INTRODUCTION

Part 2 of the Adams County All-Hazard Mitigation Plan Update provides general geographical information on Adams County including demographic and economic characteristics. The general development patterns of the County are described in terms of current land use and future development trends.

In addition to developing an understanding of the planning area, this chapter represents the beginning stages of assessing vulnerability by inventorying the numbers, types and values of existing buildings, infrastructure and critical facilities within each participating jurisdiction in the planning area. This overall summary of each jurisdiction's vulnerability to hazards describes the potential impact on the community.

Land use and development trends are analyzed to project the number and type of potential future buildings, infrastructure and critical facilities within each jurisdiction so that mitigation options can be considered in future land use decisions.

The resulting information is an important element of the update process, since sound alternative mitigation strategies cannot be formulated and evaluated without an in-depth knowledge of the relevant conditions in the study area.

GENERAL GEOGRAPHY

LOCATION

Adams County is located in central Wisconsin (See Map 1). The largest urban areas are the City of Adams and the Village of Friendship, which border each other and are located in the center of the County. The City of Wisconsin Dells is encroaching from the south into the southwest corner of the County but is covered under Columbia County's mitigation plan. The County is bounded on the north by Portage and Wood Counties, on the east by Marquette and Waushara, on the south by Columbia, and on the west by Juneau County.

Adams County lies 150 miles northwest of Milwaukee; 116 miles southwest of Green Bay; 87 miles east of La Crosse and 78 miles north of Madison. Major metropolitan areas outside of Wisconsin with transportation linkages to Adams County are Chicago, 219 miles southeast; Minneapolis-St. Paul, 202 miles northwest; and Duluth, 294 miles north.

CIVIL DIVISIONS

There are 20 municipalities (17 towns, 1 village, and 2 cities) in the Adams County planning area. The Village of Friendship is the County Seat. These units of government provide the basic structure of the decision-making framework. Although not general-purpose units of governments, there are also 9 lake and/or sanitary districts. The County has a total surface area of 688 square miles, of which 6.2 % is water. The area and proportion of the County within each civil division is presented in Table 1. The County rectified some ambiguity in its boundaries with Juneau County due to the river and

flowages between them which may explain some variation in comparing data sets on land area.

Table 1 Geographical Size by Civil Division				
	Area in square miles			
Municipality	Water area	Land area	Total area	Area as % of County
Adams city	0	2.94	2.94	0.43%
Adams town	0.31	50.09	50.4	7.33%
Big Flats town	0.16	47.89	48.05	6.98%
Colburn town	0.01	35.86	35.87	5.21%
Dell Prairie town	1.19	31.52	32.71	4.75%
Easton town	0.09	36.02	36.11	5.25%
Friendship village	0.04	0.90	0.94	0.14%
Jackson town	1.00	34.64	35.64	5.18%
Leola town	0.03	37.22	37.25	5.41%
Lincoln town	0.05	36.05	36.1	5.25%
Monroe town	16.56	21.87	38.43	5.59%
New Chester town	0.26	31.09	31.35	4.56%
New Haven town	1.25	29.12	30.37	4.41%
Preston town	0.49	35.33	35.82	5.21%
Quincy town	7.02	32.54	39.56	5.79%
Richfield town	0.01	35.54	35.55	5.17%
Rome town	8.11	54.11	62.22	9.04%
Springville town	0.97	43.71	44.68	6.49%
Strongs Prairie town	4.69	47.27	51.96	7.55%
Wisconsin Dells (part)	0.06	1.72	1.78	0.26%
Adams County	42.30	645.43	687.73	100.00%

Source: NCWRPC, 2024

Insert Map 1 Location

TOPOGRAPHY

Adams County is in the Wisconsin Central Plain, which is characterized by flat or gently undulating topography. Relief is generally low, and the county has extensive wetlands of various types. There are also occasional pinnacles and hills of sandstone such as Pilot Knob, Rabbit Mound, Friendship Mound and Roche-A-Cri Mound.

Roche-A-Cri Mound rises 300 feet above the surrounding plain to an elevation of 1,185 feet. Elevations along the Wisconsin River range from 850 feet in the southern part of the County to 950 feet in the northern part. The altitude of the outwash plain ranges from 1,000 to 1,100 feet.

The Johnstown moraine in southeastern Adams County divides the drainage between the Wisconsin and Fox Rivers. The principal drainage in Adams County is westward to the Wisconsin River. Little Roche-A-Cri Creek, Big Roche-A-Cri Creek and Fourteen Mile Creek are the major tributaries. Drainage east of the moraine is to the Fox River via Neenah Creek, Widow Green Creek, and other tributaries.

Streams in Adams County begin in outwash plains, which provide relatively large and constant amounts of ground water. Average regional runoff is about 9 inches per year. The Wisconsin River is regulated by dams and has a relatively constant flow. Floodplains in Adams County are small, and floods occur only during periods of exceptionally heavy rainfall.

CLIMATE

Adams County has a continental climate that is characterized by long, cold, snowy winters; warm summers; and springs and falls that are often short. From late fall through spring, the weather changes every few days because of air masses that are part of pressure systems moving eastward and northeastward over the northern states.

In winter, the average temperature is 20 degrees F., and the average daily minimum temperature is 11 degrees. The lowest temperature on record is -43 degrees, which occurred in 1951. The number of days at or below 0 degrees has varied from 9 in 1931 to 57 in 2008. In summer, the average temperature is 70 degrees, and the average daily temperature is 83 degrees. The highest recorded temperature is 114 degrees, which occurred in 1936. The number of days at or above 90 degrees has varied from 1 in 1951 to 53 in 1931.

Average total annual precipitation is 31.5 inches. Of this, about 70% usually falls in April through September. The heaviest 1-day rainfall on record was 7.67 inches on August 7, 1980. Thunderstorms occur on about 39 days each year. Hail falls on an average of two days a year. Average seasonal snowfall is 39.8 inches, with 97.4 inches (2007-8) being the greatest total on record.

DEMOGRAPHIC AND ECONOMIC PROFILE

POPULATION AND HOUSEHOLDS

The official 2024 population estimate for Adams County shows a population of 20,733 people for the County. This is a slight increase from the 2019 estimated reported population of 20,630 people. Since 2019, the population of Adams County has increased by 0.5% or by 103 people. Historically, Adams County had been among the fastest growing counties in the state going back to 1990, outpacing its neighbors, and only more recently being matched and surpassed (refer to Table 2). If the 24-year growth trend continues, there will be approximately 21,583 people in Adams County in 2048.

Population concentrations and trends are important when prioritizing hazard mitigation strategies. Adams/Friendship is one of the most densely populated and developed areas in the County. Other areas of population concentrations are around Lakes Camelot, Sherwood, and Arrowhead in the Town of Rome; along Castle Rock Lake in the Town of Quincy; and the communities of Dellwood, Easton, Brooks, Grand Marsh, and Big Flats. Map 2 (below) shows areas of residential population concentrations in the County. Overall population density of the County is about 30.43 persons-per-square-mile and ranges from a high of approximately 784 in the Village of Friendship to a low of about 3.99 in the Town of Richfield.

TABLE 2	Population of Adjacent Counties				
County	**2000**	**2019**	**2024**	**# Change**	**% Change**
Adams	19,920	20,630	20,733	103	0.5%
Columbia	52,468	57,282	58,360	1,078	1.9%
Juneau	24,316	27,232	26,947	-285	-1.0%
Marquette	14,555	15,390	15,558	168	1.1%
Portage	67,182	71,680	72,139	459	0.6%
Waushara	23,066	24,517	24,550	33	0.1%
Wood	75,555	75,450	73,846	-1,604	-2.1%
Wisconsin	5,363,675	5,843,443	5,989,256	145,813	2.5%

Source: U.S. Census, 2000, WisDOA, 2019 and 2024 and NCWRPC, 2024

Between 2000 and 2024, most communities within Adams County have experienced an increase in their population base (refer to Table 3). The greatest amount of growth occurred in the Town of Big Flats with a 25% increase between 2000 and 2023. The Towns of Colburn, New Haven, and Strongs Prairie also had strong growth, increasing by over 20% during that time period. The City of Wisconsin Dells has also exhibited strong growth numbers within Adams County as a result of annexing into the Town of Dell Prairie. However, the relatively small numbers involved skew the result.

Table 3 Population and Households of Minor Civil Divisions

MINOR CIVIL DIVISION	2000 Population	2000 Households	2023 Population	2023 Households	'00-'23 % Population	'00-'23 % Households
Adams town	1,267	547	1,387	634	7.7%	15.9
Big Flats town	946	402	1,185	544	25.3%	35.3
Colburn town	181	83	278	108	24.4%	30.1
Dell Prairie town	1,415	553	1,604	665	13.36	20.3
Easton town	1,194	486	1,005	415	-15.83	-14.6
Jackson town	926	397	988	470	6.70	18.4
Leola town	265	107	298	142	12.45	32.7
Lincoln town	311	129	314	133	0.96	3.1
Monroe town	363	168	377	189	3.86	12.5
New Chester* town	2,141	371	1,342	371	-37.32	0.0
New Haven town	657	260	792	252	20.55	-3.1
Preston town	1,360	561	1,370	694	0.74	23.7
Quincy town	1,181	569	1,230	679	4.15	19.3
Richfield town	144	62	142	75	-1.39	21.0
Rome town	2,656	1,181	3,094	1,618	16.49	37.0
Springville town	1,167	487	1,301	570	11.48	17.0
Strongs Prairie town	1,115	502	1,340	624	20.18	24.3
Friendship village	781	257	737	305	-5.63	18.7
Adams city	1,831	769	2,144	863	17.09	12.2
Wisconsin Dells city (part)**	19	9	0	0	-100.00	-100.0
Adams County Total	**19,920**	**7,900**	**20,928**	**9,351**	5.06	18.4

Source: U.S. Census, 2000, WisDOA, 2019 and NCWRPC, 2023 **#'s skewed by inc. of prison pop.*
*** Statistical anomaly (2020 Census Wisconsin Dells' Adams County Population reported as 105)*

According to the American Community Survey, the median age in Adams County is about 55.5, in comparison to the State's median age of 40.1. The County has been identified as a retirement area resulting from being a vacation spot for many seasonal homeowners. The location of seasonal housing is a strong indicator in terms of retirement location. In Adams County, 38.4% of all housing units have been identified as seasonal/recreational, which is among the highest percentages in the State.

SEASONAL POPULATION

The impact of this seasonal population cannot be overlooked when planning for hazards. Table 4 shows potential seasonal residents by municipality estimated based on seasonal housing data presented in the 2023 American Community Survey. Determining when and for how long these seasonal residents will be in the County is problematic, but the numbers give some indication of what weekend or other peak period population levels might be.

Table 4 Estimated Seasonal Resident Population		
Municipality	***Seasonal Housing Units***	***Estimated Seasonal Population***
Adams town	**173**	**375**
Big Flats town	**428**	**933**
Colburn town	**49**	**126**
Dell Prairie town	**132**	**318**
Easton town	**251**	**607**
Jackson town	**550**	**1,150**
Leola town	**95**	**200**
Lincoln town	**71**	**168**
Monroe town	**344**	**685**
New Chester town	**159**	**326**
New Haven town	**90**	**283**
Preston town	**377**	**743**
Quincy town	**1,045**	**1891**
Richfield town	**81**	**153**
Rome town	**1,539**	**2,939**
Springville town	**335**	**764**
Strongs Prairie town	**765**	**1,645**
Adams city	***38***	**92**
Friendship village	***8***	**17**
Wisconsin Dells *(part)*	***25***	**0**
Adams County	***6,555***	**14,159**

Source: U.S. Census, 2023 and NCWRPC, 2023

Another component of the seasonal population includes short-term accommodations such as campgrounds or hotel-style lodging. The scope of this plan did not provide for a detailed inventory of accommodations, however, the Adams County Outdoor Recreation Plan identifies about 1,900 campsites within the County including 500 at Petenwell County Park in the Town of Monroe, 200 at Castle Rock County Park in the Town of Quincy, 41 at Roche-A-Cri State Park in the Town of Preston and 1,160 private sites in various campgrounds across the County.

In addition, the NCWRPC estimates that there are over 1000 resort/motel type rooms within the County including the 620 room (equivalents) Chula Vista Resort within the area annexed to the City of Wisconsin Dells, 160 units at Northern Bay in Strongs Prairie and 118 units at the Sand Valley Golf Resort.

EMPLOYMENT

The County's highly seasonal economy is reflected in the large share of workers in seasonal leisure and hospitality jobs. The leisure and hospitalities industries employ more than a quarter of total employment. Employment in the leisure and hospitality sector swells to cater to the waves of tourists that move through the County each year, as well as to the retirees relocating here. As a result, Adams has a higher concentration of food preparation and sales related occupations than the statewide average.

Table 5	Top Employers in Adams County		
Company	***Product or Service***	***Size***	***Location***
Chula Vista Inc.	Hotels and Motels	*1000-4,999*	C. Wisconsin Dells
Allied Cooperative	Other General Merchandise Retailers	*250-499*	C. of Adams
WestRock	Corrugated & solid fiber box mfg	*250-499*	C. of Adams
Villa Pines Living Ctr	Nursing care facilities	*100-249*	V. of Friendship
Gundersen Moundview Hospital and Clinics	General medical & surgical hospitals	*100-249*	V. of Friendship
County Market	Supermarkets and other grocery stores	*50-99*	C. of Adams
Lake Arrowhead	Civic and Social Organizations	*100-249*	C. of Nekoosa
Adams-Columbia Electric Co-Op	Electric Power Distribution	*50-99*	V. of Friendship
Adams Middle School	Elementary and Secondary Schools	*50-99*	C. of Adams

Source: Wisconsin Department of Workforce Development, 2023

Accommodation and food services and drinking places together employ over 1,000 workers. Many of these jobs are seasonal or part-time. As resorts in the Wisconsin Dells area continue to expand, the accommodations sector within the County has added significant jobs. Chula Vista Resort has actually grown into the largest employer in Adams County, refer to Table 5.

The education and health sector are the largest source of jobs in the County, with Villa Pines and Gunderson Hospital being major employers. Manufacturing is the second largest source of jobs in the County. Government and school districts are also significant employers.

Looking at the concentration of employment geographically shows the range of jobs spread across the County. However, the locations of major employers again become evident: the City of Adams has the highest concentration of jobs as the commercial center

of the County, Friendship has County government and New Chester the Federal prison, while Chula Vista is in Wisconsin Dells. Identifying locations of large employment is important when prioritizing hazard mitigation strategies.

In addition to the seasonal swells in employment, the number of people working in a given locality fluctuates on a daily basis. The average commute time for Adams County residents is 29 minutes. The county is a net exporter of labor. In other words, the County has fewer local jobs than residents who work. According to the County Comprehensive Plan, there are approximately 4,475 jobs within the County. About 2,003 of those jobs are held by residents of the County, while 2,472 jobs are filled by people commuting in from surrounding areas. At the same time, about 5,924 residents of the County travel to jobs located in other counties.

Agriculture is a major component of the economy in Adams County. There is significant agricultural employment in the area. The fact that a large portion of this employment is made up of migrant seasonal workers makes it difficult to quantify and track.

Economic Impact of Job Loss in Adams County

To help determine the potential impact of a hazard occurrence on the economy of the County, EMSI economic modeling software was used to estimate the cumulative effects of job losses in the some of the top industry sectors of the County. A catastrophic, worst case, scenario is examined. Actual impacts would vary by degree of severity of the event. APPENDIX C contains a detailed printout of the analysis, and Table 6 shows a summary.

Table 6	Economic Impact of Catastrophic Event on Major Industrial Sectors of Adams County			
Sector	***# Firms***	***Multiplier***	***Potential Jobs Impacted***	***Earnings***
Crop Production		1.28	1,164	$64,702,059
Corrugated Box Mfg		1.36	327	$20,738,317
Convenience Stores		1.39	242	$8,479,222
Hotels/Motels		1.23	475	$17,936,642
Source: EMSI Economic Modeling Specialists and NCWRPC, 2023.				

LAND USE/LAND COVER AND DEVELOPMENT PATTERNS

Land use is an important determinant in the potential impact a particular hazard may have, and in action which may be taken to mitigate the hazard impacts. An understanding of the amount, type, and spatial distribution of urban and rural land uses within the County is an important consideration in the development of a sound hazard mitigation plan.

The Adams County Comprehensive Plan has categorized land use in Adams County into classifications. Aerial photos were used to digitize land use Geographic Information System (GIS) coverage. Map 2 shows the land use and development concentrations in Adams County. Table 7 shows the acreage and percent of each classification.

FORESTRY AND AGRICULTURE

The dominant land uses in Adams County are forestry and agriculture. Land area in the County is approximately 58 percent forested, comprised of around 255,000 acres of woodland. Agricultural land covers another 26 percent of the county's land area. The main agricultural practices in the county are irrigated vegetables and dairy farming. Cranberry production has expanded in the County, particularly in the Town of Leola. Agriculture is scattered throughout the County but much of it is on the eastern side. According to the Wisconsin Agricultural Statistic Service, Adams County actually gained farmland during the 1980's and 1990's – something uncharacteristic compared to the majority of Wisconsin's counties. FSA crop statistics indicate this trend is continuing with active croplands increasing from 78,589 acres in 2014 to 79,603 in 2024.

Table 7	Generalized Land Use Adams County 2020	
Description	**Acres**	**Percent**
Agriculture	115,861	26.3%
Commercial and Industrial	2,732	0.6%
Governmental / Institutional	854	0.2%
Residential	19,683	4.5%
Outdoor Recreation	2,699	0.6%
Transportation	15,026	3.4%
Utility	20	0.0%
Water	27,931	6.3%
Woodlands	255,426	58.0%
Total Acres	440,232	100.0%

*Source: NCWRPC Inventory 2015, *Broadly Includes farm areas in addition to active cropland: cranberry, open field & grasslands and other lands.*

RESIDENTIAL DEVELOPMENT

Land in residential development makes up 4.5 percent of the total county area. Residential concentrations are scattered throughout the county (see "Population and Households" above). Much of the scattered rural development is related to direct recreational demand as various types of housing have clustered along streams and lakes.

There are a number of mobile home parks in the county. According to the U.S. Census, there were 3,252 mobile homes in 2023. This is about 19 percent of housing units for the County compared to about 3 percent for the entire state. This is significant due to their vulnerability to natural hazards, especially tornados. Map 15 displays the mobile home concentrations within the County.

Insert Map 2 Land Use

COMMERCIAL AND INDUSTRIAL DEVELOPMENT

Commercial and industrial development makes up only about 0.6 percent of the total area of the County. Land use for commercial and industrial development is also scattered throughout the county. There are four designated industrial parks in Adams County. They are in the City of Adams, Village of Friendship, Town of Preston, and Town of Rome. Other industrial sites are located in the towns of Jackson and Lincoln. Commercial activity is located in the City of Adams and Friendship where it serves as a sub-regional service center supported by the surrounding agri-business and tourist industry. Commercial activity in the unincorporated areas is primarily dominated by private commercial recreation.

SURFACE WATER

The majority of the land in the County is part of the Central and Upper Wisconsin River Basins. Five main watersheds make up the two Wisconsin River basins in Adams County – Fourteen Mile Creek, Big Roche A Cri, Little Roche A Cri, Duck and Plainville Creeks, and Neenah Creek (see Map 3). The Johnstown terminal moraine in southeastern Adams County forms the drainage divide between the Wisconsin and Upper Fox River Basins. Neenah Creek is the main watershed in Adams County for Upper Fox Basin.

Within the watersheds, there are 73 interior streams covering 234.5 linear miles and 450 surface acres (see Map 3), but 12 (of 26) named steams and 27 (of 47) unnamed streams possessing 31 percent of the total stream frontage have average widths of less than 10 feet, making them relatively undesirable for development. However, all the streams, like the lakes, are important in the hydrological and ecological regime and should be protected by shoreland zoning and physical protective measures.

Streams in Adams County, except the Wisconsin River, have their headwaters in outwash plains, which contribute relatively large and constant amounts of groundwater base flow to the streams. Regional average runoff in Adams County is about nine inches/0.7 cfs per square mile of drainage basin. The Wisconsin River is well regulated and has a relatively constant flow.

The total surface water area of lakes and streams in Adams County exceeds 25,000 acres. Petenwell and Castle Rock flowages, the 2nd and 5th largest lakes in the state, cover 16,295 acres together. Unlike most counties in the west central part of the state, Adams County has 7 natural lakes, all located on the east side of the moraine, in the Towns of Jackson and New Chester. All the other lakes in the county are impoundments (man-made lakes). Most of these are located west of the moraine. The 48 interior lakes add 2,439 acres, of which 22 have surface areas of less than 5 acres. Twenty-nine lakes have maximum depths of less than 10 feet. Several are

Castle Rock Lake

subject to winter fishkill because of their shallowness. The two flowages and the 22 named lakes provide the bulk of the County's high quality lake resources. Of the 26 unnamed lakes, the largest is 12.5 acres, only one is over ten feet deep, and 17 have no fishery. Named lakes have a total of about 71 miles of shoreline, and unnamed lakes add another 7.

Lake Sherwood, Lake Camelot, and Lake Arrowhead Dams are located in the Town of Rome, see Map 4. These lakes were designed for recreational and economic purposes related to property development. They were formed by artificially constructing earthen dams made of native soil material across the river valleys. In 1967, Lake Sherwood was the first of the three dams created by damming Fourteen Mile and Spring Branch creeks. Lake Camelot was created in 1969 by damming Spring Branch Creek near the end of the upper arm of Lake Sherwood and Fourteen Mile Creek near the end of the lower arm. A channel between the two diverts part of the flow of Fourteen Mile Creek to the upper part of Lake Camelot to reduce stagnation problems that could have arisen from low flow in Spring Branch Creek and the resultant slow replacement of water in the lake. The Lake Arrowhead Dam was the last of the dams constructed in 1978 over Fourteen Mile Creek and is located approximately 2.7 miles west of State Highway 13. Nine of the dams in the county are owned by Adams County and managed by the Adams County Land & Water Conservation Department.

Floodplains and wetlands are important subsidiary components to the surface water system as described below.

Floodplain

The primary value of floodplains is their role in natural flood control. Flood plains represent areas where excess water can be accommodated whether through drainage by streams or through storage by wetlands and other natural detention/retention areas. Specific areas that will be inundated will depend upon the amount of water, the distance and speed that water travels, and the topography of the area. If uninterrupted by development, the areas shown on a map as floodplains should be able to handle the severest (regional) flood, i.e. those that have a probability of occurring once every one hundred years.

There is a value in preserving and protecting these natural flood control areas from encroachment. First, by preventing development in the floodplain, the cost of building dikes, levies, or other man-made flood control devices will be saved. Second, for each structure that is constructed in a flood-prone area, that flood-prone area expands, potentially subjecting other structures originally built outside the delineated flood hazard area to the risk of flooding. Each new structure (or modification to existing) placed in the flood plain puts more life and property in danger.

Counties, cities, and villages are required to adopt reasonable and effective floodplain zoning ordinances. The requirement is found in section 87.30 of the Wisconsin Statutes and Chapter NR 116 of the Wisconsin Administrative Code. Floodplain zoning is designed to protect individuals, private property, and public investments from flood damage.

Floodplain zoning maps identify areas where major floods occur. Regulations prohibit development in the floodway, the most dangerous flood area. In other flood areas, the flood fringe, development that is built above flood levels and otherwise flood-protected is allowed if it is in accordance with local ordinances. For regulatory purposes, a floodplain is generally defined as land where there is a 1% chance of flooding in any year (also known as the 100-year floodplain).

In order to participate in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP), the County, City of Adams, and Village of Friendship have completed a Flood Insurance Study and a Flood Insurance Rate Map (FIRM) that encompasses Adams County, see Table 8 for summary of NFIP status. This FIRM delineates the "A" Zones including the floodway and flood fringe which are those areas inundated by the 100-year flood within the County. Adams County has updated its FIRM to digital standards. The digital FIRMs are referred to as DFIRM. The NCWRPC downloaded the DFIRM from FEMA's website for use in this plan. Although unofficial, the digital files indicate there are 19,016 acres floodplain in Adams County, or 4.6 percent of the land area. Map 4 shows the approximate floodplains in Adams County. Floodplains in Adams are small and typically flood only during periods of exceptionally heavy rainfall.

Table 8 FEMA Community Status Book Report
Communities Participating in the National Flood Insurance Program
Wisconsin - Adams County

Community	Initial FHBM	Initial FIRM	Current Map	Program Entry
Adams County	02/20/76	11/16/90	06/17/08	11/16/90
City of Adams	05/14/76	09/01/88	NSFHA*	09/06/88
Village of Friendship	05/03/74	11/16/90	06/17/08	11/16/90
**No special flood hazard area - all zone C.*				

Source: FEMA, 2025

Currently, there is only one repetitive loss structure, those with multiple flood insurance claims, in Adams County.

Adams County has also chosen to participate in the Community Rating System (CRS), which is a voluntary program that provides incentives for floodplain management activities that exceed minimum requirements for NFIP. Adams County has qualified for a Class 7 rating in the CRS which results in a 15% discount for flood insurance premiums in special flood hazard areas and 5% in non-special flood hazard areas.

Insert Map 3 Surface Water and Wetlands

Insert Map 4 Floodplains and Dams

The Biggert-Waters Flood Insurance Reform Act was signed into law in July, 2012. This act implemented significant reforms to the structure of flood insurance under the National Flood Insurance Program (NFIP). Then, on March 21, 2014, President Obama signed the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA) into law amending the NFIP further. These new laws impact the various elements of the NFIP, including Insurance, Flood Mapping, Mitigation, and Floodplain management.

HFIAA repeals and modifies certain provisions of the Biggert-Waters Flood Insurance Reform Act, and makes additional program changes to other aspects of the program not covered by that Act. Many provisions of the Biggert-Waters Flood Insurance Reform Act remain and are still being implemented. The new law lowers the recent rate increases on some policies, prevents some future rate increases, and implements a surcharge on all policyholders. The Act also repeals certain rate increases that have already gone into effect and provides for refunds to those policyholders. Both of these laws are important to local floodplain managers and planners because rate structure increases may increase interest of policy holders that own floodprone properties in alternatives to mitigate both flood risk and flood insurance costs for those properties.

Wetlands

Wetlands perform many indispensable roles in the function of the hydrologic cycle and local ecological systems. In terms of hazard mitigation, they act as water storage devices in times of high water. Like sponges, wetlands absorb excess water and release it back into the watershed slowly, preventing flooding and minimizing flood damage. As more impermeable surfaces are developed, this excess capacity for water runoff storage becomes increasingly important.

The DNR has also identified the location of wetlands on their WISCLAND database. According to this, Adams County has 48,348 acres, or 11 percent of its total area. Map 3 shows these wetland areas in Adams County. There are concentrations of wetlands in Adams County including Leola Marsh Wildlife Area, Colburn Wildlife Area, and the Quincy Bluff and Wetland Natural Area. Additional wetlands are associated with the floodplains discussed above, however, smaller wetlands are scattered throughout the County.

Eradication of wetlands can occur through the use of fill material. This can destroy the hydrological function of the site and open the area to improper development. The Wisconsin Department of Natural Resources (DNR) has promulgated minimum standards for managing wetlands.

OTHER LAND COVER/USES

Recreational lands including parks and outdoor sports facilities total about 2,699 acres or 0.6 percent of the county land area. Other lands may have recreational aspects, particularly woodlands. Governmental, public and institutional lands total about 854 acres or about 0.2% of the County land area. The transportation category is primarily the roadway travel corridors for federal, state, county and local highways and roads. Sometimes overlooked, transportation land use can be significant. In Adams County, surface transportation facilities consume about 15,000 acres of land or about 3.4 percent

of total land area. Note that this is more than three times as much land area as is used for commercial, industrial and institutional uses in the County.

FUTURE GROWTH AND DEVELOPMENT IN ADAMS COUNTY

Adams County's population has increased 0.9% over the last 10 years for a net gain of 187 residents. The County's rate of growth has been declining from the very high rates observed during the previous decades. The County's rate of growth has historically been faster than state and national averages. For example, going back to the 1990s, the County's population increased 27% over the decade, compared to the state's growth of 10% over this same period. By 2035, Adams County will have grown to a population of about 21,116, a gain of 188 residents if the growth rate continues at the long-term trend level. This equates to approximately 317 structures or about 17 per year.

From a net growth perspective, residential migration into Adams County has been solely responsible for all of its population growth because natural growth has been negative (more deaths than births). This growth pattern is reflective of an aging population and seasonal-to-permanent housing markets.

The Towns of Rome and Monroe in the northwest corner of the County should continue to see strong growth as the primary lakeshore/riverfront development areas of the County. The other riverfront towns including Strongs Prairie, Quincy, Springville and Dell Prairie will also likely see continued development due to the attraction of the river and other recreational amenities. In addition, the "northern" towns of Leola, Big Flats and Preston and the "southern" towns of Jackson and New Haven will continue to grow in part as “bedroom communities” to Wisconsin Rapids and Wisconsin Dells, respectively.

New commercial and industrial development is expected to be gradual over time, paralleling population growth. The most significant concentrations of this development will likely be in the Town of Rome, City of Adams and Town of Dell Prairie. Notable areas of newer development include the Sand Valley Golf Resort in the Town of Rome and the Chula Vista complex in Dell Prairie. In the City of Adams, new commercial facilities include a new YMCA. Even with these developments, the County is expected to remain a net exporter of labor as proximity to the Wisconsin Dells and the Wisconsin Rapids area attracts much of the new commercial and industrial development that would serve Adams County.

Development of new infrastructure or public facilities remains somewhat restricted due to constraints on local government budgets. However, some needed projects do eventually move forward. For example, the Town of Rome just completed a new police and EMS building. A new fire station was opened in the City of Adams. And, the City has done extensive upgrades to its water and wastewater systems. Adams County is currently working on major renovations and expansion of the Courthouse which will include a new administration building. The Town of Jackson is considering a new town hall and storage shed. The majority of population growth will occur in the towns, which, with the exception

of Rome, do not provide extensive services, and budget constraints will curtail local governments' ability to develop new facilities and result in a tendency to make do with existing infrastructure and delay expansion plans.

Any new buildings and facilities, including new housing units, will be subject to each hazard addressed in this Plan. Even best efforts to keep new building out of flood plain and dam shadow areas cannot guarantee new construction will be exempt from flooding due to the nature of flooding within the County.

The County's population is generally older, with the median age in Adams at 55.5, in comparison to the State's median age of 40.1. Over the next few decades, the residential base will become even older, aging much more quickly than the state as a whole. In fact, the number of persons 65 and older will likely exceed 36 percent of the population by 2030. This will have implications affecting the demand for emergency services.

PUBLIC FACILITIES AND SERVICES

TRANSPORTATION

The transportation system of Adams County provides the basis for the movement of goods and people through the County. An efficient transportation system is essential to the sound social and economic development of the County and the Region. The analysis of transportation routes should be considered in the possible event of a disaster (See Map 5).

The principal highway serving the County is north-south, State Trunk Highway (STH) 13 which bisects the County through Adams/Friendship. STHs 21 and 82 provide the main east-west routes, and State highways 23 and 73 also serve the County. These highways link the County with neighboring communities and are vital to the County's tourism and recreation-based economy.

Networks of county trunk highways collect traffic from rural land uses. These county highways serve an important role in linking the area's agricultural and timber resources to the County's major highways and population centers. Local roads provide access to local development, farming and forest areas, as well as to the County's lake areas.

The Wisconsin Department of Transportation maintains 7 bridges on state highways within the County. Adams County itself owns another 10 bridges on various County highways. Local roads have 21 bridges belonging to various towns. There is also one rail bridge in the Town of New Chester.

Adams County Health & Human Services coordinates transit service for elderly and disabled in the County. Vans and mini-buses provide work routes, a weekly grocery run, a monthly food pantry run and serve nutrition sites. A volunteer driver network is also available.

The Union Pacific Railroad also serves Adams County. The rail line arcs east-west with a yard at City of Adams. There are approximately seven through trains per day on this line.

The "Adams County Legion Field" airport located east of the City serves the area. It is a basic utility airport designed for aircraft under 12,500 pounds and 49 feet in wingspan. There are 5 other landing strips within the County.

UTILITIES

Utility systems are important in hazard mitigation planning because of the dependency on water, wastewater treatment, gas service, electricity, and communications. Because of this reliance and vulnerability to hazards, utility systems must be identified for this Plan, see Map 6.

Water: The protection of the public water supply facilities from potential contamination from hazards such as flooding is a consideration for hazard mitigation planning. The City of Adams provides municipal water supplies for domestic and commercial use within the City as well as the Village of Friendship, while the Oxford Federal Correctional Institution supplies water for their inmates. The Rome Water Utility also provides a water supply system to customers around Lake Camelot.

The protection of the wastewater facilities is an important consideration for hazard mitigation planning because of its potential to contaminate nearby waterbodies in the event of high water. Also of concern during periods of flooding is the threat of damage to infrastructure and associated facilities. A municipal wastewater treatment facility serves the Adams-Friendship area. This utility is located on the west side of Friendship along the Little Roche a Cri Creek but outside the floodplain area. A private wastewater treatment facility serves the Easton Lake District. It is located in the Town of Easton along Campbell Creek. Another is located in Dell Prairie. These are of concern because of their locations within a designated floodplain.

Electric: The Adams-Columbia Electric Cooperative serves the largest part of the County. The Waushara Electric Cooperative serves part of the northeast quarter of the County while Alliant Energy serves the Adams-Friendship area and parts of the Towns of Dell Prairie and Leola. Pioneer Power and Light serves most of New Chester. There are several high-voltage transmission lines traversing the County. One line runs along the Wisconsin River to the north from the crossing at WI-21; one is located near the River from the Wisconsin Dells to the Town of Springville; and another cuts across the center of the County from the Town of Quincy eastward to the Town of Lincoln.

Insert Map 5 Transportation

Insert Map 6 Utilities

Natural Gas: The Wisconsin Gas Company distributes natural gas in the Adams-Friendship area and at the Federal Correctional Institution at Brooks. The remainder of the community depends upon LP gas from local suppliers. An oil pipeline crosses the county diagonally from the Town of Rome to the Town of New Chester.

Telecommunications: There are four telephone providers in the County – Wood County, Union, Verizon, and Marquette-Adams. Internet Dial-up service is available throughout the County. Some areas on the edge of the County have Integrated Service Digital Network (ISDN), an international digital standard for providing more bandwidth to consumers by adding a third data channel to standard copper twisted pair cables that can increase bandwidth to 144Kbps. Digital subscriber line (DSL) makes efficient use of copper wire using special equipment to provide broadband access on existing phone lines. Delivery of DSL service is dependent on the length of the customer's loop from the central office (depending on the technology used this can range from 10,000 to 18,000 feet). This distance can be extended by installation of an access multiplexer at an intervening point along the line.

There are several cell towers located in Adams County. Wireless, broadband service is provided in the Adams-Friendship area by the Marquette-Adams Telephone Cooperative. This service is available throughout the urbanized area from an antenna located in the City industrial park on a line-of-sight basis. Known internet service providers in the County include Bertram, Bug Tussel, Charter, Frontier, Solarus, Union Telephone Company, TDS, and Telecom. Wireless telephone coverage is intermittent in parts of the County. Cable TV service is available from Charter Communications in both the City and Village as well as in the Town of Rome from Wisconsin Rapids and in Dell Prairie from Wisconsin Dells.

EMERGENCY SERVICES AND FACILITIES

The type and location of public emergency services are an important consideration in hazard mitigation planning, because of the potential direct involvement of such facilities in certain hazard situations. The location of fire stations, police departments, and ambulance services in Adams County are shown on Map 7. Adams County operates the 911-call center providing dispatch for virtually all of the emergency services discussed below.

Sheriff/Police: The Wisconsin State Patrol, the Adams County Sheriff's Office, the City of Adams Police Department, and the Town of Rome Police Department are the four law enforcement agencies that operate within Adams County. The State Patrol has statewide jurisdiction on all public roads but operates mainly on State and U.S. numbered highways as a matter of general practice. The County Sheriff provides general law enforcement services throughout the County and by contract to the Village of Friendship. The Adams' police force and the Town of Rome's police force serve their respective communities.

Historically, the rural and sparsely settled areas of Adams County have needed minimal police service. However, recent development and increasing population has multiplied law enforcement problems and increased demand for law enforcement services. Adams

County has recognized this demand and added manpower and increased law enforcement expenditures.

Fire: Fire protection services in Adams County are provided by volunteer fire departments in a complex pattern with mutual aid assistance agreements between Towns. There are five fire departments located in Adams County that serve the local units of government: Rome, Big Flats, Quincy, Adams and New Chester. Five municipalities rely on the Adams County Fire District while five municipalities along the eastern and southern borders rely on fire departments located outside the county – Coloma, Hancock, Plainfield, Oxford and Kilbourn.

The City of Adams, and much of the central and western area of the County, receives service from the Adams Volunteer Fire District. The department maintains a station in the City of Adams and one in Arkdale. The Adams Fire Department covers a large area, including all of the City of Adams, the Village of Friendship and the Towns of Adams, Easton, Strongs Prairie, Preston, and Springville north of WI-82. This area has an ISO rating of seven (the level of fire protection on a one-to-ten scale where one is the highest rating) for properties within five miles of a station. For the areas of the City where fire hydrants exist, the ISO rating is four. A good ISO rating can have a positive impact on fire insurance premiums.

The Adams County Fire District and the various rural fire departments all continue to grow as needed based on the demands of the communities they serve. All existing departments are meeting the needs of the county. Each of these volunteer organizations annually reviews local needs and makes adjustments regarding staffing, equipment and facilities. These departments also coordinate with the County Emergency Management Department for various fire and other hazardous related issues.

In addition, the State of Wisconsin Department of Natural Resources (DNR) maintains a ranger station, located in the City of Adams, responsible for wildland fire suppression throughout the county. The DNR utilizes mutual aid agreements with all of the local and surrounding fire departments. Three fire towers are located in the county.

EMS: There are multiple ambulance service providers in the County. Various service agreements are in place to provide ambulance service in the County. These arrangements change regularly. Currently, a majority of the County is covered by LifeStar EMS. Waushara County covers the Town of Leola. Marquette County ambulance covers the Town of Jackson and part of the Town New Chester. Town of Rome has its own EMS department. Kilbourn provides service to the Towns of Dell Prairie, Springville, and New Haven.

Red Cross: The American Red Cross maintains agreements with the owner/operators of various facilities around the County to act as shelters in the event of an emergency. Schools and churches are the most common shelter facilities. Adams County is part of a larger chapter of the American Red Cross with 17 other counties. The chapter's

administrative office is located in Madison, but a volunteer disaster action team is maintained locally.

CRITICAL COMMUNITY FACILITIES

In addition to emergency service facilities, other community facilities are also important in hazard mitigation planning. Government administration buildings serve as the headquarters that link to resources in helping solve potential problems. Hospitals and ambulance services are very important for knowing where injured residents have to be transported and as to how many people each hospital can handle if a hazard would breakout.

Adams County Courthouse

Gundersen Moundview Hospital in the Village of Friendship is a 25-bed acute care facility with associated clinics.

Clinic in City of Adams

An Aspirus Clinic was recently opened in the City of Adams. Villa Pines Living Center in Friendship is the primary nursing home within the County. Nursing homes are vulnerable, because of the high level of assistance needed with the residents that live there. The schools are another facility that are important, since hundreds of the county's children are there for most of the year. Map 7 shows the location of selected types of critical community facilities within Adams County.

Map 7 Critical Facilities

INVENTORY & VALUE OF STRUCTURES & PROPERTY IN ADAMS COUNTY

The value of the real estate and personal property in a community reflects the upper end of the potential for property damages in each community. The annual equalized value of each municipality represents the Department of Revenue estimate of market value (Agricultural land is included at Use Value) of all taxable property. Property tax levies of jurisdictions are apportioned to each municipality on the basis of equalized value. Table 9 lists each municipality's total equalized values for real estate, personal property, and all property and the percentage each municipality represents of the county total.

Table 9	Equalized Value by Municipality *(2024)*				
	Improvement Value	Land Value	Personal Property	Total	% of Total
Adams city	$91,707,900	$14,810,100	$2,929,900	$111,524,200	2.7%
Wisconsin Dells (part)	$83,859,400	$13,363,500	$2,140,600	$99,363,500	2.4%
Adams town	$131,072,100	$71,678,600	$1,724,800	$204,508,500	4.9%
Big Flats town	$91,894,000	$72,072,700	$720,400	$164,687,100	3.9%
Colburn town	$53,937,400	$25,359,700	$790,000	$81,532,100	1.9%
Dell Prairie town	$191,990,900	$89,280,800	$1,098,000	$282,369,700	6.7%
Easton town	$83,034,400	$54,448,500	$156,500	$137,639,400	3.3%
Jackson town	$171,261,500	$116,216,500	$259,800	$287,737,800	6.9%
Leola town	$34,786,700	$20,477,500	$182,300	$55,446,500	1.3%
Lincoln town	$34,161,600	$26,893,100	$98,300	$61,153,000	1.5%
Monroe town	$96,091,400	$51,972,100	$745,600	$148,809,100	3.6%
New Chester town	$91,953,700	$44,617,600	$654,500	$137,240,200	3.3%
New Haven town	$57,283,200	$34,488,600	$84,100	$91,855,900	2.2%
Preston town	$154,620,900	$95,627,100	$600,900	$250,906,800	6.0%
Quincy town	$192,921,400	$129,423,500	$1,890,600	$324,235,500	7.7%
Richfield town	$27,419,000	$19,307,100	$91,500	$46,817,600	1.1%
Rome town	$867,815,900	$511,363,900	$2,917,100	$1,382,105,400	33.0%
Springville town	$123,166,800	$64,296,500	$952,100	$188,415,400	4.5%
Strongs Prairie town	$217,767,100	$122,527,700	$1,224,500	$341,519,300	8.2%
Friendship village	$33,092,800	$7,860,500	$810,900	$42,528,700	1.0%
Adams County	$2,621,178,000	$1,550,051,500	14,191,000	$4,186,979,300	100.0%

Source: WisDOR, 2023
**Personal Property is non-manufacturing personal property*

The valuation of property in a community reflects the potential for property damages across the community. However, only taxable properties are included in this valuation. Tax exempt government properties are not included. With Adams County owning many critical facilities that are needed in times of disaster, the potential for damages to these structures could be devastating for the county. In Table 10, the county owned critical

facilities are listed with the general location they are in and the value of the facilities. Estimates for local government facilities are given in Tables 11 - 13.

Table 10 Value of County Owned Properties		
Name	**Value***	**Location**
Courthouse / Sheriff	$29,188,500	Friendship village
Fairgrounds	$3,551,300	Friendship village
County Storage	$1,055,600	Friendship village
Solid Waste Main Facility	$4,322,100	Strongs Prairie
Social Services	$3,729,600	Friendship village
Airport	$501,700	Adams town
Industrial Park	$330,400	Jackson town
Highway Department	$7,657,800	Adams town
Highway Dept. Satellites	$853,000	Various Locations
Community Center	$5,008,100	Adams city
HHS Practical Cents Store	$1,629,200	Adams city
Parks	$8,644,975	Various locations
Total	$66,472,275	Above Locations

**=Includes insured buildings, contents, and property in the open.*
Source: Statement of Values State of Wisconsin Local Government Property Insurance Fund, 2024.

Table 11 Value of City Owned Properties	
Property	**Value***
Municipal Building	$2,725,326.56
City Garage	$509,936.35
Pump Station	$349,048.70
Treatment Plant	$7,388,269.68
Pavilion	$88,592.57
3 Well Houses	$1,982,952.84
2 Water Towers	$1,887,953.32
Lift Station	$489,132.82
Misc Other	$399,535.95
Total	$15,820,748.79

**includes insured building contents and property in the open.*
Source: NCWRPC estimate, 2025

Table 12 Value of Village Owned Properties	
Property	**Value***
Village Hall	$1,084,181.78
Public Works Building	$889,652.50
Beach Park	$201,887.29
Park	$221,062.16
Lift Station	$94,848.27
Other Misc.	$326,219.63
Total	$2,817,851.63

**includes insured building contents*
Source: NCWRPC estimate, 2025

Table 13: Value of Town Owned Properties		
Municipality	**Property**	**Value***
Adams town	Town Hall/Sand Shed	$1,129,129
Big Flats town	Town Hall/Fire Dept	$1,132,560.00
Colburn town	Town Hall/Garage	$198,198.00
Dell Prairie town	Town Hall	$377,580.50
Easton town	Town Hall	$377,580.50
Jackson town	Town Hall	$622,600
Jackson town	Equipment Shed	$181,1000
Leola town	Town Hall	$377,580.50
Lincoln town	Town Hall/Garage	$196,782.30
Monroe town	Town Hall/Garage	$1,087,969.30
Monroe town	Park Shelter	$67,632
New Chester town	Town Hall/Fire Department	$1,013,626.68
New Haven town	Town Hall	$377,580.50
Preston town	Town Hall/Garage	$169,884.00
Quincy town	Town Hall/Garage/Fire Dept.	$970,970.00
Richfield town	Town Hall	$132,561
Rome town	Town Properties - 10 Locations	$10,806,716.91
Springville town	Town Hall	$377,580.50
Strongs Prairie town	Town Hall / Fire Dept	$699,297.72

**includes insured building contents and property in the open*
Source: Local Government Insurance Policy Declarations and NCWRPC Estimates, 2019

Town of Rome Brush Fire Unit

INTRODUCTION

Analyzing the hazards in a community is an important and critical step in the mitigation planning process. Before mitigation strategies can be determined, a risk assessment must be made. Part III of Adams County All-Hazards Mitigation Plan Update will focus on the following:

- Identification of the types of natural hazards that may affect Adams County; and
- An analysis of the hazards identified as pertinent to Adams County.

The Hazard Analysis will consist of:

- Background Information;
- History of previous occurrences of hazard events;
- An assessment of the County's vulnerability to future events; and
- An estimate of future probability and potential losses from the hazard.

HAZARD IDENTIFICATION

The process of identifying those hazards that should be specifically addressed in the Adams County All-Hazards Mitigation Plan Update was based on consideration of a number of factors. The process included a review of past hazard events to determine the probability of future occurrences and threat to human safety and property damage.

Worksheets from the Wisconsin Guide to All-Hazards Mitigation Planning were used by the planning team to evaluate and rank the listing of possible hazards to help identify which hazards should be included in the Plan Update according to threat to human safety and possible damage to property. The ranking was compared against the ranking from the previous mitigation plan update.

After review of the hazard scoring exercise results, it was determined that flooding should be the top priority since it has become a serious recurring problem for the County in recent years.

The resulting priority ranking of hazards accepted by the Committee through this report is as follows:

1. Flood/Dam Failure
2. Tornado
3. Wild Fire
4. Winter Storms/Extreme Cold
5. Hazardous Materials Incidents
6. Severe Thunderstorms/Lightning/Hail
7. Drought/Extreme Heat

This Plan Update focuses on natural hazards that have or could cause disasters that can be mitigated on a local level. Technological or manmade hazards include things like transportation incidents, civil disturbances, mass casualty events, war, and terrorism. Adams County already has action plans for these types of events, so they are not included in this planning process. Low magnitude earthquakes occur in Wisconsin every few years, but none have exceeded a magnitude of 3.9, which would have vibrations similar to the passing of a semi-truck, therefore, earthquakes are not covered in this plan. Adams County does not have avalanche, coastal hazard, hurricane, tsunami or volcano issues and conditions for landslide, subsidence or expansive soil problems are not significant in the County.

Although a significant concern, human communicable diseases are not addressed in the plan. The Adams County Health Department and area hospitals work with the Wisconsin Department of Health Services (WDHS) and the CDC to monitor and plan for these situations.

HAZARD ANALYSIS

The hazard analysis for each hazard included in this plan update is broken down into four components, as follows:

1. Background on Hazard - The next step after identifying a hazard is to define the hazard and give some general background behind it. This can include occurrence of the hazard within the County or State. This section may also give some indication of the risk to public health and safety and to personal and public property.

2. History of Hazard - Past experience of disasters is an indication of the potential for future disasters for which Adams County would be vulnerable. A review of past occurrences for each identified hazard in Adams County was completed.

Some disasters have had damages that exceeded the capabilities of local communities and state agencies. Federal assistance is then requested. Federal assistance may be offered through a variety of programs. Assistance may be directed to agricultural producers, individuals and families, businesses, or local governments. There have been 12 natural disasters in Adams where Presidential Declaration was requested from 1971-2024. They include the following:

- 1973 Flood – Disaster Declaration Approved
- 1976 Drought - Disaster Declaration Approved
- 1993 Flood - Disaster Declaration Approved
- 1994 Tornados - Disaster Declaration Denied
- 2000 Severe Storms/Flooding - Disaster Declaration Approved
- 2001 Severe Storms/Flooding - Disaster Declaration Approved
- 2002 Severe Storms/Flooding - Disaster Declaration Approved

- 2004 Severe Storms/Flooding/Tornado - Disaster Dec. Approved
- 2005 Cottonville Wildfire - State Disaster Fund
- 2005 Hurricane Katrina Evacuation Disaster Declaration Approved
- 2008 Flood – Disaster Declaration Approved
- 2011 -Tornados - State Disaster Fund
- 2016 Severe Storms/Flooding - Disaster Declaration Approved
- 2018 Severe Storms/Winds/Flooding - Disaster Declaration Approved
- 2020 Wisconsin COVID-19 Pandemic - Disaster Declaration Approved
- 2020 Wisconsin COVID-19 Pandemic II - Disaster Declaration Approved

It should be noted that this significantly underestimates the number of hazards that have occurred in Adams County. Almost every year there are significant weather events or disasters that cause thousands of dollars in damage for which no Federal disaster assistance is requested. Major indicators of hazard severity are the deaths, injuries, and economic losses resulting from natural hazards and disasters.

The National Oceanic and Atmospheric Administration (NOAA) and National Climatic Data Center (NCDC) publish the National Weather Service (NWS) data describing recorded weather events and resulting deaths, injuries, and damages. From January 1, 1950 to December 31, 2024, NCDC reported 456 severe weather events for Adams County.

Note that since the earlier NCDC data is somewhat incomplete, this report focuses on the 10-year period from 2015 to 2024 for hazard analysis purposes. Other sources of data are used to supplement the NCDC data. These sources included other plans and reports, documents from the Adams County Emergency Management Department, past local newspaper articles, the Wisconsin Department of Natural Resources (DNR), Wisconsin Emergency Management (WEM), and the National Weather Service.

3. Vulnerability Assessment For Hazard - For each hazard identified, a summary of the impact that may be felt by the community is given. When possible, existing buildings, infrastructures, and critical facilities located in the hazard areas are identified. Critical facilities are community buildings that are especially important to the health and welfare of the population following hazard events. Examples of such facilities include hospitals, police & fire stations, town halls, and shelters.

Because this is a multi-jurisdictional plan, FEMA requires that the plan access each jurisdiction's risks where they vary from the risks facing the entire planning area. This section of the plan will identify variations in vulnerability for specific municipalities where they occur.

4. Future Probability and Potential Dollar Losses from Hazard - The historic data and vulnerability assessment for each hazard is used to project the

potential future probability of that hazard occurring in the County and the potential damage in dollars that might be reasonably expected. This section sets the benchmark to mitigate for each hazard.

HAZARD ANALYSIS: TORNADOS

Background on Tornado Hazard:
A tornado is a relatively short-lived storm composed of an intense rotating column of air, extending from a thunderstorm cloud system. It is nearly always visible as a funnel, although its lower end does not necessarily touch the ground. Average winds in a tornado, although never accurately measured, are between 100 and 200 miles per hour, but some tornados may have winds in excess of 300 miles per hour.

Table 14
Tornado Wind and Damage Scale

Tornado Scale	Wind Speeds	Damage
EF0	65 to 85 MPH	Some damage to chimneys, TV antennas, roof shingles, trees, and windows.
EF1	86 to 110 MPH	Automobiles overturned, carports destroyed, trees uprooted
EF2	111 to 135 MPH	Roofs blown off homes, sheds and outbuildings demolished, mobile homes overturned.
EF3	136 to 165 MPH	Exterior walls and roofs blown off homes. Metal buildings collapsed or are severely damaged. Forests and farmland flattened.
EF4	166 to 200 MPH	Few walls, if any, standing in well-built homes. Large steel and concrete missiles thrown far distances.
EF5	OVER 200 MPH	Homes leveled with all debris removed. Schools, motels, and other larger structures have considerable damage with exterior walls and roofs gone. Top stories demolished

Source: National Weather Service

A tornado path averages four miles, but may reach up to 300 miles in length. Widths average 300 to 400 yards, but severe tornados have cut swaths a mile or more in width, or have formed groups of two or three funnels traveling together. On average, tornados move between 25 and 45 miles per hour, but speeds over

land of up to 70 miles per hour have been recorded. Tornados rarely last more than a couple of minutes in a single location or more than 15 to 20 minutes in a ten-mile area.

Tornados are classified into six intensity categories, EF0-EF5. This scale is an updated or "enhanced" version of the Fujita Tornado Scale (or "F Scale"). The scale estimates wind speeds within tornados based upon the damage done to buildings and structures. It is used by the National Weather Service in investigating tornados and by engineers in correlating building design and construction standards against anticipated damage caused by different wind speeds.

Wisconsin lies along the northern edge of the nation's maximum frequency belt for tornados, known as "Tornado Alley". Tornado Alley extends northeast from Oklahoma into Iowa and then across to Michigan and Ohio. Winter, spring and fall tornados are more likely to occur in southern Wisconsin than in northern counties. Tornados have occurred in Wisconsin every month except February.

History of Tornados in Adams County:
Adams County has not had a documented tornado since 2011. The 2011 tornado along with 26 other historic tornados are reported in Table 15. The most recent was on April 10, 2011 when the National Weather Service confirmed that a second tornado formed near County Highway G and Buttercup Avenue to the north of where the Arkdale - Cottonville tornado had dissipated. EF1 damage was noted to homes and trees, along Buttercup Avenue as the tornado tracked into Waushara County. Several center-post irrigation systems were destroyed along with some roof damage to homes and downed power lines. Damage estimates for this tornado were approximately $426,000.

That was the second of two tornados affecting Adams County when a cold front pushed east into Wisconsin during the late afternoon and evening hours of April 10th. Severe thunderstorms developed along the cold front and produced very large hail and three tornadoes over portions of western and central Wisconsin. The hail ranged from quarter to tennis ball size and caused extensive damage to siding and cars in the southern portions of the City of La Crosse. Damage estimates from insurance companies and contractors in the area were between 20 and 30 million dollars from the one hail storm. National Weather Service storm survey teams confirmed two EF1 tornadoes and an EF2 tornado in Juneau and Adams counties.

The Arkdale-Cottonville tornado was the National Weather Service confirmed EF2 tornado, which tracked from about three miles west of Arkdale toward County Highway G. This tornado caused extensive damage to barns, trees, power lines and houses two miles west of Arkdale. A cement silo was also knocked over. The tornado crossed Highway 21 north of Arkdale hitting nearby homes, irrigation systems and hundreds of trees. Winds were estimated around 125 mph. Several

more farms, homes, and trees were hit as the tornado continued toward the south side of Big Roche A Cri Lake near Cottonville. Several cars and mobile homes were flipped or heavily damaged. A lake association building on the southwest side of Big Roche A Cri Lake was completely destroyed and numerous center-pivot irrigation systems were twisted or destroyed across the county.

Table 15		Reported Tornados in Adams County						
Date	Time CST	Location	Other Counties Affected	Length (miles)	Width (yards)	Deaths*	Injuries*	F-EF Scale
4/10/11	1730	Colburn	Waushara	3.86	100	0	0	EF1
4/10/11	1712	Strongs Prairie (Arkdale) - Preston (Cottonville) - Richfield	None	17.1	800	0	0	EF2
6/7/08	1357	New Haven	Marquette	3	50	0	0	EF0
8/18/05	1641	Springville	None	1	30	0	0	F1
6/23/04	1855	Quincy, Easton, New Chester	Juneau	17	50	0	11	F1
8/27/94	2210	Plainville 1SE	None	0.1	25	0	0	F0
8/27/94	2041-2057	Monroe Center 2SE	None	10.5	850	2	22	F3
6/8/93	1635	Adams 8E	None	0.5	25	0	0	F0
6/8/93	1630	Adams 7ESE	None	2	75	0	0	F0
6/8/93	1552	Rome 1SE	None	1.5	75	0	0	F0
6/8/93	1548	Rome 2.5W	None	1	50	0	0	F0
6/8/93	1330	Brooks 1N	None	1.5	75	0	0	F0
8/29/92	1900	Big Flats 3.5E	None	5	100	0	0	F1
5/24/89	1730	Adams 5W	None	0.5	50	0	0	F0
7/10/84	1551-1553	Castle Rock	None	4	500	0	0	F2
4/2784	1410	Brooks 3S	None	2	220	0	0	F1
7/3/83	1900	Lake Mason	None	0.1	10	0	0	F0
7/3/83	1845	Plainville	None	0.1	12	0	0	F0
7/3/83	1803	Dellwood	None	6	50	0	0	F1
7/19/80	2345	T.Quincy & T. Adams	None	2	?	0	0	F2
5/18/79	1645	Southeast Adams Co.	None	0.1	35	0	0	F1
4/17/75	2145	Leola	None	0.3	20	0	0	F0
6/9/74	1430	Highway 73 & CTH 1	None	?	?	0	0	F1
5/18/71	1640	Adams-Friendship to Hancock	Waushara	15.9	100	0	5	F1
5/8/64	1815	Lyndon Station 3NW to Adams	Juneau	23.5	150	0	0	F2
6/25/34	2330	Briggsville	None	1.5	880	0	0	?
10/3/03	1600	Rome 5E	Portage	22	200	5	40	F4

*Source: **Storm Data, Significant Tornados 1680-1991** by Thomas Grazulis, **WI Tornado Database 1950-2000** Geographic Techniques Report ST-WTDB01, NCDC database and Adams County EM. * Injuries and Deaths are for the entire tornado track.*

By this time the tornado had grown to nearly a half mile wide. It crossed Highway 13 at Cottonville and gradually began to weaken, hitting more seasonal homes, trees and roof tops. It dissipated south of the Colburn Wildlife Area. Damage estimates for this tornado were about $3.3 million with 7 homes and 3 businesses destroyed.

A funnel cloud was reported on July 4, 2009 just west of Big Flats. A funnel cloud was also observed in Clark County, but neither touched down.

On June 7, 2008 an EF0 tornado hit the Town of New Haven about 2.5 miles north of Briggsville before crossing into Marquette County and strengthening to EF1. Power lines and trees were downed and some homes received minor damage. Adams County estimated about $75,000 in damages. A warm front extending east to west across the Upper Mississippi River Valley was the focus for a significant severe weather event on June 7. A total of four tornados were confirmed, while numerous reports of wind damage and large hail were received from law enforcement officials and storm spotters across the state.

A tornado briefly touched down near the intersection of Highway 82 and 13 in the Town Springville August 18, 2005. One of six tornados that affected southwest Wisconsin, this tornado was part of an all-time one day record of 27 tornados hitting the state. Mobile homes were damaged, along with nearby trees and the roof of a home under construction. Damages were estimated at about $5,000.

A line of thunderstorms that moved out of Minnesota produced wind damage, hail and several tornados in June of 2004. A Presidential Disaster Declaration was issued as a result. One tornado formed in eastern Juneau County, about 2 miles west of Castle Rock Dam. That tornado moved east-northeast across Castle Rock Lake and into western Adams County. It tracked near or along Edgewood Avenue with extensive tree damage in the Quincy Bluff area, including the ranger lookout tower there. Hundreds of trees were blown down from strong winds in excess of 90 mph at times. The tornado tracked east to areas just north of Edgewood Drive crossing Highway 13 approximately 5 miles south of Adams/Friendship. Downburst winds on the south side of the storm demolished at least 8 mobile homes in Edgewood Estates that were orientated north-south and took the full brunt of the cross wind. Most of the Town of Easton had extensive damage with hundreds of trees down. It continued to move east-southeast before lifting shortly before the Adams-Marquette County line about 3 miles southeast of Grand Marsh around 7:55 pm. A broad area of straight line wind damage was found south of this tornado track with widespread tree damage occurring up to 1 mile south of the track. The tornado path was approximately 17 to 18 miles in length. The tornado was rated an F1 with estimated winds in the 73 to 112 mph range.

2004 Tornado Damage

Adams County reported that 11 people were injured including 2 that required airlifting to UW-Madison Hospital. A total of 16 homes were destroyed along with 41 having major damage and another 67 with minor damage. Governmental expenses exceeded $500,000. Private sector damage were estimated at about $6.5 million primarily agricultural including entire farms and many irrigation systems and other equipment as well as crops.

In August of 1994, a F3 tornado tore a 13-mile long, ¼ wide swath through Adams County. Two people were killed and 22 people injured by this tornado. Damage was estimated at $4.5 million with 24 homes, a tavern, a potato warehouse, and numerous out buildings destroyed. Eight homes suffered major damage, and 160 were reported to have light to moderate damage, primarily in the Town of Big Flats. In addition, the Big Flats Fire Department and town hall were destroyed, as well as a thrift shop. Seventy cows were crushed to death in one barn as the walls blew out and the upper floor, filled with 16,000 bales of hay and roof collapsed. Presidential Disaster Declaration was not issued for this event.

The largest and deadliest tornado recorded in Adams County occurred a century ago in 1903 in the Town of Rome. A large F4 tornado apparently formed over northern Adams County and then moved east-northeast passing 1.5 miles south of Bancroft in Portage County. The tornado was up to a half mile wide but most of the damage was in Portage County. Five people were killed and forty were injured by this tornado.

Only the 1994 and 1903 tornados have caused deaths, however several others have caused significant damages. The July 10, 1984, a F2 tornado that touched down in the Dellwood subdivision near Castle Rock Lake hit 59 homes and destroyed 14. More than 2,000 trees were downed.

Tornado Vulnerability Assessment:
Though Adams County is mostly a rural county, there are concentrations of population scattered throughout. Subdivisions, rural unincorporated communities, and the Adams/Friendship area can be regarded as more vulnerable because these areas pose more of a threat to human safety and property damage in more concentrated areas. Map 8 illustrates these areas with in the County.

Mobile homes are of significant concern in assessing the hazard risks from tornados. In general, it is much easier for a tornado to damage and destroy a mobile home than standard constructed houses and buildings. Since 19 percent of Adams County's housing units are mobile homes, vulnerability to health and safety along with property damage is much greater. Research by the NWS shows that between 1985 and 1998, 40 percent of all deaths in the nation from tornados were in mobile homes, compared to 29 percent in permanent homes, and 11 percent in vehicles.

Insert Map 8 Tornado Vulnerability

The 2023 American Community Survey reported there are 3,252 mobile homes in Adams County. While mobile homes are scattered throughout the County, many are concentrated in mobile home parks. Map 8 also displays the location of the mobile home parks with approximate number of units.

Foster Trailer Park Tornado Damage

In addition to mobile homes, there are many other areas vulnerable to tornados such as campgrounds. Like mobile homes parks, campgrounds are of concern in the County because often times there is a concentration of people in them and there is little shelter provided. Map 8 also shows the location of campgrounds in the County.

The following is a list of things that may be affected by a tornado. Much of this list can be referenced in Part II.

- Community facilities – hospitals, schools, "prisons/jails"
- Public Service - police and fire departments
- Utilities - power lines, telephone lines, radio communication
- Transportation – debris clean-up
- Residential – nursing homes, mobile home/parks, garages, trees and limbs, siding, windows
- Businesses – signs, windows, siding, billboards
- Agricultural - buildings, crops, livestock

Based on review of the historic events of tornados, there are no specific areas in the county that have unusual risks. The events are relatively uniform and a countywide concern. However, during the City/Village Planning Meeting for this Plan Update, both the City of Adams and the Village of Friendship identified tornados (severe winds) as a major vulnerability concern due to the potential for power outage and resulting impact on municipal services and the population itself (heating/cooling, food & water safety).

Future Probability and Potential Dollar Losses – Tornados:
Based on the historic data presented here (frequency of past events), Adams County can expect a tornado about once every 5 years on average. This equates to a probability of 0.22 or about a 22 percent chance in a given year. Table 13 indicates the probability of tornados of a specific magnitude. There was a trend of a major damaging tornado event (over $2 million in damages) every 10 years: 1984, 1994, 2004 until 2011 when the Arkdale-Cottonville EF2 came early. The lack of tornado activity since 2011 may indicate a declining trend in tornado frequency.

Historic data is again used to estimate potential future dollar losses due to tornadoes. Estimated damage resulting from various tornados in Adams County

range from $0 to $7 million. On average, Adams County might expect damages of $1.8 million per tornado based on the study period of 2009 to 2018. However, going back to 1971, only four of these 24 historic tornados resulted in damages exceeding $1 million, three others had $250,000+, and the rest were $25,000 or less. Over the next ten-year period, tornado losses in Adams County could approach $3.6 million.

Table 16 Probability of Intensity for any given Tornado in Adams County

Tornado Scale	F/EF0	F/EF1	F/EF2	F/EF3	F/EF4	F/EF5
Number of Reported Tornados*	11	9	3	1	0	0
Probability of Occurrence	46%	37%	12%	4%	<1.0%	<1.0%

*Source: Nat'l Weather Service & NCWRPC – *Based on historical data from 1971 to 2018.*

HAZARD ANALYSIS: WINTER STORMS / EXTREME COLD

Background on Winter Storms/Extreme Cold Hazard:
A variety of weather phenomena and conditions can occur during winter storms. For clarification, the following are National Weather Service approved descriptions of winter storm elements:

Heavy snowfall – the accumulation of six or more inches of snow in a 12-hour period or eight or more inches in a 24-hour period.

Blizzard – the occurrence of sustained wind speeds in excess of 35 miles per hour accompanied by heavy snowfall or large amounts of blowing or drifting snow.

Ice Storm – an occurrence where rain falls from warmer upper layers of the atmosphere to the colder ground, freezing upon contact with the ground and exposed objects near the ground.

Freezing drizzle/freezing rain – the effect of drizzle or rain freezing upon impact on objects that have a temperature of 32 degrees Fahrenheit or below.

Sleet – solid grains or pellets of ice formed by the freezing of raindrops or the refreezing of largely melted snowflakes. This ice does not cling to surfaces.

Wind chill – an apparent temperature that describes the combined effect of wind and low air temperatures on exposed skin.

Winter storms can vary in size and strength and include heavy snowfall, blizzards, ice storms, freezing drizzle/freezing rain, sleet, wind chill, and blowing and drifting snow conditions. Extremely cold temperatures accompanied by strong winds can result in wind chills that cause bodily injury such as frostbite and death.

True blizzards are rare in Wisconsin. They are more likely to occur in the northwestern part of the state than in south-central Wisconsin, even though heavy

snowfalls are more frequent in the southeast. However, blizzard-like conditions often exist during heavy snowstorms when gusty winds cause the severe blowing and drifting of snow. Heavy snow and ice storms have been part of nearly every winter in Adams County.

Dangerously cold conditions can be the result of the combination of cold temperatures and high winds. The combination of cold temperatures and high wind creates a perceived temperature known as "wind chill". Wind chill is the apparent temperature that describes the combined effect of wind and air temperatures on exposed skin. When wind blows across the skin, it removes the insulating layer of warm air adjacent to the skin. When all factors are the same, the faster the wind blows the greater the heat loss, which results in a colder feeling. As winds increase, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature.

The National Weather Service issues wind chill advisories when wind chill readings of -20 to -34 degrees are expected. Wind chill warnings are issued when wind chill values are expected at or below -35 degrees. Extreme cold events are most likely during the months of January and February.

History of Winter Storms/Extreme Cold in Adams County:
The NCDC has reported 17 major winter events for Adams County between 2015 and 2024. All of these events contained some form of cold, snow, sleet, freezing rain, or ice conditions.

Most recently, on December 19, 2024, a potent winter system brought heavy snow amounts as high as 5 to 8 inches in a narrow band near the Interstate 90 corridor beginning in the morning hours and continuing through the overnight. Snowfall amounts ranged from 4 to 8 inches across Adams County as a result of this winter system. The highest storm total snow accumulation in the county occurred 3 miles south of Brooks where 8.0 was measured.

Another notable event began on December 22, 2022, when a storm brought an extended period of hazardous winter weather to western Wisconsin ahead of the Christmas holiday. Periods of snow fell from December 21st into the 23rd. The combination of arctic air and wind gusts of 25 to 40 mph created wind chills of 20 to 35 below zero across Adams County. The lowest calculated wind chill was -38 near Grand Marsh.

On February 10, 2013, the NCDC reported one person was killed in a two vehicle accident on State Highway 82 in the Township of Jackson. The accident occurred as a result of icy roads from freezing rain that was occurring at the time.

Blizzard conditions present some of the most severe winter weather the County can face. Over the period of analysis, 2009 - 2018, there have been 2 blizzard reports by NCDC, occurring in 2012 and 2010.

A strong area of low pressure moved out of the Central Plains into Illinois and the Great Lakes region on December 19th and 20th of 2012. As this storm moved by, it produced a period of blizzard conditions during the morning and afternoon of the 20th as sustained north winds of 25 to 35 mph with higher gusts created poor visibility from falling and blowing snow. Impacts from the blizzard included closed roads, trapped vehicles, power outages, region wide school closings on the 20th with some schools remaining closed on the 21st or started 2 hours late. The Governor issued an executive order declaring a state of emergency before the storm hit. This placed the state emergency management, National Guard, State Patrol and other state and county agencies on high alert.

The accumulating snow started in southwest Wisconsin during the middle of the evening on the 19th, reaching central Wisconsin in the early morning hours of the 20th. Accumulations reached winter storm criteria of 6 inches between midnight and 7 a.m. on the 20th. Two bands of heavy snow, with accumulations of 10 or more inches, occurred. The first was from Grant County northeast through Richland County into the southern sections of Adams and Juneau Counties. Within Adams County, the highest reported snow total was 11.0 inches in the Town of Adams. The second band was across northern Buffalo and Trempealeau Counties into northwest Jackson and southwest Clark Counties. The highest reported snow total in the southern band was 14.5 inches in Grant County with 15.0 inches in the northern band in Trempealeau County. National Guard troops were used to help rescue stranded drivers.

In December 2010, a powerful low pressure system tracked across the Upper Midwest and Great Lakes region during the evening hours of December 10th into the morning hours of December 12th. This storm brought heavy snow and blizzard conditions across portions of western and central Wisconsin. Snowfall amounts of 19.9 inches were measured at Friendship. In addition to the heavy snow, sustained wind speeds of 25 to 30 miles per hour with gusts up to 50 miles per hour caused whiteout conditions, widespread road closures, stranded motorists and power outages.

The winter of 2007-2008 was one of the worst on record for Adams County with 97.4 inches setting a seasonal snowfall record. The NCDC had nine heavy snow/winter storm reports including blizzard conditions on February 17, 2008 which resulted in 11.2 inches of snow at Friendship.

On December 20-21, 2004, the northern 1/3 of the County sustained a power outage due to a winter storm. A power substation in Wood County failed leaving 5,100 customers in the Towns of Big Flats and Rome without power with temperatures below zero. Most had power restored in about a day, but 700 were without power for two days. Critical facilities affected by the outage included the Town of Rome Police and Fire Stations. This event required opening of the County

EOC, Red Cross and Salvation Army shelter operations and door-to-door notification/transportation for elderly.

In February of 2001, Adams County was hit by consecutive ice storms. The first period of freezing rain produced a widespread coating of 1/4 to 1/2 inch of ice, which was followed by 1 to 3 inches of snow accumulation. This caused hazardous traveling conditions, but law enforcement officials reported only minor accidents. The second period of freezing rain affected southwest and central Wisconsin. Even though glazing was widespread, with ice accumulations of 1/4 inch, law enforcement officials reported only minor automobile accidents.

Arctic cold outbreaks are common in the upper Midwest and sub-zero readings occur 22 times per winter on average. Occasionally strong northwest winds will combine with cold outbreaks to create dangerous wind chill conditions. The coldest temperatures are usually in January and February with average lows in the single digits and record lows colder than -25 degrees. The all-time record low in Adams County is -43 degrees (actual) set in 1951. The NCDC reports 7 extreme cold events between 2009 and 2018.

Most recently, Arctic air spread into western and central Wisconsin on the morning of January 17th, 2016 producing wind chills of -35 in Friendship. In another example from 2014, dangerous wind chills of 35 below or colder occurred across western Wisconsin and Adams County from the early morning of January 27th into the morning of the 28th. The lowest recorded wind chill in Adams was 40 below from the Mesonet reporting station in Friendship, and 46 below was observed at Black River Falls. All the schools across western Wisconsin were closed on both January 27th and 28th.

A cold spell hit the region to start the year in January of 2010 with temperatures below zero for several days and extremely low wind chills at times. It was the coldest first few days of a January since 1979 and one of the coldest starts to the New Year in history with average temperatures just above zero. Wind chills were well below -30 on January 2nd. The year prior, an arctic cold front over southern Canada moved southeast into the Ohio River valley in the evening hours of January 14, 2009. This brought bitterly cold temperatures and wind chills across portions of southwest and central Wisconsin in the evening hours of the 14th through the morning hours of the 16th. Wind chill values ranged from -33F in Jackson county to -42F in Grant county. Although unofficial, the lowest wind chill value of -43F was observed at Friendship in the morning hours on January 15th.

The wind chill at Friendship hit -44 degrees on January 30, 2008. An arctic cold front moved across southwest and central Wisconsin on January 29. Very cold temperatures and strong northwest winds combined to produce dangerously cold wind chill values between 30 below and 45 below during the night and mainly into the morning hours of January 30.

Winter Storms / Extreme Cold Vulnerability Assessment:
Winter storms present a serious threat to the health and safety of affected citizens and can result in significant damage to property. Heavy snow or accumulated ice can cause the structural collapse of buildings, down power lines, motor vehicle accidents or isolate people from assistance or services.

The following is a list of things that may be adversely affected by a winter storm. Much of these community assets can be referenced in Part II.

- Infrastructure – operation of emergency services, operation of public facilities and schools
- Utilities – down power and telephone lines
- Transportation – automobile accidents, roadway plowing, salting/sanding
- Residential – roofs
- Businesses – commerce
- Agricultural - livestock

Based on review of the historic events of winter storms and extreme cold, there are no specific areas in the county that have unusual risks. Winter storms cover a broad area and are a region-wide concern. However, during the City Planning Meeting for this Plan Update, the City of Adams identified winter snows and in particular ice storms as a major vulnerability concern due to the potential for power outage and resulting impact on municipal services and the population itself (heating, food & water safety).

The extreme cold weather can affect the entire county. The risk to public health includes the chance of getting frostbite and hypothermia, and motor vehicle accidents. Everyone is at risk for becoming injured in extreme cold weather, either because of a frail body or because of travel in a motor vehicle.

Future Probability & Potential Dollar Losses – Winter Storms/Extreme Cold:
Based on historical frequency, Adams County can expect 1.4 significant winter storms per year on average. In other words, the probability is .75 or a 75% chance in a given year. For extreme cold temperatures, based on historical frequency, Adams County can expect an occurrence about every 3 years, on average, for a probability of 0.26 or a 26% chance in a given year.

Estimating potential future losses for winter storms is difficult. Damages and losses are typically widespread. Auto accidents and additional snow removal time are typical impacts of winter storms, and such claims are not aggregated or tracked for monetary damage. About 189 annual motor vehicle accidents occur with snow/ice/slush road conditions, and produce about 71 injuries and 1.4 deaths annually. Winter storms do have the potential to be extremely destructive, particularly in the case of ice storms. Potential future losses per incident might range from $5,000 to $2 million based on experiences from other counties.

HAZARD ANALYSIS: FLOODING/DAM FAILURE

Background on Flood Hazard:
There are a variety of classifications for flooding including coastal, dam or levee failure, flash, lake, riverine, stormwater and urban/small stream. Adams County has the potential for all these types except coastal. The following descriptions of the types of flooding are compiled from various FEMA and other notable hazard planning sources:

Coastal – Different from other types of flooding which relate to movement of water through a watershed, coastal flooding is due to the effect of severe storm systems on tides resulting in a storm surge. Primarily known as an ocean-based event, the Great Lakes coastal areas can also be affected.

Dam or levee Failure – More of a technology related hazard than a natural hazard, various factors can result in the failure of the structural technology that is a dam, thus causing flooding of areas downstream of the dam often similar in effect to flash flooding.

Flash – Involves a rapid rise in water level moving at high velocity with large amounts of debris which can lead to damage including tearing out of trees, undermining buildings and bridges, and scouring new channels. Dam failure, ice jams and obstruction of the waterway can also lead to flash flooding. Urban /built-up areas are increasingly subject to flash flooding due to removal of vegetation, covering of ground with impermeable surfaces and construction of drainage systems.

Lake – Prolonged wet weather patterns can induce water-level rises that threaten lakeshore areas.

Riverine – Also known as overbank flooding, this is the most common type of flooding event. The amount of flooding is a function of the size and topography of the watershed, the regional climate, soil and land use characteristics. In steep valleys, flooding is usually rapid and deep, but of short duration, while flooding in flat areas is typically slow, relatively shallow, and may last for long periods.

The cause of flooding in rivers is typically prolonged periods of rainfall from weather systems covering large areas. These systems may saturate the ground and overload the streams and reservoirs in the smaller sub-basins that drain into larger rivers. Annual spring floods are typically due to the melting of snowpack.

Stormwater – Water from storm event that exceeds the capacity of local drainage systems, either man-made or natural, can result in flooding. Inadequate storm

sewers and drainage systems are often the primary factor resulting in this type of flooding.

Urban and Small Stream – Locally heavy rainfall can lead to flooding in smaller rivers and streams. Streams through urban or built-up areas are more susceptible due to increased surface runoff and constricted stream channels.

Major floods in Adams County tend to occur in the spring when melting snow adds to normal runoff and in summer or early fall after intense rainfalls. Flooding occurs in the spring due to snowmelt and frozen soil. This build up continues until the river or stream overflows its banks, for as long as a week or two and then slowly recedes inch by inch. The timing and location of this type of flooding is fairly predictable and allows ample time for evacuation of people and protection of property.

Adams County Highway Washout

Flooding is a significant hazard in Adams County, particularly because it borders the Wisconsin River. As described in Part II, there are approximately 235 miles of streams in Adams County within five main watersheds. Four are part of the Wisconsin River Basin, while the Neenah Creek Watershed is part of the Upper Fox River Basin.

Floodplains exist along the Wisconsin River and the tributaries that feed into it. These floodplains are narrow along tributaries and lakes but extensive throughout the County. Floodplains are described in Part II and shown on Map 4 of this plan. The Federal Emergency Management Agency (FEMA) identifies these floodplains on Digital Flood Insurance Rate Maps (DFIRMs) as downloaded by the NCWRPC from FEMA's website.

There are 66 dams in Adams County (See Map 3 and Table 17). These dams serve many useful purposes, including agricultural uses, providing recreational areas, electrical power generation, erosion control, water level control and flood control. According to the DNR, Adams County has 21 large dams (including Castle Rock and Petenwell Dam), which have a structural height of over 6 feet and impounds 50 acre-feet or more. The other 34 are regarded as small or unknown dams. The Wisconsin DNR regulates all dams on waterways to some degree; however the small dams are not stringently regulated for safety purposes. The federal government has jurisdiction over large dams that produce hydroelectricity. Castle Rock and Petenwell Dams are the major producers of hydroelectricity in Adams County. Friendship and Big Roche-A-Cri also produce electricity.

DAM Name	Stream Name	Dam Size	Hazard Rating	Last EAP Year	OWNER SHIP_
Arkdale		Large	Low	2000	Lake District
Big Springs	Big Spring Creek	Small	Significant		Private
Boehm	TROUT CREEK	Small	Low		Private
Castle Rock	Wisconsin River	Large	High	2023	Private
Cool Creek 1	BINGHAM CREEK	Small	Low		Private
Cool Creek 2	BINGHAM CREEK	Small	Low		Private
Cottonville	Big Roche A Cri Creek	Large	High	2004	County
Easton	Campbell Creek	Large	Low	2010	County
Easton Shores	RISK CREEK	Small	Low		Private
Evans, Orvel	Unnamed	Small	Low		Private
Fawn Lake	Trout Creek	Large	High	2017	County
Fedler	Unnamed	Large	Low	2018	Private
Foseid No. 9-A	Unnamed	Large	Low		Missing
Friendship	Little Roche A Cri Creek	Large	Significant	2020	Lake District
Gaus		Small	Low		Private
Holm, Harold	Big Roche A Cri Creek	Small	Low		Private
Hyler, Donald	TR-BIG ROCHE A CRI CREEK	Small	Low		Private
Joe Lake	RISK CREEK	Small	Low		Private
Kohl, Karl	TR WIS RIVER UNNAMED19-5 R6E	Small	Low		Private
Lake Arrowhead	14 MILE CREEK	Large	Low	2003	County
Lake Camelot	FOURTEENMILE&SPRING BRANCH CR	Large	High	2003	County
Landis, Charles	TR LITTLE ROCHE A CRI CREEK	Small	Low		Private
Leola 12	Unnamed	Small	Low		Drainage District
Leola 14	Unnamed	Small	Low		Drainage District
Leola 15	Unnamed	Large	Low		Drainage District
Leola 16	Unnamed	Small	Low		Drainage District
Leola 17	Unnamed	Small	Low		Drainage District
Leola 18	Fourteenmile Creek	Small	Low		Drainage District
Leola 19	Fourteenmile Creek	Small	Low		Drainage District
Leola 2	Leola Ditch	Small	Low		Drainage District

Leola 20	Unnamed	Small	Low		Drainage District
Leola 22	DITCH 2	Small	Low		Drainage District
Leola 23	Unnamed	Small	Low		Drainage District
Leola 24	Unnamed	Small	Low		Drainage District
Leola 3	DITCH 3 LEOLA DITCH	Small	Low		Drainage District
Leola 4	Leola Ditch	Large	Low		Drainage District
Leola 5	DITCH 3 LEOLA DITCH	Small	Low		Drainage District
Leola 6	Leola Ditch	Small	Low		Drainage District
Leola 7	Leola Ditch	Small	Low		Drainage District
Leola 8	Unnamed	Small	Low		Drainage District
Manteufel, Norman O.	PEPPERMILL CREEK	Small	Low		Private
McGinnis Lake	NEENAH CREEK	Large	Low	2010	County
Peppermill	PEPPERMILL CREEK	Large	Low	2010	County
Pierce	Unnamed	Small	Low		Private
Ramstedt, Ronald	TR-LAWRENCE CREEK	Small	Low		Private
Randorf, Clayton	TR BIG ROCHE A CRI DR DITCH	Small	Low		Private
Risk Creek	Risk Creek	Small	Low		Private
Schwahn	DUCK CREEK	Large	Low	2018	Private
Sciepko, Joseph	TR WISCONSIN (STREAM 24-16)	Small	Low		Private
Sherwood	FOURTEEN MILE CREEK	Large	Significant	2003	County
Splitek	CARTER CREEK	Large	Low		Private
Van Ert	Unnamed	Small	Low		Private
Walker, Harry	Unnamed	Large	Low		Private
White Creek	Unnamed	Large	Low		Missing
White Creek	WHITE CREEK	Small	Low	2021	Private
White Creek, Town of Quincy	Unnamed	Large	Low	2014	State Agency
White Creek, Town Of Quincy	Unnamed	Large	Low		Missing

A dam can fail for a number of reasons such as excessive rainfall or melting snow. It can also be the result of poor construction or maintenance, flood damage,

weakening caused by burrowing animals or vegetation, surface erosion, vandalism or a combination of these. Dam failure can happen with little warning resulting in loss of life and significant property damage in an extensive area downstream of the dam.

The WDNR assigns hazard ratings to large dams within the state. When assigning hazard ratings, two factors are considered: existing land use and land use controls (zoning) downstream of the dam. Dams are classified into three categories that identify the potential hazard to life and property downstream should the dam fail. A high hazard indicates that a failure would most probably result in the loss of life. A significant hazard indicates a failure could result in appreciable property damage. A low hazard exists where failure would result in only minimal property damage and loss of life is unlikely. For Adams County, there are four dams that have a high hazard rating: Castle Rock, Cottonville, Fawn Lake, Lake Camelot. Big Springs, Friendship and Sherwood have a significant rating, while the rest are rated low.

Friendship Dam

History of Flooding in Adam County:
Flooding is a significant hazard of concern in Adams County, being a principal cause of damage in nine Presidential Disaster Declarations that included Adams County from 1971 to 2018. The most recent declaration as of this plan occurred in 2018. NCDC has reported 11 flood events for Adams County over the study period between 2015 and 2024.

On August 28, 2020, several rounds of thunderstorms with heavy rain occurred across portions of western Wisconsin during the early morning of August 28th. These storms were centered along and north of Interstate 94 from Monroe County southeast through Adams County. Runoff from thunderstorms with heavy caused flooding to occur across the southern portions of Adams County. Water covered roads north of Plainville and south of White Creek. Approximately $4,000 in property damage was reported.

A major flooding event occurred on March 14, 2019, due to the period between March 10 through 15, when daytime temperatures warmed well into the 40s with some locations reaching the 50s. Runoff from melting snow caused flooding to occur along numerous streams across Adams County. Most county highways were impacted by water, with numerous closures. Some homes had water in the basements or first floor. Almost 20 homes sustained minor damage with 5 homes

and businesses sustaining major damage. At least two drivers unknowingly drove into washouts on county roads. A county-wide state of emergency was declared, and $750,000 in property damage was reported.

The storms dumped excessive amounts of rain from southern La Crosse County and northern Vernon County east across the southern sections of Monroe, Juneau and Adams Counties. Numerous roads were closed because of flooding or mudslides, homes had to be evacuated with several water rescues were performed. The eastbound Amtrak Empire Builder had to be halted near Tomah because of a washout on the rail line near Mauston (Juneau County). In Monroe and Vernon Counties, four earthen flood control dams failed and seven others sustained damage. Rainfall totals of 6 to 10 inches were common in this heavy rain band with the highest reported totals being 9.98 inches near Westby (Vernon County). The runoff later produced historic flooding on the Kickapoo River with several record flood crests established. Damages in Juneau County exceeded $22 million of which $6.5 million was from Elroy. Tornado and straight-line wind damage accompanied the flooding with this storm. The Governor declared a state of emergency for the entire state. A federal disaster declaration was made for La Crosse, Monroe, Juneau, Adams, Vernon, Crawford and Richland Counties.

In 2016, flooding occurred as several rounds of thunderstorms with heavy rain moved across southwest Wisconsin from the morning of September 21st into the morning of the 22nd. Runoff from the heavy rain caused flood waters from Big Spring Creek to washout a section of County Highway G northwest of Big Spring. Flood waters from Big Spring Creek also covered County Highway P near Big Spring. Flooding elsewhere in the county damaged three homes. The rain resulted in flash flooding across portions of Adams, Clark, Crawford, La Crosse, Monroe, Richland, Vernon and Trempealeau Counties. The Governor declared a state of emergency for Adams, Clark, Crawford, Jackson, La Crosse, Monroe, Richland, Trempealeau and Vernon Counties, and a federal disaster declaration was subsequently made for Adams, Clark, Crawford, Jackson, Juneau, La Crosse, Monroe and Vernon Counties.

In June 2008 another disaster declaration included most of southern Wisconsin. Heavy rain resulted in flooding that caused numerous road and culvert washouts throughout the southern half of Adams County. Crop losses and water damage to homes and outbuildings including mold problems were significant. Public sector damages exceeded $400,000, and individual losses have exceeded $300,000. High wind including a tornado in the Town of New Haven was also associated with this event.

In 2004, severe storms resulted in flooding and a disaster declaration for central and southern Wisconsin including Adams County. Flash flooding occurred after 3 to 6 inches of rain fell within two hours. High water conditions persisted for some time after the initial flood. Several roads were impassable. Approximately 40 homes were damaged along with a number of government facilities throughout the

County. NCDC reported property damages of $125,000 and crop damages of $25,000.

In 2002, at least 15 inches of rain fell in northern Adams County on June 21 and 22. The disaster declaration covered eight Wisconsin counties including Adams. Numerous roads were reported closed due to flooding. The risk of a dam failure was issued for areas along Lake Arrowhead, Lake Sherwood and Lake Camelot drainages. Runoff filled lakes to the point of nearly breeching the levees and embankments. Water had to be released into the drainage system to prevent levee and dike failures. In some locations, the water flooded homes and businesses, washed out roads, bridges and culverts, and damaged crops. Estimated damage by NCDC to Adams County was about $577,000. The Town of Big Flats suffered major damage to roads, resulting in more than $195,000 in repair costs.

Severe storms again resulted in flooding (and disaster declaration) in 2001 and 2000.

The Flood of 1993 was one of the worst flood events experienced by Adams County, the state, and entire Midwest. The flooding in Adams County was a result of several compounding factors including heavy rains and flooding in the fall of 1992, above average amounts of precipitation in the Spring of 1993, and unusually heavy amounts of rain onto already saturated ground from early June throughout July. Fortunately, before the flood peaks arrived on the Wisconsin River in Adams County, the Petenwell and Castle Rock Reservoirs were drawn down. This created additional storage capacity that helped ease flow and lowered discharges downstream.

East of the Wisconsin River in the County, there was substantial flooding reported near the border of the City of Adams and the Village of Friendship. The Health and Social Services Building, DNR Offices, Jr. High School, and numerous homes all experienced flooding and water damage. Standing water plagued the area for months afterward. Adams County received approximately $792,562 in disaster disbursements. The major impacts from flooding were to agriculture lands public roadway washouts. Nearly 50 percent of financial aid disbursements were for agriculture where wet croplands prevented normal farming operations and stunted or killed crops. Twenty percent of the funds were for public relief. High groundwater eroded road bases and caused excessive runoff that washed out culverts and embankments or stripped gravel surfaces off of town roads. In the private sector, the three most common problems were groundwater in basements, failing septic systems, and polluted wells.

Major flooding also occurred in 1973 affecting a large portion of the county with flooding along the entire length of the Mississippi River resulting in a disaster declaration. Flood crest at Wisconsin Dells was 20.7 feet compared to 18.2 feet

in 1993. Other notable flooding includes 1967 and 1965 with crests measured at Wisconsin Dells of 19.2 and 19.0 feet respectively.

Prior to the construction of the reservoirs at Petenwell and Castle Rock, large-magnitude floods were recorded on the Wisconsin River in September 1911, July 1912, September 1938 and September 1941. A maximum discharge of 72,200 cubic feet per second (cfs) was recorded on September 14, 1938, on the Wisconsin River near Wisconsin Dells just south of the Adams County line.

Adams County has not experienced a dam failure with any loss of life or substantial property damage. However, there have been notable incidences of threatened failure. The Town of Rome avoided dam blowouts with the help of many volunteer sandbaggers during the June 2002 flooding when the Lake Camelot dam came within an inch of failure; Lake Arrowhead dam came within seven inches of failure; and Sherwood was about four inches away from failure.

In 2006, the Tri-Lakes dams were again threatening failure. The Kingsway Dam on Upper Lake Camelot is the uppermost dam in a series of dams. Failure of this dam could ultimately lead to failure of 3 other dams downstream and close State Highway 13 as well as various County and local roads. Rapid draw down of the lakes prevented the dam failure and allowed repair of a failing drain system.

In 2007, a bowed and leaking stop log at the base of the Easton Lake Dam required draw down and emergency repair. The dam was built in the 1860s to form a 24-acre millpond. During the repairs, other issues were revealed, and full replacement of the dam was subsequently planned.

Flood Vulnerability Assessment:
Flood events in the County have caused substantial property and infrastructure damage in the past and have the potential to cause future damage, since a significant number of structures still exist in the floodplain. Looking at past events, the following have been significantly impacted by flooding:

- Infrastructure – flooded public facilities and schools
- Utilities - down electric lines/poles/transformers, telephone lines, lost radio communication
- Roadways – washouts, inundated roadways, debris clean-up
- Residential structures – flooded basements, damaged septic systems
- Businesses – loss of commerce
- Agriculture - inundated cropland

To assess the vulnerability of the Adams County area to flooding hazards, basic inventory data described in Part II must be analyzed. For this purpose, consideration should be given to structures (specifically critical facilities), infrastructure, and cropland.

One of the first reports to reference in assessing vulnerability to structures during flooding is the Wisconsin Repetitive Loss Report. The Repetitive Loss Report provides information to the status of repetitive loss properties by community. FEMA classifies a repetitive loss structure "when more than one flood insurance claim of at least $1,000 is made within a ten-year period". The information is used as a floodplain management tool and to supplement information provided by communities for flood mitigation grants administered by WEM. According to the report, there are no repetitive loss structures within Adams County.

There is one property listed in the Repetitive Loss Report. Structures within floodplains were also analyzed, see methodology outlined below. The floodplain boundaries within Adams County are shown on Map 4. Table 18 shows the number of structures in each municipality identified as "vulnerable to flooding" according to proximity to floodplains. There were a total of 828 structures identified in the designated floodplain boundaries, see Map 9.

Methodology – Structures within Floodplains:

1. *NCWRPC downloaded the new DFIRM floodplain maps from the FEMA website into a GIS coverage for the County.*
2. *A building point cover was digitized from current digital aerial photography of the floodplain areas.*
3. *The floodplain coverage was then combined with the building point coverage to identify those structures within the floodplain boundary.*
4. *Total structures with the floodplain were then tabulated by municipality.*
5. *Land records data was used to determine the total value for the identified vulnerable structures by municipality.*

Flooding in Adams County is often felt beyond the floodplain boundaries due to factors such as topography and high groundwater. The drainage (surface runoff) network in the County is poorly defined. During periods of extended rainfall and/or snowmelt, a general condition of flooding exists throughout the communities. During this time, basements and roadways suffer considerable damage.

Table 18
2019 Improvement Values for Structures in Floodplains in Adams County

Municipality	Number	Average Value
Adams town	3	$222,500
Big Flats town	22	$1,292,100
Colburn town	1	n/a
Dell Prairie town	71	$6,064,500
Easton town	95	$4,211,200
Jackson town	27	$1,992,000
Leola town	20	$1,074,400
Lincoln town	0	$0
Monroe town	5	$339,500
New Chester town	1	n/a
New Haven town	80	$7,008,800
Preston town	59	$5,744,600
Quincy town	131	$7,879,300
Richfield town	3	$209,900
Rome town	196	$24,254,100
Springville town	94	$2,579,600
Strongs Prairie town	17	$1,656,500
Friendship village	3	$128,900
Wisconsin Dells (part)	n/a	n/a
Adams city	0	$0
Adams County	828	$64,959,900

Source: Adams County Land Records and NCWRPC, 2019

In addition to structural damage from flooding, there would be significant damages to public roadways, particularly to roadway surfaces, culverts and bridges. Flooding would inundate or close roadways due to washouts from a period of a few days up to as much as three months. Such interruptions in the County transportation network cause travel delays through detours. Businesses are often impacted by this restriction in access.

Businesses can be forced to close due to septic system problems and other issues resulting from flooding and the high water table. Tourism is an important industry in the County and several campgrounds, lodges, and restaurants may be affected by flooding.

The agriculture industry is a sector that can face substantial losses during a flood. Flood conditions can leave farmers with the following economic setbacks:

- Delayed planting (reduced growing season)
- Prevention of fields from being seeded
- Seed and agricultural chemicals washing out of fields

- Rotting of plants due to excess moisture
- Areas where planted crops left in the fields due to excessive moisture
- Crops not reaching full maturity or stunted growth
- Requirements by farmers to expend higher amounts of money on additional soil amendments
- Lower quality (nutritional value) of harvestable crops as a feed source.

Reductions in quantity can result in loss of revenues from cash crops and increased expenses for purchasing the needed livestock feed from outside sources. Additionally, reductions in crop quality result in lower prices received for cash crops and increased amounts spent for nutritional supplements to animal feed, which need to be added even in much of the purchased feed.

Economic losses to farmers can generate a ripple effect to the local community as well. Reduction in farm income will curtail the farmers' ability to purchase new equipment and make other improvements. Farmers will have less money to spend at farm dealers, farm supplies, building/hardware suppliers, fertilizer, feed and seed dealers, and other agribusiness and retail establishments. The State itself will have reduced tax revenues. Farmers will have less money to save and invest, and suffer still more increases in debt load.

The forest products industry is affected similarly to agriculture. Forestlands become too wet for logging operations and many water logged tree plantations suffer high mortality rates. Mill inventories become very low, resulting in increased prices for consumers.

The areas considered to have a higher risk for impact from flooding include those communities with structures in floodplains as shown in Map 9. In addition, the Village of Friendship identified flooding and more specially dam failure as a primary concern during their mitigation planning meeting.

Insert Map 9 Flood Vuln.

Insert Map 10 Flood Damage

Future Probability and Potential Dollar Losses – Flood:
Based on the historical data presented here (frequency of past events), Adams County can expect 1.1 significant flood events per year on average. This equates to a probability of 0.67 or about a 67 percent chance in a given year.

Due to the significant number of dams and particularly large dams with high hazard ratings, dam failure is an important hazard event to plan for in Adams County. However, based on past experience, the actual probability of a major dam failure is very low. Considering the near failure of the Lake Camelot Dam in 2002 in conjunction with historic flood frequency data, probability of dam failure might be estimated at (less than) 0.05 or 5 percent chance in a given year, although this is not completely accurate, since failure of the dam was avoided by human intervention. The Easton Lake Dam and Kingsway Dam incidents in 2006 and 2007 may be an indicator that age and structural condition dams in the County may be pushing the probability of dam failure.

Historic data is again used to estimate potential future dollar losses due to flood. On average, Adams County might expect property and crop losses of $115,000 on average, per flood occurrence based on the study period of 2015 to 2024. Over the next ten-year period, flood losses in Adams County could approach over $2 million. However, there is always the chance that a more significant flood will occur like 2018 or even 1993 with greater potential for damage.

HAZARD ANALYSIS: WILDFIRE

Background on Wildfire Hazard:
A wildfire is any instance of uncontrolled, wild, or running fires occurring on forest, marsh, field, cutover, or other lands. Sometimes referred to as forest fires, wildfires can occur at any time the ground is not completely snow covered. The season length and peak months may vary appreciably from year to year. Land use, vegetation, amount of combustible materials present and weather conditions such as wind, low humidity and lack of precipitation are the chief factors for fire season length.

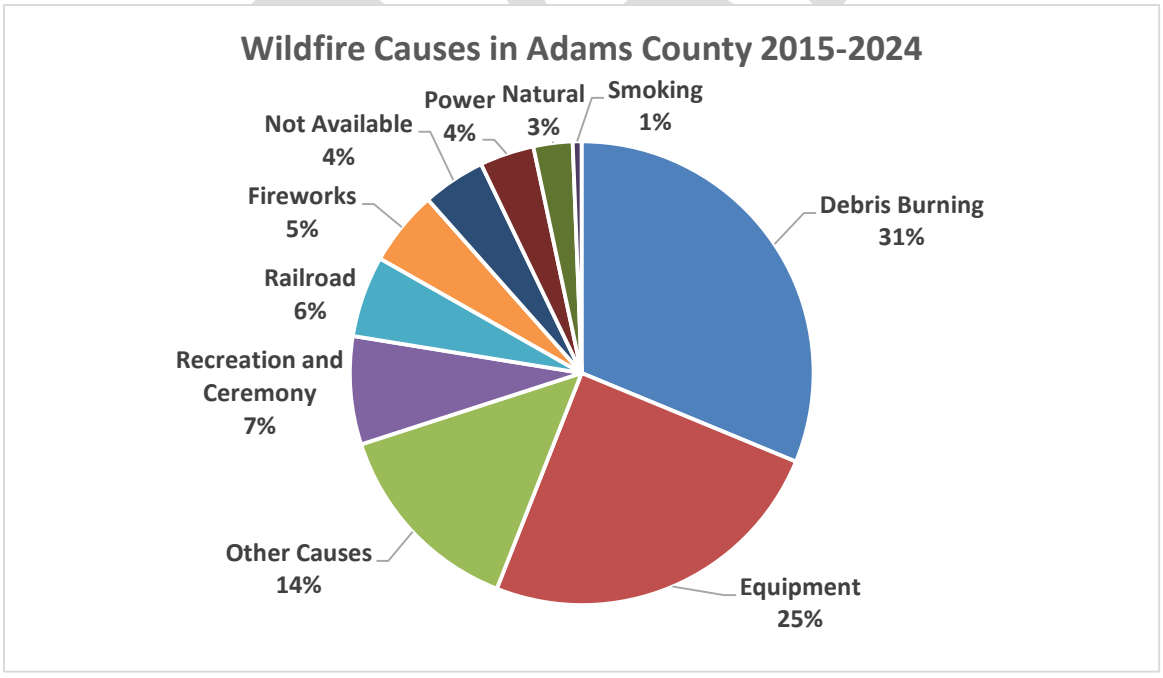
History of Wildfire in Adams County:
The Wisconsin DNR maintains a database of wildfire data. This data represents the most comprehensive source of information for analyzing fire trends in an area such as Adams County. The data is current through 2024, so the 10-year span from 2015 through 2024 is used for analysis. Between 2015 and 2024, there was an average of 48 fires that have burned 38 acres, annually (excluding Cottonville). The typical fire in Adams County burns less than an acre.

April is the leading month for fire in Adams with 24% of the total number of fires between 2015 and 2024. During this time frame, wildfires have occurred in each month of the year in Adams.

The Town of Adams experienced the most fires between 2015 and 2024 with 53, Besides the cities and village which have low wildfire occurrences (1 - 3), the Town of Colburn had the fewest fires with 9 over that period. The Town of Lincoln had the least area burned, with only 1.48 acres affected.

Cottonville Fire, 2005

The chart below breaks down the causes of wildfire within Adams County between 2015 and 2024 as classified by the WDNR. The principal cause of wildfire in Adams County and Wisconsin is debris burning, which resulted in 149 or 31% of wildfires within the County. Equipment is the next leading category at 25% and includes vehicle, motor and other machinery related causes except railroad. Other causes includes a variety of factors such as power lines, structure fires, and improper ash disposal. Smoking resulted in less than 1% of wildfires. Natural causes, like lightning, was responsible for only 13 of the fires, or around 3%.



Source: WDNR

In 2005, Adams County experienced one of the largest wildfires in Wisconsin history. Known as the Cottonville Fire, the fire began on May 5 when debris burning in a fire pit got out of control. Approximately 3,410 acres were burned in the Towns of Big Flats, Colburn and Preston covering an area 1.5 miles wide and 7 miles long. Weather conditions were ideal for fire: warm and windy with very low humidity. Part of "sand country", Adams County's dominant vegetation is grass, pine and scrub oak, which are all known to burn quickly and intensely. Fire spread quickly to the tops of the pine trees.

Losses included 9 primary homes, 21 seasonal homes, and 60 outbuildings. Damage was sustained to 15 other homes. Evacuation of 200 residents was required. Firefighting efforts were massive with 5 aircraft (1 from Minnesota DNR), 200 WDNR personnel from across the state, 30 volunteer fire departments and law enforcement from State Patrol, Adams, LaCrosse and Vernon County Sheriffs and Onalaska Police. The fire took 11 hours to bring under control and several days for mop -up. The courts set restitution at over $1.4 million indicating the level of damages.

According to the National Climatic Data Center's database, very dry conditions and strong winds across portions of central Wisconsin caused a controlled burn of grass clippings in a wooded area to quickly become out of control in Adams County on April 17, 2009. The wildfire burned approximately 106 acres and destroyed several vehicles, outbuildings, personal property, permanent and seasonal residences. One person was injured and damages were estimated at about $500,000.

The NCDC also reported a wildfire, fanned by gusty winds, charred 158 acres of red pine in the Town of Rome during the early morning of April 13, 1998. The fire necessitated the evacuation of some nearby residences. Nobody was injured and no homes were lost, but there was an estimated property value loss of $80,000.

Wild Fire Vulnerability Assessment:

Adams County has 253,962 acres of forestland, or 58 percent of the total land area, scattered throughout the County. The potential for property damage from fire increases each year as more recreational and retirement homes are developed on wooded land.

The trend toward introducing more human development into fire prone areas has brought about the term wildland urban interface or WUI. The WUI identifies areas where structures and human development meet or intermingle with undeveloped wildlands. It is within these areas where wildfire poses the greatest risk to human lives and property.

The WDNR has completed a statewide evaluation of fire risk, referred to as the CAR or Communities At Risk assessment. This assessment uses extensive DNR geo-databases to analyze and map hazardous woodland fuel types and the degree

of the intermixing of development with wildlands. The maps identify the level of risk for each community on a scale of very high, high, moderate, or low, and also have a community of concern designation. Virtually all of Adams County is rated very high or high except for Leola and Colburn, which are designated as communities of concern. See Map 11.

WDNR reports on the Cottonville Fire indicate that the loss of buildings was due, in part, to a lack of access (long, narrow driveways) and a lack of defensible space (free of fuels that can transmit fire to the structure and allow firefighters to safely operate).

Campgrounds are also a concern because of campfires. Adams County has seven campgrounds. Locations of the campgrounds are shown on Map 9.

Future Probability and Potential Dollar Losses – Wild Fire:
Wild fires are relatively common occurrences in Adams County. Over the 10 year period of analysis, there has been an average of 48 fires per year in the County. In other words, the probability is 1.0 or 100% chance of wildfire each year. However, these fires are typically contained rapidly and remain small, so that each has a minimal impact. The probability of a fire becoming more substantial, like Cottonville, might be estimated at (less than) 10% per year or 0.1.

Because of the relatively small impact of typical individual fires in the County, loss data is not tracked. This makes it difficult to develop an estimate of potential future dollar losses. However, with 48 fires per year, the County should expect some fires to "get out of hand" and likely approach or exceed the $1.4 million in damages of the Cottonville Fire.

HAZARD ANALYSIS: DROUGHT / EXTREME HEAT

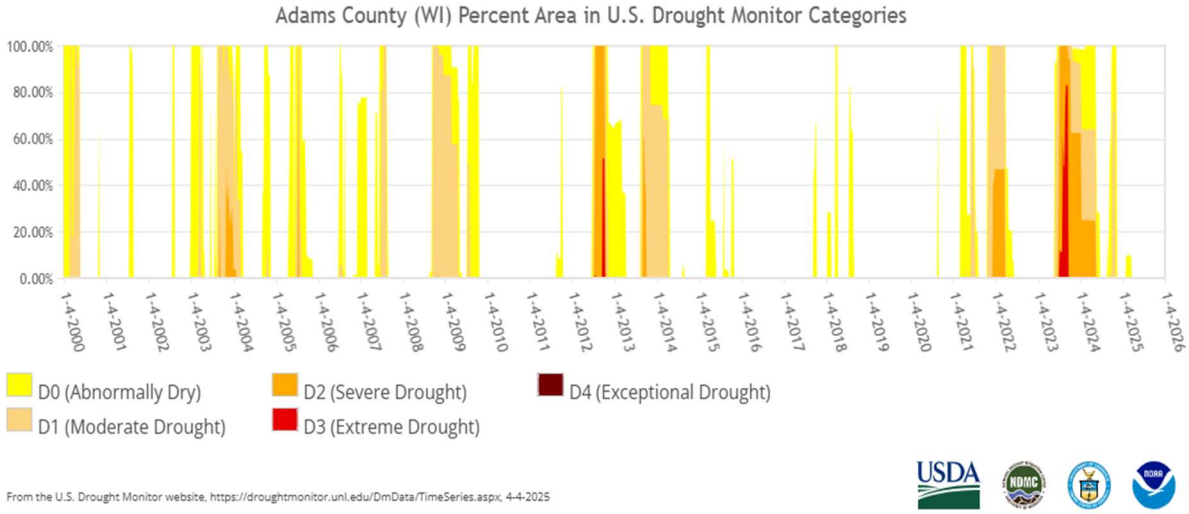
Background on Drought / Extreme Heat Hazard:
A drought is an extended period of unusually dry weather, which may be accompanied by extreme heat (temperatures which are 10 or more degrees above the normal high temperature for the period). There are basically two types of drought in Wisconsin: agricultural and hydrologic. Agricultural drought is a dry period of sufficient length and intensity that markedly reduces crop yields. Hydrologic drought is a dry period of sufficient length and intensity to affect lake and stream levels and the height of the groundwater table. These two types of drought may, but do not necessarily, occur at the same time.

Droughts, both agricultural and hydrologic, are relatively common in the state. Small droughts of shortened duration have occurred at an interval of about every ten years since the 1930's.

Insert Map 11 Wildfire

Extended periods of warm, humid weather can create significant risks for people, particularly the elderly who may lack air conditioning or proper insulation or ventilation in their homes. Animals are also at risk during extended periods of heat and humidity. The National Weather Service issues a Heat Advisory when the Heat Index ranges from 105 to 114 degrees daytime and remains at or above 80 degrees at night, during a 24-hour period. The heat index combines the effects of heat and humidity to better reflect the risk of warm weather to people and animals. When heat and humidity combine to reduce the amount of evaporation of sweat from the body, outdoor activity becomes dangerous even for those in good shape. The index measures the apparent temperature in the shade. People exposed to the sun would experience an even higher apparent temperature. A heat index of 105 is considered dangerous and prolonged exposure can result in heat stroke, exhaustion and cramps. People should be reminded to use extreme caution when the heat index is between 95 and 105. A heat index of 95 occurs when the temperature is 90 degrees and the relative humidity is 50 percent.

History of Drought / Extreme Heat in Adams County:
NOAA reports indicate that much of Wisconsin, including Adams County, was under drought conditions at varying times between 2015 and 2024. Previously, in 2012, the Governor had declared a state of emergency to get assistance to the state's agricultural sectors. Between 2015 and 2024 there has been 12 drought events, all of which have occurred in 2023 and 2024. In the past few years, Adams County has experienced significant drought conditions. The extended dry conditions have posed serious challenges for farmers from drought-stressed crops to issues providing feed for livestock.



In 2023, ongoing drier than normal conditions, comprised of 7 consecutive weeks of extreme drought (D3), expanded in Adams County through September. Through September 11th, approximately a quarter inch of rainfall resulted in 50% below normal topsoil moisture. The increased longevity of abnormally dry conditions

decreased water levels along the Wisconsin River to 10% of normal, marooning and killing many mussels along its banks. A series of storms provided 2 to 4 inches of rainfall during the second half of September, up to 2 inches above normal for the time period. This above normal rainfall lessened drought severity to extreme (D2) across the county. Due to the drought, the United States Department of Agriculture had declared Adams County as a primary natural disaster area on July 25th and a contiguous natural disaster area on August 10th and September 13th. Severe (D2) drought persisted across the southern half of Adams County through November and December. This was a result of monthly precipitation totals near 2 inches below normal and anomalously warm temperatures. Drought conditions in Adams County continued for the first 5 months of 2024.

Beginning in 2013, improved rainfall across the Midwest gradually relieved the drought in Wisconsin. Nationally, however, what is being tagged as the 2012-2015 North American Drought has affected over 80% of the U.S. as well as parts of Canada and Mexico, and drought continues to affect parts of the country. This drought is on track to exceed the 1988-89 drought, which also affected Wisconsin/Adams County, as the costliest natural disaster in U.S. history.

Adams County experienced the 1988-1989 drought with the rest of the Midwest. It was characterized not only by below level precipitation, but also persistent dry air and above normal temperatures. Stream flow measuring stations in the state indicated a recurrence interval of between 75 and 100 years. The drought occurred early in the growing season and resulted in a 30-60% crop loss, with agricultural losses set at $1.3 billion for the state. No statistics were available for the amount of crops lost in Adams County, but 52 percent of the state's 81,000 farms were estimated to have losses of 50 percent or more, with 14 percent estimated having losses of 70 percent or more. Some rural wells went dry, and water conservation was instituted in the rural areas

The drought of 1976-1977 was most severe in a wide band stretching from north to south across the state. Stream flow measuring stations recorded recurrence intervals from 10 to 30 years. Agricultural losses during this drought were set at $624 million. Adams County was one of 64 counties that were declared federal drought areas and deemed eligible for assistance under the Disaster Relief Act.

According to the National Weather Service, Adams County has been affected by a number of heat waves over the years (16 since 1982 however no fatalities were documented). The warmest temperature (actual) on record in Adams County was 114 degrees F set on July 13, 1936.

The NOAA database has three recent listings for extreme heat events. The most recent was June 29-30, 2018 with two days of excessive heat across western Wisconsin. Heat indices topped out between 105 and 115 on both June 29th and 30th, although the high heat indices were more widespread on the 29th. Air temperatures in the upper 80s to middle 90s with dew points in the middle 70s

combined to create the excessive heat. The highest calculated heat index in Adams County was 111 at the Mesonet station in Friendship.

Five people died from the effects of a long duration heatwave that gripped western Wisconsin from July 2nd through July 7th, 2012. The nearest fatality occurred in Juneau County. Numerous people were also treated for heat related illnesses. The highest apparent temperatures during the heatwave ranged from 100 to 110 each day. Other impacts from the heat included stimulating algae growth on area waterways which depleted oxygen levels leading to fish kills. Milk production was down during the heat as well, as cows starting drinking more water and ate less feed leading to the drop. Campgrounds also reported a downturn in business as potential campers remained at home and numerous roads buckled and had to be repaired.

Other notable occurrences include 2011 and 2001. Warm and humid air invaded western Wisconsin on July 17, 2011 and remained in place for the next three days. Two people perished as a result of the excessive heat and at least eight other were treated for heat related illnesses (outside Adams). During this stretch, afternoon heat indices routinely topped out between 110 and 120. Little relief occurred at night, as overnight lows remained in the 70s. Most of the counties across western Wisconsin opened cooling centers. In 2001, the high temperature hit 90 degrees or higher for 9 consecutive days from July 31 to August 10. High humidity pushed the heat indices to 105-115. These dangerous levels lead to two deaths, although outside of Adams County.

Drought / Extreme Heat Vulnerability Assessment:
Droughts can have a dramatic effect on Adams County. The County has 118,737 acres of farmland or 27% of its land area dedicated to farming. With agriculture being a critical sector of the County's economy, droughts have disastrous effects. Even small droughts of limited duration can significantly reduce crop growth and yields, adversely affecting farm income. More substantial events can decimate croplands and result in total loss, hurting the local economy.

There are a number of high capacity wells in the County, mostly for crop irrigation. Irrigation can withdraw significant amounts of groundwater. The Central Wisconsin Groundwater Data Center reports that 95 percent of all groundwater withdrawal was used for irrigation in Adams County.

Irrigation can draw water that otherwise would naturally go to aquifers or surface waters. Drought can exacerbate the problem when high withdrawal rates versus little precipitation deplete waterbodies and aquifer supplies, therefore decreasing drinking water supplies, drying streams, and hindering aquatic and terrestrial wildlife. During severe droughts, some wells - mainly private wells - will go dry.

Another significant area of impact from drought includes the tourism sector of the economy. As lake levels go down, there is less tourism seen in the county. Recent

drought conditions have left lake levels down and many boat launches cannot be used.

Droughts can trigger other natural and man-made hazards as well. They greatly increase the risk of forest fires and wildfires because of extreme dryness. In addition, the loss of vegetation in the absence of sufficient water can result in flooding, even from average rainfall, following drought conditions.

The following is a list of things that may be adversely affected by a drought. Much of these community assets can be referenced in Part II.

- Infrastructure – municipal water supplies
- Surface water –groundwater reserves, recreation, and wildlife
- Forests
- Agricultural - crops, livestock

The areas most susceptible to drought conditions would be agricultural towns. Agricultural land is scattered throughout the County but largely the Towns of New Haven, Lincoln, New Chester, Jackson, Colburn, and Leola.

According to the Wisconsin Emergency Management, excessive heat has become the most deadly hazard in Wisconsin in recent times. Extreme heat can happen anywhere within Adams County affecting everyone, however the elderly and young are the ones with the highest risk of getting heat related injuries, which can lead to death. Ways to prevent injuries include wearing light-colored clothing, drinking plenty of water, slowing down, and not staying in the sun for too long.

Future Probability and Potential Dollar Losses – Drought/Extreme Heat:
Based on the historic data presented here (frequency of past events), Adams County can expect to not experience a drought in most years. However, because the significant number of drought events over the last two years, it is challenging to predict the future frequency of drought. Significant severe drought is somewhat less common, affecting Wisconsin once about every 10 years.

Drought is another hazard that lacks good loss figures at the county level. However, a look at aggregate data for two major droughts can give some indication of potential impact. The two major droughts in Wisconsin resulted in losses of $9.6 million (1976-77) to $18 million (1987-88) per county on average.

Normally, central Wisconsin is known for its cold winters, however, extreme heat waves will affect Adams County in the future. Adams County can expect a heat wave once every 3.3 years or a 33 percent chance in a given year based on the historic data presented.

HAZARD ANALYSIS: SEVERE THUNDERSTORM/HIGH WIND/LIGHTNING/HAIL

Background on Severe Thunderstorm Hazard:
The National Weather Service definition of a severe thunderstorm is a thunderstorm event that produces any of the following: downbursts with winds of 58 miles per hour or greater (often with gusts of 74 miles per hour or greater), hail 1 inch (recently increased from ¾ inch) in diameter or greater or a tornado. Strong winds, hail, and lightning will be addressed in this section, however tornados will be referenced as a separate hazard.

Lightning results from discharge of energy between positive and negative areas separated by rising and falling air within a thunderstorm. This discharge heats the surrounding air to 50,000 degrees. Hail results as the warm rising air cools, forming ice crystals which are held by the updrafts until accumulating enough weight to fall. The hail size depends on strength of the updrafts keeping it up.

Thunderstorms frequency is measured in terms of the incidence of thunderstorm days or days on which thunderstorms are observed. Wisconsin averages between 30 and 50 thunderstorm days per year depending on location. A given county may experience ten or more thunderstorm days per year. The southwestern area of the state normally has more thunderstorms than the rest of the state.

History of Severe Thunderstorms in Adams County:
The NCDC has reported 72 severe storm events for Adams County between 2015 and 2024. These storms typically contain some form of heavy rain, strong winds, and lightning. About 26 significant hail events, typically related to a severe thunderstorm, were listed during this time period. There were also two notable lightning incidents identified.

On July 7, 2023, two areas of strong to severe storms shifted southeast and east through central Minnesota and northeast Iowa, respectively, during the late afternoon into the early evening of July 28th. As the northern cluster of severe storms traversed western into central Wisconsin during the early evening hours, damaging wind gusts resulted in fallen power poles near Nelson (Buffalo County) and tennis ball sized hail near Medford (Taylor County). The clusters of storms continued to intensify as they progressed east through western and central Wisconsin, resulting in widespread damage from wind and very large to giant hail. The Public reported multiple fallen mature trees near and west of Arkdale along Wisconsin State Highway 21, with $75,000 in property damage reported.

Severe storms moved across western Wisconsin on August 28, 2018. These storms produced damaging winds, large hail and heavy rain. This rainfall aggravated ongoing flooding and caused some new flooding to occur. Thousands of trees were blown down or snapped across southern Adams County in a 3 to 4 mile wide area that started just south of the State Highways 13 and 82 intersection

and continued east across Springville and Jackson to the Marquette County line east of Jordan Lake. Houses were damaged by trees that landed on them and boats were dislodged from docks and floated out into Jordan Lake. In Adams County, the only hail reported was quarter sized south of Brooks. Because of the flooding, the Governor declared a state of emergency for the entire state. A federal disaster declaration was also made for Adams, Crawford, Juneau, La Crosse, Monroe, Richland and Vernon counties. Damage estimates exceeded $6 million.

On July 6, 2017, severe thunderstorms with very large hail moved across portions of western Wisconsin during the late afternoon and evening. Hail ranged in size up to 3.5 inches in diameter for the event. Quarter sized hail generally fell across Adams County, however, hail reached half-dollar size in the Big Flats area and caused around $1.5 million in crop damages. Power poles and trees were blown down near Brooks.

Thunderstorms developed during the afternoon of June 15th, 2016 ahead of a cold front. As these storms moved across central Wisconsin, they dropped large hail and produced some damaging winds. The largest hail size reported was egg sized south of Big Flats. An estimated 70 mph wind gust was reported near Monroe Center which blew down several trees and damaged homes. Several trees were blown down near Petenwell Lake. Power lines were also taken down by the storm. NCDC damage estimate was $25,000.

Wind Damage - Com. Tower

On September 2, 2011, severe thunderstorms produced damaging winds during the morning hours across portions of southwest and central Wisconsin. Numerous trees and power lines were down from La Crosse eastward to Adams County. Over 10,000 residents lost power and schools were either delayed or closed in these areas. Trees and power lines were blown down across portions of Adams County blocking roadways and falling on top of homes and cars. Several six inch diameter trees were blown down near Castle Rock Park. Four miles north of Friendship, a tree fell on a vehicle on State Highway 21 at the entrance of Roche-A-Cri State Park. The Town of Preston was hit the hardest. NCDC damage estimate was $42,000.

On October 26, 2010, a low pressure system deepened over northern Minnesota and set the Wisconsin state record for the lowest recorded barometric pressure. This system was responsible for high winds across portions of southwest and central Wisconsin in the morning hours of October 26th and the daytime hours of the 27th. Several trees were blown down across the county, including the areas around Dellwood, County Highway Z, and Arkdale. Some sporadic fires were started from trees falling onto power lines causing power outages. Sporadic damage to roofs and buildings also occurred. A few vehicle collisions also occurred with downed trees. Two pine trees, nearly seventy feet tall, blew down

in Friendship. One of the pine trees landed on a parked pick-up truck partially crushing the cab.

The most recent hail incident occurred on August 28, 2018, as noted above. This was preceded by events on September 20, 2017 and July 6, 2017 (see above for July 6). On September 20, 2017 a line of thunderstorms developed across portions of western and central Wisconsin. Some of these storms produced hail up to golf ball sized near the south end of Lake Petenwell in Adams County. In June of 2016, egg-sized hail fell in Big Flats.

Thunderstorms that developed over South Dakota during the early morning hours of May 26, 2012 held together and intensified through southeast Minnesota to produce large hail and locally heavy rain over portions of western and central Wisconsin during the late afternoon and evening. The hail ranged in size from one inch up to golf ball in Big Flats. NCDC damage estimate was $6,000.

A complex of thunderstorms developed during the evening hours of July 12, 2015 over Minnesota. As these storms move southeast during the early morning hours of the 13th, they strengthened over central Wisconsin and started producing damaging winds up to 62 mph which blew down trees in Arkdale and Petenwell County Park. A house located near Lake Camelot sustained significant fire and water damage from a fire started by a lightning strike. The lightning strike also damaged the phone lines of a neighboring house. NCDC damage estimate was $20,000.

On May 4, 2010, a lightning strike started a garage fire. Local fire officials indicated the garage was a complete loss, but there were no injuries as a result of the fire. The start time of the fire was corroborated with radar data, as well as with the detection of a cloud to ground lightning strike in the exact location of the fire at that time. NCDC damage estimate was $8,000.

Severe Thunderstorm Vulnerability Assessment:
The National Weather Service can forecast and track a line of thunderstorms that may be likely to produce severe high winds, hail, and lightening but where these related hazards form or touch down and how powerful they might be, remains unpredictable. The distribution of thunderstorms and related hazard events have been widely scattered throughout the county.

Many thunderstorm events (without tornados) have caused substantial property and infrastructure damage, and have the potential to cause future damage. In order to assess the vulnerability of the Adams County area to thunderstorms and related storm hazards, a review of the past events indicate significant impacts to:

- Infrastructure – hospitals, schools, street signs, police and fire departments
- Utilities - electric lines/poles/transformers, telephone lines, radio communication

- Transportation – debris clean-up
- Residential - mobile homes, garages, trees and limbs, siding, windows
- Businesses – signs, windows, siding, billboards
- Agricultural - buildings, crops, livestock
- Vehicles – campers, boats, windshields, body, paint

Based on a review of the historical patterns of thunderstorms associated with high wind, hail, or lightning, there are no specific municipalities that have unusual risks. The events are relatively uniform and a countywide concern. However, during the City/Village Planning Meeting for this Plan Update, both the City of Adams and the Village of Friendship identified severe thunderstorm winds (high straight line winds) as a major vulnerability concern due to the potential for power outage and resulting impact on municipal services and the population itself (heating/cooling, food & water safety).

Future Probability and Potential Dollar Losses - Severe Thunderstorms:
Based on historical frequency, Adams County can expect 7.2 thunderstorm events per year on average. In other words, the probability is 1.0 or a 100% chance of multiple storms in a given year. The probability of a thunderstorm with damaging hail in Adams County is also at 1.0 or 100% chance with about 2.6 incidents in a given year. For notable lightning events there is about a 20% chance in a year.

According to the NCDC, historic thunderstorm events with associated high wind and reported damages averaged $154,047 in property damage per incident and $15,000 in reported crop damage. Historic thunderstorm events with associated hail that reported property damage averaged $486,000 in reported crop damage. Historic thunderstorm events with associated lightning that reported property damage averaged $17,000. Losses in Adams County associated with severe thunderstorms could approach $35,868,647 over the next ten-year period.

HAZARD ANALYSIS: HAZARDOUS MATERIALS INCIDENTS

Background on Hazardous Materials Incidents Hazard:
This type of hazard occurs with the uncontrolled release or threatened release of hazardous materials from a fixed site or during transport that may impact public health and safety and/or the environment.

Under the Emergency Planning and Community Right to Know Act (EPCRA), a hazardous material is defined as any chemical that is a physical hazard or health hazard [defined at 29 CFR 1910.1200(c)] for which the Occupational Health and Safety Administration (OSHA) requires a facility to maintain a Material Safety Data Sheet (MSDS). Under EPCRA there is no specific list of hazardous materials. An extremely hazardous substance (EHS) is defined as one of 356 substances on the United States Environmental Protection Agency list of extremely hazardous substances, identified at 40 CFR Part 355.

EPCRA of 1986 also known as SARA Title III, brings industry, government and the general public together to address emergency planning for accidental chemical releases. The emergency planning aspect requires communities to prepare for hazardous chemical releases through emergency planning. This provides essential information for emergency responders. The community right-to-know aspect increases public awareness of chemical hazards in their community and allows the public and local governments to obtain information about these chemical hazards.

Counties in Wisconsin, including Adams County have a Local Emergency Planning Committee (LEPC) that is set up in accordance with the federal legislation and is responsible for implementation of EPCRA at the county level. The County Emergency Management Director is a member of the LEPC to ensure continuity and coordination of emergency response planning.

To meet the requirements of Title III of EPCRA, the LEPC developed the County Hazardous Materials Response Plan. This plan establishes policies and procedures for responding to hazardous material incidents. The LEPC is required to review, test, and update the Plan every two years. Methods for notification and reporting an incident are outlined in the plan. This plan also works in conjunction of the County Emergency Operations Plan (EOP) where alert to the public, communications, and response procedures are outlined. The plan is tested through tabletop, functional and full-scale exercises and actual response situations.

To provide a high level of hazardous materials response capabilities to local communities, Wisconsin Emergency Management contracts with 21 Regional Hazardous Materials Response Teams. The teams are divided into Task Forces: Northeast Task Force, Northwest Task Force, Southeast Task Force, and the Southwest Task Force. These Task Forces are then divided into Type I, Type II, and Type III teams, all with complimentary capabilities and training requirements.

Adams County is located in the Southwest Taskforce area with Type II teams out of the La Crosse and Madison Fire Departments. The nearest Type III team is at the Portage Fire Department with other Type III's at Vernon, Grant and Rock counties. The Regional Response Team may be activated for an incident involving a hazardous materials spill, leak, explosion, injury or the potential of immediate threat to life, the environment, or property. The Regional Teams respond to the most serious of spills and releases, requiring the highest level of skin and respiratory protective gear. This includes all chemical, biological, or radiological emergencies.

Several counties have Type IV Hazardous Materials Response Teams. These county teams respond to chemical incidents that exceed the capabilities of local fire departments but do not require the specialized training or equipment of the Regional teams. County teams may also provide assistance to surrounding counties. Adams County does not have its own team but contracts with the Juneau County Team for this coverage.

HazMat Team Training

History of Hazardous Materials Incidents in Adams County:

There have not been any major reported hazardous material problems involving fixed facilities, roadways, railways, or pipelines. Hazardous materials incidents have occurred but on a relatively small scale. They still, however, can cause considerable property damage and can have a high risk in terms of loss of human life or injury. The WDNR Bureau for Remediation and Redevelopment Tracking System or BRRTS maintains a listing of contaminated properties online. The BRRTS database identifies 58 environmental spills in Adams County between 2015 and 2024. All of these spill sites have been cleaned and closed at this time.

Vulnerability Assessment:

In 2013, the Adams County LEPC sponsored a detailed Hazardous Materials Commodity Flow Study. This Study inventoried the risk factors that make hazardous materials incidents a keen concern in Adams County, which are reviewed below:

Fixed Facilities

The Commodity Flow Study identified 21 facilities within the County meeting reporting the requirements for one or more hazardous chemicals. These are sites that have hazardous substances present at any one time in amount equal to or exceeding the chemical-specific threshold planning quantity (TPQ).

Highway

Trucks carry the bulk of hazardous materials to and through the County. Regular shipments of gasoline, propane, acid and other substances are delivered across Wisconsin. Every roadway in the County is a potential route for hazardous material transport, but major transportation routes are State Highways 13, 21, and 82 (see Map 5).

Table 19 – Number of Trucks Carrying Hazardous Materials at Intersections in County	
Intersection	**# of Trucks**
State Hwys. 13 & 21	34
State Hwy. 13 & UP RR Intersection	7
State Hwys. 13 & 82	27

Source: Richland & Adams Co. LEPCs, 2013.

The Commodity Flow Study monitored traffic at key locations and counted trucks with Hazardous Warning Placards. The locations of the intersections and the total number of trucks with hazardous materials are seen in Table 19.

Railroad

The Union Pacific Railroad – another mode for the transportation of hazardous material, provides 24 miles of track to Adams County (see Map 5) with a rail yard located on the south side of the City. Although trucks transport most of the hazardous materials in the state and the U.S., rail can carry significantly larger loads of hazardous materials. The Commodity Flow Study identified the hazardous materials being transported by rail through Adams County. Table 20 lists the top five with percent of total.

Table 20 – Top Hazardous Commodities Carried on Rail In Adams County by %	
Material	**% of total**
Molten Sulfur	33.41
Elevated Temp. Liquid NOS	19.40
Sulfuric Acid	13.66
Hydrochloric Acid	12.55
Ferric Chloride Solution	3.48

Source: Richland & Adams Co. LEPCs, 2013.

The study cited 4,100 rail car loads of hazardous materials moved through the County in 2012 with the average number of hazardous cars at about 11 per day.

Pipeline

Enbridge Pipeline Company provides pipeline to move petroleum through the County (see Map 6). It runs 31 miles from the northern part of the county to the eastern part. Approximately 1.5 million barrels per day move through this pipeline. There had not been a major incident with the pipeline within Adams County, but the DNR database shows some significant spills such as in July 2012 when a crack in the pipeline allowed about 1,700 barrels of crude oil to spill in the town of Lincoln. Total property damage was listed at $10.5 million. An example of a major incident is the leak of 176,000 gallons of crude oil in Rusk County in 2007. Groundwater contamination was the primary consequence of that spill.

There are also natural gas sub-transmission lines entering the County from the east. According to the Commodities Flow Study, natural gas pipelines while not common are not rare either and can be very dangerous. Large amounts of explosive gas can escape quickly from a breech.

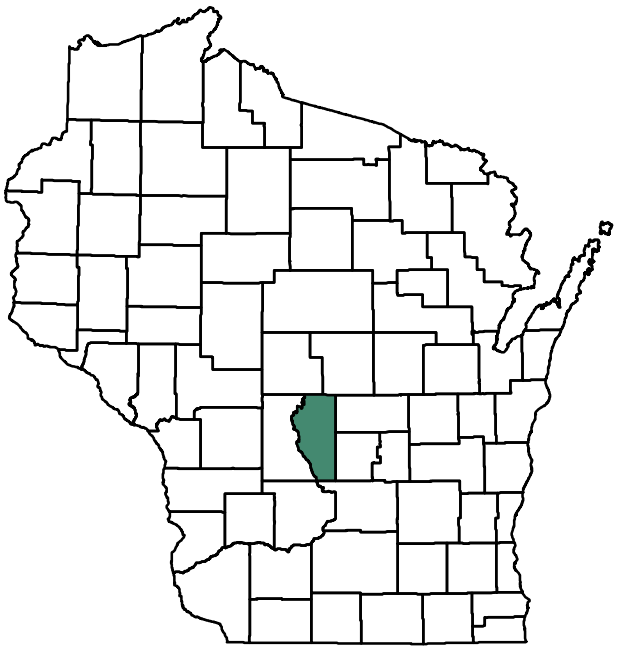
A hazardous materials incident can have far reaching impacts, however, those communities which are traversed by major highways, rail or pipeline are susceptible to a higher risk, refer to Maps 5 and 6. During the City/Village Planning Meeting for this Plan Update, both the City of Adams and the Village of Friendship identified hazardous materials incidents as a major vulnerability concern due to being hubs for facilities and transport of these materials within the County.

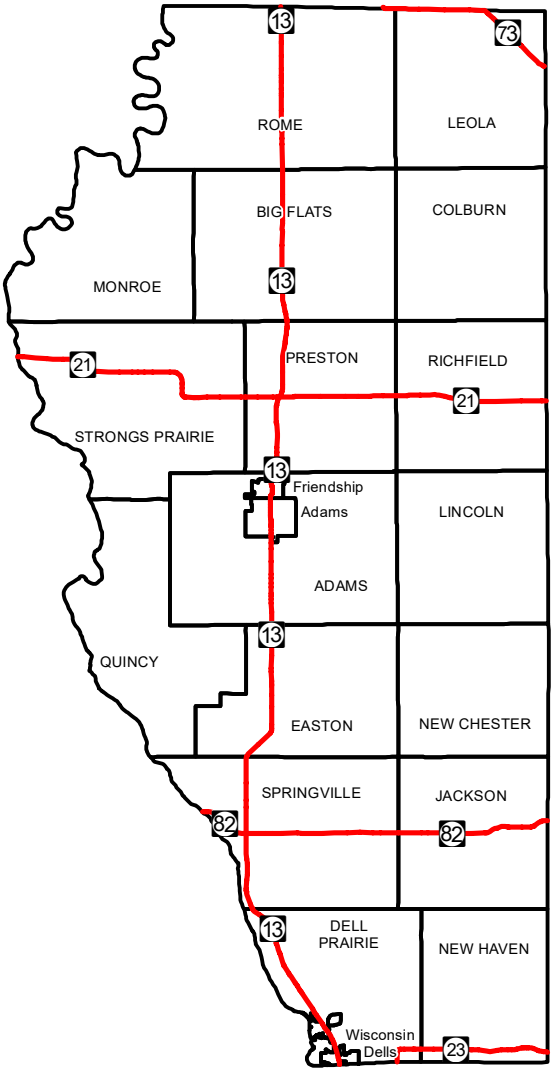
Future Probability & Potential Dollar Loss – Hazardous Materials Incidents: Based on the historic data presented here (frequency of past events), Adams County can expect about 5.8 minor hazardous material releases each year on average, which is a probability of 1.0 or a 100 percent chance in a given year.

There is insufficient data to determine the probability of a major incident. However, with the number of verified trucks carrying hazardous materials, a major industrial railway and a petroleum pipeline moving through the County, the chances appear to be significant for a catastrophic hazardous materials incident occurring at some point in Adams County.

As with the probability, there is limited historic data to base an estimate of potential dollar losses from HazMat incidents. However, based on occurrences statewide, damages range from $100 to $10.5 million per incident. The higher end of the range is not impossible in Adams County.

Adams County, Wisconsin — Location Map — Draft — Map 1





Legend

- Minor Civil Divisions
- State Highways

0 2 4 8 12 16 Miles

Source: WIDNR, NCWRPC

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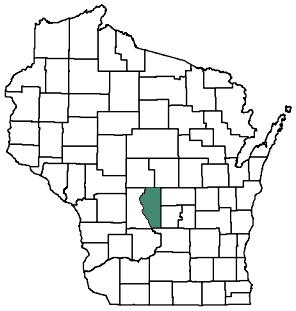
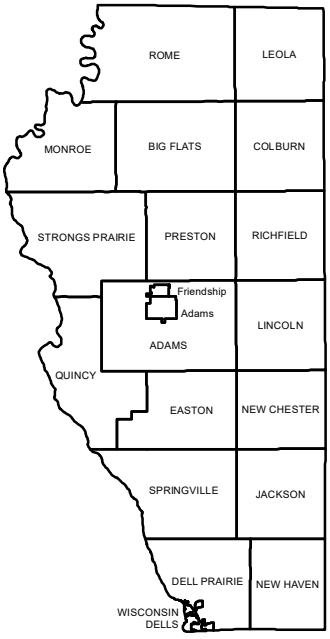
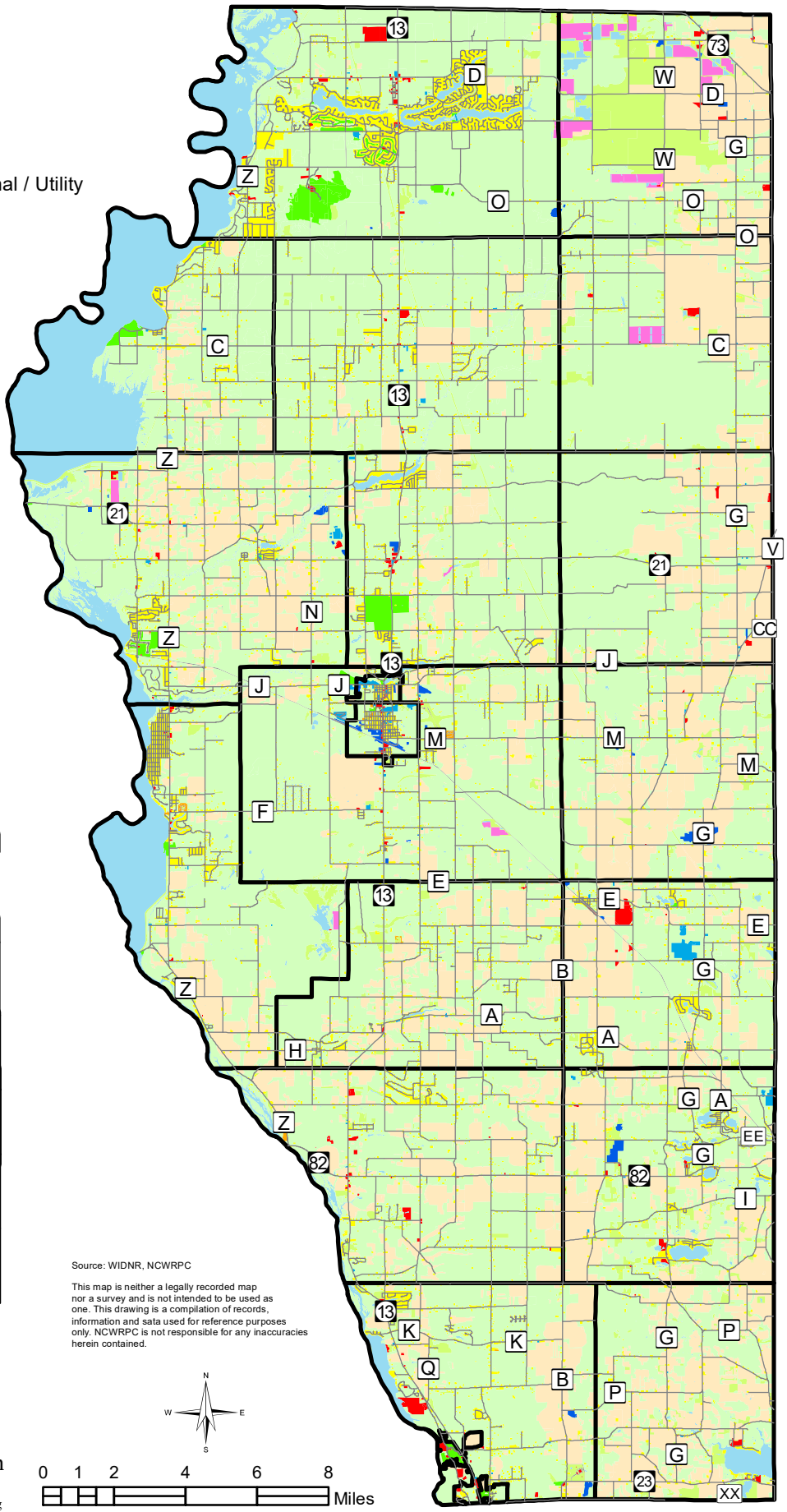
Adams County, Wisconsin — Generalized Land Use Draft — Map 2

Legend

- Minor Civil Divisions
- Agriculture
- Commercial
- Cranberry Bog
- Governmental / Institutional / Utility
- Industrial / Quarry
- Multi-Family
- Open Lands
- Outdoor Recreation
- Residential
- Transportation
- Water
- Woodlands







Source: WIDNR, NCWRPC

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0 1 2 4 6 8 Miles

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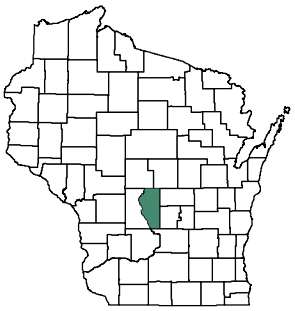
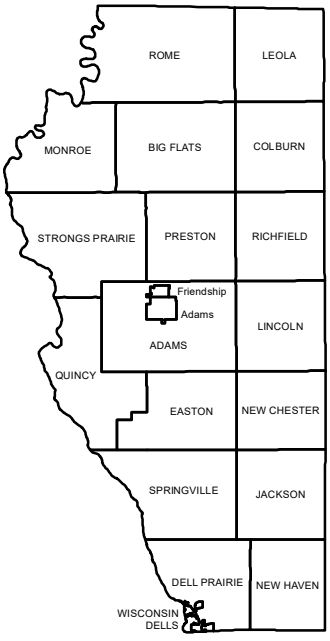
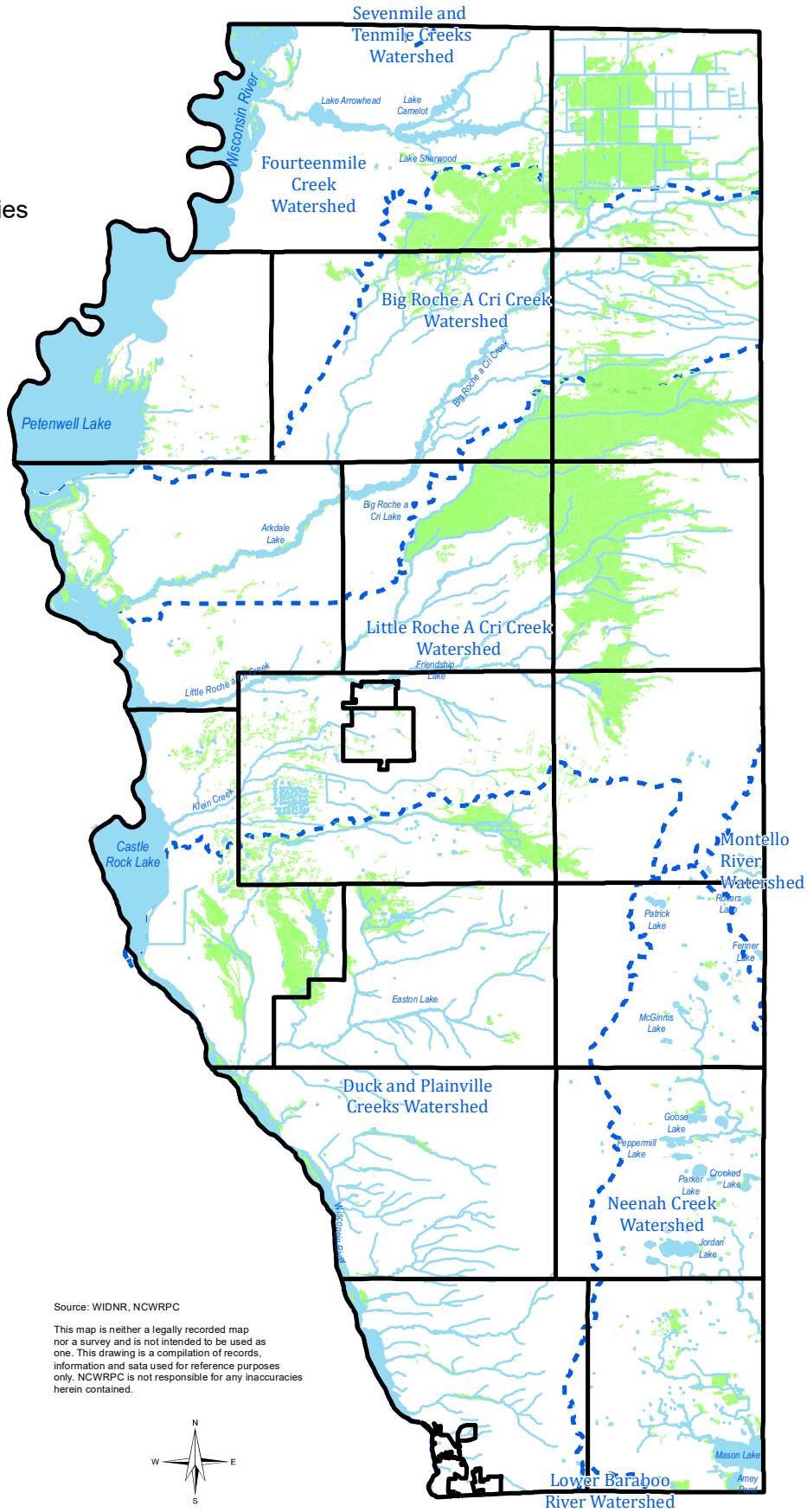
Adams County, Wisconsin Surface Water & Watersheds Draft Map 3

Legend

- Minor Civil Divisions
- Wetlands
- Watershed Boundaries
- Water







Source: WIDNR, NCWRPC

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0 1.25 2.5 5 7.5 10

Miles

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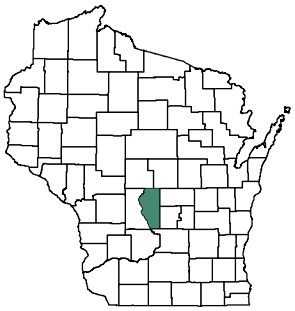
Adams County, Wisconsin — Floodplains & Dams — Draft — Map 4

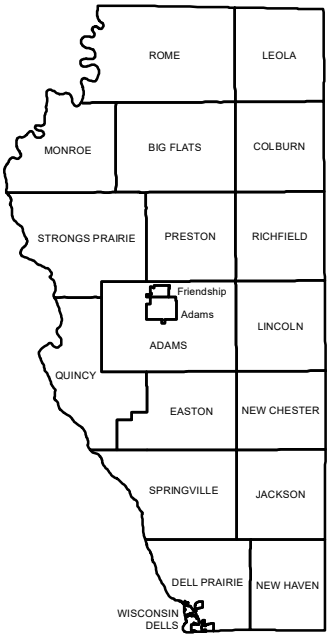
Legend

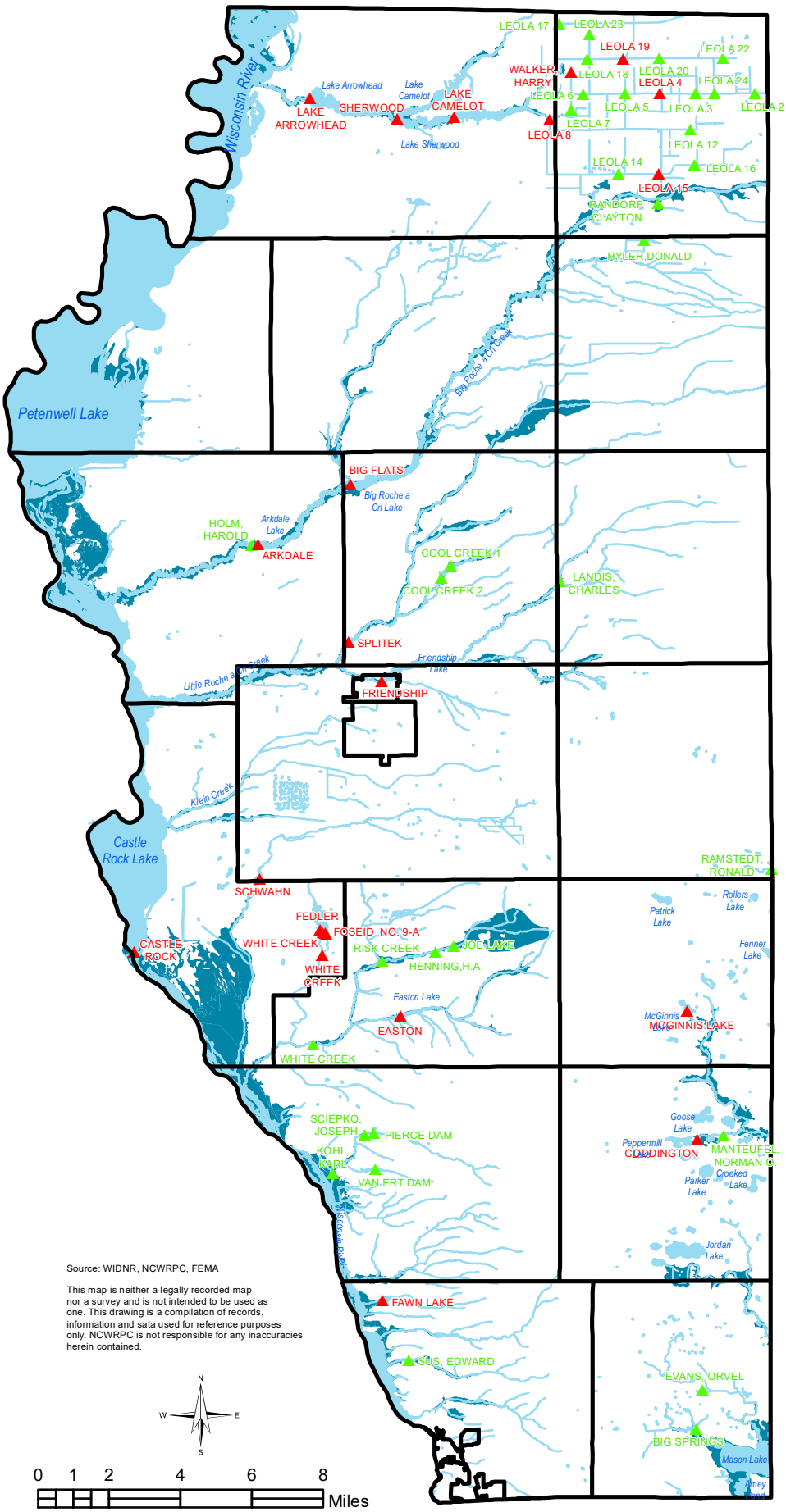
- Minor Civil Divisions

Dam Size

- Large
- Small
- Water
- Floodplain







Source: WIDNR, NCWRPC, FEMA

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0 1 2 4 6 8 Miles

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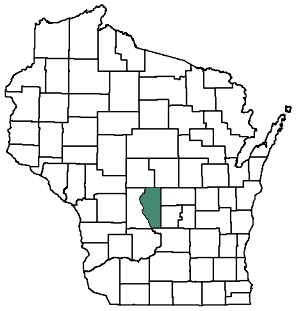
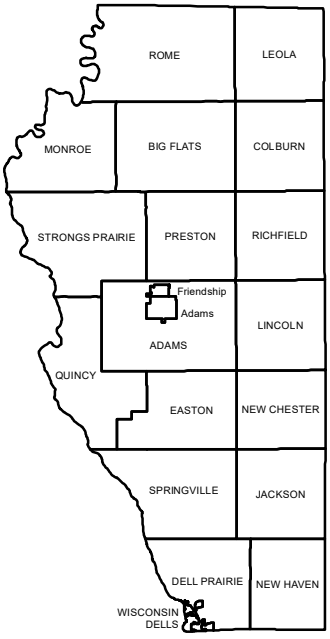
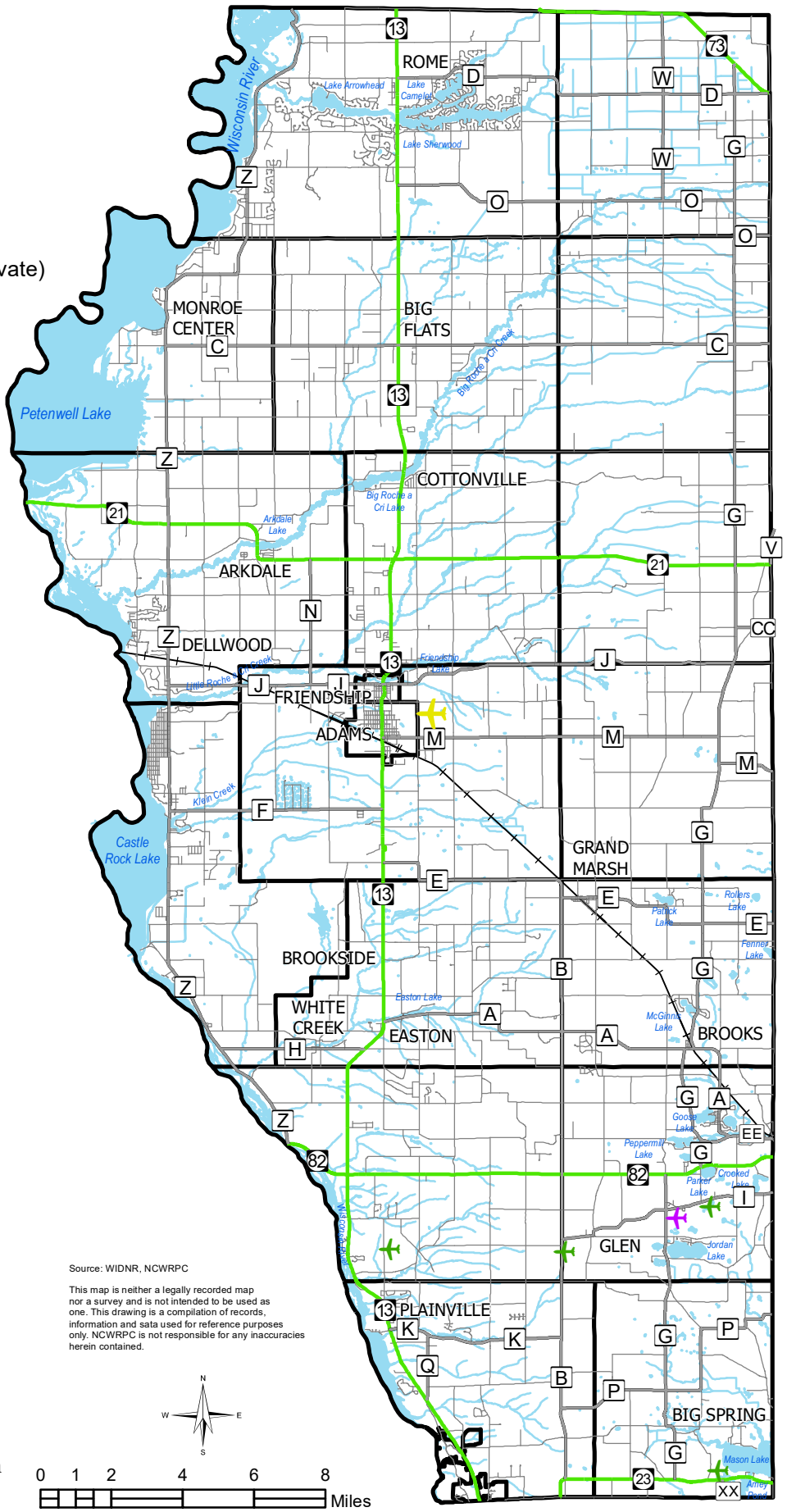
Adams County, Wisconsin — Transportation — Draft — Map 5

Legend

- Minor Civil Divisions
- State Highways
- County Highways
- Local Roads
- Small General Aviation
- Paved Landing Strip (Private)
- Grass Strip (Private)
- Railroad
- Water







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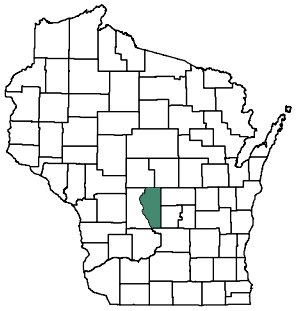
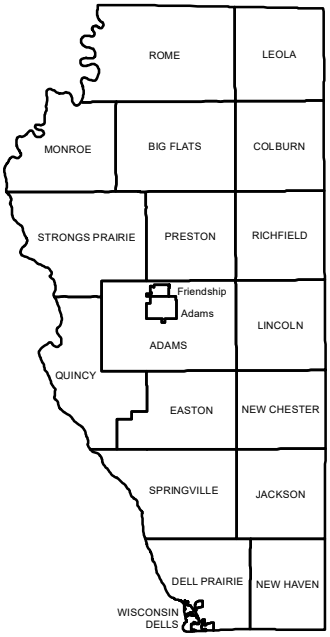
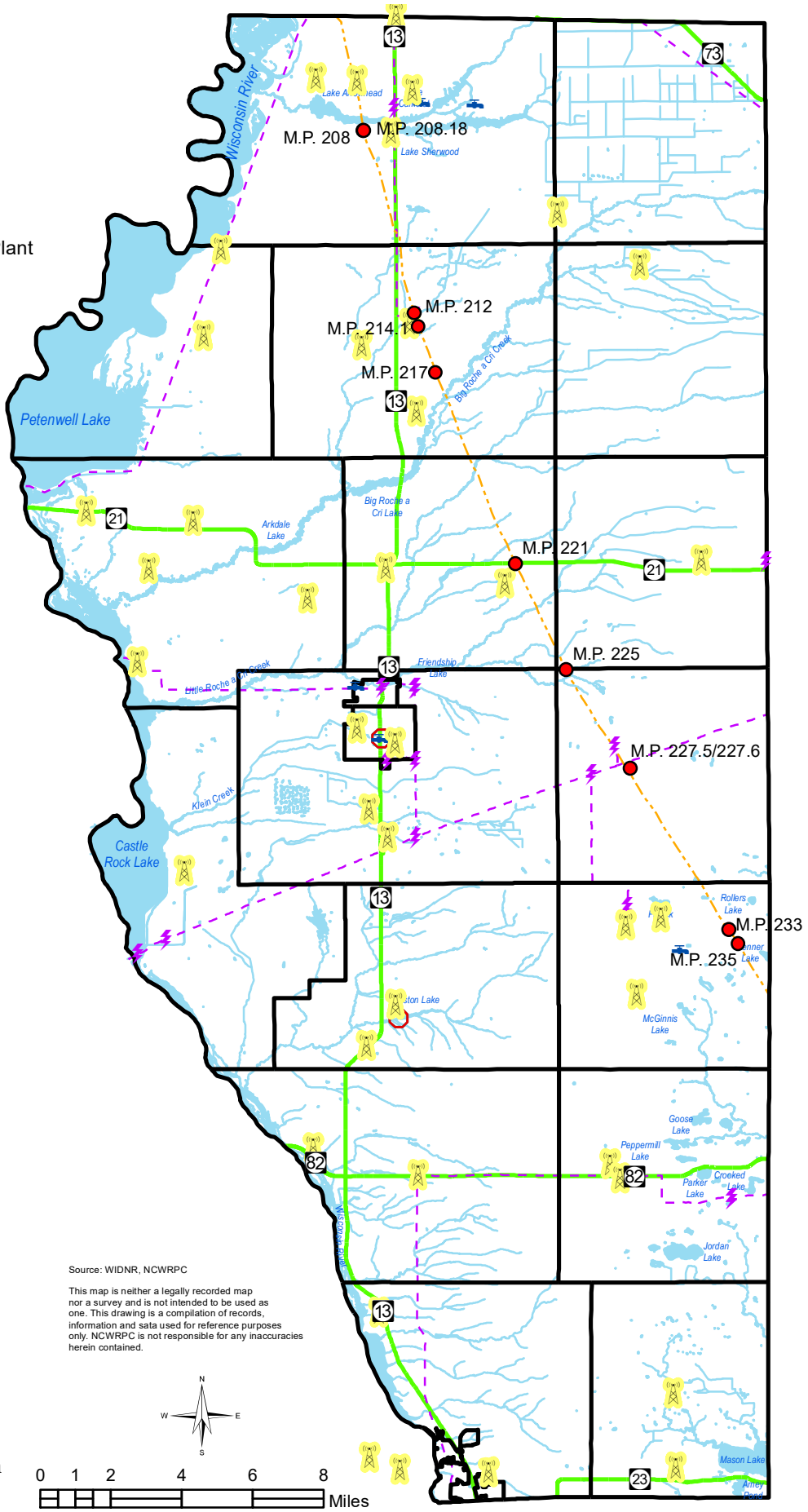
Adams County, Wisconsin — Utilities — Draft — Map 6

Legend

- Minor Civil Divisions
- State Highways
- Communication Towers
- Public Water Supply
- Waste Water Treatment Plant
- Pipeline
- Pipeline Values
- High Voltage Powerline
- Substations
- Water







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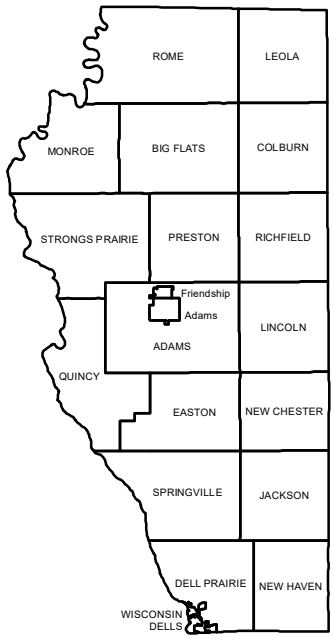
Adams County, Wisconsin Critical Community Facilities Map 7

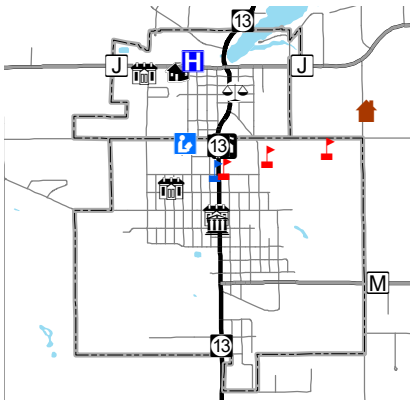
Draft

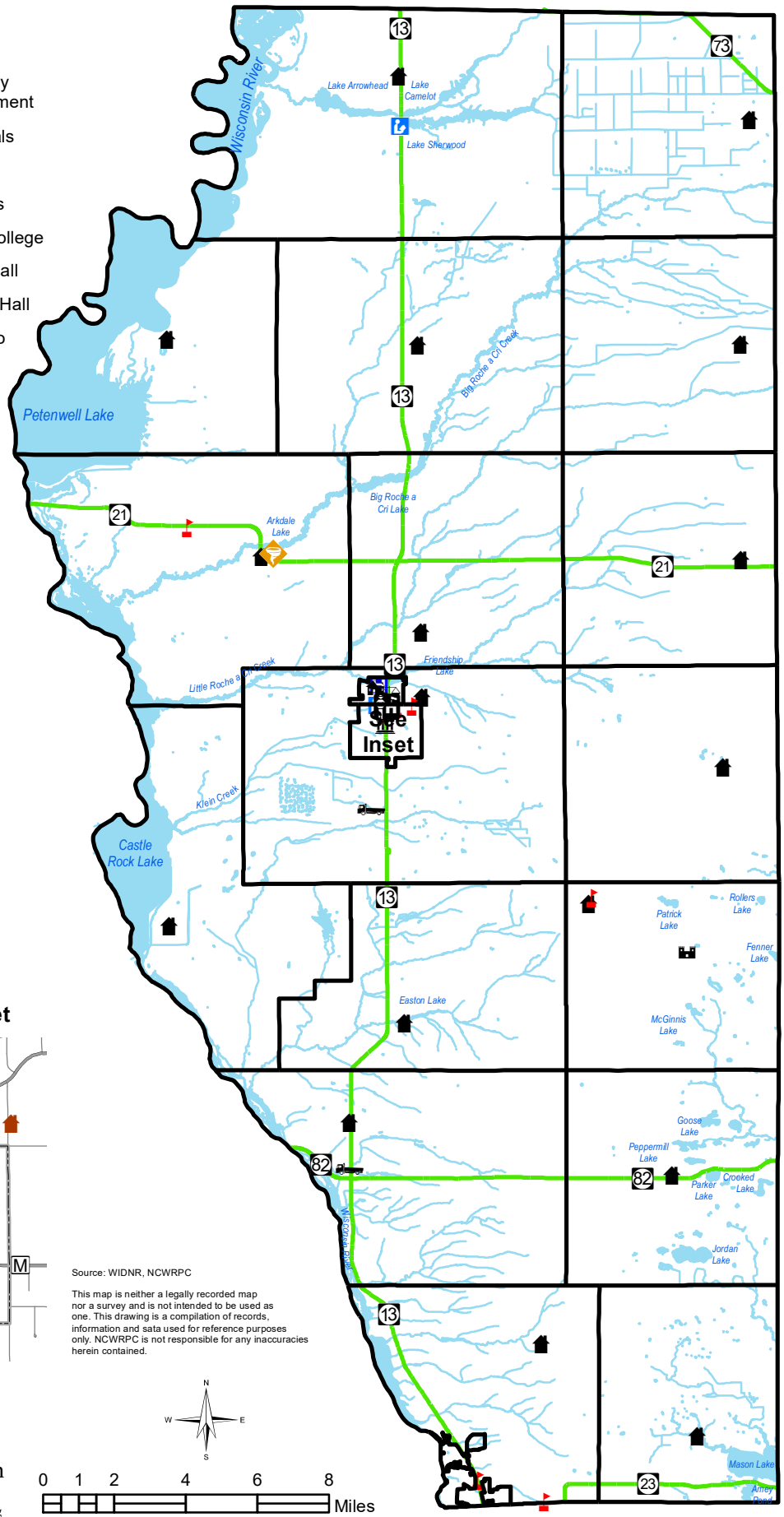
Legend

- Minor Civil Divisions
- State Highways
- City Hall
- Correctional Facility
- Courthouse
- DNR Ranger Station
- Highway Department
- Hospitals
- Library
- Schools
- Tech College
- Town Hall
- Village Hall
- Tornado Shelter
- Water



Adams - Friendship Inset





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0 1 2 4 6 8 Miles

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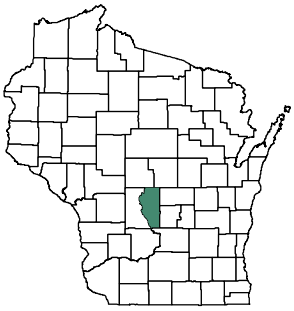
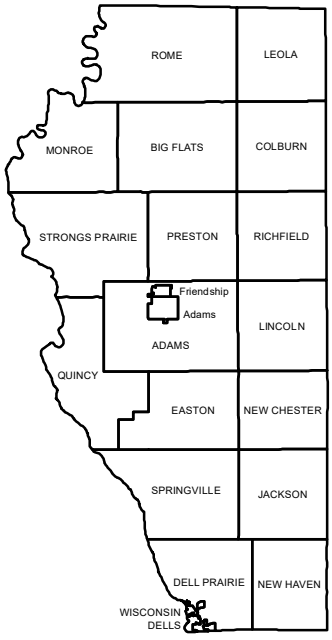
Adams County, Wisconsin — Areas of Vulnerability

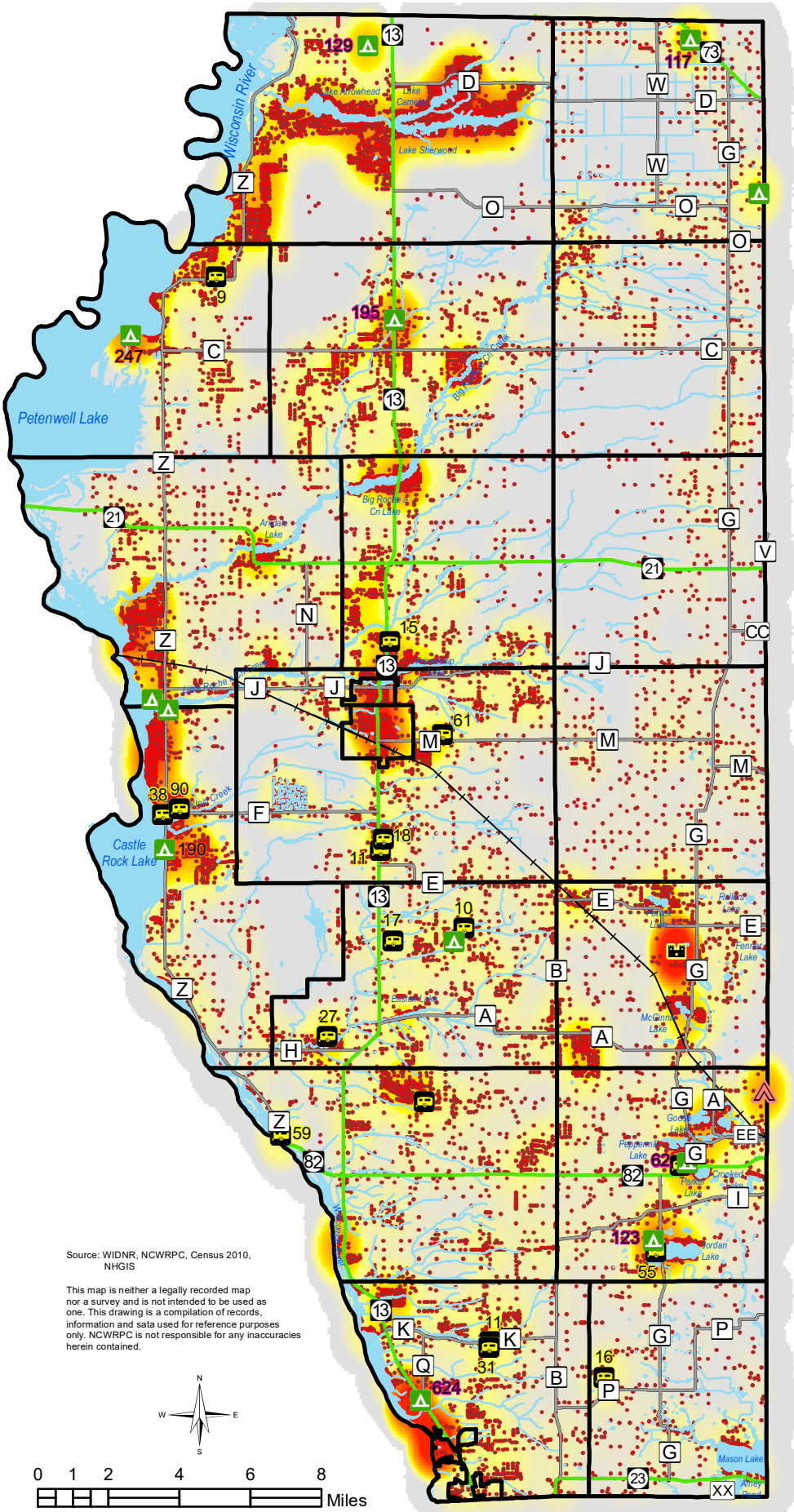
Draft
Map 8

Legend

- State Highways
- County Highways
- Railroad
- Minor Civil Divisions
- County Campgrounds
- Boy Scout Summer Camp
- Correctional Facility
- Mobile Home Parks
- Water
- Parcel Improvements
- High Density
- Low Density







Source: WIDNR, NCWRPC, Census 2010, NHGIS

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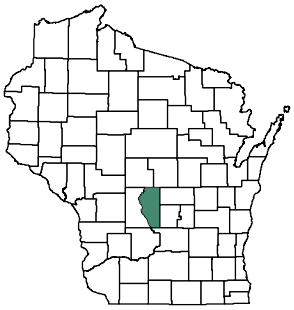
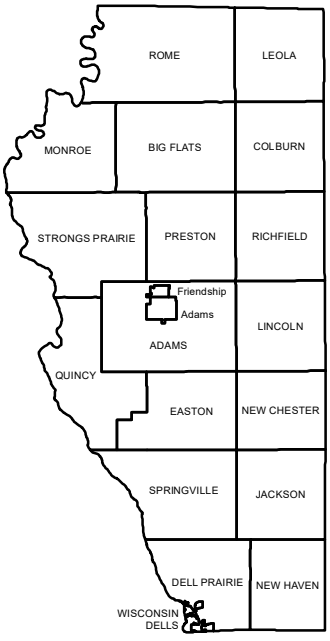
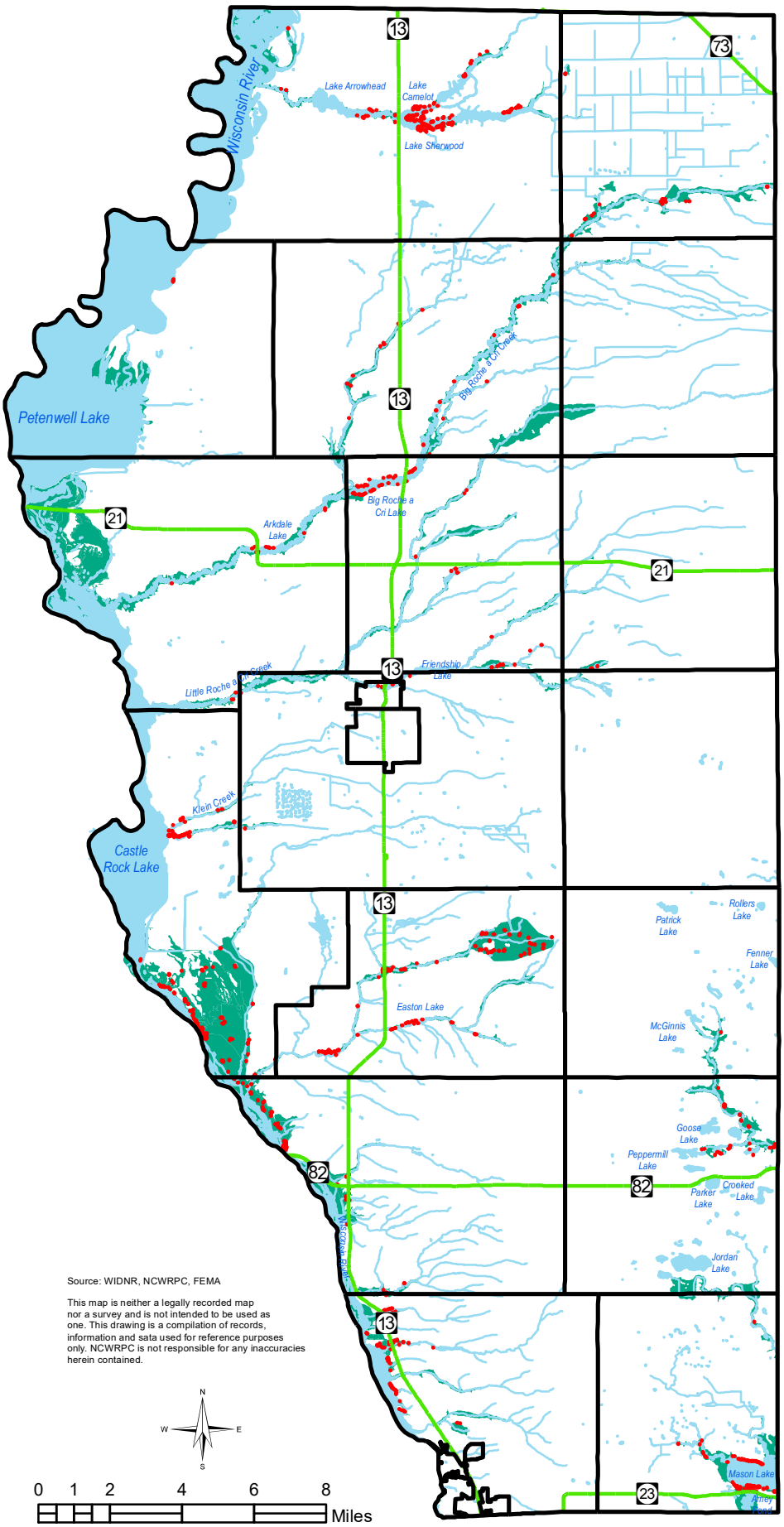
Adams County, Wisconsin — Flood Vulnerability Draft — Map 9

Legend

- Minor Civil Divisions
- State Highways
- Water
- Structures in Floodplain
- Floodplain







Source: WIDNR, NCWRPC, FEMA

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N W E S

0 1 2 4 6 8 Miles

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Adams County, Wisconsin Areas of Flooding 2018-2019 Map 10

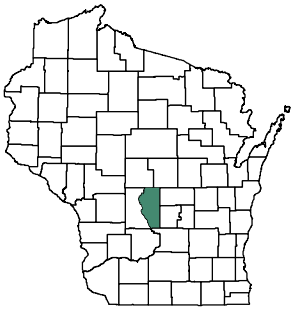
Draft

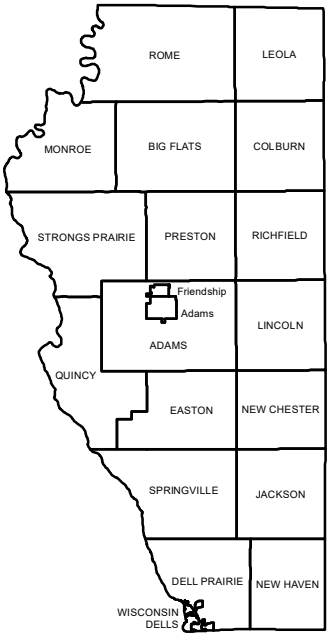
Legend

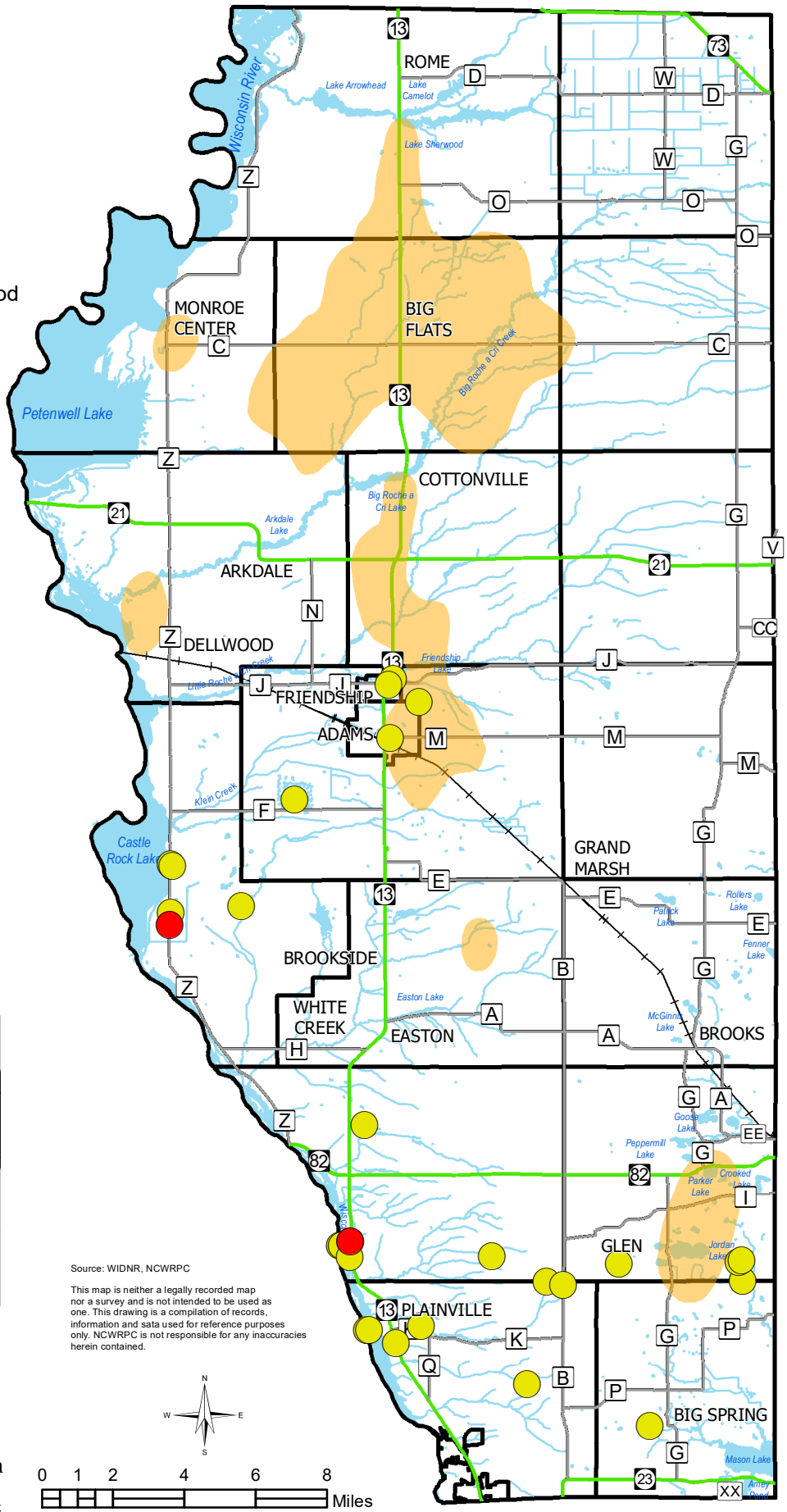
- Minor Civil Divisions
- State Highways
- County Highways
- Railroad
- Water
- Areas of on-going Flood Issues - Oct. 2019

Flood Damaged Structures - August 2018

- Commercial
- Residential







Source: WIDNR, NCWRPC

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0 1 2 4 6 8 Miles

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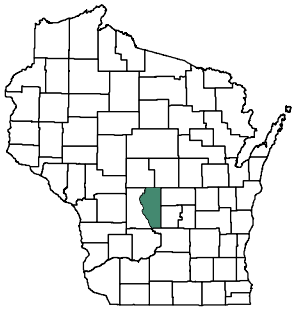
Adams County, Wisconsin — Wildfire Risk — Draft — Map 11

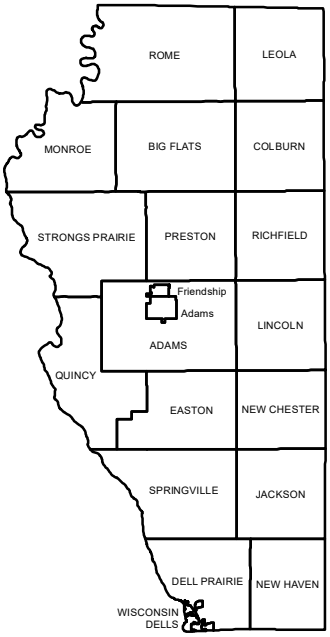
Legend

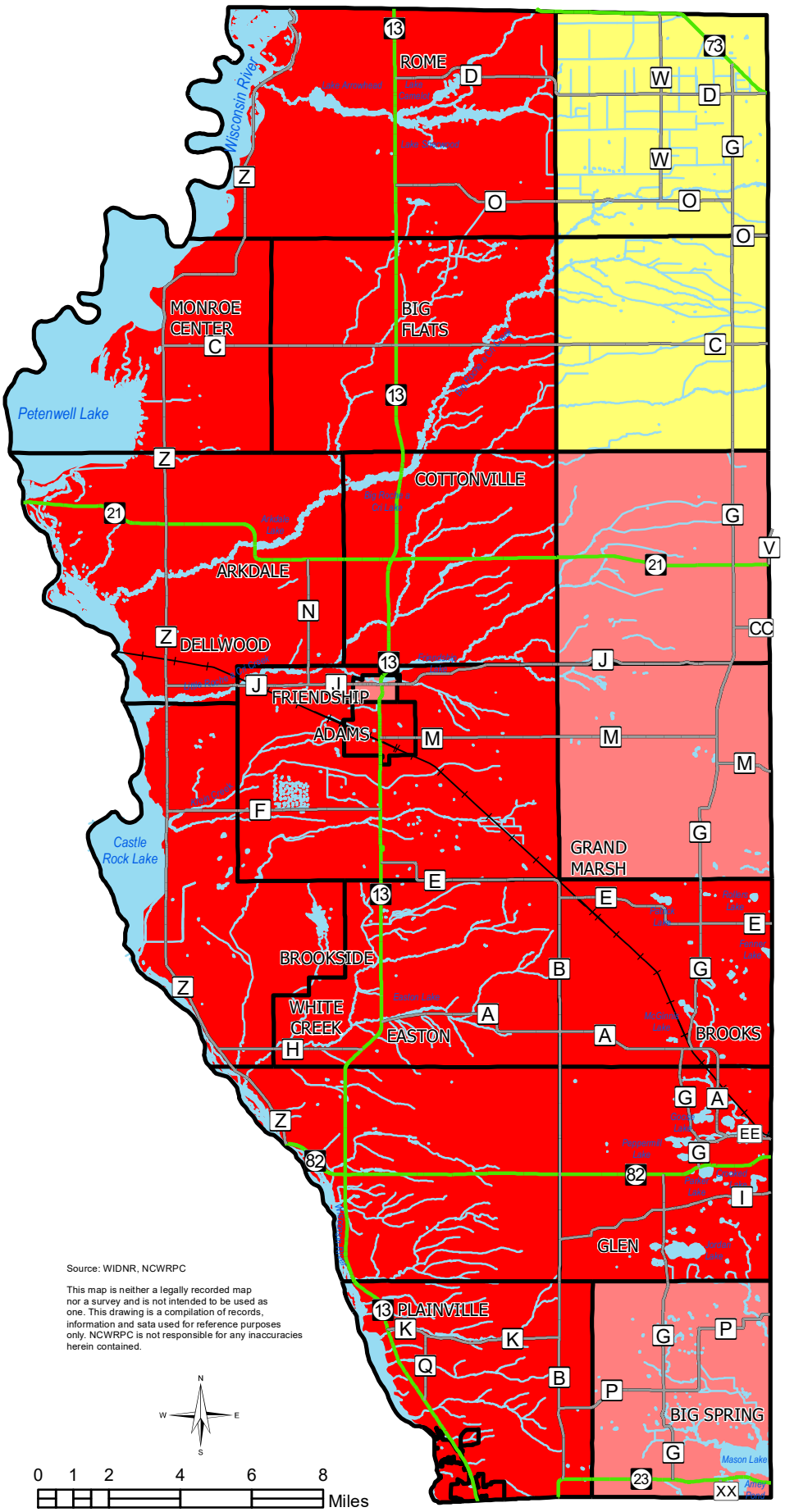
- Minor Civil Divisions
- State Highways
- County Highways
- Railroad
- Water

Wildfire Risk

- Very High
- High
- Concern







Source: WIDNR, NCWRPC

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0 1 2 4 6 8 Miles

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