vulnerable, but can be affected by their system components that are above ground. Economic impacts can result from direct damages to facilities or business disruption from the lack of critical services such as power. Crop damage is often associated with windstorms; laying down crops, breaking stalks, and twisting plants, reducing the yield and making it difficult to harvest.	2.3
Warning Time	Wind speeds may approach 120 miles per hour and the storm can travel across the ground at more than 50 mph. These winds can uproot trees and structures and turn harmless objects into deadly missiles, all in a matter of seconds. The development of conditions suitable for high and strong wind events is available a day in advance. The advancement in weather forecasting has allowed watches to be delivered to those in the path of these storms up to hours in advance. The best warning lead-time for a specific severe storm is about 30 minutes.	2.94
Duration	The response tied to windstorm events is one directly related to the immediate protection of vulnerable populations from the direct threat to life and property. Response time is limited to event duration and immediate impact.	2.1
	Final Weighted Score	2.59

TABLE 19 – Beaufort Wind Scale

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind determined on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4ft. becoming longer, numerous whitecaps	Dust, leaves and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft, white foam streaks off breakers	Whole trees moving, resistance determined walking against wind
8	34-30	Gale	Moderately high (13-20 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance determined walking against wind
9	41-47	Strong Gale	High waves (20 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft) with overhanging crests sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land trees broken or uprooted, “considerable structural damage”
11	56-63	Violent Storm	Exceptionally high (30-45 ft) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	

TABLE 20 – Excluded Hazards

Hazard Excluded	Reasoning
Earthquake	There has been no history of an earthquake that caused any damage to Winnebago County and it is very improbable that one may occur as shown in the following earthquake probability chart. The arrow below shows the approximate location of Winnebago County.  Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years site: NEHRP B-C boundary National Seismic Hazard Mapping Project (2008)
Radiological Incident	No facilities are located in Winnebago County that has dangerous radiological material. It could not be determined if any amounts of radiological material was being transported through the County and these incidents would be considered to be handled by those companies transporting the material and State and Federal response teams.
Expansive Soils	Expansive soils hazard and risk information provided by Iowa HLSEM, the Multi-Hazard Identification and Risk document, USGS, and the Winnebago County Emergency Management Coordinator indicated the level of risk associated with expansive soils was slight with little swelling clay potential.
Landslide	Minor landslides and rock falls do occur in Winnebago County. Due to the geography and incident rate information provided by HLSEM, that any landslide that may occur is only going to be small and cause only minor damage with no threats to human safety and minimal threats to property.
Levee Failure	Levee failure is not considered because according to the United States Army Corps of Engineers (USACE) there is no levee protecting any portion of Winnebago County or jurisdiction located within Winnebago County.

Dam Failure	Dam failure is not being profiled due to any known high-hazard dams being located in the county, according to IHSEMD. All dams that are located in the Winnebago County are of the low-head type. Low-head dams do not hold water back in a reservoir they were mostly used for grain milling in the late 1800's and now provides stream flow stabilization.
Sink Holes	Not profiled due to no or low occurrence in the county according to the committee. Measures are in place for rescue due to a sink hole if necessary.

HAZARD SCORING SUMMARY

The Winnebago County hazard mitigation participants reviewed discussed and scored all of the hazards that might impact the county. The chart that follows shows a breakdown of the scoring for each hazard that was identified. The following tables show the scoring summary for Winnebago County and its jurisdictions. Jurisdictions scored some of the hazards different than the county and that is reflected in that particular jurisdictions table, also some communities elected to not score some of the hazards and their justification is listed after each respective hazard. The weighted score is calculated by using the following formula: (Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10) = Final Hazard Assessment Score

TABLE 21 – Winnebago County Hazard Score

Landslides, levee failures, and sinkholes were eliminated due to the threats not being present or high enough in probability to considered in Winnebago County

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	1.67	2.33	1.33	4	9.33	2.05
Dam Failure	1	2	2	3	8	1.65
Drought	2.5	2	1	4	9.5	2.28
Earthquake	1	3	4	1	9	2.05
Expansive Soils	2	1	1	4	8	1.75
Extreme Heat	4	3	1	3	11	3.15
Flash Flood	1.67	1.67	2.67	2.67	8.68	1.92
Grass or Wildland Fire	2.33	2	3.33	1.67	9.33	2.32
Hailstorm	3	3	3.33	1	10.33	2.85
Hazardous Materials	1.67	2	3.33	2.33	9.33	2.08
Human Disease	2	1.5	1	2.5	7	1.75
Infrastructure Failure	2	2.33	3.67	2.33	10.33	2.38
Landslide					0	0
Levee Failure					0	0
Radiological Incident	1	3	4	4	12	2.35
River Flooding	2	2.5	1.5	3.5	9.5	2.23
Severe Winter Storm	3	2.67	2.67	3	11.34	2.85
Sinkholes					0	0
Terrorism	3	3	3.5	2.5	12	3.03
Thunderstorms and Lightning	3.33	2.67	3	2	11	2.95
Tornado	3.33	3	3.33	2	11.66	3.1
Transportation Incident	2	2	1	1.5	6.5	2.25
Windstorm	2.67	2.67	2.67	2	10.01	2.6

TABLE 22 – Buffalo Center Hazard Score

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	2	1.67	3	3.67	10.34	2.22
Dam Failure	1	1.33	2	2.33	6.66	1.38
Drought	3.33	2.67	1.67	4	11.67	2.95
Earthquake	1.5	1.5	3.5	2	8.5	1.85
Expansive Soils	1.5	1.5	3	4	10	1.98
Extreme Heat	3	1.67	1.67	3.67	10.01	2.47
Flash Flood	2.33	2.33	3.67	3.67	12	2.67
Grass or Wildland Fire	1.67	2.33	3.67	3	10.67	2.3
Hailstorm	2.33	3	4	2.67	12	2.82
Hazardous Materials	2	2	4	2.67	10.67	2.67
Human Disease	2	2.67	2.67	3.67	11.01	2.47
Infrastructure Failure	1.33	2.33	3.33	2	8.99	2
Landslide	1	2	1	2	6	1.4
Levee Failure	1	2	2	4	9	1.75
Radiological Incident	1.5	3	3	4	11.5	2.43
River Flooding	2.33	2.67	2.33	3	10.33	2.5
Severe Winter Storm	2.67	2.67	2.33	3	10.67	1.65
Sinkholes	2	2.5	3	3.5	11	2.45
Terrorism	1.33	2.33	4	2.67	10.33	2.17
Thunderstorms and Lightning	2.67	2.67	3	3	11.34	2.75
Tornado	2.67	2.67	3.67	3.67	12.68	2.92
Transportation Incident	2	3	2.5	3	10.5	2.63
Windstorm	2.33	2.67	3.67	3	11.67	2.7

TABLE 23 – Forest City Hazard Score

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	2.29	1.86	1.14	4	9.29	2.16
Dam Failure	1.5	2	0.25	3	6.75	1.95
Drought	2.67	2.11	1	3.56	9.34	2.33
Earthquake	1	3	4	3	11	2.25
Expansive Soils	2.67	1.67	2.33	3	9.67	2.35
Extreme Heat	3.22	1.89	1.22	3	9.33	2.5
Flash Flood	2.75	2.13	2.38	3.25	10.51	2.56
Grass or Wildland Fire	2	1.89	3.22	2.44	9.55	2.19
Hailstorm	3	2.56	3.78	1.89	11.23	2.87
Hazardous Materials	1.88	2.38	4	2.13	10.39	2.37
Human Disease	1.86	2	1.86	2.88	8.6	2.01
Infrastructure Failure	2	2.25	3.63	2.44	10.32	2.36
Landslide	1	1	2.67	1.67	6.34	1.32
Levee Failure	1.5	1.5	3.5	4	10.5	2.05
Radiological Incident	1.25	3	3.25	2.5	10	2.2
River Flooding	3.22	1.78	2.33	3.44	10.77	2.68
Severe Winter Storm	3.22	2.22	1.78	2.89	10.11	2.67
Sinkholes	1.6	1.4	3.6	2.2	8.8	1.9
Terrorism	2	2.71	4	2.71	11.42	2.59
Thunderstorms and Lightning	3.11	2.22	2.44	1.89	9.66	2.62
Tornado	2.67	3.72	3.89	2.5	12.78	3.15
Transportation Incident	2.11	1.3	4	2	9.41	2.3
Windstorm	3.22	2.06	2.78	1.78	9.84	2.66

TABLE 24 – Lake Mills Hazard Score

The Lake Mills planning committee determined to eliminate dam failure, earthquakes, expansive soils, landslides, levee failures, sinkholes and transportation incidents because the participants believed that either was either impossible or highly improbable

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	2	1	1	1	5	1.45
Dam Failure					0	0
Drought	2	2	1	1	6	1.75
Earthquake					0	0
Expansive Soils					0	0
Extreme Heat	2	2	1	2	7	1.85
Flash Flood	2	2	1	1	6	1.75
Grass or Wildland Fire	2	2	2	2	8	2
Hailstorm	2	2	1	1	6	1.75
Hazardous Materials	2	2	2	2	8	2
Human Disease	2	1	1	2	6	1.55
Infrastructure Failure	2	2	2	2	8	2
Landslide					0	0
Levee Failure					0	0
Radiological Incident	2	1	1	1	5	1.45
River Flooding	2	1	1	1	5	1.45
Severe Winter Storm	2	2	1	1	6	1.75
Sinkholes					0	0
Terrorism	2	2	2	2	8	2
Thunderstorms and Lightning	2	2	2	2	8	2
Tornado	2	2	1	1	6	1.75
Transportation Incident					0	0
Windstorm	2	2	1	1	6	7.75

TABLE 25 – Leland Hazard Score

The Leland planning committee determined to eliminate dam failure, earthquakes, landslides, and levee failures because the participants believed that either was either impossible or highly improbable

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	2	2.2	1.8	3.4	9.4	2.17
Dam Failure					0	0
Drought	2.4	2.8	1	4	10.2	2.47
Earthquake					0	0
Expansive Soils	1.75	2	1.75	3.75	9.25	2.03
Extreme Heat	2.83	2.67	1.5	3.33	10.33	2.63
Flash Flood	2.4	3	2.6	3.4	11.4	2.71
Grass or Wildland Fire	2.6	2.6	3.8	2.6	11.6	2.78
Hailstorm	3	2.83	3.67	2	11.5	2.95
Hazardous Materials	1.2	2.8	4	3	11	2.28
Human Disease	2.2	2.8	2	4	11	2.53
Infrastructure Failure	1.25	2.5	3.75	3.5	11	2.23
Landslide					0	0
Levee Failure					0	0
Radiological Incident	2	2	4	4	12	2.5
River Flooding	3.33	2.17	2.67	3.83	12	2.93
Severe Winter Storm	3.67	3	2.17	3.17	12.01	3.19
Sinkholes	2.25	1.75	4	3.75	11.75	2.51
Terrorism	1.25	2.5	3.5	3.5	10.75	2.19
Thunderstorms and Lightning	3.67	3.33	2.5	3.17	12.67	3.34
Tornado	3.33	3.5	2.83	3.5	13.16	3.33
Transportation Incident	1.5	2	4	2.25	9.75	2.1
Windstorm	3.17	2.83	3.17	3.5	12.67	3.1

TABLE 26 – Rake Hazard Score

The Rake planning committee determined to eliminate dam failure, earthquakes, expansive soils, landslides, levee failures, radiological incidents, river flooding and sinkholes because the participants believed that either was either impossible or highly improbable

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	1	1	1	4	7	1.3
Dam Failure					0	0
Drought	2	2	2	4	10	2.2
Earthquake					0	0
Expansive Soils					0	0
Extreme Heat	3	2	2	3	10	2.55
Flash Flood	2	2	4	1	9	2.2
Grass or Wildland Fire	1	1	4	1	7	1.45
Hailstorm	3	2	4	1	10	2.65
Hazardous Materials	1	3	4	2	10	2.15
Human Disease	1	2	2	4	9	1.75
Infrastructure Failure	2	1	4	3	10	2.1
Landslide					0	0
Levee Failure					0	0
Radiological Incident					0	0
River Flooding					0	0
Severe Winter Storm	3	3	3	4	13	3.4
Sinkholes					0	0
Terrorism	1	3	4	1	9	2.05
Thunderstorms and Lightning	4	2	4	1	11	3.1
Tornado	2	4	4	1	11	2.8
Transportation Incident	2	1	4	1	8	1.9
Windstorm	3	2	4	1	10	2.65

TABLE 27 – Scarville Hazard Score

The Scarville planning committee determined to eliminate dam failure, earthquakes, landslides, levee failures and terrorism because the participants believed that either was either impossible or highly improbable

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	1	1	2.5	4	8.5	1.53
Dam Failure					0	0
Drought	2.5	1.5	1.25	3.5	8.75	2.11
Earthquake					0	0
Expansive Soils	2	2	2	2	8	2
Extreme Heat	2.5	1.5	1.75	3	8.75	2.14
Flash Flood	2.33	2	2.33	2.67	9.33	2.27
Grass or Wildland Fire	1.75	1.75	2.5	2.75	8.75	1.96
Hailstorm	2.5	1.75	3	2	9.25	2.3
Hazardous Materials	2	3.33	4	3.67	13	2.87
Human Disease	1	1	2	2.25	6.25	1.28
Infrastructure Failure	1.33	2	3	2.33	8.66	1.88
Landslide					0	0
Levee Failure					0	0
Radiological Incident	1	1	4	4	10	1.75
River Flooding	2	2	2	2.5	8.5	2.05
Severe Winter Storm	3.75	2	2	2.5	10.25	2.84
Sinkholes	1	1	1	1	4	1
Terrorism					0	0
Thunderstorms and Lightning	3.5	1.75	3	2.25	10.5	2.76
Tornado	2.25	3	3.5	3.5	12.25	2.79
Transportation Incident	2.33	1.33	3.33	1.67	8.66	2.17
Windstorm	2.75	2.5	3.25	3.25	11.75	2.8

TABLE 28 – Thompson Hazard Score

The Thompson planning committee determined to eliminate dam failure, landslides and levee failures because the participants believed that either was either impossible or highly improbable

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	1.75	2.25	2.25	3.75	10	2.18
Dam Failure					0	0
Drought	2.75	2.25	1	3.75	9.75	2.44
Earthquake	1	1.5	4	2.5	9	1.75
Expansive Soils	1.5	1.5	1	3.5	7.5	1.63
Extreme Heat	3.25	1.75	1.25	3	9.25	2.48
Flash Flood	1.33	1.33	3.33	3.33	9.32	1.83
Grass or Wildland Fire	1.75	1.75	3.75	2.75	10	2.15
Hailstorm	2.25	2	3.5	1.5	9.25	2.29
Hazardous Materials	1.33	1.67	4	2.67	9.67	1.97
Human Disease	1.67	1.33	1.67	4	8.67	1.8
Infrastructure Failure	1	1.67	3.67	2.67	9.01	1.77
Landslide					0	0
Levee Failure					0	0
Radiological Incident	1	1	3	3	8	1.5
River Flooding	1	1	2	3	7	1.35
Severe Winter Storm	3.5	2.25	2	3	10.75	2.85
Sinkholes	1	1	4	4	10	1.75
Terrorism	1	1	4	3	9	1.65
Thunderstorms and Lightning	3	2	2.5	1.75	9.25	2.5
Tornado	1.75	2.25	3.75	1.75	9.5	2.2
Transportation Incident	1	2	2.5	1.5	7	1.58
Windstorm	1.5	2	2.75	2	8.25	1.89

TABLE 29 – North Iowa Community School(NICS) District Score

The NICS District planning committee determined to eliminate dam failure, earthquakes, expansive soils, landslides, levee failures, radiological incidents and transportation incidents because the participants believed that either was either impossible or highly improbable

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	1	1	3	4	9	1.6
Dam Failure					0	0
Drought	2	2	1	4	9	2.05
Earthquake					0	0
Expansive Soils					0	0
Extreme Heat	2	1	1	3	7	1.65
Flash Flood	2	1	4	1	8	1.9
Grass or Wildland Fire	2	1	4	1	8	1.9
Hailstorm	3	1	4	1	9	2.35
Hazardous Materials	1	1	4	1	7	1.45
Human Disease	1	3	1	4	9	1.9
Infrastructure Failure	1	2	4	3	10	1.95
Landslide					0	0
Levee Failure					0	0
Radiological Incident					0	0
River Flooding	1	1	1	4	7	1.3
Severe Winter Storm	3	1	2	3	9	2.25
Sinkholes	1	1	4	1	7	1.45
Terrorism	1	2	4	1	8	1.75
Thunderstorms and Lightning	3	1	3	1	8	2.2
Tornado	2	1	4	1	8	1.9
Transportation Incident					0	0
Windstorm	3	1	4	1	9	2.35

TABLE 30 – Forest City Community School District Score

The FCCS District planning committee determined to eliminate landslides and radiological incidents because the participants believed that either was either impossible or highly improbable

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	1.78	1.67	1.56	3.78	8.79	1.91
Dam Failure	2	2.33	4	3.33	11.66	2.53
Drought	2.56	2.67	1	3.89	10.12	2.49
Earthquake	1	1	4	1	7	1.45
Expansive Soils	2.2	1.6	2.5	3.4	9.7	2.19
Extreme Heat	2.44	2.44	1	3.22	9.1	2.31
Flash Flood	2.78	2.22	2.11	3.22	10.33	2.56
Grass or Wildland Fire	1.86	1.71	2.86	2.29	8.72	2.01
Hailstorm	3	2.3	2.4	1.3	9	2.6
Hazardous Materials	1.11	1.67	3.67	2.89	9.34	1.84
Human Disease	1.33	2	2.11	3.67	9.11	1.88
Infrastructure Failure	1.63	1.63	3.06	2.81	9.13	1.96
Landslide					0	0
Levee Failure	1	1	4	4	10	1.75
Radiological Incident					0	0
River Flooding	2.78	2.11	1.78	3.56	10.23	2.21
Severe Winter Storm	3.22	2.11	1.67	2.67	9.67	2.6
Sinkholes	1.5	1.5	3.75	2.5	9.25	1.94
Terrorism	1.25	2.38	4	2.38	10.01	2.12
Thunderstorms and Lightning	3.11	1.89	2.11	2	9.11	2.48
Tornado	2.78	2.78	3	2.39	10.95	2.77
Transportation Incident	1.56	1.94	3.56	1.89	8.95	2.01
Windstorm	2.78	2.61	2.5	2.11	10	2.62

TABLE 31 – Lake Mills Community School District Score

The LMCS District planning committee determined to eliminate dam failures because the participants believed that either was either impossible or highly improbable

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	3	2	1	4	10	2.5
Dam Failure					0	0
Drought	4	2.5	1	4	11.5	3.1
Earthquake	1	4	4	1	10	2.35
Expansive Soils	2	2	1	2	7	1.85
Extreme Heat	4	0.15	1	3	8.15	2.7
Flash Flood	2	2	4	2	10	2.3
Grass or Wildland Fire	2	1.5	3.5	1.5	8.5	2.03
Hailstorm	3.5	2	3.5	1	10	2.8
Hazardous Materials	2	1.5	4	1.5	9	2.1
Human Disease	3	2	1.5	4	10.5	2.58
Infrastructure Failure	1.5	3	4	2.5	11	2.43
Landslide	1	4	4	1	10	2.35
Levee Failure	1	4	4	2	11	2.45
Radiological Incident	1	4	4	4	13	2.65
River Flooding	3	1.5	1.5	3.5	9.5	2.38
Severe Winter Storm	4	2	2	2.5	10.5	2.95
Sinkholes	1	2	4	1	8	1.75
Terrorism	1	4	4	1	10	2.35
Thunderstorms and Lightning	4	2.5	3.5	1	11	3.18
Tornado	2.5	3.5	3.5	2.5	12	2.95
Transportation Incident	2	2	3.5	1.5	9	2.18
Windstorm	4	3	2.5	2.5	12	3.33

HAZARD PRIORITIZATION

The Winnebago Hazard Mitigation participants has scored and identified the hazards affecting their community. They examined each hazard in relation to the risk it posed to the county. The committee then gave each identified hazard a priority level. The weighted score served to give the committee a basis to put the hazards in a priority level which then determined which mitigation measures to put with each hazard. The following tables show the priority levels for each jurisdiction starting with the County. Priority Group 1 hazards are candidates for immediate focus in the emergency plans because of their high risk. Priority Group 2 hazards are those hazards that should be addressed, but are longer-term in focus. These are low-risk hazards that can affect the community, but will not be addressed immediately. Priority Group 3 hazards are those that have an acceptable level of risk. In the happenstance that the weighted score is the same between two or more hazards the hazards are listed in alphabetical order.

TABLE 32 – Hazard Priority for Winnebago County

No known structures could be found within a SFHA according to FIRMs and BING Maps.

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Infrastructure Failure	3.25	1
2	Tornado	3.25	
3	Hailstorm	3.1	
4	Human Disease	3.1	
5	River Flooding	3.1	
6	Thunderstorms and Lightning	3.1	
7	Windstorm	3.1	
8	Transportation Incident	3.05	2
9	Severe Winter Storm	3.0	
10	Grass or Wild-land Fire	2.95	
11	Flash Flood	2.85	
12	A/P/C Disease	2.65	3
13	Terrorism	2.65	
14	Hazardous Materials	2.55	
15	Extreme Heat	2.4	
16	Drought	2.05	

TABLE 33 – Hazard Priority for Buffalo Center

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Transportation Incident	3.8	1
2	Infrastructure Failure	3.7	
3	Thunderstorms and Lightning	3.1	
4	Severe Winter Storm	3.0	
5	Tornado	2.8	2
6	Flash Flood	2.65	
7	Hazardous Materials	2.65	
8	Human Disease	2.65	3
9	Terrorism	2.65	
10	Extreme Heat	2.05	
11	Hailstorm	1.9	

TABLE 34 – Hazard Priority for Forest City

Forest City has approximately 5-10 residential and commercial structures located in the SFHA according to the FIRM and BING Maps.

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Infrastructure Failure	3.25	1
2	Hailstorm	3.1	
3	Human Disease	3.1	
4	River Flooding	3.1	
5	Thunderstorms and Lightning	3.1	
6	Windstorm	3.1	
7	Transportation Incident	3.05	2
8	Severe Winter Storm	3.0	
9	Tornado	2.8	
10	Terrorism	2.65	
11	Hazardous Materials	2.55	
12	Extreme Heat	2.4	3
13	Flash Flood	2.4	
14	A/P/C Disease	2.05	
15	Drought	2.05	
16	Grass or Wild-land Fire	1.9	

TABLE 35 – Hazard Priority for Lake Mills

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Thunderstorms and Lightning	3.1	1
2	Flash Flood	2.85	
3	Transportation Incident	2.8	
4	Hailstorm	2.65	2
5	Severe Winter Storm	2.45	
6	Tornado	2.35	
7	Hazardous Materials	2.25	3
8	Infrastructure Failure	2.05	
9	Extreme Heat	1.2	

TABLE 36 – <u>Hazard Priority for Leland</u>

Leland has approximately 5-8 residential and agricultural structures located in a SFHA according to their FIRM and BING Maps. The committee noted that river flooding does not affect them as much as flash flooding from up north causing the ground to saturate and causing water to seep into the basements.

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Infrastructure Failure	4	1
2	River Flooding	4	
3	Hailstorm	3.7	
4	Grass or Wild-land Fire	3.4	
5	Severe Winter Storm	3.3	2
6	Tornado	3.25	
7	Thunderstorms and Lightning	3.1	
8	Transportation Incident	3.05	
9	Flash Flood	2.85	3
10	Hazardous Materials	2.55	
11	Extreme Heat	2.4	
12	Drought	1.9	

TABLE 37 – Hazard Priority for Rake

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Hazardous Materials	3.45	1
2	Tornado	3.25	
3	Thunderstorms and Lightning	3.2	
4	Hailstorm	3.1	
5	Windstorm	3.1	
6	Severe Winter Storm	3.0	2
7	Transportation Incident	2.75	
8	Human Disease	2.65	
9	Terrorism	2.65	
10	A/P/C Disease	2.35	3
11	Infrastructure Failure	2.35	
12	Extreme Heat	2.1	
13	Drought	2.05	
14	Flash Flood	1.95	

TABLE 38 – Hazard Priority for Scarville

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Infrastructure Failure	3.55	1
2	Tornado	3.25	
3	Hailstorm	3.1	
4	Human Disease	3.1	
5	Thunderstorms and Lightning	3.1	2
6	Windstorm	3.1	
7	Transportation Incident	3.05	
8	Severe Winter Storm	3.0	
9	Grass or Wild-land Fire	2.95	3
10	Flash Flood	2.85	
11	Hazardous Materials	2.55	
12	Extreme Heat	2.4	

TABLE 39 – Hazard Priority for Thompson

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Thunderstorms and Lightning	3.1	1
2	Windstorm	3.1	
3	Severe Winter Storm	3.0	
4	Flash Flood	2.85	
5	Tornado	2.8	2
6	Hailstorm	2.65	
7	Human Disease	2.5	
8	Terrorism	2.45	
9	Infrastructure Failure	2.3	3
10	Transportation Incident	2.3	
11	Hazardous Materials	2.25	
12	Extreme Heat	1.65	

TABLE 40 – Hazard Priority for North Iowa Community School District

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Tornado	4	1
2	Thunderstorms and Lightning	3.4	
3	Infrastructure Failure	3.3	
4	Severe Winter Storm	3.0	
5	Flash Flood	2.65	2
6	Hazardous Materials	2.65	
7	Human Disease	2.65	
8	Terrorism	2.65	3
9	Transportation Incident	2.5	
10	Extreme Heat	2.05	
11	Hailstorm	1.9	

TABLE 41 – Hazard Priority for Forest City School District

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Thunderstorms and Lightning	3.1	1
2	Windstorm	3.1	
3	Severe Winter Storm	3.0	
4	Flash Flood	2.85	
5	Tornado	2.8	2
6	Hailstorm	2.65	
7	Human Disease	2.5	
8	Terrorism	2.45	
9	Infrastructure Failure	2.3	3
10	Transportation Incident	2.3	
11	Hazardous Materials	2.25	
12	Extreme Heat	1.65	

TABLE 42 – Hazard Priority for Lake Mills Community School District

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Tornado	4	1
2	Thunderstorms and Lightning	3.4	
3	Infrastructure Failure	3.3	
4	Severe Winter Storm	3.0	
5	Flash Flood	2.65	2
6	Hazardous Materials	2.65	
7	Human Disease	2.65	
8	Terrorism	2.65	3
9	Transportation Incident	2.5	
10	Extreme Heat	2.05	
11	Hailstorm	1.9	

INVENTORY OF ASSETS

In order to identify appropriate mitigation techniques and projects the committee determined that it was necessary to identify the assets of the community. The table that follows lists the Winnebago County's assets that would be affected if the entire community was to be impacted by a hazard. Hazards do not typically affect an entire community to complete destruction; however, Tables 43 and 44 indicates community valuations for Winnebago County (unincorporated and incorporated). Community valuations for each jurisdiction are included on Tables 9-13. The committee determined that hazards do not typically affect a jurisdiction to complete destruction.

TABLE 43 – County Values

Type of Structure	Number of Structures		Value of Structures		Number of People	
	# in County	# at risk	$ in County	$ at risk	# in County	# at risk
Residential	4,317	4,317	$547,528,396	$547,528,396		
Commercial	414	414	$105,598,792	$105,598,792		
Industrial	17	17	$175,540,380	$175,540,380		
Agricultural	-	-	$34,758,370	$34,758,370		
Exempt Parcels	-	-	$68,771,515	$68,771,515	10,679	10,679
Totals	4,748	4,748	$932,197,453	$932,197,453	10,679	

Source: Winnebago County Assessor's Office-Abstract for 2024-Unincorporated and Incorporated

TABLE 44 – Unincorporated Values

Type of Structure	Number of Structures		Value of Structures		Number of People
	# in County	# at risk	$ in County	$ at risk	# at risk
Residential	707	707	$125,966,659	$125,966,659	-
Commercial	39	39	$27,364,531	$27,364,531	-
Industrial	17	17	$161,801,370	$161,801,370	-
Agricultural Realty			$32,141,290	$32,141,290	-
Residential dwellings on Agricultural Realty	540	540	$83,660,270	$83,660,270	-
Exempt Parcels	-	-	-	-	-
Totals	1,303	1,303	$398,792,830	$398,792,830	2,622

Source: Winnebago County Assessors Office-Abstract for 2024-Unincorporated Data Only

Residential/Commercial/Industrial = Assessed Value. Agricultural = Undeveloped parcels of land.
Exempt Parcels: Religious, Non-profits, County Courthouse, Fire Stations, Public Works facilities, etc

Winnebago County has identified specific structures in the county as critical facilities and infrastructure. Due to the function and value of the structures in the community, they need to be protected against the identified hazards. The critical facilities maps are located in the appendix of this plan, along with a list of critical facilities.

TABLE 45 – Critical Facility Values

Structures listed below are not known to be in a SFHA, more research will be conducted at the next plan update to determine if any of the following structures or possible new structures added to this list at the next plan update currently reside in an SFHA

Critical Facility	**Replacement Value $**	**Content Value $**	**Square Feet**	Occupancy
Scarville Town Hall	-	-	2,250	-
Scarville Fire Hall	-	-	2,475	-
Scarville Synod Church	-	-	4,024	-
Scarville Immanuel Church	-	-	6,375	-
Forest City Clinic			18,075	-
Forest City Water Treatment			5,383	-
Forest City City Shop			13,200	-
Forest City Police Department			7,280	-
Forest City Fire/EMS			17,752	-
Forest City City Hall			4,596	-
Winnebago County Courthouse			25,051	-
Winnebago County Sheriff's Office			15,683	-
Forest City Electric Plant			5,676	-
Forest City Water Tower 1			300,000 gallons	-
Forest City Water Tower 2			200,000 gallons	-

Forest City Warning Sirens	-	70,000	-	-
Forest City High/Middle School 206 W School Street FC			93,616	-
Forest City Elementary School 1405 W I Street FC			66,972	-
Forest City School Administration Building 145 S Clark St FC			14,964	-
Forest City School Bus Garage West K Street FC			15,088	-
Lake Mills K-12 School 102 S 4th Ave E Lake Mills			122,044	-
Lake Mills School Bus Garage			16,000	
North Iowa Community School Buffalo Center 111 3rd Ave NW			86,368	-
NICS Buffalo Center Bus Garage and Shop			8,800	-

VULNERABILITY ASSESSMENT AND ANALYSIS

The Hazard Analysis and Risk Assessment (HARA) is a product developed to provide an overview and analysis of the county's vulnerability to hazards. This plan used Census 2020 data, American Community Survey data 2018-2021, Winnebago County Abstract of Assessment for 2024. Development patterns in the County primarily are concentrated in Forest City and Lake Mills, rural areas of the county continue to decline in population. To assess the 23 identified hazards, a methodology was established to account for how hazards impacted the county or could potentially impact the county. The HARA is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from hazards by assessing:

- Probability – The likelihood of the hazard occurring in any given year while also incorporating any available data on historical occurrences.
- Magnitude/Severity – Measure of severity in terms of injuries and fatalities, personal property, and infrastructure and the extent with which the hazard affects the county.
- Warning Time – The potential amount of warning time that is available before the hazard

occurs.

- Duration – A measure of the amount of time that the hazard will affect the county.

The hazard analysis and risk assessment process sought to strike a balance between evaluation criteria. An example would be the evaluation of low probability-high impact events versus high probability-low impact events. Each category of a particular hazard is rated on a scale of one through four. Totaling the categorical ratings and averaging the scores provide an overall score in the range of 1.0 to 4.0.

The methodology includes a scoring guide, which was used by the Winnebago Participants and each jurisdictions participants to help obtain a proper assessment for each of the hazards in a countywide context. A scale of one through four was used in all of the scoring guide tables because of the large variation in historical occurrences, probabilities, percentages of vulnerabilities, percentage of spatial extent, the number of casualties, or the value of property damaged. Often this data was not available or would have been impossible to extract from aggregate data. Using this scale provided the best option for comparison of vastly different types of hazards.

Using a quantifiable system as described above gives more detail and still allows for adjustments when necessary. The idea of weighing comes from the State of Iowa 2010 Hazard Mitigation Plan. The committee determined that it was easier to use the State's method than create their own.

To determine loss estimates from the hazards the committee determined to use the State of Iowa Hazard Mitigation Plan dated 2010. The following table has the loss estimates by hazard for Winnebago County.

TABLE 46 – Annual Loss Estimation by Natural Hazard

County	Flood	Drought	Crop Loss	Extreme Heat	Extreme Cold	Hail
Winnebago	$329,596	$991,484	$575,637	$19,345	$284,520	$331,311
County	Snow & Ice	Tornado	Lightning	Thunderstorm	Windstorm	
Winnebago	$217,315	$937,021	$25,778	$71,882	$623,713	

CURRENT MITIGATION ACTIVITIES

This section is intended to give a brief overview of current and past mitigation activities that Winnebago County has undertaken.

Buffalo Center: Buffalo Center is currently working toward upgrading emergency power for the sewer system, upgrading the East lift station and acquiring a trailer pump for emergency bypass during heavy rain events. Future projects would be upgrading of the aging water system and supply lines as well as replacing the aging sewer system service lines. All of these projects would alleviate storm water inundation by increasing capacity for water handling. Due to the high cost of all these projects local, state and federal funding would have to be sought to offset any regular budgeted expenditures.

Forest City: Currently updating the City Emergency Plan to strengthen the City's capability to respond to emergencies; storm sewer upgrade project; sewage disposal upgrade project to increase capacity handling for water inundation. The Emergency Plan can be completed with relative ease and little in the way of budgetary considerations. The storm water and sewer projects will be completed with regular budgeted public funds and any opportunities for local, state of federal funds.

Lake Mills: Upgrading City Emergency Plan to strengthen the City's capability to respond to emergencies; Adding/Upgrading outdoor warning sirens to aid the city's notification and warning capability; enhancing storm water handling capacity; purchasing larger/more pumps for excessive rain inundations. The Emergency Plan can be completed with relative ease and little in the way of budgetary considerations. The siren project will take some fiscal planning to complete and may use grant funding as found available. Storm water handling and pump capacity upgrades may be completed seeking local, state or federal funding.

Leland: Move outdoor warning siren to more centralized location for better early warning coverage; Develop a new emergency operations plan for the City to strengthen the City's capability to respond to emergencies; Clear Winnebago River of obstacles to mitigate against flooding on eastern portion of the City. The debris removal would have to be conducted in cooperation with the Iowa DNR and funded almost solely through that entity.

Rake: Currently working towards upgrading emergency power generator at fire station; Upgrade of outdoor warning siren; develop a comprehensive shelter plan and incorporate local churches in planning process; Upgrade storm water and sewer system to increase the water handling capacity to quickly remove stormwater from streets during heavy rains; Upgrade of electrical infrastructure to provide a more consistent power source during and after high wind and/or ice event. All of these project will need outside funding through local, state and/or federal grants to be completed.

Scarville: Enhance emergency responder training and planning with rail incorporated to address hazardous materials concerns with rail line in City to aid the City in better preparing for emergencies.; New outdoor warning siren; Seek funding for a tornado safety room for community; develop a local debris management plan for post-disaster vegetative and material

debris. The training for local emergency responders may be funded through regular budgetary dollars. The remaining project would likely need local, state or federal grant opportunities to become a reality.

Thompson: Currently undertaking a water supply project to include water tower work; upgrading of water mains and enhancing the ability to increase the City's water pressure; Upgrade of the City's outdoor warning sirens; provide emergency power generators to city's critical facilities; Develop a shelter plan for the City. The water tower work is being cost shared through a State grant and local public dollars. The water pressure project would need to be completed utilizing similar funding mechanisms. The shelter planning may be easily completed using local time and budgeted dollars. The warning siren and generator projects will likely need to be completed with funding from local, state or federal grant dollars.

The Community School District's in Winnebago County lie within the jurisdictional boundaries of either one of the communities in this plan as well as the unincorporated areas and had no specific mitigation activities or plans to list. However, each district continues to enhance their physical and technological security measures as well as provide training to district personnel on critical safety issues.

Hazardous Materials

The North Iowa Hazardous Emergency Action Team (NIHEAT) was formed in 1993. The program is administered by the North Central Regional Emergency Planning Commission (NCREPC) with representatives from Cerro Gordo, Emmet, Floyd, Franklin, Hancock, Kossuth, Mitchell, Palo Alto, Winnebago and Worth. The hazardous emergency action team consists of twenty-six (26) hazardous materials technicians, twenty-three (25) of which are Mason City Firefighters. When a hazmat incident occurs, the team assembles technicians for response. The firefighters in Winnebago County's fire departments are trained to operations level. Contact information for Hazardous Material Response is as follows:

Hazardous Material Response

350 Fifth St. SW
Mason City, IA 50401
Phone: 641-421-3640

Tornado/Windstorm Activities

Tornadoes have been known to cause great destruction. They can demolish entire buildings, and it is not uncommon to hear of a tornado tearing off the roof of a house. With this type of potential damage, it is important that mitigation efforts are made to protect people from this deadly force. The most important measure in reducing the threat of injury is to be aware of the oncoming danger. Winnebago County has weather sirens implemented within most communities. Alert Iowa also delivers weather warning to citizens via their mobile devices. Members of the emergency services departments in the cities act as tornado spotters if storm conditions warrant.

There are a wide variety of early warning messages provided through local radio and television stations as well as the cable channel, Weather Channel. The National Oceanic and Atmospheric Administration (NOAA) provide an alternative weather band over the radio. Special NOAA Weather Radios and general radios capable of tuning into this band receive weather information that is broadcast from nearby National Weather Service offices. The local National Weather Service office broadcasts National Weather Service warnings, watches, forecasts and other hazardous weather information 24 hours a day. Information regarding protecting oneself in the event of a tornado should be largely publicized in the form of flyers, radio, newspaper and television announcements. The following is an example of the types of actions that should be taken in the event of a tornadic storm.

TABLE 47 - Tornado Safety Rules

1.	In a home or building, move to a pre-designated shelter such as a basement.
2.	If an underground shelter is not available, move to a small interior room or hallway on the lowest floor and get under a sturdy piece of furniture. Put as many walls as possible between you and the outdoors.
3.	Stay away from windows.
4.	Stay away from automobiles.
5.	Do not try to outrun a tornado in your car, leave it and immediately seek shelter. If caught outside or in a vehicle, lie flat in a nearby ditch or depression and cover your head with your hands.
6.	Highway overpasses do not provide shelter from tornadoes and high speed winds.
7.	Be aware of flying debris. Flying debris from tornadoes causes most fatalities and injuries.
8.	Mobile homes, even if tied down, offer little protection from tornadoes. You should leave a mobile home and go to the lowest floor of a sturdy nearby building or storm safe-room.

Winter Storm

Winnebago residents rely on local forecasting efforts to predict the onset of a winter storm. Current technology usually allows for one or more days of notice before the arrival of a major winter storm. NOAA estimates that approximately 70 percent of all deaths attributed to winter storms occur in an automobile. Therefore, the Winnebago County secondary road department provides snow and ice removal for roadways to mitigate the negative effects of winter storms. Snow removal equipment has been updated regularly within the past five years to give Winnebago County a fast response time.

Sheriff's Department

Law enforcement and protection is provided by the Winnebago County Sheriff's Office, which is located at 935 U.S. Highway 69 North, Forest City, IA. All officers must be certified by the Iowa Law Enforcement Academy, be certified in CPR, train on a firing range annually and receive training on general criminal investigation. Additional police services are provided through the local jurisdiction's police departments and the Iowa State Patrol and the communications center is also operated in the Winnebago County Sheriff's office within the City of Forest City.

Winnebago County Sheriff's Office
935 U.S. Highway 69 North
Forest City, IA 50436
(641) 585-2828

Emergency Medical Services and Health and Human Services

Patients with health problems exceeding the county's medical expertise are referred to larger health care facilities in Iowa or Minnesota including Mercy Medical Center in Mason City, IA; and the Mayo Clinic in Rochester, MN.

HAZARD MITIGATION PLAN GOALS

The Winnebago County Mitigation Participants identified the mitigation plan goals. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals identified are as follows:

The purpose of establishing goal statements is to set a general guideline for eliminating or reducing the long-term effects to property and life, reducing costs of response and recovery and minimizing disruption to Winnebago County following a hazardous event. Goal statements do not spell out specific strategies that can be measured but are written in general terms. Mitigation actions or measures are designed to be measured. The subsections of the hazards worksheets sections, i.e., probability, magnitude/severity, warning time, and duration (which form the methodology of the assessment) were consulted as necessary. These are all the goals that were established and considered by the Winnebago Participants.

The individual jurisdictions accepted the goals for each of their respective communities.

TABLE 48 – Goals

Goals ***Requirement §201.6(c)(3)(i):*** *[The hazard mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*	
1. Minimize vulnerability of the people and their property in Winnebago County to the impacts of hazards.	2. Protect critical facilities, infrastructure and other community assets from the impacts of hazards.
3. Improve education and awareness regarding hazards and risk in Winnebago County.	4. Strengthen communication among agencies and between agencies and the public.

MITIGATION MEASURES FEASIBLILITY

The Winnebago Hazard Mitigation committee and each jurisdiction's participants were given a list of mitigation measures which all 23 follow starting on page 101, these were all the mitigation measures that were discussed. After mitigation measures were chosen each person present had 3 votes, chosen mitigation measures were read aloud one by one and each person voted for the mitigation they determined that their respective community should focus on.

The mitigation measures are categorized as follows:

A. **Prevention:** Administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
B. **Property protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or remove them from the hazard area.
C. **Structural:** Actions that involve the construction of structures to reduce the impact of hazards.
D. **Natural resource protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
E. Public education and awareness: Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential way to mitigate them.

The participants reviewed the hazards that had been identified as well as the mitigation measure goals and categories with regards to the identified hazards. Anyone on the committee and in attendance at the meetings could verbally submit a mitigation measure to be considered in the plan, and then each mitigation measure was discussed, placing particular emphasis on new and existing buildings and infrastructure. Through much discussion of a comprehensive range of alternatives the participants achieved and consensus on the measures to include in the plan. Each jurisdiction had respective measures that were important to them. Each jurisdiction would be willing to accomplish any/all measure(s), if funds were secured.

The following tables show each mitigation measure(s) for their respective jurisdiction.

Analysis of Mitigation Measures

1. **Develop/update/publicize emergency management plans, including preparedness, response, recover, operations, long term recovery, and mitigation plans and maintain data inventory.**
   This measure will allow the jurisdiction to produce required and relevant plans that are up to date and are working documents that the community can use.

2. **Electrical Utility Retrofit/Hardening**
   This measure will allow the jurisdiction with the cooperation of the local utility company to upgrade and harden electrical lines and facilities in order to withstand hazardous events.

3. **Construct, retrofit, or maintain drainage systems to provide adequate and proper functioning systems to include sewage systems and retention and detention systems.**
   This measure will allow the jurisdiction to construct proper drainage and sewer systems in order to prevent infiltration of silt, soil, and other foreign materials into their sewage systems causing backup into homes and businesses.

4. **Acquire flood prone properties and convert to open space/green space; or elevate to or above base flood elevation.**
   This measure will allow the jurisdiction the option to acquire flooded properties in order

to prevent the continued flooding of structures located in a flood plain, or elevate structures as to not have to have the threat of repeated flooding to the subject property.

5. **Construct public safe rooms for government facilities, critical facilities, recreational areas, manufactured home parks, schools (North Iowa Community School District, Forest City Community Schools, and Lake Mills Community Schools), and day care centers.**
   This measure will allow the jurisdiction to construct safe rooms that will protect the public during extremely hazardous events, i.e., tornado, thunderstorms and lightning, severe winter storm, etc. The North Iowa Community School District, Forest City Community Schools and Lake Mills Community Schools would like to have tornado safe rooms as a part of their facilities in order to protect the children during hazardous weather. Right now the children go to the hallway during a tornado warning which has been proven as unsafe. This measure would ensure that the children and others that are in the school building are protected during a tornadic event. This measure is supported by the school districts as well as the communities as the facilities that are designed to be used not only by the school but also the community as a whole, many residents will also benefit from the safe room. Heritage Park a recreational area has indicated their interest in a tornado safe room.
6. **Replace or retrofit bridges and culverts to meet capacity requirements.** This measure will allow the jurisdiction the ability to prevent damage from flash floods with additional capacity to handle large amounts of water from heavy rains.

7. **Purchase/install backup power generators.**
   This mitigation measure assures that county critical facilities as designated by the Board of Supervisors, Emergency Management Coordinator, Sheriff's Department, etcetera, have adequate backup power supply to carry on the critical mission of the county during a disaster.

8. **Develop and implement watershed studies and implement watershed plan and conduct hydrology studies of groundwater problems, support of siltation removal projects, and creation of retention basins.**
   This measure will allow the jurisdiction to look into the watershed to see what the jurisdiction can do to help maintain proper drainage into the watershed that the jurisdiction lies in.

9. **Install soil stabilization, drainage and erosion protection measures.**
   This measure will allow the jurisdiction to prevent erosion of river and creek banks. The proper drainage that allows water to drain properly and at a controlled rate into a creek or river will lessen the chances of erosion and possible flooding.

10. **Non-structural retrofit of public structures.**
    Retrofitting public structures to prevent damages from hazardous events will ultimately protect the occupants and protect the limited budgets of local jurisdictions by lessoning the damage from the hazardous events.

11. **Construct, retrofit or maintain levees, dams, floodwalls, culverts, and floodgates to ensure adequate capacity and protection levels for property and critical facilities.**
    This measure will allow the jurisdictions in Winnebago County the option of updating their culverts to meet the capacity requirements of a heavy rainstorm.

12. **Raise roads to reduce hazard risk.**
    This measure will allow users of the road to see properly thereby reducing transportation incidents; this will also allow for proper drainage also reducing transportation incidents.

13. **Develop and promote comprehensive cost-effective recommendation for adoption and enforcement of land use, ordinances and regulations, promote legislation, zoning, and building codes that regulate construction, and decrease risk in areas susceptible to hazards.**
    This measure will allow jurisdictions the option of putting into place proper ordinances and building codes to prevent or lessen the damage from hazardous events.
14. **Ensure that proper security measures are in place for critical facilities.**
    This measure will ensure that security measures at noted critical facilities will be in place to prevent damage and protect those that rely on the function of those critical facilities.

15. **Establish natural vegetation buffers and removal of dead vegetation next to sensitive lands and forestry improvements/tree planting.**
    This measure will prevent many hazardous events like flooding, grass or wild- land fire, etc. This measure will ensure safety and property protection of Winnebago County residents and property owners.

16. **Encourage communities to include severe repetitive loss and repetitive loss strategy in all-hazard mitigation plans and comprehensive plans and educate communities on these properties in their jurisdiction and measures which may be used to reduce future damages.**
    This measure will encourage the communities in Winnebago County to continue to recognize repetitive loss claims and educate the communities to continue doing what they are doing to prevent these properties from becoming damaged and possibly removing them from the hazardous areas.

17. **Complete FIRM (Flood Insurance Rate Maps) and encourage NFIP community and individual participants, and survey of flood prone areas, and river channel studies, and update of existing flood maps.**
    This action ensures the safety and property protection of Winnebago County residents and property owners.

18. **Relocate critical facilities for flood protection.**
    By relocating critical facilities out of the areas that are prone to flooding ensures that these facilities can be relied upon during times of hazardous events when they are most

likely to be needed.

19. **Construct/elevate wastewater lift station.**
    The construction and elevation of a sewage lift station will allow the jurisdiction to prevent the flooding of the wastewater sewage system and hopefully prevent the backup seen in many homes in the past.

20. **Construct floodwalls.**
    The construction of floodwalls will protect the jurisdiction from floods and also protect critical functions of the jurisdiction to ensure the proper functioning of the city.

21. **Install and maintain protective measures for the safety and security of critical facilities.**
    This measure will allow a jurisdiction to fully protect its critical facilities from a wide range of hazardous events to prevent damage, theft, and loss of function.
22. **Employ construction measures that direct water away from structures.** This measure will prevent the flooding of structures and protect property owners from flooding.

23. **Remove asbestos from public facilities.**
    This measure will protect users and occupants in public facilities that have hazardous substances in them, thereby preventing health problems of these users and occupants.

TABLE 49 – Mitigation Measures and Goals

Measure	Goals	Hazard addressed	Action Category
Develop/update/publicize emergency management plans, including preparedness, response, recover, operations, long term recovery, and mitigation plans and maintain data inventory.	1,2,3,4	All hazards	Prevention Public education and awareness
Electrical Utility Retrofit/Hardening	2	Thunderstorms and Lightning, Infrastructure Failure, Tornado, Severe Winter Storm, Windstorm	Property protection, structural
Construct, retrofit, or maintain drainage systems to provide adequate and proper functioning systems to include sewage systems and retention and detention systems	1,2	Flash Flooding, River Flooding, Severe Winter Storms, Infrastructure Failure	Property Prevention, Structural, and Natural resource protection

Acquire flood prone properties and convert to open space/green space; or elevate to or above base flood elevation.	1,2,3	Flash Flooding, River Flooding	Prevention, Property Protection
Construct public safe rooms for government facilities, critical facilities, recreational areas, manufactured home parks, schools (North Iowa Community School District, Forest City Community	1,2,3	Thunderstorms and Lightning, Tornado, Severe Winter Storms, Extreme Heat, Windstorm	Prevention, property protection, structural
Schools, and Lake Mills Community Schools), and day care centers.			
Replace or retrofit bridges and culverts to meet capacity requirements.	2	Flash Flooding, River Flooding	Structural
Purchase/install backup power generators.	2	Thunderstorms and Lightning, Severe Winter Storms, Infrastructure Failure	Property protection
Develop and implement watershed studies and implement watershed plan and conduct hydrology studies of groundwater problems, support of siltation removal projects, and creation of retention basins.	1	Flash Flooding, River Flooding	Natural resource protection
Install soil stabilization, drainage and erosion protection measures.	1	Flash Flooding, River Flooding, grass or wild-land fire	Natural resource protection
Non-structural retrofit of public structures.	2	All Hazards	Property protection
Construct, retrofit or maintain levees, dams, floodwalls, culverts, and floodgates to ensure adequate capacity and protection levels for property and critical facilities	1,2	Flash Flooding, River Flooding	Property protection, Structural
Raise roads to reduce hazard risk.	1	Hazardous Materials, Infrastructure failure, Transportation Incident	Structural
Develop and promote comprehensive cost-effective recommendation for adoption and enforcement of land use, ordinances and regulations, promote legislation, zoning, and building codes that regulate construction, and decrease risk in areas susceptible to hazards.	3	All hazards	Prevention, Public education and awareness
Ensure that proper security measures are in place for critical facilities.	2,4	Hazardous Materials, Human Disease, Terrorism	Property protection, public education and awareness

Establish natural vegetation buffers and removal of dead vegetation next to sensitive lands and forestry improvements/tree planting.	1	Grass or Wild-land Fire	Property protection, Natural resource protection
Encourage communities to include severe repetitive loss and repetitive loss strategy in all-hazard mitigation plans and comprehensive plans and educate communities on these properties in their	1,3	Flash Flooding, River Flooding	Prevention, property protection, public education and
jurisdiction and measures which may be used to reduce future damages.			awareness
Complete FIRM (Flood Insurance Rate Maps) and encourage NFIP community and individual participants, and survey of flood prone areas, and river channel studies, and update of existing flood maps	3,4	Flash Flooding, River Flooding	Prevention, property protection, public education and awareness
Relocate critical facilities for flood protection.	2	Flash Flooding, River Flooding	Property protection, structural
Construct/elevate wastewater lift station.	1,2	Flash Flooding, River Flooding, Infrastructure Failure	Structural
Construct floodwalls	1,2	Flash Flooding, River Flooding	Structural
Install and maintain protective measures for the safety and security of critical facilities.	2	Terrorism	Property protection, Structural
Employ construction measures that direct water away from structures.	1,2	Flash Flooding, River Flooding	Property protection, structural
Remove asbestos from public facilities	2	Human Disease	Public education and awareness

TABLE 50 – <u>Mitigation Measures by Jurisdiction</u>

Measure	Buffalo Center	Forest City	Lake Mills	Leland	Rake	Scarville	Thompson	Winnebago County	FCCS	LMCS	NICS	Cumulative

1. Develop/update/publicize emergency management plans, including preparedness, response, recover, operations, long term recovery, and mitigation plans and maintain data inventory.	X(2)		X(6)	X(1)	X(4)	X(4)	X(6)		X(4)		X(4)	31
2. Electrical Utility Retrofit/Hardening	X(2)		X(3)	X(1)	X(3)	X(2)	X(2)	X(1)	X(1)	X(3)		18
3. Construct, retrofit, or maintain drainage systems to provide adequate and proper functioning systems to include sewage systems and retention and detention systems	X(6)		X(6)	X(1)	X(4)		X(2)	X(1)	X(3)	X(1)	X(1)	24
4. Acquire flood prone properties and convert to open space/green space; or elevate to or above base flood elevation.				X(1)	X(1)				X(1)	X(1)		4
5. Construct public safe rooms for government facilities, critical facilities, recreational areas, manufactured home parks, schools (North Iowa Community School District, Forest City Community Schools, and Lake Mills Community Schools), and day care centers.		X(3)	X(4)	X(1)		X(3)	X(3)		X(3)	X(2)	X(1)	20
6. Replace or retrofit bridges and culverts to meet capacity requirements.		X(9)		X(1)		X(1)		X(2)	X(6)	X(2)		21
7. Purchase/install backup power generators.	X(4)	X(2)	X(1)	X(2)	X(3)	X(1)	X(7)	X(2)	X(6)	X(5)	X(2)	35
8. Develop and implement watershed studies and implement watershed plan and conduct hydrology studies of groundwater problems, support of siltation removal projects, and creation of retention basins.		X(9)								X(5)		14

9. Install soil stabilization, drainage and erosion protection measures.		X(3)						X(1)		X(1)		7
10. Non-structural retrofit of public structures.	X(1)	X(6)								X(2)		9
11. Construct, retrofit or maintain levees, dams, floodwalls, culverts, and floodgates to ensure adequate capacity and protection levels for property and critical facilities.		X(3)						X(1)	X(1)	X(1)		6
12. Raise roads to reduce hazard risk.	X(1)	X(1)		X(1)				X(1)		X(4)		8
13. Develop and promote comprehensive cost-effective recommendation for adoption and enforcement of land use, ordinances and regulations, promote legislation, zoning, and building codes that regulate construction, and decrease risk in areas susceptible to hazards.	X(1)			X(1)		X(1)		X(1)				4
14. Ensure that proper security measures are in place for critical facilities.	X(3)			X(3)			X(1)		X(8)		X(8)	23
15. Establish natural vegetation buffers and removal of dead vegetation next to sensitive lands and forestry improvements/tree planting.	X(1)			X(1)					X(3)			5
16. Encourage communities to include severe repetitive loss and repetitive loss strategy in all-hazard mitigation plans and comprehensive plans and educate communities on these properties in their jurisdiction and measures which may be used to reduce future damages.			X(1)									1

17. Complete FIRM (Flood Insurance Rate Maps) and encourage NFIP community and individual participants, and survey of flood prone areas, and river channel studies, and update of existing flood maps	X(1)											1
18. Relocate critical facilities for flood protection.							X(1)	X(1)				2
19. Construct/elevate wastewater lift station.	X(1)		X(3)	X(1)			X(2)		X(2)			7
20. Construct floodwalls												0
21. Install and maintain protective measures for the safety and security of critical facilities.				X(3)			X(1)	X(1)			X(7)	14
22. Employ construction measures that direct water away from structures.												0
23. Remove asbestos from public facilities	X(1)					X(1)					X(1)	3

FUNDING OF FUTURE MITIGATION MEASURES

The participants analyzed the future mitigation actions and identified future funding associated with each mitigation action. The actions that called for a continuation of a current activity were easily identified, whereas other cost estimates were available from previous planning documents or project plans. Some of the costs were estimated by the committee's knowledge of the activity in question. **The projects are to be considered for implementation during the next five years and a full cost/benefit analysis will be required to determine the feasibility of each project.**

Factors and/or information necessary for further consideration of future mitigation activities:

1. Estimated Cost = Estimated cost to construct or purchase.
2. Federal Funds = Federal funds identified as possible source of funds.
3. State Funds = State funds identified as possible source of funds.
4. Local Funds = Local (City and County) funds identified as possible source of funds.
5. $ = Possible future funding source.

TABLE 51 – Funding of Future Measures

		Funding Sources			
Mitigation Action	**Estimated Cost**	**Federal Funds**	**State Funds**	**Local Funds**	**Comment and Responsible Party**
1. Develop/update/publicize emergency management plans, including preparedness, response, recover, operations, long term recovery, and mitigation plans and maintain data inventory.	$1,000-$60,000	75%	10%	15%	County Emergency Management Coordinator, City Councils, School Boards
2. Electrical Utility Retrofit/Hardening	$20,000+	-	-	-	Local Electric Utilities, Rural Electric Cooperatrives
3. Construct, retrofit, or maintain drainage systems to provide adequate and proper functioning systems to include sewage systems and retention and detention systems	$1,000+	-	-	-	Local public works directors
4. Acquire flood prone properties and convert to open space/green space; or elevate to or above base flood elevation.	$10,000+	75%	10%	15%	Local Flood Plain Managers, City Councils, City Clerks
5. Construct public safe rooms for government facilities, critical facilities, recreational areas, manufactured home parks, schools (North Iowa Community	$500,000+	75%	10%	15%	City Councils, School Boards, Parks and Rec Departments, etc.
School District, Forest City Community Schools, and Lake Mills Community Schools), and day care centers.					
6. Replace or retrofit bridges and culverts to meet capacity requirements.	$50,000+	-	-	-	County Road Departments, City Road Departments, IDOT
7. Purchase/install backup power generators.	$5,000+	-	-	-	City Councils, School Boards, Public Works Departments
8. Develop and implement watershed studies and implement watershed plan and conduct hydrology studies of groundwater problems, support of siltation removal projects, and creation of retention basins.	$2,000	-	-	-	IDNR, County Natural Resource offices

9. Install soil stabilization, drainage and erosion protection measures.	$500+	-	-	-	County Engineers office, IDNR, County Natural Resource offices
10. Non-structural retrofit of public structures.	$1,000+	-	-	-	Public Works, Building managers
11. Construct, retrofit or maintain levees, dams, floodwalls, culverts, and floodgates to ensure adequate capacity and protection levels for property and critical facilities.	$10,000+	-	-	-	Public Works, IDNR, USACE
12. Raise roads to reduce hazard risk.	$500,000+	-	-	-	IDOT, County Engineers office,
13. Develop and promote comprehensive cost-effective recommendation for adoption and enforcement of land use, ordinances and regulations, promote legislation, zoning, and building codes that regulate construction, and decrease risk in areas susceptible to hazards.	Variable	-	-	-	County Planning and Zoning officials, Local Planning and Zoning officials
14. Ensure that proper security measures are in place for critical facilities.	Variable	-	-	-	Building managers, Local Law enforcement, security agencies
15. Establish natural vegetation buffers and removal of dead vegetation next to sensitive lands and forestry improvements/tree planting.	Variable	-	-	-	County road departments, IDNR, County Natural Resource office
16. Encourage communities to include severe repetitive loss and repetitive loss strategy in all-hazard mitigation plans and comprehensive plans and educate communities on these properties in their jurisdiction and measures which may be used to reduce future damages.	Variable	-	-	-	City Council, Planning and Zoning Departments, Board of Supervisors
17. Complete FIRM (Flood Insurance Rate Maps) and encourage NFIP community and individual participants, and survey of flood prone areas, and river channel studies, and update of existing flood maps	Variable	-	-	-	Planning and Zoning Departments, GIS departments, IDNR

18. Relocate critical facilities for flood protection.	Variable	75%	15%	10%	Planning and Zoning Departments, County Emergency Management
19. Construct/elevate wastewater lift station.	$20,000+	-	-	-	Public Works departments
20. Construct floodwalls	Variable	-	-	-	USACE, Public Works departments, IDNR
21. Install and maintain protective measures for the safety and security of critical facilities.	Variable	-	-	-	Building managers, Local law enforcement, security agencies
22. Employ construction measures that direct water away from structures.	Variable	-	-	-	IDNR, Public works departments
23. Remove asbestos from public facilities	Variable	-	-	-	Public works

PLAN MAINTENACE, REVIEW AND UPDATE

Mitigation Prioritization

There are a number of hazards that could potentially affect the residents of Winnebago County indicated throughout this plan. In relation, there are also a large number of activities that could be undertaken to mitigate the effects of these hazards. Unfortunately, the County does not have an unlimited amount of funds or funding sources for mitigation projects. In an attempt to determine the most immediate mitigation needs, the participants prioritized each mitigation activity for every hazard as detailed in the MITIGATION MEASURES FEASIBLILITY section of this plan. There were two mitigation actions that received a positive score for each mitigation measure.

Plan Adoption and Amendment

This plan and any future amendments to the plan shall occur only after an official Public Notice has been posted in a local publication announcing a Public Hearing on the matter. After the public has had the opportunity to review the proposed amendments the Winnebago County Board of Supervisors may, by resolution, choose to accept any amendments to the plan. Amendments to the plan will be shared with the County Emergency Management Coordinator, the Iowa Department of Homeland Security and Emergency Management Division and the Federal Emergency Management Agency.

Phasing

Phasing is a budgetary responsibility of the Winnebago County Board of Supervisors and Department Heads who will review the projects annually. It is recommended that this review be incorporated into the strategic planning documents and plans, i.e. comprehensive land use plan, floodplain ordinance, etc. For projects that require a local match commitment, the council should begin setting aside appropriate resources to meet their match liability. Land-use plans and county evacuation plans shall be incorporated within this plan as well as this plan shall be implemented in those future plans. The Board of Supervisors will incorporate the

requirements of this plan into these future plans and any other plans the Board sees fit to include.

Continued Public Participation

In order to ensure that the public remains involved in the future implementation of this plan a file shall remain on hand at the County Court House. This plan shall be made available to any party who requests to see it. Furthermore, if Winnebago County intends to make amendments to the plan, a posted public notice in local newspapers and local fliers should be made available so that the public can be made aware. Public notice should also be posted for any meetings that deal with the amendment of this plan. Said meetings are to remain open to the public.

Evaluation and Review Process

The participants is to be comprised of representatives from all county departments; members of the public and elected officials will review and evaluate progress of the mitigation plan once each year. The plan will be reviewed and updated by the end of every fifth year. The participants will invite a cross section of the community to participate in any future meetings regarding the update or amendment of the Plan. In addition, public notice will be posted at the County Courthouse inviting the general public to participate as members of the participants and/or to review the plan and provide comments. The county is responsible for contacting members and organizing five year update meetings. The meetings will be held after the first of the year and committee members will be responsible for evaluating the progress of the plan activities. To make sure the plan is current with expected conditions, the participants will review each goal and activity to determine the relevance to the county, as well as changes in state or federal policies. The participants will also review the risk assessment for updates and modifications. The responsible department for each activity will then report the status of each project including implementation process that worked well, the difficulties that were encountered during the activity and how strategies could be revised. Winnebago County will then update the plan and make the appropriate changes to the plan. Copies of the plan and the committee's review will be available at the County Courthouse. Following the participants's completion of the review process, the findings of the annual review and recommended changes, if applicable, will be presented during a regular Board of Supervisors meeting and a public hearing will be held at that time. Copies of the plan will then be sent to the Iowa Department of Homeland Security and Emergency Management Division and the Federal Emergency Management Agency. Any changes to future plans will be integrated with the multi- hazard mitigation plan. The multi-hazard mitigation plan will also take into account any changes in these plans and incorporate the information in the next update.

The County will use Worksheet #1 (located in the Appendix) when they are working on a mitigation activity. This will give the future committee a good place to start when updating the plan and deciding which activities was successful or not. The committee will use Worksheet #2 during each yearly review and during the 5 year plan update to evaluate how to make the committee more representative of the community and surrounding communities. The committee and county will use Worksheet #3 to evaluate each activity that was completed and each activity that was not completed. The committee will use Worksheet #4 at each yearly review and update to evaluate the risk assessment in order to address new concerns and update inventories of assets.

The Winnebago County Multi-Jurisdictional Mitigation Plan will be updated every five years as stated, and reviewed annually by the Board of Supervisors, Emergency Management Coordinator, Zoning Administrator and other key county members or after a hazardous event, whichever one occurs first.

Schedule for Updating

In the five year cycle, the Board of Supervisors will look at the plan at its annual review and at that time appoint a committee to update the plan. If assistance is needed the county will contact a planner and ask for assistance in updating their plan. The updating process will consist of two to three meetings of the committee to discuss changes that need to be made to the plan and after that time the committee will recommend the plan be offered for adoption by the Winnebago County Board of Supervisors. Following adoption by the Board the county will submit the plan to Iowa Homeland Security and Emergency Management and FEMA for final approval. The following is a schedule that Winnebago County will follow for plan updates.

Objective A. Evaluate the effectiveness of the planning process.

1. Reconvene or reappoint the Planning Team.
2. Review your Planning Process.
   Items to Discuss:
   a. Building the Planning Team.
   b. Engaging the Public.
   c. Data Gathering and Analysis.
   d. Coordinating with other Agencies.

Objective B. Evaluate the effectiveness of your actions.

1. What were the results of the implemented action? Did the results achieve the goals/objectives outlined in the plan? Did the actions have the intended results?
2. Were the actions cost-effective? Did (or would) the project result in the reduction of potential losses?
3. Document those actions that were slow to get started or not implemented.

Objective C. Determine why the actions worked or did not work.

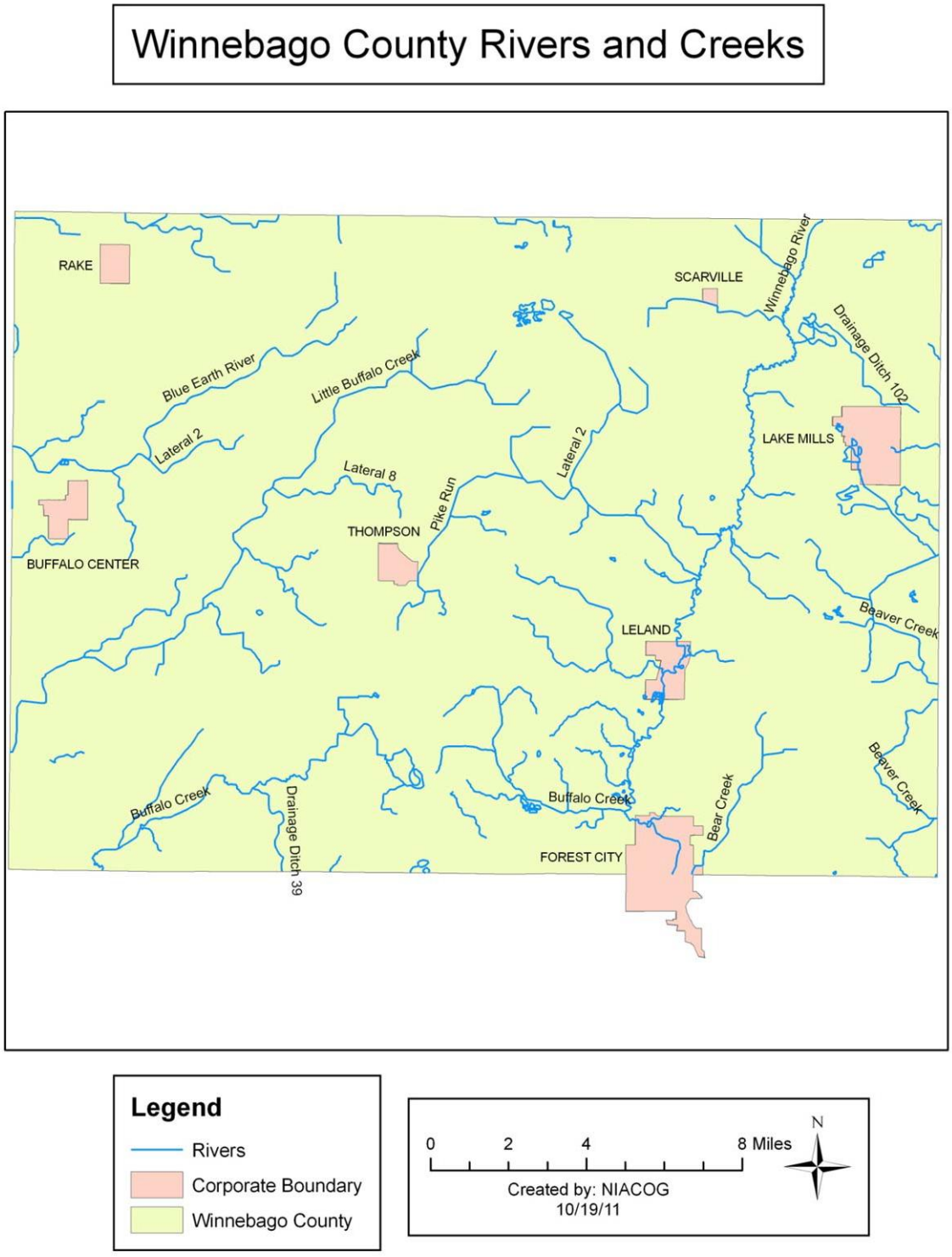
1. Lack of available resources.
2. The political or popular support for or against the action.
3. The availability of funds.
4. The workloads of the responsible parties.
5. The actual time necessary to implement the actions.

Existing Document Incorporation

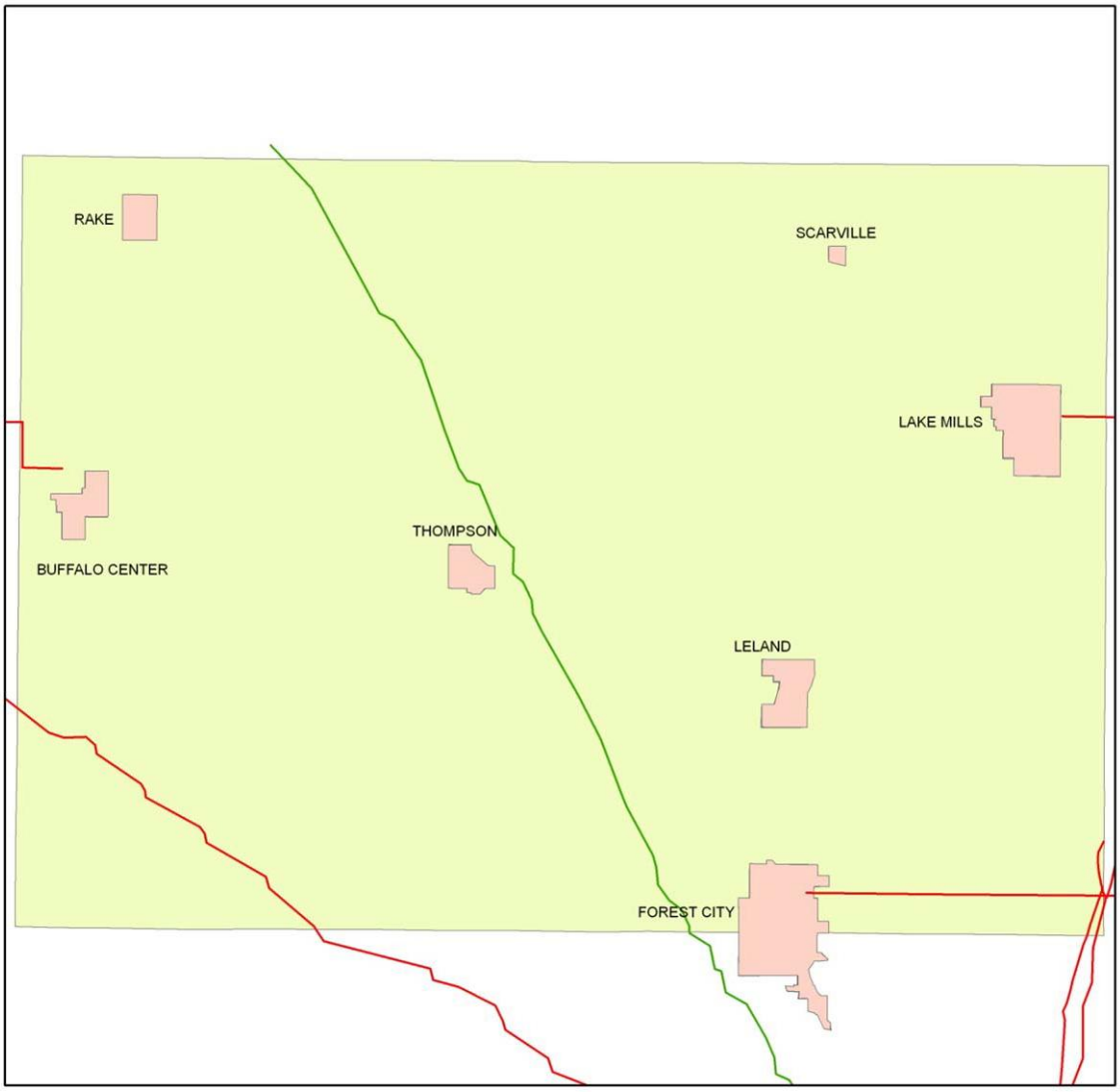
The Winnebago County Multi-Jurisdictional Hazard Mitigation Participants will remain focused on this plan and will ensure this plan's recommendations are included in current planning processes. The Emergency Management Coordinator will monitor development and the effectiveness of ordinances and will continue to do so following adoption of the Mitigation Plan. These activities will be incorporated into the Plan Evaluation and Review Process.

Note that the participants intend to review current ordinances as part of the implementation, in order to ensure that we do not have to wait until a new plan or ordinance is created in order to update the methods used to monitor land use in the county. The capital improvements planning of the future will include some of the recommendations of this plan and will include funding toward some of the capital infrastructure issues discussed in this plan. Within 12 months, the adopted plan should be incorporated fully into the current and future county and other jurisdiction plans.

APPENDIX I: MAPS



Winnebago County Pipelines



Legend

Pipelines

PRODUCT

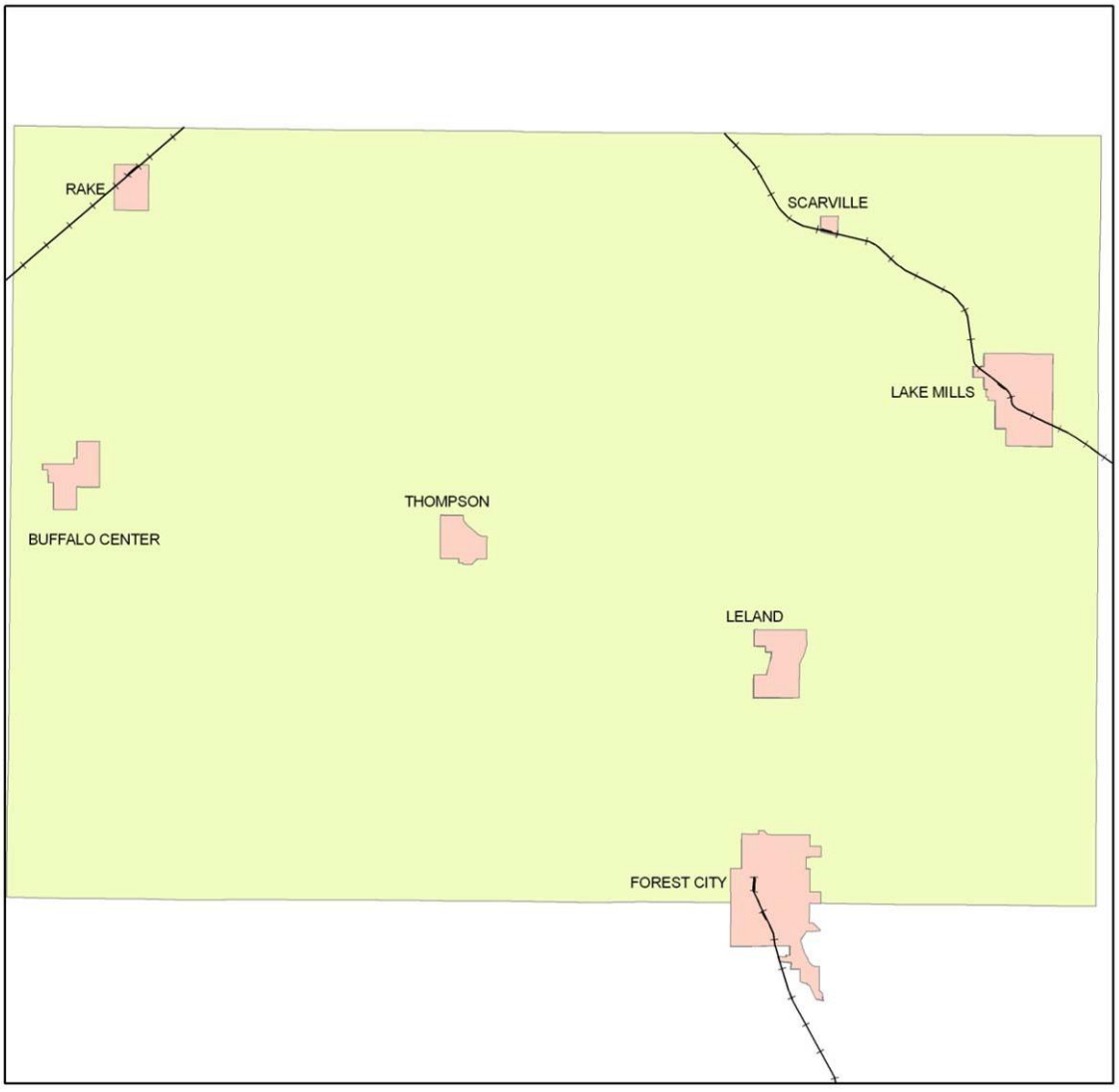
- Ammonia
- Crude oil/petroleum
- Gas storage structure
- Natural gas
- Corporate Boundary
- Winnebago County

0 2 4 8 Miles

N

Created by: NIACOG
10/19/11

Winnebago County Railroads



Legend

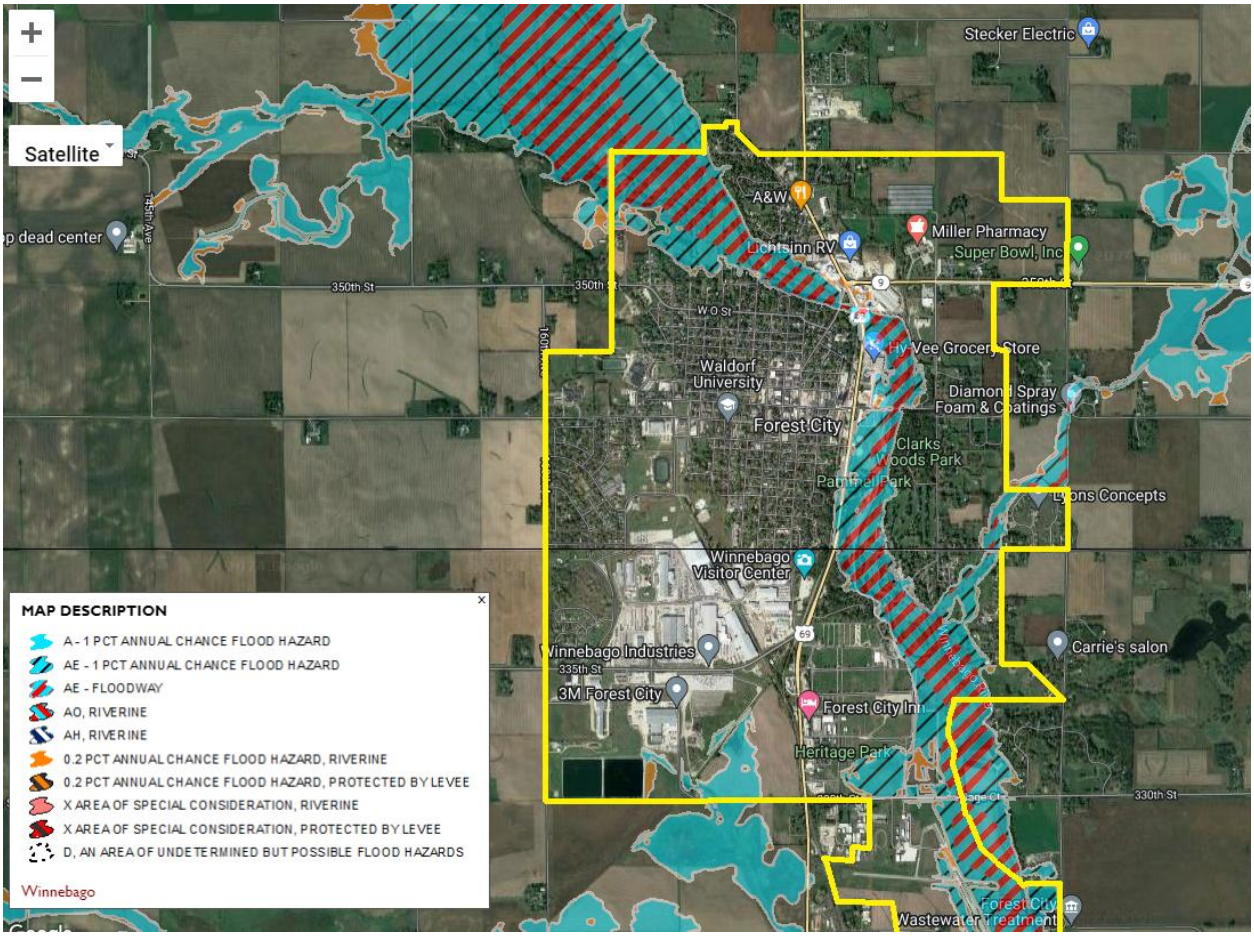
- RAILROADS
- Corporate Boundary
- Winnebago County

0 2 4 8 Miles

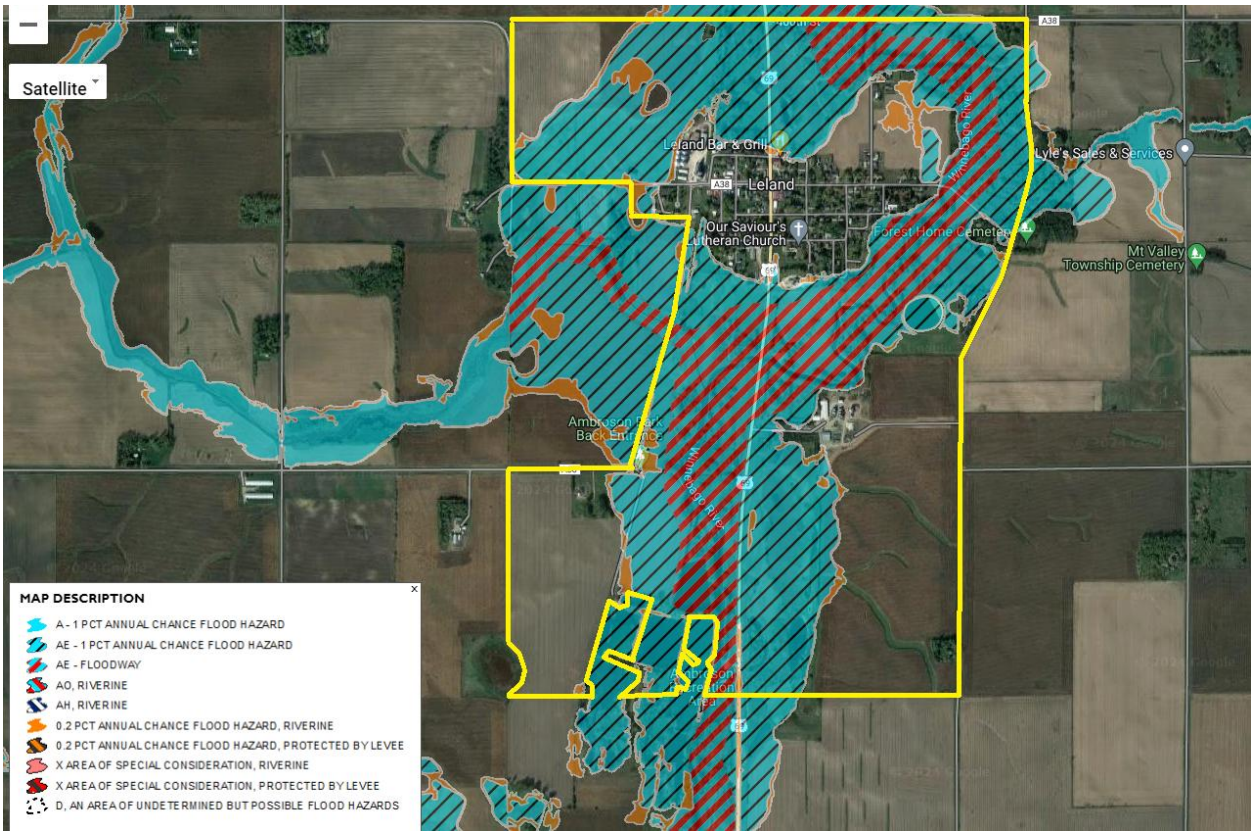
N

Created by: NIACOG
10/19/11

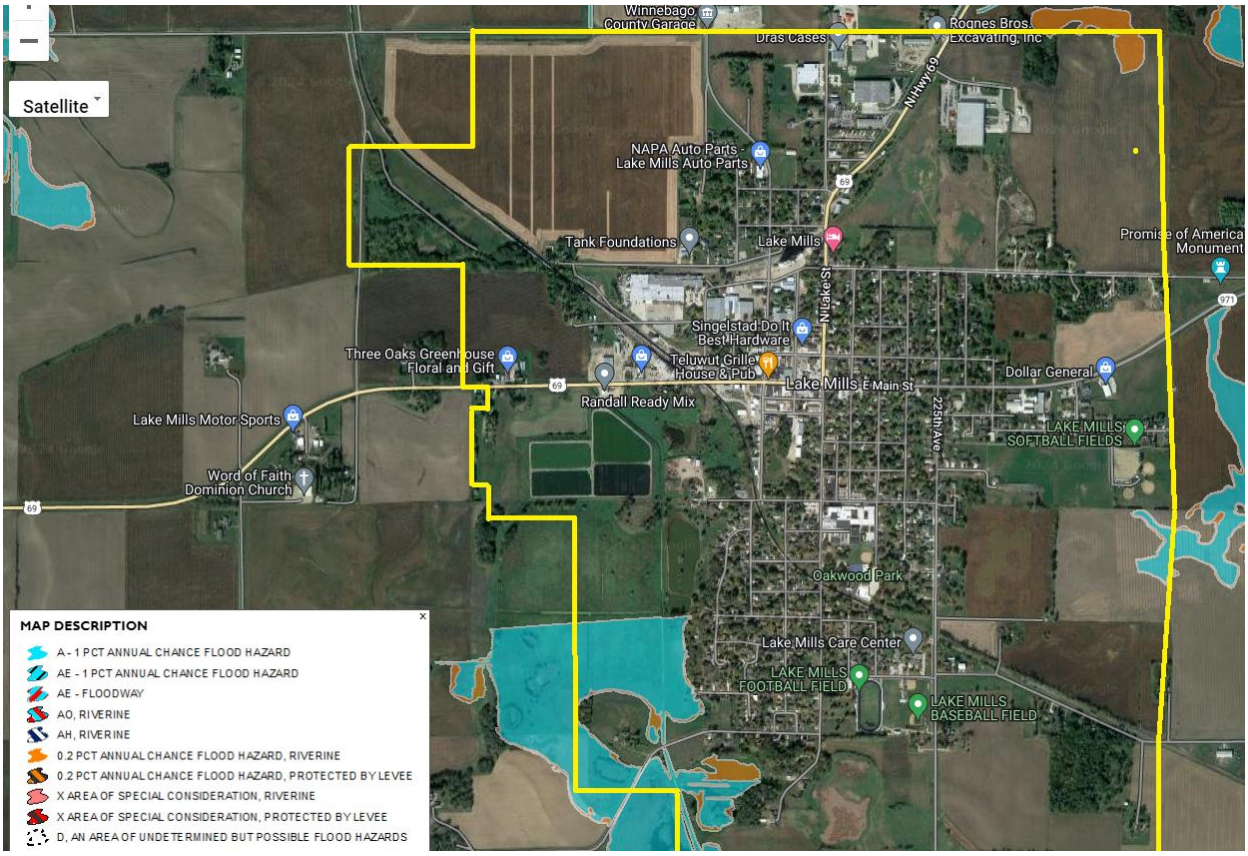
Forest City Flood Hazard Map



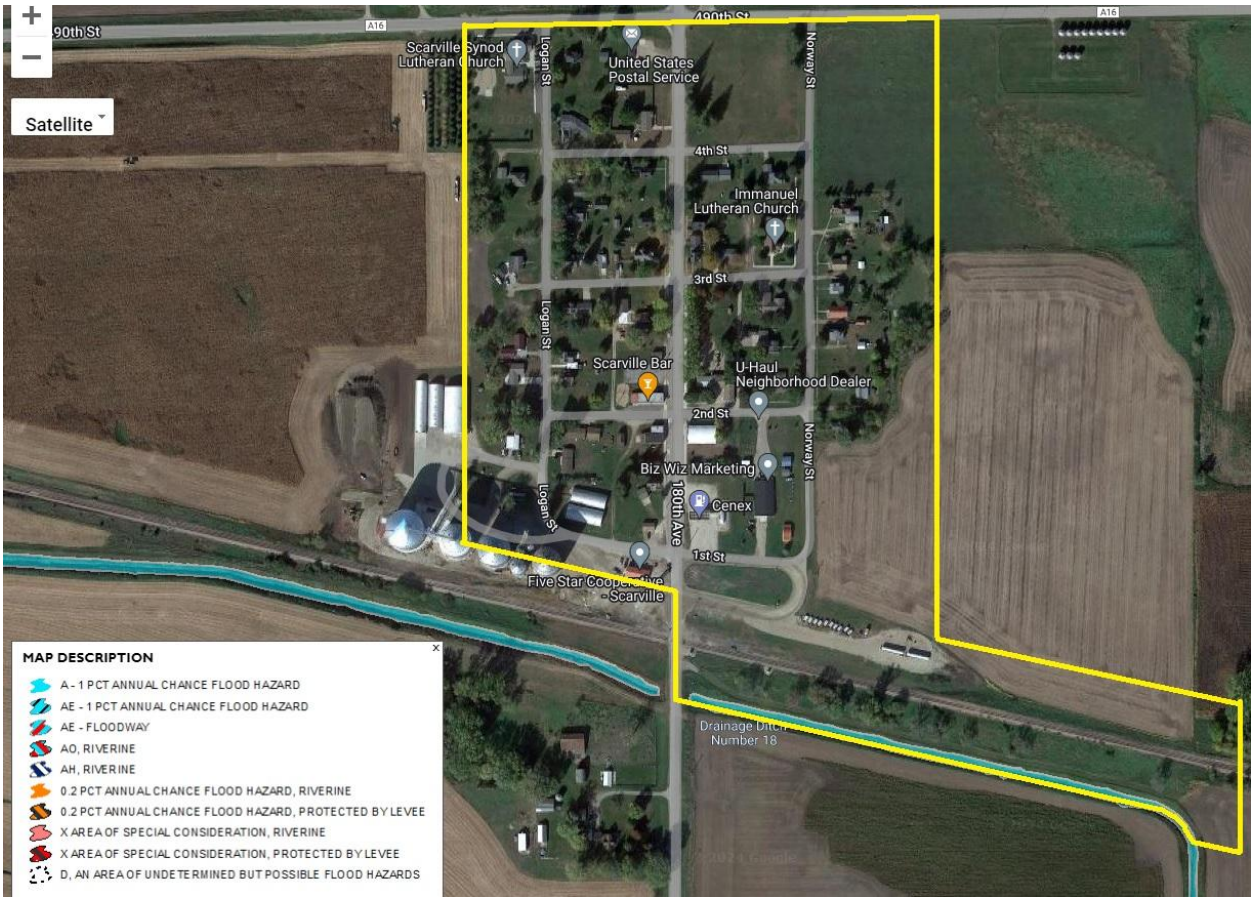
Leland Flood Hazard Map



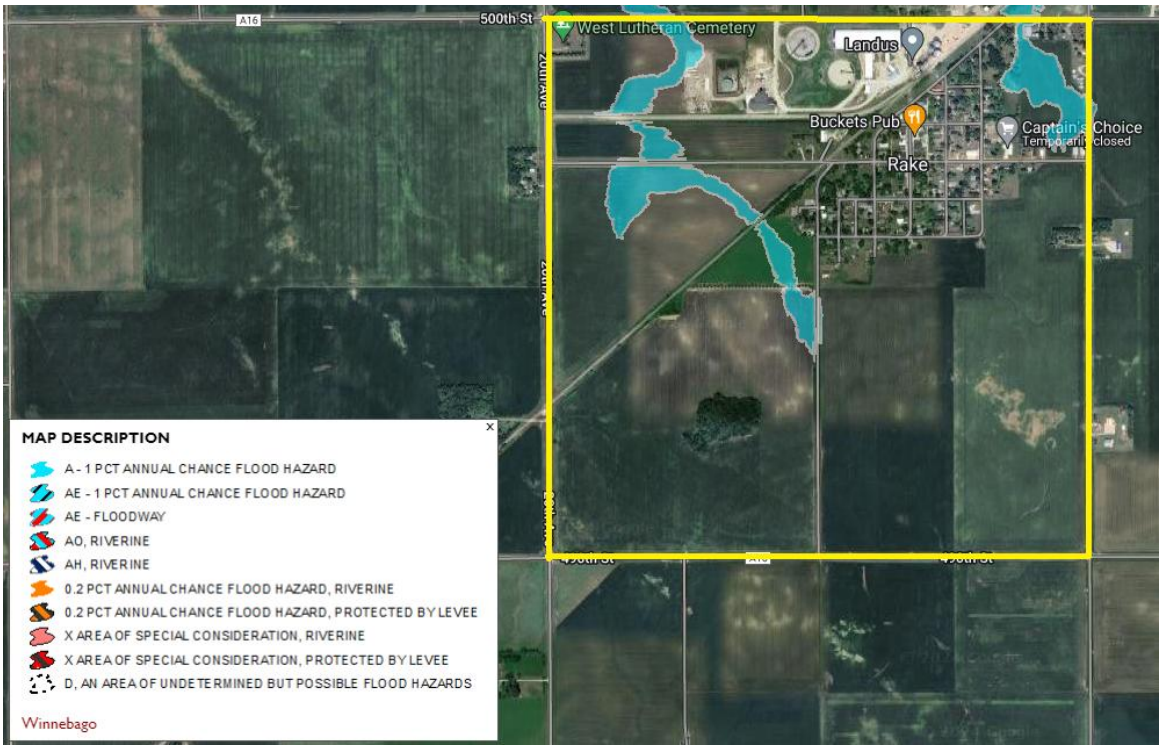
Lake Mills Flood Hazard Map



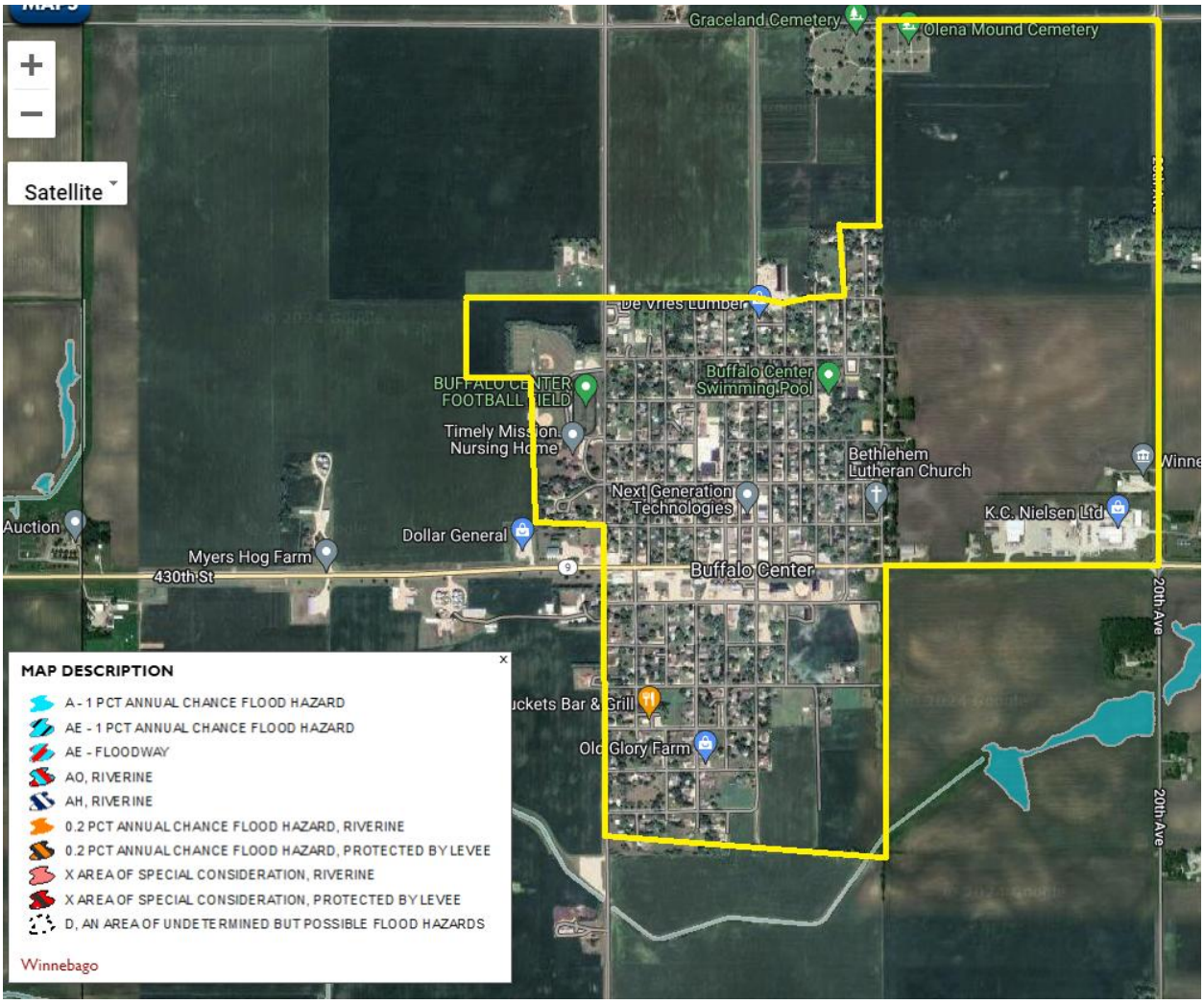
Scarville Flood Hazard Map



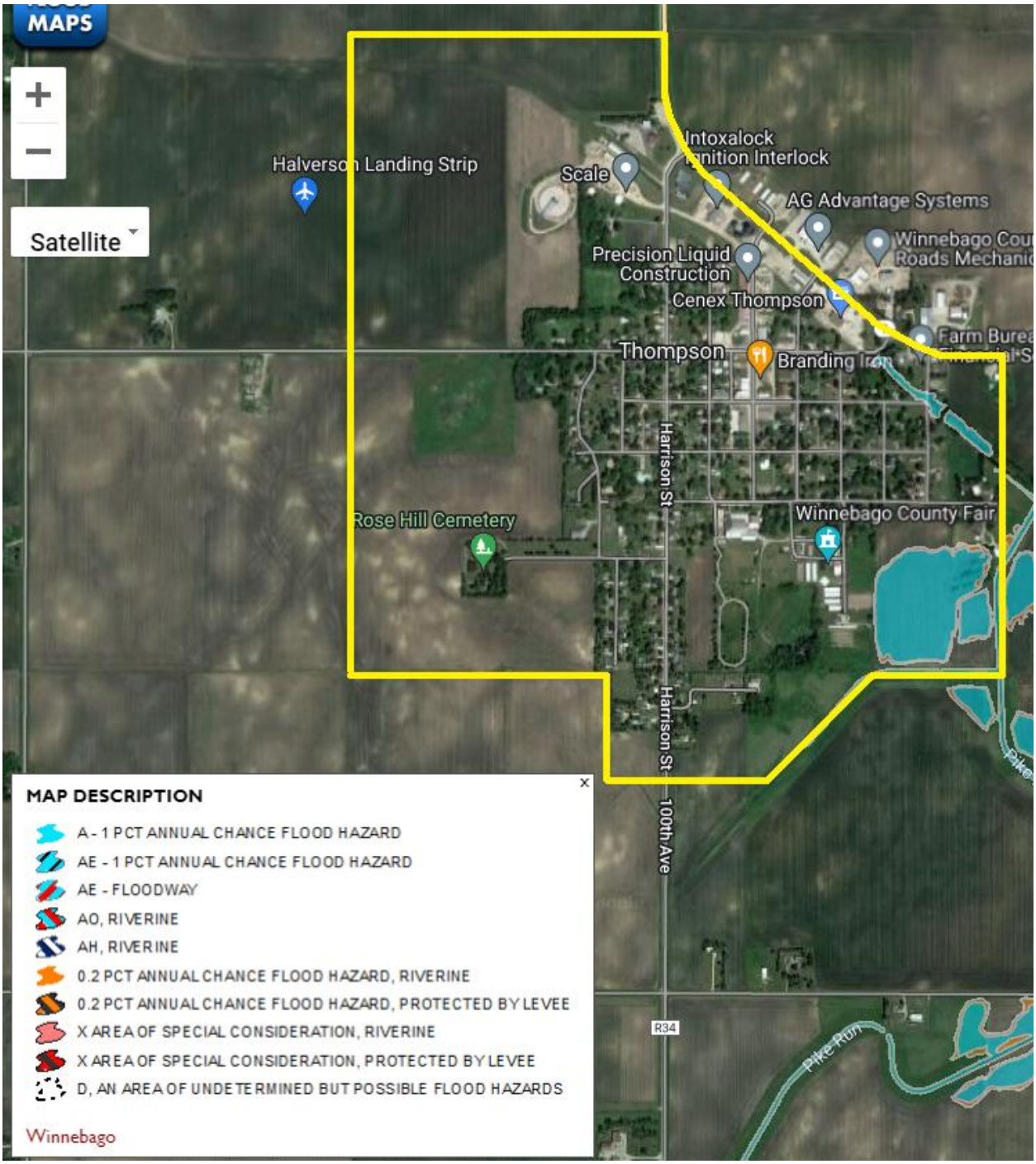
Rake Flood Hazard Map



Buffalo Center Flood Hazard Map



Thompson Flood Hazard Map



APPENDIX II: AGENDAS

The following agendas were used for each of the meetings in the 7 incorporated communities, the Board of Supervisors and the 3 Community School Districts.

2025 Winnebago County Hazard Mitigation Plan Update

Hazard Analysis/Risk Assessment

AGENDA

I. Introductions
II. Explanation of Hazard Mitigation Planning
III. Explanation of HARA Methodology
IV. Hazard Analysis and Risk Assessment
  a. Electronic Submission
  b. Survey Form
V. Discussion of next steps to plan completion
  a. Identification of Hazards in Community
  b. Identification of Planning factors for risk reduction
  c. Project Identification
VI. Questions

2025 Winnebago County Hazard Mitigation Plan Update

HARA Review and Identification of Measures and Projects

AGENDA

I. Introductions
II. Review of Hazard Analysis and Risk Assessment Information
III. Review of past Hazard Mitigation identified projects and their status
IV. Identification of ongoing and future hazard mitigation projects
V. Identification and scoring of mitigation measures
  a. 12 measures
  b. Scored by average of respondants.
VI. Discussion regarding next steps to plan completion
  a. Completion of information to be included in the plan
  b. 30 day review period
  c. Resolution adopting County-wide plan

Questions

APPENDIX III: ACRONYM LIST

Acronym List

BCA	Benefit Cost Analysis
BFE	Base Flood Elevation
CBD	Central Business District
CFR	Code of Federal Regulations
COG	Council of Governments
CRS	Community Rating System
DMA 2000	Disaster Mitigation Act of 2000
EMI	Emergency Management Institute
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance
GIS	Geographic Information Systems
$HAZUS_{MH}$	Hazards U.S. – Multi- Hazard
HMGP	Hazard Mitigation Grant Program
HQ	Headquarters
ISO	Insurance Services Office
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
N/A	Not Applicable
NCDC	National Climatic Data Center
NEIC	National Earthquake Information Center
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
PDM	Pre-Disaster Mitigation
PGA	Peak Ground Acceleration
QC	Quality Control
SHMO	State Hazard Mitigation Officer
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, Environmental
USGS	U.S. Geological Survey

APPENDIX IV: UPDATE SHEETS

Worksheet # 1: Progress Report

Progress Report Period: _____ (Date) to _____ (Date)

Project Title: _____ Project ID#: _____

Responsible Agency: _____

Address: _____

City/County: _____

Contact Person: _____ Title: _____

Phone #(s): _____ e-mail address: _____

List Supporting Agencies and Contacts: _____

_____

Total Project Cost: $_____ Anticipated Cost Overrun/Under run: _____

Date of Project Approval: _____ Start date of the project: _____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase).

_____

_____

Milestones	Complete	Projected Date of Completion

Plan Goal(s)/Objective(s) Addressed:

Goal: _____

Objective: _____

Indicator of Success (e.g., losses avoided as a result of the acquisition program):

In most cases, you will list losses avoided as the indicator. In cases where it is difficult to quantify the benefits in dollar amounts, you will use other indicators, such as the number of people who now know about mitigation or who are taking mitigation actions to reduce their vulnerability to hazards.

Status *(Please checks pertinent information and provide explanations for items with an asterisk. For completed or canceled projects, see Worksheet #2 — to complete a project evaluation):*

Project Status Status	Project Cost
(1) ☐ Project on schedule unchanged	(1) ☐ Cost
(2) ☐ Project completed	(2) ☐ Cost overrun* *explain: _____ _____
(3) ☐ Project delayed* under run* *explain:_____ _____	(3) ☐ Cost *explain: _____ _____
(4) ☐ Project canceled	

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

B. What obstacles, problems, or delays did you encounter, if any?

C. How was each problem resolved?

Next Steps: What is/are the next step(s) to be accomplished over the next reporting period?

Other comments:

Worksheet #2: Evaluating Your Planning Team

When gearing up for the plan evaluation, the planning team should reassess its composition and ask the following questions:

	YES	NO
Have there been local staffing changes that would warrant inviting different members to the planning team?		

Comments/Proposed Action:

Are there organizations that have been invaluable to the planning process or to project implementation that should be represented on the planning team?		

Comments/Proposed Action:

Are there any representatives of essential organizations who have not fully participated in the planning and implementation of actions? If so, can someone else from this organization commit to the planning team?		

Comments/Proposed Action:

Are there procedures (e.g., signing of MOAs, commenting on submitted progress reports, distributing meeting minutes, etc.) that can be done more efficiently?		

Comments/Proposed Action:

Are there ways to gain more diverse and widespread cooperation?		

Comments/Proposed Action:

Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?		

Comments/Proposed Action:

If the planning team determines the answer to any of these questions is "yes," some changes may be necessary.

Worksheet #3: Evaluate Your Project Results

Was the action implemented?

Project Name and Number:	***Insert location***
Project	***include before and after photos***
Associated Goal and	
Indicator of Success	

IF YES ↓ **IF NO** ↓

What were the results of the implemented action?

Why Not?

Was there political support for the action?	**YES**	**NO**
Were enough funds available?	**YES**	**NO**
Were workloads equitably or realistically distributed?	**YES**	**NO**
Was new information discovered about the risks or community that made implementation difficult or no longer sensible?	**YES**	**NO**
Was the estimated time of implementation reasonable?	**YES**	**NO**
Were sufficient resources (for example staff and technical assistance) available?	**YES**	**NO**

Were the outcomes as expected? If No, please explain:

YES NO Additional comments or other outcomes:

Did the results achieve the goal and objective (s)?

YES NO

Explain how:

Was the action cost-effective? Explain how or how not:

YES NO

What were the losses avoided after having completed the project?

If it was a structural project, how did it change the hazard profile?

Date

Prepared by:

Worksheet #4: Revisit Your Risk Assessment

Risk Assessment Steps	Questions	YES	NO	COMMENTS
Identify hazards	Are there new hazards that can affect your community?			
Profile hazard events	Are new historical records available?			
	Are additional maps or new hazard studies available?			
	Have chances of future events (along with their magnitude, extent, etc.) changed?			
	Have recent and future development in the community been checked for their effect on hazard areas?			
Inventory assets	Have inventories of existing structures in hazard areas been updated?			
	Are future developments foreseen and accounted for in the inventories?			
	Are there any new special high-risk populations?			
Estimate losses	Have loss estimates been updated to account for recent changes?			

If you answered "Yes" to any of the above questions, review your data and update your risk assessment information accordingly

Worksheet #5: Revise the Plan

Prepare to update the plan.

When preparing to update the plan: **Check the box when addressed** ✓

1. Gather information, including project evaluation worksheets, progress reports, studies, related plans, etc. ☐

Comments:

2. Reconvene the planning team, making changes to the team composition as necessary (see results from *Worksheet #2*). ☐

Comments:

Consider the results of the evaluation and new strategies for the future.

When examining the community consider:	Check the box when addressed ✓
1. The results of the planning and outreach efforts. **Comments:**	☐
2. The results of the mitigation efforts. **Comments:**	☐
3. Shifts in development trends. **Comments:**	☐
4. Areas affected by recent disasters. **Comments:**	☐
5. The recent magnitude, location, and type of the most recent hazard or disaster. **Comments:**	☐
6. New studies or technologies. **Comments:**	☐
7. Changes in local, state, or federal laws, policies, plans, priorities, or funding. **Comments:**	☐
8. Changes in the socioeconomic fabric of the community. **Comments:**	☐
9. Other changing conditions. **Comments:**	☐

Incorporate your findings into the plan.

When examining the plan: ✓	**Check the box when addressed**
1. Revisit the risk assessment. **Comments:**	☐
2. Update your goals and strategies. **Comments:**	☐
3. Recalculate benefit-cost analyses of projects to prioritize action items. **Comments:**	☐

Use the following criteria to evaluate the plan:

Criteria	**YES**	**NO**	**Solution**
Are the goals still applicable?			
Have any changes in the state or community made the goals obsolete or irrelevant?			
Do existing actions need to be reprioritized for implementation?			
Do the plan's priorities correspond with state priorities?			
Can actions be implemented with available resources?			

Comments:

APPENDIX V: RESOLUTIONS