JACKSON COUNTY WISCONSIN

MULTI-HAZARDS MITIGATION PLAN 2020-2024

This plan was prepared by the Mississippi River Regional Planning Commission through a cooperative cost sharing agreement with the Jackson County Board of Supervisors, the Mississippi River Regional Planning Commission, the Wisconsin Emergency Management and the Federal Emergency Management Agency.

ABSTRACT

Title: **JACKSON COUNTY MULTI- HAZARDS MITIGATION PLAN**

Plan Purpose: This plan's purpose it to identify goals, projects and actions the county, other local governments and other organizations can undertake to reduce hazard risks to life, health and property.
This plan through properly addressing the federal requirements in the Disaster Mitigation Act of 2000 makes the county and other local governments that participated in the planning process eligible for Federal Hazard Mitigation Grant Programs. These programs can assist in planning, relocation and infrastructure projects that reduce and sometimes eliminate losses and damage from hazards.

Plan Participants: This plan was prepared under the direction of the County Law Enforcement Committee who coordinated their plan development efforts through the County Emergency Management Coordinator. The Mississippi River Regional Planning Commission who wrote a planning grant to fund this plan was contracted with to write the plan and facilitate public meetings.

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Jackson County, Wisconsin Multi-Hazards Mitigation Plan 2020-2024
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1.0 JACKSON COUNTY NATURAL HAZARDS MITIGATION PLANNING PROCESS

Disaster Mitigation Act of 2000-DMA2K

The development of the Jackson County Natural Hazards Mitigation Plan 2015 – 2019 and this update to that plan was the result of the passage of the Disaster Mitigation Act of 2000 (DMA2K). This Act (Public Law 106-390) signed into law on October 30, 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The Act attempts to stem the losses from disasters, reduce future public and private expenditures, and to speed up response and recovery from disasters. The following is a summary of the Act that pertains to local governments and tribal organizations.

- The Act establishes a new requirement for local governments and tribal organizations to prepare an All-Hazard Mitigation Plan in order to be eligible for funding from FEMA through the Pre-Disaster Mitigation Assistance Program and Hazard Mitigation Grant Program.
- The Act establishes a requirement that natural hazards such as tornadoes, floods, wildfires need to be addressed in the risk assessment and vulnerability analysis parts of the All Hazard Mitigation Pan. Manmade hazards such as hazardous waste spills is encouraged but not required to be addressed.
- The Act authorizes up to seven percent of Hazard Mitigation Grant Program funds available to a state after a federal disaster to be used for development of state, local, and tribal organization All Hazard Mitigation Plans.
- The Act establishes November 1, 2004 as the date by which local governments and tribal organizations are to prepare and adopt their respective plans in order to be eligible for FEMA Hazard Mitigation Grant Program and November 1, 2003 Pre-Disaster Mitigation Program.
- If a plan is not prepared by November 1, 2004, and a major disaster is declared, in order for a local government or tribal organization to be eligible to receive funding through the Hazard Mitigation Grant Program, they must agree to prepare an All Hazards Mitigation Plan within one year.
- In addition, by not having an All Hazard Mitigation Plan, local governments and tribal organizations cannot utilize funding through the Pre-Disaster Mitigation Grant Program.

Plan Committees and Organizations

This Jackson County All Hazards Mitigation Plan 2015-2019 included all local units of government and organizations that desired to participate in it. This update to that plan will also include all local units of government and organizations that desire to participate. This include the County along with the Towns of Adams, Albion, Alma, Bear Bluff, Brockway, City Point, Cleveland, Curran, Franklin, Garden Valley, Garfield, Hixton, Irving, Knapp, Komensky, Manchester, Melrose, Millston, North Bend, Northfield, Springfield, the Villages of Alma Center, Hixton, Melrose, Merrillan, Taylor and the City of Black River Falls. The update of the plan was prepared under the guidance of the County Law Enforcement Committee due to their familiarity with flooding issues and floodplain management. Members of this committee and who they represent are listed in Table 1-1. The County Emergency Management Coordinator also participated in committee meetings and served as a liaison between the County Law Enforcement Committee and other local units of government in the County. The County, being a member of the Mississippi River Regional Planning Commission, contracted with them to facilitate the updating of the plan under the direction of the County Emergency Management Coordinator.

Table 1-1 Law Enforcement Committee Members

Chuck Jenson (Committee Chair)
Ray Ransom
Jeff Amo
Ron Carney
Isaiah Funmaker

Public Involvement

The County used two surveys, committee meetings, a special public information meeting, a public hearing and news releases as methods to garner public input into the plan. See Table 1-1 for a listing of the representatives who received surveys.

Surveys. To ensure the opportunity for inclusion of all municipalities and organizations into the planning process a risk assessment survey was mailed to all police chiefs, fire chiefs, town chairmen, village presidents, and mayor. In addition to these local units of government the Ho Chunk Nation was sent a survey so that their input could be included within this plan. The risk assessment survey asked the respondents to rank 24 natural hazards, on a high, medium or low basis based on their opinion of a given hazards probable threat to their community's health and public safety. The survey also asked the respondents for suggestions on projects or programs that they perceive as being needed to reduce future losses from the various hazards. The results of this survey are shown on Tables 3-1 and 3-3. The projects identified through this survey as well as others are listed in Chapter 4. A copy of this survey can be found in Appendix A.

In addition to the risk assessment survey every municipality within Jackson County was mailed in October 2019, their hazard mitigation projects list from the first plan. Each municipality was asked to update this listing by striking out those projects which have been completed and adding new projects to be included in the updated plan. Also, a hazard mitigation project identification survey was mailed to the county zoning administrator, county highway commissioner, county sheriff and the county land conservation coordinator. A second survey was mailed in February of 2020 to those who did not respond to the first survey. A listing of who received this survey can be found in Table 1-2 on page 1-4 and a copy of the survey can be found in Appendix B. The projects identified through this process as well as others are listed in Chapter 4.

Law Enforcement Committee Meetings. During the period in which the plan was being developed the County Emergency Management Committee included the Multi-Hazards Mitigation Plan Update on their quarterly agenda at various times. These meetings are open to the public and input from the public was accepted at these meetings. A copy of a Law Enforcement Committee meeting agenda can be found in Appendix C.

Public Meetings and Hearings. The County also sponsored a public meeting on October 7, 2020 to present a draft of the Jackson County Multi-Hazard Mitigation Plan to the public. During this meeting the results of the local official Hazard Risk Assessment Survey were presented (Tables 3-1 and 3-2) and a list of potential projects needed to reduce future losses from these hazards was presented. The public was notified of the public meeting on the draft plan through a notice in the County's official newspaper, the Jackson County Chronicle. A copy of the public notice can be found in Appendix C.

Municipal and Business Participation. All local municipalities were mailed the risk assessment surveys. The municipalities receiving the survey were the Towns of Adams, Albion, Alma, Bear Bluff, Brockway, City Point, Cleveland, Curran, Franklin, Garden Valley, Garfield, Hixton, Irving, Knapp, Komensky, Manchester, Melrose, Millston, North Bend, Northfield, Springfield, the Villages of Alma Center, Hixton, Melrose, Merrillan, Taylor and the City of Black River Falls. In addition, these municipalities were mailed their project listing from the first plan and were asked to update this list. See Tables 1-2, 1-3 and 1-4 on pages 1-4 and 1-5 for a listing of who received and who responded to these surveys. And lastly all these municipalities were asked to approve the updated plan by

resolution. In order to accomplish this each municipality is required by law to have the adoption of the resolution as an agenda item for their board meeting. To get local business input, a draft of the plan was sent to Seven Rivers Alliance.

Neighboring Communities, Academia and Nonprofits Participation. Emergency Management Coordinators of neighboring Counties were sent copies of the draft plan for their review and comments. The Alma Center, Black River Falls and the Melrose-Mindoro school districts were sent copies of the draft for their review and comment. Nonprofit organizations were given the opportunity to participate in the public hearings as these were notified public notices.

MRRPC Bimonthly Meetings: Beginning with the December 10, 2018 MRRPC Bimonthly and continuing until the final approval from FEMA, the Jackson County Multi-Hazards Mitigation Plan was an agenda item at every meeting. These bimonthly meetings, which are announced through the press and direct mailings, are open to the public. Commissioners, the public, and other interested parties were updated as to the progress of the plan and their comments and suggestions were accepted. A copy of a MRRPC Bimonthly meeting agenda can be found in Appendix C.

Incorporated Plans, Studies, Reports and Technical Data

The following is a list of plans, studies and reports that were used to assist in preparing this plan.

Plan Name	How used
Hazard Analysis for the State of Wisconsin, November 2008	Provided data for historical natural hazard events.
2011 State of Wisconsin Hazard Mitigation Plan	Provided dates and amounts of damage for the various natural hazards
National Climatic Data Center	Provided data for history and damage amounts for the various natural hazards
Hazard Analysis and Mitigation, Jackson County	Provided data for on the history and damage amounts for the various natural hazards and provided a source of mitigation projects
Natural Hazards Assessment, Jackson County WI, by NOAA/National Weather Service La Crosse, WI	Provided data for history and damage amounts for the various natural hazards
Wis. Dept. of Natural Resources Dam Database	Provided list of dams within Vernon County
Wis. Dept. of Administration, Hazard Material Site Database	Provided a list of hazardous material sites located within the County

Funding for the Jackson County All Hazards Mitigation Plan

In December 2011, the County received word that they were awarded a $40,500.26 FEMA planning grant through the Hazard Mitigation Grant Program under federal disaster declaration, FEMA-1933-DR to update their All Hazards Mitigation Plan 2020-2024. FEMA will provide 75% of the funds ($30,375.20). On September 25, 2017, the Mississippi River Regional Planning Commission (MRRPC) signed a contract with Jackson County that called for MRRPC to prepare the plan and provide most of the local matching share. MRRPC and Jackson County provided a 25% or $10,125 contribution towards the total.

Plan Contents

In order to meet FEMA's local mitigation plan requirements Jackson County's Multi-Hazards Mitigation Plan is organized into the following five parts, which also follow the Resource Guide to All Hazard Mitigation Planning in Wisconsin.

1. Planning Process
2. Planning Area
3. Risk Assessment
4. Mitigation Strategy
5. Plan Maintenance and Adoption

Updated Items

During this update each of the chapters of the old plan were reviewed and updated. The following items were updated during this process:

Chapter 1: Jackson County Emergency Management Committee members were listed; survey information was updated and the table identifying who received surveys was updated;

Chapter 2: Population, housing and land use tables were updated;

Chapter 3: Updated risk assessments, historical data, vulnerability data (to include data up to 2017), 100-year floodplain data, flood potential, updated critical facilities tables and maps and added pandemic flu information;

Chapter 4: Updated mitigation projects lists by identifying completed projects and adding new projects;

Chapter 5: Reviewed maintenance schedule and updated list of municipalities which have approved the plan.

Plan Contact Information

For further information pertaining to this plan contact:
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Table 1-2
Risk Assessment Survey Mailing List

Name	Representing
Harley Boehm	T. Adams
Leonard Olson	T. Albion
Charles Smith	T. Alma
Al Potter	T. Bear Bluff
Norman Stoker	T. Brockway
James Grutzik	T. City Point
Dwight Swenson	T. Curran
Merlin Fredrickson	T. Franklin
Vincent Ruzic	T. Garden Valley
Steve Dickensen	T. Garfield
Tony Lien	T. Hixton
Bruce Johnson	T. Irving
Scott Goetzka	T. Knapp
Tracy Thundercloud	T. Komensky
Pat Franks	T. Manchester
Jeffrey Waughtal	T. Melrose
Dan Smrekar	T. Millston
Rick Olson	T. North Bend

Name	Representing
Richard Erickson	T. Northfield
Leif Olson	T. Springfield
Ken Ristow	V. Alma Center
Charles Taylor	V. Hixton
Joel Gilbertson	V. Melrose
Margaret Young	V. Merrillan
Steve Roseth	V. Taylor
Jay Eddy	City of Black River Falls
Duane Waldera	Jackson County Sheriff's Office
Cal Smokowicz	Melrose Police Dept.
David Hartl	Merrillan Police Dept.
Jeremy Isensee	Black River Falls Police Dept.
Jess Gaede	Alma Center Fire Department
Tom Davidson	Hixton Fire Dept.
Ed Lloyd	Merrillan Fire Dept.
Kurt Kaufman	Hatfield Fire Dept.
Robert Scheel	City Point Fire Dept.
Tim Rose	Taylor Fire Dept.
Steve Schrieber	Black River Falls Fire Dept.
Amanda Richmond	Ho-Chunk Emergency Management

In addition, each member of the Law Enforcement Committee also received surveys at the meeting and were encouraged to fill it out. Table 1-1 lists the members of the Law Enforcement Committee.

Table 1-3
Projects Needs Survey Mailing List

Name	Title
Harley Boehm	T. Adams
Leonard Olson	T. Albion
Charles Smith	T. Alma
Al Potter	T. Bear Bluff
Norman Stoker	T. Brockway
James Grutzik	T. City Point
Dwight Swenson	T. Curran
Merlin Fredrickson	T. Franklin
Vincent Ruzic	T. Garden Valley
Steve Dickinsen	T. Garfield
Tony Lien	T. Hixton
Bruce Johnson	T. Irving
Scott Goetzka	T. Knapp
Tracy Thundercloud	T. Komensky

Name	Title
Pat Franks	T. Manchester
Jeffrey Waughtal	T. Melrose
Dan Smrekar	T. Millston
Rick Olson	T. North Bend
Richard Erickson	T. Northfield
Leif Olson	T. Springfield
Ken Ristow	V. Alma Center
Charles Taylor	V. Hixton
Joel Gilbertson	V. Melrose
Margaret Young	V. Merrillan
Steve Roseth	V. Taylor
Jay Eddy	C. Black River Falls
Duane Waldera	Jackson County Sheriff's Office
Gaylord Olson II	Jackson County Land Conservation
Terry Schmidt	Jackson County Zoning
Jay Borek	Jackson County Highway

Table 1-4
Municipal Surveys Results

Municipality	Risk Assessment Survey		Mitigation Projects Survey		
	Received Survey	Returned Survey	Received Survey	Mailed Survey Back	Replied by individual meeting
Town of Adams	X	X	X		
Town of Albion	X	X	X	X	
Town of Alma	X	X	X	X	
Town of Bear Bluff	X	X	X	X	
Town of Brockway	X	X	X	X	
Town of City Point	X	X	X	X	
Town of Cleveland	X	X	X	X	
Town of Curran	X	X	X	X	
Town of Franklin	X	X	X	X	
Town of Garden Valley	X	X	X	X	
Town of Garfield	X	X	X	X	
Town of Hixton	X	X	X	X	
Town of Irving	X	X	X		
Town of Knapp	X	X	X	X	
Town of Komensky	X	X	X	X	
Town of Manchester	X	X	X	X	
Town of Melrose	X	X	X	X	
Town of Millston	X	X	X	X	
T. North Bend	X	X	X	X	
Town of Northfield	X	X	X	X	
Town of Springfield	X	X	X		
Village of Alma Center	X	X	X		X

Village of Hixton	X	X	X	X	
Village of Melrose	X	X	X	X	
Village of Merrillan	X	X	X	X	
Village of Taylor	X	X	X		X
City of Black River Falls	X	X	X	X	

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2.0 JACKSON COUNTY PLANNING AREA

General Geography

The planning area for this Multi-Hazards Mitigation plan is all of Jackson County. Jackson County is located in western Wisconsin, and is bordered by Trempealeau County to the west, Eau Claire and Clark Counties to the north, La Crosse and Monroe Counties to the south, and Wood and Juneau Counties to the east. The total land and water area in the county totals approximately 998 square miles. The only city in the county is Black River Falls; it has a land area of 4.06 square miles. Of the 5 Villages located in the County both Hixton and Merrillan have 1.16 square miles of land. The town with the largest land area is City Point, which covers 90.0 square miles. There is 1 city, 5 villages, and 21 town governments in the County. The Ho-Chunk Nation also owns land in the County. Table 2-1 provides land area data on all the units of government in the County.

Table 2-1

Jackson County Land Area Data

Jurisdiction	Land Area (Sq. Miles)		
	Land	Water	Total
Adams	35.86	.95	36.81
Albion	45.61	0.15	45.76
Alma	57.91	0.02	57.93
Bear Bluff	53.19	3.02	56.21
Brockway	47.02	0.73	47.75
City Point	88.70	1.54	90.24
Cleveland	35.90	0	35.90
Curran	36.20	0	36.20
Franklin	36.62	0	36.62
Garden Valley	36.23	0	36.23
Garfield	35.95	0.01	35.96
Hixton	34.94	0	34.94
Irving	43.96	0.47	44.43
Knapp	69.15	2.35	71.50
Komensky	59.00	0.48	59.48
Manchester	64.29	0.18	64.47
Melrose	27.00	0.52	27.52
Millston	71.13	1.21	72.34
Northbend	27.63	0.67	28.30
Northfield	35.98	0.02	36.00
Springfield	36.48	0.02	36.50
Town Totals	**978.75**	**12.34**	**991.89**

Jurisdiction	Land Area (Sq. Miles)		
	Land	Water	Total
V. Alma Center	1.00	0	1.00
V. Hixton	1.09	0	1.09
V. Melrose	0.80	0.03	0.83
V. Merrillan	1.26	0.08	1.34
V. Taylor	0.73	0	0.73
C. Black River Falls	4.10	0.10	4.20
City & Village Totals	**8.98**	**0.21**	**9.19**
Jackson County	**987.73**	**12.55**	**1000.28**
Wisconsin	**54,158**	**11,339**	**65,497**
United States	**3,531,905**	**264,837**	**3,796,742**

Demographic and Economic Profile

Population. Jackson County experienced a stagnant population from 20,449 in 2010, to 20,531 in 2017, a negligible difference. This rate of growth was lower than the State (7.0%) and the Nation (4%), See Table 2-2. Black River Falls is the largest municipality in Jackson County with a 2017 American Community Survey population of 3,537. Merrillan is the largest village with a 2017 population of 671. The smallest Village is Taylor with a 2017 population of 454. The largest town is Brockway with a 2017 population of 2,856 and the smallest town is Bear Bluff with a 2010 population of 127. The fastest growing incorporated community from 2010-2017 was Merrillan, which grew 24 percent. The fastest growing town from 2010-2017 was Franklin, which grew by 20 percent. A slight majority of Towns experienced a slight decrease in population from 2010-2017. Most incorporated communities saw an increase in population except the Village of Taylor and the City of Black River Falls, which experienced small decreases. See Table 2-2 for population numbers.

Table 2-2

Jackson County Population Data

Municipality	Population			
	2010 Census	2017 ACS	# Change 10-17	% Change 10-17
Adams	1,342	1,355	13	1%
Albion	1,210	1,124	-86	-7%
Alma	1,044	983	-61	-6%
Bear Bluff	138	127	-11	-8%
Brockway	2,828	2,856	28	1%
City Point	182	175	-7	-4%
Cleveland	481	545	64	13%
Curran	343	302	-41	-12%
Franklin	448	410	-38	-8%
Garden Valley	422	354	-68	-16%
Garfield	638	767	129	20%
Hixton	652	613	-39	-6%
Irving	751	821	70	9%
Knapp	299	259	-40	-13%
Komensky	509	554	45	9%
Manchester	704	787	83	12%
Melrose	470	436	-34	-7%
Millston	159	125	-34	-21%
North Bend	488	431	-57	-12%
Northfield	639	661	22	3%
Springfield	623	638	15	2%
Town Totals	**14,370**	**14,323**	**-47**	**0%**

Municipality	Population			
	2010 Census	2017 ACS	# Change 10-17	% Change 10-17
V. Alma Center	503	513	10	2%
V. Hixton	433	467	34	8%
V. Melrose	503	566	63	13%
V. Merrillan	542	671	129	24%
V. Taylor	476	454	-22	-5%
C. Black River Falls	3,622	3,537	-85	-2%
City & Village Totals	**6,079**	**6,208**	**129**	**2%**
Jackson County	**20,449**	**20,531**	**82**	**0%**
Wisconsin	**5,363,675**	**5,763,217**	**399,542**	**7%**
United States	**308,745,538**	**321,004,407**	**12,258,869**	**4%**

Source: U.S. Census Bureau 2010; American Community Survey 2013-2017 5 Yr. Estimates

Housing. The number of housing units in the County increased from 9,727 in 2010, to 9,898 in 2017, an increase of 2.0 percent. This rate of growth was equal to the State and less than the Nation. The number of housing units in Wisconsin grew from 2,624,358 in 2000 to 2,668,692 in 2017, an increase of 2.0 percent. Nationally the number of housing units grew from 131,704,730 in 2010, to 135,393,564 in 2017, a 3.0 percent increase.

The City of Black River Falls with 1,642 housing units in 2017 had the most housing units of any municipality. The municipality with the largest percentage increase from 2010-2017 was the Village of Merrillan with a 31 percent increase. The municipality with the largest percentage decrease from 2010-2017 was Garden Valley with an 8 percent decrease. 17 out of the 27 municipalities saw increases in housing units from 2010-2017. The number of housing units per square mile of land area increased for Jackson County (1.0%), 1.9 percent less than the national average (2.9%) and 0.6 percent less than the state average (1.6%) from 2010 to 2017. See Table 2-3 for additional housing data.

Table 2-3

Jackson County Housing Data

	Housing Units				Housing Units Per Sq. Mile of Land Area			
Jurisdiction	2010	2017	# Change 10-17	% Change 10-17	2010	2017	# Change 10-17	% Change 10-17
Adams	877	854	-23	-3%	24.5	23.8	-0.7	-2.9%
Albion	537	565	28	5%	11.8	12.4	0.6	5.1%
Alma	482	509	27	6%	8.3	8.8	0.5	6.0%
Bear Bluff	78	74	-4	-5%	1.5	1.4	-0.1	-6.7%
Brockway	848	858	10	1%	18.0	18.2	0.2	1.1%
City Point	257	242	-15	-6%	2.9	2.7	-0.2	-6.9%
Cleveland	250	250	0	0%	7.0	7.0	0.0	0.0%
Curran	183	197	14	8%	5.1	5.4	0.3	5.9%
Franklin	222	214	-8	-4%	6.1	5.8	-0.3	-5.0%
Garden Valley	195	180	-15	-8%	5.4	5.0	-0.4	-7.4%
Garfield	322	360	38	12%	9.0	10.0	1.0	11.1%
Hixton	306	336	30	10%	8.8	9.6	0.8	9.1%
Irving	309	308	-1	0%	7.0	7.0	0.0	0.0%
Knapp	194	199	5	3%	2.8	2.9	-0.1	-3.6%
Komensky	165	187	22	13%	2.8	3.2	0.4	14.3%
Manchester	436	432	-4	-1%	6.8	6.7	-0.1	-1.5%
Melrose	198	197	-1	-1%	7.4	7.3	-0.1	-1.4%
Millston	128	119	-9	-7%	1.8	1.7	-0.1	-5.6%
North Bend	215	222	7	3%	7.7	8.0	0.3	3.9%
Northfield	289	301	12	4%	8.0	8.4	0.4	5.0%
Springfield	262	279	17	6%	7.2	7.6	0.4	5.6%
Town Totals	**6,753**	**6,883**	130	2%	**159.9**	**162.9**	**3.0**	**1.9%**
V. Alma Center	229	242	13	6%	229.9	226.7	-3.2	-1.4%
V. Hixton	219	236	17	8%	201.2	204.7	3.5	1.7%
V. Melrose	250	244	-6	-2%	310.7	316.5	5.8	1.9%
V. Merrillan	318	415	97	31%	251.8	252.4	0.6	0.2%
V. Taylor	226	236	20	4%	310.4	309.6	-0.8	-0.3%
C. Black River Falls	1,732	1,642	-90	-5%	422.8	548.1	125.3	3.0%
City & Village Totals	**2,974**	**3,015**	**41**	**1%**	**1,726.8**	**1,858.0**	**131.2**	**7.6%**

Jackson County	**9,727**	**9,898**	**171**	**2%**	**9.8**	**9.9**	**0.1**	**1.0%**
Wisconsin	**2,624,358**	**2,668,692**	**44,334**	**2%**	**48.5**	**49.3**	**0.8**	**1.65**
United States	**131,704,730**	**135,393,564**	**3,688,834**	**3%**	**37.2**	**38.3**	**1.1**	**2.9%**

Source: U.S. Census Bureau

Employment and Industry. Total employment in the County declined from 9,481 in 2010 to 9,274 in 2016 a decrease of 2.2 percent. This rate was below the State (5.6%) and the Nation (4.3%) growth rates. The top three employment sectors in the County in 2016 were Educational, health, and social services (21.5%), Manufacturing (16.8%), and Arts, entertainment, recreation, accommodation, and food service (10.0%). These 3 sectors were 1st, 4th and 5th leading sectors respectfully for the nation and the 1st, 2nd and 4th for Wisconsin. From 2010 to 2016 the following employment sectors experienced growth of at least 10%; Finance, insurance, real estate, and rental and leasing (33%), Transportation and warehousing, and utilities (19.8%), Wholesale trade (18.8%), Other services (except public administration) (16.7%), Public administration (15.5%), Construction (15%), Professional, scientific, management, administrative, and waste management services (11.2%), and Information (11.1%). During this same time period, the employment sector of Agriculture, forestry, fishing, and hunting, and mining saw a decline of 3.0%. Additional information on employment sectors can be found in Table 2-3.

Table 2-3

Employment by Industry

	Jackson County					Wisconsin					United States				
	2010 (1)		2016 (2)		% Change 10-16	2010 (1)		2016 (2)		% Change 10-16	2010 (1)		2016 (2)		% Change 10-16
	No. Emp.	%	No. Emp.	%		No. Emp.	%	No. Emp.	%		No. Emp.	%	No. Emp.	%	
Agriculture, forestry, fishing and hunting, and mining	937	9.9	909	9.8	-3.0	70,599	2.5	71,512	2.4	1.3	2,634,188	1.9	2,843,703	1.9	8
Construction	742	7.8	631	6.8	-15.0	150,622	5.4	163,427	5.5	8.5	10,115,885	7.1	9,256,637	6.3	-8.5
Manufacturing	1,496	15.8	1,561	16.8	4.3	501,176	17.9	537,565	18.1	7.3	15,581,149	11	15,316,355	10.3	-1.7
Wholesale trade	149	1.6	121	1.3	-18.8	80,592	2.9	78,900	2.7	-2.1	4,344,743	3.1	3,993,420	2.7	-8.1
Retail trade	845	8.9	914	9.9	8.2	324,308	11.6	338,006	11.4	4.2	16,293,522	11.5	17,027,853	11.5	4.5
Transportation and warehousing, and utilities	506	5.3	406	4.4	-19.8	124,762	4.4	130,656	4.4	4.7	7,183,901	5.1	7,411,283	5	3.2
Information	63	0.7	70	0.8	11.1	47,418	1.7	48,321	1.6	1.9	3,368,676	2.4	3,131,838	2.1	-7
Finance, insurance, real estate, and rental and leasing	288	3.0	383	4.1	33.0	169,750	6.1	181,264	6.1	6.8	9,934,900	7	9,731,609	6.6	-2
Professional, scientific, management, administrative, and waste management services	383	4.0	340	3.7	-11.2	222,953	7.9	249,481	8.4	11.9	14,772,322	10.4	16,516,075	11.2	11.8
Educational, health and social services	1,971	20.8	1,998	21.5	1.4	645,576	23.0	686,467	23.2	6.3	31,277,542	22.1	34,202,980	23.1	9.4
Arts, entertainment, recreation, accommodation	893	9.4	925	10.0	3.6	254,082	9.1	252,164	8.5	-0.8	12,566,228	8.9	14,316,298	9.7	13.9

and food services															
Other services (except public administration)	365	3.8	304	3.3	-16.7	111,412	4.0	122,082	4.1	9.6	6,899,223	4.9	7,275,839	4.9	5.5
Public Administration	843	8.9	712	7.7	-15.5	101,852	3.6	102,850	3.5	1.0	6,864,046	4.8	6,977,436	4.7	1.7
Total Employees	9,481	100	9,274	100	-2.2	2,805,102	100	2,962,695	100	5.6	141,836,325	100	148,001,326	100	4.3

1) Census 2010, Profile of Selected Economic Characteristics
(2) 2012-2016 American Community Survey 5-Year Estimates, Industry by Occupation for the Civilian Employed Population 16 Years and over

The largest employer in 2013 located in Jackson County was the Ho Chunk Nation with close to 1,000 employees. The second largest was Millis Transfer Inc. with between 500-999 employees. The next largest employers with between 250-499 employees are: Black River Memorial Hospital Inc., Jackson Correctional Institution, and Lunda Construction Co. Employers with 100-249 employees in the top ten employers are Jackson County, Walmart, Nelson Global Products Inc., D & S Manufacturing Co. Inc., and Regal Beloit America Inc.

Table 2-5
Jackson County Employers

Establishment	Service or Product	Number of Employees (June 2010)
Ho Chunk Nation	Tribal governments	500-999 employees
Millis Transfer Inc.	General freight trucking, long-distance TL	500-999 employees
Black River Memorial Hospital Inc.	General medical and surgical hospital	250-499 employees
Jackson Correctional Institution	Correctional institutions	250-499 employees
Lunda Construction Co	Highway, street, & bridge construction	250-499 employees
Jackson County	Executive & legislative offices	100-249 employees
Walmart	Discount department stores	100-249 employees
Nelson Global Products Inc.	Misc. general-purpose machinery mfg.	100-249 employees
D & S Manufacturing Co Inc.	Misc. fabricated metal product mfg.	100-249 employees
Regal Beloit America Inc.	Motor and generator manufacturing	100-249 employees

Source: State of Wisconsin, Department of Workforce Development

General Development Pattern

Land Use Trends. There are three major land uses in Jackson County. The three land uses are Agriculture, Agriculture Forests and Forest Land and they cover 78.4 percent of the land area within the county. Agricultural land use makes up 39.0 percent of the land area while Forests Land covers 21.0 percent and Agriculture Forest covers 18.4 percent. The most significant land use changes between 2012–2019 involved increasing Manufacturing land by 70.89 percent and increases in commercial land of 25.94 percent. The largest losses in acreage from 2012-2019 were 10,969 acres from Agriculture and 8,862 acres from Forest Land. See Table 2-6.

Table 2-6 Jackson County Land Use

	2012		2019		2012-2019	
Land Classification	Acres	% of County	Acres	% of County	Acreage Change	% Change
Residential [(1)]	13,033	3.42	12,108	3.36	-925	-7.10
Commercial [(1)]	1,523	0.04	1,918	0.53	395	25.94
Manufacturing [(1)]	1,577	0.41	2,695	0.75	1,118	70.89

Agriculture [1]	151,648	39.8	140,679	39.0	-10,969	-7.23
Undeveloped [1]	57,224	15.0	57,825	16.02	601	1.05
Agriculture Forest [1]	67,643	17.8	66,284	18.4	-1,359	-2.01
Forest Land [1]	84,548	22.2	75,686	21.0	-8,862	-10.48
Other [1]	3,528	0.93	3,692	1.02	164	4.65
County Total [2]	**380,724**		**360,887**			

(1) Wis. Dept. of Revenue Div. of State and Local Finance - 2005 and 2010 Real Property Equalized Value and Acreage Figures
(2) Includes total area of County - both land area and water area. Source: Jackson County Land Information Office

Class 1- **Residential** Any parcel (or part of a parcel) of untilled land not suitable to produce row crops, on which a dwelling or other form of human abode is located» Vacant land where the most likely use is residential development. Mobile homes assessed as real property are classified as residential. Apartment buildings of up to three units are also classified as residential.

Class 2 - **Commercial** Land and improvements primarily devoted to buying and reselling goods. Includes the providing of services in support of residential, agricultural, manufacturing and forest uses.

Class 3 - **Manufacturing** - See Section 70.995, Wis. Stats., State assessment of manufacturing property.

Class 4 - **Agricultural** State law Section 70 .32(2)(c)1g., Wis. Stats., describes this as "land, exclusive of buildings and improvements, which is devoted primarily to agricultural use." Land devoted primarily to the production of crops (excluding forestry operations) or the keeping, grazing, or feeding of livestock for the sale of livestock or livestock products. Buildings and dwellings associated with growing, production and associated services are classified as "Other" (Class 7). Agricultural Assessment Guide for Wisconsin Property Owners provides classification examples.

Class 5 - **Undeveloped Land See** Section 70.32(2)(c)4., Wis Stats., Areas commonly called marshes, swamps, thickets, bogs or wet meadow. Fallow tillable land (assuming agricultural use is the land's highest and best use). Road right-of-way, ponds and depleted gravel pits» Land because of soil or site conditions is not producing or capable of producing commercial forest products.

Class 5m - **Ag Forest Land** - See Section 70.32(2)(c)1d, Wis. Stats., defines agricultural forest as land producing or can produce commercial forest products, if the land satisfies any of the following: Forest land is contiguous to a parcel that is classified in whole as agricultural land. The forest land and the contiguous agricultural parcel must have the same owner. Contiguous includes separated only by a road. Forest land is located on a parcel containing agricultural land for the January 1, 2004 assessment and on January 1 of the current assessment year. Forest land is located on a parcel where at least 50 percent of the acreage was converted to agricultural land for the January 1, 2005 assessment year or thereafter.

Class 6 – **Productive Forest Land** – See Section 70.32(2)(c)2., Wis Stats. Land producing or capable of producing commercial forest products. Forest land cannot include buildings and improvements. Forested areas that are managed or set aside to grow tree crops for "industrial wood" or to obtain tree products (ex: sap, bark, seeds). Forested areas with no commercial use made of the trees, including cutover. Cherry orchards, apple orchards and Christmas tree plantations are classified as agricultural property. Lands designated Forest Crop Land and Managed Forest Land by the Department of Natural Resources are entered separately in the assessment roll. Improvements on Forest Crop Lands and Managed Forest Land must be listed as personal property under state law (sec. 77 .04(1) and sec. 77 .84, Wis. Stats.). Forested areas primarily held for hunting, trapping or in the operation of game preserves, must be classified as forest, unless clearly operated as a commercial enterprise or exempt.

Class 7 - **Other** – See Section. 70.32(2)(c)1m, Wis. Stats. Buildings and improvements on a farm (ex: houses, barns and silos along with the land necessary for their location and convenience)

Development Trends. Most of the new development in the County is occurring in the City and Villages. Between 2010 and 2017 City and Village populations grew by 129 or 2 percent, while the population in the Towns decreased by 47 or -0.3 percent. In addition, the Towns also saw an increase of 130 housing units (2%) while the Villages and City only increased by 41 housing units (1%). Some municipalities experienced a growth in housing units from 2010 to 2017 with the greatest increase in housing units in the Village of Merrillan which increased by 97 units (31%). The largest percent decrease in housing units occurred in Garden Valley (-8%). See Tables 2-2 and 2-3 for additional information.

3.0 JACKSON COUNTY RISK ASSESSMENT

The following is Jackson County's assessment of each of the natural hazards identified as occurring in the State of Wisconsin. Each natural hazard is assessed on the historical occurrence of the hazard, the vulnerability to a given hazard, the probability of the hazard occurring again and a local official's opinion survey. A final risk assessment designation of high, moderate or low is then assigned to each hazard based on a total score from ratings within each of these four assessment factors. Each jurisdiction in the county has the same risk to each hazard apart from flooding and wildfire. See Maps 3-6 7 for flood prone areas.

An overall risk assessment rating of 22 points or greater equates to a "high" risk assessment designation for a given hazard. A risk assessment rating of 17 to 21 points equates to a moderate risk assessment designation and a rating of 16 points or less results in a low risk assessment rating for a given hazard. Table 3-2 provides a summary of the ratings for all the natural hazards.

The following is a description of how the ratings are determined for each assessment and how these ratings result in the final risk assessment designation.

Historical Occurrence Rating Criteria:
Historical occurrence refers to the number of times a hazard occurred in the past. Because historical records for the hazards vary greatly, each hazard is assessed on occurrences within a 25-year period.

• Less than 4 occurrences in the past 25 years = Low rating, 1-3 points
• 4 to 7 occurrences in the past 25 years = Moderately Low rating, 3-5 points
• 8 to 12 occurrences in the past 25 years = Moderately High rating, 5-7 points
• More than 12 occurrences in the past 25 years = High rating, 7-9 points

Vulnerability Rating Criteria:
Vulnerability is a measure of how people, buildings, structures, personal property, and other things considered important are adversely affected by a given hazard. Some aspects to help measure the magnitude of vulnerability in the county have been quantified in Tables 3-1 and 3-2. These tables show the maximum extent of vulnerability within the county. The vulnerability of a population, buildings, structures, transportation routes and businesses will vary from one community to another and from one hazard to another.

• Less than 10% of population or property adversely affected =	Negligible rating, 1-3
• Ten to less than 25% of population or property adversely affected =	Limited rating, 3-5 points
• Twenty-Five to less than 50% of the population or property adversely affected	Critical rating, 5-7 points
• More than 50% of the population or property adversely affected =	Catastrophic rating, 7-9

Probability Rating Criteria:
Probability rating is a measure of the likelihood and frequency of hazard occurring in the future.

• Less than 1% probability in the next 100 years =	Unlikely rating, 1-3
• From 1% and 10% probability in the next year or at least one chance in next 100	Possible rating, 3-5
• Over 10% to nearly 100% probability in the next year or at least one chance in the next 10 years =	Likely rating, 5-7 points
• Nearly 100% chance in the next year =	Highly Likely rating, 7-9 points

Local Official Hazard Survey Rating Criteria:

In October of 2019 a local official's survey was mailed to county board supervisors, village presidents, town chairman, mayors, chiefs of police, the sheriff and fire department chiefs in the county. Each jurisdiction was asked to rank the county's natural hazards as high, medium, or low regarding their opinion on each hazard's threat to health and public safety.

• Many local officials were of the opinion that this hazard posed a "low" threat to health and public safety in comparison to the 17 other hazards =	Low rating, 1-3 points
• Many local officials were of the opinion that this hazard posed a "medium" threat to health and public safety in comparison to the other 17 hazards =	Medium rating, 3-6 points
• Many local officials were of the opinion that this hazard posed a "high" threat to health and public safety in comparison to the other 17 hazards =	High rating, 6-9 points

Risk Assessment Designation:
The risk assessment designation is determined by adding the rating points assigned from historical occurrences, vulnerability, probability and the local official survey factors. These summations for each hazard are then assigned a low, moderate, or high threat based on numerical rank.

• A combined risk factor rating of 14 points or less =	Low Threat
• A combined risk factor rating of 15 to 21 points =	Moderate Threat
• A combined risk factor rating of 22 points or more =	High Threat

3.1 Jackson County, Hailstorm Risk Assessment

Hailstorm Definition: A hailstorm is a weather condition where atmospheric water particles form into rounded or irregular masses of ice that fall to earth. Hail is a product of strong thunderstorms that frequently move across the state. Hail normally falls near the center of the moving storm along with the heaviest rain; however, the strong winds at high altitudes can blow the hailstones away from the storm center, causing unexpected hazards at places that otherwise might not appear threatened.

Hailstorms normally range from the size of a pea to that of a golf ball, but sizes larger than baseballs have occurred with the most severe storms. They form when subfreezing temperatures cause water in thunderstorm clouds to accumulate around an icy core. When strong underlying winds no longer can support their weight, the hailstones fall earthward. Hail tends to fall in swaths that may be 20-115 miles long and 5-30 miles wide. The swath is not normally a large, continuous bombardment of hail, but generally consists of a series of hail strikes that are produced by individual thunderstorm clouds traversing the same general area. Hail strikes are typically one-half mile wide and five miles long. They may partially overlap, but often leave completely undamaged gaps between them.

Hailstorms are considered formidable among the weather and climatic hazards to property and crops of the interior plains of the U.S. because they dent vehicles and structures, break windows, damage roofs and batter crops to the point that significant agricultural losses result. Serious injury and loss of human life, however, are rarely associated with hailstorms.

Hailstorm History and Frequency:

1960's:	3 reported events by NCDC - 5/5/62, 6/23/62, 6/20/64, 1.0-1.75" size hailstorm
1970's:	5 reported events by NCDC - 6/14/74, 7/26/74, 5/22/75, 5/21/77, 7/3/79, .75 to 1.75" size hailstorm
1980's:	6 reported events by NCDC – 7/1781, 7/20/81, 9/24/84, 5/19/85, 7/4/85, 5/8/88, .75" to 1.75" size hailstorm

1990's:	8 reported events by NCDC – 5/29/91 (Jackson County), 8/3/92 (Jackson County), 8/29/92 (Jackson County), 4/24/94 (Melrose- $5,000 PD), 6/5/97 (Merrillan, Northfield & Black River Falls), 9/19/97 (Millston- $25,000 PD), 6/24/98 (Black River Falls), 9/1/98 (Hatfield), .75" to 1.75" size hailstorm
2000's	25 reported events by NCDC –5/18/00 (Melrose), 9/3/00 (North Bend-$1,000 PD), 9/11/00 (Black River Falls), 4/23/01 (Black River Falls), 6/9/01 (Franklin), 6/11/01 (Taylor-$1,000 PD), 6/17/01 (Black River Falls-$1,000 PD, Merrillan- $1,000 PD, $4,000 CD), 5/6/02 (City Point), 9/29/02 (Price), 9/30/02 (Franklin), 6/23/04 (Price, Hixton & Shamrock), 6/7/05 (Price, Northfield-$2.000 PD & Merrillan-$1,000 PD), 7/28/05 (Franklin), 9/7/05 (Alma Center-$ 1,000 PD), 4/13/2006 (Alma Center), 8/23/2006 (Millston- $135,000 PD, $600,000 CD; Merrillan-$59,000 PD, $35,000 CD & Black River Falls-$75,000PD, $60,000 CD), 8/24/2006 (Alma Center; Taylor - $3,000 PD, $3,000 CD; Black River Falls- $5,000 PD, $9,000 CD; Millston- $20,000 PD, $250,000 CD; Merrillan), 10/3/06 (Lewis-$15,000 PD, $8,000 CD; Northfield-$50,000 PD, $25,000CD; Alma Center- $25,000 PD, $25,000 CD; Merrillan), 3/25/07 (Shamrock), 6/7/07 (Pleasant View), 5/25/08 (City Point-$10,000 PD, $30,000 CD; Merrillan - $2,000 PD; Hatfield), 7/11/08 (Hatfield), 4/24/09 (Taylor, Merrillan & Alma Center), 7/27/09 (City Point; Melrose-$3,000PD), 8/28/09 (City Point),.75" to 2.50" hailstorm.
2010's	13 reported events: 4/30/10 (Merrillan), 9/6/10 (Merrillan & City Point), 7/31/11 (Alma Center, Merrillan & Hatfield), 5/29/2013 (Merrillan), 7/7/2014 (Taylor), 8/1/2014 (Vaudreuil-$15,000 PD), 8/25/2014 (Hatfield & Shamrock), 7/13/2015 (Levis-$5,000 PD & Taylor), 9/6/2016 (Vaudreuil), 4/9/2017 (Taylor, Pleasant View & Vaudreuil), 5/16/2017 (Price), 6/11/2017 (Taylor & Vaudreuil), 6/16/2017 (Price)

PD = Property Damage and CD = Crop Damage

Wisconsin averages between two to three hail days per year as recorded by National Weather Service stations, although this may not be indicative of the number of hailstorms which occur within a county or larger area during any given hail season. The months of maximum hailstorm frequency are May through September with approximately 85% of hailstorms occurring during this period. Unfortunately, hailstorms are most frequent during the four months of the growing and harvesting seasons for most crops in the state. According to the National Weather Service, about 20% of all severe weather events in Wisconsin are hail events in which hailstones are at least ¾ inch in diameter. Serious hailstorms with hailstones 1.5 inch or larger in diameter are not common.

According to National Weather Service Reports, Jackson County experienced 46 hailstorms from 1990 through 2018. This was below the average for Wisconsin counties of 49.5. Neighboring La Crosse and Monroe counties experienced 51 and 65 hail events during this same time period. Better reporting in La Crosse and Monroe may account for the higher rates.

Between 1990 and the end of 2018 the NCDC reported 46 Hailstorm events. Of these 46 events 14 events resulted in property damage and 5 had crop damage reported. The total property damage reported for the 14 events was $458,000 and crop damage reported totaled $1,048,000 during 5 events. Based upon this historical data when Jackson County experiences a hailstorm large enough to cause property damage or crop damage the average amount of property damage to occur is $32,714 and the average amount of crop damage is $209,600. Between 1990 and 2018 Jackson County averaged 1.6 hailstorm events per year. Based on these averages, the county can expect to experience 8 hailstorms within the next 5-year period. If historical trends continue, the county can expect 24% of these storms to be strong enough to cause property damage. This would result in 2 storms strong enough to cause property damage resulting is $65,500 in property damage. In addition, 10% of the hailstorms would cause crop damage. This would result in 1 storm causing $210,000 of crop damage during that same 5-year period.

Hailstorm Vulnerability Assessment

- Critical Facilities In the county 57 service oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns hailstorms a risk factor of 22 indicating this natural hazard is a high risk to the county. Critical facilities vulnerability to hailstorms would be limited primarily to damage to the building's roof and windows and would not interrupt services provided by these

facilities except in extreme cases. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.

- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, with an annual payroll of approximately $285 million, see Table 3-6. For most businesses and industries hailstorms pose a moderate hazard risk with damage confined to building roofs and windows. Examples of businesses that are particularly vulnerable to hail damage include car and truck dealerships that display vehicles outdoors, greenhouses, and nurseries that store plants and trees outdoors. Auto dealerships can suffer significant losses to their vehicles.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Agriculture is a significant part of the County's economy. While the overall threat of hailstorm is ranked as moderate, agricultural crops can sustain significant damage and economic loss from hailstorms. Hailstorms occur most frequently in the county in the months from May through September which coincides with the planting and harvesting of most crops in the county making those crops vulnerable to hailstorms.
- Roads and Highways. Hail damage can occur to any vehicle exposed to elements, whether moving or parked. Hail, although when it is lying on the ground, can cause icing conditions, usually is melted before mitigation action such as sanding, salting, or plowing is done. It can occur in seasons when highway trucks are not set up for snow and ice control.
- Railroads. Hail can cause cessation of rail work crews. Hail can cause damage to windshields and headlight covers of locomotives and Maintenance of Way (M of W) equipment. Hail can cause damage to signal lamp covers. Hail can also cause damage to building roofs.
- Airway. Hail can cause damage to aircraft skin and control surfaces. Such damage may be critical to the safety and integrity of the aircraft and its control. Hail can cause icing and clogging of engines of small planes in flight. Hail can damage runway lighting fixtures.
- Waterways. Hail can damage watercraft windows, lights, instruments and communication devices.
- Municipal Water. In the county there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities vulnerability to hailstorms would be limited to damage to the roofs, windows and electrical service, and would not interrupt services provided by these facilities except in extreme cases.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the county, see Table 3-12. These facilities vulnerability to hailstorms would be limited to the building roofs, windows and electrical service and would not interrupt services provided by these facilities except in extreme cases.
- Hazardous Material Sites. Hazardous material containers in transport can be breached by any accident to the transport mode caused by hail. Hazardous material in storage has no severe impacts caused directly by hail.

Hailstorm Risk Assessment Designation

Hailstorm Historical Occurrence Rating: High - 9
Hailstorm Vulnerability Rating: Negligible - 2
Hailstorm Probability Rating: Highly Likely - 8
Hailstorm Local Official Survey Rating: Low - 2
Hailstorm Risk Assessment Designation: **High Threat - 22 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Hailstorm Hazard Mitigation Ideas: ● Remove or protect vulnerable attachments such as awnings, antennas and signs on buildings ● Replace vulnerable shingles and siding with hail resistant building materials ● Protect or relocate essential utility and communication equipment ● Provide county residents with public information on hailstorms during severe weather awareness ● Promote the purchase of hail insurance ● Have at least one highway truck at each shop, with a plow and sander that can easily be quickly mounted to respond to emergency situations ● Provide a shed or covered area to store government vehicles if a hail storm is predicted.

3.2 Jackson County, Lightning Storm Risk Assessment

Lightning Storm Definition: Lightning is a sudden and violent discharge of electricity from within a thunderstorm due to a difference in electrical charges and represents a flow of electrical current from cloud-to-cloud or cloud-to-ground. Nationally, lightning causes extensive damage to buildings and structures, kills or injures people and livestock, starts untold numbers of forest fires and wildfires and disrupts electromagnetic transmissions.

To the general public, lightening is often perceived as a minor hazard. However, lightning-caused damages, injuries and deaths establish lightning as a significant hazard associated with any thunderstorm in any part of the State. Damage from lightning occurs four ways:

1) Electrocution/severe shock of humans and animals;
2) Vaporization of materials along the path of the lightning strike;
3) Fire caused by the high temperatures associated with lightning (10,000-60,000°F); and
4) The sudden power surge that can damage electrical/electronic equipment.

Large outdoor gatherings (sporting events, concerts, campgrounds, etc.) are particularly vulnerable to lightning strikes that could result in injuries and deaths. Early warning of lightning hazards, combined with prudent protective actions, can greatly reduce the likelihood of lightning-related injuries and deaths.

Lightning Storm History and Frequency:

2010's	6 reported events: 7/14/2010 (Millston-$13,000 PD), 5/3/2012 (Buckholz Corners-$60,000 PD), 8/24/2012 (Winnebago Mission-$210,000 PD), 6/15/2014 (Vaudreuil-$82,000 PD), 9/17/2015 (Vaudreuil-$20,000 PD), 5/3/2016 (Vaudreuil-$30,000 PD)

PD = Property Damage and CD = Crop Damage

Wisconsin has a high frequency of property losses due to lightning. Insurance statistics show that one out of every fifty farms are struck by lightning or have a fire that may have been lightning-caused each year. According to 2012 Census of Agriculture, Jackson County has 864 farms. Using the insurance statistics (1 out of every 50 farms being struck by lightning) would mean Jackson County would experience 17 lightning strikes on farms each year. The total number of strikes hitting within Jackson County is higher if those strikes not on farms could be counted. In the State of Wisconsin between 2005 and 2014, 8 people were killed by lightning or about 1 per year on average. Wisconsin ranks 16th nationally in the number of lightning deaths. There were no reported deaths during that time period in Jackson County. If this trend continues the likelihood of Jackson County having a lightning storm which causes injuries or property damage is low.

Lightning Vulnerability Assessment

- Critical Facilities. In the county 57 service oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns lightning a risk factor of 22 indicating this natural hazard is a high risk to the County. Critical facilities vulnerability to lightning is generally perceived as a minor hazard. The damages caused by lightning to buildings and the potential injuries and deaths resulting from a lightning strike established lighting as a significant hazard associated with any thunderstorm. Lightning can cause electrocution and severe shock in humans, fires in buildings and the sudden power surges resulting from lightning can cause significant damages to a facility's electrical services, and electronic equipment such as computers and motors and communications systems. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. For most business and industries, lightning poses a moderate hazard risk. The damages caused by lightning to buildings and the potential injuries and deaths resulting from a lightning strike established lighting as a significant hazard associated with any thunderstorm. Lightning can cause

electrocution and severe shock in humans; fires in buildings and the sudden power surges resulting from lightning can cause significant damages to a business/industries electrical services, and electronic equipment such as computers and motors and communications systems. The manufacturing industry could experience disruptions caused by lightning strikes to their product processes that could result in the company sustaining economic losses.

- Agriculture. The overall hazard risk ranking for lightning for agriculture is high. The damages caused by lightning strikes can be a significant hazard because lighting strikes can cause electrocution or severe shock to humans and farm animals, fire risk to buildings and sudden power surges associated with lightning strikes can cause significant damage to electrical services, motors and milking machinery. Workers in fields and animals in open spaces are particularly vulnerable to lighting strikes. Tree plantations are also susceptible to fires causes by lightning strikes.
- Roads and Highways. Severe lightning in Wisconsin is invariably accompanied by heavy rains, which can limit visibility for drivers. Lightning can cause trees, or parts of trees, to suddenly fall across the road. Lightning can be a hazard to people who attempt to leave their vehicle at service plazas, etc.
- Railroads. Severe lightning can be hazardous to railway track and other workers. Lightning can cause trees, or parts of trees, to suddenly fall across railroad tracks. Lightning can cause electric signals and remote-controlled switches to malfunction. Lightning can cause radio communications outages.
- Airway. Lightning can cause malfunction of aircraft communications and navigation devices. Lightning can be hazardous to airport workers and passengers who must access the aircraft by walking across an open field/taxi area.
- Waterways. Lightning can be hazardous to workers exposed on dams during the storm. Lightning can disrupt electronic devices and communications.
- Municipal Water. In the County there are 25 municipal wells and waters systems in operation, see Table 3-11. These facilities vulnerable to lighting would include fire damage to facilities from lightning strikes, damage to a facility's electrical service, electronic equipment and motors. Municipal water service would not be interrupted except in extreme cases.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities operating in the county, see Table 3-12. These facility's vulnerability to lightning would include fire damage to facilities from lighting strikes, damage to the facilities electrical service, electronic equipment and motors and as a result of power surges, wastewater treatment service would not be interrupted except in extreme cases.
- Hazardous Material Sites. The impact of lightning storms on hazardous material is specific to the type of material and its storage or transportation conditions. A lightning strike to a fixed storage building, while having little impact on transportation modes, could start a fire or explosion with the stored hazardous material.

Lightning Storm Risk Assessment Designation

Lightning Storm Historical Occurrence Rating: High - 9
Lightning Storm Vulnerability Rating: Negligible - 2
Lightning Storm Probability Rating: Highly Likely - 8
Lightning Storm Local Official Survey Rating: Medium - 3
Lightning Storm Risk Assessment Designation: **High Threat - 22 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Lightning Storm Hazard Mitigation Ideas: ● Communities may use outreach programs to promote awareness of thunderstorm/lightning dangers – for example: consider placing lightning safety tips and/or action plan in game programs, flyers, scorecards etc. and during Severe Weather Awareness Week emphasize issues on weather related disaster preparedness through public education ● Local and state governments can invest in public early warning systems/networks, as well as train people to serve as weather spotters ● Promote establishment of indoor warning systems at all critical facilities and public gathering locations ● When thunder is heard, seek shelter inside the nearest building or enclosed vehicle (e.g., a car, bus or truck). If shelter is not available, avoid trees or tall objects because electricity may be conducted from that object to other nearby

objects or persons ● Avoid high ground, water, open spaces and metal objects (golf clubs, umbrellas, fences, tools) ● When indoors, turn off appliances and electronic devices and remain inside until the storm passes ● Surge protection can be installed on critical electronic equipment (*protection devices such as lightning rods and grounding can be installed on critical facilities*) ● Remove taller trees in the vicinity of vulnerable structures ● Specimen trees growing along roadways, or in rest areas or landscaped areas, can be protected by properly installed lightning rods ● Local airports can suspend operations during severe lightning storms ● Major hazardous material storage sites should be protected with properly installed lightning rods

3.3 Jackson County, Thunderstorm Risk Assessment

Thunderstorm Definition: Thunderstorms are severe and violent forms of convection produced when warm moist air is overrun by dry cool air. As the warm air rises *thunderheads* (cumulonimbus clouds) form and cause the strong winds, lightning, thunder, hail, and rain associated with these storms. 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 ¾ of an inch in diameter or greater, or a tornado.

The thunderheads formed may be a towering mass six miles or more across and 40,000 to 50,000 feet high. It may contain as much as 1.5 million tons of water and enormous amounts of energy that often are released in the form of high winds, excessive rains and three violently destructive natural elements: lightning, tornadoes and hail.

On the ground directly beneath the storm system, the mature thunderstorm is initially felt as rain, which is soon joined by a strong downdraft. The downdraft spreads out from the cloud in gusting divergent winds and brings a marked drop in temperature. Even where the rain has not reached the ground, this cold air stream flowing over the earth's surface is a warning that the storm's most violent phase is about to mature.

A thunderstorm often lasts no more than 30 minutes in each location because an individual thunderstorm cell frequently moves between 30 and 50 miles per hour. However, strong frontal systems may spawn more than one squall line composed of many individual thunderstorm cells. Thunderstorms may occur individually, in clusters or as a portion of a large line of storms that may stretch across the entire state. Thus, it is possible that several thunderstorms may affect an area in the course of a few hours.

Severe thunderstorms can cause injury or death and can also result in substantial property damage. They may cause power outages, disrupt telephone service and severely affect radio communications and surface/air transportation, which may seriously impair the emergency management capabilities of the affected jurisdictions.

Thunderstorm History and Frequency:

1960's	5 reported days of events by NCDC – 6/28/60, 6/23/62, 6/8/63, 4/13/64, 9/3/64
1970's:	8 reported days of events by NCDC – 7/7/70, 12/1/70, 5/22/75, 6/13/76, 6/27/77, 6/30/77, 7/14/77, 5/27/78
1980's:	9 reported days of events by NCDC – 7/15/80, 7/25/82, 7/13/83, 7/19/83, 4/27/84, 6/17/84, 6/26/84, 5/14/85, 5/24/89
1990's:	19 reported days of events by NCDC – 6/2/90, 8/26/90, 9/14/91, 6/17/92, 8/1/92, 4/24/94 (Melrose- $500,000 PD), 5/30/94 (Melrose - $1,000 CD), 7/7/94 (Merrillan - $5,000 CD), 5/19/96 (Taylor - $100,000 PD), 6/29/96 (Black River Falls), 8/7/96 (Taylor - One death and 4 injuries, $80,000 PD), 4/5/97 (Black River Falls - $1,000 PD), 7/5/97 (Hixton - $30,000 PD, $18,000 CD), 7/13/97 (Hatfield - $5,000 PD), 5/15/98 (City Point - $8,000 PD, Black River Falls - $10,000 PD, Alma Center - $10,000 PD), 5/28/98 (Hatfield- $8,000 PD), 5/31/98 (Black River Falls- $8,000 PD), 6/26/98 (Alma Center, Melrose - $40,000 PD, $40,000 CD), 6/27/98 (North Bend - $85,000 PD, $22,000 CD, Melrose - $32,000 PD, $12,000 CD), 7/8/99 (Merrillan- $5,000 PD)
2000's	21 reported days of events by NCDC – 6/1/00 (Merrillan), 6/10/00 (Hatfield- $25,000 PD, Black River Falls), 6/11/01 (Hixton- $3,000 PD, North Bend), 7/21/02 (Alma Center), 6/24/03 (Black River Falls- $1,000 PD), 5/12/04 (Merrillan),

	6/23/04 (Price- $3,000 PD, Taylor- $15,000 PD, Price), 6/5/05 (Black River Falls- $1,000 PD), 7/17/05 (Price- $1,000 PD, $3,000 CD), 7/23/05 (Merrillan- $1,000 PD, Hatfield- $2,000 PD), 7/25/05 (Price- $1,000 PD, $8,000 CD), 8/9/05 (Disco- $1,000 PD, Black River Falls- $2,000 PD), 10/4/05 (Levis-- $2,000 PD), 8/23/2006 (Price, Black River Falls), 8/24/2006 (Alma Center- $3,000 CD, Black River Falls), 6/7/07 (Shamrock- $25,000 PD and City Point- $10,000 PD), 8/11/07 (Shamrock- $1,000 PD), 8/13/07 (Buckholz Corners- $2,000 PD, Taylor-- $85,000 PD, Black River Falls), 5/25/08 (Pray- $36,000 PD, $22,000 CD), 7/27/09 (Winnebago Mission- $10,000 PD, Franklin- $2,000 PD, $10,000 CD), 8/8/09 (Hixton, Merrillan, Taylor & Vaudreuil)
2010's	28 reported days of events by NCDC – 6/17/10 (Northfield- $1,000 PD, Taylor- $3,000 PD & Merrillan- $2,500 PD), 6/26/10 (Pleasant View), 7/14/10 (Levis- $8,000 PD), 8/13/10 (Taylor - $5,000 PD and Alma Center- $5,000 PD), 7/1/11(Alma Center- $5,000 PD), 7/18/11 (Northfield - $1,000 PD, Disco- $2,000 PD, Irving- $9,000 PD, Fan Hall Glen- $2,000 PD, & Franklin- $1,000 PD), 7/19/11 (North Branch- $2,000 PD, Merrillan - $400 PD), 7/23/11 (Alma Center- $200 PD, Merrillan- $2,000 PD), 5/2/12 (Taylor - $5,000 PD), 5/24/2012 (Taylor Halverson ARP-$2000 PD), 8/1/2012 (Pleasant View-$1,500 PD & Pray-$2,000 PD), 8/6/2013 (Vaudreuil-$3,000 PD & Winnebago Mission-$2,000 PD), 7/7/2014 (Hatfield-$2,000 PD), 8/25/2014 (Hixton-$2,000 PD, Disco-$2,000 PD, Melrose-$6,000 PD, Shamrock-$3,000 PD & Black River Falls AR-$3,000 PD), 7/18/2015 (Pleasant View-$2,000 PD), 9/6/2015 (Alma Center-$2,000 PD), 5/25/2016 (Vaudreuil-$5,000 PD), 6/3/2016 (Northfield-$2,000 PD), 6/10/2016 (Lake Arbutus-$2,000 PD), 6/15/2016 (City PT-$2,000 PD), 7/5/2016 (Taylor-$2,000 PD, Vaudreuil-$2,000 PD & Fall Hall Glen-$2,000 PD), 9/6/2016 (Vaudreuil-$1,000 PD), 5/16/2017 (Sechlerville-$2,000 PD, Hixton-$2,000 PD, Alma Center-$2,000 PD, Merrillan- $4,000 PD, Hatfield-$2,000 PD), 5/17/2017 (North Bend-$2,000 PD & Vaudreuil-$3,000 PD), 6/12/2017 (Shamrock- $5,000 PD & Millston-$2,000 PD), 6/15/2018 (Taylor Halverson ARP-$1,500), 8/27/2018 (Schlerville-$6,000 PD, Alma Center-$2,000 PD & Price-$30,000 PD), 9/17/2018 (Melrose-$19,000 PD & Millston-$4,000 PD)

PD = Property Damage and CD = Crop Damage

Thunderstorm frequency is measured in terms of incidence of *thunderstorm days* or days on which thunderstorms are observed. Wisconsin averages between 30 and 50 thunderstorm days per year depending on location, with the southwestern area of the state normally having more thunderstorms than the rest of the state. A given county may experience ten or more thunderstorm days per year with multiple events per day per county.

According to the National Weather Service Publication, Storm Data, in the past 30 years, Wisconsin has experienced hurricane force winds of 75 mph or higher on 120 days or about 4 days per year on average. Within the same period there have been 17 days when winds at or above 100 mph have been documented. This means that winds like a Category 2 Hurricane are experienced about one day every two years on average in Wisconsin. Thunderstorm winds can be fatal. During the period from 1982 to 2001, 20 fatalities have been attributed to wind from severe thunderstorms.

In Wisconsin, thunderstorms and their associated high winds can occur throughout the state during any month of the year with little or no notice, but their highest frequency is during the period of May through September. They also occur most often between the hours of noon and 10:00 p.m.

Between 1990 and the end of 2018 the NCDC reported 68 Thunderstorm event days in Jackson County. This is lower than the 70-county average for severe thunderstorm wind event days over this 28-year period. Of these 68 Thunderstorms 54 of them resulted in property damage and 10 had crop damage reported. The total property damage reported for these 54 thunderstorms was $1,191,000 and crop damage reported totaled $142,000 during those 10 storms. Based upon this historical data when Jackson County experiences a thunderstorm large enough to cause property damage or crop damage the average amount of property damage to occur is $22,055 and the average amount of crop damage is $14,200. Between 1990 and 2018 Jackson County averaged 2.5 thunderstorms per year. Based upon these averages Jackson County can expect to experience 12.5 thunderstorms within the next 5-year period. If historical trends continue the county can expect that 79% of these storms will be strong enough to cause property damage. This would result in 9.88 storms strong enough to cause property damage resulting in approximately $217,900 in property damage. In addition, 14.7% of these storms will cause crop damage. This would result in 2.5 storms causing $35,500 of crop damage during that same 5-year period.

Thunderstorm Vulnerability Assessment

- Critical Facilities. In the county 57 service oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns thunderstorms a risk factor of 22 indicating this natural hazard is a high risk to the County. Thunderstorms can produce heavy rains and downbursts that induce straight-line winds with high wind speeds. Buildings could be damaged by the high winds and temporary flooding could occur in low-lying areas where these facilities are located. Thunderstorms can also produce three violently destructive natural elements, which include lightning, tornadoes, and hailstorms, which are discussed separately in this chapter. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. Thunderstorms can cause damage to buildings by the high winds created by the storms and temporary flooding could occur in low-lying areas where these facilities are located. Thunderstorms can also produce violent destructive natural elements including lightning, tornadoes and hailstorms that can cause severe damage to buildings and can cause injuries and deaths to human.
- Agriculture. Thunderstorms can cause significant damage to agricultural crops, buildings and livestock. Heavy rains can cause erosion, wash out seedlings and create standing water in fields. Downbursts and straight-line winds can cause damage to buildings and flatten crops. The other natural elements that are produced by thunderstorms, including lightning, hailstorms and tornadoes can cause severe damage to crops, buildings and livestock.
- Roads and Highways. Heavy rains can limit visibility for drivers. Electric traffic signals can malfunction. Washouts and spot flooding can occur. Debris cleanup from roadway is needed soon after the storm.
- Railroads. Signals and electric switches can malfunction. Washouts and spot flooding can occur. Debris cleanup from tracks and right-of-way is needed soon after the storm. Damage to freight in poorly fitted cars or covered loads can cause problems, often discovered days or weeks later.
- Airway. Flight operations of aircraft, especially small planes, can be disrupted during the storm. Planes from other areas passing over the County may put down at local private airports as “port of refuge”. Small aircraft parked on the ground at private airports may be damaged.
- Waterways. Poor visibility during the storm can cause safety problems to boaters. Dangerous conditions may exist for deck crews and lock crews working outside during the storm. Locking may be aborted. Improperly moored barges could break loose from fleets or terminals.
- Municipal Water. In the county there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities’ vulnerability to thunderstorms would include damage from high winds and heavy rainfall and could pollute underground wells. Other natural elements that are produced by thunderstorms include lightning, hailstorms, and tornadoes and can cause severe damage to municipal water facilities and equipment. Services provided by these facilities would not be interrupted except in extreme cases.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. The facilities’ vulnerability to thunderstorms would include damage to buildings and equipment from high winds. Heavy rainfall could cause holding ponds to overflow and treatment facilities could be inundated with water that could cause system failure. Thunderstorms can also produce lightning, hailstorms and tornadoes that could severely damage the wastewater treatment facilities and equipment. Services provided by these facilities would not be interrupted except in extreme cases.
- Hazardous Material Sites. The impact of thunderstorms on hazardous material is specific to the type of material and its storage or transportation conditions. Material in a state of transportation is more vulnerable than material in storage.

Thunderstorm Risk Assessment Designation

Thunderstorm Historical Occurrence Rating: High - 9
Thunderstorm Vulnerability Rating: Negligible - 2
Thunderstorm Probability Rating: Highly Likely - 9
Thunderstorm Local Official Survey Rating: Low - 2

Thunderstorm Risk Assessment Designation: **High Threat – 22 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Thunderstorm Hazard Mitigation Ideas: ● Communities may use outreach programs to promote awareness of thunderstorm dangers - for example: during Severe Weather Awareness Week emphasize issues on weather related disaster preparedness through public education ● Local and state governments can invest in public early warning systems/networks, as well as train people to serve as weather spotters ● Provide weather radios to critical areas ● Public and private buildings can be designed with structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage ● Bury power lines with consideration for maintenance and repair ● Promote indoor warnings at all critical facilities ● Communities my adopt building codes requiring weatherproofing such as wall and roof anchoring, reinforcement of walls, ceilings and floors, etc. ● Cleaning and clearing culverts, drains, and waterways must be kept uppermost as a maintenance practice

3.4 Jackson County, Tornado/High Winds Risk Assessment

Tornado/High Winds Definition: 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 may have winds exceeding 300 miles per hour. For standardization, the following are National Weather Service definitions of a tornado and associated terms:

- *Tornado* – a violently rotating column of air that is touching the ground
- *Funnel Cloud* – a rapidly rotating column of air that does not touch the ground
- *Downburst* – A strong downdraft, initiated by a thunderstorm, which induces an outburst of straight-line winds on or near the ground. They may last anywhere from a few minutes in small-scale microbursts to periods of up to 20 minutes in large, longer macro-bursts. Wind speeds in downbursts can reach 150 mph, in the range of a tornado.

A tornado path averages four miles but may reach up to 300 miles in length. Widths average 300-400 yards, but severe tornadoes have cut swaths a mile or more in width or have formed groups to two or three funnels traveling together. On the average, tornadoes move between 25 and 45 miles per hour, but speeds over land of up to 70 mph have been reported. Tornadoes rarely last more than a couple of minutes over a spot or more than 15-20 minutes in a ten-mile area, but their short periods of existence do not limit their devastation of an area.

The destructive power of a tornado results primarily from its high wind velocities and sudden changes in pressure. Wind and pressure differentials probably account for 90 percent of tornado-caused damage. Since tornadoes are generally associated with severe storm systems, they are usually accompanied by hail, torrential rain and intense lightning. Depending on their intensity, tornadoes can uproot trees, down power lines and destroy buildings. Flying debris can cause serious injury and death.

Pre January 31, 2007-TORNADO DAMAGE SCALE			
Scale	**Wind Speeds**	**Damage**	**Frequency**
F0	40 to 72 MPH	Some damage to chimneys, TV antennas, roof shingles, trees and windows	29%
F1	73 to 112 MPH	Automobiles overturned, carports destroyed, trees uprooted	40%
F2	113 to 157 MPH	Roofs blown off houses, sheds and outbuildings demolished; mobile homes overturned	24%
F3	158 to 206 MPH	Exterior walls & roofs blown off homes. Metal buildings collapsed or are severely damaged. Forests & farmland flattened.	6%

F4	207 to 260 MPH	Few walls, if any, standing in well-built homes. Large steel and concrete missiles thrown far distances.	2%
F5	261 to 318 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.	Less than 1%

Post January 31, 2007 TORNADO DAMAGE SCALE			
Scale	**Wind Speeds**	**Damage**	**Frequency**
EF0	60 to 85 MPH	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees	53.50%
EF1	86 to 110 MPH	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; broken windows	31.60%
EF2	111 to 135 MPH	Considerable damage. Roofs torn off well-constructed houses; foundations shifted; mobile homes destroyed; trees uprooted; cars lifted	10.70%
EEF3	136 to 165 MPH	Severe damage. Entire stories of houses destroyed; damage to large buildings; trains overturned	3.40%
EF4	166 to 200 MPH	Devastating damage. Houses leveled; and cars thrown	0.70%
EF5	> 200 MPH	Total destruction. Houses swept off foundation; automobile sized missiles thrown through the air; high rise buildings deformed	Less than 0.1%

Downbursts are characterized by straight-line winds. Downburst damage is often highly localized and resembles that of tornadoes. There are significant interactions between tornadoes and downbursts and a tornado's path can also be affected by downbursts. Because of this, the path of a tornado can be very unpredictable, including veering right and left or even a U-turn.

Tornado/High Winds History and Frequency:

1950's:	3 reported events by NCDC – 6/18/54 (Magnitude F2 - $250,000 PD), 5/4/59(Magnitude F2 - $25,000 PD), 5/26/59(Magnitude F3 - $250,000 PD)
1960's:	5 reported events by NCDC – 10/10/62(Magnitude F1 - $25,000 PD), 5/4/64(Magnitude F2 - $250,000 PD), 7/23/65(Magnitude F1), 7/10/66(Magnitude F2 – 3 injuries, $25,000 PD), 6/26/69 (Magnitude F2 - $2,500,000 PD)
1970's:	No events reported
1980's:	1 reported event by NCDC – 7/25/82 (Magnitude F1 - $250,000 PD).
1990's:	4 reported events – 9/13/94(Melrose, Magnitude F2 - $250,000 PD), 5/19/96 (Taylor, High Winds – 90 mph, $100,000 PD), 6/27/98 (Melrose, High Winds – 96 mph, $320,000 PD, $12,000 CD), 11/10/98 (High Winds – 93 mph, 1 death, 2 injuries, $1,700,000 PD)
2000's:	5 reported events – 4/7/01(High Winds – 74 mph, $12,000 PD), 6/11/01 (Hixton, High Winds – 75 mph, $20,000 PD), 10/25/01(High Winds – 65 mph), 6/23/04 (Taylor, Magnitude F1 - $75,000 PD), 7/23/05(Hatfield & Merrillan, High Winds – 74 mph, $3,000 PD),
2010's:	2 reported events by NCDC - 7/14/10 (Levis, High Winds – 70 mph, $8,000 PD), 10/26/10 (High Winds – 59 mph, $21,000 PD)

PD = Property Damage and CD = Crop Damage

All counties in Wisconsin have recorded at least two tornadoes in the period 1990 to 2018. The National Weather Service reported that Jackson County experienced 4 tornadoes during that period. These 4 tornadoes caused $335,000 in property damage, ranging from $5,000 to $250,000. Using this historical data there is a 14% chance to experience a tornado each year, which would cause $83,750 in property damage. None of these tornadoes have hit populated areas. Should a tornado strike a populated area the property damage would significantly exceed the average of $83,750. However, there is no way to predict when and where a tornado will strike.

Tornado/High Winds Vulnerability Assessment

- Critical Facilities. In the county 57 service oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment Assigns Tornado/High Winds a risk factor of 23 indicating this natural hazard is a high risk to the County. Critical facility's vulnerability to tornadoes and high winds could adversely affect 25 percent of the County's population or property in a single event, see Table 3-2. While tornadoes occur infrequently in the County, 20 occurred in the years 1954-2011. Tornadoes and High winds can cause critical facilities to sustain substantial damage or could be destroyed, causing injury and even death. High winds and storms occur more frequently than tornadoes in the county. In 1998, Jackson County and thirteen other counties sustained $11.1 million in damages to public and government property and the area received a Presidential Disaster Declaration. The services provided by these facilities would not be interrupted except in extreme cases. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries, see Table 3-6. For businesses and industries tornadoes and high winds pose a high hazard risk in the County. Buildings could sustain substantial damage or be completely destroyed causing injuries and even death. High winds occur more frequently and the extent of the damage to buildings is determined by wind speed. The damages could range from damage to chimney, roof shingles and broken windows to exterior wall and roofs blown off buildings or the buildings could collapse. Businesses that are particularly vulnerable to tornadoes and high winds are car and truck dealerships.
- Agriculture. Tornadoes and high winds pose a high hazard threat to agricultural buildings, crops and livestock. Tornadoes and high winds can cause significant damage to buildings and can cause injuries and deaths. These events can flatten crops and forests.
- Roads and Highways. Trailers, especially high profile, empty, or lightly loaded trailers, are susceptible to being blown over, or otherwise adversely impacted, by high winds. As wind speed increases, even sub-tornado speeds can adversely impact vehicle handling, especially on bridges or open areas with long wind sweeps. Gusty winds are particularly dangerous as they occur sporadically and unexpectedly and can cause unpredicted handling problems. High winds can blow fine soil/sand and other debris across the road and cause visibility problems, or direct damage to vehicles being struck by large blowing debris. Debris blown by high winds, sometimes rather large pieces of wood, tree limbs, or trash barrels, are blown onto highways and can cause safety problems even after the winds have subsided. Vehicles traveling on highways on ridge tops, and oriented in a north-south direction are more subject to high wind damage than are highways in valleys or running parallel to the predominant wind direction.
- Railroads. High profile and/or lightly loaded cars, especially the "high cube" boxcars typically used to carry auto parts, can be blown over in high winds. Parked individual rail cars that are not properly chocked or brake set can be set in motion by high winds striking the car at a critical angle. Heavy debris striking trains during a high wind episode can cause direct damage to the locomotive or cars. Wind deposited debris on the tracks can cause safety problems after the winds have subsided.
- Airway. Light weight general aviation aircraft, typical of the type most likely to be based at, or using the Black River Falls airport, are the most prone to wind damage while parked on the ground
- Waterways. High winds can have the same impact to craft on Lake Arbutus as vehicles on roadways, with the wave action across long reaches of water creating potential for capsizing vessels. Waterway operations are controlled by the U.S. Coast Guard. Dangerous conditions may exist for deck crews and lock crews working outside during these storms.
- Municipal Water. In the county there are 25 municipal wells and water systems, see Table 3-11. These facilities and equipment could be significantly damaged or destroyed as a result of tornadoes and high winds. The services provided by these facilities would not be interrupted except in extreme cases.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities operating in the county, see Table 3-12. These facilities and equipment could be significantly damaged or destroyed as a result of tornadoes and high winds. The services provided by these facilities would not be interrupted except in extreme cases.

- Hazardous Material Sites. Hazardous material in transit is exposed to the same dangers as the mode of transport. Hazardous material in storage is more vulnerable than other material, and storage buildings should be storm reinforced.

Tornado/High Winds Risk Assessment Designation
Tornado/High Winds Historical Occurrence Rating: High - 7
Tornado/High Winds Vulnerability Rating: Critical - 5
Tornado/High Winds Probability Rating: Possible - 6
Tornado/High Winds Local Official Survey Rating: Medium - 5
Tornado/High Winds Risk Assessment Designation: **High Threat – 23 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Tornado/High Winds Hazard Mitigation Ideas: ● Local and state governments can invest in public early warning systems/networks, as well as train people to serve as weather spotters ● Provide weather radios to critical areas ● Encourage development of storm shelters in each community readily accessible to the public ● Strengthen public and private structures by using engineering measures and construction techniques that may include structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced pedestrian and garage doors, window shutters, waterproof adhesive sealing strips, or interlocking roof shingles ● Construct and use concrete safe rooms in homes and shelter areas of mobile home parks, fairground, shopping malls, or other vulnerable public areas ● Anchor manufactured homes and exterior attachments such as carports and porches ● Communities may adopt building codes requiring weatherproofing such as wall and roof anchoring, reinforcement of walls, ceilings and floors, etc. ● Secure loose yard items like yard and patio furniture ● Protect temporary debris disposal sites by fencing and/or locating away from populated areas ● Require use of special roofing shingles designed to interlock and resist uplift forces ● Bury power lines ● Designed failure mode to power line design ● Provide backup power resources that can enable critical facilities to continue basic services and can be used by businesses to ensure security and protect refrigerated goods ● Prune trees near power lines ● Promote public education during Severe Weather Awareness Week ● Promote preparation of a home tornado plan and assembling a disaster supply kit ● Highway agencies need to begin immediate patrols after high winds have swept through an area to clean dangerous debris off the road and shoulder, and ensure road signs and traffic signal are visible and functioning ● Railroad company maintenance-of-way forces should conduct patrols as soon as possible after a heavy wind event to remove debris on the tracks ● An emergency plan for retrieving and securing run away watercraft may be developed in cooperation with marinas

3.5 Jackson County, Riverine/Flash Flooding/Storm Water Flooding Risk Assessment

Riverine/Flash Flooding Definition: Flooding occurs when a river, stream, lake or other body of water overflows its banks onto normally dry land or there is an excessive pooling of surface water. These events can be slow to develop or happen very quickly. Flash floods are usually the result of excessive precipitation or rapid snowmelt and can occur suddenly with awesome power. Increased demand for housing along Jackson County's waterfronts increases flooding vulnerability.

Flood related hazards in Wisconsin arise from a complex set of hydrologic and hydraulic interactions, including excessive precipitation; rapid snowmelt, ice or debris jams in waterway channels and dam or levee failures. These result in river flooding, stream flooding, coastal flooding and erosion, bank slumping, inland lake flooding, flash flooding, flooding from levee and dam failure and storm water runoff and ponding.

The effects of flooding can be devastating and cause extensive property damage. Although the probability of serious injury and loss of life is usually low, flooding increases the likelihood of long-term health hazards from water-borne diseases, mold, mildew, insect infestation and contaminated drinking water. Long-term damage to the environment may also result from flooding of sites containing hazardous materials or waste.

Major floods in Wisconsin tend to occur either in the spring when melting snow adds to runoff from rain or in summer and early fall after intense rainfalls. Flooding which occurs in the spring due to snowmelt and/or a prolonged period of heavy rain is characterized by a slow build-up of flow and velocity in rivers and streams over a period of days. This build-up continues until the river or stream overflows its banks, for as long as a week or two. The water then slowly recedes inch by inch to its original level. The expected occurrence and location of this type of flooding is fairly predictable and normally there is enough time for the orderly evacuation of people and property.

Flash flooding, which usually results from surface runoff after intense rains or the failure of water control structures, also poses a threat to all areas of Wisconsin. This is an extremely dangerous form of flooding because it is not very predictable. It can occur very quickly, precluding evacuation to higher ground to prevent loss of life. Small and normally calm rivers and streams will rise very rapidly when surrounding soil and terrain are unable to accommodate intense precipitation. Raging torrents of water can rip through waterways, surging well beyond normal banks and sweeping away everything in their path. Houses, structures, bridges, and boulders can be tossed and rolled by a flash flood. The strength of the water current, carrying debris and surging through an area, can cause serious injuries and death. It can also interrupt power, disable fuel sources, make roads impassable, hamper response efforts and strand people in their homes awaiting rescue.

Riverine/Flash Flooding History and Frequency:

1980's:	No information available from the National Climatic Data Center. Wisconsin Emergency Management Agency reports one event in 1980, Flooding in Black River Falls - $1,065,650 in losses reported.
1990's:	5 events: 1992, 1993, 8/14/95 (Hixton - $15,000 PD), 8/14/95 (Taylor - $15,000 PD), 6/26/98 (Hatfield - $70,000 PD, $70,000 CD)
2000's:	4 reported events: 6/1/00 ($116,000 PD, $35,000 CD), 4/12/08 (Pray - $50,000 PD), 7/12/08 (Millston - $15,000 PD, $2,000 CD), 8/8/09 (Sheppard - $50,000 PD, $50,000 CD),
2010's:	31 reported events by NCDC – 7/14/10 (Taylor), 8/13/10 (Requa- $297,000 PD), 9/22/10 (Merrillan, Taylor & Vaudreuil), 9/23/10 (North Bend - $2,600,000PD, $500,000 CD; Vaudreiul- $350,000 PD; Black River Falls- $15,000 PD; Winnebago Mission - $15,000 PD & Hatfield- $5,000 PD), 3/20/11 (Vaudreiul), 4/10/11 (Vaudreiul), 7/18/11 (Taylor- $10,000 PD), 7/28/11 (Vaudreiul), 5/7/2012 (Vaudreuil, Flood), 4/8/2013 (Hatfield, Flood and Melrose, Flood), 4/9/2013 (North Bend, Flood, Vaudreuil, Flood & Alma Center, Flood), 4/11/2013 (Fall Hall Glen, Flood), 5/1/2013 (Melrose, Flood & Fall Hall Glen, Flood), 5/30/2013 (Vaudreuil, Flood), 4/30/2014 (Vaudreuil, Flood), 5/20/2014 (Vaudreuil, Flood), 6/18/2014 (Merrillan, Flash Flood, Taylor, Flash Flood, Vaudreuil, Flood-$5,000 PD, Alma Center, Flood-$5,000 PD, Shamrock, Flood-$5,000 PD & Franklin, Flood-$5,000 PD), 9/6/2015 (Requa, Flash Flood-$400,000), 9/7/2015 (Vaudreuil, Flood), 12/14/2015 (Vaudreuil, Flood), 3/16/2016 (Vaudreuil, Flood & Hatfield, Flood), 9/21/2016 (Hatfield, Flood), 9/22/2016 (Vaudreuil, Flood-$825,000 & North Bend, Flood-$58,000), 2/21/2017 (Vaudreuil. Flood & Hatfield, Flood), 4/20/2017 (Vaudreuil, Flood), 5/16/2017 (York, Flash Flood-$10,000 PD), 5/17/2017 (Requa, Flood-$110,000), 5/18/2017 (Vaudreuil, Flood), 7/12/2017 (Franklin, Flash Flood-$35,000 PD), 7/20/2017 (Taylor, Flash Flood-$303,000 PD, $2,200,000 CD), 9/5/2018 (Vaudreuil, Flood), 10/10/2018 (Vaudreuil, Flood)

PD = Property Damage and CD = Crop Damage

Flooding has increased dramatically in Jackson County in the last decade. Previous decades saw 4-5 events and in the 2010's, 31 reported events occurred. Wisconsin Emergency Management reports indicate that from 1971 through 2001 the 72 counties in Wisconsin averaged four flood related emergency and disaster events. Jackson County received 7 events during this time period. Flooding in Jackson County is highly likely along the streams and rivers within the county. With the changes in flood frequency over the past decade, it is hard to predict a linear pattern for flooding in the future. Based on the 2010's data, there was an average of 1.72 floods per year.

Floodplain Development and Regulation

National Flood Insurance Program: The County along with the Villages of Hixton, Melrose, Merrillan, Taylor and the City of Black River Falls all participate in the NFIP. The Village of Alma Center which does not have any structures located along a floodplain does not participate at this time.

Floodplain Management Programs: Enforcement and day-to-day administration of the Floodplain Zoning Ordinances is conducted by the County Zoning Administrator for the County (unincorporated areas) and the individual zoning administrators for the Villages of Hixton, Melrose, Merrillan, Taylor and the City of Black River Falls. The Zoning Administrators review, and issue floodway or flood fringe land use permits based on the permitted uses and prohibited uses outlined in the Floodplain Zoning Ordinances. Standards for structures and buildings being built are also outlined in the Floodplain Ordinances. Reviewing plans of structures and buildings and then inspecting them is another floodplain management responsibility. Reporting to the DNR on decisions on variances, appeals, amendments, and violations pertaining to floodplain zoning and reporting violations to the appropriate law enforcement agency for prosecution are also an integral part of the Zoning Administrator's responsibilities. The Zoning Administrators also frequently advises applicants of the provisions of the Floodplain Zoning Ordinances and assists them in properly preparing permit applications or proceeding with an appeals or amendment request.

Regulating Development. The development that occurs within the unincorporated areas of the County is subject to two ordinances. These are the County Shoreland-Wetland Ordinance and the County Floodplain Zoning Ordinance. The purpose and how the County addresses development with these ordinances is discussed below. The Villages of Hixton, Melrose, Merrillan and Taylor along with the City of Black River Falls all have adopted shoreland zoning ordinances.

Floodplain Zoning Ordinances. The State of Wisconsin has delegated responsibility to counties to administer and enforce floodplain zoning in unincorporated areas to cities and villages in incorporated areas. This regulatory activity is to be conducted in accordance with Chapter NR 116 of Wisconsin Administrative Code and the standards of the National Flood Insurance Program. All municipalities are in compliance with this Administrative Code.

Floodplains are land areas, which have been or may be covered by floodwater during the "regional flood". The regional flood is a flood determined to be representative of large floods known to have occurred in Wisconsin or which may be expected to occur on a lake, river or stream. The regional flood is based upon a statistical analysis of lake level or stream flow records available for the watershed or an analysis of rainfall and runoff characteristics in the watershed or both. In any given year, there is a 1% chance that the regional flood may occur or be exceeded. This regional flood is often referred to as the 100-year flood.

The floodplain is made up of the floodway and flood fringe areas. A floodway is the channel of a river or stream and those portions of the floodplain adjoining the channel required to carry the regional flood discharge. A flood fringe is that portion of the floodplain outside of the floodway, which is covered by floodwater during the regional flood. The term flood fringe is generally associated with standing water rather than flowing water.

Prohibiting new residential construction in the floodway, regulating improvements to existing residential structures in the floodway, requiring dry land access to new development in the flood fringe and requiring a floodplain zoning or shoreland-wetland permit application for all floodplain or shoreland-wetland development are common examples on how the County addresses development and redevelopment in its floodplains and shoreland-wetland areas.

Shoreland-Wetland Ordinances. Shoreland wetlands are defined as wetlands of five acres or larger in size, identified on Wisconsin Wetland Inventory Map, and in the Shoreland Zone. The Shoreland Zone is defined

as the area located 1,000 feet from the ordinary high water mark of a navigable lake, pond or flowage or within 300 feet of the ordinary high water mark of a navigable stream or to the landward side of the floodplain whichever distance is greater. These regulations are unique in that they regulate additional uses detrimental to shoreland-wetland areas and preserve the shore cover and natural beauty by restricting the removal of natural shoreland cover and controlling shoreland-wetland excavation, filling and other earth moving activity. The County along with the Villages of Hixton, Melrose, Merrillan, Taylor and the City of Black River Falls have adopted and enforce a Shoreland-Wetland Zoning Ordinance.

Flooding Vulnerability Assessment

- Floodplain Structures and Assessed Values. Jackson County has a total of 97 parcels on which structures are located within the FEMA 100-year flood boundary. These 97 parcels have a total assessed land value of $745,600; an assessed improvements value of $5,845,800; and a total assessed value of $6,115,400. The Village of Hixton has over half of the parcels with a total of 59 followed by the Town of Melrose with 14 parcels. These two municipalities account for 73 parcels or 75% of the total number of parcels and a total assessed value of $5,151,500 or 84% of the County's total. Table 3-3 has a complete listing by municipality of the parcels located within FEMA's 100-year flood boundary. Map 3-6 shows the location of these properties throughout the floodplain.

- Repetitive Loss Structures. Repetitive Loss Structures are defined as those properties that have had two or more flood insurance claims of at least $1,000 each. As of February 4th, 2020, there were six repetitive loss structures in the county located in Black River Falls.

- Flood Risk Assessment. Determining potential damage to residential and commercial structures is a difficult undertaking without intense survey work. Some of the factors which make it difficult are: not all of the first floor elevations of the structures are the same; even structures adjacent to each other often have different first floor elevations; some areas will receive damage due to wave action or flowing water; some may appear to be flooded and heavily damaged from the outside but in fact have received little damage due to flood proofing techniques; some cannot be observed due to floodwaters inhibiting access; damages are often not reported; and damages that are reported are based on each property owners individual opinion of damage.

  Despite these factors an attempt has been made to ascertain the approximate damages a 100-year flood would inflict on residences and businesses in the County. To assist in this damage assessment process the Federal Insurance Administration has prepared a table, which lists the percentage of damage to a structure based upon the amount of water in the first floor. This table can be found in the book titled "Design Manual for Retrofitting Flood-prone Residential Structures" published by FEMA. We used this table when determining the amount of damage to structures. To determine the amount of water in the first floor of structures and the number of structures, which would have water in the first floor, we used Flood Insurance Rate Maps and local knowledge of the areas. To make flood damage estimates more accurate we divided the County into 6 different areas; these are: 1) Buffalo River; 2) Beaver Creek; 3) Village of Hixton; 4) Trempealeau River – West County line to Village of Hixton; 5) Black River – City of Black River falls to Lake Arbutus; 6) Black River Falls – South County line north to City of Black River Falls; 7) East Fork Black River.

  Dividing the County into 7 different geographic areas enables the assignment of different real property values to different areas which is needed because each area is unique regarding topography, hydrology and development characteristics. This process compensates for the change flood prone property can have across the County in property values from one area to another. By using an average value for each area more realistic flood damage estimates can be generated than if a county wide average value for each structure were used.

  During a 100-year flood event the County would have a projected damage total to residential and commercial structures of approximately $921,175. The area totals are as follows: 1) Buffalo River -

$109,076; 2) Beaver Creek - $73,512; 3) Village of Hixton - $491,758; 4) Trempealeau River – West County line to Village of Hixton - $1,540; 5) Black River – City of Black River falls to Lake Arbutus - $3,000; 6) Black River – South County line north to City of Black River Falls - $218,727; 7) East Fork Black River - $23,562. A detailed breakdown of the areas showing total number of structures affected and depth of water in the structures can be seen in Table 3-4.

- Critical Facilities. In the county 57 service oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment Assigns Flooding a risk factor of 26 indicating this natural hazard is a high risk to the County. While the overall risk of flooding to critical facilities in the County is negligible there is only one critical facility located within the 100-year floodplain and vulnerable to flooding. The Village of Hixton Village Hall is in the FEMA 100-year floodplain boundary. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, with an annual payroll of approximately $285 million, see Table 3-6. In the County there are 17 commercial structures located in the floodplain. These businesses have an assessed value $1,441,900. Businesses and industries in the County that do not suffer physical damage often sustain significant income losses as a result of a flood event due to reduction in sales or production problems caused by flood induced customer loss, employee problems and input / output interruptions. Tourism related businesses, such as restaurants, motels, marinas and campgrounds, suffer a loss or revenue because of reduced customers desiring to visit the area. The media publicity generated during a flood event focus on flood related disasters and create a negative mind-set in the public that can persist long after the floodwaters recede.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. The Natural Hazard Risk Assessment assigns flooding a high risk factor in the County. The land adjacent to these rivers is mostly agricultural and pastureland that are subject to flooding.
- Roads and Highways. Of all the hazards discussed so far, flooding is the hazard most likely to seriously impact the transportation infrastructure, rather than the vehicles used in transportation, or transportation operations and safety. Periodic flooding of fixed waterways, such as streams and the Black River is a known factor, and the extent of flooding, or potential flooding, has been delineated on maps. Several roadways in Jackson County are subject to flooding, either by the predictable, advance notice rising of the rivers and streams, or by the shorter advance warning flash flooding often besetting smaller streams. Other streams and low areas can result in water across the roadway, or at an intersection, even without the event being noted as a major flood event by FEMA.
- Railroads. Periodic flooding of fixed waterways, such the Black River is a known factor, and the extent of the flooding, or potential flooding, has been delineated on maps. There are two railroad lines in Jackson County. The Union Pacific (UP) mainline between Chicago and the Twin Cities and the Canadian National. Stretches of the railroads are reinforced with large boulder and rock riprap as necessary during high water.
- Airway. There is one airport in Jackson County. The Black River Falls Municipal Airport is not located in a floodplain and therefore is not subject to flooding.
- Waterways. There are no commercially navigable waterways in Jackson County. The only impact Riverine Flooding will have is on recreational boating.
- Municipal Water. In the County there are 25 municipal wells and water systems, see Table 3-11. These facilities are usually located outside the floodplain, which lessens their vulnerability to flooding. With the volume of water associated with floods and the runoff from the lands and sites that are not usually covered by water, filtration could be accelerated, and pollutants could migrate into the water source. Pumping stations in low areas may need to be protected.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. These facilities can be located in low-lying areas especially gravity type systems making them vulnerable to flooding. Homes and businesses with basement floor drains that empty directly into the wastewater treatment systems can overload wastewater treatment facilities if the buildings are flooded

causing the discharge of untreated wastewater. Floodwaters can infiltrate into the piping of the system that could result in the system operating over its capacity. Lift stations may need to be protected.

- Hazardous Material Sites. Hazardous material in transit is subject to the same risk as other material on a given transportation mode. Hazardous material in a storage mode must be protected from floodwaters. Material stored in floodplains should be moved or flood proofed when a prediction of high water is received.

Riverine/Flooding Risk Assessment Designation

Riverine/Flooding Historical Occurrence Rating: High - 9
Riverine/Flooding Vulnerability Rating: Limited - 4
Riverine/Flooding Probability Rating: Highly Likely - 7
Riverine/Flooding Local Official Survey Rating: Medium/High - 6
Riverine/Flooding Risk Assessment Designation: **High Threat– 26 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Flooding Hazard Mitigation Ideas: ● Acquire land in flood prone areas and remove structures and enforce permanent restrictions on development ● Relocate structures to less hazardous locations ● Elevate structures – mechanically lift so that the lowest floor, including the basement, is raised above the base flood elevation – utilities and other mechanical devices should also be raised above expected flood levels ● Dry-floodproofing – keep water out by strengthening walls, sealing openings, or by using waterproof compounds or plastic sheeting on walls ● Wet-floodproofing – Use water resistant paints or other materials that can allow for easy cleanup after floodwater exposure in accessory structures or in a garage area below an elevated residential structure. In basement, wet-floodproofing may be preferable to attempting to keep water out completely. ● Adopt zoning ordinances that limit development in the floodplain ● Limit density of developments in the floodplain ● Require that floodplains be kept as open space ● Subdivision design standards can require elevation data collection during the platting phase and lots may be required to have a buildable space above the base flood elevation ● Requirements for building design standards and enforcement include the following possibilities: 1) that a residential structure be elevated; and 2) that a non-residential structure be elevated or floodproofed ● Conservation easements may be used to protect environmentally significant portions of parcels from development – they do not restrict all use of the land, rather they direct development to areas of land that are not environmentally significant ● Purchasing flood insurance does not prevent a flood from occurring, but it does mitigate a property owner's financial exposure to loss from flood damage ● By taking initiative locally, to more accurately map problem areas with information not already on FEMA maps a community can warn residents about potential risks that may not have been anticipated ● To maintain dry access, roads should be elevated above the base flood elevation. However, if a road creates a barrier it can cause water to pond. Where ponding is problematic, drainage and flow may be addressed by making changes to culvert size and placement. ● Flood warning can alleviate health and safety risk by providing citizens time to escape and possibly remove belongings that could be damaged. NOAA all-hazard warning radio and EAS broadcasts can be incorporated into a community's flood warning system ● Local and state governments should have a plan/procedure in place for flood damage control by establishing volunteer teams available for sandbagging etc. and providing for temporary relocation and storage of equipment, furniture etc. ● Communities should develop a post-flood clean up-decontamination, and recovery plan/procedures ● Alternate routes can be determined and marked in advance of the actual flooding ● Movable message portable signs should be posted at locations where motorists can make detour decisions before entering into the flooded road segment ● Cleaning and clearing culverts, drains, and waterways must be kept uppermost as a maintenance practice ● After a flood it is especially important to check and maintain all drainage ways ● Highway agencies need to begin immediate patrols after floods have swept through an area to clean dangerous debris off the road and shoulder, and ensure road signs and traffic signals are visible and functioning ● An emergency plan for retrieving and securing run away watercraft may be developed in cooperation with marinas ● Have public relations strategy in place to counteract negative media reports after a flood to maintain community's tourism base

3.6 Jackson County, Dam Failure Flooding Risk Assessment

Dam Failure Flooding Definition: A dam failure involves the uncontrolled release of stored water due to the breaching of a water control structure, resulting in rapid downstream flooding. A dam can fail because of excessive rainfall or melted snow, poor construction or maintenance, flood damage, earthquake activity, weakening caused by burrowing animals or vegetation, surface erosion, vandalism or a combination of these factors. Dam failures can result in the loss of life and significant property damage in an extensive area downstream of the dam.

Dams serve many purposes, including agricultural uses, providing recreation areas, electrical power generation, erosion control, water level control and flood control. The federal government has jurisdiction over dams that produce hydro-electricity-approximately 5% of the dams in Wisconsin. Private individuals own approximately 50% of the dams in Wisconsin, the State owns 19%, municipalities such as townships or county governments own 16% and 15% are owned by various other groups. The Wisconsin Department of Natural Resources regulates all dams on waterways to some degree. However, many dams overall in Wisconsin are small and are not stringently regulated for safety purposes.

For emergency planning purposes, dam failures are categorized as either *rainy day* or *sunny day failures*. *Rainy day failures* involve periods of excessive precipitation leading to an unusually high runoff. This high runoff increases the reservoir of the dam and if not controlled, the overtopping of the dam or excessive water present can lead to dam failure. Normal storm events can also lead to rainy day failures if water outlets are plugged with debris or otherwise made inoperable. *Sunny day failures* occur due to poor dam maintenance, damage/obstruction of outlet systems or vandalism. This type is the worst case of failure and can be catastrophic because the breach is unexpected and there may not be enough time to properly warn downstream residents.

Dam Failure Flooding History and Frequency:
An overtopping of the Hatfield dam due to failure of the power canal, along with the failure of a Cranberry marsh dam contributed to the levee failure in the City of Black River Falls on 6/20/93. In addition, dams were overtopped in 2010 due to excessive rainfall. Due to the large number of Cranberry bogs which utilizes dams to control water levels the probability of a dam failure in Jackson County is high. But because the locations of these dams are in rural areas, the probability of the loss of life or structures is low. Road closures with the resulting loss of access to areas is the major concern from the dam failures. With little consistent data on dam failure, it would be beneficial to conduct a new study to determine the dam failure frequency. There are 4 high hazard dams in Jackson County. Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life. They include May Coulee, Beaver Creek, Hatfield, and Resettlement Admin. 23.

Dam Failure Flooding Vulnerability Assessment

- Critical Facilities. In the County, 57 service-oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment Assigns Dam Failure Flooding a risk factor of 9 indicating this natural hazard is a low risk to the county. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries. The Natural Hazard Risk Assessment assigns dam failure flooding a low risk factor in the County.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. The Natural Hazard Risk Assessment assigns dam failure flooding a low risk factor in the county. The land below the dams is mostly agricultural and pastureland that would be subject to flooding in the rare occurrence a dam fails.
- Roads and Highways. Dam failure differs from traditional flooding in that flooding, even on a rapidly rising stream such as the Black River happens both with a certain regularity in terms of not being an “if”, but a “when”, and also with a certain advance warning, perhaps weeks for the Black River but none-the-less, there

is a warning period to take action to close roads, move equipment, or other take other mitigation. A dam break on the other hand could leave little time, even in terms of minutes, to take any mitigation action.

- Railroads. There are two railroad lines in Jackson County. The Union Pacific (UP) mainline between Chicago and the Twin Cities and the Canadian National Railway. The risk factor is low for dam failure.
- Airway. The Black River Falls airport is the only public airports located Jackson County and is not located in the hydraulic shadow of any dam.
- Waterways. There is no commercial navigation on any waterway in Jackson County. Only pleasure crafts would be susceptible to a dam failure.
- Municipal Water. In the County there are 25 municipal wells and water systems, see Table 3-11. These facilities are usually located at higher elevation, which lessens their vulnerability to flooding or damage if a dam would fail.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the county, see Table 3-12. These facilities can be in low-lying areas especially gravity type systems making them vulnerable to flooding in event that a dam fails. Floodwaters could infiltrate into the piping of the system that could result in the system operating over its capacity.
- Hazardous Material Sites. No major hazardous waste disposal or storage sites are in the hydraulic shadows of dams. Most rural dwellings have fuel oil, bottled gas, gasoline, and other containers of various sizes mounted outdoors or in storage buildings. These containers need to be made secure from winds and flooding.

Dam Failure Flooding Risk Assessment Designation

Dam Failure Flooding Historical Occurrence Rating: Low - 1
Dam Failure Flooding Vulnerability Rating: Negligible - 2
Dam Failure Flooding Probability Rating: Unlikely - 3
Dam Failure Flooding Local Official Survey Rating: Low -3
Dam Failure Flooding Risk Assessment Designation: **Low Threat – 9 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Dam Failure Flooding Hazard Mitigation Ideas: ● Have an inspection, maintenance and enforcement program in place to ensure the continued structural integrity of dams ● Remove unnecessary or old and structurally unsound dams ● Planning for dam breaks can include constructing emergency access roads as well as automating pump and flood gate operation ● Regulate development in a dam's hydraulic shadow, where flooding would occur if there were a severe dam failure ● Develop and coordinate dam failure emergency action plans

3.7 Jackson County, Forest/Wildland Fire Risk Assessment

Forest Fire Definition: A forest fire is an uncontrolled, wild, or running fires occurring on forest, marsh, field, cutover, or other lands. The causes of these fires include lightning, human carelessness and arson.

Forest and wildfires can occur at any time of the day and during any month of the year, but the peak fire season in Wisconsin is normally from March through November. 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 determining the number of fires and acreage burned. Generally, fires are more likely when vegetation is dry from a winter with little snow and/or a spring and summer with sparse rainfall.

Forest fires and wildfires can cause significant injury, death and damage to property. A recent inventory showed that 46 percent of the state or 16 million acres is covered with forests. The potential for property damage from fire increases each year as more recreational properties are developed on wooded land and increased numbers of people use these areas. Fires can extensively impact the economy of an affected area, especially the logging, recreation and tourism industries. Major direct costs associated with forest fires or wildfires are the salvage and removal of downed

timber and debris and the restoration of the burned area. If burned-out woodlands and grasslands are not replanted quickly to prevent widespread soil erosion, then landslides, mudflows and floods could result, compounding the damage.

Forest/Wildland Fires History and Frequency: No major forest fires have occurred in Jackson County in recent history. The 1976 drought created the most severe fire danger condition in Wisconsin forests and grasslands since the 1930's. During 1976 a total of 4,144 fires occurred, the greatest number in any one-year since 1971, when detailed record keeping began. The fire season of 1988 is also remembered as one of the driest on record. A total of 3,242 fires occurred that year, but just 9,740 acres burned, an extraordinarily low number considering the severity of the threat. The National Climatic Data Center reports 3 wildfire events for Jackson County 4/23/94 (720 acres burned near Black River Falls), 4/22/07 and 4/1/10 (30 acres burned east of Melrose). Due to the limited number of fires and the lack of jurisdictions reporting smaller fires and costs associated with containing them is difficult to give a dollar amount of future fires.

According to the DNR's Communities-at-Risk MCD Map for forest fires, Jackson County has 5 towns which fall into the "Very High" category. These 5 towns are: Adams, Brockway, Komensky, Manchester and Merrillan. In addition, six towns are in the category of "High," these are; Albion, Alma, Cleveland, Garfield, Knapp, and Millston. There are also 6 areas of "Concern," these are; Bear Bluff, City Point, Garden Valley, Hixton, Irving, and Melrose.

Forest/Wildland Fires Vulnerability Assessment

- Critical Facilities. In the County, 57 service-oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns Forest/Wildland Fires a risk factor of 12 indicating this natural hazard is a low risk to the County. Critical facilities vulnerable to Forest/Wildland Fires are negligible. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries. For many urban businesses and industries forest/wildland fires pose a low risk. Businesses and industries located in rural areas or those located adjacent to forests and grasslands may be at a more significant risk. Examples of businesses that would be more vulnerable to these natural disasters include campgrounds and other recreation facilities.
- Agriculture. The overall hazard risk to agriculture is low. Agricultural buildings, especially out buildings that may be adjacent to forests or grasslands have an increased vulnerability to forest/wildland fires. Crops that have sustained long periods of drought or crops at harvest time could be more susceptible to damage from fires. This natural hazard could also endanger livestock.
- Roads and Highways. Smoke from forest fires can adversely affect visibility for motorists. The movement of heavy and specialized fire-fighting equipment on public roadways to fire scenes can cause temporary disruption or inconvenience to the motoring public. Following a major forest or wildland fire, enough vegetation may have been destroyed to warrant consideration of temporary emergency soil erosion control methods.
- Railroads. Smoke from forest fires can adversely affect visibility for train operation, but this is an isolated occurrence and can be mitigated by notification of the railroad dispatcher. A decision to close the railroad temporarily can be made by railroad management. Following a major forest or wildland fire, enough vegetation may have been destroyed to warrant consideration of temporary emergency soil erosion control methods.
- Airway. Although fires in the hardwood forests of Jackson County rarely reach the spectacular proportions of fires in the western state mountains, or even in the coniferous forests of northern Wisconsin, aircraft are sometimes used for observation, or water drops. During major fire events the Black River Falls airport could become a major hub of air and ground activity. Highway traffic control by local officers in the vicinity of the airports might be needed.

- Waterways. As with land and air transportation, there could be isolated incidents of smoke drift creating a visibility hazard to boaters.
- Municipal Water. In the County there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities' vulnerability to forest/wildland fires would be negligible except if these facilities are located adjacent to forests. The services provided by these facilities would not be interrupted except in extreme cases.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the county, see Table 3-12. These facilities' vulnerability to forest/wildland fires would be negligible except if these facilities were located adjacent to forests. The services provided by these facilities would not be interrupted except in extreme cases.
- Hazardous Material Sites. Hazardous material storage areas in the path of forest or wildland fire would have to either receive concentrated protection, at the expense of resources that could otherwise be devoted to the main task of fire suppression, or the material would have to be moved and transported to a pre-designated relocation site if there were sufficient advance warning and accurate prediction of the fire's path. This latter option is not very likely to present itself.

Forest/Wildland Fires Risk Assessment Designation
Forest/Wildland Fires Historical Occurrence Rating: Low - 1
Forest/Wildland Fires Vulnerability Rating: Limited - 3
Forest/Wildland Fires Probability Rating: Possible - 4
Forest/Wildland Fires Local Official Survey Rating: Medium - 4
Forest/Wildland Fires Risk Assessment Designation: **Low Threat – 12 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Forest/Wildland Fires Hazard Mitigation Ideas: ● Outreach efforts can promote such items as non-combustible roof covering, construction, clearing brush away from buildings and other fire-wise recommendations ● Promote public education on fire prevention, including the burning permit system and the need to follow daily burning restrictions for those living in areas protected by the DNR ● Zoning can be used to cluster development into defensible areas and keep development away from fire hazards such as steep slopes, where fires are difficult to contain ● Damage potential can be reduced by ensuring that structures are surrounded by defensible space or buffer zones ● Local power companies can help prevent or alleviate wildfires by property maintenance and separation of power lines, as well as efficient response to fallen power lines ● Maintenance of property in or near wildfire prone areas (fuel management techniques, pruning/clearing dead vegetation, selective logging, planting fire-resistant vegetation, creating fire breaks) ● Local governments can require burn permits and restrict campfires and outdoor burning ● Establish or continue to maintain cooperative fire agreements with the Wisconsin Department of Natural Resources ● Smoke from forest fires can adversely affect visibility for motorists, but can be mitigated by temporary signage or even road closures in a temporary basis ● Following a major forest or wildland fire, sufficient vegetation may have been destroyed so as to warrant consideration of temporary emergence soil erosion control methods

3.8 Jackson County, Heavy Snowstorm Risk Assessment

Heavy Snowstorm Definition: Winter storms can vary in size and strength and include heavy snowstorms. A heavy snowfall is the accumulation of six or more inches of snow in a 12-hour period or eight or more inches in a 24-hour period.

Heavy Snowstorm History and Frequency:

1990's:	13 reported events by NCDC – 1/16/94, (1/26/94 heavy snow/ice), 3/6/95, 3/27/95, 11/26/95, 1/18/96, 11/20/96, (12/23/96 blowing snow), (1/15/97 blowing snow), 2/4/97, (3/13/97 heavy snow/blowing/drifting), (1/1/99 heavy snow and blowing & drifting), 3/8/99.
2000's:	26 reported events by NCDC – 1/12/00, 12/18/00, 12/28/00, (2/8/01 freezing rain/snow), 3/12/01, 3/1/02, (2/2/03 ice/snow/wind), 2/1/04, 12/20/04, 1/21/05, 2/20/05, 3/17/05, 12/14/05, 2/15/06, 3/15/06, 11/10/06, 1/14/07, 2/23/07, 2/28/07, 3/1/07, 4/11/07, 12/22/07, 2/17/08, 3/21/08, 12/08/08, 12/8/09,.
2010's:	16 reported events by NCDC – 12/10/10, 12/20/10, 2/20/11-$6,000 PD, 12/9/2012, 12/20/2012, 3/5/2013, 3/12/2013, 1/14/2014, 12/28/2015, 2/2/2016, 3/23/2016, 1/10/2017, 2/23/2017, 1/22/2018, 4/3/2018, 4/13/2018

Much of the snowfall in Wisconsin occurs in small amounts between one and three inches per occurrence. Heavy snowfalls that produce at least eight to ten inches accumulation happen on the average only five times per season. Southwestern Wisconsin receives most of its snow during mid-winter. Snowfall averages in Wisconsin vary between approximately 30 inches in the south-central area of the state to over 100 inches a year in the extreme northwestern counties.

The National Climatic Data Center records show 13 heavy snowstorm events in Jackson County during the 1990's, 26 events in the 2000's and 13 events between January 1, 2010 and April 2018. Based on this data Jackson County can expect 2 winter storms, which produces at least 6" of snow per year. Estimating potential future losses for winter storms is difficult. Typically, damages are minor and widespread. Cost such as additional snow removal time and minor auto accidents are the typical costs associated with heavy snowstorms and are not usually tracked at the county level.

Heavy Snowstorm Vulnerability Assessment

- Critical Facilities. In the County, 57 service-oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns Heavy Snowstorm a risk factor of 29 indicating this natural hazard is a high risk to the County. In fact, this natural hazard received the highest risk assessment of all-natural hazards assessed for the County. Heavy snowstorms with large accumulations of snow could cause structural damage to the roofs of these buildings due to inadequate snow load capacity. In extreme cases, operations of these facilities could be limited because employees are unable to get to work. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, with an annual payroll of approximately $285 million, see Table 3-6. Heavy snowstorms with large accumulations of snow could cause structural damages to roofs of these buildings due to inadequate snow load capacity. Businesses and industries vulnerability to heavy snowstorms could include economic loss and disruptions of inputs and outputs in extreme cases.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Snow from snowstorms is beneficial to many crops because it provides insulation from freezing and extreme cold. Livestock can be vulnerable to heavy snowstorms and can cause injuries and death. Cropland with significant frost depth can be negatively impacted by heavy snow cover. Spring rains are needed to draw the frost out of the ground; otherwise the water from snowmelt will not be absorbed by the soil and can cause severe runoff and flooding.
- Roads and Highways. Direct hazard caused by poor visibility and slippery surface. Safety concerns with snowplows. Following a heavy snowfall, visibility problems can persist with blowing snow, and icing following partial melting and refreezing of the runoff water. Blowing snow is more apt to occur on north-south oriented roads such as STH 27. Following a heavy snowfall, children may be outside playing in the snow near the roadway and be oblivious to traffic. Following the snow deposition, lesser-used roads may remain blocked for hours, or even days after the storm is over. This blockage can cause motorist confusion and circuitous

detours, as well as hampering access for emergency vehicles. Finding locations to store snow, especially snow removed from large expanses like urban parking lots, can be challenging.

- Railroads. Direct hazard caused by poor visibility. Following a heavy snowfall, visibility problems can persist with blowing snow.
- Airway. Light plane operation from the Black River Falls airport would not be possible during a heavy snowstorm because of the poor visibility and the physical blockage of the runway and taxiways. Following a heavy snowfall, visibility problems can persist with blowing snow and icing following partial melting and refreezing of the runoff water. Heavy snow squalls in the vicinity of Jackson County could cause some light aircraft, possibly flying over the county, to decide to land at Black River Falls until the storms stop.
- Waterways. The recreational boating season is typically closed when most heavy snowfalls occur in the winter, and therefore present no challenge. Early heavy snows in early October, November or mid-March could catch some recreational boaters out. The same conditions of poor visibility that affect road and rail travel can impact boaters as well.
- Municipal Water. In the County, there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities vulnerability to heavy snowstorms is negligible and would not cause interruption of services provided by these facilities.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the county, see Table 3-12. These facilities vulnerability to heavy snowstorms is negligible and would not interrupt services provided by these facilities.
- Hazardous Material Sites. Heavy snow does not have as great an impact on hazardous materials in storage as does some of the other natural hazards, but heavy snow could cause collapse of storage building roofs, as well as restricting the response of emergency crews to the scene.

Heavy Snowstorm Risk Assessment Designation
Heavy Snowstorm Historical Occurrence Rating: High - 9
Heavy Snowstorm Vulnerability Rating: Catastrophic - 7
Heavy Snowstorm Probability Rating: Highly Likely - 9
Heavy Snowstorm Local Official Survey Rating: Medium - 4
Heavy Snowstorm Risk Assessment Designation: **High Threat – 29 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Heavy Snowstorm Hazard Mitigation Ideas: ● Local and state governments can produce and distribute family and traveler emergency preparedness information relating to severe winter weather hazards ● Safety strategies for severe weather events can be included in driver education classes ● Burying or otherwise protecting electric and other utility lines can prevent utility disruption ● Local governments can impact building/site design through building code enforcement of snow-related ordinances such as snow loads, roof slope, snow removal, and storage ● Establish additional heating centers or shelters for vulnerable populations ● Local governments need to always plan for and maintain adequate road and debris clearing capabilities ● Use snow fences to limit blowing and drifting of snow over critical roadway segments

3.9 Jackson County, Ice Storm Risk Assessment

Ice Storm Definition: Winter storms can vary in size and strength and include ice storms. An ice storm is 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 is the effect of drizzle or rain freezing upon impact on objects that have a temperature of 32 degrees Fahrenheit or below. Sleet is 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.

Both ice and sleet storms can occur at any time throughout the winter season from October into early April. Early and late season ice and sleet storms are generally restricted to northern Wisconsin, otherwise many of these storms occur in southern Wisconsin. In a typical winter there are 3-5 freezing rain events and a major ice storm occurs on a frequency of about once every other year. If a half inch of rain freezes on trees and utility wires, extensive damage can occur, especially if accompanied by high winds that compound the effects of the added weight of ice. There are also between three and five instances of glazing (less than ¼ inch of ice) throughout the state during a normal winter.

Ice Storm History and Frequency:

1990's:	4 events reported by NCDC –1/26/94 (heavy snow/ice storm); 12/13/95 (glaze); 2/26/96; 1/4/98 (Jackson & 11 other counties, 14 injuries).
2000's:	5 events reported by NCDC – 1/29/01, 2/24/01, 1/1/05, 1/3/09, 12/23/09.
2010's:	2 events reported by NCDC – 12/20/10, 12/29/10.

The National Climatic Data Center reported that Jackson County experienced four ice storm events in the 1990's and 5 events in the 2000's and 2 events between 1/1/10 and 12/31/18. Damages and costs typically associated with Ice Storms are downed power lines, auto accidents and additional personnel time for salting and plowing. Estimating future losses is difficult because most costs associated with Ice Storms are not tracked at the County level. The county can expect to experience one ice storm every 2-3 years.

Ice Storm Vulnerability Assessment

- Critical Facilities. In the County, 57 service-oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns Ice Storm a risk factor of 26 indicating this natural hazard is a high risk to the County. Ice storms can damage the roofs of these facilities by forming "ice dams" and in severe conditions the weight of the ice from these storms can cause roofs to collapse. Ice storms can damage power and communication lines and cut off service to these buildings. Services provided by these facilities would not be interrupted except in extreme cases. See Table 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, with an annual payroll of approximately $285 million, see Table 3-6. Ice storms can damage the roofs of these buildings by forming "ice dams" and in severe conditions the weight of the ice from these storms could cause roofs to collapse. Ice storms can damage power and communication lines and cut off service to buildings resulting in lost production and revenue from businesses and industries. Agricultural-related businesses and industries could suffer economic losses from crop damages, reduced milk production and loss of livestock due to ice storms.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. The hazard threat from ice storms is high in the County. The agricultural economy can sustain substantial economic losses from these storms. Ice storms can damage and collapse the roofs of buildings and can damage power and communication cutting off service to these buildings. The dairy industry in particular is vulnerable to ice storms because these operations are dependent on electric milking equipment that could result in reduced production and in extreme cases could result in reduced production and extreme cases milk may have to be dumped. This natural hazard can result in the loss of livestock due to exposure and increase crop damages. Christmas tree farms and fruit tree orchards can suffer damages due to ice-sheared treetops, branches pulled down and destruction of trees. The gathering of sap for maple syrup production can be halted due to ice covering tree spigots and gathering systems during sap runs. Rural areas can be the last to get electrical power restored from downed lines to farms.

- Roads and Highways. Ice is one of the more treacherous hazards to roadway travel. It is not always as plainly obvious on the surface as is snow, and in spotty icing conditions; a vehicle can come upon it unexpectedly on a curve or the bottom of a hill, even though other parts of the highway are clear. Motorists tend to expect icing on bridges. Heavy ice can cause tree limbs or utility lines to fall across the roadway.
- Railroads. The main impact ice storms have on railroad movement is their potential to disrupt wire-based communications if the wires are weighted down and break. Icing can cause obvious productivity and safety hazards to rail crews working on the ground, as in necessary to switch cars at customer sidings or in rail sorting yards.
- Airway. Icing on wings and elsewhere on the exterior of an aircraft make it impossible to fly. Light planes in flight may have to make emergency landings at Black River Falls if they encounter icing in flight. Aircraft parked in the open on the ground could have their control surfaces damaged by heavy ice storms.
- Waterways. Ice storms can occur earlier and later in the winter season than do severe snowstorms, and the most typical time for ice storms is in November and March. The typical boating season is over during this time period, so Ice Storms have minimal impact on waterways.
- Municipal Water. In the County, there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities' vulnerability to ice storms would be limited to such things as damage to the facility's roofs and loss of electrical service from downed power lines. Services provided by these facilities would not be interrupted except in extreme cases.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in the County, see Table 3-12. These facilities' vulnerability to ice storms would be limited to such things as damage to building's roofs and loss of electrical service from downed power lines. Services provided by these facilities would not be interrupted except in extreme cases.
- Hazardous Material Sites. Ice, like snow, is more harmful for the potential peripheral impacts than direct impact. Icy road conditions can make emergency vehicle response difficult.

Ice Storm Risk Assessment Designation

Ice Storm Historical Occurrence Rating: Moderately High - 7
Ice Storm Vulnerability Rating: Catastrophic - 7
Ice Storm Probability Rating: Likely - 6
Ice Storm Local Official Survey Rating: Medium/High - 6
Ice Storm Risk Assessment Designation: **High Threat – 26 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Ice Storm Hazard Mitigation Ideas: ● Local and state governments can produce and distribute family and traveler emergency preparedness information relating to severe winter weather hazards ● Burying or otherwise protecting electric and other utility lines can prevent utility disruption ● Local governments need to always plan for and maintain adequate road and debris clearing capabilities ● Home and building maintenance should be encouraged in order to prevent roof and wall damage from "ice dams"

3.10 Jackson County, Blizzard Risk Assessment

Blizzard Definition: Winter storms can vary in size and strength. A blizzard is 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. True blizzards are rare in Wisconsin, however blizzard-like conditions often exist during heavy snowstorms when gusty winds cause severe blowing and drifting of snow.

Blizzard History and Frequency:

1990's: 1 event reported by NCDC – 1/26/96
2000's 1 event reported by NCDC – 2/24/07

Jackson County has been experiencing a blizzard once a decade since 1990. The same as Heavy Snowstorms and Ice storms estimating potential future losses for blizzards is difficult. Typically, damages are minor and widespread. Cost such as additional snow removal time and minor auto accidents are the typical costs associated with blizzards and are not usually tracked at the county level. If trends continue the county can expect one blizzard in the next 10 years.

Blizzard Vulnerability Assessment

- Critical Facilities. In the County, 57 service oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns Blizzard a risk factor of 18 indicating this natural hazard is a moderate threat to the County. Blizzards with heavy snowfalls and strong wind speeds could cause structural damage to roofs of these facilities because of inadequate snow load capacity. Roofing material could be blown off. Electrical service may be interrupted. Operations of these facilities could be limited because employees are unable to get to work. The services of these facilities provided would not be interrupted except in extreme cases. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, with an annual payroll of approximately $285 million, see Table 3-6. Blizzards with heavy snowfalls and strong wind speeds could cause structural damage to buildings because of inadequate snow load capacity. Roofing material could be blown off. Businesses and industries' vulnerability to blizzards could include economic loss and disruption of inputs and outputs.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Snow from blizzards is beneficial to many crops because it provides insulation from freezing and extreme cold. Livestock can be vulnerable to exposure from strong and persistent winds and the heavy snowfall with drifting which can cause injuries and death. The strong winds that accompany blizzards can cause soil erosion of soil especially on ridge tops.
- Roads and Highways. The same problems created by heavy snowfall apply to blizzards as well, except blizzards are characterized by heavy winds in addition to snow. Direct hazards caused by poor visibility and slippery surface are safety concerns with snowplows. Following a heavy snowfall, visibility problems can persist with blowing snow and icing following partial melting and refreezing of the runoff water. Blowing snow is more apt to occur on north-south oriented roads such as STH 27. Following a heavy snowfall, children may be outside playing in the snow near the roadway and be oblivious to traffic. Following the snow deposition, lesser-used roads may remain blocked for hours, or even days after the storm is over. This blockage can cause motorist confusion and circuitous detours, as well as hampering access for emergency vehicles. Finding locations to store snow, especially snow removed from large expanses like urban parking lots, can be challenging.
- Railroads. Direct hazard caused by poor visibility. Following a heavy snowfall, visibility problems can persist with blowing snow.
- Airway. Light plane operation from the Black River Falls airport would not be possible during a heavy snowstorm, because of the poor visibility and the physical blockage of the runway and taxiways. Following a heavy snowfall, visibility problems can persist with blowing snow and icing following partial melting and refreezing of the runoff water. Heavy snow squalls in the vicinity of Jackson County could cause some light aircraft, possibly flying over the county, to decide to land at Black River Falls until the storms stop.
- Waterways. Blizzards would most likely only occur during periods of the year when navigation on County lakes and rivers would be seasonally closed. Recreational boaters in airboats, ice fishermen or snowmobilers could be subject to extreme hazard if they became stranded in an inaccessible area due to mechanical failure or other cause.
- Municipal Water. In the County, there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities' vulnerability to blizzards is negligible and would not be interrupted except in extreme cases.

- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the county, see Table 3-12. These facilities' vulnerability to blizzards is negligible and would not interrupt services provided by these facilities.
- Hazardous Material Sites. Heavy snow does not have as great an impact on hazardous materials in storage as does some of the other natural hazards, but heavy snow could cause collapse of storage building roofs, as well as restricting the response of emergency crews to the scene.

Blizzard Risk Assessment Designation
Blizzard Historical Occurrence Rating: Low - 2
Blizzard Vulnerability Rating: Catastrophic - 7
Blizzard Probability Rating: Possible - 4
Blizzard Local Official Survey Rating: Medium - 5
Blizzard Risk Assessment Designation: **Moderate Threat – 18 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Blizzard Hazard Mitigation Ideas: ● Local and state governments can produce and distribute family and traveler emergency preparedness information relating to severe winter weather hazards ● Burying or otherwise protecting electric and other utility lines can prevent utility disruption ● Local governments need to always plan for and maintain adequate road and debris clearing capabilities ● Use snow fences to limit blowing and drifting of snow over critical roadway segments

3.11 Jackson County, Extreme Cold Risk Assessment

Extreme Cold Definition: Winters are often accompanied with extremely cold temperatures. Extremely cold temperatures with strong winds can result in wind chills that cause bodily injury such as frostbite and death.

Extreme Cold History and Frequency:

1990's:	6 reported events by NCDC: 1/13/94, 2/10/95, 12/9/95, 1/29/96, 2/1/96, 1/16/97
2000's:	6 reported events by NCDC: 1/29/08, 2/10/08, 12/14/08, 12/21/08, 1/14/09, 12/10/09
2010's	5 reported events by NCDC: 1/1/10, 1/6/2014, 1/27/2014, 1/5/2015, 1/17/2016

The National Climatic Data Center reported that Jackson County experienced 6 extreme cold events during the 1990's, 6 events in the 2000's and 5 events in 2010's. This averages out to a little over one every other year. Damages associated with extreme cold temperatures include frostbite, loss of revenue for businesses that close early, water pipes breaking and flooding basements, heat and power failure in homes, vehicles that won't start and even death. No deaths have been recorded in Jackson County due to extreme cold temperatures. Estimating losses due to extreme cold temperatures are hard to predict due to the fact most damages are not recorded at a county level. If trends continue the county can expect to experience 3 extreme cold events in the next 5 years.

Extreme Cold Vulnerability Assessment

- Critical Facilities. In the County, 57 service oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns Extreme Cold a risk factor of 27 indicating this natural hazard is a high risk to the County. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.

- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, with an annual payroll of approximately $285 million, see Table 3-6. Extreme cold can lead to physical problems for workers (frostbite) and lower productivity. The extreme cold can cause mechanical equipment failures, which could lead to economic loss and disruption of inputs and outputs. In addition, businesses may close early, thus losing sales.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Extreme cold can cause dangerous physical conditions (frostbite) for agricultural workers. Livestock can be vulnerable to exposure from cold temperatures causing more stress on the animal and less production. In addition, extreme cold can cause injuries and death. Equipment failures such as frozen water pipes, fuel lines, etc. can disrupt agricultural production.
- Roads and Highways. Extreme cold impacts highway transportation by creating problems with vehicle starting and operation. Fuels lines and cooling systems can freeze, door latches can stop working properly, and other mechanical components can fail. The problem of extreme cold is compounded by the fact that roadways are usually already impacted by snow and ice from previous snowstorms. There are safety hazards to individual motorists if they have any vehicle mechanical problems, or a driving situation that forces them into the ditch or situation where the vehicle is inoperative. Exposure injury, or death, either in or out of the vehicle, can occur quickly. Adverse impact to the road infrastructure can include contraction of bridge joints; contribute to rock face collapse, and pavement cracking.
- Railroads. Extreme cold causes contraction of welded continuous rails, and the imposition of a speed limit by the railroad companies. This speed reduction would impact operations on some railroads. The mechanical components of locomotives, rail cars, and railroad crossing gates can be adversely impacted by extreme cold. The extreme cold can impact railroad operating and maintenance crew's personal safety if they are exposed to the temperatures.
- Airway. Extreme cold can adversely impact all the mechanical components of a light aircraft, including the engine and control surfaces. Planes in flight during extreme cold periods can experience engine icing.
- Waterways. Extreme cold events would most likely only occur during periods of the year when navigation on County lakes and rivers would be seasonally closed. Recreational boaters in airboats, or snowmobiles could be subject to extreme hazard if they became stranded in an inaccessible area due to mechanical failure or other cause.
- Municipal Water. In the County, there are 25 municipal wells and water systems in operation, see Table 3-11. The water systems are at slight risk to extreme cold temperatures as water mains are more susceptible to problems (frozen water lines) but service interruption would be minimal except in extreme cases.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. These facilities' vulnerability to extreme cold is negligible and would not interrupt services provided by these facilities.
- Hazardous Material Sites. Depending upon the type of material involved, there could be problems from the material escape if the containers or piping rupture during extreme cold.

Extreme Cold Risk Assessment Designation

Extreme Cold Historical Occurrence Rating: High - 9
Extreme Cold Vulnerability Rating: Critical - 7
Extreme Cold Probability Rating: Likely - 6
Extreme Cold Local Official Survey Rating: Medium - 5
Extreme Cold Risk Assessment Designation: **High Threat – 27 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Extreme Cold Hazard Mitigation Ideas: ● Local governments can organize outreach to vulnerable populations during periods of extreme temperature ● Communities can encourage utility companies to offer special arrangements for paying heating bills ● A community can establish heating and/or cooling centers for vulnerable populations

3.12 Jackson County, Earthquake

Earthquake Definition: An earthquake is a shaking or sometimes violent trembling of the earth's surface from the sudden shifting of rock beneath the earth's crust. These sudden shifting releases energy in the form of seismic waves or wave-like movement of the earth's surface. Earthquakes can strike without warning and may range in intensity from slight tremors to great shocks. They can last from a few seconds to over five minutes and they may also occur as a series of tremors over a period of several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Many casualties result from falling objects and debris, due to the shocks. The shocks cause structures to shake resulting in damage or even destruction of structures. Disruption of communications, electrical power supplies and gas, sewer and water lines should be expected. Earthquakes may trigger fires, dam failures, landslides or releases of hazardous material, compounding their disastrous effects.

Earthquakes are measured by two principal methods: seismographs and human judgment. The seismograph measures the magnitude of an earthquake and interprets the amount of energy released on the *Richter scale*, a logarithmic scale with no upper limit. This amount is expressed in Arabic numbers and each unit of increase represents a ten-fold increase in magnitude. An earthquake measuring 6.0 on the Richter scale is ten times more powerful than a 5.0 and one hundred times more powerful that an earthquake, measuring 4.0. This is a measure of the absolute size or strength of an earthquake and does not consider the effect at any specific location. The *Modified Mercalli Intensity Scale* is an intensity scale expressed in Roman numerals, which reports the amount of shaking and effects at a specific location based on expert judgment. The scale has twelve classes and ranges from I (not felt) to XII (total destruction). No occurrence of earthquakes in Wisconsin has been severe. The most serious recorded earthquake registered 5.1 on the Richter scale and had a maximum intensity on the Mercalli Scale of VII.

Earthquake History and Frequency: While earthquakes were felt in Milwaukee in 1981, Madison in 1987 and 2008, and Clintonville in 2012, no major earthquakes have occurred in Jackson County in recent history.

Earthquake Vulnerability Assessment

- Critical Facilities. In the County, 57 service-oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns Earthquake a risk factor of 13 indicating this natural hazard is a low threat to the County. Earthquakes can range from nothing felt to total destruction and loss of life. Since no major earthquakes have occurred in Wisconsin including Jackson County in recent history, the risk to these facilities is insignificant. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, with an annual payroll of approximately $285 million, see Table 3-6. Businesses vulnerability to earthquakes can range from nothing felt to total destruction and loss of life. Since no major earthquakes have occurred in Wisconsin or Jackson County the risk to businesses is insignificant.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Agriculture vulnerability to earthquakes is negligible.
- Roads and Highways. Earth movement can cause obvious incongruities with the roadway, as well as secondary damage due to related landslides, broken utility lines, and collapsed buildings on the roadway. This secondary damage of landslides would be most severe on roads in rock cuts, or cliffs, or any of the roads leading ridge tops. Broken water or sewer lines could present the biggest problem in the eleven incorporated communities. Broken gas mains would present the greatest danger of fire and explosion, especially in the vicinity of downed power lines that are creating sparks.
- Railroads. Earth movement can cause obvious incongruities with railroad lines. Even a slight shift in the earth's surface can cause switches to not properly align, and a slight tremor could cause a parked rail car to move if the brakes were not properly set.

- Airway. Earth movement could cause parked planes to shift position, and in severe, but unlikely, movement, to smash into one another. Underground fuel tanks could rupture. Hangers and other structures could be damaged. An earthquake would have no direct effect on an airborne aircraft, but runway damage could occur, with rutting or furrowing affecting the unsuspecting pilot upon landing.
- Waterways. An earth tremor could cause wave action, and possibly temporary current reversal on even rivers like the Black River. If the event should occur during the recreation season it could influence unsuspecting small crafts such as canoes, kayaks or small fishing boats.
- Municipal Water. In the County, there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities vulnerability is negligible and would not interrupt services provided by the facilities except in extreme cases.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. These facilities vulnerability to earthquakes is negligible and would not interrupt services provided except in extreme cases.
- Hazardous Material Sites. Industrial operations that require the piping of hazardous material to various locations in the storage or manufacturing process are most prone to earth tremor damage in that the pipes could break during the tremors. Material stored in tanks or other containers is always prone to the containers falling or being hit by debris, and breaking, resulting in the release of the material.

Earthquake Risk Assessment Designation
Earthquake Historical Occurrence Rating: Low - 1
Earthquake Vulnerability Rating: Catastrophic - 7
Earthquake Probability Rating: Possible - 3
Earthquake Local Official Survey Rating: Low - 2
Earthquake Risk Assessment Designation: **Low Threat – 13 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Earthquake Hazard Mitigation Ideas: ● Information gained from seismic hazard mapping can be used to assess risk ● State and local highway departments should review construction plans from all bridges to determine their susceptibility to collapse ● Local or state governments can use community outreach activities to foster an awareness of earthquake mitigation activities ● Earthquake hazards can be mitigated through land use planning ● Encourage local governments to adopt and enforce updated building code provisions is one effective way to reduce earthquake damage risk.

3.13 Jackson County, Extreme Heat Risk Assessment

Extreme Heat Definition: A heat wave is primarily a public health concern. During extended periods of very high temperatures or high temperatures of humidity, individuals can suffer a variety of ailments including heat exhaustion and heat stroke. Heat stroke is a life-threatening condition that requires immediate medical attention. In addition to posing a public health hazard, periods of excessive heat usually result in high electrical consumption for air conditioning, which can cause power outages and brown outs. Many deaths during a heat wave are the result of heat stroke. The elderly, disabled and debilitated are especially susceptible to heat stroke.

Heat is the number-one weather killer in this country. According to information from the Centers of Disease Control and Prevention there is on average 146 people killed per year in the U.S. for the period of 1998-2010. Wisconsin is no exception to heat related deaths. Since 1982 heat waves have been responsible for more deaths in Wisconsin (216) than all other natural disasters combined. Of these 216 deaths, heat was the direct or primary cause in 121 of them. This comes out to an average of 4 per year.

In 1995, two major killer heat waves affected most of Wisconsin, resulting in 154 heat-related deaths and over 300 heat-related illnesses. In the summer of 2011, Wisconsin lost five people to heat-related illnesses during the

July 18-22 heat wave. In 2012, Wisconsin had confirmed 27 heat related deaths, most occurred during five days of Excessive Heat Warnings from July 2-6. The heat index rose to 105 F degrees for 48 hours with nighttime lows of 75 F. It was the second hottest and third longest heat wave in Wisconsin. In 2013, 11 Wisconsin residents suffered heat-related death. The 1995 heat wave caused more deaths than any other weather-related event in the history of Wisconsin. Other recent heat waves include the summer of 1999 which claimed 20 lives and the summer of 2001 in which 15 people died.

Extreme Heat History and Frequency:

1970's	No information available from NCDC. WI Emergency Management Agency's Natural Disaster Activity by County (1991-2001) Report recorded 1976 drought. Presidential Emergency Declaration.
1990's:	6 reported events by NCDC: 4/3/95, 7/13/95 -57 deaths in state, 10/12/95, 7/4/99, 7/23/99, 7/28/99
2000's:	1 reported event by NCDC: 7/31/01 through first week and a half of August
2010's:	3 reported events by NCDC: 7/17/11-$6,000 PD, 7/2/2012, 6/29/2018

The National Climatic Data Center reported that Jackson County experienced 6 extreme heat events during the 1990's, 1 event in 2001, and 3 events from 2010 to 2018. The National Weather Service Forecast Office, Milwaukee/Sullivan, WI reported that between 1982 and 2011 Jackson County experienced 14 heat wave events totaling 42 heat wave days. Southwestern Wisconsin logged the most heat wave days during this time period. Damages associated with extreme heat are difficult to estimate, as amounts directly related to extreme heat are not tracked at the county level. Most damages which occur are additional costs associated with the additional power consumption by air conditioning and the costs associated with medical responses to heat strokes.

Extreme Heat Vulnerability Assessment

- Critical Facilities. In the County, 57 service-oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns extreme heat a risk factor of 22 indicating this natural hazard is a high risk to the County. See Tables 3-9 through 3-16 and Maps 3-1 through 3-5 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, with an annual payroll of approximately $285 million, see Table 3-6. Extreme heat can lead to physical problems for workers (heat exhaustion) and lower productivity. The extreme heat can cause mechanical equipment failures, which could lead to economic loss and disruption of inputs and outputs.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Extreme heat can cause dangerous physical conditions (heat exhaustion) for agricultural workers. Livestock can be vulnerable to extreme heat causing more stress on the animal and less production. In addition, severe heat can cause injuries and death. Equipment failures due to overheating could disrupt agricultural production.
- Roads and Highways. High heat does not present as direct a threat to transportation in general than do some other natural hazards such as blizzards or extreme cold, however heat can have many side impacts, such as the safety and comfort of people and livestock having to endure the condition without air conditioning. Motor vehicles may overheat and stall in unsafe locations at highway intersections, fuel stored, illegally, in vehicle trunks or truck beds is more apt to volatilize and cause safety problems. As heat increases vehicle tires have the potential to deteriorate more quickly. Extreme heat can cause asphalt road surface buckling and rough bumps and cracks. Extreme heat can cause dangerous working conditions for highway maintenance workers outdoors or in poorly ventilated or non-air-conditioned shop buildings.

- Railroads. Extreme heat can cause buckling and kinking of welded continuous steel rails. Extreme heat can cause dangerous working conditions for track and other rail maintenance workers outdoors or in poorly ventilated or non-air-conditioned shop buildings.
- Airway. Extreme heat can cause volatilization of fuel in aircraft parked outside. Extreme heat can cause changes in atmospheric pressure and in the lift characteristics of small aircraft that a pilot must be aware of and compensate for.
- Waterways. The biggest impact of extreme heat is apt to be the danger of heat exhaustion to people working or playing outdoors. Hot weather could increase the number of pleasure craft operating on rivers and lakes and result in increased potential for heat exhaustion.
- Municipal Water. In the County, there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities' vulnerability is negligible and would not interrupt services provided by the facilities except in extreme cases. In extreme cases water usage may increase to the point where the water system supply may be stressed.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. These facilities' vulnerability to extreme heat is negligible and would not interrupt services provided except in extreme cases.
- Hazardous Material Sites. Hazardous material of various types could volatilize in extreme heat, especially if safety relief valves were not operating properly.

Extreme Heat Risk Assessment Designation
Extreme Heat Historical Occurrence Rating: Moderately High - 6
Extreme Heat Vulnerability Rating: Catastrophic - 7
Extreme Heat Probability Rating: Likely - 6
Extreme Heat Local Official Survey Rating: Low/Medium - 3
Extreme Heat Risk Assessment Designation: **High Threat - 22 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Extreme Heat Hazard Mitigation Ideas: ● Local governments can organize outreach to vulnerable populations during periods of extreme temperature ● Communities can encourage utility companies to offer special arrangements for paying utility bills ● A community can establish additional heating and/or cooling centers for vulnerable populations.

3.14 Jackson County, Agricultural Risk Assessment

Agricultural Definition: Agriculture is the science or art of cultivating the soil, producing crops, and raising livestock and in varying degrees the preparation of these products for man's use - *Webster's New Collegiate Dictionary*. For more than 150 years, agriculture has driven the State of Wisconsin's economy. It remains the number one industry in Wisconsin, employing one of every five people. In 2017 approximately 10% of Jackson County's employed civilian population was employed in agriculture.

There are many natural hazards that can affect agricultural production in the State. Droughts reduce crop growth and yields and can decimate croplands. Extreme temperatures, high winds, hail and other extreme weather conditions can also decimate crop production. Insects can also decimate a crop resulting in a total loss. Animal diseases in farm animals carry the potential of harming not only the animals' health, but also human health in some cases. Agricultural losses from floods include crop loss, soil erosion or property damage to farm structures and equipment. These are just some of the hazards that may affect agriculture.

Agricultural History and Frequency: The history of agricultural losses due to droughts, floods, extreme temperatures, high winds, and hail are detailed under the appropriate natural hazard section.

There are many natural hazards that can affect agricultural production droughts, floods, extreme temperatures, high winds, hail, insects to name a few. Department of Revenue records show that in 2019 Jackson County had approximately 209,963 acres of agricultural land. Agricultural hazards can occur annually in the County. Estimating future agricultural losses is difficult due to the numerous way losses can occur and the fact that some of the losses are covered by insurance and are not reported at a county level.

Agricultural Vulnerability Assessment

- Critical Facilities. In the County, 57 service-oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns Agricultural a risk factor of 11 indicating this natural hazard is a low risk to the County. Critical facility's vulnerability to agriculture is not applicable. See Table 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, see Table 3-6. For most businesses and industries, vulnerability to agriculture production and raising of livestock would be negligible. Businesses and industries that are involved in the growth, production, processing, manufacturing, distribution and wholesale and retail sales of agricultural products and food products can be vulnerable to crop and livestock losses. These businesses and industries can sustain economic losses from reduced production of agricultural commodities due to damages caused by natural hazards.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Agriculture production is vulnerable to numerous natural hazards including droughts, floods, extreme temperatures, high winds, hail etc. and is detailed under the appropriate hazard section.
- Roads and Highways, Railroads, and Waterways. Unlike the other risks outlined in this section, agricultural risk is not a natural hazard, but rather an economic condition created by the occurrence of natural hazards. If any result would occur from agricultural risk, or crop failure, to impact transportation modes, it would be a reduction in truck and train traffic due to less grain being produced to haul. Ultimately an import of hay or other livestock feed into the area could result.
- Airway. Agricultural risk is an economic condition, not a natural hazard. There would not be a direct threat to the airports or air travel.
- Municipal Water. In the County there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities vulnerability to agriculture is not applicable.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. These facilities vulnerability to agriculture is not applicable.
- Hazardous Material Sites. If the agricultural risk is brought about because of severe drought, then it is likely natural weather conditions and ground cover condition is also conducive to the danger of wildfire. The same threat caused by fire would be possible. If the agricultural risk is caused by a shift in market conditions, or severe insect or disease infestation, the wildfire threat would not be as high.

Agricultural Risk Assessment Designation

Agricultural Historical Occurrence Rating: Low - 2
Agricultural Vulnerability Rating: Limited - 3
Agricultural Probability Rating: Possible - 3
Agricultural Local Official Survey Rating: Medium - 3
Agricultural Risk Assessment Designation: **Low Threat – 11 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Agricultural Hazard Mitigation Ideas: Agricultural Hazard Mitigation Ideas for droughts, floods, extreme temperatures, high winds, and hail are detailed under the appropriate natural hazard section.

3.15 Jackson County, Drought Risk Assessment

Drought Definition: 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 enough length and intensity that markedly reduces crop yields. Hydrologic drought is a dry period of enough 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.

Wisconsin is most vulnerable to agriculture drought. In 2016 the state had about 14,427,000 acres of farmland on 68,700 farms with $10.7 billion in farm receipts (Wisconsin Agricultural Statistics Service). 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. Droughts also greatly increase the risk of forest fires and wildfires because of the extreme dryness. In addition, the loss of vegetation in the absence of enough water can result in flooding, even from average rainfall, following drought conditions.

Drought History and Frequency:

1970's:	1 event report by Wisconsin Emergency Management, 1976, $1 million-Public Gov't Property and Facilities Damage and $623 million Private-Individual Property, Crop and Facilities Damage to Jackson and 63 other counties, Presidential Emergency Declaration.
1980's	1 event report by Wisconsin Emergency Management, *Hazard Analysis, November 2002* - One of the most severe droughts on record for state - 1987-1998 drought that resulted in 52% of the state's 81,000 farms having a crop loss of 50% or more. All Wisconsin counties were designated eligible for drought assistance.
1990's	No reported events
2000's	1 event reported 2003
2010's	10 reported events by NCDC: 8/1/2012-11/1/2012, 9/3/2013-12/1/2013, 1/1/2014-2/1/2014

Wisconsin Emergency Management reported one major drought event (1976), which affected Jackson and 63 other counties in the State. A Presidential Emergency Declaration was made for those counties. According to *Wisconsin Emergency Management's Hazard Analysis, November 2002*, Wisconsin's five most significant droughts in terms of severity and duration are: 1987-1988, 1976-1977, 1955-1959, 1948-1950 and 1929-1934. Jackson County's probability of a drought occurring is approximately 27% per year based on the 48-year record of data. Based on the trends reported by NCDC, 3 years of drought occurred from 2010 to 2018 which would raise the risk of drought to 37.5% when looking at more recent data and potential trends.

Drought Vulnerability Assessment

- Critical Facilities. In the County, 57 service-oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns Drought a risk factor of 20 indicating this natural hazard is a moderate threat to the County. In drought situations, water use may be restricted and affect the operation of these facilities. Hospitals may need water storage systems in emergency situations. Fire stations need adequate water capacity to fight fires. Critical facilities' vulnerability to droughts is negligible and won't interrupt services provided by these facilities except in extreme cases. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, with an annual payroll of approximately $285 million, see Table 3-6. For most businesses and industries, vulnerability to drought would be negligible. Examples of businesses and industries that are negatively impacted by drought conditions include: agribusinesses, tourism related businesses, boat dealerships and marinas, golf courses, and fisheries. Droughts also have the potential to restrict water availability to create

energy, reduce cooling processes, and decrease the ability to clean machinery or equipment. In extreme cases, this can hinder energy production and industries dependent on high water use.

- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Agriculture's vulnerability to drought can be catastrophic. One of the most severe droughts in the state occurred in 1987-1988, which resulted in 52% of the state's 81,000 farms having crop losses of 50% or more. All Wisconsin counties were designated eligible for drought assistance. The costs and losses to agriculture producers can include: reduced yields and crop loss, increased insect infestation and plant disease, increased irrigation, cost of new or supplemental water resource development, wind erosion of top soil, forced reduction of foundation stock, reduced milk production, increased feed costs, high livestock mortality rates, disruption of reproductive cycles, decreased stock weights, reduced productivity of pastureland and loss of farms and dairy herds.
- Roads and Highways, Railroads, and Waterways. The impact of drought on transportation modes is much the same as that caused by agricultural failure; a reduction in agriculturally related freight traffic. Droughts can impact water levels for navigable waterways, posing threats to transportation of watercraft when water levels decrease.
- Airway. Extended drought could increase the possibility of wildfires. The possible impact of wildfires on the Black River Falls airport and on light plane travel has been discussed under that topic.
- Municipal Water. In the County, there are 25 municipal wells and water systems in operation, see Table 3-11. Municipal water vulnerability to droughts can include decreased supply of water from low water tables and increased pollutant concentrations. Services from these facilities should not be interrupted except in extreme cases.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the county, see Table 3-12. These facilities' vulnerability to droughts can include decreased water supply and diminished sewage flows. Services from facilities should not be interrupted except in extreme cases.
- Hazardous Material Sites. Extended drought could increase the possibility of wildfires. The possible impact of wildfires on hazardous material sites has been discussed under that topic.

Drought Risk Assessment Designation

Drought Historical Occurrence Rating: Moderately High - 7
Drought Vulnerability Rating: Critical - 5
Drought Probability Rating: Likely - 6
Drought Local Official Survey Rating: Low - 2
Drought Risk Assessment Designation: **Moderate Threat – 20 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Drought Hazard Mitigation Ideas: ● Citizens can be encouraged to take water-saving measures, especially when extra water is needed for irrigation and farming ● Maintain adequate water storage for human consumption ● Communities can pass ordinances to prioritize or control water use, particularly for emergency situations ● Contingency plans can be developed to help anticipate needs and actions to take during a drought ● Designs or plans for water delivery systems can include consideration of drought events ● Crop insurance can preserve economic stability for farmers during a drought

3.16 Jackson County, Fog Risk Assessment

Fog Definition: Simply, fog is a cloud near the ground. A cloud is an area of condensed water droplets (or ice crystals in the upper atmosphere). The same processes that produce clouds high above the ground can produce clouds near the surface. Therefore, understanding fog requires some basic meteorology. Fog forms when air can no longer hold all the moisture it contains. This happens when 1) air is cooled to its dew point, which is the temperature at which air is holding as much moisture as it can (cool air can hold more moisture than warm air) or 2) the amount of moisture in the air increases. Once air has reached its dew point, it condenses onto very small particles forming tiny water droplets that comprise fog.

Fog is a hazard mostly for one very important reason: reduced visibility. Airport delays, automobile accidents, plane crashes, and many other transportation problems are frequently caused by fog. However, like several other natural hazards, fog can also be beneficial. Several species of plants, including some crops, depend on fog for moisture and cool temperatures from decreased sunlight.

Fog History and Frequency:
2010's: 1 event reported by NCDC-3/28/2018

Fog is responsible for an average of over $1 million in property damage, dozens of injuries, and several deaths every year in the United States. The financial cost of transportation delays caused by fog has not been calculated but is substantial. While fog will occur in Jackson County, fog covering a large area and causing significant damage is not likely to occur.

Fog Vulnerability Assessment

- Critical Facilities. In the County, 57 service-oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment Assigns Fog a risk factor of 20 indicating this natural hazard is a moderate threat to the County. Critical facilities' vulnerability to fog is negligible and would not interrupt services provided by these facilities. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries, see Table 3-6. Businesses and industries vulnerability to fog would be negligible.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Several species of plants, including some crops, depend on fog for moisture. Agriculture's vulnerability to fog is negligible except in extreme cases during prolonged periods of heavy rains, fog may be a contributing factor in some plant diseases.
- Roads and Highways. Fog is most apt to occur in lower elevations blocked by wind flow. Poor visibility is the major problem with fog although in the early spring and late fall freezing of the roadway surface can accompany fog and present an additional hazard. Heavy fog can be particularly challenging to pedestrians and bicyclists, even those not directly on the roadway. Heavy fog in parking lots can present security and safety problems for people walking to their cars to and from buildings.
- Railroads. The same visibility problems confronting the motorist confront the railroad engineer, except the rail operator is more assured other trains will be clear of the right-of-way than a motorist can be assured other vehicles will be clear of the highway. The train engineer still must contend with pedestrians and animals being on the track and not seen in a heavy fog, as well as the possibility of an unseen vehicle at a road grade crossing.
- Airway. The Black River Falls airport is not equipped to handle aircraft in conditions other than Visual Flight Rules.
- Waterways. There is no commercial navigation on any waterway in Jackson County. Most waterways in the County are not big enough to handle larger boats, which typically have radar. This means that the same visibility problems confronting motorists apply to pleasure boaters.
- Municipal Water. In the County there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities' vulnerability to fog is negligible and would not interrupt services provided by these facilities.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. These facilities' vulnerability to fog is negligible and would not interrupt services provided by these facilities.
- Hazardous Material Sites. Fog presents no specific hazard to stored hazardous material. Hazardous material being transported is subject to the same danger as the transportation mode being used.

Fog Risk Assessment Designation

Fog Historical Occurrence Rating: High - 7
Fog Vulnerability Rating: Limited - 3
Fog Probability Rating: Highly Likely - 9
Fog Local Official Survey Rating: Low - 1
Fog Risk Assessment Designation: **Moderate Threat – 20 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Fog Hazard Mitigation Ideas: ● Local and State governments can develop automated visibility warning systems that use weather sensors to detect reduced visibility conditions (heavy rains, fog white-out). These systems could trigger a permanent or portable Dynamic Message Sign (DMS) with a message indicating the adverse driving conditions. These same systems could also distribute information on the road hazard to traffic management centers, public safety agencies, or other traffic information systems. ● Educate citizens on weather and road condition resources such as radio, cable TV, Internet etc.

3.17 Jackson County, Landslide Risk Assessment

Landslide Definition: A landslide is a relatively sudden movement of soil and bedrock downhill in response to gravity. The movement of the soil can cause damage to structures by removing the support for the foundation of a building or by falling dirt and debris colliding with or covering a structure. Landslides can be triggered by heavy rain, bank or bluff erosion or other natural causes.
In Wisconsin landslides generally are not dramatic, however there have been instances of rock fall along bluffs and the collapsing of hillsides during heavy rainfall.

Landslide History and Frequency: In Jackson County landslides are very infrequent and generally cause minor damage therefore there is no available data pertaining to the history of landslides.

Landslide Vulnerability Assessment

- Critical Facilities. In the County, 57 service-oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns Landslide a risk factor of 8 indicating this natural hazard is a low risk to the County. Critical facilities' vulnerability to landslides is negligible and would not interrupt services provided by these facilities except in extreme cased. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 business and industries that employ 6,557 people, see Table 3-6. For most businesses and industries vulnerability to landslides would be negligible except for buildings located next to steep slopes or blufflands.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Agriculture's vulnerability to landslides is negligible because this natural hazard is usually an isolated incident and damages would be confined to a limited area.
- Roads and Highways. Landslides would be most severe on roads in rock cuts, or cliffs.
- Railroads. Landslides can cause obvious damage to railroad lines. Landslides would be most severe on railroads in rock cuts, or cliffs.
- Airway. Underground fuel tanks could rupture. Hangers and other structures could be damaged. A landslide would have no direct effect on an airborne aircraft, but runways damage could occur with mud or debris covering it.
- Waterways. A landslide could cause wave action on rivers like the Black River. If the event should occur during the recreation season it could influence unsuspecting small crafts such as canoes, kayaks or small fishing boats. In extreme cases, landslides can lead to low water visibility and create blockages in river channels.

- Municipal Water. In the County there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities' vulnerability to landslides is negligible and would not interrupt services provided by the facilities except in extreme cases.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. These facilities' vulnerability to landslides is negligible and would not interrupt services provided except in extreme cases.
- Hazardous Material Sites. Industrial operations that require the piping of hazardous material to various locations in the storage or manufacturing process are most prone to landslide damage in that the pipes could break. Material stored in tanks or other containers is always prone to the containers falling or being hit by debris, and breaking, resulting in the release of the material.

Landslide Risk Assessment Designation
Landslide Historical Occurrence Rating: Low - 1
Landslide Vulnerability Rating: Negligible - 1
Landslide Probability Rating: Possible - 3
Landslide Local Official Survey Rating: Low/Medium - 3
Landslide Risk Assessment Designation: **Low Threat – 8 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Landslide Hazard Mitigation Ideas: ● Local governments, developers, and residents can make better decisions using maps ● Building codes can set construction standards, including minimum foundation requirements, in landslide-prone areas ● Zoning ordinances may be used to create buffers between structures and high-risk areas ● A special purpose ordinance for slide-prone areas may be used to limit fill or dumping ● Set drainage control regulations to reduce the risk of landslides resulting from saturated soils ● Grading ordinances require developers and landowners to obtain permits prior to filling or regrading ● Hillside development ordinances are special purpose ordinances that set specific standards for construction on hillsides ● Sanitary system codes can reduce the effect of drainage on landslides by limiting the type and location of sanitary systems ● Open space designations keep landslide prone areas undeveloped ● Structures may be moved to less hazardous locations ● Land and structures may be purchased by and titled in the name of a local government body than can remove structures and enforce permanent restrictions on development ● Restraining structures may be designed and used to hold soil in place ● Grading can be used to increase slope stability ● Various types of vegetation increase soil stability ● Placing utilities outside of landslide areas decreases risk of service disruption ● Restrictive covenants, a legal binding agreement, can be used in a private development to impose restrictions on land use

3.18 Jackson County, Subsidence Risk Assessment

Subsidence Definition: Sinkholes are geological phenomena that can pose a hazard to structures and people. A sinkhole is a depression in the ground caused by an evacuation of support from below the soil. Sinkholes can form naturally in areas with karst geology, areas that have limestone or other bedrock that can be dissolved by water. As the limestone rock under the soil dissolves over time from rainfall or flowing groundwater, a hollow area may form underground, into which surface soil can sink. Sinkholes can also be caused by human activity. Areas with karst conditions can be subject to groundwater contaminants from pollutants entering a sinkhole, fissure or other karst features.

Sinkholes have not been a factor in any natural disaster. However, karst features should be identified and considered in a community especially for land use planning, stormwater management and hazardous materials planning to avoid possible damage to structures or contamination of groundwater. Even a well 100 feet deep can be contaminated from surface pollutants entering a sinkhole.

Subsidence History and Frequency: No information was found on major subsidence events in Jackson County. Due to this fact of no major subsidence events within the county the probability of a subsidence causing structural damage within Jackson County is low.

Subsidence Vulnerability Assessment

- Critical Facilities. In the County, 57 service oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. The Natural Hazard Risk Assignment assigns Subsidence a risk factor of 7 indicating this natural hazard is a low risk to the County. Buildings are susceptible to sink holes and can cause a wide range of damage to structures including damage to foundations, partial collapse and/or total destruction of buildings. Sinkholes have not been a factor in any natural disasters in the County. Critical facilities' vulnerability to sinkholes in this area is negligible and would not interrupt services provided by these facilities except in extreme cases. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries that employ 6,557 people, with an annual payroll of approximately $285 million, see Table 3-6. Buildings are susceptible to sinkholes and can cause a wide range of damages to structures including damage to foundations, partial collapse, and/or total destruction of buildings. Business and industries' vulnerability to sinkholes is negligible in this area.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Agriculture vulnerability to sinkholes is negligible because this natural hazard is usually an isolated incident and damages would be confined to a limited area.
- Roads and Highways. Roads built on areas with karst topography could be subject to subsidence. Sinkholes, when the have occurred in other areas, often happen suddenly, and a vehicle on the highway could fall into a hole opening beneath it. The danger of the large subsidence area remains a threat to an unsuspecting motorist, especially at night, until proper barricades can be put up. The threat of subsidence is greater on the ridge top and side hill areas than in the valleys.
- Railroads. Subsidence along the railroad tracks could come from direct undermining of the banks by river action. Potential sinkholes can damage railway infrastructure and disrupt normal transportation patterns.
- Airway. The Black River Falls airport is not built in an area prone to subsidence.
- Waterways. Soil surface subsidence would have little impact on river navigation.
- Municipal Water. In the County there are 25 municipal wells and water systems in operation, see Table 3-11. Sinkholes can cause damage to structures and underground piping that carries the water supply. Wells can be contaminated from surface pollutants entering sinkholes. These facilities' vulnerability to sinkholes in this area is negligible and would not interrupt services provided by the facilities except in extreme cases. In extreme cases, long term overdraft of wells can result in subsidence and sinking ground surface.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. Sinkholes can cause damage to structures and underground piping that carries wastewater. These facilities vulnerability to sinkholes is negligible and would not interrupt services provided except in extreme cases.
- Hazardous Material Sites. Unless a hazardous materials storage or disposal site were built in a karst topography or on unstable wetland soils, an unlikely possibility, subsidence would not pose a major problem.

Subsidence Risk Assessment Designation

Subsidence Historical Occurrence Rating: Low -1
Subsidence Vulnerability Rating: Negligible - 1
Subsidence Probability Rating: Possible - 3
Subsidence Local Official Survey Rating: Low - 2
Subsidence Risk Assessment Designation: **Low Threat – 7 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Subsidence Hazard Mitigation Ideas: ● Local governments and state governments can promote community awareness of subsidence risks and effects ● Old mining areas or geologically unstable terrain should be identified and mapped so development can be prevented and limited ● Areas susceptible to collapse can be maintained as public open space ● Local governments can acquire and title land and enforce permanent restrictions on development ● Filling or buttressing subterranean open spaces, as with abandoned mines ● Move structures to less hazardous locations ● Monitor groundwater levels in subsidence-prone areas

3.19 Jackson County, Pandemic Flu Risk Assessment

Pandemic Flu Definition: A pandemic is a global disease outbreak. A flu pandemic occurs when a new influenza virus emerges for which people have little or no immunity, and for which there is no vaccine. The disease spreads easily person-to-person, causes serious illness, and can sweep across the country and around the world in very short time.

It is difficult to predict when the next influenza pandemic will occur or how severe it will be. Wherever and whenever a pandemic starts, everyone around the world is at risk. Countries might, through measures such as border closures and travel restrictions, delay arrival of the virus, but cannot stop it. Flu Pandemics are low frequency events, but they have the capability of being extreme impact disasters.

Pandemic Flu History and Frequency:
Flu Pandemics are naturally occurring events. Flu pandemics have occurred three times in the last century, in 1918, 1958, and 1967. The 1918 pandemic was the most severe disease outbreak in the history of the world. An estimated 20-40 million people died worldwide. The most recent outbreak was the 2019 novel coronavirus pandemic. It is not a matter of if another pandemic will occur but when will it occur and how lethal will it be.

Pandemic Flu Vulnerability Assessment

- Critical Facilities. In the County, 57 service oriented critical facilities were identified. These include (31) government and military facilities; (6) hospitals, clinics, and residential facilities; (11) police and fire facilities; and (9) schools. These facilities will be severely affected during a pandemic flu. Hospitals and clinics will be inundated with the sick, Residential Care facilities will be closed to visitors and all the services will be severely affected by employees unable to come to work. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries, see Table 3-6. Businesses and industries will be severely affected by employees unable to come to work due to illness, at-home caring for ill family members, or perhaps a fear of going to work due to the contagious nature of the disease. Businesses can suffer from shut-downs and layoffs from infected employees.
- Agriculture. In 2019, county land use statistics indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. Agriculture will be affected by workers unable to tend to crops and animals if workers become ill and industry market disruption occurs.
- Roads and Highways. Automobiles and buses carrying infected people are a means of spreading a pandemic flu quickly throughout the U.S. and the world. A way of slowing this spread will be to ask people not to travel and mandating travel restrictions. In addition, highway crews and maintenance personnel will be affected.
- Railroads. Trains carrying infected people and supplies are a means of spreading a pandemic flu quickly throughout the U.S. and the world. A way of slowing this spread will be to stop passenger train services. In addition, other train services would be affected due to the lack of operators who would be unable to work due to the flu.
- Airway. Airplanes carrying infected people are a means of spreading a pandemic flu quickly throughout the U.S. and the world. A way of slowing this spread will be to close airports and mandate travel restrictions. A pandemic flu will have a severe impact on airways.
- Waterways. Pandemic Flu presents no specific hazard to waterways.

- Municipal Water. In the County there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities' vulnerability to Pandemic Flu is through the people who would be maintaining and running these facilities. If the operators are affected, then the facility will be affected due to lack of operators. If a waterborne illness occurs, municipal water could be affected and continue to spread the illness.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. These facilities' vulnerability to Pandemic Flu is through the people who would be maintaining and running these facilities. If the operators are affected, then the facility will be affected due to lack of operators. If a waterborne illness occurs, wastewater could be affected and continue to spread the illness.
- Hazardous Material Sites. Pandemic Flu presents no specific hazard to stored hazardous material but could impact persons responsible for monitoring and maintaining these sites.

Pandemic Flu Risk Assessment Designation

Pandemic Flu Historical Occurrence Rating: Low -1

Pandemic Flu Vulnerability Rating: Critical – 7

Pandemic Flu Probability Rating: Possible - 2

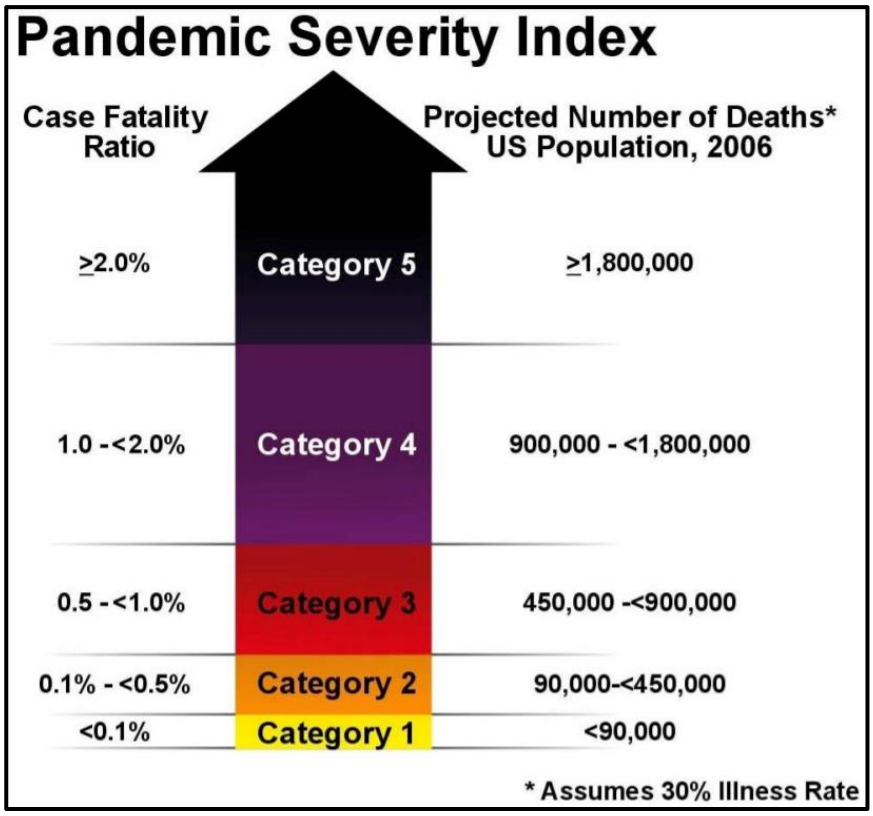
Pandemic Flu Local Official Survey Rating: Low - 3

Pandemic Flu Risk Assessment Designation: **Low Threat – 13 points**

See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

Pandemic Flu Risk Assessment Designation

The following is a Pandemic Severity Index, this index uses case fatality ratio as the critical driver for categorizing the severity of a pandemic. The index is designed to enable estimation of the severity of a pandemic on a population level to allow better forecasting of the impact of a pandemic. Severe risk of contracting novel coronavirus increases with age. The population 65 and older is at the highest risk for contracting the illness. The US. Census Bureau reported in 2019 19.3% of the population in Jackson County was 65 or older.



Source: Interim Pre-Pandemic Planning Guidance: Community Guidance for Pandemic Influenza Mitigation in the United States.

Pandemic Flu Hazard Mitigation Ideas: The pandemic mitigation framework that is proposed is based upon an early, targeted, layered application of multiple partially effective nonpharmaceutical measures. It is recommended that the measures be initiated early before explosive growth of the epidemic and, in the case of severe pandemics, that they be maintained consistently during an epidemic wave in a community. The pandemic mitigation interventions described in this document include:

1. Isolation and treatment (as appropriate) with influenza antiviral medications of all persons with confirmed or probable pandemic influenza. Isolation may occur in the home or healthcare setting, depending on the severity of an individual's illness and/or the current capacity of the healthcare infrastructure.

2. Voluntary home quarantine of members of households with confirmed or probable influenza case(s) and consideration of combining this intervention with the prophylactic use of antiviral medications, providing enough quantities of effective medications exist and that a feasible means of distributing them is in place.

3. Dismissal of students from school (including public and private schools as well as colleges and universities) and school-based activities and closure of childcare programs, coupled with protecting children and teenagers through social distancing in the community to achieve reductions of out-of-school social contacts and community mixing.

4. Use of social distancing measures to reduce contact between adults in the community and workplace, including, for example, cancellation of large public gatherings and alteration of workplace environments and schedules to decrease social density and preserve a healthy workplace to the greatest extent possible without disrupting essential services. Enable institution of workplace leave policies that align incentives and facilitate adherence with the nonpharmaceutical interventions outlined above.

All such community-based strategies should be used in combination with individual infection control measures, such as hand washing and cough etiquette.

Implementing these interventions in a timely and coordinated fashion will require advance planning. Communities must be prepared for the cascading second- and third-order consequences of the interventions, such as increased workplace absenteeism related to child-minding responsibilities if schools dismiss students and childcare programs close.

Decisions about what tools should be used during a pandemic should be based on the observed severity of the event, its impact on specific subpopulations, the expected benefit of the interventions, the feasibility of success in modern society, the direct and indirect costs, and the consequences on critical infrastructure, healthcare delivery, and society. The most controversial elements (e.g., prolonged dismissal of students from schools and closure of childcare programs) are not likely to be needed in less severe pandemics, but these steps may save lives during severe pandemics. Just as communities plan and prepare for mitigating the effect of severe natural disasters (e.g., hurricanes), they should plan and prepare for mitigating the effect of a severe pandemic.

3.20 Jackson County, Railroads Risk Assessment

Railroad Definition: "Accident/Incident" include collisions, derailments, and other events involving the operation of on-track equipment causing damage including impacts between railroad on-track equipment and highway users at crossings.

In Jackson County there are two rail lines, the Canadian National and Union Pacific Railway. The Canadian National Railway runs east and west through Merrillan, Hixton, and Taylor. The Union Pacific Railway connects Merrillan to Milwaukee and Minneapolis/St. Paul and is a higher density line.

Train accidents are generally localized and most of the incidents result in limited impacts at the community level. However, if there are volatile or flammable substances on the train and the train is in a highly populated or densely forested area, death, injuries, and damage to homes, infrastructure, and the environment, including forest fires can occur.

It is difficult to predict when the next rail hazard will occur. Due to the number of trains passing through Jackson County daily, it is not a matter of if a rail incident will occur but a matter of when. In addition, due to the rail lines passing through the incorporated communities the possibility of a derailment causing significant injury and damage is high. An added hazard is the growing number of hazardous cargo shipments these trains are carrying. Rail hazards are low frequency events, but they have the capability of being extreme impact disasters

Railroad History and Frequency:

1980's:	17 accidents reported by the Federal Railroad Administration: 1981 3 accidents-$609,000 TD (1 killed), 1982 6 accidents-$12,838 TD (2 injuries), 1983 1 accident-$5,500 TD (1 killed), 1984 1 accident-(1 injury), 1986 1 accident-$1,000 (1 injury), 1987 2 accidents-$431,841 TD, 1988 1 accident-$24,250 TD, 1989 2 accidents-$3,800 TD (3 injuries)
1990's:	8 accidents reported by the Federal Railroad Administration: 1992 1 accident-$2,000 TD, 1993 1 accident-$4,000 TD, 1994 1 accident-$100 TD, 1995 1 accident-$50,540 TD, 1996 1 accident-$5,000 TD (1 killed), 1998 1 accident-$1,500 TD (1 injury), 1999 2 accidents-$9,000 TD (3 injuries)
2000's:	11 accidents reported by the Federal Railroad Administration: 2000 5 accidents-$87,194 TD (1 injury), 2006 2 accidents-$575,003 TD, 2007 1 accident-$49,586 TD, 2008 1 accident-$5,000 TD, 2009 2 accidents-$464,502 TD
2010's:	9 accidents reported by the Federal Railroad Administration: 2010 1 accident-$40,000 TD, 2011 2 accidents-$207,654 TD (2 injuries), 2012 1 accident-$5,000 TD, 2013 2 accidents-$59,045 TD, 2014 1 accident-$3,000 TD, 2018 2 accidents-$242,663 TD (2 injuries)

Source: Federal Railroad Administration, Office of Safety Analysis
TD=Total Damages

Railroad accidents have caused $2,899,016 in damages, 16 injuries, and 3 deaths from 1980-2018. Jackson County could anticipate an average of $74,334 in total damages per year in rail accidents occurring once per year (based on this data).

Railroad Vulnerability Assessment

- Critical Facilities. In the County, 57 service oriented critical facilities were identified. These 57 facilities include: (31) government and military facilities; (6) hospitals, clinics, or residential facilities; (11) police and fire facilities; and (9) schools. These facilities could be severely affected from a train derailment. The structures could be destroyed or damaged from an explosion from a derailment, they could be forced to evacuate, or they could be cut off due to road closures. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities.
- Business and Industry. In Jackson County there are 421 businesses and industries, see Table 3-6. Due to the location and layout of the incorporated communities, many businesses and industries located within these communities could be severely affected by a train derailment. While most would not be structurally impacted or damaged by a derailment, road closures or evacuations due to a derailment would shut down these businesses and industries.
- Agriculture. In 2019, Department of Revenue records indicated that 32.6% or 209,963 acres of county land were classified as Agriculture or Agriculture Forest. A lot of agricultural products are transported by rail but a train derailment would have little impact unless the derailment would cause a significant shut down time for the rail line.
- Roads and Highways. State Highway 95 runs parallel to the Canadian National and County highway 12 runs parallel to the Union Pacific rail line. A derailment causing an evacuation could shut down significant

roadways in the county. In addition to potential evacuations train derailments could potentially close roads which cross over tracks if the derailment would occur at these points.

- Railroads. Train derailments have a huge impact on railroads as any derailment cases a shutdown of that line until the derailment can be cleared.
- Airway. The Black River Falls Airport vulnerability to train derailments is negligible.
- Waterways. There is no commercial navigation on any waterway in Jackson County. Most waterways in the county are not large enough to handle larger boats or commercial traffic. The Canadian National and Union Pacific rail lines run along waterways. A train derailment along either of these lines could potentially spill pollutants into the river or creek beds.
- Municipal Water. In the County there are 25 municipal wells and water systems in operation, see Table 3-11. These facilities' vulnerability to rail derailment is minimal. These facilities could be affected through a spillage from a derailment seeping into the groundwater and contaminating the well or if a facility would have to be shut down due to a prolonged evacuation caused by a derailment.
- Wastewater Treatment Facilities. There are 11 wastewater treatment facilities in operation in the County, see Table 3-12. A derailment adjacent to one of these facilities could damage or even destroy the facility. In addition, these facilities could also be affected in the event of a derailment causing a prolonged evacuation.
- Hazardous Material Sites. Hazardous materials located near rail lines could be impacted by a train derailment. A derailment with explosive materials could damage or destroy buildings which house hazardous materials.

Railroad Risk Assessment Designation

Railroad Historical Occurrence Rating: High - 8
Railroad Vulnerability Rating: Limited - 1
Railroad Probability Rating: Likely - 6
Railroad Local Official Survey Rating: Low - 2
Railroad Risk Assessment Designation: **Moderate Threat – 17 points**
See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.

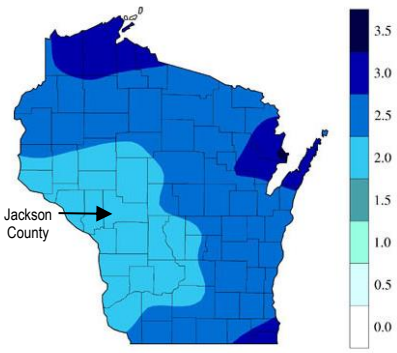
Rail Hazard Mitigation Ideas: ● Local governments and state governments can promote community awareness of train derailment risks ● First responders can obtain specific training provided by the railroad companies on how to respond to derailments ● Municipalities can develop evacuation plans ● Local governments can petition state and federal agencies for safer rail cars and equipment ● Local municipalities can purchase and stage along the rail line specific response equipment ● Move structures to less hazardous locations

3.21 Jackson County, Natural Hazards and Climate Change

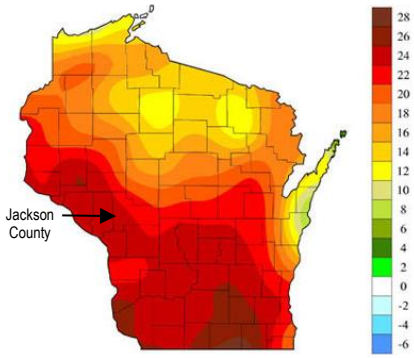
Hazard profiles provide information and predictions based on past hazard occurrence data. Climate change may make past trends unreliable sources for predicting future impacts, frequency, probability, and vulnerabilities. Climate change has and will continue to impact average annual temperatures causing increased frequency in heat waves; increased frequency and intensity of severe rainstorms; shorter, warmer winters with decreased river ice cover; increased drought frequency, and other impacts. In general, Jackson County, along with most of Wisconsin, will continue growing warmer and drier during this century, especially in the summer; and rainfall amount and intensity will continue to increase. It is projected that over the next 25 years, Jackson County's climate will experience:

- Increases in temperatures of 6.5°F, with the greatest increases in the winter
- Sixteen less nights a year with temperatures below 0°F
- Twenty-four more days a year with temperatures above 90°F

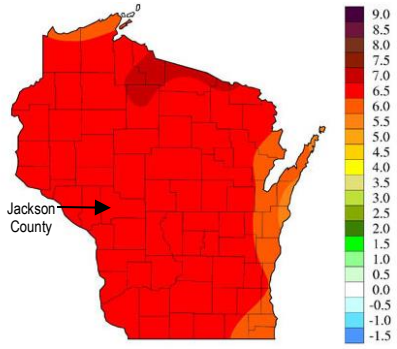
- More precipitation with more severe precipitation events
- Less snow cover, deeper frost depth, and more freeze-thaw cycles



Projected Change in the Frequency of 2" Precipitation Events (days/decade) from 1980 to 2055



Projected Change in the Frequency of 90°F Days Per Year from 1980 to 2055



Projected Change in Annual Average Temperature (°F) from 1980 to 2055

(Wisconsin's Changing Climate: Impacts and Adaptation 2011)

Analysis of historical data, combined with climate model downscaling, suggests a trend towards wetter conditions and more intense rainfall. Climate models also suggest that increased winter snowpack, and late winter rainfall, may result in high regional groundwater tables and river levels, and saturated soil conditions.

Potential Impacts

The University of Wisconsin and the Wisconsin Department of Natural Resources (DNR) have established the Wisconsin Initiative on Climate Change Impacts (WICCI). WICCI working groups have investigated how potential changes in Wisconsin's climate might impact natural and human systems around the state. Some potential impacts of concern for Jackson County with regards to stormwater management and large rainfalls include:

- Conveyance systems filled beyond capacity cause flooded homes and streets;
- Roadways and bridges are washed-out or become impassable;
- Groundwater flooding of property and cropland increases;
- Rural residential wellheads contamination by flood waters and high groundwater;
- Impoundments and stormwater detention ponds fail more frequently;
- Raingardens and other biofiltration best management practices (BMPs) fail due to saturated soil conditions;
- Increased erosion of slopes by intense rainfall events leads to high sediment and phosphorus loading to surface waters;
- Runoff of manure from fields, and accompanying fish kills, are more frequent;
- Stormwater inflow and groundwater infiltration to sanitary sewers, results in untreated municipal wastewater flowing into to lakes and streams.

Other potential impacts of concern for Jackson County include:

- Warmer nighttime temperatures might lead to more extreme heat waves, increasing the risk for heat stroke in some populations.
- Air pollution, increasing temperatures, changing circulation patterns, and other processes combine to increase ground-level ozone, which affects respiratory health.
- Heavy rains and flooding can overwhelm sewer and stormwater systems, leading to a rise in water pollution and the risk of waterborne diseases such as cryptosporidium and giardia.

- Changes in temperatures and precipitation could result in an increase in disease-carrying insects, including ticks and mosquitoes. This can result in a greater risk for contracting vector-borne diseases, such as Lyme disease, West Nile encephalitis, and Zika virus.
- Changes in temperature and precipitation could affect growing seasons, crop yields, weed and pest infestations, and dairy productivity.
- Changes in the timing and amount of rainfall influence groundwater recharge, and any decrease in groundwater recharge could be compounded by increased demand for irrigation due to an extended growing season, shifts in the timing of precipitation, and high temperatures or regional droughts.

Solutions/Adaptations

Although the impacts of climate change are already being seen in Wisconsin, there are things Jackson County policymakers, business leaders, and residents can do to help reduce potential impacts from climate change. The development of climate change mitigation programs can help decrease the impacts from climate change while advancing other community priorities. Examples include implementing cost-effective clean energy policies and programs and reducing carbon emissions. Climate change and clean energy policies and programs can reduce greenhouse gas emissions, lower energy costs, improve air quality and public health, and help achieve economic development goals. The following are some solutions or adaptations to climate change impacts that could be employed in Jackson County. Many of the identified solutions/ adaptations were developed by the WICCI working groups.

● Strengthen public health response and warning systems ● Increase energy efficiency ● Incorporate renewable energy sources such as wind, solar, geothermal, and biomass ● Increase vehicle fuel economy ● Invest in clean transportation choices ● Encourage bicycle and pedestrian transportation and expand availability options ● Implement bank improvement projects that reduce stormwater runoff to banks and waterways and integrate natural infiltration features such as vegetated swales ● Improve or restore natural bank protection features ● Protect floodplains, wetlands, and other natural “green infrastructure” features that can hold flood waters and enable water infiltration ● Implement development setbacks based on defensible scientific data ● Relocate or elevate structures that are threatened by flooding or erosion ● Provide education for developers, bankers, and insurance agents ● Ongoing comprehensive planning and improved implementation of existing plans ● Use best management practices for site design to control stormwater runoff ● Develop plans for hillslope stability enhancement, e.g. slow erosion by planting vegetation on hillslopes ● Use a risk/consequence approach to evaluate and modifying existing infrastructure to accommodate observed and predicted changes in climate ● Develop and evaluate alternative tools and strategies for the design of stormwater-related infrastructure, using a collaborative process that includes climate scientists, water resource managers, design engineers, and regulators, and members of relevant business communities.

Table 3-1

Jackson County Local Official's, Natural Hazard Risk Assessment Survey

In October 2019 the Jackson County Emergency Coordinator and the Mississippi River Regional Planning Commission coordinated efforts in developing a Natural Hazard Risk Assessment Survey for local officials to complete and return. This survey was mailed to all County Board Supervisors, Village Presidents, Town Chairman, Mayors, Chiefs of Police, the Sheriff, and Fire Department Chiefs in the County. Each local official was asked in the survey to rank the County's natural hazards as high, medium, or low regarding their opinion on each hazard's threat to their community's health and public safety.

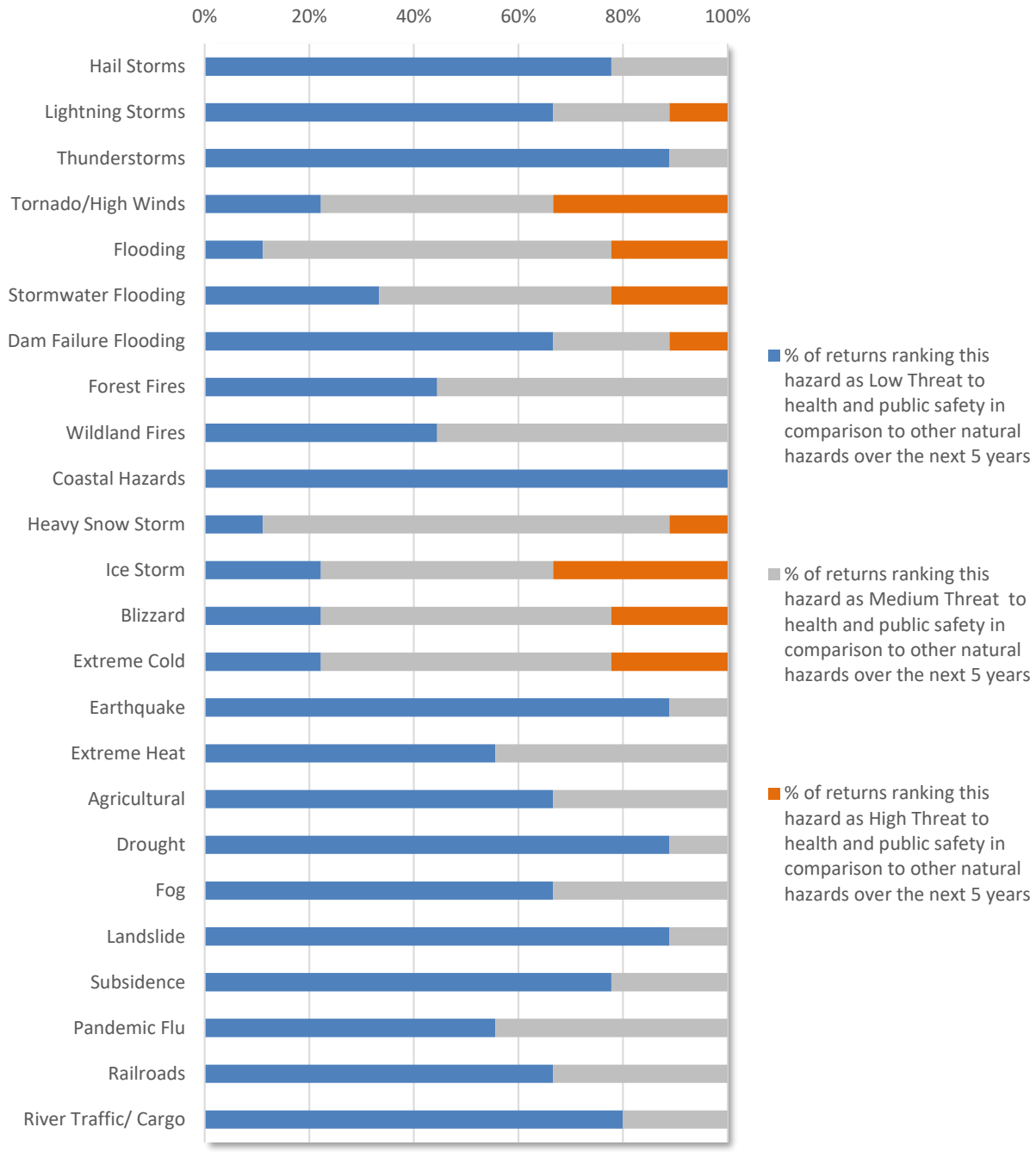


Table 3-2
Jackson County Hazard Risk Assessment

Natural Hazards:	**Historical Occurrence Rating Criteria:** • Less than 4 occurrences in the past 25 years =Low rating, 1-3 points • 4 to 7 occurrences in the past 25 years = Moderately Low rating, 3-5 points • 8 to 12 occurrences in the past 25 years = Moderately High rating, 5-7 points • More than 12 occurrences in the past 25 years = High rating, 7-9 points	**Vulnerability Rating Criteria:** • Less than 10% of population or property adversely affected = Negligible rating, 1-3 points • 10% to less than 25% of population or property adversely affected = Limited rating, 3-5 points • 25% to 50% of the population or property adversely affected = Critical rating, 5-7 points • More than 50% of the population or property adversely affected = Catastrophic rating, 7-9 points	**Probability Rating Criteria:** • Less than 1% probability in the next 100 years = Unlikely rating, 1-3 points • From 1% and 10% probability in the next year or at least one chance in next 100 years = Possible rating, 3-5 points • Over 10% to nearly 100% probability in the next year or at least one chance in the next 10 years = Likely rating, 5-7 points • Nearly 100% chance in the next year = Highly Likely rating, 7-9 points	**Local Official Hazard Survey Rating Criteria:** • A majority of local officials were of the opinion that this hazard posed a "low" threat to health and public safety = Low rating, 1-3 points • A majority of local officials believed this hazard posed a "medium" threat to health and public safety = Medium rating, 3-6 points • A majority of local officials believed this hazard posed a "high" threat to health and public safety = High rating, 6-9 points	**Risk Factor Rating Total:**	**Risk Assessment Designation:** • A combined risk factor rating of 14 points or less = Low Threat • A combined risk factor rating of 15 to 21 points = Moderate Threat • A combined risk factor rating of 22 points or greater = High Threat
Hailstorm	9	2	9	2	**22**	High Threat
Lightning Storm	9	2	8	3	**22**	High Threat
Thunderstorm	9	2	9	2	**22**	High Threat
Tornado/High Winds	7	5	6	5	**23**	High Threat
Riverine/Flash Flooding	9	4	7	6	**26**	High Threat
Dam Failure Flooding	1	2	3	3	**9**	Low Threat
Forest/Wildland Fires	1	3	4	4	**12**	Low Threat
Heavy Snowstorm	9	7	9	4	**29**	High Threat
Ice Storm	7	7	6	6	**26**	High Threat
Blizzard	2	7	4	5	**18**	Moderate Threat
Extreme Cold	9	7	6	5	**27**	High Threat
Earthquake	1	7	3	2	**13**	Low Threat
Extreme Heat	6	7	6	3	**22**	High Threat
Agricultural	2	3	3	3	**11**	Low Threat
Drought	7	5	6	2	**20**	Moderate Threat
Fog	7	3	9	1	**20**	Moderate Threat
Landslide	1	1	3	3	**8**	Low Threat
Subsidence	1	1	3	2	**7**	Low Threat
Pandemic Flu	1	7	2	3	**13**	Low Threat
Railroads	8	1	6	2	**17**	Moderate Threat

Table 3-3
Jackson County
Structures in the 100-Year Floodplain

Municipality	Number of Parcels	2019 Land Value	2019 Assessed Improvements Value	Total Assessed Value
T. City Point	3	$64,000	$64,300	$128,300
T. Garfield	5	$33,000	$495,800	$52,800
T. Irving	4	$98,000	$70,700	$168,700
T. Komensky	3	$0	$0	$0
T. Melrose	14	$184,300	$776,000	$960,300
T. North Bend	2	$59,600	$271,300	$330,900
T. Northfield	5	$21,100	$249,000	$270,100
T. Springfield	2	$6,100	$7,000	$13,100
V. Hixton	59	$279,500	$3,911,700	$4,191,200
Jackson County Total	**97**	**$745,600**	**$5,845,800**	**$6,115,400**

Source: Jackson County Land Information Department http://jacksoncowi.wgxtreme.com/.

TABLE 3-4
JACKSON COUNTY (100 YEAR) FLOOD DAMAGE POTENTIAL
FOR RESIDENCES AND BUSINESSES

River Body and Location of Structures	Number of Structures at This Location	Structures Impacted During 100 Year Flood Event and First Floor Water Level Estimates[1]	Total Damage to Structures During a 100 Year Flood Level Event[1]
Buffalo River – Town of Garfield	5 residences	5 residences with 1' of water	Assessed Improvements $495,800 $495,800 X 0.22 = $109,076 **TOTAL $109,076**
Beaver Creek – Town of Northfield	3 residences 1 commercial 1 agriculture	3 residences with 1' of water 1 commercial with 1' of water 1 agriculture with minor damages	Assessed Improvements $249,000 $249,000 X .22 = $54,780 $80,600 X .22 = $17,732 1 X $1,000 = $1,000 **TOTAL $73,512**
V. Hixton	40 residences 14 commercial 3 municipal/tax exempt	25 residences with 1' of water 15 residences with minor damage 5 commercial with 1' of water 9 commercial with minor damage 3 municipal/tax exempt with minor damage	Avg. residence $66,920 25 X $66,920 X 0.22 = $368,060 Avg. commercial $87,907 5 X $87,907 X 0.22 = $96,698 27 X $1,000 = $27,000 **TOTAL $491,758**
Trempealeau River – West County line to the V. of Hixton	1 residential	1 residential with 1' water in first floor	Residential Assessed Imp. $7,000 $7,000 X 0.22 = $1,540 **TOTAL $1,540**
Black River – C. Black River Falls north to Lake Arbutus	3 residences	3 residences with minor damage	3 X $1,000 = $3,000 **TOTAL $3,000**
Black River – South County line to C. Black River Falls	16 residences 1 commercial 1 agriculture	10 residences with 1' of water 6 residences with minor damage 1 commercial with 1' of water 1 agriculture with minor damage	Avg. residence $66,106 10 X $66,106 X 0.22 = $145,433 9 X $1,000 = $9,000 Commercial Ass. Imp. $52,700 $52,700 X 0.22 = $11,594 **TOTAL $218,727**
East Fork of the Black River	3 residences	3 residences with 1' of water	Residential Assessed Imp. $107,100 107,100 X 0.22 = $23,562 **TOTAL $23,562**
JACKSON COUNTY TOTAL			**$921,175**

Table 3-5

Jackson County Transportation Assessment

Municipality	No. of Motor Vehicles and Trailers	Interstate Miles	County Jurisdiction Arterial Miles	County Jurisdiction Collector Miles	County Highway Miles	Town Roads	Village/ City Streets	Canadian Nat'l Rail Miles	Union Pacific Rail Miles	Total Rail Miles
T Adams	1,189	9.03	0.47	18.33	18.8	53.29		1.7	2.6	4.3
T Albion	1,118		0.76	22.78	23.54	54.02				
T Alma	973			12.78	12.78	68.66		5.2	9.1	14.3
T Bear Bluff	186			7.06	7.06	37.96				
T Brockway	3,698	4.13				47.2			5.9	5.9
T City Point	284			5.49	5.49	49.01		12.1		12.1
T Cleveland	529			6.39	6.39	50.35			3.6	3.6
T Curran	353	1.84		7.64	15.81	37.95		3.3		3.3
T Franklin	3,383			13.2	16.18	33.81				
T Garden Valley	431					53.64		1.3		1.3
T Garfield	710	6.3		13.29	19.04	32.57				
T Hixton	716	7.15		10.09	10.09	46.56		4.2		4.2
T Irving	597			15.91	18.83	44.58				
T Knapp	362			9.37	9.37	56.52				
T Komensky	185			6.19	6.19	52.26		8.6		8.6
T Manchester	679	8.99		7.64	8.69	60.69			5.2	5.2
T Melrose	780			4.04	4.04	27.41				
T Millston	220	12.33		6.33	6.33	53.5			5.4	5.4
T North Bend	372			9.55	10.43	28.22				
T Northfield	630	14.64		6.64	14.27	48.27				
T Springfield	449			13.4	13.4	47.39		2.8		2.8
Town Totals	**17,844**	**64.41**	**1.23**	**196.12**	**226.73**	**982.86**		**39.2**	**31.8**	**71**
V Alma Center	1,086			1	1		4.03	1		1
V Hixton	1,142	1.09		0.78	0.78		4.22	2.1		2.1
V Melrose	1,027						3.72			
V Merrillan	1,171			0.08	0.08		7.52	1	1.4	2.4
V Taylor	974			1.69	1.69		4.04	1		1
C Black River Falls	8,977	3.43	0.6		0.96		28.68		0.7	0.7
City and Village Totals	**14,377**	**4.52**	**0.6**	**3.55**	**4.51**		**52.21**	**5.1**	**2.1**	**7.2**
Jackson County	**32,221**	**68.93**	**1.83**	**199.67**	**231.24**	**982.86**	**52.21**	**44.3**	**33.9**	**78.2**

WISDOT Valid Vehicle Type by County Within CVT Analysis for CY Ending 2017

There are five jurisdictional classifications: Interstate Highways (Example I94), State System Highways (Example USH 14-STH 171), County Highways (Example CTH B), Town Roads (Example Mound Ridge Road), Village/City Streets (Example Main Street). Within incorporated areas (villages/Cities), highways marked as state system or county roads will be classed by mileage by that system, even though they may also carry a local street name. The State system highways are either identified by functional classification-Principal/Minor Arterial (example USHs 14/61, STH 35, STH 27) or as Major/Minor collectors (example STH 179). Some local roads that are not identified as state system roads may be a "federal aid" road. (5) WISDOT WISLER Certified Mileage, January 2019

Table 3-6
Jackson County Business Vulnerability Assessment
Number of Establishments/Employment/Payroll

NAICS code and Description	Paid employees for paid period including March 12 (number)	Annual Payroll ($1,000)	Total Establishments
Jackson County Totals	**6,557**	**284,817**	**421**
11---- Forestry, fishing, hunting, and Agriculture Support	4	441	6
21---- Mining, quarrying, and oil and gas extraction	331	16,246	5
22---- Utilities	20-99	D	2
23---- Construction	910	91,756	30
31-33 Manufacturing	536	24,613	21
42---- Wholesale trade	128	4,952	14
44-45 Retail trade	856	20,994	62
48-49 Transportation and warehousing	1,104	39,386	28
51---- Information	54	1,995	7
52---- Finance and insurance	206	8,103	29
53---- Real estate and rental and leasing	24	464	11
54---- Professional, scientific, and technical services	107	3,242	25
55---- Management of companies and enterprises	100-249	D	3
56---- Administrative and Support and Waste Management and Remediation Services	106	2,385	10
61---- Educational services	0-19	D	1
62---- Health care and social assistance	1,068	47,161	51
71---- Arts, entertainment, and recreation	24	745	5
72---- Accommodation and food services	664	1,828	59
81---- Other services (except public administration)	172	2,780	51

(1) Total includes number of employees in all industry classifications

(2) Total includes annual payroll in all industry classifications

Source: U.S. Department of Commerce-Economic and Statistics Administration-U.S. Census Bureau-County Business Patterns 2016

D: Withheld to avoid disclosing data for individual companies' data are included in higher level totals

Table 3-7

Jackson County Critical Facilities: Government and Military Facilities

Critical Facility Name	City	Address Line 1	Address Line 2	Telephone
Jackson County Courthouse	Black River Falls	307 Main Street		(715) 284-0258
Black River Falls City Hall	Black River Falls	101 South Second Street		(715) 284-5514
Alma Center Village Hall	Alma Center	200 North Church Street		(715) 964-7211
Hixton Village Hall	Hixton	145 East Main Street		(715) 963-3732
Melrose Village Hall	Melrose	112 N Washington Street	PO Box 117	(608) 488-3191
Merrillan Village Hall	Merrillan	101 S. Main Street		(715) 333-2322
Taylor Village Hall	Taylor	420 2nd St.		(715) 662-3404
Adams Town Hall	Black River Falls	N7370 US Hwy 12		(715) 284-5407
Albion Town Hall	Black River Falls	N5740 STH 54		(715) 284-2365
Bear Bluff Town Hall	Warrens	W919 County Rd HH		
Brockway Town Hall	Black River Falls	236 Gebhardt Road		(715) 284-5234
Cleveland Town Hall	Fairchild	N13698 Town Hall Road		(715) 334-2535
Franklin Town Hall	Taylor	W16177 County Rd C		(608) 525-3004
Garden Valley Town Hall	Alma Center	W13760 State Rd 121		(715) 964-6410
Garfield Town Hall	Osseo	County Rd B & Hillcrest Rd		(715)533-0661
Irving Town Shop	Black River Falls	N3291 Nichols Road		(715) 284-7516
Manchester Town Hall	Black River Falls	W9757 County Rd O		(715) 896-4425
Melrose Town Hall	Melrose	N1146 Red School Rd		(608) 865-0803
Millston Town Hall	Black River Falls	W6621 US Hwy 12		(715) 963-5782
Alma Town Hall	Alma Center	200 N Church St		(715) 964-7211
North Bend Town Hall	Melrose	N631 North Bend Drive		
Northfield Town Hall & Garage	Hixton	N10752 School House Avenue		(715) 984-2332
Jackson Correctional Institution	Black River Falls	N6500 Haipek Road		(715) 284-4550
Black River Correctional Center	Black River Falls	W6898 Staffon Road		(715) 333-5681
WI National Guard Armory	Black River Falls	441 STH 54		(715) 284-2813

Table 3-8

Jackson County Critical Facilities: Hospitals, Clinics, and Residential Care Facilities

Critical Facility Name	City	Address Line 1	Telephone
Ho Chunk Nation Health Care Center	Black River Falls	N6520 Lumberjack Guy Rd	(715) 284-9851
Family Health Care	Black River Falls	N6571 Lumberjack Guy Rd	(715) 670-0400
Krohn Clinic	Black River Falls	610 W Adams	(715) 284-4311
Black River Memorial Hospital	Black River Falls	711 W Adams	(715) 284-5361
Black River Hospice	Black River Falls	311 County Hwy A Suite 1	(715) 284-3662
Atrium Senior Living	Black River Falls	1311 Tyler Street	(715) 284-4396
Pine View Care Center	Black River Falls	400 County Road R	(715) 284-5396

Source: WI DHS

Table 3-9
Jackson County Critical Facilities: Police and Fire Facilities

Critical Facility Name	City	Address Line 1	Address Line 2	Telephone
Fire Departments				
Black River Falls Fire Dept	Black River Falls	30 South Water St	PO Box 435	(715) 284-2656
Alma Center Volunteer Fire Dept	Alma Center	200 N Church St.		(715) 964-6207
Hatfield Fire and Rescue	Merrillan	N9510 County Rd K		(715) 429-0852
Hixton Volunteer Fire Department	Hixton	140 Interstate Road N		(715) 963-2802
Melrose Volunteer Fire Dept	Melrose	112 N Washington St.		(608) 488-2709
Merrillan Volunteer Fire Dept	Merrillan	101 S Main St.		(715) 333-2332
Taylor Volunteer Fire Dept	Taylor	41 Church St.		(715) 896-5354
Police Departments				
Jackson County Sheriff's Office	Black River Falls	30 N Third St		(715) 284-5357
Black River Falls Police Department	Black River Falls	101 S 2nd Street		(715) 284-9155
Melrose Police Department	Melrose	112 N Washington St	PO Box 117	(608) 488-3191
Merrillan Police Department	Merrillan	101 S Main St		(715) 284-5357

Table 3-10
Jackson County Critical Facilities: School Facilities

Critical Facility Name	City	Address Line 1	Telephone
Lincoln Elementary School	Merrillan	207 E Pearl St	(715) 333-2911
Lincoln Jr./Sr. High School	Alma Center	124 S School St	(715) 964-5311
Black River Falls Middle School	Black River Falls	1202 Pierce St	(715) 284-5315
Children's Learning Village Montessori Academy	Black River Falls	N6431 Lumberjack Guy Rd	(715) 284-7987
Forrest Street Elementary School	Black River Falls	720 Forrest St	(715) 284-9406
Gebhardt Elementary School	Black River Falls	411 Gebhardt Rd	(715) 284-5125
Puzaki Pei Cinak Center	Black River Falls	N7293 Low Cloud Rd	(715) 284-3331
Red Creek Elementary School	Black River Falls	410 County Road A	(715) 284-7155
Western Wis. Technical College-Black River Falls	Black River Falls	24 Fillmore Street	(715) 284-2253
Melrose-Mindoro Junior/Senior High School	Melrose	N181 State Road 108	(608) 488-2201

Source: WISEdash

Table 3-11
Jackson County Critical Facilities: Municipal Wells

Municipality	Well Use	Construction Date	Well Bottom (ft.)	Static Water Level (ft.)	Well Status
Alma Center	Community Municipality	1/1/1907	297	5	Active
Alma Center	Community Municipality	11/7/2000	280	73	Active
Alma Center	Community Municipality	6/10/2019	158	48	Active
Black River Falls	Community Municipality	1/2/1960	52	26	Permanently Filled
Black River Falls	Community Municipality	10/12/1995	169	49	Active
Black River Falls	Community Municipality	9/12/1995	159	48	Active
Black River Falls	Community Municipality	11/10/1995	65	51	Active
Brockway	Community Municipality	8/1/1971	80	52	Active
Brockway	Community Municipality	7/26/1995	97	55	Active
Brockway	Community Municipality	11/15/1994	108	50	Active
Brockway	Community Municipality	4/12/2005	84	38.4	Active
Hixton	Community Municipality	7/21/1964	192	116	Active
Hixton	Community Municipality	8/15/2007	180	106	Active
Komensky	Community Municipality	7/15/1996	40	8	Active
Melrose	Community Municipality	1/1/1938	184	116	Permanently Filled
Melrose	Community Municipality	11/20/1981	83	22	Permanently Filled
Melrose	Community Municipality	11/27/2007	325	82	Active
Melrose	Community Municipality	12/1/2008	285	100	Active
Melrose	Community Municipality	11/20/1981	83	22	Permanently Filled
Merrillan	Community Municipality	1/1/1975	68	0	Active
Merrillan	Community Municipality	1/1/1975	79	1.5	Active
Merrillan	Community Municipality	1/1/1975	68	0	Active
Northfield	Community Municipality	7/14/2000	140	93	Active
Taylor	Community Municipality	7/15/1986	185	20	Active
Taylor	Community Municipality	9/16/1985	321	48	Active

Source: Wisconsin Department of Natural Resources

Table 3-12
Jackson County Critical Facilities: Wastewater Treatment Plants

Facility Name	Community	Phone	Permit Number
Alma Center Wastewater Treatment Facility	Alma Center	(715) 964-7211	0021385
Black River Falls WWTF	Black River Falls	(715) 284-2777	0021954
Hatfield Sanitary District	Merrillan	(715) 333-7732	0036641
Hixton Wastewater Treatment Facility	Hixton	(715) 963-3732	0024236
Ho Chunk Nation - Black River Falls	Black River Falls	(715) 284-9851	0049824
Melrose Wastewater Treatment Facility	Melrose	(608) 488-3191	0024678
Merrillan Wastewater Treatment Facility	Merrillan	(715) 333-2332	0024732
North Bend Sanitary District 1WWTF	Melrose	(608) 488-8442	0031453
Superior Fresh LLC	Hoxton	(715) 984-2598	0065200
Taylor Wastewater Treatment Facility	Taylor	(715) 662-3404	0021881
Wazee Area Wastewater Commission	Black River Falls	(715) 284-9851	0036889

Source: Department of Natural Resources

Table 3-13

Jackson County Critical Facilities: Hazardous Waste Generators

Facility Name	Address	Community
Alma Center Vil	East Limits Rd	Alma
Badger Mining Corp-Merrillan East Coating	W10835 Cherry Rd	Merrillan
Badger Mining Corp-Merrillan West Coating	W10899 Cherry Rd	Merrillan
Badger Mining Corp-Taylor Coating Plant	N7530 County Rd P	Merrillan
Badger Mining Corp-Taylor Sand Plant	N7815 County Rd P	Merrillan
Badger Mining Corp-Alma Center	W11494 STH 95	Alma Center
Badger Mining Corp-Taylor Research	315 Badger Dr	Taylor
Black River Auto Sales	303 CTH A	Black River Falls
Black River Falls Clinic Pharmacy	610 W Adams St	Black River Falls
Black River Falls Municipal Utilities	119 N Water St	Black River Falls
Block Printing	28 Main St	Black River Falls
Castle Mound Salvage	W9945 W Castle Mound Rd	Black River Falls
Cummins Filtration	745 N Elm St	Black River Falls
D & S Mfg. Co Inc	301 E Main St	Black River Falls
Dahls Body Shop	N6510 Hideaway Rd	Black River Falls
Davis Furniture Co	N4873 Morken Rd	Melrose
Dollar General #19452	504 S Hammond St	Merrillan
Dollar General Store #10118	205 E Main St	Black River Falls
FedEx Freight Inc	I-94 EB & MM 98	Pigeon Falls
Greenleaf Trucking Inc	320 Badger Dr	Taylor
GTE North Inc Wisconsin Operations	Industrial Park	Black River Falls
Gundersen Health System Renal Dialysis	711 W Adams St	Black River Falls
Hart Tie & Lumber Co Inc	518 Winnebago St	Brockway Tn
Hwy 54 Towing & Repair LLC	N5999 STH 54	Black River Falls
Hwy 54 Towing & Repair LLC	N5999 STH 54 W	Black River Falls
Jackson County Recycling Ctr & Sharps Col Fac	115 N Harrison St	Black River Falls
Jackson Correctional Institution	N6500 Haipek Rd	Black River Falls
Jensen Towing and Repair	128 S State St	Hixton
Knutson Sales Inc	41 Bridge St	Taylor
Krohn Clinic Ltd	610 W Adams	Black River Falls
Lunda Const Co	620 Gebhardt Rd	Black River Falls
Lunda Const Co Wbs.	River Rd 0 W Brockway	Black River Falls
Marshfield Clinic-Black River Falls Dental	N6571 Lumberjack Guy Rd	Black River Falls
Melrose Village	112 N Washington St	Melrose
Millis Transfer Inc	121 Gebhardt Rd	Black River Falls
Millston Town Garage-Fred Krueger Spill	9264 USH 12	Black River Falls
Modern Disposal Systems LLC	401 Pine View Rd	Black River Falls
Nelson (Basil) Property	N9236 N Branch Rd	Hixton
Nelson Global Products LLC	915 Red Iron Rd	Black River Falls
Northern Natural Gas-Taylor Tbs	W15989 Kelly Rd	Taylor
NSPW Hatfield Hydro Plt	2 Mi S Hatfield On Black River	Black River Falls
Popps Body Shop	112 E Second St	Black River Falls

Prindle (Ralph) Property	N12139 Alma Center Rd	Black River Falls
Rush Pontiac Buick GMC	530 N Water St	Black River Falls
Scholze Ace Home Center Inc	123a CTH A	Black River Falls
Speed Bump Auto Body & Towing	305 E Second St	Black River Falls
SSG Corp - Auto Stop	520 N Water St	Black River Falls
The Print Shop	415 E Main St	Black River Falls
Trautlein Property	N12131 Old Stage Rd	Cleveland
Wallin Trucking LLC	15668 Dopp Rd	Ettrick
Walmart Supercenter #1277	611 STH 54 East	Black River Falls
Wi Army Natl Guard Black River Falls	441 STH 54 W	Black River Falls
Wi DNR Black River Falls Shop	910 Hwy 54 E	Black River Falls
Wild Body Shop	Address Unknown	Black River Falls
Wintex (Incubator Bldg.)	720 Red Iron Rd	Black River Falls
Wiza Trucking	132 W Main St	Hixton

Source: Wisconsin DNR's Solid and Hazardous Waste Information Management System (SHWIMS)

Table 3-14
Jackson County Critical Facilities: Dams

Map Code	Dam ID	Dam Name	Estimated Hazard Rating
1	1654	North Bend	
2	1873	Brown and Young	
3	1872	Brown, Leo C	
4	1871	Baird, Arthur	
5	1879	Haag, Carroll	
6	1892	Stetzer, Delano 3	
7	16	Melrose	Significant
8	1886	Norgaard & Gilbertson	
9	2528	Anderson, David M.	
10	1893	Strawhorn, Neil	
11	2536	Kyser, Donald No.1	Low
12	3401	Olson, James D	
13	1243	Wyman Lake Club	Low
14	2537	Kyser, Donald No.2	
15	1887	Olson, James	
16	2544	Wold, Ronald	
17	4058	Dam on Shamrock Creek	
18	3402	Waughal, Walter D	
19	919	Harkner 2	Low
20	1880	Hughes, John	
21	2530	Busse, Preston	
22	2376	Sener, John B.	
23	2545	Zeman, Harold	
24	2543	Tranberg, Halmer	
25	257	Janke	Low
26	71	Millston	Low
27	3190	Jennings Gaylen 3	
28	138	Harkner 1	Low
29	2922	Brown, Leo C.	
30	4094	Dodge Mill	
31	2540	Stetzer, Walter	

32	3399	Steine, Vilas #1	
33	1680	Steine, Vilas	
34	4057	Polly	
35	3398	Steine, Vilas #2	
36	2921	Rudolph, Neil	
37	4055	By Henry	
38	786	Resettlement Admin. 23	High
39	1878	Gerdes, Daniel	
40	1233	Resettlement Admin 51	Low
41	1218	Resettlement Admin. 7	Low
42	1885	Mitskogen, Phillip	
43	541	Beaver Creek 8	Low
44	1884	Miles, Richard	
45	4509	Trout Run Creek Dam #2	Low
46	2529	Beck, Leonard	
47	3422	Kampen, Nick	
48	4508	Trout Run Creek Dam #1	Low
49	4718	Northland Cranberries, Inc.	Low
50	1870	Bahnub, John	Low
51	2918	Schmidt, William A.	
52	1888	Rosenbaum, Fred	
53	1876	Dunnigan, Leo	
54	1875	Dunnigan, Leo	
55	1877	Elvaker, Robert	
56	3214	Albion A-1a	
57	1234	Beaver Creek 10	Low
58	1666	Albion B-1	
59	3477	Albion A-1	
60	1665	Albion A-3	
61	1664	Albion A-2	
62	3215	Albion A-4	
63	1667	Albion C-1	
64	1668	Albion C-2	
65	543	Beaver Creek 11	Low
66	258	Perry Creek	Low
67	4692	Buchaklian	Low
68	4082	Saw Mill	
69	1882	Kersting, Darrel	
70	4081	Birchard	
71	3213	Albion C-3	
72	644	Gebhardt Reservoir	Low
73	1223	Resettlement Admin. 16	Low
74	4078	Edmond's sash and door mill	
75	4079	Shep's Island	
76	821	Trump Lake	Low
77	4077	Gilberts's Mill	
78	3298	Olson, David R	
79	5664	Vern Johnson	Low
80	4093	Charter Oak	
81	4076	Brockway	
82	778	Resettlement Admin. 6	Low
83	784	Resettlement Admin. 20	Low
84	4095	Loesching	
85	3699	Black River Falls -Dn	

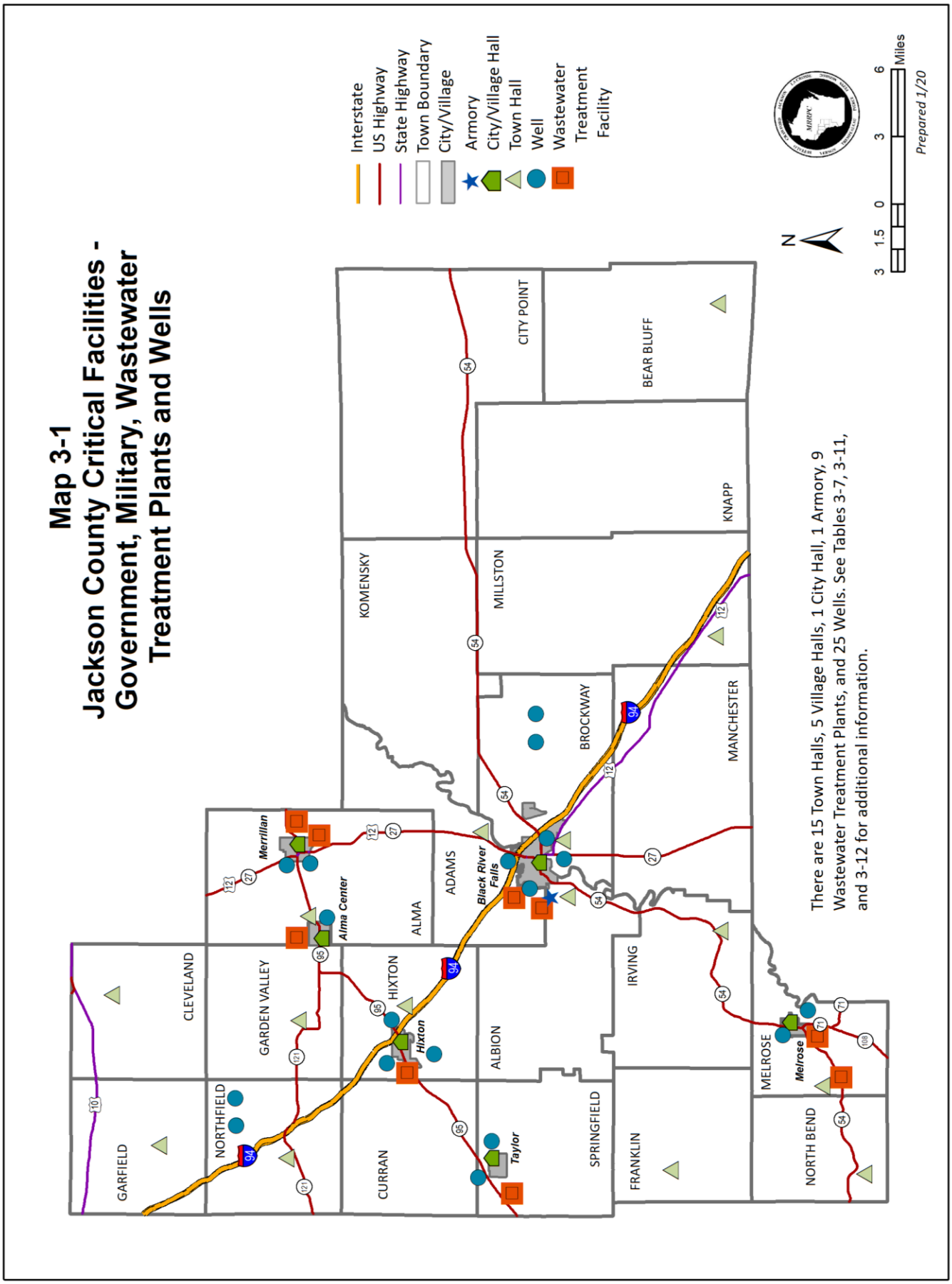
86	4075	Woolen Mill	
87	777	Resettlement Admin. 5	Low
88	4061	Brockway	
89	4697	Mueller	Low
90	3698	Black River Falls -Up	
91	1222	Resettlement Admin. 14	Low
92	776	Resettlement Admin. 4	Low
93	1214	Taylor Rod and Gun Club	Low
94	4099	O.O. Potter	
95	44	Black River Falls	Low
96	432	Lewis	Low
97	1215	City Waterworks	Significant
98	4074	Dam on Town Creek	
99	47	Potter	Low
100	1883	Meyer, Philip	
101	4062	Brockway	
102	1625	Black River State Forest	
103	782	Resettlement Admin. 12	Low
104	2920	Jacobson, Howard J.	
105	1217	Resettlement Admin. 3	Low
106	781	Resettlement Admin. 9	Low
107	4059	Brockway	
108	4507	Hart	
109	1220	Resettlement Admin. 17	Low
110	5494	No Name	Low
111	4072	Levis Mill	
112	5493	Upper Seventeen	
113	4065	Bull Dog	
114	775	Resettlement Admin. 2	Low
115	1244	Hart	Low
116	5496	Lower Wilson	
117	4066	Merrill	
118	785	Resettlement Admin. 21	Low
119	1889	Rozmenoski, Arnold	
120	5497	Big Bear	
121	1221	Resettlement Admin. 13	Low
122	5495	Koranda	
123	783	Resettlement Admin. 15	Low
124	4064	Dam on Black River	High
125	4789	Cutler Cranberry	Low
126	1216	Resettlement Admin. 1	Low
127	4098	Taylor Mill	
128	422	Ludeman	Low
129	1231	Resettlement Administrat 29d	Low
130	787	Resettlement Admin. 29	Low
131	1230	Resettlement Administra. 29c	Low
132	779	Resettlement Admin. 8 East	Low
133	1219	Resettlement Admin. 8 West	Low
134	780	Resettlement Admin. 8 Center	Low
135	1232	Resettlement Admin 32	Low
136	1225	Resettlement Admin 24	Low
137	4086	Woodbury Burnt Mills	
138	1226	Resettlement Admin 25	Low
139	1891	Skaar, Gary	

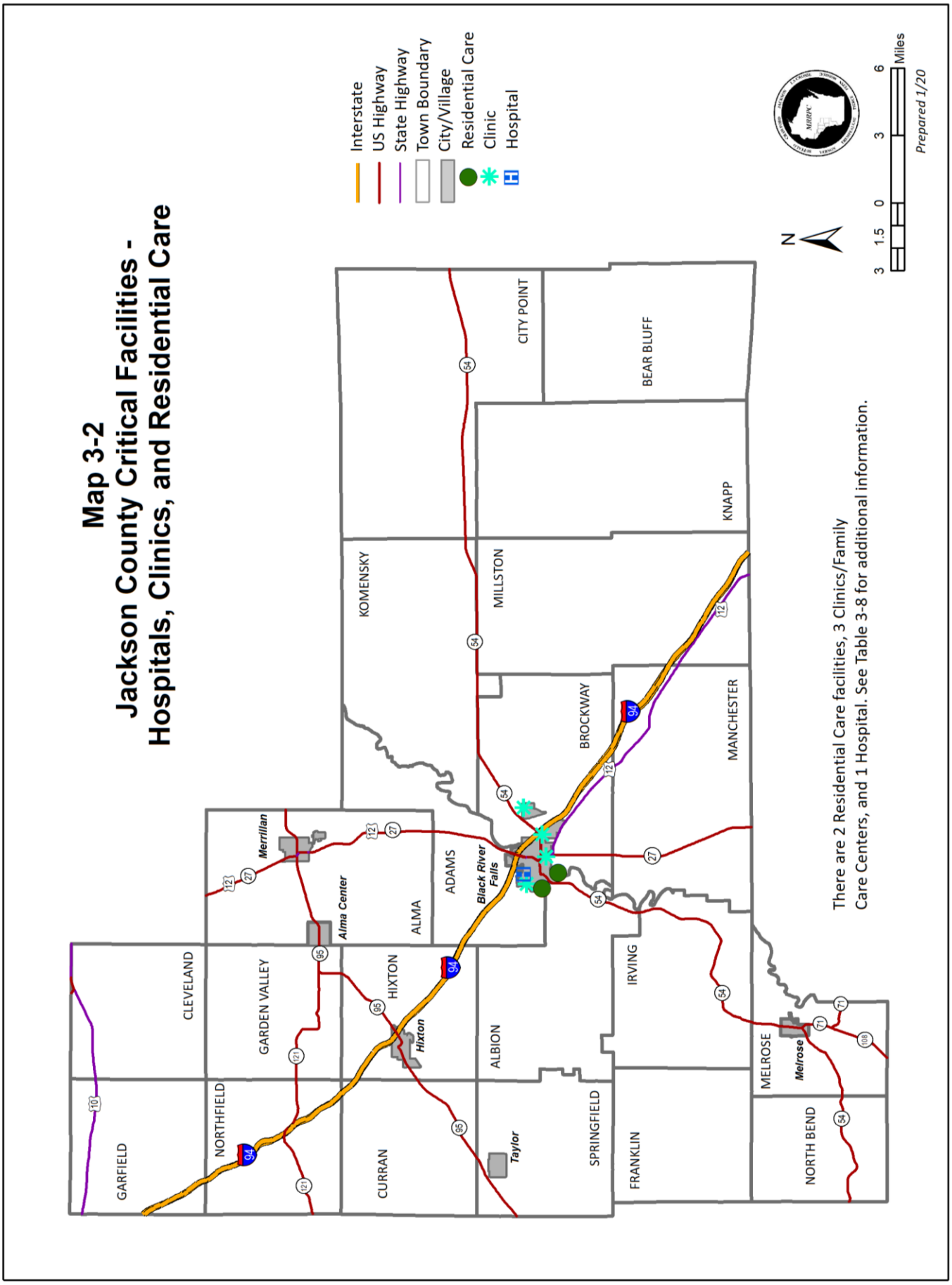
140	2917	Gould, Thomas	
141	4085	Peterson's	
142	1224	Resettlement Admin. 19	Low
143	1241	Jackson County 14	Low
144	1240	Jackson County 13	Low
145	433	Normington	Low
146	1242	Jackson County 15	Low
147	3556	Saddle Mound	Low
148	3541	Crawford Creek	
149	1239	Jackson County 12	Low
150	2532	Gjerseth, Vernon	
151	827	Chier Sand Co.	Low
152	1238	Jackson County 11	Low
153	1707	McNulty, William	Low
154	1663	Resettlement Admin 34	Low
155	3436	Black River Camp	
156	3555	White Creek Flowage	Low
157	4797	Saddle Mound Reservoir B	Low
158	1662	Lowe Creek 1	
159	1661	Lowe Creek 2	
160	1236	Jackson County 4	Low
161	1227	Resettlement Admin. 26	Low
162	4087	Black Yank's	
163	4798	Saddle Mound Reservoir C	Low
164	1237	Jackson County 10	Low
165	1012	Grutzik	Low
166	2916	Bahnub, Claire	
167	4088	Amos Elliot	
168	4097	Sechlerville	
169	1235	Jackson County 3	Low
170	4056	Hall Creek	
171	1229	Resettlement Admin 28	Low
172	1704	Bjork, Clarence E.	
173	4096	Hixton	
174	1706	Hostrawser, Allan V.	
175	5575	Darst	Low
176	3533	Hatfield Headrace	
177	2535	Karner, Donald	
178	17	Hatfield	High
179	1228	Resettlement Admin 27	Low
180	2919	Heinick, Roger E.	
181	4619	Knuth	Low
182	4083	Rock Creek	
183	4084	Avery's	
184	2531	Downy, Jack	
185	4610	Klomsten	Low
186	2374	Martinovici	
187	6219	Christian Lie	Low
188	2539	Ott, Robert	
189	1894	Rebarchik	
190	1874	Dokkestul, Maynard	
191	3133	Olstad, Harlan 3	
192	825	May Coulee	High
193	2375	Thompson, Thomas J.	

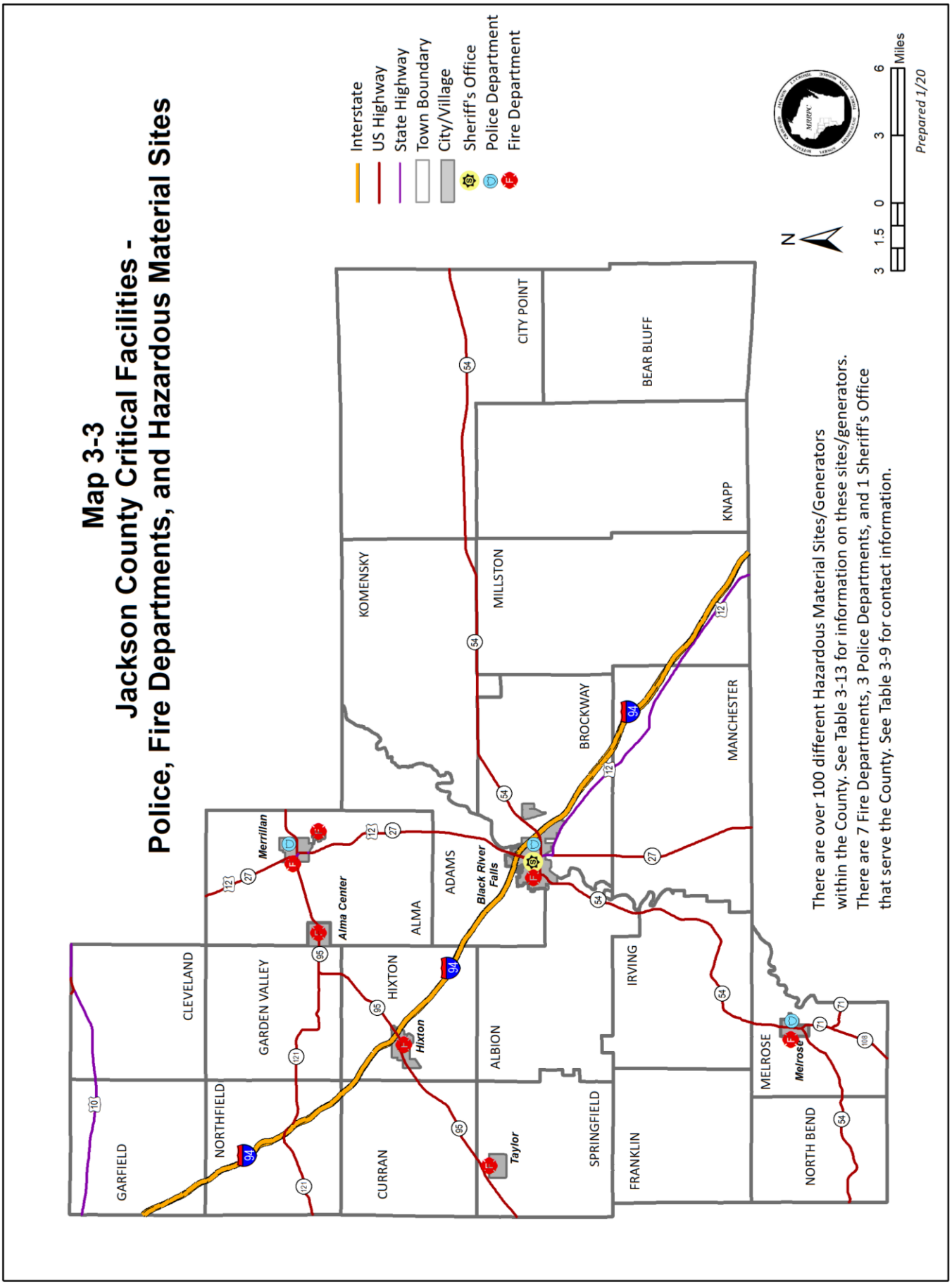
194	45	Trows		Low
195	46	Merrillan Mills		Low
196	2534	Johnson, Jule		
197	3130	Bute, Paul Jr.	3	
198	4090	Snow's		
199	2538	Meyer, Wayne		
200	4089	Lyon's Mill		
201	19	Beaver Creek		High
202	1669	Holen School		
203	6178	Mariah		Low
204	1881	Humphrey, Delwin		
205	2533	Haugen, Arnold		
206	2541	Tesmer, Ray		
207	4782	Stanley		Low
208	1660	Frelk, George R.		
209	1895	Watson, Leonard		
210	3400	Dalziel, Linn	DNR Dis	
211	1890	Sieg, Gordon		

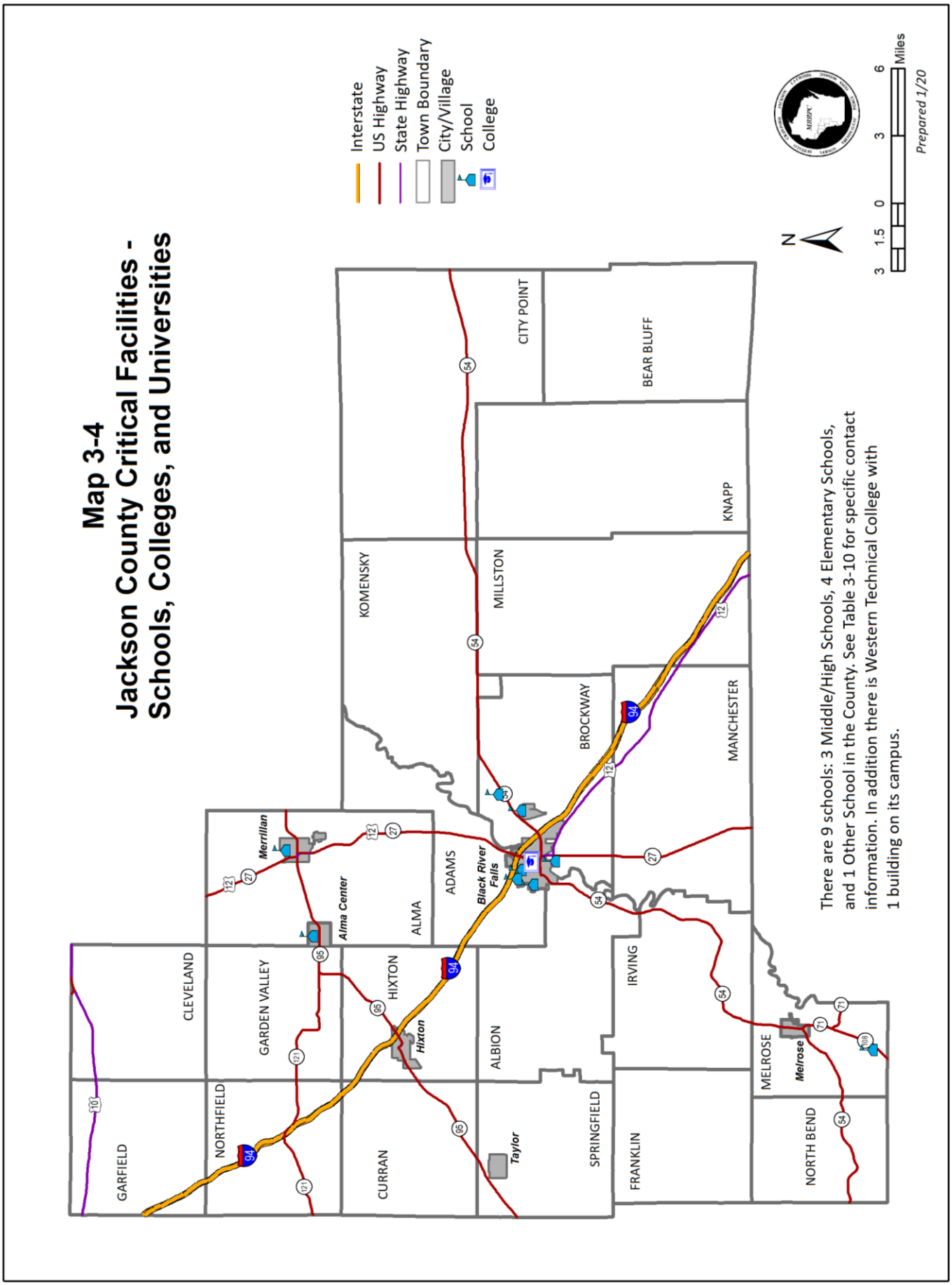
Hazard Rating Code - Dams are classified as Low, Significant or High Hazard. A dam is assigned a rating of High Hazard when its failure would put lives at risk. The "hazard" rating is not based on the physical attributes, quality or strength of the dam itself, but rather the potential for loss of life or property damage should the dam fail.

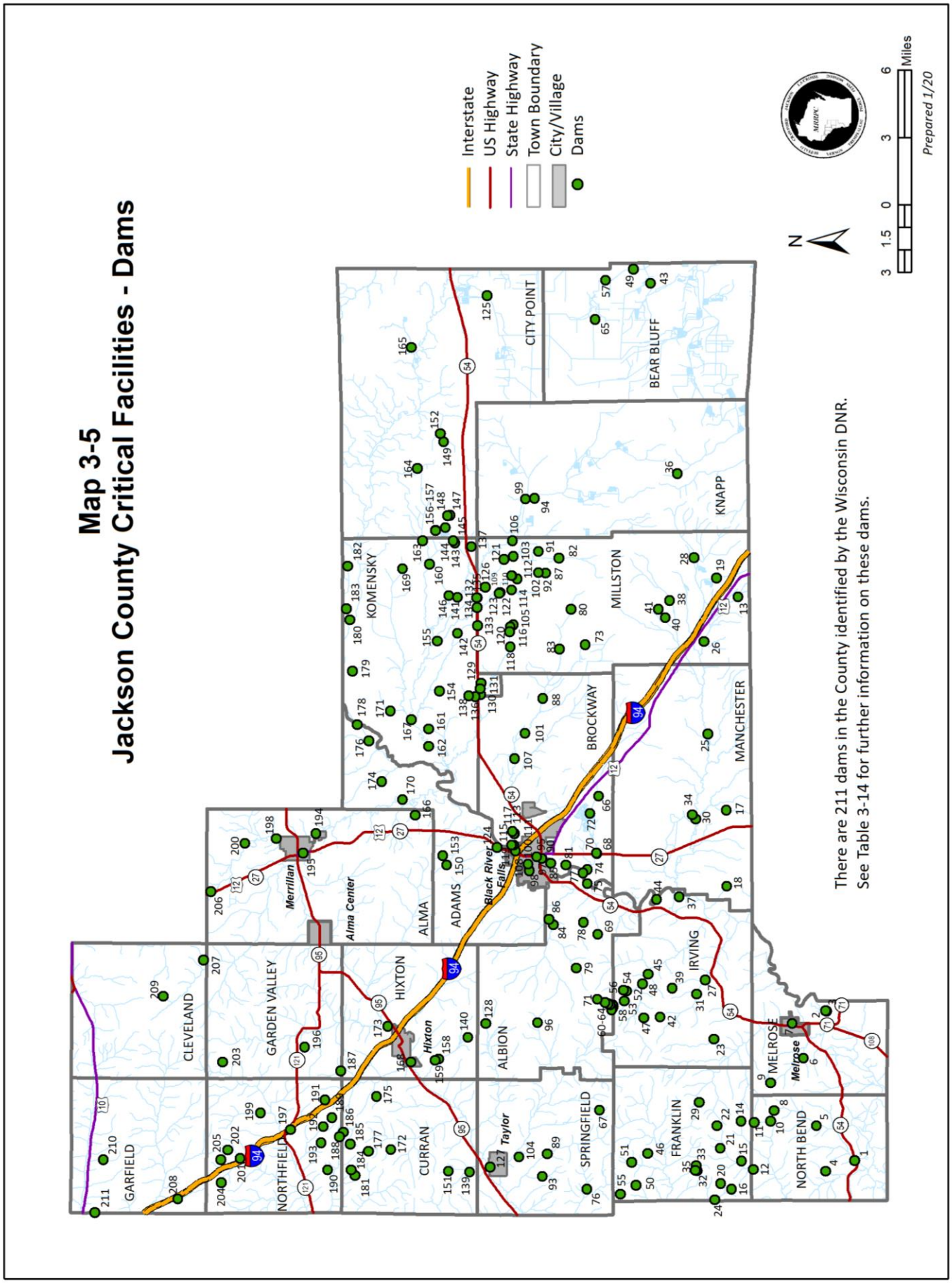
Source: WI DNR Dam Inspection

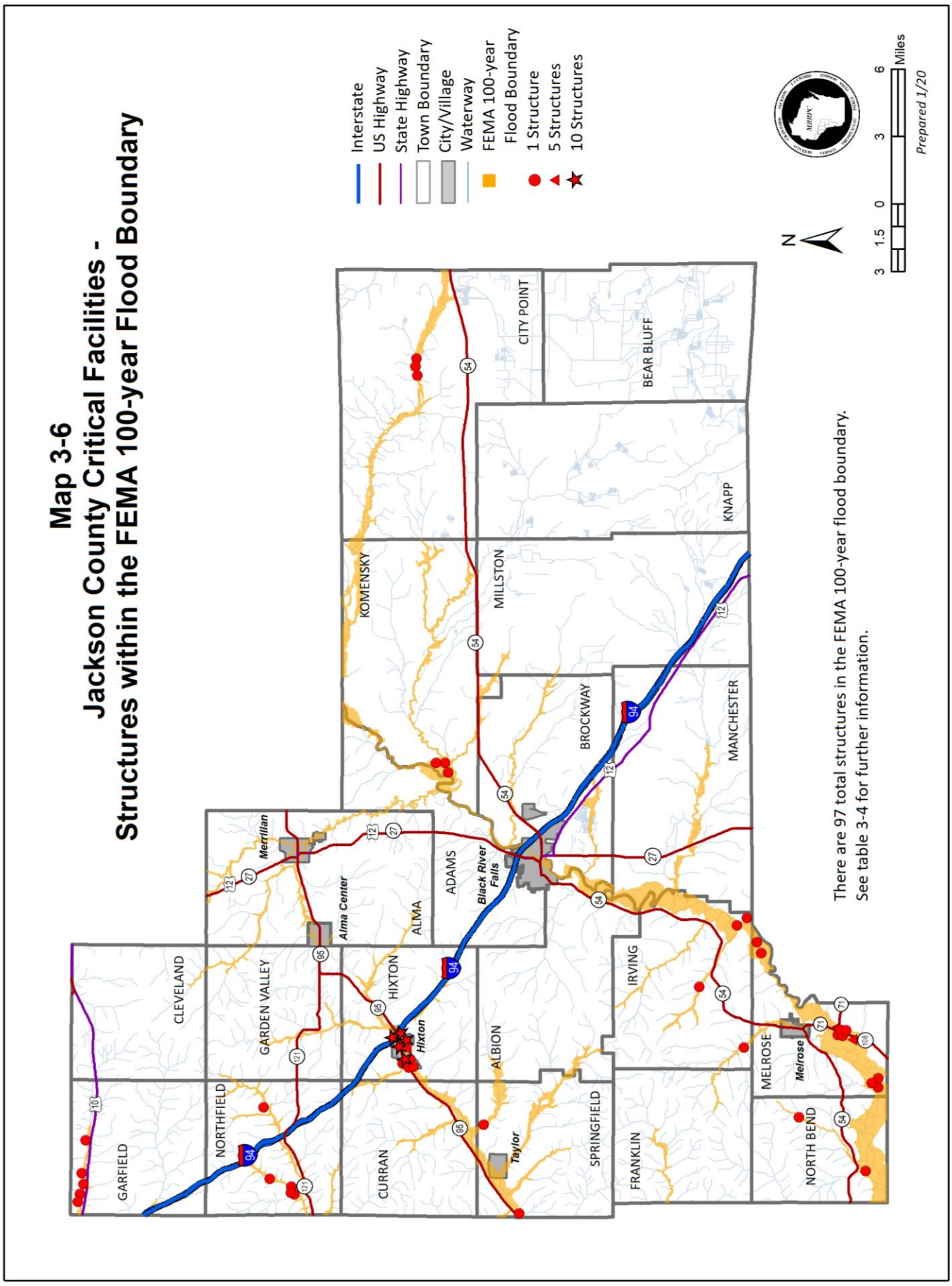

Map 3-1
Jackson County Critical Facilities - Government, Military, Wastewater Treatment Plants and Wells
Interstate
US Highway
State Highway
Town Boundary
City/Village
Armory
City/Village Hall
Town Hall
Well
Wastewater Treatment Facility
N
3 1.5 0 3 6 Miles
Prepared 1/20
There are 15 Town Halls, 5 Village Halls, 1 City Hall, 1 Armory, 9 Wastewater Treatment Plants, and 25 Wells. See Tables 3-7, 3-11, and 3-12 for additional information.
GARFIELD
CLEVELAND
NORTHFIELD
GARDEN VALLEY
CURRAN
HIXTON
ALMA
ADAMS
ALBION
SPRINGFIELD
FRANKLIN
IRVING
KOMENSKY
MILLSTON
BROCKWAY
CITY POINT
BEAR BLUFF
KNAPP
MANCHESTER
MELROSE
NORTH BEND
Merrillan
Alma Center
Black River Falls
Hixton
Taylor
Melrose


Map 3-2
Jackson County Critical Facilities -
Hospitals, Clinics, and Residential Care
Interstate
US Highway
State Highway
Town Boundary
City/Village
Residential Care
Clinic
Hospital
N
3 1.5 0 3 6 Miles
Prepared 1/20
There are 2 Residential Care facilities, 3 Clinics/Family
Care Centers, and 1 Hospital. See Table 3-8 for additional information.
GARFIELD
CLEVELAND
NORTHFIELD
GARDEN VALLEY
CURRAN
HIXTON
ALMA
ADAMS
ALBION
SPRINGFIELD
IRVING
FRANKLIN
KOMENSKY
MILLSTON
BROCKWAY
MANCHESTER
CITY POINT
BEAR BLUFF
KNAPP
MELROSE
NORTH BEND
Merrillan
Alma Center
Black River Falls
Hixton
Taylor
Melrose


Map 3-3
Jackson County Critical Facilities -
Police, Fire Departments, and Hazardous Material Sites
Interstate
US Highway
State Highway
Town Boundary
City/Village
Sheriff's Office
Police Department
Fire Department
N
3 1.5 0 3 6 Miles
Prepared 1/20
There are over 100 different Hazardous Material Sites/Generators within the County. See Table 3-13 for information on these sites/generators. There are 7 Fire Departments, 3 Police Departments, and 1 Sheriff's Office that serve the County. See Table 3-9 for contact information.
GARFIELD
CLEVELAND
NORTHFIELD
GARDEN VALLEY
CURRAN
HIXTON
ALMA
ADAMS
KOMENSKY
CITY POINT
BEAR BLUFF
MILLSTON
KNAPP
BROCKWAY
MANCHESTER
ALBION
IRVING
SPRINGFIELD
FRANKLIN
MELROSE
NORTH BEND
Merrillan
Alma Center
Black River Falls
Hixton
Taylor
Melrose


Map 3-4
Jackson County Critical Facilities -
Schools, Colleges, and Universities
Interstate
US Highway
State Highway
Town Boundary
City/Village
School
College
N
3 1.5 0 3 6 Miles
Prepared 1/20
There are 9 schools: 3 Middle/High Schools, 4 Elementary Schools, and 1 Other School in the County. See Table 3-10 for specific contact information. In addition there is Western Technical College with 1 building on its campus.
GARFIELD
CLEVELAND
NORTHFIELD
GARDEN VALLEY
CURRAN
HIXTON
ALMA
ADAMS
ALBION
SPRINGFIELD
FRANKLIN
IRVING
KOMENSKY
MILLSTON
BROCKWAY
MANCHESTER
CITY POINT
BEAR BLUFF
KNAPP
MELROSE
NORTH BEND
Merrillan
Alma Center
Black River Falls
Hixton
Taylor
Melrose


Map 3-5
Jackson County Critical Facilities - Dams
Interstate
US Highway
State Highway
Town Boundary
City/Village
Dams
N
3 1.5 0 3 6 Miles
Prepared 1/20
There are 211 dams in the County identified by the Wisconsin DNR.
See Table 3-14 for further information on these dams.
CLEVELAND
GARFIELD
GARDEN VALLEY
NORTHFIELD
HIXTON
CURRAN
ALMA
ADAMS
ALBION
SPRINGFIELD
KOMENSKY
CITY POINT
BEAR BLUFF
KNAPP
MILLSTON
BROCKWAY
MANCHESTER
IRVING
FRANKLIN
MELROSE
NORTH BEND
Merrillan
Alma Center
Hixton
Taylor
Melrose
Black River Falls


Map 3-6
Jackson County Critical Facilities -
Structures within the FEMA 100-year Flood Boundary
Interstate
US Highway
State Highway
Town Boundary
City/Village
Waterway
FEMA 100-year Flood Boundary
1 Structure
5 Structures
10 Structures
N
3 1.5 0 3 6 Miles
Prepared 1/20
There are 97 total structures in the FEMA 100-year flood boundary.
See table 3-4 for further information.
GARFIELD
CLEVELAND
NORTHFIELD
GARDEN VALLEY
CURRAN
HIXTON
ALMA
ADAMS
ALBION
SPRINGFIELD
IRVING
FRANKLIN
KOMENSKY
MILLSTON
CITY POINT
BEAR BLUFF
KNAPP
BROCKWAY
MANCHESTER
MELROSE
NORTH BEND
Merrillan
Alma Center
Black River Falls
Hixton
Taylor
Melrose

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4.0 JACKSON COUNTY MULTI-HAZARDS MITIGATION PLAN STRATEGIES

The County's villages, city and towns overall multi-hazards mitigation goal is to identify economical and environmentally sound ways to protect life, health and property from future hazards.

The following is a list of projects and actions by local governments or organizations that are designed to achieve this goal that collectively serve as an overall strategy for hazard mitigation. These goals, actions and projects are the result of the public participation process outlined in Chapter One and the hazard risk assessment conducted in Chapter 3. Cost effectiveness is not used to prioritize projects due to costs being unknown until the time that the project study is launched. A cost effectiveness study will be completed when costs for the project are known and sources of funds have been committed to undertake them. The project timetable on the following pages is how the County and municipalities will prioritize these goals, actions and projects. The project timetable listed for each of the municipalities was obtained from the respective municipality officials. Municipal officials did stress that due to financial considerations if funding for a specific project becomes available then that specific project would become its priority. Once funding becomes available a cost benefit review would be completed to prioritize which projects would be completed. Due to reductions in budgets and loss of State Aids most projects listed the Jackson County Multi-Hazards Mitigation Plan 2015 - 2019 have been carried over or deferred to this plan.

The Jackson County Emergency Coordinator will be the lead person for all jurisdictions regarding hazard mitigation projects as no other jurisdiction has a dedicated Emergency Management department. The County along with all Villages and the City have the authority to enact and enforce zoning ordinances, are their own taxing authority have their own comprehensive plan and maintain their own annual budget. The County along with all jurisdictions within the county are in the Mississippi River Regional Planning Commission area and are eligible for planning assistance from that organization.

JACKSON COUNTY SPECIFIC HAZARD GOALS, ACTIONS AND PROJECTS

The following is a list of goals Jackson County has developed for the various hazards

Table 4-1 Jackson County
Hazard Mitigation Goals

Hazard	Goal
Flooding, Stormwater Drainage, and Dams	*Protect the health and safety of residents and property in high water events by improving infrastructure and warning and communication systems.*
Hail, Lightning, Thunderstorm and Fog	*Inform residents on the dangers of hail, lightning, thunderstorm and fog hazards and take actions to improve warning and communications and reduce loses from these hazards*
Tornadoes and High Winds	Protect the health safety and welfare of residents and property by improving emergency communication systems and shelters.
Extreme Cold and Heat Event Hazards	*Provide educational information to the public on the dangers of extreme heat and cold to reduce future loss of life.*
Forest and Wildland Fire Hazards	*Protect residents and property from forest and wild land fires.*
Heavy Snow and Ice Storms and Blizzard Hazards	*Inform the public about the threat of heavy snow and Ice storms and blizzards and take actions to improve warning and communications and reduce future losses from these hazards.*

Earthquake, Landslide and Subsidence Hazards	*Lessen the impact of earthquakes, landslides, and subsidence on persons and property*
Agricultural and Drought Hazards	*Inform the public on the hazards associated with drought and provide information on methods to reduce water usage and minimize agricultural losses.*

The following is a list of Multi-Hazard Mitigation Actions and Projects to be implemented by Jackson County.

Table 4-2
Jackson County
Hazard Mitigation Actions or Projects

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Flooding, Storm water Drainage, and Dam Hazards Actions and Projects				
Investigate the concept of a voluntary floodplain property buyout program through a survey of property owners in the floodplain. This survey could also inquire about interest in flood proofing and/or elevating their properties to protect health, public safety and welfare.	Existing County staff resources	County Local Emergency Planning Committee	After each flooding event	
Continue to monitor and enforce N.R. 116 Floodplain, Shore Land - Wetland Regulations and any changes to it.	County Zoning Administrator	County Zoning Administrator	Annually	Carried over from previous plan
Relocate or remove structures in the Floodplain	As funding becomes available	County Zoning Administrator	Annually	New
To maintain the County's compliance with the National Flood Insurance Program the County will undertake the following actions: • The County Zoning Administrator shall annually attend floodplain zoning seminars and workshops to keep informed on floodplain issues and regulations. • The County Zoning Administrator shall report monthly on floodplain permit activity to the Emergency Management Committee. • The County Zoning Administrator shall administer, enforce and update the County's floodplain ordinance as prescribed by law.	Existing County staff resources	County Zoning Administrator	Annually	Carried over from previous plan, relates to NFIP compliance
Work to reduce or eliminate repetitive loss or substantially damaged structures by undertaking the following: • The Emergency Management Coordinator shall biannually write a letter to owners of repetitive loss structures or substantially damaged structures to inform them of techniques and potential state and federal resources available to reduce further flood losses. Specific emphasis will be placed on contacting them if the County, City or a Village proceeds with a voluntary buyout program as described above. • Inform property owners through the annual Survey to act as a resource for information and answer questions on how to reduce future flood losses.	Existing County staff resources	Emergency Management Coordinator	Biannually	Carried over from previous plan
Promote the National Flood Insurance Program through community education.	Existing County staff resources	Local Emergency Planning Committee	Continual	Deferred, relates to NFIP compliance
Identify and upgrade/improve or replace existing culverts and bridges within the County that are causing flooding issues or concerns as funding becomes available		Emergency Management Coordinator and County Highway Dept.	Continual Program	

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Update bridge and culvert layer in GIS	When funding becomes available	County GIS		New
Upgrade Emergency Management layer in GIS (earthen dams, facilities, environmental concerns, etc.)	When funding becomes available	County GIS		New
Update address signs for emergency response	When funding becomes available	County Law Enforcement Committee		New
Implement emergency signs on rivers and public facilities containing emergency contacts and procedures	When funding becomes available	County Law Enforcement Committee		New
In coordination with affected villages and the City of Black River Falls develop evacuation plans for those areas lying within the floodplain.	Existing County staff resources	Emergency Management Coordinator		Carried over from previous plan
Annually review and upgrade the County's communications capability specifically, the wireless capability.	Existing County staff resources	County Law Enforcement Committee, County Emergency Management Coordinator	Continual Program	
Create a family information center for public health awareness	As funding becomes available	Public Health Department	2020-2024	New
Increase environmental response services for well and water testing.	As funding becomes available	Emergency Health Services	Continual Program	
Review flood disaster impacts and revise and update this plan as needed after a flood disaster. New flood hazard mitigation projects and strategies are likely to arise after a flood disaster. To deal with this situation the County Emergency Management Coordinator and Zoning Administrator shall meet and report in a timely manner to the County Emergency Management Committee on potential changes to the County's Multi-Hazard Mitigation Plan. The Emergency Management Committee shall recommend to reaffirm, amend or update (rewrite) this plan to the County Board. This disaster assessment may be included in the annual review process discussed in the Plan Maintenance and Adoption section of this plan if the response to the recent flood disaster will not be impaired by doing so.	Existing County staff resources	County Zoning Administrator, County Law Enforcement Committee, County Emergency Management Coordinator	After each flood disaster	Carried over from previous plan
Hail, Lightning, Thunderstorm and Fog Hazard				
Encourage the burying of electrical lines	Existing County staff resources	County Law Enforcement Committee	Continual Program	Carried over from previous plan
Encourage the burying of telecommunication lines	Existing County staff resources	County Law Enforcement Committee	Continual Program	Carried over from previous plan
Utilize the Severe Awareness Week to alert residents of the need for concern about hail, lightning, thunderstorm and fog hazards and actions they can take to minimize losses from these hazards.	Existing County staff resources	County Emergency Management Coordinator	Annual Program	Carried over from previous plan
Identify risk populations and notification management systems to create action plans for power outages.	As funding becomes available	Public Health Department	Continual Program	
Tornadoes and High Winds				

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Require anchoring on new mobile home residences, carports and porches.	Existing County staff resources	County Law Enforcement Committee	Continual Program	Carried over from previous plan
Encourage burying of underground power, cable and telephone lines.	Existing County staff resources	County Law Enforcement Committee	Continual Program	Carried over from previous plan
Encourage the use of interlocked roofing shingles.	Existing County staff resources	County Law Enforcement Committee	Continual Program	Carried over from previous plan
Encourage the construction of safe rooms in mobile home parks and other residential structures subject to high winds.	Existing County staff resources	County Law Enforcement Committee	Continual Program	Carried over from previous plan
Identify buildings that would provide protection to the public in the event of a tornado or high winds.	Existing County staff resources	County Emergency Management Coordinator	Continual Program	
Purchase NOAA All Hazards radios		County Law Enforcement Committee	Continual Program	
Extreme Cold and Heat Event				
Identify buildings that could be used as shelters with appropriate heating, ventilation and air conditioning for housing that segment of the population that are more vulnerable to extreme temperature events, such as the low income, elderly, and sick.	Existing County staff resources	County Emergency Management Coordinator and County Law Enforcement Committee	2020-2024	Carried over from previous plan
Investigate developing a program that provides fans to the elderly in times of extreme heat.	Existing County staff resources	County Emergency Management Coordinator and County Law Enforcement Committee	2020-2024	Carried over from previous plan
Continue support of the Salvation Army, Red Cross and similar programs	Existing County staff resources	County Emergency Management Coordinator and County Law Enforcement Committee	Continual Program	Carried over from previous plan
Forest and Wildland Fire				
Develop/maintain cooperative fire agreements among area fire departments and the Department of Natural Resources as necessary.	Existing County staff resources	County Emergency Management Coordinator	Continual Program	Carried over from previous plan
Encourage periodic cutting of Conservation Reserve Program (CRP) land per program requirements	Existing County staff resources	County Emergency Management Coordinator and National Resource Conservation Service	Continual Program	Carried over from previous plan
Promote understanding of the importance of fire prevention, burning permit restrictions/requirements and the Firewise program by: • Preparing a flyer to be mailed to property owners • Including information on wildfire prevention and/ or Firewise practices in town newsletters and on town websites • Making wildfire information packets available for easy pickup at town halls	Existing County staff resources and the DNR	County Emergency Management Coordinator	Continual Program	Carried over from previous plan

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Meet annually with WDNR fire staff to coordinate dissemination of information to local partners	Existing County staff resources	County Emergency Management Coordinator	Annually	Carried over from previous plan
Heavy Snow and Ice Storms and Blizzard				
Prepare timely releases that inform the public on actions and precautions they can take to minimize disruptions and losses	Existing County staff resources	County Emergency Management Coordinator	Annually	Carried over from previous plan
Investigate the concept of identifying locations in the County where snow fences could be constructed or trees and bushes (living snow fence) could be planted to increase motor vehicle safety.	Existing County staff resources	County Emergency Management Coordinator in cooperation with the County Highway Commissioner and Highway Committee	2015	Carried over from previous plan
Earthquake, Landslide and Subsidence				
Investigate developing an inventory/prioritization of roads/road segments that have shoulders with slopes conducive to erosion and land/mud slides. The roads/road segments identified can be stabilized as funding becomes available.	Existing County staff resources	County Emergency Management Coordinator in cooperation with the County Highway Commissioner and Public Safety Committee	2020-2024	Carried over from previous plan
Agricultural and Drought				
Consider developing an education/information program that informs agricultural producers and residents about water conserving measures and crop insurance.	Existing County staff resources	County Emergency Management Coordinator in cooperation with City, Village and Town Officials	2020-2024	Carried over from previous plan
Pandemic Flu				
Develop a pandemic flu plan listing specific actions and identifies emergency powers and who has the authority to use them	Existing County staff resources	County Emergency Management Coordinator with City Officials, Village Officials, Emergency response personnel and local hospitals and clinics	2020-2024	Carried over from previous plan
Develop funding to swear in quarantine guards when needed	When funding becomes available	Public Health Department		New
Create Points of Dispensing (PODs)	As funding becomes available	Public Health Department	2019-2020	
Training for declared event		County Public Health	2020	
Disinfection of public facilities		County Public Health	2020	
Temporary medical facilities		County Public Health	2020	
Personal protective equipment		County Public Health	2020	
Communication of health and safety to the public		County Public Health	2020	
Reimbursement of overtime costs		County Public Health	2020	
Railroads				

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Update warning systems at crossing	As funding becomes available	County Emergency Management Coordinator	Ongoing	New
All Hazards				
Upgrade technology to use mobile GIS/GPS for emergency response and mitigation	As funding becomes available	County GIS	Ongoing	New
Website updates to improve access to land records and education	As funding becomes available	County GIS		New
Allocate and develop funding resources for updating NG 911	As funding becomes available	County GIS		New
Ongoing staff training for hazard mitigation	As funding becomes available	County Emergency Management Coordinator, County GIS	Ongoing	Continual

Mitigation Projects for Municipalities

The following is a list of Multi-Hazard Mitigation Actions and Projects to be implemented by each City, Village and Town within Jackson County.

Table 4-3
Jackson County Municipal
Hazard Mitigation Actions or Projects

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Flooding, Stormwater Drainage, and Dam Hazards Actions and Projects				
In conjunction with the County investigate the concept of a voluntary floodplain property buyout program through a survey of property owners in the floodplain. This survey could also inquire about interest in flood proofing and/or elevating their properties to protect health, public safety and welfare.	Existing Village and County staff resources to investigate	Town, Village, or City Boards, and, County Local Emergency Planning Committee	After each flooding event	Continual Program
Continue to monitor and enforce N.R. 116 Floodplain, Shore Land - Wetland Regulations and any changes to it.	Existing County Staff	County Zoning Administrator	Annually	Continual Program
Assist the County in working to reduce or eliminate repetitive loss or substantially damaged structures by undertaking the following: The Emergency Management Coordinator shall biannually write a letter to owners of repetitive loss structures or substantially damaged structures to inform them of techniques and potential state and federal resources available to reduce further flood losses. Specific emphasis will be placed on contacting them if the County, Village or a City proceeds with a voluntary buyout program as described above. Inform property owners through the annual Survey to act as a resource for information and answer questions on how to reduce future flood losses.	Existing County staff resources	Emergency Management Coordinator	Biannually	Carried over from previous plan

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
In conjunction with the County investigate the idea of promoting the National Flood Insurance Program through a community seminar where federal and state officials would be able to present the program and answer questions.	Existing County staff resources	Town, Village, or City Boards, and with the County Law Enforcement Committee	Continual Program	Continual Program
Identify and upgrade/improve or replace existing culverts and bridges within the municipality that are causing flooding issues or concerns as funding becomes available		Municipality, Emergency Management Coordinator and County Highway Department	Continual Program	Continual Program
The municipality will work in conjunction with the County to review flood disaster impacts and revise and update this plan as needed after a flood disaster. New flood hazard mitigation projects and strategies are likely to arise after a flood disaster. To deal with this situation the County Emergency Management Coordinator and Zoning Administrator shall meet and report in a timely manner to the County Local Emergency Planning Committee on potential changes to the County's Multi-Hazard Mitigation Plan. The Local Emergency Planning Committee shall recommend reaffirmation, amendment or update (rewrite) of this plan to the County Board for action. This disaster assessment may be included in the annual review process discussed in the Plan Maintenance and Adoption section of this plan if doing so will not impair the response to the recent flood disaster.	Existing County staff resources	County Zoning Administrator, Municipality, County Law Enforcement Committee	After each flood disaster	Continual Program
Hail, Lightning, Thunderstorm and Fog Hazard				
Encourage the burying of electrical lines	Existing City, Village, Town and County staff resources	Individual municipal Boards in conjunction with the County Law Enforcement Committee	Continual Program	Carried over from previous plan
Encourage the burying of telecommunication lines	Existing City, Village, Town and County staff resources	Individual municipal Boards in conjunction with the County Law Enforcement Committee	Continual Program	Carried over from previous plan
Assist the County in utilizing the Severe Awareness Week to alert residents of the need for concern about hail, lightning, thunderstorm and fog hazards and actions they can take to minimize losses from these hazards.	Existing County staff resources	County Emergency Management Coordinator	Annual Program	Carried over from previous plan
Tornadoes and High Winds				
Require anchoring on new mobile home residences, carports and porches.	Existing City, Village, Town and County staff resources	Individual municipal Boards in conjunction with the County Law Enforcement Committee	Continual Program	Carried over from previous plan
Encourage the burying of underground power, cable and telephone lines.	Existing City, Village, Town and County staff resources	Individual municipal Boards in conjunction with the County Law Enforcement Committee	Continual Program	Carried over from previous plan

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Encourage the use of interlocked roofing shingles.	Existing City, Village, Town and County staff resources	Individual municipal Boards in conjunction with the County Law Enforcement Committee	Continual Program	Carried over from previous plan
Encourage the construction of concrete safe rooms in mobile home parks and other residential structures subject to high winds.	Existing City, Village, Town and County staff resources	Individual municipal Boards in conjunction with the County Law Enforcement Committee	Continual Program	Carried over from previous plan
Identify buildings that will provide protection to the public in the event of a tornado or high winds.	Existing City, Village, Town and County staff resources	Individual municipal Boards in conjunction with the County Law Enforcement Committee	Continual Program	Carried over from previous plan
Purchase NOAA All Hazards radios		Individual municipal Boards in conjunction with the County Law Enforcement Committee	Continual Program	Carried over from previous plan
Extreme Cold and Heat Event				
In conjunction with the County and adjacent municipalities identify buildings within or adjacent to their respective municipality that could be used as centers with appropriate heating, ventilation and air conditioning for housing that segment of population that are more vulnerable to extreme temperature events, such as the low income, elderly, and sick.	Existing City, Town, Village and County staff resources	Individual municipal Boards in conjunction with the County Law Enforcement Committee	2020-2024	Carried over from previous plan
Purchase backup generators for Departments, Village, and Town Halls		County, Individual municipal Boards in conjunction with the County Law Enforcement Committee	2020-2024	New
Forest and Wildland Fire				
Develop/maintain cooperative fire agreements with area fire departments and the Department of Natural Resources as necessary.	Existing City, Town and Village staff resources	City, Town and Village Boards will be responsible for their municipality	Continual Program	Carried over from previous plan
Heavy Snow and Ice Storms and Blizzard				
Cooperate with the County in preparing timely releases that inform the public on actions and precautions they can take to minimize disruptions and losses.	Existing County staff resources	County Emergency Management Coordinator	Annually	Carried over from previous plan
Identify locations where snow fences could be constructed or trees/brushes (living snow fences) could be erected or planted to increase motor vehicle safety by reducing or eliminating blowing/drifting snow	Existing County staff resources along with	County Emergency Management Coordinator and County Highway	2015	Carried over from previous plan

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
	City, Town and Village staff and resources	Commissioner coordinating with City, Town and Village Clerks		
Earthquake, Landslide and Subsidence				
Investigate developing an inventory/prioritization of roads/road segments that have shoulders with slopes conducive to erosion or land /mud slides. The roads/road segments identified can be stabilized as funding becomes available.	Existing City, Village/ and Town staff resources	County Emergency Management Coordinator in cooperation with County Highway Commissioner and City, Town or Village Officials	2015-2016	Carried over from previous plan
Agricultural and Drought				
In conjunction with the County consider developing an education/information program that informs agricultural producers and residents about water conserving measures and crop insurance.	Existing County staff resources	County Emergency Management Coordinator in cooperation with City, Village and Town Officials	2020-2024	Carried over from previous plan
Pandemic Flu				
Develop a pandemic flu plan listing specific actions and identifies emergency powers and who has the authority to use them	Existing County staff resources	County Emergency Management Coordinator with City Officials, Village Officials, Emergency response personnel and local hospitals and clinics	2020-2024	Carried over from previous plan
Create Points of Dispensing (PODs)	As funding becomes available	Public Health Department	2019-2020	
Railways				
Update warning systems at crossing	As funding becomes available	County Emergency Management Coordinator	Ongoing	New

Individual Municipal Projects

The following is a list of Multi-Hazard Mitigation Actions and Projects which individual municipalities have identified. The Villages of Alma Center, Merrillan, Taylor and the City of Black River Falls did not have specific mitigation projects for this update but will be doing the actions/projects listed in Table 4-3.

Table 4-4

Municipal Specific Hazard Mitigation Actions or Projects

Town of Albion

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Raise Old Highway 54 to mitigate flooding (particularly at Pine Grove Creek end)	Town Board and County Highway Department		Continued from previous plan

Town of Alma

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Replace box culvert on Sand Road	Town Board and County Highway Department		Continued from previous plan

Town of Bear Bluff

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Raise roadways prone to flooding in the Town	David Olson, Bear Bluff Chairman, 608-648-3676	2020-2024	Continued from previous plan
~~Install telephone in Town Hall~~	~~Town Board~~		Completed

Town of Brockway

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Current siren needs maintenance	~~Existing Town Officials and County staff resources~~	~~2008-2009~~	Completed
Trailer park needs storm shelters for its residents	Existing Town Officials and County staff resources	2020-2024	Carried over from previous plan
Install additional water well	~~Existing Town Officials and County staff resources~~		Completed
Install new water tower	Existing Town Officials and County staff resources		Carried over from previous plan

Town of City Point

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
~~Repair Knutes Road where East Fork of the Black River crosses~~	~~Town of City Point and the County Highway Department~~		Completed
Trim trees near power lines which cross the East fork of the Black River	Oakdale Electric Co-op and Town	Continual	Carried over from previous plan
Retrofit the Town Hall for a severe weather shelter	Town of City Point Board		New Project
Purchase new wildfire fighting brush truck	Town of City Point Board		New Project
Install additional phones at Town Hall for use as EOC during forest fires	County Emergency Management Coordinator and Town Officials		Carried over from previous plan
Brushing/clearing of Town Road right-of-way	Town Board		New
Update rail crossing at town roads for semi-trucks	Town Board		New
Update or upgrade existing motor grader for plowing snow	Town Board		New

Town of Cleveland

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Identify and upgrade/improve or replace existing culverts and bridges within the municipality that are causing flooding issues or concerns as funding becomes available especially on Town Hall, Lang, and Fairview Roads	Town of Cleveland, Emergency Management Coordinator and County Highway Department	Continual Program	Carried over from previous plan

Culvert and drainage improvements	Town Board		New
Training for first responders	Town Board		New

Town of Curran

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Install swing gates at Trempealeau River Crossings	Town of Curran Board in conjunction with the County Local Emergency Planning Committee	2020-2024	Carried over from previous plan
~~Fix road washouts on the following roads: 1) Pierce Rd, 2) Navies Rd, 3) Bekkelund Rd, 4) Miller Rd, 5) Curran Rd, 6) Ridgeway Rd~~	~~Town of Curran Board along with the County Highway Department~~		Completed

Town of Franklin

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Install culverts and improve drainage on the following roads: 1) Steinie Rd, 2)Lein Rd, and 3) Busse Rd	Town of Franklin Board along with the County Highway Department	2020-2024	Carried over from previous plan

Town of Garden Valley

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Develop a public warning system	Town of Garden Valley Board in conjunction with the County Local Emergency Planning Committee	2020-2024	Carried over from previous plan
Install air conditioning and heat in Town Hall for special needs population	Town of Garden Valley Board		Carried over from previous plan

Town of Garfield

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Install dry well (water points) locations on ponds, creeks	Town of Garfield Board in conjunction with the County Local Emergency Planning Committee	2020-2024	Carried over from previous plan

Town of Komensky

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Install air conditioning in Town Hall so that it can be used as a shelter in extreme heat events	Town of Komensky Board	2020-2024	Carried over from previous plan

Town of Millston

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Identify and upgrade/improve or replace existing culverts and bridges within the Town that are causing flooding issues or concerns as funding becomes available. Particularly the following roads which have frequent washouts; 1) Stanton Creek Rd, ~~2) Hunter Haven~~ Rd, ~~3) King Rd~~, 4) Shale Rd, 5) ~~North Settlement Rd~~, 6) Suraken Rd, and 7) Woodland Rd.	Town of Millston Board and County Highway Department	2020-2024	This is on-going, some of the culverts have been replaced

Town of North Bend

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Update Sewer plant pumping station to handle emergencies.	Town of North Bend Board and Sewer Board	When funding is found	Continued from previous plan
Develop public early warning plan and system	Town of North Bend in conjunction with the County Local Emergency Planning Committee	Town of North Bend – Develop public early warning plan and system	Continued from previous plan
~~Purchase power supply backup generators~~	~~Town of North Bend Board~~		Completed
Purchase a siren to alert residences	Town of North Bend Board		New Project
Install dry hydrant in river	Town of North Bend Board in conjunction with the County Local Emergency Planning Committee		Continued from previous plan

Village of Hixton

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
~~Update FEMA flood maps~~	~~Village of Hixton Board in conjunction with the County Local Emergency Planning Committee~~	~~2010-2012~~	Completed
Flood proof structures lying within FEMA 100-year floodplain boundary	Village of Hixton Board	Ongoing	Carried over from previous plan

Village of Merrillan

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
~~Install another warning siren in north portion of Village~~	~~Village Board~~	~~2008~~	Completed
Rebuild the hydro-electric building located on Trow Lake to reduce eroding walls	Village Board	When funding becomes available	New Project
Replace the Oakwood Dam located on Halls Creek	Village Board	When funding becomes available	New Project
Promote burying of electric utilities to prevent storm damage	Village Board	Ongoing	Continuous
Upgrade generators for water wells	Village Board		Continuous
~~Replace 7 water lines along Hwy 95 to prevent freezing~~	~~Existing Village Officials, Village of Merrillan Board, and County staff resources~~		Completed
Put railroad cross arms on railroad crossing without them	Village Board		New Project

Village of Melrose

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments

Purchase a portable generator for the Village Hall and Fire Hall for use as an emergency shelter	Village of Melrose Board	2021	Deferred

Village of Taylor

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Culvert improvements and upgrades	Village of Taylor Board	When funding becomes available	
Purchase 3" trash pump	Village of Taylor Board	When funding becomes available	ASAP
Roadway repair	Village of Taylor Board	When funding becomes available	

City of Black River Falls

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
~~Map elevations and plot evacuation zones for flood prone downtown and Grove~~	~~City of Black River Falls Board and Fire Chief~~	~~2010-2012~~	Completed
~~Repair or replace Black River Falls Dam~~	~~City Board~~	~~2008~~	Completed
~~Purchase 2 new sirens and repair old sirens~~	~~City Board~~	~~2008-2012~~	Completed
Forebay and non-overflow wall repairs (dam hazard mitigation)	City Board	When funding becomes available	New project
Water line improvements and follow WDNR directive for replacement of old and undersize water main	City Board	Ongoing	Continuous
Update river gauges	City Board	When funding becomes available	Continuous
Burry power lines	City Board	When funding becomes available	Continuous
Purchase of back-up power generator	City Board	When funding becomes available	New project
Tree clearing/pruning near power lines	City Board	Continual Program	Continuous
Replacement of old/inadequate water mains	City Board	Continual Program	Continuous
Purchase municipal well pumping equipment to meet to size needs	City Board	When funding becomes available	New project
Municipal well rehabilitation and upkeep	City Board	Annual	Continuous
Maintenance of water towers and ground reservoirs	City Board	Continual Program	Continuous
Reduce or eliminate repetitive damage to structures by improving storm water drainage on Van Buren Street, N. 10th Street, and Melrose Street	City Board	When funding becomes available	Est. $1,037,330

River channel improvement -Dredge approximately 1,450 feet of the Black River beginning approximately 1,750 downstream from Black River dam.	City Board	When funding becomes available	New Project
Raise levy approximately 2 feet from MainStreet Bridge south for the entire length of the levy so it matches the height on the flood wall located north of the Main Street bridge.	City Board	When funding becomes available	New Project
Raise Winnebago Avenue (formerly Old Hwy 54) and install storm sewer to tie into storm sewer on North Roosevelt Road to handle runoff from this area and eliminate standing water on the roadway during rain events.	City Board	When funding becomes available	New Project

4Jackson County Plan Maintenance and Adoption Action Plan

The following table is the Jackson County Multi-Hazards Mitigation Plan Maintenance and Adoption Action Plan. The plan maintenance and adoption projects are detailed in Chapter 5. Jackson County's Plan Maintenance and Adoption goal is: *To provide a continual opportunity for local officials to update, maintain and implement the Jackson County Multi-Hazard Mitigation Plan*.

TABLE 4-5
Jackson County Multi-Hazards Mitigation Plan Maintenance and Adoption Action Plan

Plan Maintenance and Adoption Projects	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Continual monitoring of progress made toward achieving plan goals, projects and action items by the Emergency Management Coordinator	Existing County resources	County Emergency Management Coordinator	Annually	See Chapter 5
Post disaster Multi-Hazard Mitigation Plan review and comment period for plan stakeholders	Existing County staff resources	County Emergency Management Coordinator in cooperation with County, City, Village and Town Officials	Post disaster	See Chapter 5
Annual Multi-Hazard Mitigation Plan review and comment period for plan stakeholders	Existing County staff resources	County Emergency Management Coordinator in cooperation with County, City, Village and Town Officials	Annually	See Chapter 5
County, City, Village, and Town plan approval by adopting resolutions	Existing County, City, Village, and Town resources	County Emergency Management Coordinator in cooperation with County, City, Village and Town Officials	After plan modification	See Chapter 5

5.0 JACKSON COUNTY NATURAL HAZARDS MITIGATION PLAN MAINTENANCE AND ADOPTION

Plan Maintenance

Since changes across the County's landscape will always be occurring this Multi-Hazards Mitigation Plan should be monitored and amended as needed to meet these changing conditions. To accomplish this it has been determined that the County Emergency Management Coordinator should review the contents of the plan for its applicability each year during the 3rd quarter and report to the Local Emergency Planning Committee on the progress made pertaining to goals, projects and actions contained in the plan. Prior to the end of each calendar year, the County Local Emergency Planning Committee shall recommend either reaffirmation, amendment or update (rewrite) of the plan to the County Board for their action based on recommendations provided by county staff, public input and other pertinent information provided to the committee. The Disaster Mitigation Act of 2000 requires that this plan be evaluated and updated at least every five years to remain eligible for assistance.

It has also been determined that the County Local Emergency Planning Committee evaluate the plan after disasters to determine if the information, goals and actions are still appropriate considering the given disaster. In addition, the committee shall evaluate the plan bi-annually to assess the following: are the goals and objectives addressing current or expected conditions; are the nature, magnitude, and/or type of risks changed; are current resources appropriate for implementing the plan; are there implementation problems, such as technical, political, legal, or coordination issues with other agencies; have agencies and other partners participated as proposed; and have outcomes happened as expected. When this plan is being considered for evaluation due to the annual evaluation policy or because of the post disaster evaluation policy it will be the County Emergency Management Coordinator's responsibility to let stakeholders know through meeting notices and public announcements about the plan evaluation process and provide them with an adequate comment period if they cannot attend a plan evaluation meeting. The Disaster Mitigation Act of 2000 requires that this plan be evaluated and updated at least every five years to remain eligible for hazard mitigation grant assistance.

Plan Coordination

Upon adoption of the plan by the County and other participating local units of government the County Emergency Management Coordinator will distribute copies to key stakeholders including any additional copies needed by local governments that participated in and adopted the plan. The initial Hazard Mitigation Plan was not incorporated very well into other planning activities. The plan was used during land use planning by some but not all municipalities. To ensure that this updated plan will be incorporated into planning activities within the county, the County Emergency Management Coordinator will monitor other planning activities being undertaken and see to it that any related topics, goals or projects in this plan are presented to those involved in planning activities and especially those involved in preparing county, city, village or town comprehensive plans. In addition, the annual plan evaluation policy should serve as another method to ensure the information, findings, goals, actions and projects in this plan are incorporated into other planning projects and initiatives across the County. Lastly the County Emergency Management Coordinator will annually send out letters to all participating local units of government, county department directors and all new county board supervisors reminding them of the existing plan and that the plan should be incorporated into any new or revised comprehensive plan, ordinance or code.

Plan Approval Process

The adoption of this plan by the County and any participating local unit of government certifies to program and grant administrators from FEMA and Wisconsin Emergency Management that the Plan's findings, goals and projects have been thoroughly considered and they have a desire to take planned actions to reduce losses from future hazard events. In exchange for this local commitment to plan to reduce future losses the Federal Emergency Management Agency and Wisconsin Emergency Management Agency will designate the County and other participating local governments that adopted the plan eligible for their Hazard Mitigation Grant Programs. The County and other participating local units of government are to adopt this plan by appropriate public meeting notice and by resolution.

RESOLUTIONS

RESOLUTION # 38-10-2020

RESOLUTION ADOPTING THE JACKSON COUNTY MULTI-HAZARDS MITIGATION PLAN

WHEREAS, The County of Jackson recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazards mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, The County of Jackson participated jointly in the planning process with the other local units of government within the County to prepare the Jackson County Mulit-Hazards Mitigation Plan

NOW, THEREFORE, BE IT RESOLVED, that the Jackson County Board, hereby adopts the Jackson County Multi-Hazards Mitigation Plan as an official plan

BE IT FURTHER RESOLVED, that Jackson County Emergency Management will submit on behalf of the participating municipalities the adopted Multi-Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval.

Dated this 19 day of October, 2020

Law Enforcement Committee

Executive and Finance Committee

I, Kyle Deno, as County Clerk, do hereby certify that the foregoing is true and correct copy of the resolution adopted by Jackson County at the meeting held October 19, 2020.

Kyle Deno, County Clerk

Adoption Resolutions

The following is a list of the local units of government in the County. Those local units of government that adopted this plan are indicated with a check mark. The adoption resolutions from each local government follow this list.

Municipality	Adopted 2015-2019 Plan	Adopted 2020-2024 Plan
Jackson County	☒	☒
Town of Adams	☒	☐
Town of Albion	☐	☐
Town of Alma	☐	☐
Town of Bear Bluff	☒	☐
Town of Brockway	☒	☐
Town of City Point	☒	☐
Town of Cleveland	☒	☐
Town of Curran	☒	☐
Town of Franklin	☐	☐
Town of Garden Valley	☐	☐
Town of Garfield	☐	☐
Town of Hixton	☐	☐
Town of Irving	☐	☐

Municipality	Adopted 2015-2019 Plan	Adopted 2020-2024 Plan
Town of Knapp	☒	☐
Town of Komensky	☐	☐
Town of Manchester	☐	☐
Town of Melrose	☒	☐
Town of Millston	☒	☐
Town of North Bend	☒	☐
Town of Northfield	☒	☐
Town of Springfield	☐	☐
Village of Alma Center	☐	☐
Village of Hixton	☒	☐
Village of Melrose	☒	☐
Village of Merrillan	☒	☐
Village of Taylor	☒	☐
City of Black River Falls	☒	☐

APPENDIX A

RISK ASSESSMENT SURVEY

JACKSON COUNTY MULTI-HAZARDS RISK ASSESSMENT SURVEY

From your experience living in your community and the current societal and environmental conditions please check one of the three columns titled Low, Medium or High-Risk Rating to the right of each natural hazard listed in the far-left column. Your check mark should be based on your opinion of that natural hazard's probable threat to your community's health and public safety over the coming five years. Each of the Hazards listed is to receive only one check mark. For example if you check a medium risk rating for Lightning Storms this would be interpreted to mean that you think that over the next five years Lighting Storms will probably have a medium harmful effect on your community in comparison to the other hazards listed. The five-year period was chosen because that is how often Jackson County must update their Multi-Hazards Mitigation Plan. This survey is one of the methods Jackson County is using to receive public input into the plan. The survey information you and others provide is advisory and will not by itself set future public policy on how to deal with natural hazards.

NATURAL HAZARDS - Each natural hazard should receive a low, medium, or high-risk rating check mark.	**Low Risk Rating √** A hazard risk rating of low means that in your opinion this hazard probably will have the least harmful effect on health and public safety in your community over the next five years in comparison to the other hazards listed in column one.	**Medium Risk Rating √** A hazard risk rating of medium means that in your opinion this hazard will probably have a medium or average harmful effect on health and public safety in your community over the next five years in comparison to the other hazards listed in column one.	**High Risk Rating √** A hazard risk rating of high means that in your opinion this hazard will probably have the highest or greatest harmful effect on health and public safety in your community over the next five years in comparison to the other hazards listed in column one.
Hailstorms			
Lightning Storms			
Thunderstorms			
Tornado/High Winds			
Flash Flooding			
Riverine Flooding			
Lake Flooding			
Stormwater Flooding			
Dam Failure Flooding			
Forest Fires			
Wildland Fires			
Coastal Hazards			
Heavy Snowstorm			
Ice Storm			
Blizzard			
Extreme Cold			
Earthquake			
Extreme Heat			
Agricultural			
Drought			
Fog			
Landslide			
Subsidence			
Pandemic Flu			
Railroads			

Do you have any suggestions on projects or programs that may be undertaken by your local unit of government, the County or others that would reduce future losses and the threat to health and public safety from any of the above natural hazards? Please describe your suggestion(s) here or on a separate sheet of paper.

_____
_____
_____
_____
_____

I am a resident of the (circle one) Town / Village / City of _____

Please return this survey to Kristina Page Jackson County Emergency Management Director, Jackson County Emergency Management, 307 Main Street, Black River Falls, Wisconsin 54615 by October 31st, 2019.

APPENDIX B

HAZARD MITIGATION PROJECTS SURVEY

JACKSON COUNTY MULT-HAZARDS MITIGATION PROJECT NEED SURVEY

The Jackson County Emergency Management Department along with the Mississippi River Regional Planning Commission are updating the existing Jackson County Multi-Hazards Mitigation Plan. A key part of this plan is the identification of policies, programs and projects from throughout the county that will reduce losses from future hazards. We are asking for your input in preparing this portion of the plan. Please be inclusive and generous in your ideas for policies, programs, or projects that you think are needed for your local government or organization. Listing a project in this survey will be interpreted as something needed to meet a local need and not as a commitment to undertake it. Projects you list may possibly become eligible for funding from Federal and State grant programs.

1. Does your local unit of government or organization you represent have any flooding, storm water drainage or dam hazard mitigation projects? If so, please describe below: (Examples of this these types of projects could include: road raising (dry land access) and/or repair, bridge improvements, culvert improvements, drainage channel improvements, elevation of buildings, flood proofing of buildings, floodplain mapping, dam hydraulic shadow mapping, new river gages, flood warning plans, evacuation plans, storm water, water line and sewer line improvements, and dam inspection or maintenance projects.)

Proposed flooding, storm water drainage, or dam hazard mitigation projects your local government or organization would like to seriously consider.	**Estimated Project Cost if Known?**	**Proposed Project Beginning & Ending Date if Known**	**Key Project Contact Person & Telephone Number**
a.			
b.			
c.			

2. Does your local unit of government or organization you represent have any hail, thunderstorm, lightning and fog hazard mitigation projects? If so, describe below. (Examples of these types of projects could include: Improving protection of warning and communication equipment, burying of power and communication lines, improvements to public early warning systems and plans, improvements to roadways and waterways that provide aid to visibility.)

Proposed hail, thunderstorm, lightning and fog hazard mitigation projects your local government or organization would like to seriously consider.	**Estimated Project Cost if Known?**	**Proposed Project Beginning & Ending Date if Known**	**Key Project Contact Person & Telephone Number**
a.			
b.			
c.			

3. Does your local unit of government or organization you represent have any tornado, and high wind mitigation projects you would like to undertake? If so, describe below. (Examples of these types of projects could include: public warning communication systems and networks i.e. sirens, telecommunications, radios, weather radios, weather spotters etc.; storm shelters-particularly for mobile home courts and campgrounds; projects that strengthen public and private structures i.e. structural bracing, straps, anchor bolts, using laminated or impact resistant glass; concrete safe rooms for mobile home parks, fairgrounds and shopping areas; protection of permanent and temporary debris disposal sites by fencing or relocation; burying power and telecommunication lines; purchase power supply backup power resources-generators.)

Proposed tornado and high wind hazard mitigation projects your local government or organization would like to seriously consider.	**Estimated Project Cost if Known?**	**Proposed Project Beginning & Ending Date if Known**	**Key Project Contact Person & Telephone Number**
a.			
b.			
c.			

4.

Does your local unit of government or organization you represent have any extreme cold and heat mitigation projects you would like to undertake? If so, describe below. (Examples of these types of projects could include: local governments, civic and social service organizations can organize outreach activities to vulnerable residents during periods of extreme temperature; local governments, civic and social service organizations can work together to offer special arrangements for paying utility bills of vulnerable residents during times of extreme temperatures; local governments and civic and social service organizations can establish heating and cooling centers for vulnerable residents.)

Proposed extreme cold and heat event mitigation projects your local government or organization would like to seriously consider.	**Estimated Project Cost if Known?**	**Proposed Project Beginning & Ending Date if Known**	**Key Project Contact Person & Telephone Number**
a.			
b.			
c.			

5. Does your local unit of government or organization you represent have any forest and wildfire hazard mitigation projects you would like to undertake? If so, describe below. (Examples of these types of projects could include: promote use of non-combustible roof covering, fire safe construction materials and techniques; public education of smoking hazards and risks of recreational fires; use of zoning and subdivision regulations that create defensible space or buffer zones between structures and woodlands or grasslands; select logging, pruning and clearing of vegetation; create fire breaks; planting fire resistant vegetation; having adequate water supply locations, tanker trucks and pumping equipment.)

Proposed forest and wildfire mitigation projects your local government or organization would like to seriously consider.	**Estimated Project Cost if Known?**	**Proposed Project Beginning & Ending Date if Known**	**Key Project Contact Person & Telephone Number**
a.			
b.			

6. Does your local unit of government or organization you represent have any heavy snow, ice or blizzard hazard mitigation projects you would like to undertake? If so, describe below. (Examples of these types of projects could include: promote traveler emergency preparedness in education programs on severe weather hazards; burying electric and telecommunication lines underground; joint acquisition of vehicles and equipment among local governments to respond to severe winter storms; use of snow fences, including planting of trees to limit blowing and drifting of snow over roadways and to protect critical facilities.)

Proposed heavy snow, ice or blizzard mitigation projects your local government or organization would like to seriously consider.	**Estimated Project Cost if Known?**	**Proposed Project Beginning & Ending Date if Known**	**Key Project Contact Person & Telephone Number**
a.			
b.			

7. Does your local unit of government or organization you represent have any earthquake, landslide or subsidence hazard mitigation projects you would like to undertake? If so, describe below. (Examples of these types of projects could include: mapping and educating the public about areas in the county vulnerable to landslides and subsidence; identify and warn public about areas where falling rock from hillsides or cliffs can cause damage or harm; prepare zoning, subdivision, and site construction ordinances that set land use, development density, setback and slope construction standards.)

Proposed earthquake, landslide and subsidence mitigation projects your local government or organization would like to seriously consider.	**Estimated Project Cost if Known?**	**Proposed Project Beginning & Ending Date if Known**	**Key Project Contact Person & Telephone Number**
a.			
b.			

8. Does your local unit of government or organization you represent have any agricultural or drought hazard mitigation projects you would like to undertake? If so, describe below. (Examples of these types of projects could include: encouraging the purchase of crop insurance to preserve economic stability for farmers during drought; maintaining adequate municipal water storage supplies to provide water for human consumption over an extended period during times of drought; pass local government water emergency control ordinances to limit water use; construction of reservoirs for use during times of drought for agricultural use; purchasing tank trucks and pumping equipment for conveyance of water to special impact areas.)

Proposed agricultural or drought hazard mitigation projects your local government or organization would like to seriously consider.	**Estimated Project Cost if Known?**	**Proposed Project Beginning & Ending Date if Known**	**Key Project Contact Person & Telephone Number**
a.			
b.			

9. Does your local unit of government or organization you represent have any pandemic flu mitigation projects you would like to undertake? If so, describe below. (Identify nutrition program adaptations needed to respond to social distancing, voluntary quarantines, and possible disruption of the normal food supply, Develop clear and consistent guidance for planning for home care of ill individuals, such as when and where to seek medical care, how to safely care for an ill individual at home, and how to minimize disease transmission in the household. Develop guidance for appropriate use of community resources, such as home healthcare services, telephone care, the 9-1-1 emergency telephone system, emergency medical services, and triage services (nurse-advice lines, self-care guidance, and at-home monitoring systems) that could be deployed to provide resources for home care. Develop a plan to use media and trusted sources in communities to 1) explain the concepts of pandemic preparedness, 2) explain what individuals and families can do to be better prepared, and 3) disseminate clear information about what the public may be asked to do in the case of a pandemic.)

Proposed pandemic flu mitigation projects your local government or organization would like to seriously consider.	**Estimated Project Cost if Known?**	**Proposed Project Beginning & Ending Date if Known**	**Key Project Contact Person & Telephone Number**
a.			
b.			

10. Does your local unit of government or organization you represent have any railroad hazard mitigation projects you would like to undertake? If so, describe below. (Examples of these types of projects could include: (Examples are: additional emergency response training; purchase of new or additional emergency response equipment; relocate critical emergency response structures away from rail lines; develop evacuation plans; upgrade rail crossings.)

Proposed railroad hazard mitigation projects your local government or organization would like to seriously consider.	**Estimated Project Cost if Known?**	**Proposed Project Beginning & Ending Date if Known**	**Key Project Contact Person & Telephone Number**
a.			
b.			
c.			

Please return this survey to Kristina Page Jackson County Emergency Management Director, Jackson County Emergency Management, 307 Main Street, Black River Falls, Wisconsin 54615 By October 31st, 2019.

APPENDIX C

PUBLIC HEARING NOTICE,

LAW ENFORCEMENT COMMITTEE AGENDA

&
MISSISSIPPI RIVER REGIONAL PLANNING COMMISSION AGENDA

Affidavit of Publication

STATE OF WISCONSIN } ss.
County of Jackson

Julie Iverson, being duly sworn on oath, says that she is a Bookkeeper for THE BANNER JOURNAL, a weekly newspaper of general circulation published at the City of Black River Falls, in Jackson County and State of Wisconsin, that a notice of which a printed copy is here-to attached, has been published in said newspaper once in each week for 1 consecutive weeks, commencing with the issue bearing date Sept 30 A.D. 20 20, and ending with the issue bearing date Sept 30 A.D. 20 20, and that said attached printed copy was taken from said newspaper.

Julie Iverson

Subscribed and sworn to before me this 30th day of Sept A.D. 20 20

Kathy Potter
Notary Public, Jackson County, Wisconsin

KATHY POTTER NOTARY PUBLIC STATE OF WISCONSIN

My Commission expires 12-28, 20 21.

Jackson County Emergency Management

Kristina Page, Emergency Management Coordinator
30 N. 3rd Street - Black River Falls, WI 54615 - (715) 284-0263 - Fax: (715) 284-0252

Jackson County Emergency Management will hold a public hearing on October 9, 2020 at 10:00 am in the Explorer Conference Room in Black River Falls located at 307 Main Street. The purpose of this public hearing is to receive public input on the County's All Hazard Mitigation Plan that is being updated, in accordance with the Federal Disaster Mitigation Act of 2000. By developing this plan, Jackson County, towns, villages, and city can become eligible for FEMA's Hazard Mitigation Grant programs. Prior to the public comments a brief presentation will be made on the process used to develop the plan, hazard risk assessment research that was conducted and on some projects that have been identified to reduce future damages and losses from hazards. For those individuals who cannot attend this meeting and want to provide written comments, please submit them by October 7, 2020 to: Kristina Page, Jackson County Emergency Management Coordinator, 30 N. 3rd St., Black River Falls, WI 54615

Jackson County Sheriff's Office

30 N. 3rd Street - Black River Falls, WI 54615 - (715) 284-9009 - Fax: (715) 284-0252

***DUANE M. WALDERA**, SHERIFF – **ADAM M. OLSON**, CHIEF DEPUTY*

E-MAIL: sheriff@co.jackson.wi.us

September 18, 2020

TO: Jackson County Law Enforcement Committee:

Charles Jensen, Ray Ransom, Jeff Amo, Ron Carney, Isaiah Funmaker

RE: REGULAR SESSION MEETING NOTICE

AGENDA
September 22, 2020 9:30 a.m.
County Board Room

OPEN SESSION

A. Call to Order
B. Approve minutes from previous meetings
C. Agenda Revisions
D. Set next meeting date/time
E. Resolution - Hazard Mitigation Plan
F. Divisional Reports
    a) Technical Support Specialist (TSS) Monthly Activity Report
G. Staff Vacancies and Recruitment Updates
H. Vouchers Payable
I. Budget Review
J. Motion to Adjourn

cc: Banner Journal WWIS Radio Bulletin Boards
Ray Ransom Human Resources County Clerk County Website

NOTICE OF QUORUM: Based on the composition of the members of the Executive and Finance and Personnel & Bargaining Committees, a quorum of the Executive and Finance and Personnel & Bargaining Committees will also be present at the above noticed meeting. There will not be any formal discussion or any official action taken of any pending or future matters pertaining to Jackson County under the authority of the Executive and Finance or Personnel & Bargaining Committees at this meeting. The action items at this meeting will be limited to the Law Enforcement Committee as to the items posted on this agenda.

MISSISSIPPI RIVER REGIONAL PLANNING COMMISSION

1707 Main Street, Suite 435
La Crosse, WI 54601
Phone: (608) 785-9396
Fax: (608) 785-9394
Email: plan@mrrpc.com
Website: mrrpc.com

MISSISSIPPI RIVER REGIONAL PLANNING COMMISSION
BIMONTHLY MEETING NOTICE AND AGENDA
10:00 AM, Wednesday, October 10, 2018
AmericInn,1835 Rose Street, La Crosse, WI 54601

< MRRPC BIMONTHLY MEETING AGENDA >

1. Roll call and guest introductions
2. Decision on August 8, 2018 Bimonthly Meeting Minutes
3. Decision on Treasurer's Report: (a) August 2018 and September 2018 Account Balance, Revenue and Expense Reports. (b) Revolving Loan Fund Reports: (1) Business Capital Fund, (2) Crawford, Monroe Vernon - CMV Growth Development Fund (3) La Crosse County Loan Fund (4) Monroe County Loan Fund. (5) Pierce County Loan Fund. VB/GF
4. Decision on bookkeeping-accounting firm for MRRPC. GF
5. Decision on annual auditing firm for MRRPC. GF
6. Report on heavy rain and flooding disaster event of August 27-28 and local, state, federal, recovery efforts to date. DB
7. Report on US Dept. Of Commerce-EDA economic recovery flood disaster grant assistance projects in the cities of La Crosse, Arcadia and Viroqua. ($3.6 million grant was approved for La Crosse!)
8. Decision on Jackson County Hazard Mitigation Plan Contract. DB
9. Decision on La Crosse County Hazard Mitigation Plan Contract. DB
10. Approval of disaster recovery microloan agreement between WEDC and MRRPC. GF
11. Approval of forming an ad hoc Micro Loan Review Committee. GF
12. Update on the Wisconsin Department of Administration's proposed Community Development Block Grant (CDBG) Close Grant program involving terminating all CDBG Revolving Loan Funds in cities and counties across the state with CDBG RLFs. Then allowing these communities to apply for a guaranteed CDBG grant for the amount of RLF funds returned. GF
13. Commissioners' questions and comments on the following projects listed in the written staff report:
    a. Crawford County Hazard Mitigation Plan. DB
    b. Trempealeau County Hazard Mitigation Plan. DB
    c. Scenic Mississippi Regional Transit (SMRT) bus serving Crawford, Monroe, La Crosse and Vernon counties. PF
    d. Viroqua Recreation Plan. DB
    e. The Upper Mississippi River Manufacturing Alliance – TUMMA. GF
    f. Trempealeau County Towns - Comprehensive Plan update. PF
    g. Monroe County Hazard Mitigation Plan. DB
    h. Vernon County Hazard Mitigation Plan. DB

<AGENDA CONTINUED>

    i. Coulee Region Business Center and Western Wisconsin Workforce Development Board's Joint Application of $45,000 to the U.S. Department of Commerce - Economic Development Administration to fund a feasibility study on development of a fabrication lab, food processing, packaging and distribution center and a transitional jobs program to assist persons with barriers to employment. GF
    j. Comprehensive Plan for the City of Mondovi. PF
    k. Pierce County Community Development Block Grant Revolving Loan Fund. GF
    l. Mississippi River Parkway Commission's corridor management plan. PF
    m. Regionally Coordinated County Human Services Transportation Plans 2018-2023 involving all nine counties to maintain state and federal transportation aids funding eligibility. PF
14. Old Business
15. New Business
16. Adjourn

Commissioners

Buffalo County	**La Crosse County**	**Pierce County**
Mary Anne McMillan Urell	Vicki Burke	Richard Purdy
Del Twidt	James Ehrsam	William Schroeder
John Schlesselman	Shelly Miller	James Ross
Crawford County	**Monroe County**	**Trempealeau County**
Greg Russell	Sharon Folcey	Margaret Baecker
Gerald Krachey	James Kuhn	Ernest Vold
Ron Leys	Cedric Schnitzler	Phillip Borreson
Jackson County	**Pepin County**	**Vernon County**
Ron Carney	Bruce Peterson	Herb Cornell
Brad Chown	Irene Wolf	Jo Ann Nickelatti
Todd Stittleburg	James Kraft	Nancy Jaekel

Staff
Dave Bonifas, Community Development Planner
Peter Fletcher, Transportation Planner
Greg Flogstad, Director
Sarah Ofte, Administrative Assistant