Buffalo County Multi-Hazards Mitigation Plan 2021-2025

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

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ABSTRACT

Title:	BUFFALO COUNTY MULTI-HAZARDS MITIGATION PLAN 2021-2025
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 Local Emergency Planning Committee who coordinated their plan development efforts through the County Emergency Management Director. 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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1.0 BUFFALO COUNTY MULTI-NATURAL HAZARDS MITIGATION PLANNING PROCESS

Disaster Mitigation Act of 2000-DMA2K

The development of this plan is 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 a Multi-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 Multi-Hazard Mitigation Pan. Manmade hazards such as hazardous waste spills are 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 a Multi- Hazards Mitigation Plan within one year.
- In addition, by not having a Multi-Hazard Mitigation Plan, local governments and tribal organizations cannot utilize funding through the Pre-Disaster Mitigation Grant Program.

Plan Committees and Organizations

The Buffalo County Multi-Hazards Mitigation Plan 2021-2025 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 includes the County along with the Towns of: Alma, Belvidere, Buffalo, Canton, Cross, Dover, Gilmanton, Glencoe, Lincoln, Maxville, Milton, Modena, Mondovi, Montana, Naples, Nelson, Waumandee, the Villages of Cochrane, Nelson, and the Cities of Alma, Buffalo City, Fountain City and Mondovi. The update of the plan was prepared under the guidance of the Law Enforcement Committee. Members of this committee are: John Sendelbach, Nathan Nelson, Larry Grisen, and Michael Taylor. The Local Emergency Planning Committee was also consulted in the preparation and approval of the Plan. County Emergency Management Coordinator also participated in committee meetings and served as a liaison between the Law Enforcement, Local Emergency Planning 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 development and writing of the plan under the direction of the County Emergency Management Director.

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 A-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. The risk assessment survey asked the respondents to rank 20 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 C.

In addition to the risk assessment survey every municipality within Buffalo County was emailed in May 2021 their hazard mitigation projects list from the first plan. Each municipality was asked to update this list 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 emailed in July of 2021 to those who did not respond to the first survey. A listing of who received this survey can be found in Table 1-1 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.

Local Emergency Planning Committee Meetings (LEPC). During the course of the period in which the plan was being developed the County Emergency Management Committee included the Multi-Hazards Mitigation Plan Update on their 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 Local Emergency Management Committee meeting agenda can be found in Appendix D.

Public Meetings and Hearings. The County also sponsored a public meeting on October 27 ,2021 to present a draft of the Buffalo 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. Additional public input or potential projects/programs were also received during the course of this meeting. The public was notified of the public meeting on the draft plan through notices at the Courthouse, on the County website, and at numerous town, city and village halls. A copy of the public notice can be found in Appendix D.

Municipal and Business Participation. All local municipalities were emailed the risk assessment surveys. The municipalities receiving the survey were the Towns of Alma, Belvidere, Buffalo, Canton, Cross, Dover, Gilmanton, Glencoe, Lincoln, Maxville, Milton, Modena, Mondovi, Montana, Naples, Nelson, Waumandee, the Villages of Cochrane, Nelson and the Cities of Alma, Buffalo City, Fountain City and Mondovi. In addition, these municipalities were mailed their project listing from the first plan and were asked to update this list. See Table 1-2 on page 1-5 for a listing of 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. Due to the lack of an organized business association within Buffalo County, local business input was obtained from those business owners who are also on the various first responders, town boards, village boards and city boards. In addition, business owners were provided the opportunity to make comments at the open meetings and public hearings.

Neighboring Communities, Academia and Nonprofits Participation. Emergency Management Directors of neighboring Counties were sent copies of the draft plan for their review and comments. The Alma, Arcadia, Cochrane-Fountain City, Durand, Gilmanton, Independence and Mondovi 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 2019 MRRPC Bimonthly meeting and continuing until the final approval from FEMA, the Buffalo 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 addenda can be found in Appendix D.

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 2016	Provided data for historical natural hazard events.
2016 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, Buffalo 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, Buffalo 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 Buffalo County
Wis. Dept. of Administration, Hazard Material Site Database	Provided a list of hazardous material sites located within the County

Funding for the Buffalo County All Hazards Mitigation Plan

In May 2019, the County received word that they were awarded a $39,285.64 FEMA planning grant through the Pre-Disaster Mitigation Grant Program to update their All-Hazards Mitigation Plan 2016-2020. FEMA will provide 75% ($29,464) of the funds and the remaining 25% ($9,821.41) will be provided by local match. On February 10, 2021, the Mississippi River Regional Planning Commission (MRRPC) signed a contract with Buffalo County that called for the MRRPC to prepare the plan and provide most of the local matching share.

Plan Contents

In order to meet FEMA's local mitigation plan requirements Buffalo County's Multi-Hazards Mitigation Plan is organized into the following five parts, which also follow the Resource Guide to 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: The Committee responsible for oversight of the plan update was changed from the Land Records Committee to the County Emergency Management Committee, 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 2015), 100-year floodplain data, flood potential, updated critical facilities tables and maps and added pandemic flu information, added train and lock & dam hazards;

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.

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2.0 BUFFALO COUNTY PLANNING AREA

General Geography

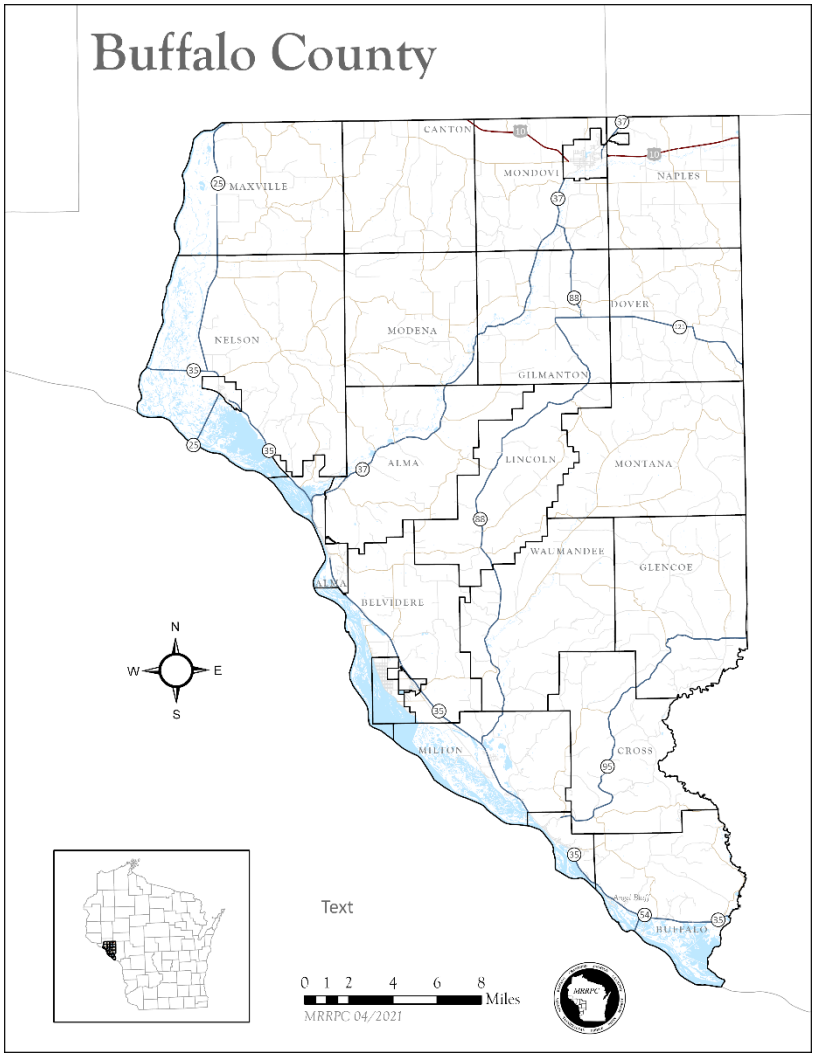


FIGURE 1 BUFFALO COUNTY MAP

Buffalo County is located in west central Wisconsin, with parts of the southern portion within a 30-minute drive of the La Crosse urban area and the northern portion of the same distance from Eau Claire, and also serves as a suburban venue for Winona, Minnesota, across the Mississippi River.

Buffalo County is 28.5 miles east-west at its widest part, and about 40.5 miles north-south at the tallest part. It borders Pepin and Eau Claire Counties to the north and Trempealeau County to the east. The rest of Buffalo County is bordered by the Mississippi River and Minnesota, which cover all the west and south.

Buffalo County is located within the unglaciated, Driftless Area of Western Wisconsin. It has a varied topography with high ridges, long narrow valleys and steep slopes. Bluffs rise above the river bottoms by 500 feet in some areas. The land area of the county is 684.5 square miles, or about 438,061 acres.

The planning area for this Multi-Hazard Mitigation plan includes all local units of government within Buffalo County. The local government units include four cities (Alma, Buffalo City, Fountain City, Mondovi), two villages (Cochrane, Nelson), and seventeen town governments (Alma, Belvidere, Buffalo, Canton, Cross, Dover, Gilmanton, Glencoe, Lincoln, Maxville, Milton, Modena, Mondovi, Montana, Naples, Nelson Waumandee). The cities and villages in the County range in geographic size from the City of Alma 5.86 square miles to the Village of Cochrane with an area of less than a square mile. Town governments range in geographic size from the Town of Nelson 70 square miles to the Town of Milton with 25 square miles. Tables 2-1and 2-2 provide population and housing data for all the local units of government.

Demographic and Economic Profile

Population: The County's population decreased from 13,319 in 2017 to 13,126 in 2019, a 1.4 percent decrease. This decrease was opposite of the State and the Nation which both grew by 0.8 percent and 2.6. percent respectively. The 2019 American Community Survey (ACS) showed that the six cities and villages in

the County range in population size from 2,603 in the City of Mondovi to 340 residents in the Village of Nelson. The population of the towns in the County ranged from 816 in the Town of Buffalo to 225 in the Town of Lincoln, Table 2-1.

Table 2-1 Buffalo County Population and Land Area Data

	Population				*Land Area (Square Miles)*		
Jurisdiction	*2015*	*2019*	*# Change 15-19*	*% Change 15-19*	*Land*	*Water*	*Total*
Alma	290	326	36	12.4%	42.79	0.14	42.93
Belvidere	395	374	-21	-5.3%	33.15	1.4	34.55
Buffalo	766	816	50	6.5%	29.85	4.34	34.19
Canton	292	272	-20	-6.8%	35.81	0	35.81
Cross	356	342	-14	-3.9%	37.68	0.01	37.69
Dover	523	545	22	4.2%	36.21	0	36.21
Gilmanton	369	415	46	12.5%	36.28	0.01	36.29
Glencoe	505	453	-52	-10.3%	44.68	0	44.68
Lincoln	189	225	36	19.0%	36.94	0	36.94
Maxville	383	377	-6	-1.6%	42.03	0.73	42.76
Milton	501	554	53	10.6%	25.05	4.49	29.54
Modena	288	238	-50	-17.4%	36.08	0	36.08
Mondovi	454	444	-10	-2.2%	32.37	0	32.37
Montana	274	303	29	10.6%	47.19	0	47.19
Naples	650	617	-33	-5.1%	35.53	0.02	35.55
Nelson	631	697	66	10.5%	70.66	6.95	77.61
Waumandee	428	409	-19	-4.4%	43.76	0.02	43.78
Town Totals	7,294	7,407	113	1.5%	666.06	18.11	684.17
V. Cochrane	442	392	-50	-11.3%	0.72	0	0.72
V. Nelson	324	340	16	4.9%	1.46	0.02	1.48
C. Alma	678	688	10	1.5%	5.86	1.92	7.78
C. Buffalo City	1,035	875	-160	-15.5%	2.14	3.91	6.05
C. Fountain City	853	821	-32	-3.8%	4.46	1.11	5.57
C. Mondovi	2,693	2,603	-90	-3.3%	3.79	0.03	3.82
City/Village Totals	6,025	5,719	-306	-5.1%	18.43	6.99	25.42
Buffalo County	13,319	13,126	-193	-1.4%	684.49	25.10	709.59
Wisconsin	5,742,117	5,790,716	48,599	0.8%	54,310	11,888	65,498
United States	316,515,021	324,697,795	8,182,774	2.6%	3,537,422	181,272	3,718,694

Source: 1) 2015 & 2019 Population and Housing Units: American Community Survey 5 year estimates
2) Buffalo County and Jurisdictions Land/Water Area, State of Wisconsin Department of Administration, Demographic Services Center
3) Wis. And U.S. Land/Water Area: U.S. Census Bureau, 2010 Census of Population and Housing, Summary Population and Housing Characteristics

Housing: Housing units in the County grew from 6,672 in 2015 to 6,788 in 2019 , an increase of 1.7 percent. This rate of growth was less than both the State (2.0%) and the Nation (3.1%). The 2015-2019 ACS showed that housing growth rates in the six cities and villages ranged from 3.2% in the City of Mondovi to -3.3% in Village of Nelson. Housing growth rates in the towns ranged from 39.5% in the Town of Montana to –9.9% in the Town of Maxville, Table 2-1.

Table 2-2 Buffalo Housing Units and Housing Units Per Square Mile of Land

	Housing Units				*Housing Units Per Sq. Mile of Land Area*			
Jurisdiction	*2015*	*2019*	*# Change 15-19*	*% Change 15-19*	*2015*	*2019*	*# Change 15-19*	*% Change 15-19*
Alma	168	181	13	7.7%	3.9	4.2	0.3	7.7%
Belvidere	242	236	-6	-2.5%	7.3	7.1	-0.2	-2.5%
Buffalo	336	372	36	10.7%	11.3	12.5	1.2	10.7%
Canton	126	124	-2	-1.6%	3.5	3.5	-0.1	-1.6%
Cross	167	167	0	0.0%	4.4	4.4	0.0	0.0%
Dover	219	208	-11	-5.0%	6.0	5.7	-0.3	-5.0%
Gilmanton	189	183	-6	-3.2%	5.2	5.0	-0.2	-3.2%
Glencoe	221	220	-1	-0.5%	4.9	4.9	0.0	-0.5%
Lincoln	140	147	7	5.0%	3.8	4.0	0.2	5.0%
Maxville	172	155	-17	-9.9%	4.1	3.7	-0.4	-9.9%
Milton	244	266	22	9.0%	9.7	10.6	0.9	9.0%
Modena	162	146	-16	-9.9%	4.5	4.0	-0.4	-9.9%
Mondovi	208	239	31	14.9%	6.4	7.4	1.0	14.9%
Montana	124	173	49	39.5%	2.6	3.7	1.0	39.5%
Naples	289	282	-7	-2.4%	8.1	7.9	-0.2	-2.4%
Nelson	300	328	28	9.3%	4.2	4.6	0.4	9.3%
Waumandee	201	197	-4	-2.0%	4.6	4.5	-0.1	-2.0%
Town Totals	3,508	3,624	116	3.3%	5.3	5.4	0.5	3.3%
V. Cochrane	214	208	-6	-2.8%	297.2	288.9	-8.3	-2.8%
V. Nelson	182	176	-6	-3.3%	124.7	120.5	-4.1	-3.3%
C. Alma	475	460	-15	-3.2%	81.1	78.5	-2.6	-3.2%
C. Buffalo City	591	582	-9	-1.5%	276.2	272.0	-4.2	-1.5%
C. Fountain City	479	476	-3	-0.6%	107.4	106.7	-0.7	-0.6%
C. Mondovi	1,223	1,262	39	3.2%	322.7	333.0	10.3	3.2%
City/Village Totals	3,164	3,164	0	0.0%	171.7	171.7	0.0	0.0%
Buffalo County	6,672	6,788	116	1.7%	9.7	9.9	0.2	1.7%
Wisconsin	2,641,627	2,694,527	52,900	2.0%	48.6	49.6	1.0	2.0%
United States	133,351,840	137,428,986	4,077,146	3.1%	37.7	38.9	1.2	3.1%

Source: 1) 2015 & 2019 Population and Housing Units: American Community Survey 5 year estimates
2) Buffalo County and Jurisdictions Land/Water Area, State of Wisconsin Department of Administration, Demographic Services Center
3) Wis. And U.S. Land/Water Area: U.S. Census Bureau, 2000 Census of Population and Housing, Summary Population and Housing Characteristics

Employment and Industry. Total employment in the County decreased from 7,104 in 2015 to 6,841 in 2019, a decrease of 2.5% percent. This rate of growth was below both the State (3.4%) and the Nation (4.8%). The top three employment sectors in the County in 2019 include: Educational, health and social services (21.5%), Manufacturing (18.7%), and Retail Trade (9.4%). The three sectors with the most growth from 2015-2019 include: Professional, scientific, management, administrative, and waste management services (41.3%), Transportation and warehousing, and utilities (30.4%), and Public Administration (8.5%).

Table 2-3 Employment by Industry

	Buffalo County					*Wisconsin*					*United States*				
	2015 (1)		*2019 (2)*		*% Change 15-19*	*2015 (1)*		*2019 (2)*		*% Change 15-19*	*2015 (1)*		*2019 (2)*		*% Change 15-19*
	No. Emp.	*%*	*No. Emp.*	*%*		*No. Emp.*	*%*	*No. Emp.*	*%*		*No. Emp.*	*%*	*No. Emp.*	*%*	
Agriculture, forestry, fishing and hunting, and mining	830	11.8	634	9.3	-23.6	71,069	2.5	66,179	2.2	-6.9	2,852,402	2.0	2,743,687	1.8	-3.8%
Construction	529	7.5	505	7.4	-4.5	153,703	5.3	172,389	5.8	12.2	9,027,931	6.2	10,207,602	6.6	13.1 %
Manufacturing	1,303	18.6	1,282	18.7	-1.6	532,873	18.5	543,309	18.2	2.0	15,171,260	10.4	15,651,460	10.1	3.2%
Wholesale trade	175	2.5	177	2.6	1.1	76,802	2.7	79,069	2.7	3.0	3,968,627	2.7	4,016,566	2.6	1.2%
Retail trade	647	9.2	642	9.4	-0.8	325,573	11.3	329,313	11.0	1.1	16,835,942	11.6	17,267,009	11.2	2.6%
Transportation and warehousing, and utilities	427	6.1	557	8.1	30.4	125,112	4.3	135,231	4.5	8.1	7,226,063	5.0	8,305,602	5.4	14.9
Information	69	1.0	54	0.8	-21.7	47,677	1.7	47,499	1.6	-0.4	3,094,143	2.1	3,114,222	2.0	0.6
Finance, insurance, real estate, and rental and leasing	310	4.4	261	3.8	-15.8	176,228	6.1	181,084	6.1	2.8	9,578,175	6.6	10,151,206	6.6	6.0
Professional, scientific, management, administrative, and waste management services	269	3.8	380	5.6	41.3	232,821	8.1	250,422	8.4	7.6	16,074,502	11.0	17,924,655	11.6	11.5
Educational, health and social services	1,508	21.5	1,473	21.5	-2.3	671,113	23.3	698,568	23.4	4.1	33,739,957	23.1	35,840,954	23.1	6.2
Arts, entertainment, recreation, accommodation, and food services	452	6.4	405	5.9	-10.4	249,741	8.7	252,805	8.5	1.2	13,739,126	9.6	14,962,299	9.7	8.9
Other services (except public administration)	293	4.2	253	3.7	-13.7	120,056	4.2	124,066	4.2	3.3	7,198,201	4.9	7,522,777	4.9	4.5
Public Administration	187	2.6	218	3.2	8.5	100,622	3.5	102,425	3.4	1.8	6,996,990	4.8	7,134,146	4.6	2.0
Total Employees	7,104		6,841		-2.5	2,883,390		2,982,359		3.4	147,747,779		154,842,185		4.8

(1) 2015 American Community Survey 5-Year Estimates, Profile of Selected Economic Characteristics

(2) 2019 American Community Survey 5-Year Estimates, Industry by Occupation for the Civilian Employed Population 16 Years and over

Employers. The largest employer in the County is Marten Transport LTD, Mondovi (250-499 employees). There are 3 employers who employ between 100 and 249 people. These employers are Mondovi Public Schools, Cochrane Fountain City Schools, and American Lutheran Homes. The other 6 employers who round out the top 10 employers within the county are Alma Schools, La Crosse Milling Company, Builders Millwork, The Homeplace Assisted Living, Mayo Clinic Health Systems, and St. Michaels Lutheran Home.

Table 2-4 Prominent Buffalo County Employers

Establishment	*Service or Product*	*Number of Employees*
Marten Transport Ltd	Freight trucking long - distance	250-499
Mondovi Public Schools	Elementary and Secondary Schools	100-249
Cochrane Fountain City Schools	Elementary and Secondary Schools	100-249
American Lutheran Homes	Nursing care facilities	100-249
Alma Schools	Elementary and Secondary Schools	50-99
La Crosse Milling Company	Grain manufacturer	50-99
Builders Millwork	Millwork, Doors	50-90
The Homeplace Assisted Living	Assisted living	20-49
Mayo Clinic Health Systems	Medical facilities	20-49
St. Michaels Lutheran Home	Assisted living	20-49

Source: Data Axle by Reference Solution, Database accessed 03/08/2021

General Development Pattern

Land Use Trends. Real estate assessment records from 2014 to 2020 provide the most current land use information for the County. In 2020 agricultural land totaled 202,771 acres in addition there was 63,704 acres of agricultural forest land. These two categories combine for a total of 266,475 acres or 57.42 percent of land use in the County. This was followed by Other Land (water areas, exempt lands, etc.), 141,237 – 30.43%; Undeveloped, 27,254 acres – 5.87 percent; Forest, 17,558 – 3.80 percent; Residential, 6,211 – 1.33 percent; Other Real Estate, 3,590 – 0.80 percent; Commercial, 1,101 - 0.24 percent; and Manufacturing, 664 acres – 0.24 percent. Table 2-5. As in almost all Wisconsin Counties, Agricultural assessed lands within Buffalo County continue to decline. Between 2014 and 2020 agricultural lands decreased by 5,681 acres or 2.72 percent. The Use Value Assessment Law probably contributed to keeping the conversion of farmland on urban fringes to a minimum by assessing the land on its agricultural value and not its residential or commercial value. This reduces property taxes and creates an incentive to maintain farmland and not sell it for other uses.

Table 2-5 Buffalo County Land Use

	2014		*2020*	
	Acres	*% of County*	*Acres*	*% of County*
Residential [(1)]	5,876	1.27	6,211	1.33
Commercial [(1)]	977	0.21	1,101	0.24
Manufacturing [(1)]	801	0.17	664	0.14

Agriculture [1]	208,452	44.92	202,771	43.69
Undeveloped [1]**	24,816	5.35	27,254	5.87
Agriculture Forest [1]****	67,338	14.51	63,704	13.73
Forest [1]***	21,250	4.58	17,558	3.80
Other Real Estate [1]	3,622	0.78	3,590	0.80
Other [3]	130,958	28.21	141,237	30.43
County Total [4]	464,090	100	464,090	100

(1) Wisconsin Department of Revenue Division of State and Local Finance - 2014 and 2020 Real Property Equalized Value and Acreage Figures

(2) Total of Residential, Commercial, Manufacturing, Agriculture, Swamp and Waste, and Forest. Figures as recorded by the Department of Revenue for
Real Estate Equalization adjustment purposes.

(3) Includes water areas but excludes the Mississippi River. Also includes tax exempt lands as identified by the Wisconsin Department of Revenue.
These tax-exempt lands include city, village, town, county, state, and federally owned lands as well as: School districts, lake districts, sewer districts,
vocational and technical districts, colleges, universities, forest management lands, some nonprofit organization lands, cemeteries, and shelters.
State Statute 70.11 lists all tax-exempt properties which would be included in this category.

(4) Includes total area of county - both land area and water area but excludes the water area of the Mississippi River. Source: Wisconsin DNR

**Use value law froze ag land values therefore making it necessary to keep a separate figure for ag buildings/sites and improvements.*

***Legislation passed for the 1998 assessment period made a change governing land classification. Land has been reassessed in many cases and moved from one classification to the Swamp/Waste Category or Class E. Most likely the land being moved is land that was classed as Ag land but was not being tilled or planted.*

****With the Use Value Assessment of Farmland Law, acres that were previously classed as Forest may have been moved to Agriculture if those acres are used as pastureland. One of the benefits of the use value law has been slowing the loss of farmland. Wisconsin Farm Bureau's June 25, 2002, press release said that use value assessment has slowed the annual rate of farmland being diverted to non-ag uses by 23 percent from 1996-2000, compared to five years before the law went into effect. There are also more acres being enrolled in the Managed Forest Land Program through the Department of Natural Resources.*

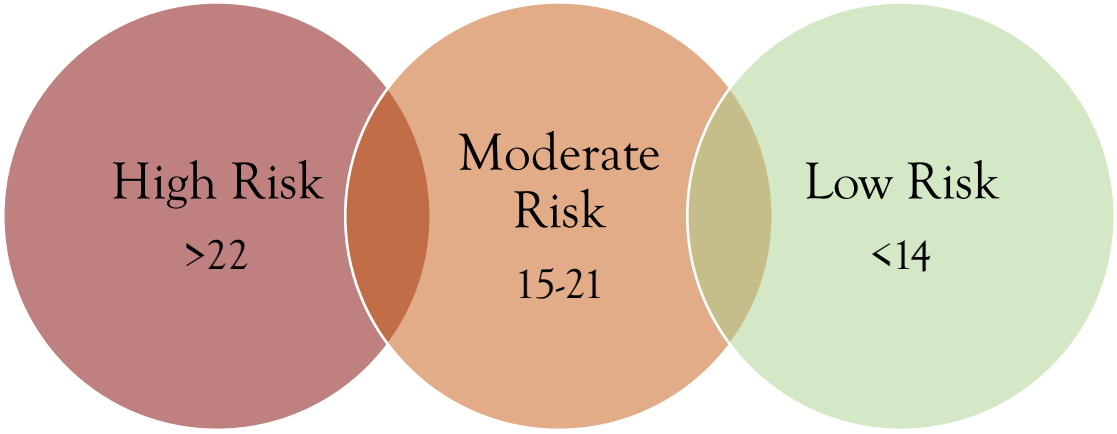
*****Effective for 2005 assessment year, 2003 Wisconsin Act 230 amended the definition of "Agricultural Forest". Sec. 70.32(2)(c)1d now defines "agricultural forest as land that is producing or capable of producing commercial forest products.*

Development Trends

Between 2015 and 2019 city and village populations decreased by 309 people, and the population in the towns increased by 113 people. During this same time period the County actually saw an increase of 116 net housing units. The towns experienced an increase of 116 net housing units and the cities and villages had an increase of 0 net housing units. The greatest increases in housing units were in the Town of Montana (49 units) and the Town of Buffalo (36 units). See tables 2-1 and 2-2.

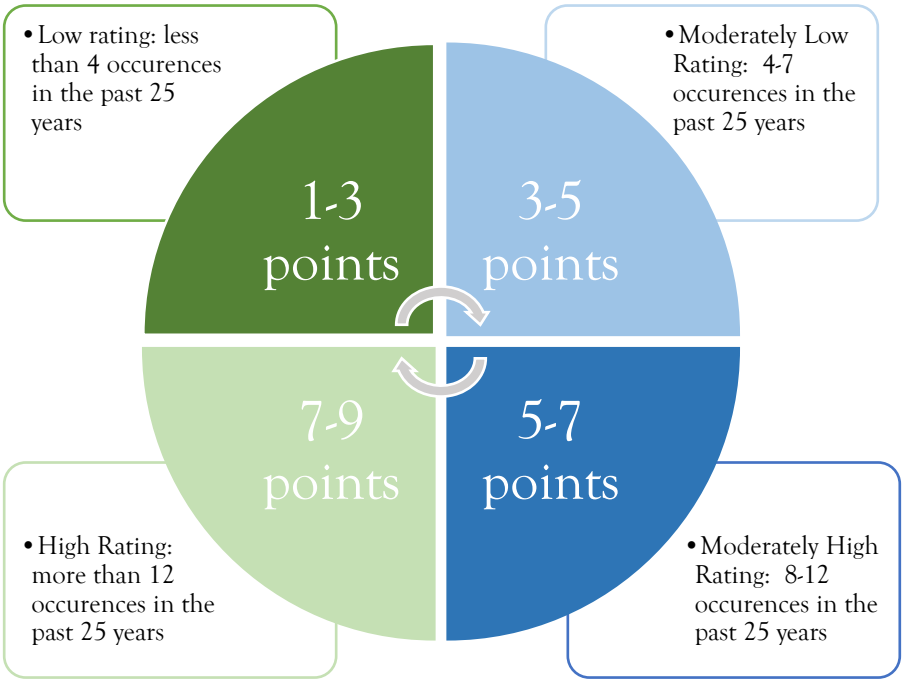
3.0 BUFFALO COUNTY RISK ASSESSMENT

The following is Buffalo 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 officials' opinion survey. Overall points for each assessment designation will be addressed at the end of each natural hazard risk assessment in this chapter.



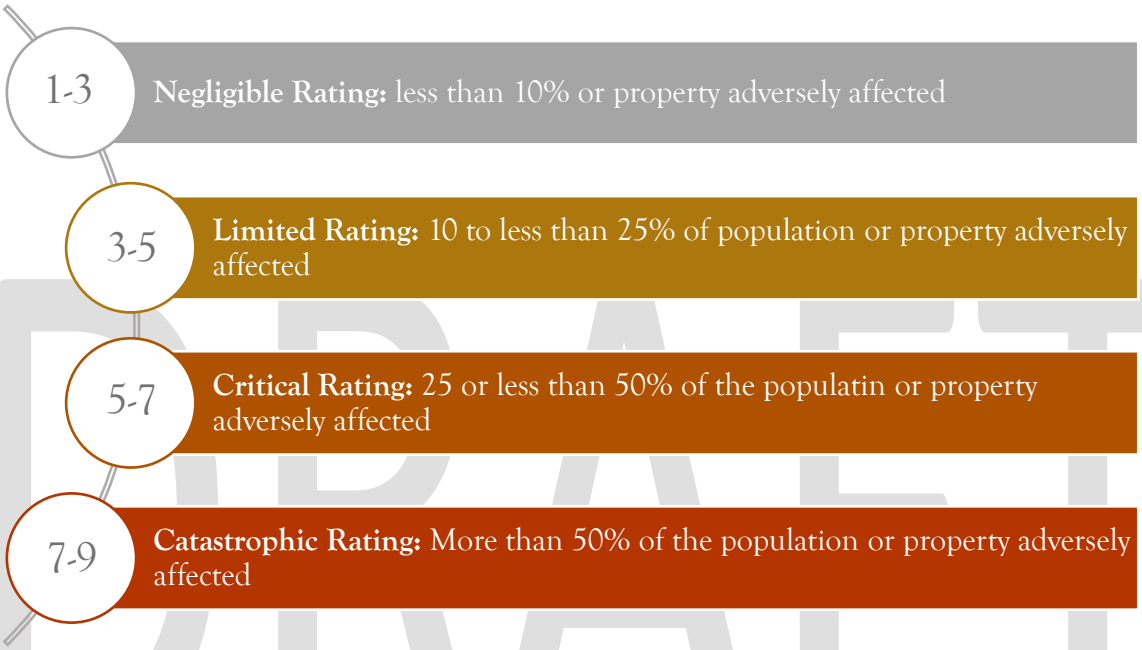
Historical Occurrence Rating Criteria

The number of times a particular hazard occurs within a 25-year period.



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 ad businesses will vary from one community to another and from one hazard to another.

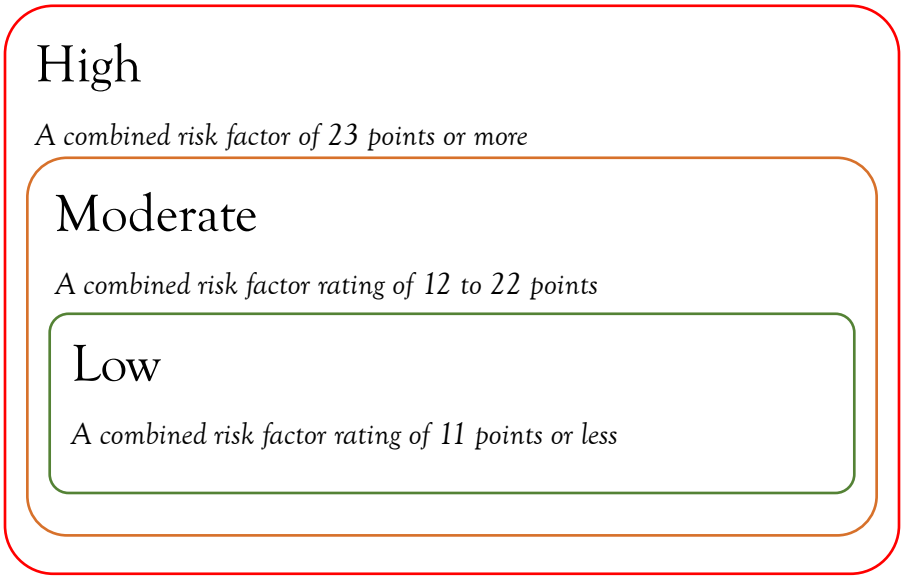


Probability Rating Criteria

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

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 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. *All jurisdictions in the county are equally at risk for all hazards except for flooding, dam failure and forest fires, which are limited to areas to those areas where there are forests, rivers or dams.* See Maps 3-6 and 3-7 for flood prone areas.



3.1 Buffalo 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.

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 the National Climatic Data Center, Buffalo County experienced 113 hailstorms from 1970 through 2020 (Table B-1, Appendix B). This averaged out to 2.26 events per year within the average for Wisconsin counties.

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assessment assigns hailstorms a risk factor of 25 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 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 2020, county land use statistics indicated that 43.69% or 202,771 acres of county land were classified for agricultural use (See Table 2-5). Agriculture is a significant part of the county's economy. The overall threat of hailstorm is ranked as high and 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 coincide 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 setup 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.
WATERWAY	Hail can damage watercraft windows, lights, instruments, and communication devices.
MUNICIPAL WATER	In the county there are 9 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 7 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 broached 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: Limited - 4
Hailstorm Probability Rating: Highly Likely - 9
Hailstorm Local Official Survey Rating: Medium - 4
Hailstorm Risk Assessment Designation: **High Threat - 26 points**

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

3.2 Buffalo 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.

It is not possible to have thunder without lightning. Thunder starts as a shockwave from the explosively expanding lightning channel when a large current causes rapid heating. However, it is possible that you might see lightning and not hear the thunder because it was too far away. Sometimes this is called “heat lightning” because it occurs most often in the summer.

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:

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

Lightning traveling down a tree trunk turns water to steam. If it gets under the bark into the surface moisture of the wood, the rapidly expanding steam can blast pieces of bark and branches from the tree, and the wood along the path is often killed. The charge carried by the lightning is then dissipated along the surface of the Earth. If you are near something that was hit by lightning such as a tree or fence, this process can be extremely dangerous as all of this current does not get dissipated instantaneously. The lightning may hit a tree then branch off and hit something else, or after the current travels through the tree trunk, it can also travel through the immediately surrounding area, and into anything or anyone nearby. This process, however, happens quick, so the ground or object struck does not remain electrically dangerous afterwards.

A lightning current can travel farther through water, metal fences, power lines or plumbing. Lightning current may enter a building and transfer through wires or plumbing and damage everything in its path. Similarly, in urban areas, it may strike a pole or tree and the current then travels to several nearby houses and other structures and enter them through wiring or plumbing.

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: The National Weather Service estimates there to be 5 to 10 Severe Thunderstorm Warnings per county per year and approximately 40 thunderstorm days per year in a given county on the western side of the state. Wisconsin has a high frequency of property losses due to lightning. Insurance statistics show that two out of every 100 farms are struck by lightning or have a fire that may have been lightning-caused each year.

LIGHTNING VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assessment assigns lightning a risk factor of 25 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	In Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, see Table 3-6. 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 service, 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.
WATERWAY	Lightning can be hazardous to workers exposed on decks, or at locks during the storm. Lightning can disrupt electronic devices and communications.
MUNICIPAL WATER	In the county there are 9 municipal wells and water 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 7 wastewater treatment facilities in operation in the county, see Table 3-12. These facilities' 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: Limited - 4

Lightning Storm Probability Rating: Highly Likely - 9

Lightning Storm Local Official Survey Rating: Medium - 4

Lightning Storm Risk Assessment Designation: **High Threat - 26 points**

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

3.3 Buffalo 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 a given 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 frequency is measured in terms of incidence of *thunderstorm days* or days on which thunderstorms are observed. The National Weather Service estimates there to be 5 to 10 Severe Thunderstorm Warnings per county per year and approximately 40 thunderstorm days per year in a given county on the western side of the state. Buffalo County had 113 recorded thunderstorm events from 1960 to 2020 with $2,431,250 in property damage and $100,000 in crop damage (Table B-2, Appendix B). Using the data from 1990 to 2020,

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 similar to 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 1960 to 2020, 6 injuries have been attributed to wind from severe thunderstorms in Buffalo County.

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.

As shown in the history above, the National Climatic Data Center (NCDC) reported 113 thunderstorm events in Buffalo County from 1960-2020. No damage amounts were reported before 1990. Since 1990 there have been 96 events which have caused $2,431,250 in property damage, $100,000 in crop damage. This creates an average of 3.7 events, $81,033 in property damage and $3,333 in crop damage per year. Using this data Buffalo County can expect to have 18.5 thunderstorm events over the next 5 years causing $405,165 in property damage and $16,665 in crop damage.

THUNDERSTORM VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. 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 death.
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. Downspouts 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 ground at private airports may be damaged.
WATERWAY	Poor visibility during the storm can cause safety problems to pilots. 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 9 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 7 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: Limited - 4

Thunderstorm Probability Rating: Highly Likely - 9

Thunderstorm Local Official Survey Rating: Medium - 3

Thunderstorm Risk Assessment Designation: **High Threat - 25 points**

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

3.4 Buffalo 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 micro-bursts 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 and 300-400 yards wide. 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.

The National Weather Service reported that Buffalo County experienced 22 tornadoes from 1950 to 2020 (Table B-3, Appendix B). In 1998, High winds in Buffalo and 13 other counties caused so much damage that the region received a Presidential Disaster Declaration. The history above details tornadoes and high winds in the County from 1950 through 2020.

TORNADO VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. 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. 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, two events were reported in the county. In the events, Buffalo County and thirteen other county critical facilities 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	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	Lightweight general aviation aircraft, typical of the type most likely to be based at, or using the Chippewa Valley airport, are the most prone to wind damage while parked on the ground.
WATERWAY	High winds can have the same impact to craft on the Mississippi River as on lakes and oceans, with the wave action across long reaches of water creating potential for separating the barges and towboats. Waterway operations are controlled by the U.S. Coast Guard. 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 9 municipal wells and water systems in operation, 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 7 wastewater treatment facilities in operation 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 Risk Assessment Designation

Tornado Historical Occurrence Rating: Moderately High - 6

Tornado Vulnerability Rating: Critical - 5

Tornado Probability Rating: Likely - 7

Tornado Local Official Survey Rating: High - 7

Tornado Risk Assessment Designation: **High Threat - 25 points**

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

3.5 Buffalo 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 Wisconsin'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 prolonged periods 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 sufficient 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.

The Mississippi River, the largest river in the state, borders Buffalo County making low-lying areas in the county prone to flooding. In addition, other small rivers in Buffalo County flood periodically. The Mississippi River has a long history of flood events dating back to 1907. The history details flooding events in the County from 1950 to 2020. The County has received three Presidential Disaster Declarations since 1973 due to flooding. Buffalo County received 22 events from 2000 to 2020 with only 8 reported events between 1960 to 1990 (Table B-4, Appendix B). This could indicate the number of events per year is increasing and will

continue to increase over time. From 2000 to 2020 there was an average of 2.2 flash flood events per year. Due to the County's location along the Mississippi River and the numerous other streams and rivers within the County Flooding is considered a high risk within the County.

Flood Warning and Evacuation Plans – Mississippi River: Flood events on the Mississippi River are generally predictable and with rare exception even the crest height can be accurately forecast several days to a week or more before the event. There is no history of flash flooding on this part of the Mississippi River. There is usually ample time to prepare for a flood event, and to minimize flood damage by moving property out of lower elevations. This predictability makes the development of a flood warning and evacuation plan a practical concept.

Flood Warning and Evacuation Plans – Trempealeau River: Flood events on the Trempealeau River are generally predictable, however areas along the river are vulnerable to flash flooding in the event of a dam failure. There is usually ample time to prepare for a flood event, and to minimize flood damage by moving property out of lower elevations. This predictability makes the development of a flood warning and evacuation plan a practical concept.

Flood Warning and Evacuation Plans – Buffalo River: Flood events on the Buffalo River are generally predictable, however communities are vulnerable to flash flooding in the event of a dam failure. There is usually ample time to prepare for a flood event, and to minimize flood damage by moving property out of lower elevations. This predictability makes the development of a flood warning and evacuation plan a practical concept.

Flood Warning and Evacuation Plans – Chippewa River: Flood events on the Chippewa River have had little impact due to the wetland environment and minimal development occurring in the floodplain. Because of this formal flood warning and evacuation plans have not been developed.

Floodplain Development and Regulation

County (unincorporated area) Floodplain Management Program: Enforcement and day-to-day administration of the County Floodplain Zoning Ordinance is conducted by the County Zoning Administrator. The Zoning Administrator reviews, and issues floodway or flood fringe land use permits based on the permitted uses and prohibited uses outlined in the County Floodplain Zoning Ordinance. Standards for structures and buildings being built are also outlined in the Floodplain Ordinance. 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 County Zoning Agency and County Attorney for prosecution are also an integral part of the County Zoning Administrator's responsibilities. The County Zoning Administrator also frequently advises applicants of the provisions of the Floodplain Zoning Ordinance and assists them in properly preparing permit applications or proceeding with an appeals or amendment request. The existing floodplain ordinance was first adopted in 1978 and was updated in 2007.

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.

County Floodplain Zoning Ordinance. The State of Wisconsin has delegated responsibility to counties to administer and enforce floodplain zoning in unincorporated 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.

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 particular 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.

Flood Classification Definitions: Flood definitions are defined as what chance a high-water event has in any given year of its water level exceeding established flood levels.
10-Year Flood has a 10% chance of occurring in any given year
25-Year Flood has a 4% chance of occurring in any given year
50-Year Flood has a 2% chance of occurring in any given year
100-Year Flood has a 1% chance of occurring in any given year (also referred to as the Base Flood)
500-Year Flood has a 0.2% chance of occurring in any given year

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.

County Shoreland-Wetland Ordinance. The State of Wisconsin has delegated responsibility to counties to protect shoreland-wetlands in unincorporated areas. 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 of 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.

City and Village Floodplain Management Programs: The State of Wisconsin has delegated responsibility to cities and villages to administer and enforce floodplain zoning 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.

Flooding Vulnerability Assessment
Floodplain Structures and Assessed Values. Buffalo County has a total of 230 parcels on which structures are located within the FEMA 100-year flood boundary. These 230 parcels have a total assessed land value of $4,429,000; an assessed improvements value of $19,937,800; and a total assessed value of $24,366,800. The Village of Cochrane has the most parcels with 98 followed by the City of Buffalo City with 32 parcels, Fountain City with 23 parcels and the Town of Belvidere with 14 parcels. These four municipalities account for 168 parcels or 72% of the total number of parcels and a total assessed value of $18,273,700 or 75% 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 August 31, 2015 there is 1 repetitive loss structures in the county. This structure is located in the City of Fountain City.

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 on 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 on the first floor of structures and the number of structures, which would have water on the first floor, we used Flood Insurance Rate Maps, photos of the 2001 flood, and local knowledge of the areas. To make flood damage estimates more accurate we divided the County into 15 different areas; these are: 1) Mississippi River – Chippewa River south to the City of Alma; 2) Mississippi River – City of Alma; 3) Mississippi River – City of Alma to City of Buffalo City; 4) Mississippi River – City of Buffalo City; 5) Mississippi River – Village of Cochrane; 6) Mississippi River – Village of Cochrane south to City of Fountain City; 7) Mississippi River – City of Fountain City; 8) Mississippi River – City of Fountain City south to southern County Border; 9) Buffalo River – East County line to City of Mondovi; 10) Buffalo River – City of Mondovi; 11) Buffalo River – City of Mondovi to City of Alma; 12) Chippewa River; 13) Tiffany and Bear Creeks; 14) Elk Creek; and 15) Waumandee and Little Waumandee Creeks.

Dividing the County into 16 different geographic areas enables the assignment of different real property values to different areas which is needed because each area is unique in regard to 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 a little over $4 million. The area totals are as follows: 1) Mississippi River – Chippewa River south to the City of Alma, $5,000; 2) Mississippi River – City of Alma, $50,000; 3) Mississippi River – City of Alma to City of Buffalo City, $159,095; 4) Mississippi River – City of Buffalo City, $382,373; 5) Mississippi River – Village of Cochrane, $2,358,109; 6) Mississippi River – Village of Cochrane south to City of Fountain City, $120,666; 7) Mississippi River – City of Fountain City, $524,149; 8) Mississippi River – City of Fountain City south to southern County Border, $120,798; 9) Buffalo River – East County line to City of Mondovi, $32,714; 10) Buffalo River – City of Mondovi, $139,061; 11) Buffalo River – City of Mondovi to City of Alma, $30,000; 12) Chippewa River, $5,000; 13) Tiffany and Farrington Creeks, $35,000; 14) Elk Creek, $47,620; and 15) Waumandee and Little Waumandee Creeks, $259,121. 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 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assessment assigns flooding a risk factor of 22 indicating this natural hazard is a high risk to the county. The overall risk of flooding to critical facilities in the county is negligible as there is only one critical facility, the Town of Buffalo Town Hall, which is located within the 100-year floodplain and vulnerable to flooding. 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, see Table 3-6. In the county there are 22 businesses located in the floodplain. These businesses have an assessed value $2,755,400. Many of these businesses sustain flooding damage and economic loses in lesser flood events. 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 is sales or production problems caused by flood induced customer loss, employee problems and input / output interruptions. Tourism related businesses in particular, 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 2020, county land use statistics indicated that 43.69% or 202,771 acres of county land were classified for agricultural use (See Table 2-5). 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, the Mississippi, Chippewa, Trempealeau, and Buffalo Rivers is a known factor, and the extent of flooding, or potential flooding, has been delineated on maps. Several roadways in Buffalo County are subject to flooding, either by the predictable, advance notice rising of the Mississippi, Chippewa, Trempealeau, and Buffalo Rivers, 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 Mississippi is a known factor, and the extent of the flooding, or potential flooding, has been delineated on maps. There are two railroads line in Buffalo County. The Burlington Northern & Santa Fe Railway's (BNSF) mainline between Chicago and the Twin Cities lies along the Mississippi River. The Canadian National's Wisconsin Central Limited line runs along the Trempealeau River. Stretches of the railroad are reinforced with large boulder and rock riprap as necessary during Mississippi River high water.
AIRWAY	There is one airport in Buffalo County. The Chippewa Valley airport is not located in a floodplain and therefore is not subject to flooding.
WATERWAY	The Mississippi River is the only commercially navigable waterway in Buffalo County. Each Corps of Engineers Navigation Lock has a water elevation at which point the lock operations are stopped a that lock, and no further operations are conducted. All commercial tows, whether up bound or down bound, seek secure mooring in existing fleeting areas if possible. Some tows may be permitted to pass through the lock to a different pool after closure, if it can be safely done, to allow a tow access to a more secure mooring location. Improperly moored barges could break loose from fleets or terminals. Three dams impact the Buffalo County reach of the Mississippi River. The lock closure river elevation at Alma Lock 4 is 671.5 feet above mean sea level. Lock & Dam 5 located approximately 3 miles south of

	Buffalo City, closure elevation is 664.5, and Lock 5A located just south of Fountain City is 660.0.
MUNICIPAL WATER	In the county there are 9 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 7 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. 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: Critical - 5

Riverine/Flooding Probability Rating: Likely - 7

Riverine/Flooding Local Official Survey Rating: Medium - 3

Riverine/Flooding Risk Assessment Designation: **High Threat - 24 points**

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

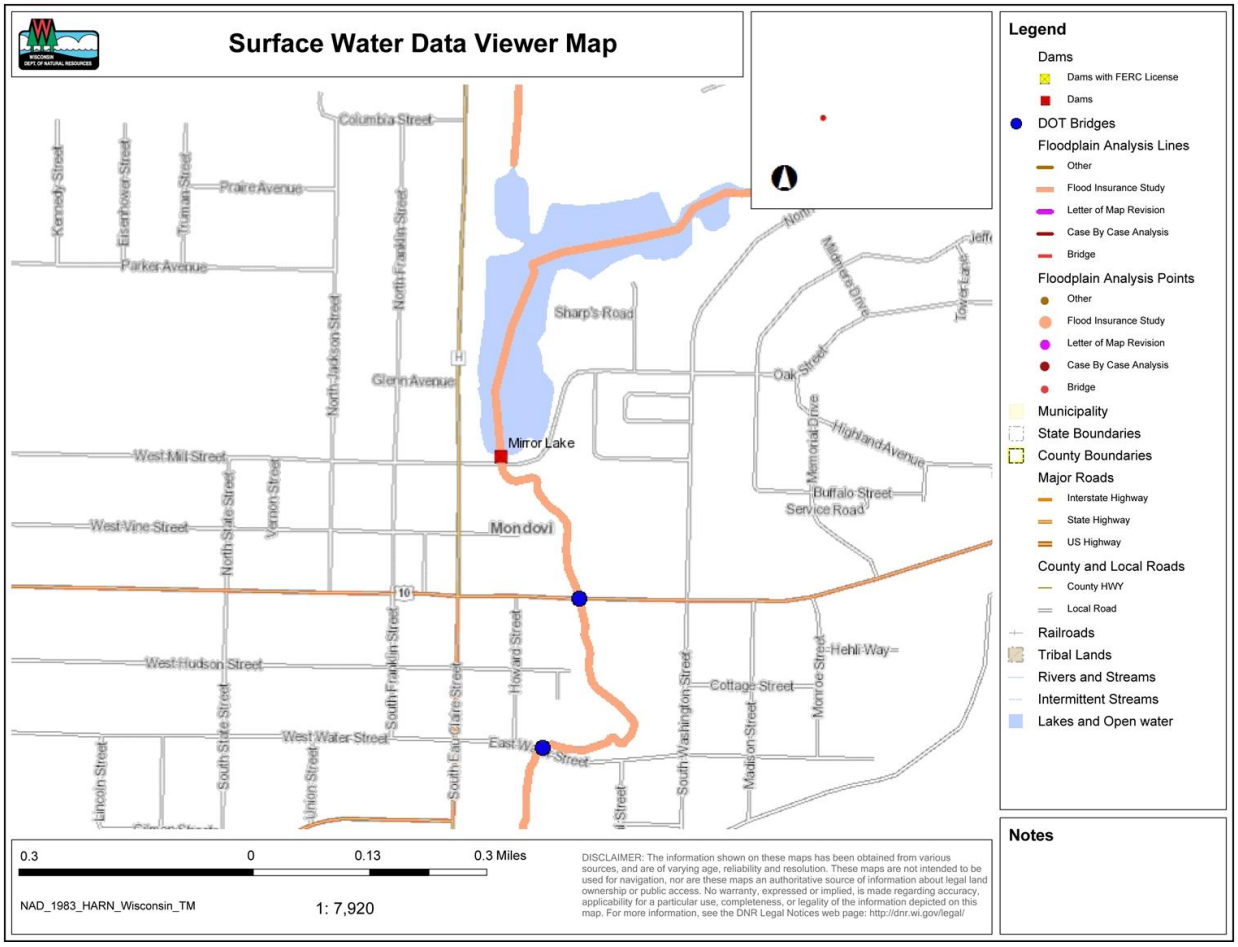
3.6 Buffalo County - Dam Failure Flooding Risk Assessment

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, the majority of dams overall in Wisconsin are small and are not stringently regulated for safety purposes.

Most of the dams that provide a flood control benefit are large hydroelectric dams on major rivers where flood control is a secondary benefit, or they are PL 566 dams built through the Watershed Protection and Flood Prevention Act of 1954. The PL 566 dams hold little or no water in their reservoirs under normal conditions. Since these dams only hold significant amounts of waters during floods, they present a special hazard as everyday water related problems such as seepage cannot be readily seen and corrected. When floodwater does arrive, the dam is used to its maximum capacity. There are thirteen PL 566 dams in Buffalo County.

There are two high hazard potential dams in Buffalo County. They include Mirror Lake Dam and Lock and Dam Number 4. An Emergency Action Plan (EAP) is in place for Lock and Dam #4 and can be found at the US Army Corps of Engineers, St. Paul District. The City of Mondovi approved the EAP for Mirror Lake Dam in 2020. The City of Mondovi's Mirror Lake Dam, along the Peeso and Brownlee Creeks, is accessed from E. Mill/Oak Streets. The small red square on the below map at the southern tip of Mirror Lake is the location of the dam and its controls.



MIRROR LAKE DAM MAP

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 sufficient time to properly warn downstream residents.

Dam Failure Flooding History and Frequency: There are no reported incidences of dam failure.

FLOOD VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assessment assigns Dam Failure Flooding a risk factor of 8 indicating this natural hazard is a low risk to the county. The "Dam Hazard Assessment" completed for eight PL566 dams in Buffalo County showed that no critical facilities are located in the hydraulic shadows of dams. See Tables 3-7 through 3-10 and Maps 3-1 through 3-4 for further information and location of these facilities. Hydraulic shadows of other dams in Buffalo County are not known.
BUSINESS AND INDUSTRY	In Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, see Table 3-6. The "Dam Hazard Assessment" completed for eight PL566 dams in Buffalo County showed that there are no businesses located in the hydraulic shadows of dams. Hydraulic shadows of other dams in Buffalo County are not known.
AGRICULTURE	In 2020, county land use statistics indicated that 43.69% or 202,771 acres of county land were classified for agricultural use (See Table 2-5). 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. The "Dam Hazard Assessment" completed for eight PL566 dams in Buffalo County showed that agricultural crops would be impacted in the rare occurrence that one of the dams fail. The most significant crop damage would occur if the Garden Valley No. 10 dam failed, as the report estimated that approximately $27,000(in 1995 dollars) in crop damage would be sustained (see Table 3-15). Hydraulic shadows of other dams in Buffalo County are not known.
ROADS AND HIGHWAYS	Dam failure differs from traditional flooding in that flooding, even on a rapidly rising rivers such as the Buffalo 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 Mississippi 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. The "Dam Hazard Assessment" completed for eight PL566 dams in Buffalo County showed that several roads would be impacted in the rare occurrence that one of the dams fail. Three roads would be susceptible to damage if the Alma No. 4, 5, or 6 dams were to fail (see Table 3-15 for additional impacted roads). Hydraulic shadows of other dams in Buffalo County are not known.
RAILROADS	There are two railroads line in Buffalo County. The Burlington Northern & Santa Fe Railway's (BNSF) mainline between Chicago and the Twin Cities lies along the Mississippi River. The Canadian National's Wisconsin Central Limited line runs along the Trempealeau River. The risk factor is low for dam failure. The "Dam Hazard Assessment" completed eight dams in Buffalo County showed that one railroad line and one bridge are located in the hydraulic shadow of the PL566 dams. Hydraulic shadows of other dams in Buffalo County are not known.
AIRWAY	Chippewa Valley airport is the only public airport located Buffalo County. The "Dam Hazard Assessment" completed for Buffalo County showed that this airport is not located in the

	hydraulic shadows of the PL566 dams. Hydraulic shadows of other dams in Buffalo County are not known.
WATERWAY	The hazard to commercial navigation on the Mississippi River from dam failures on tributaries is minute. In most cases the initial flush of water from a partial or complete failure of a PL566 dam on a tributary would not even reach the Mississippi in a noticeable form.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, see Table 3-11. These facilities are usually located at higher elevations, which lessens their vulnerability to flooding or damage if a dam would fail. The "Dam Hazard Assessment" completed for eight dams in Buffalo County showed that no municipal water systems are located in the hydraulic shadows of the PL566 dams. Hydraulic shadows of other dams in Buffalo County are not known.
WASTEWATER TREATMENT FACILITIES	There are 7 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 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. The "Dam Hazard Assessment" completed for eight dams in Buffalo County showed that no wastewater treatment facilities are located in the hydraulic shadows of the PL566 dams. Hydraulic shadows of other dams in Buffalo County are not known.
HAZARDOUS MATERIAL SITES	No major hazardous waste disposal or storage sites are located in the hydraulic shadows of PL566 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 Risk Assessment Designation
Dam Failure Historical Occurrence Rating: Low - 2
Dam Failure Vulnerability Rating: Negligible - 2
Dam Failure Probability Rating: Possible - 3
Dam Failure Local Official Survey Rating: Low - 2
Dam Failure Risk Assessment Designation: **Low Threat - 9 points**

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

3.7 Buffalo County - Forest/Wildland Fire Risk Assessment

Forest/Wildland Fires Definition: A forest fire is an uncontrolled, wild or running fire occurring on forest, marsh, field, cutover, or other lands. Causes of these fires include lightning, human negligence, 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, number 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 17.5 percent of the County or 81,292 acres is covered with forests or agriculture forest. 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 Buffalo 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. Department of Natural Resource records show that no major forest fires *(fires burning over 500 acres)* have been reported for Buffalo County from 1976 through 2020. Maps 3.7 and 3.8 depict high risk areas for wildfires.

Forest/Wildland Fires Vulnerability Assessment

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assignment assigns Forest/Wildland Fires a risk factor of 7 indicating this natural hazard is a low risk to the county. Critical facility's vulnerability to Forest/Wildland Fires is very 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, see Table 3-6. For the majority of 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, but this is an isolated occurrence. 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, sufficient vegetation may have been destroyed so as to warrant consideration of temporary emergence soil erosion control methods. This would especially apply to steep slopes, such as along STH 35.
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, sufficient vegetation may have been destroyed so as to warrant consideration of temporary emergence soil erosion control methods.
AIRWAY	Although fires in the hardwood forests of Buffalo 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 Chippewa Valley airport could become a major hub of air and ground activity. Highway traffic control by local officers in the vicinity of the airport might be needed.
WATERWAY	Although there are some historical accounts of navigation by steamboat on the Mississippi River during wildfires on adjacent bluffs, these accounts relate little in the way of direct threat to boats on the river. As with land and air transportation, there could be isolated incidents of smoke drift creating a visibility hazard to river boat pilots, but modern tow boats equipped with radar, are less apt to be impacted by this than are motorists on a highway.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 7 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 - 2

Forest/Wildland Fires Vulnerability Rating: Negligible - 2

Forest/Wildland Fires Probability Rating: Possible - 3

Forest/Wildland Fires Local Official Survey Rating: Medium - 3

Forest/Wildland Fires Risk Assessment Designation: **Low Threat - 10 points**

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

3.8 Buffalo 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.

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 of accumulation happen on the average only five times per season. Southwestern Wisconsin receives most of its snow during mid-winter. Snowfall in Wisconsin varies between the seasonal average of 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 19 heavy snowstorm events in Buffalo County from the 1990-2020 (Table B-5, Appendix B).

HEAVY SNOWSTORM VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assignment assigns Heavy Snowstorm a risk factor of 28 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 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	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 snow melt 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 88. 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 Chippewa Valley 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 Buffalo County could cause some light aircraft, possibly flying over the county, to decide to land at Chippewa Valley airport until the storms stop.
WATERWAY	The Mississippi River is typically closed from about the first week of December to the second week of March. Most heavy snowfalls occur in the winter when the Mississippi River is closed to navigation, and therefore present no challenge. Early heavy snows in early December or mid-March could catch an active tow still on the Upper River. The same conditions of poor visibility that affect road and rail travel can impact river pilots as well. Although commercial riverboats are equipped with radar, eyesight visibility is still critical to navigate through locks, and while performing barge transfers. Heavy snow makes conditions dangerous for deck personnel where a slip and fall can be fatal. Lock workers experience the same problem. There are three Corps of Engineers navigation locks on the Mississippi River along the Buffalo border.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 7 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: Negligible - 2

Heavy Snowstorm Probability Rating: Likely - 7

Heavy Snowstorm Local Official Survey Rating: High - 8

Heavy Snowstorm Risk Assessment Designation: **High Threat - 26 points**

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

3.9 Buffalo 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 the majority 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.

Wisconsin Emergency Management records show that in March of 1976 a devastating ice storm hit Buffalo County along with 21 other counties, causing over $50 million in property damage warranting a Presidential Disaster Declaration. The National Climatic Data Center reported that Buffalo County experienced three ice storm events in the 1990's, three events in the 2000's, and one in the 2010's (Table B-6, Appendix B).

ICE STORM VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assignment assigns Ice Storm a risk factor of 23 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 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	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 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 Chippewa Valley airport if they encounter icing in flight. Aircraft parked in the open on the ground could have their control surfaces damaged by heavy ice storms.
WATERWAY	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. Commercial navigation can still be in full operation at the time of an ice storm. Deck surface conditions can be very treacherous for deck hands working on barge tows and for workers at navigation locks and cargo piers.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 7 wastewater treatment facilities in operation 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 Low - 3

Ice Storm Vulnerability Rating: Negligible - 2

Ice Storm Probability Rating: Likely - 5

Ice Storm Local Official Survey Rating: Medium - 5

Ice Storm Risk Assessment Designation: **Moderate Threat - 15 points**

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

3.10 Buffalo 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.

One blizzard event was recorded in 1996, one in 2007, and one in 2019 by the National Climatic Data Center for Buffalo County (Table B-7, Appendix B).

BLIZZARD VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assignment assigns Blizzard a risk factor of 17 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, see Table 3-6. Blizzards with heavy snowfalls and strong wind speeds could cause structural damage to buildings because of inadequate snow loan capacity. Roofing material could be blown off. Businesses and industries' vulnerability to blizzards could include economic loss and disruption of inputs and outputs.
AGRICULTURE	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 applies 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 88. 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 Chippewa Valley 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 Buffalo County could cause some light aircraft, possibly.
WATERWAY	The river is closed to commercial navigation from about the first week of December to the second week of March. Most heavy snowfalls occur in the winter when the Mississippi River is closed to navigation, and therefore present no challenge. Early heavy snows in early December or mid-March could catch an active tow still on the Upper River. The same conditions of poor visibility that affect road and rail travel can impact river pilots as well. Although commercial riverboats are equipped with radar, eyesight visibility is still critical to navigate through locks, and while performing barge transfers. Heavy snow makes conditions dangerous for deck personnel where a slip and fall can be fatal. Lock workers experience the same problem. There are three Corps of Engineers navigation locks on the Mississippi River along the Buffalo County border.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 7 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: Negligible - 2
Blizzard Probability Rating: Likely - 5
Blizzard Local Official Survey Rating: High - 8
Blizzard Risk Assessment Designation: **Moderate Threat - 17 points**

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

3.11 Buffalo 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.

Table B-8 (Appendix B) shows the National Climatic Data Center reported that Buffalo County experienced a total of 10 extreme cold events since the mid-1990's. This averages out to be one event every 3 years.

Extreme Cold Vulnerability Assessment

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assignment assigns Extreme Cold a risk factor of 24 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 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.
AGRICULTURE	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, and 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 do not work properly, and other mechanical components can fail. The problem of extreme cold is compounded by the fact the roadways usually are already impacted by snow and ice from previous snowstorms. There is a 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 of the mechanical components of a light aircraft, including the engine and control surfaces. Planes in flight during extreme cold periods can experience engine icing.
WATERWAY	Extreme cold events would most likely only occur during periods of the year when commercial navigation on the Mississippi River would be seasonally closed. Recreational boaters in airboats, or recreationists crossing the Mississippi River in 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 9 municipal wells and water systems, 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 7 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: Moderately High - 6

Extreme Cold Vulnerability Rating: Negligible - 3

Extreme Cold Probability Rating: Likely - 5

Extreme Cold Local Official Survey Rating: Medium - 5

Extreme Cold Risk Assessment Designation: **Moderate Threat - 19 points**

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

3.12 Buffalo County - Earthquake

Earthquake Definition: An earthquake is a shaking or sometimes violent trembling of the earth that results from the sudden shifting of rock beneath the earth's crust. These sudden shifting release 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. Casualties may result from falling objects and debris, because of the shocks, shake, damage or demolish buildings and other 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: No major earthquakes have occurred in Buffalo County in recent history.

EARTHQUAKE VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assignment assigns Earthquake a risk factor of 12 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 or Buffalo 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, see Table 3-6. Businesses vulnerability to earthquakes can range from nothing felt to total destruction and loss of life. Since not major earthquakes have occurred in Wisconsin or Buffalo County the risk to businesses is insignificant.

AGRICULTURE	An earthquake can cause significant damage to agriculture. It can destroy agricultural land and recreate the shape of the landscape. Agriculture vulnerability to earthquakes is negligible in Buffalo County as no earthquakes have historically occurred in this area.
ROADS AND HIGHWAYS	Extreme cold impacts highway transportation by creating problems with vehicle starting and 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 six 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, as well as secondary damage due to landslides along the Mississippi River. 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.
WATERWAY	An earth tremor could cause wave action, and possibly temporary current reversal on even a large river like the Mississippi. If the event should occur during the active commercial navigation season the problems caused could include, moored barges breaking free, tows running aground, and lock chamber doors becoming jammed and inoperative.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 7 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: Negligible - 1

Earthquake Probability Rating: Unlikely - 1

Earthquake Local Official Survey Rating: Low - 1

Earthquake Risk Assessment Designation: **Low Threat - 4 points**

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

3.13 Buffalo 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 in particular 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. The majority of 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. From 2004-2018, a national average of 702 people have died annually as a result of health problems directly related to excessive heat.

In Wisconsin the greatest number of weather-related fatalities since 1982 has been due to excessive heat. 134 people have died from high heat and humidity. Summer heat waves have been the biggest weather-related killers in Wisconsin for the past 50 years, far exceeding tornadoes and severe storms. The 1995 summer heat waves which caused 154 heat-related deaths and over 300 heat-related illnesses hold the record as the number one weather-related killer in Wisconsin since it became a state in 1848.

As shown in the above table Buffalo County has experienced 6 extreme heat events during the 1990's, one event in the 2000's and five in the 2010's (Table B-9, Appendix B). Southwestern Wisconsin logged the most heat wave days during this time period.

EXTREME HEAT VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 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	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. 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.
WATERWAY	The biggest impact of extreme heat on commercial navigation is apt to be the danger of heat exhaustion to deck crews working outdoors. Hot weather could increase the number of

	pleasure craft operating on the Mississippi River and result in increased conflict with safe navigation.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 7 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: High - 7

Extreme Heat Vulnerability Rating: Negligible - 2

Extreme Heat Probability Rating: Likely - 5

Extreme Heat Local Official Survey Rating: Low - 2

Extreme Heat Risk Assessment Designation: **Moderate Threat - 16 points**

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

3.14 Buffalo 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. The US Department of Commerce – Bureau of Economic Analysis reported that a 12.3% of Buffalo County's employed civilian population was employed in Agriculture, Forestry, Fishing, and Hunting sector in 2020.

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 etc.) to name a few. Department of Revenue records show that in 2020 Buffalo County had approximately 202,771 acres of agricultural land. Agricultural hazards can occur annually in the county.

AGRICULTURAL VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, 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	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, 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, train, and barge traffic due to less grain being produced to haul. Ultimately an import of hay or other livestock feed into the area could result.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, see Table 3-11. These facilities vulnerability to agriculture is not applicable.
WASTEWATER TREATMENT FACILITIES	There are 7 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: Moderately Low - 5
Agricultural Vulnerability Rating: Limited - 4
Agricultural Probability Rating: Likely - 5
Agricultural Local Official Survey Rating: Low - 2
Agricultural Risk Assessment Designation: **Moderate Threat - 16 points**

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

3.15 Buffalo 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 sufficient length and intensity that markedly reduces crop yields. Hydrologic drought is a dry period of sufficient length and intensity affecting 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. The state has about 14,500,000 acres of farmland on 69,000 farms and was ranked 9th in the country in total value of agricultural products sold (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 sufficient water can result in flooding, even from average rainfall, following drought conditions.

Wisconsin Emergency Management reported one major drought event (1976), which affected Buffalo 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. Since 1970, there have been four events reported in Buffalo County (Table B-10, Appendix B).

DROUGHT VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assignment assigns Drought a

	risk factor of 13 indicating this natural hazard is a low 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 facility's 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, see Table 3-6. Examples of businesses and industries that are negatively impacted by drought conditions include: agribusinesses, tourism related businesses, boat dealerships and marinas, golf courses, businesses that rely on barge traffic for shipment of raw materials or transporting finished goods and products, and fisheries.
AGRICULTURE	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 had 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 topsoil, 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, 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.
AIRWAY	Extended drought could increase the possibility of wildfires. The possible impact of wildfires on the Chippewa Valley airport, and on light plane travel has been discussed under that topic.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 7 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: Low - 3

Drought Vulnerability Rating: Negligible - 3

Drought Probability Rating: Possible - 5

Drought Local Official Survey Rating: Low - 3

Drought Risk Assessment Designation: **Low Threat - 14 points**

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

3.16 Buffalo 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 of 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, shipwrecks, 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: Not available.

Beyond the loss of life and property, fog makes our nation's commerce and transportation systems less efficient. Weather-related crashes cost an average of **$42 billion** annually in the United States from personal injury, loss of life, and property damage (Lombardo, 2000). The estimated cost of weather-related delay to trucking companies ranges from $2.2 to $3.5 billion annually (DOT, 2007). And each year, $6 billion is lost due to air traffic delays, of which $4.2 billion (70 percent) is attributed to weather (Air Transport Association, 2002). There were 12 fatal crashes from 2015-2019 in Buffalo County (NHTSA 2020).

FOG VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assignment assigns Fog a risk factor of 12 indicating this natural hazard is a low threat to the county. Critical facility's 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, see Table 3-6. Businesses and industries vulnerability to fog would be negligible.
AGRICULTURE	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	Fogs are most apt to occur in lower elevations blocked by wind flow. STH 35 along the Mississippi River is a good example of fog occurrence. 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 location of railway lines along the Mississippi River requires train engineers to operate more frequently in fog. 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 Chippewa Valley airport is not equipped to handle aircraft in conditions other than Visual Flight Rules, therefore during fog events the airport would be closed.
WATERWAY	Commercial vessels on the Mississippi River are equipped with radar and Coast Guard licensed pilots that know how to use the equipment. Navigation in fog is possible, but the reduced visibility increases the danger. Pleasure craft operated by recreationists pose the biggest threat to safety during foggy periods. Fog makes deck work more dangerous for deck hands on commercial craft.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 7 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: Low - 3
Fog Vulnerability Rating: Negligible - 3
Fog Probability Rating: Possible - 4
Fog Local Official Survey Rating: Low - 2
Fog Risk Assessment Designation: **Low Threat - 12 points**

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

3.17 Buffalo 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.

Landslide History and Frequency: No information was found relating to landslides occurring in Buffalo County.

In Wisconsin landslides generally are not dramatic, however there have been instances of rock fall along the bluffs of the Mississippi River and the collapsing of hillsides during heavy rainfall. Landslides can cause damage and delays if these slides occur around developed areas and roadways.

LANDSLIDE VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assignment assigns Landslide a risk factor of 6 indicating this natural hazard is a low risk to the county. Critical facility's vulnerability to landslides 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, 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	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 with railroad lines, especially on lines along the Mississippi River.
AIRWAY	The Chippewa Valley airport's vulnerability to landslides is negligible and would not affect the airport except in extreme cases.
WATERWAY	An earth tremor could cause wave action, and possibly temporary current reversal on even a large river like the Mississippi. If the event should occur during the active commercial navigation season the problems caused could include, moored barges breaking free, tows running aground, and lock chamber doors becoming jammed and inoperative.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 7 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 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.

Landslide Risk Assessment Designation

Landslide Historical Occurrence Rating: Low - 2
Landslide Vulnerability Rating: Negligible - 3
Landslide Probability Rating: Possible - 4
Landslide Local Official Survey Rating: Low - 2
Landslide Risk Assessment Designation: **Low Threat - 11 points**

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

3.18 Buffalo County, Subsidence Risk Assessment

Subsidence Definition: Sinkholes are a geological phenomenon 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 for surface pollutants entering a sinkhole.

Subsidence History and Frequency: No information was found on major subsidence events in Buffalo County.

SUBSIDENCE VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. The Natural Hazard Risk Assignment assigns Subsidence a risk factor of 6 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 facility's 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 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 destruction of buildings. Businesses and industries' vulnerability to sinkholes is negligible in this area.
AGRICULTURE	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 literally 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.
AIRWAY	The Chippewa Valley airport does not lie in an area prone to subsidence.
WATERWAY	Soil surface subsidence would have little impact on river navigation.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 provide by the facilities except in extreme cases.

WASTEWATER TREATMENT FACILITIES	There are 7 wastewater treatment facilities in operation in the county, see Table 3-12. Sinkholes can cause damage to structures and underground piping that carry wastewater. These facilities vulnerability to sinkholes is negligible and would not interrupt services provided except in extreme cases.
HAZARDOUS MATERIAL SITES	Unless a hazardous material storage or disposal site were built in 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 - 2

Subsidence Vulnerability Rating: Negligible - 3

Subsidence Probability Rating: Possible - 4

Subsidence Local Official Survey Rating: Low - 1

Subsidence Risk Assessment Designation: **Low Threat - 10 points**

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

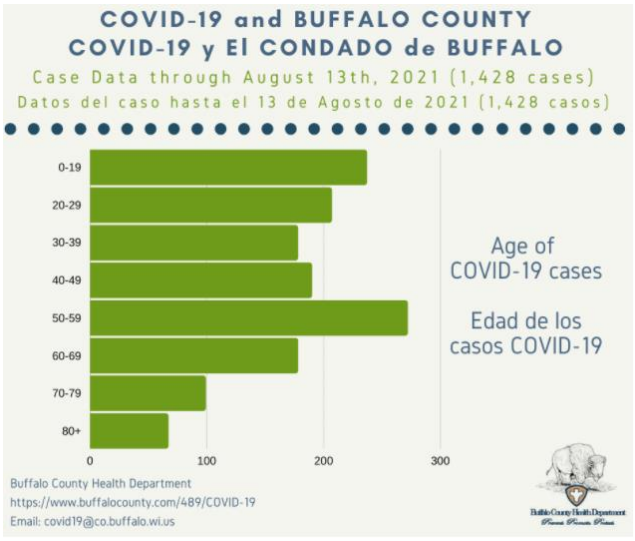
3.19 Buffalo County - Pandemic Flu Risk Assessment

Pandemic Flu Definition: A pandemic is a global disease outbreak. 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 a noticeably 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 four times in the last century, in 1918, 1958, 1967, and 2019. The 1918 pandemic was the most severe disease outbreak in the history of the world. An estimated 20-40 million people died worldwide. The COVID-19 pandemic, caused by a coronavirus called SARS-CoV-2, has caused 4.37 million deaths worldwide as of August 2021. COVID-19 is an ongoing pandemic worldwide. As of August 2021, Buffalo County had 1,428 cases and 7 deaths from COVID-19. Currently, the best way to prevent infection according to the CDC is to a) wear a mask in public places, b) stay at least 6 feet away from other people, c) wash your hands, and d) avoid crowds and confined spaces. The Buffalo County Health Department gives their additional recommendations on the diagram below.



PANDEMIC VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, 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.
AGRICULTURE	Agriculture will be affected by workers unable to tend to crops and animals if they are infected. Supply lines will be disrupted causing changes in supply and demand in the market.
ROADS AND HIGHWAYS	Automobiles and buses carrying affected 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. In addition, highway crews and maintenance personnel will be affected.
RAILROADS	Trains carrying affected 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 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 affected 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 down airports. A pandemic flu will have a severe impact on airways.
WATERWAY	Pandemic flu would cause changes to workers on the waterways as indicated in business and industry. Waterways would not be affected.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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.

WASTEWATER TREATMENT FACILITIES	There are 7 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 infected operators.
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

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.

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 sufficient 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.

Case Fatality Ration	Category	Projected Number of Deaths US Population 2006
≥ 2.0%	5	≥ 1,800,000
1.0% - < 2.0%	4	900,000 - < 1,800,000
0.5% - < 1.0%	3	450,000 - < 900,000
0.1% - < 0.5 %	2	90,000 - < 450,000
< 0.1%	1	< 90,000

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

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.

Pandemic Risk Assessment Designation
Pandemic Historical Occurrence Rating: High - 9
Pandemic Vulnerability Rating: Critical - 6
Pandemic Probability Rating: Likely - 5
Pandemic Local Official Survey Rating: Medium - 5
Pandemic Risk Assessment Designation: **High Threat - 25 points**

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

3.20 Buffalo County - Railroad 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 Buffalo County there are two rail lines. The Burlington Northern-Santa Fe runs along the Mississippi River from the Chippewa River in the north to the Trempealeau River in the south. The Canadian National runs for a few miles in the Town of Buffalo.

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 large number of trains passing through Buffalo County on a daily basis, 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 of Nelson, Alma, Buffalo City, Cochrane and Fountain City 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.

From 1980 to 2020 there have been 18 railroad accidents causing $4,287,700 in total damages (Table B-11, Appendix B). Based on this data, in the next five years we can estimate 2.25 accidents occurring with damages totaling $535,962.

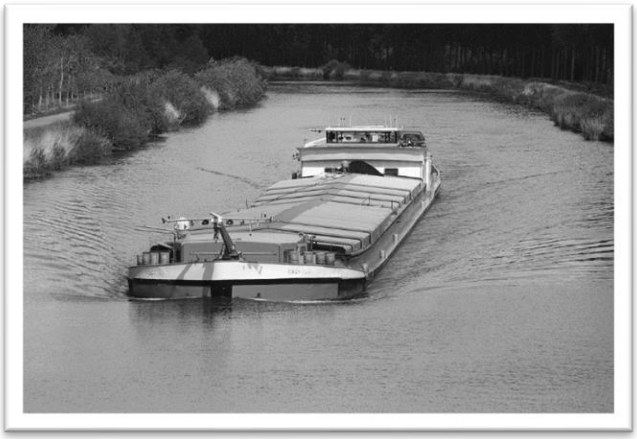
RAILROAD VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, see Table 3-6. In Buffalo County the Canadian Pacific rail line runs through the Villages of Nelson and Cochrane and the cities of Alma, Buffalo City and Fountain City. Due to the location and layout of these incorporated communities almost all businesses and industries located within these communities would 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	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	Automobiles and buses carrying affected 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. In addition, highway crews and maintenance personnel will be affected.
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 Chippewa Valley airport's vulnerability to train derailments is negligible and would only be affected in the event of an evacuation being necessary due to the release of toxins which would cover the airport area.
WATERWAY	The Canadian Pacific rail lines runs along the Mississippi River and a train derailment along the river could potentially spill pollutants into the river. In addition, rail lines also run adjacent to Lock & Dam 4 in the City of Alma and Lock & Dam 5A south of Fountain City. A derailment on these tracks alongside one of these locks could potentially damage or shut down the locks which would close the Mississippi River to all boat traffic both recreational and commercial.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, 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 7 wastewater treatment facilities in operation in the county, see Table 3-12. Five of these facilities are located in close proximity to rail lines, these facilities are located in the Villages of Nelson and Cochrane and the Cities of Alma, Buffalo City and Fountain City. 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 in close proximity to rail lines could be impacted by a train derailment. A derailment with explosive materials could damage or destroy buildings which house hazardous materials.

3.21 Buffalo County - River Traffic Risk Assessment

River Traffic Definition: The passage of people or commercial goods along a river.



The main channel of the Mississippi River forms the western border of Buffalo County. The border starts are river mile 721 and ends at river mile 763, a total distance of 42 river miles. The Mississippi River has been controlled by a system of navigation locks and dams in order to maintain a 9-foot channel since 1930's. The dams were built to hold back water and form deeper navigation "pools." The pools are maintained at a constant minimum water depth of 9 feet for safe navigation. Dams allow river vessels to use a series of locks to "step" up or down the river from one water level to another. The U.S. Corps of Engineers operates the locks and dams on the Mississippi River for navigation, not flood control. The locks and dams create slack-water pools for navigation during periods of low- and moderate-level water. In the 42 miles of the Mississippi River which flows through Buffalo County there are 3 Lock and Dams. Lock and Dam 5a is located at mile maker 728.5, Lock and Dam 5 is located at mile marker 738.1 and Lock and Dam 4 is located in the City of Alma at mile marker 753.

Lock and Dam 4 Commodities passing through in 2020

Commodity	Upbound Ktons	Downbound Ktons	Total Ktons
Coal, Lignite and Coke	15.80	28.50	44.30
Petroleum and Petroleum Products	20.91	316.50	337.41
Chemicals and Related Products	1,336.20	246.41	1,582.61
Crude Materials, Inedible, except Fuels	1,420.70	340.00	1,760.70
Primary Manufactured Goods	883.03	6.73	889.76
Food and Farm Products	39.7	5,285.06	5,324.76
All Manufactured Equipment and Machinery	10.35	9.42	19.77
Total Tons:	3,726.69	6,232.62	9,959.31

Source: US Army Corp of Engineers, Lock Performance Monitoring System 3/20-12/20

"Accident/Incident" includes any event involving the operation of equipment on waters of the Mississippi River which causes damage or injury to any person.

River Traffic 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 a barge and the barge is in traveling through a populated area, death, injuries, and damage to homes, businesses, infrastructure can occur. In addition, environmental contamination can result from River Traffic accidents. Anhydrous Ammonia is the hazardous material that is carried the most on this portion of the river.

Commercial traffic along the Mississippi River is not required to notify county of when hazardous materials are being transported or how much is being transported. Without the knowledge of what is actually being transported or how often it is being transported along the river it is very difficult to make any predictions of how often an accident will occur or how much damage an accident would cause. large number of trains passing through Buffalo County on a daily basis, 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 of Nelson, Alma, Buffalo City, Cochrane and Fountain City 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.

River Traffic History and Frequency:
No historic data is available.

RIVER TRAFFIC VULNERABILITY ASSESSMENT

CRITICAL FACILITIES	In the county 37-service orientated critical facilities were identified. These include (11) government and military facilities; (6) hospitals, clinics, and residential facilities; (10) police and fire facilities; and (10) schools. These facilities could be affected from a river traffic incident by either being destroyed or damaged from an explosion from an incident, 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 Buffalo County there are 298 businesses and industries that employ 2,977 people, with an annual payroll of approximately $119 million, see Table 3-6. In Buffalo County Lock and Dam 4 is located adjacent to the business district in the City of Alma. Due to its location almost all businesses and industries located within the City of Alma could be severely affected by a river accident at the Lock and Dam. While most would not be structurally impacted or damaged by a river accident, road closures or evacuations due to an accident could shut down these businesses and industries.
AGRICULTURE	Agriculture will be affected only by an accident or incident which would shut down the river for a long term which would affect the transportation of agricultural commodities.
ROADS AND HIGHWAYS	River Traffic would have an effect on Roads and Highways only if the accident would cause damage to a bridge which crosses the river.
RAILROADS	The Burlington Northern Santa Fe rail line runs along the shore of the Mississippi River, river traffic, especially large barge traffic can undermine the banks along the river. This undermining of the tracks can and has in the past, cause derailments of trains.
AIRWAY	The only airport in Buffalo County, the Chippewa Valley airport does not lie in an area that would be affected by a River Traffic accident.
WATERWAY	The Canadian Pacific rail lines runs along the Mississippi River and a train derailment along the river could potentially spill pollutants into the river. In addition, rail lines also run adjacent to Lock & Dam 4 in the City of Alma and Lock & Dam 5A south of Fountain City. A derailment on these tracks alongside one of these locks could potentially damage or shut down the locks which would close the Mississippi River to all boat traffic both recreational and commercial.
MUNICIPAL WATER	In the county there are 9 municipal wells and water systems, see Table 3-11. These facilities' vulnerability to river traffic is minimal. These facilities could be affected through a spillage from a river traffic accident into the groundwater and contaminating the well.
WASTEWATER TREATMENT FACILITIES	There are 7 wastewater treatment facilities in operation in the county, see Table 3-12. Five of these facilities are located along the Mississippi River, these facilities are located in the Villages of Nelson and Cochrane and the Cities of Alma, Buffalo City and Fountain City. A river traffic accident 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 river traffic

	accident occurring upstream of the facility which could contaminate the facility causing it to be shut down.
HAZARDOUS MATERIAL SITES	Hazardous materials located in close proximity to the Mississippi River could be impacted by a river traffic accident. An accident with explosive materials could damage or destroy buildings which house hazardous materials.

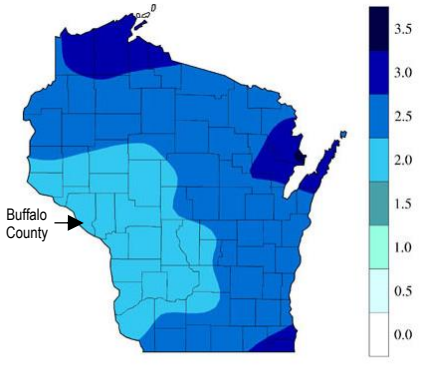
Railroads Risk Assessment Designation
Railroads Historical Occurrence Rating: Moderately Low - 4
Railroads Vulnerability Rating: Negligible - 2
Railroads Probability Rating: Possible - 5
Railroads Local Official Survey Rating: Low - 3
Railroads Risk Assessment Designation: **Low Threat - 14 points**

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

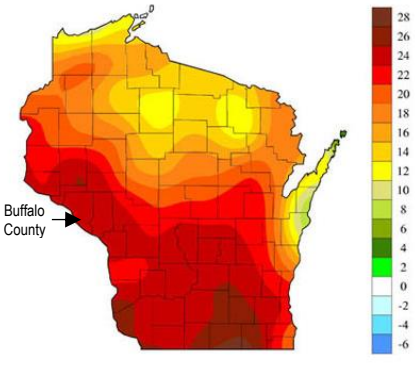
3.22 Buffalo County – Climate Change

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, Buffalo 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, Buffalo County's climate will experience:

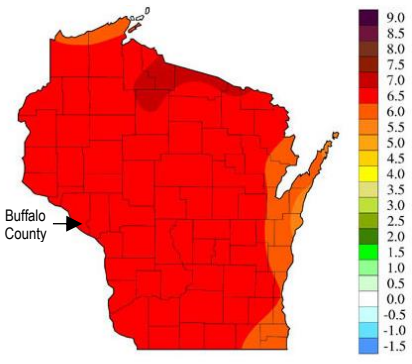
- Increases in temperatures of 6.5°F, with the greatest increases in the winter
- Sixteen less nights a year with temperatures below 0°F
- Twenty-four more days a year with temperatures above 90°F
- More precipitation with more severe precipitation events
- Less snow cover, deeper frost depth, and more 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

Source: 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 Buffalo 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 Buffalo 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

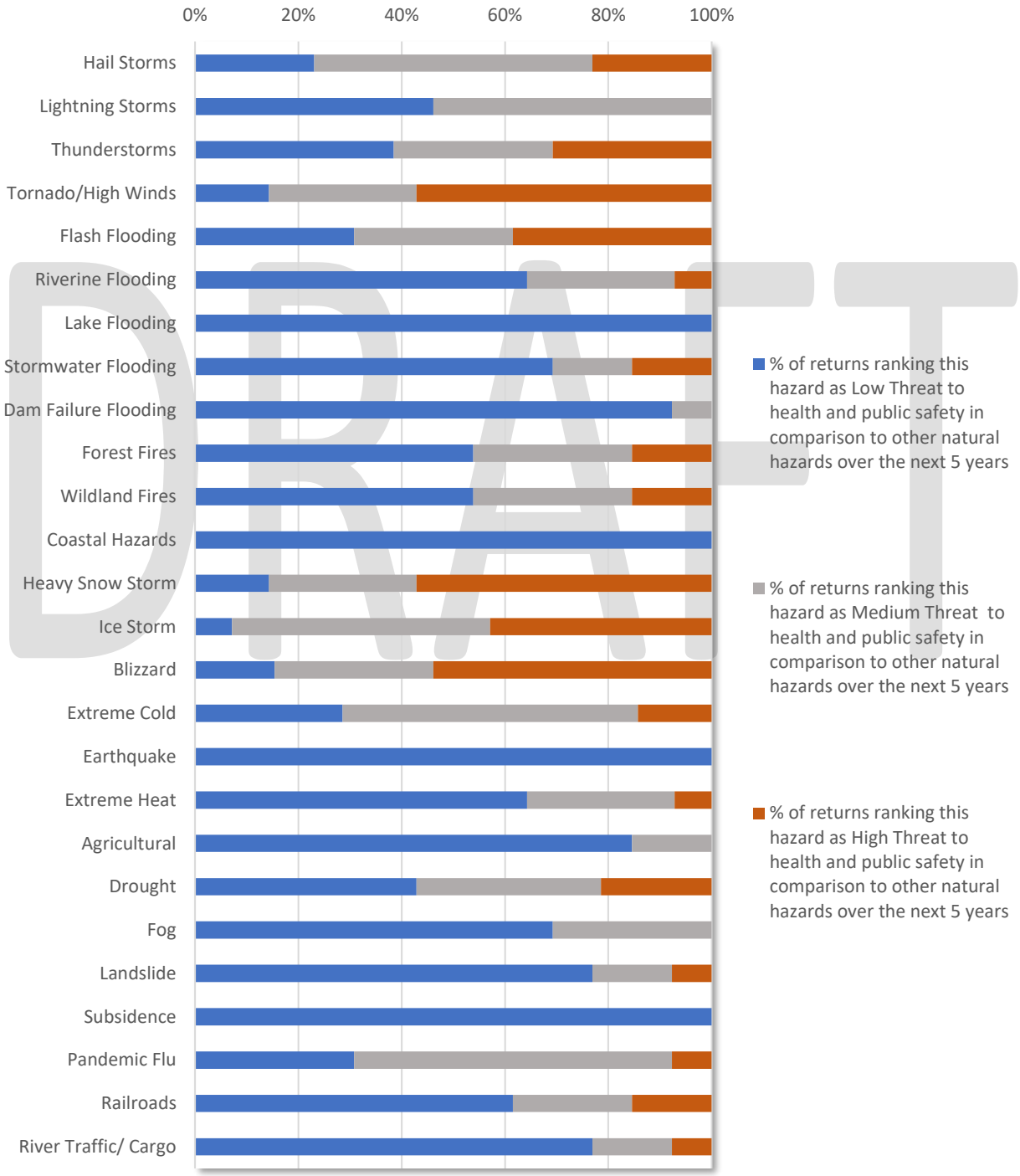
Although the impacts of climate change are already being seen in Wisconsin, there are things Buffalo County policymakers, business leaders, and residents can do to help reduce potential impacts from climate change. The development of climate change mitigation programs can help decrease the impacts from 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 Buffalo 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 bluff stability enhancement, e.g. slow erosion by planting vegetation on bluffs ● 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 Buffalo County Local Official's Hazard Risk Assessment Survey Results

In spring 2021 the Buffalo County Emergency Management 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. The following are results of this survey. Twenty three surveys were mailed out and fourteen were returned.

Table 3-2 Buffalo 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 were of the opinion that this hazard posed a "medium" threat to health and public safety = Medium rating, 3-6 points* • *A majority of local officials were of the opinion that 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	4	9	4	**26**	High
Lightning Storm	9	4	9	4	**26**	High
Thunderstorm	9	4	9	3	**25**	High
Tornado/High Winds	6	5	7	7	**25**	High
Riverine/Flash Flooding	9	5	7	3	**24**	High
Dam Failure Flooding	2	2	3	2	**9**	Low
Forest/Wildland Fires	2	2	3	3	**10**	Low
Heavy Snowstorm	9	2	7	8	**26**	High
Ice Storm	3	2	5	5	**15**	Moderate
Blizzard	2	2	5	8	**17**	Moderate
Extreme Cold	6	3	5	5	**19**	Moderate
Earthquake	1	1	1	1	**4**	Low
Extreme Heat	7	2	5	2	**16**	Moderate
Agricultural	5	4	5	2	**16**	Moderate
Drought	3	3	5	3	**14**	Low
Fog	3	3	4	2	**12**	Low
Landslide	2	3	4	2	**11**	Low

Subsidence	2	3	4	1	**10**	Low
Pandemic Flu	9	6	5	5	**25**	High
Railroads	4	2	5	3	**14**	Low

TABLE 3-3 Structures within the FEMA 100-year Floodplain by Municipality

Municipality	*Number of Parcels*	*2021 Assessed Land Value*	*2021 Assessed Improvement Value*	*Total*
T. Alma	0	$0	$0	$0
T. Belvidere	14	$1,396,900	$1,895,400	$3,292,300
T. Buffalo	6	$219,700	$533,100	$752,800
T. Canton	6	$60,000	$487,300	$547,300
T. Dover	1	$15,000	$5,800	$20,800
T. Gilmanton	8	$38,400	$338,600	$377,000
T. Lincoln	6	$61,700	$362,400	$424,100
T. Maxville	1	$16,900	$80,200	$97,100
T. Milton	7	$130,500	$625,300	$755,800
T. Mondovi	4	$36,000	$422,200	$458,200
T. Montana	4	$76,000	$832,400	$908,400
T. Naples	2	$20,000	$148,700	$168,700
T. Nelson	1	$5,000	$39,700	$44,700
T. Waumandee	3	$25,000	$336,100	$361,100
V. Cochrane	98	$1,035,100	$7,062,400	$8,097,500
C. Alma	6	$122,200	$262,300	$384,500
C. Buffalo City	32	$518,000	$3,961,800	$4,479,800
C. Fountain City	23	$534,600	$1,873,500	$2,404,100
C. Mondovi	9	$118,000	$670,600	$788,000
Total for Buffalo County	**230**	**$4,429,000**	**$19,937,800**	**$24,366,800**

TABLE 3-4 Buffalo 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*	*Total Damage to Structures During a 100 Year Flood Level Event*

MISSISSIPPI RIVER			
North of Alma	1 residence	1 residence with minor damage	1 X $5,000 = $5,000 TOTAL $5,000
C. Alma	4 residences 2 nonprofits	All structures would only have minor damage	10 X 5,000 = $50,000 TOTAL $50,000
C. Alma south to C. Buffalo City	13 residences	4 residences with 1' of water 9 residences with minor damage	Avg. residence = $129,654 4 X $129,654 X 0.22 = $114,095 9 X $5,000 = $45,000 TOTAL $159,095
C. Buffalo City	32 residences	10 residences with 1' of water 22 residences with minor damage	Avg. residence $123,806 10 X $123,806 X 0.22 = $272,373 22 X $5,000 = $110,000 TOTAL $382,373
V. Cochrane	82 residences 7 commercial 8 municipal/exempt	23 residences with 1' of water 60 residences with 2' of water 3 commercial with 1' of water 4 commercial with 2' of water 8 municipal/exempt with 2' of water	Avg. residence $80,424 Avg. commercial $118,200 Commercial avg. will be used for exempt 23 X $80,424 X 0.22 = $406,945 60 X $80,424 X 0.30 = $1,447,632 3 X $118,200 X 0.22 = $78,012 4 X $118,200 X 0.30 = $141,840 8 X $118,200 X 0.30 = $283,680 TOTAL $2,358,109
V. Cochrane south to C. Fountain City	6 parcels 1 exempt 1 residential 4 agricultural	1 residence with 1' of water 2 agricultural with 1' of water 2 agricultural with minor damage 1 exempt with minor damage	Avg. agricultural $135,200 $209,900 X 0.22 = $46,178 2 X $135,200 X 0.22 = $59,488 3 X $5,000 = $15,000 TOTAL $120,666
C. Fountain City	9 residences 13 commercial 1 municipal	4 residences with 3' of water 2 residences with 2' of water 3 residences with 1' of water 6 commercial with 3' of water 4 commercial with 2' of water 3 commercial with minor damage 1 municipal with minor damage	Avg. residence - $76,111 Avg. commercial - $91,423 4 X $76,111 X 0.35 = $106,555 2 X $76,111 X 0.30 = $45,666 3 X $76,111 X 0.22 = $50,233 6 X $91,423 X 0.35 = $191,988 4 X $91,423 X 0.30 = $109,707 4 X $5,000 = $20,000 TOTAL $524,149
C. Fountain City south to Trempealeau River	3 residential 2 municipal / exempt	1 residence with 3' of water 1 residence with 2' of water 1 residence with minor damage 2 municipal/exempt with minor damage	Avg. residence $162,767 1 X $162,767 X 0.35 = $56,968 1 X $162,767 X 0.30 = $48,830 1 X $5,000 = $15,000 TOTAL $120,798

TOTAL MISSISSIPPI RIVER	$3,765,190

TABLE 3-4 Buffalo County (100 Year) Flood Damage Potential

For Residences and Businesses - Continued

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			
Buffalo River East County line to C. Mondovi	2 residences	2 residences with 1' of water	Ave. residence - $74,350 2 X $74,350 X 0.22 = $32,714 TOTAL $32,714
C. Mondovi	8 residences 1 municipal	2 residences with 2' of water 4 residences with 1' of water 2 with minor damage 1 municipal with minor damage	Ave. residence - $83,825 2 X $83,825 X 0.30 = $50,295 4 x $83,825 X 0.22 = $73,766 3 X $5,000 = $15,000 TOTAL $139,061
C. Mondovi to C. Alma	4 residences 1 agricultural 1 commercial	All structures would only have minor damage	6 X $5,000 = $30,000 TOTAL $30,000

TOTAL BUFFALO RIVER	**$201,775**

Other Areas			
Chippewa River	1 residence	1 residence with minor damage	1 X $5,000 = $5,000 TOTAL $5,000
Tiffany and Farrington Creeks	3 agricultural 3 residential 1 municipal	All structures would only have minor damage	7 X $5,000 = $35,000 TOTAL $35,000
Elk Creek	6 residences 1 agricultural	2 residences with 2' of water 2 residences with 1' of water 2 residences with minor damage 1 agricultural with minor damage	Ave. residence - $31,366 2 X $31,366 X 0.30 = $18,819 2 x $31,366 X 0.22 = $13,801 3 X $5,000 = $15,000 TOTAL $47,620
Waumandee and Little Waumandee Creeks	7 residences 1 commercial 7 agricultural	2 residences with 2' of water 4 residences with 1' of water 1 commercial with 1' of water 4 agricultural with 1' of water 1 residential with minor damage	Ave. residence - $26,628 Avg. agricultural - $165,514 Commercial - $270,400 2 X $26,628 X 0.30 = $21,497 5 X $26,628 X 0.22 = $39,412 $270,400 X 0.22 = $57,376 4 X $165,514 X 0.22 = $120,836

		3 agricultural with minor damage	4 X $5,000 = $20,000 TOTAL $259,121
TOTAL OTHER AREAS			**$346,741**
COUNTY TOTAL			$19,937,800

TABLE 3-5 Buffalo County Population, Real Estate and Transportation Vulnerability Assessment

Municipality	*2007 Number of Motor Vehicles & Trailers (1)*	*Fed/State Numbered Highways Arterial Miles (2)*	*Fed/State Numbered Highways Collector Miles (2)*	*County Hwy Miles (2)*	*Town Roads (2)*	*Village/ City Streets(2)*	*Total Hwy Miles*	*Burlington Northern Santa Fe Rail Miles*	*Canadian National Rail Miles*	*Total Rail Miles*
Towns										
Alma	378	1.4	9.20	20.53	18.20		49.37	2.7		2.7
Belvidere	413	8.2		14.11	30.82		53.02	8.1		8.1
Buffalo	719	6.8	1.00	13.38	27.94		49.35	10.6	3.3	13.9
Canton	357			25.31	29.43		54.74			
Cross	401		8.70	9.89	34.85		53.44		2.2	2.2
Dover	467		7.30	18.15	38.72		64.17			
Gilmanton	480		14.6	13.52	22.67		50.88			
Glencoe	522		6.8	12.76	48.76		68.38			
Lincoln	209		9.50	16.47	12.05		38.02			
Maxville	407		6.50	25.36	21.65		53.51			
Milton	577	7.80	3.90	3.84	26.18		41.72	4.8		4.8
Modena	312		2.90	26.64	23.00		52.54			
Mondovi	813	4.80	4.50	15.51	25.98		50.79			
Montana	322			24.03	36.30		60.31			
Naples	689	6.20	1.50	18.71	35.50		61.91			
Nelson	664	8.8	7.80	36.85	35.75		89.2	9.7		9.7
Waumandee	90		6.60	11.95	41.83		60.38			
Cities & Villages										
V. Cochrane	1,024		0.60	0.79		4.35	5.74	0.5		0.5
V. Nelson	795	0.90	0.30	0.07		2.31	3.58			
C. Alma	1,417	3.5		3.49		11.42	18.37	2.4		2.4
C. Buffalo City	1,243			3.32		18.20	21.52			0.0
C. Fountain City	1,963	2.7		1.37		8.51	12.58	1.7		1.7

C. Mondovi	4,177	1.8	2.30	1.85		18.44	23.8			
COUNTY TOTAL	**18,942**	**52.90**	**94.00**	**317.90**	**509.63**	**63.23**	**1037.32**	**40.5**	**5.5**	**46.0**

(1) Does not include vehicles registered in "unknown tax districts"
(2) There are four jurisdictional classifications: State System Highways (Example USH 10-STH 35), County Highways (Example CTH B), Town Roads (Example Mill Rd), 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 USH 10, STH 35) or as Major/Minor collectors (example STH 37).

Some local roads that are not identified as state system roads may be a "Federal Aid" road.

TABLE 3-6 Buffalo County Business Vulnerability Assessment

Number of Establishments/Employment/Payroll

NAICS CODE AND DESCRIPTION	*No. of Employees (1)*	*Annual Payroll ($1,000) (2)*	*No. of Establishments*
Buffalo County Totals	**2,977**	**118,994**	**298**
11 Forestry, fishing & hunting, & ag support services (113-115)	0-19	(D)	0
21 Mining, Quarrying, and Oil and Gas Extraction	0-19	(D)	0
22 Utilities	0-19	(D)	0
23 Construction	119	4,141	25
31-33 Manufacturing	277	11,556	15
42 Wholesale trade	132	8,271	12
44-45 Retail trade	301	6,511	41
48-49 Transportation & warehousing	848	44,430	22
51 Information	16	864	6
52 Finance & insurance	123	4,995	19
53 Real estate & rental & leasing	10	294	7
54 Professional, scientific, & technical services	69	1,476	17
56 Administrative & support & waste management & remediation service	261	14,200	12
61 Educational services	0	0	0
62 Health care & social assistance	292	7,111	27
71 Arts, entertainment, & recreation	8	442	9
72 Accommodation & food services	325	3,729	49
81 Other services (except public administration)	98	2,142	3
99 Unclassified	0-19	(D)	1

Source: U.S. Department of Commerce-Economic and Statistics Administration-U.S. Census Bureau-County Business Patterns 2018
(1) Total includes No. of employees in all industry classifications
(2) Total Includes annual payroll in all industry classifications
Note: County Business Patterns (CBP) covers most NAICS industries excluding crop and animal production; rail transportation; National Postal Service; pension, health, welfare, and vacation funds; trusts, estates, and agency accounts; private households; and public administration. CBP also excludes most establishments reporting government employees.

A: 0-19 employees
B: 20-99 employees
C: 100-249 employees
E: 250-499 employees
F: 500-999 employees
G: 1,000-2,499 employees
H: 2,500 - 4,999 employees
I: 5,000 - 9,999 employees
J: 10,000 - 24,999 employees
K: 25,000 - 49,999 employees
L: 50,000 - 99,999 employees
M: 100,000 or more employees
S: Withheld because estimate did not meet publication standards
D: Withheld to avoid disclosing data for individual companies' data are included in higher level totals

Table 3-7 Buffalo County Critical Facilities: Government and Military Facilities

Critical Facility Name	*City*	*Address*	*Telephone*
Alma City Hall	Alma	314 N Main St	(608) 685-3330
Buffalo City - City Hall	Buffalo City	245 E 10th Street	(608) 248-2262
Fountain City - City Hall	Fountain City	42 N. Main Street	(608) 687-7481
Mondovi City Hall	Mondovi	156 S. Franklin Street	(715) 926-3866
Cochrane Village Hall	Cochrane	102 E. 5th Street	(608) 248-2737
Nelson Village Hall	Nelson	N104 N Main St.	(715) 673-4748
Town of Belvidere	Cochrane	W1624 North St.	(507) 450-1207
Town of Buffalo	Fountain City	W387 Hwy 35/54	(608)687-9502
Town of Cross	Fountain City	W614 Buehler Valley Road	(608) 687-3228
Town of Milton	Fountain City	S2794 State Road 88	(608) 687-4800
Buffalo County Courthouse	Alma	407 2nd Street	(608) 685-6202

Table 3-8 Buffalo County Critical Facilities: Hospitals, Clinics, and Residential Care Facilities

Critical Facility Name	*City*	*Address*	*Telephone*
Gundersen St. Elizabeth's Alma Clinic	Alma	203 S Main St.	(651) 565-5599
St. Michaels Assisted Living	Fountain City	270 North St.	(608) 468-6380
American Lutheran Communities	Mondovi	200 Memorial Dr.	(715) 926-4962
Homeplace of Mondovi LLC	Mondovi	158 E Main St.	(715) 926-4777
Mayo Clinic Health System	Mondovi	700 Buffalo St.	(715) 926-4858
Privea Mondovi Health Center	Mondovi	250 WI-37	(715) 926-6230

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

Critical Facility Name	*City*	*Address*	*Telephone*
Alma Volunteer Fire Dept.	Alma	310 N. Main St.	(608) 685-4907
Mondovi Fire Dept.	Mondovi	131 W. Riverside Ave.	(715) 926-4901
Nelson Volunteer Fire Dept.	Nelson	S302 ST Rd. 35	(715) 673-4801
Fountain City Fire Dept.	Fountain City	2 S. Hill St.	(608)687-6211
Waumandee Montana Fire Dept.	Waumandee	S2004 County Rd. U	(608) 626-3431
Tri-Community Fire Dept.	Buffalo City	245 East 10th St.	(608)248-3044
Buffalo County Sheriff's Office	Alma	407 South Second St.	(608) 248-3044
Alma Police Dept.	Alma	314 N. Main St.	(608)685-4577
Fountain City Police Dept.	Fountain City	42 N. Main St.	(608) 687-4214
Mondovi Police Dept.	Mondovi	225 E. Main St.	(715) 926-4423

Table 3-10 Buffalo County Critical Facilities: Schools

Critical Facility Name	*City*	*Address*	*Telephone*
Alma Elementary/High School	Alma	S1618 State Rd. 35	(608) 685-4416
Cochrane-Fountain City Elementary/High School	Fountain City	S2770 State Hwy 35	(608) 687-4171
Gilmanton Elementary School	Gilmanton	W241 Linse Rd.	(715) 946-3158
Gilmanton Junior Senior High	Gilmanton	S889 Larson Rd.	(715) 946-3158
Anthony Acres Charter School	Mondovi	S12115 State Hwy 37	(715) 926-3645
Mondovi Elementary/Middle/High School	Mondovi	337 N Jackson St.	(715) 926-3656
Albany Hills School	Mondovi	N6964 Albany E	(715) 672-5976
Poplar Grove School	Mondovi	W1142 Albany Gg.	(715) 875-4609
Buffalo Lutheran School	Cochrane	401 South Main St.	(608) 248-2387
St. Boniface School	Waumandee	S2026 CT. Rd. U	(608) 626-2611

Table 3-11 Buffalo County Critical Facilities: Wells

Community	*Utility ID*	*Well ID No*	*ID #*	*Well Depth (feet)*	*Design Yield (GPD)*	*Actual Cap (GPM)*	*Currently in Service*	*Ground Storage*	*Elev Storage(1)*
Alma	80	Alma 1	1	400	300,000	250	Yes	158,565	
Alma	80	Alma 2	2	480	560,000	395	Yes	158,565	

Alma	90	BF837	1	297	50,500	250	Yes		75,000
Cochrane	1240	Cochrane 1	2	109	62,823	320	Yes		199,000
Fountain City	2070	Ftn City 1	1	305	133,000	125	Yes	150,000	
Mondovi	3780	BF-233	1	834	580,000	300	Yes	750,000	
Mondovi	3780	BF-235	3	373	648,000	450	Yes	750,000	
Mondovi	3780	EM-262	4	485	787,000	457	Yes	750,000	
Nelson	4060	Nelson 1	1	85	187,000	250	Yes	86,600	

Source: Wisconsin Department of Natural Resources, Well Construction Information System 2020

(1) Standpipe or Elevated Tank Storage

Table 3-12 Buffalo County Critical Facilities: Wastewater Treatment Facility (WWTF)

Critical Facility Name	*Community*	*Address*	*Telephone*
Alma WWTF	Alma	314 N. Main St.	608-685-3330
Cochrane WWTF	Cochrane	Village Hall, PO Box 222	608-248-2737
Fountain City WWTF	Fountain City	P.O. Box 85	608-386-2148
Mondovi WWTF	Mondovi	156 S Franklin St	715-926-4458
Nelson WWTF	Nelson	PO Box 131	608-626-2279
Site Manager	Mondovi	431 South Washington Street	864-407-7242
Waumandee Sanitary District #1	Waumandee	S2002B Cty Rd U	608-626-2279

Source: Department of Natural Resources 2021

Table 3-13 Buffalo County Critical Facilities: EPCRA Planning Facilities

Critical Facility Name	*Address*	*Municipality*
Agrilance	W892 USH 10	Mondovi
Dairyland Power Coop – JP Madgett Station	500 Old STH 35	Alma
Foremost Farms	S1856 CTH U	Waumandee
Garden Valley Cooperative	S1853 CTH U	Waumandee
City of Mondovi Wastewater Treatment Plant	665 Riverside	Mondovi
City of Mondovi Well #1	156 S. Franklin St.	Mondovi
City of Mondovi Well #3		Mondovi
City of Mondovi Well #4	950 N. Harrison St.	Mondovi

Source: Buffalo County Emergency Management Department

Table 3-14 Buffalo County Critical Facilities: Dams

Map Code	*Official Name*	*Hazard Potential*	*Dam Size*
1	Brownlee	High	LARGE
2	Alma Mill 2	Low	LARGE
3	Alma Mill 3	Low	LARGE
4	Alma Mill 4	Low	LARGE
5	Alma Mill 5	Low	LARGE
6	Alma Mill 6	Low	LARGE
7	South Nelson 1	Low	LARGE
8	Garden Valley 10	Low	LARGE
9	Helwig	Low	LARGE
10	Secrist	Low	LARGE
11	Lock & Dam No 5	Significant	LARGE
12	Aaron Rueter	Low	SMALL
13	Waumandee Mill		SMALL
14	Fishers Mill		SMALL
15	Schlosstien, Gary 3		SMALL
16	Boland, Tom 3		SMALL
17	Hurlburt Brothers		SMALL
18	Kramer, Joe		SMALL
19	Molland, Milfred		SMALL
20	Owen, Donald		SMALL
21	Owen, Laverne 3		SMALL
22	Thoeny, C.		SMALL
23	Weisenbeck, Darel		SMALL
24	Wald, Kenneth		SMALL
25	Wald, Marvin		SMALL
26	Wall, Dan		SMALL
27	Castleberg,Martin		SMALL
28	Hillig, John		
29	Johnson, Silas No.2		SMALL
30	Skroch, Mabel		SMALL
31	Weisenbeck, James		SMALL
32	Schultz,Warner		SMALL
33	Bechley, Leroy		SMALL
34	Haeuser, Glenn		SMALL
35	Jones, Gene		SMALL
36	Pronschinske, Tony		SMALL
37	Sabotta,Eugene		SMALL
38	Weltzein,Gaylord		SMALL
39	Wolfe, Anton		SMALL
40	Hayes, Nathan		SMALL
41	Segerstrom,Duane		SMALL
42	Barnes,Edward D		SMALL
43	Modena Mill	High	SMALL
44	Cream Mill	Low	SMALL
45	Glencoe Mill		SMALL
46	Misha Moka		

47	Cochrane -Up		
48	Cochrane -Dn		
49	Olaf Rod		
50	Dam Near Fountain City		
51	Quarberg	Low	SMALL
52	Schafer	Low	SMALL
53	Kees		SMALL
54	Gilmanton	Low	SMALL
55	Flury	Low	SMALL
56	Alma Mill 1	Low	LARGE
57	Brantner	Low	SMALL
58	Drescher,Marie		SMALL
59	Weisenbeck, James		SMALL
60	Garden Valley Structure No 11		SMALL
61	Cochrane Flood Control	Low	LARGE

Source: Wisconsin DNR

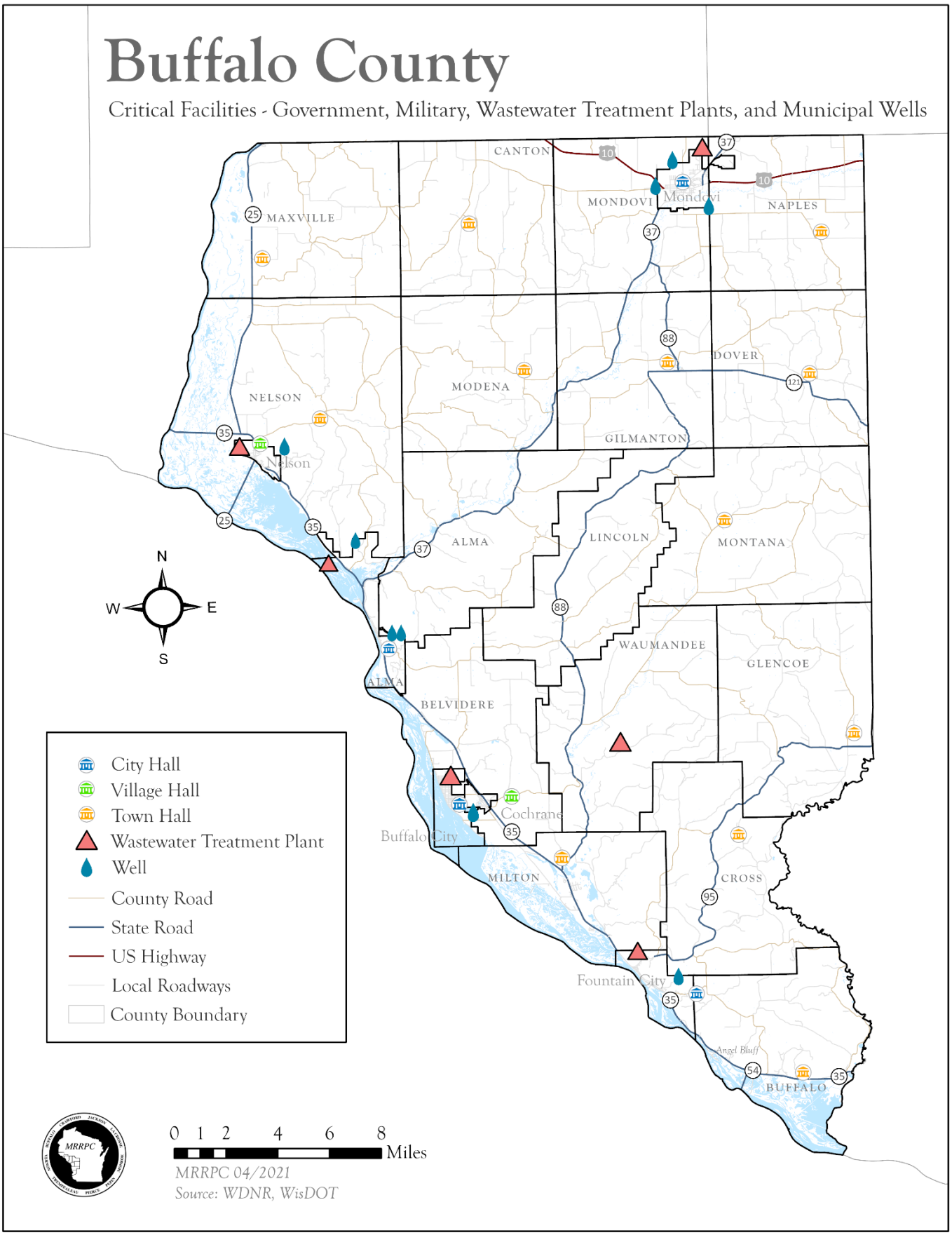
Table 3-15 Dam Failure Impact Study

Dam Name	*Roads Impacted*	*Number of Businesses/Industries Impacted*	*Private Property Damages*	*Agriculture Crops Impacted***	*Infra-structure Losses*	*Dam Repairs*	*Dam Hazard Rating*	*Emergency Evacuation Plan*
Alma Mill No. 1	CTH S	0	Minimal	$1,000	$159,000	$250,000	Low	No
Alma Mill No. 2	None	0	Minimal	$1,000	$4,000	$285,000	Low	No
Alma Mill No. 3	None	0	Minimal	$1,000	$4,000	$274,000	Low	No
Alma Mill No. 4	Rotering Rd, Riesch Vly Rd, CTH S	0	Minimal	Minimal	$133,000	$274,000	Low	No
Alma Mill No. 5	Rotering Rd, Riesch Vly Rd, CTH S	0	Minimal	$5,000	$100,000	$259,000	Low	No
Alma Mill No. 6	CTH S, Rotering Rd, Riesch Vly Rd	0	Minimal	$1,000	$5,000	$230,000	Low	No
South Nelson No. 1	STH 35, B & N Railroad	0	Minimal	$5,000	$10,000	$341,000	High	No
Garden Valley No. 10	STH 35, RR Bridge	0	Minimal	$27,000	$7,000	$270,000	Low	No

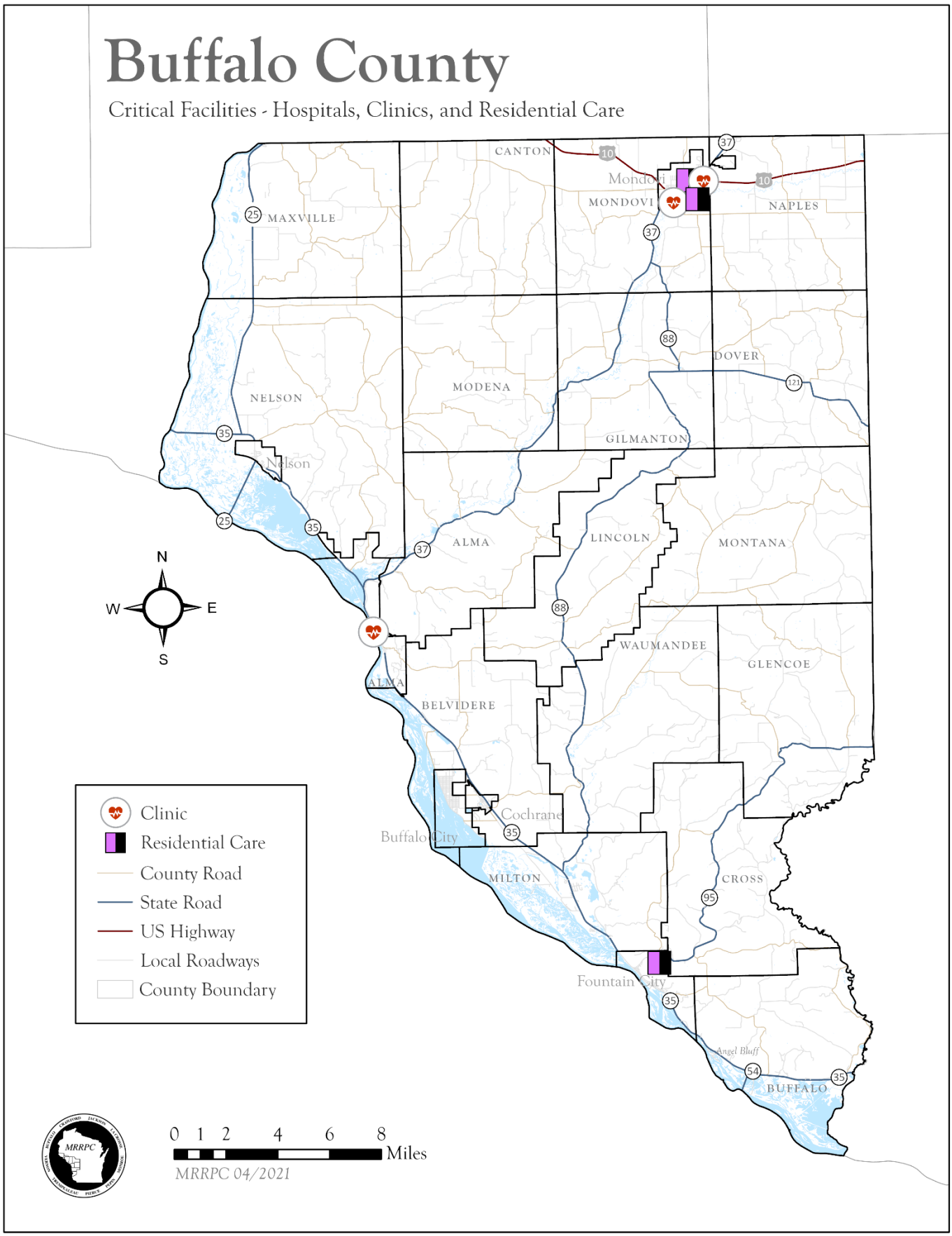
Source: Dam Failure Analysis, Ayres Associates, 1996

Impact in 1995 Dollars

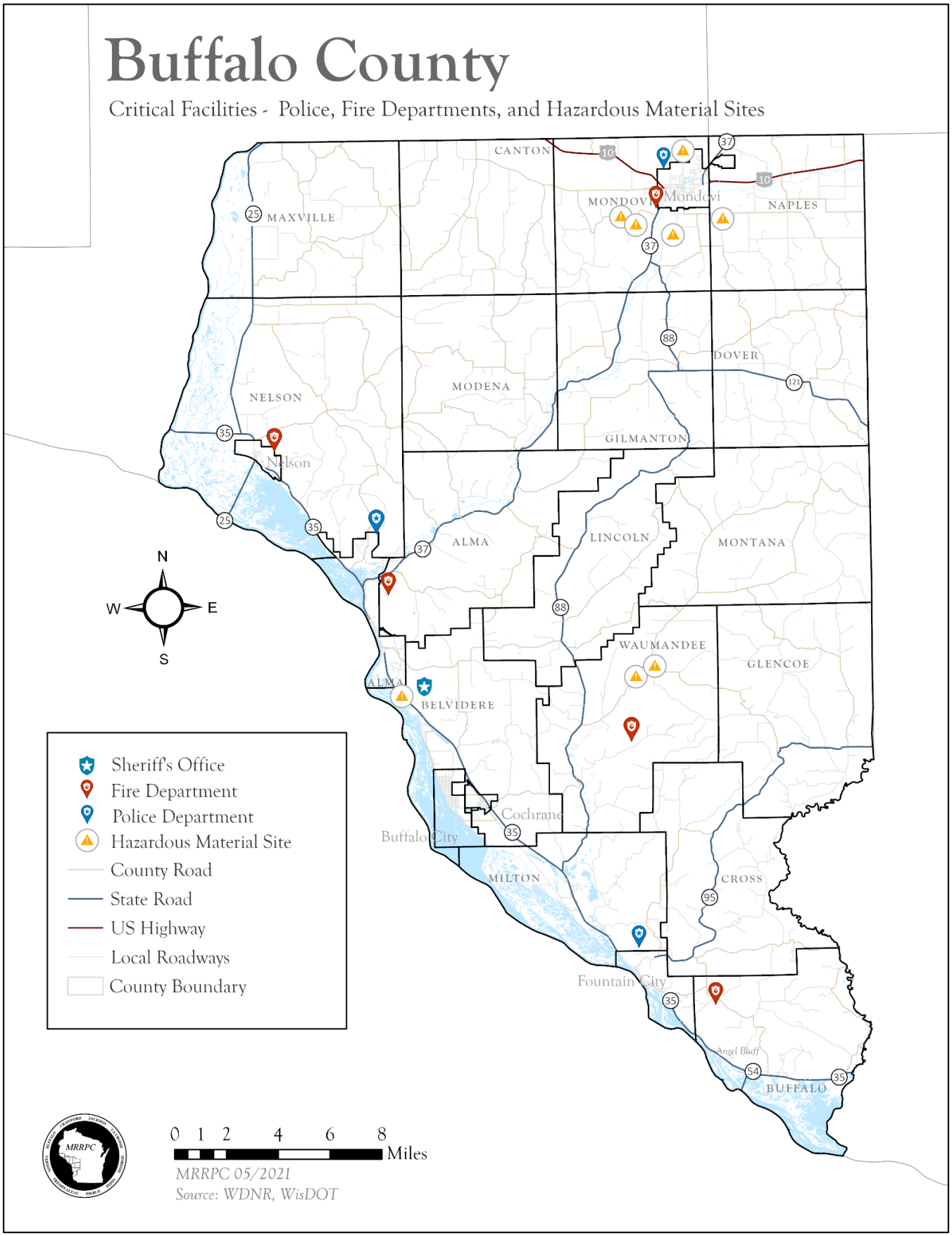
Map 3.1 Buffalo County Critical Facilities – Government, Military, Wastewater Treatment Plants, and Municipal Wells



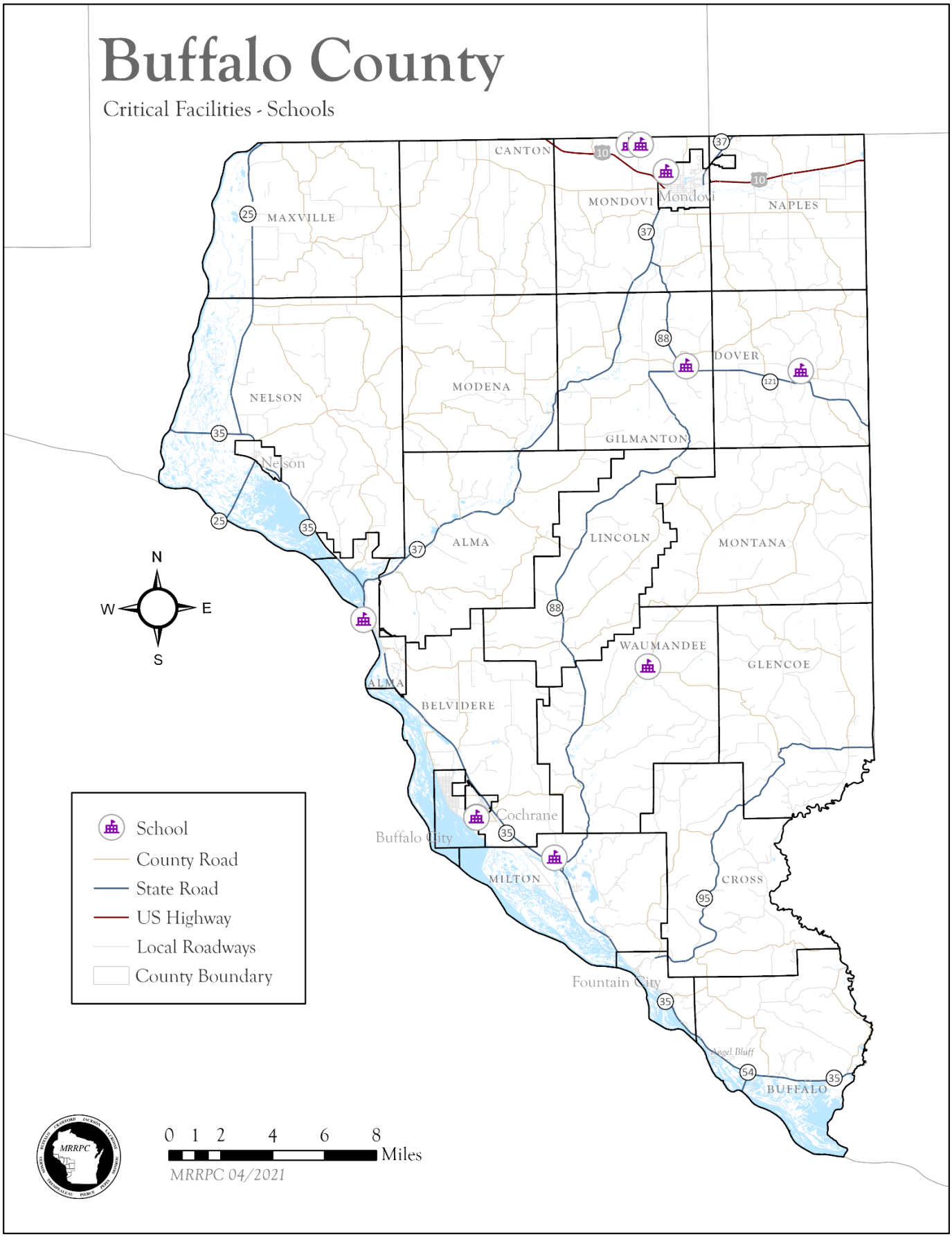
Map 3.2 Buffalo County Critical Facilities – Hospitals, Clinics, and Residential Care



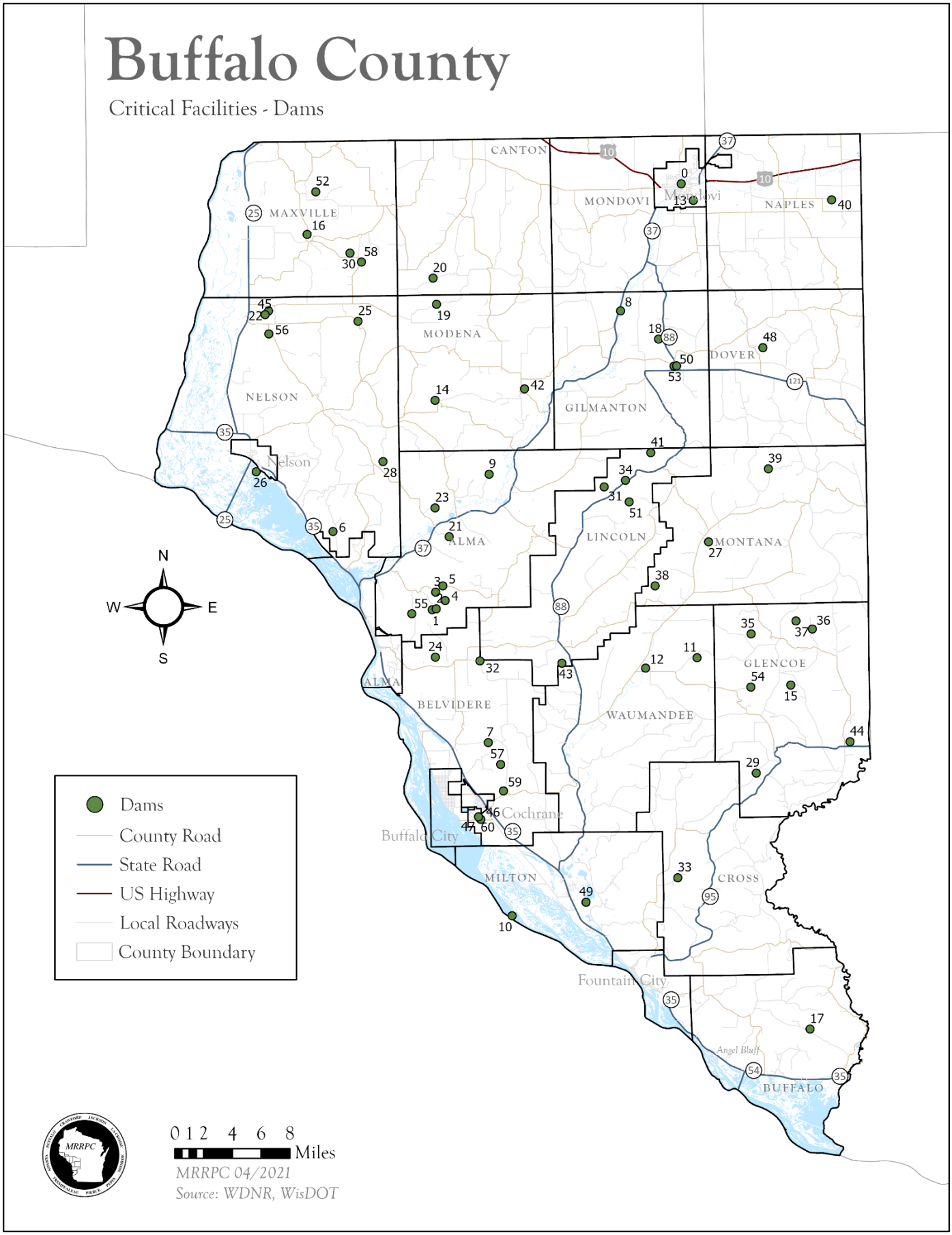
Map 3.3 Buffalo County Critical Facilities – Police, Fire Departments, and Hazardous Material Sites



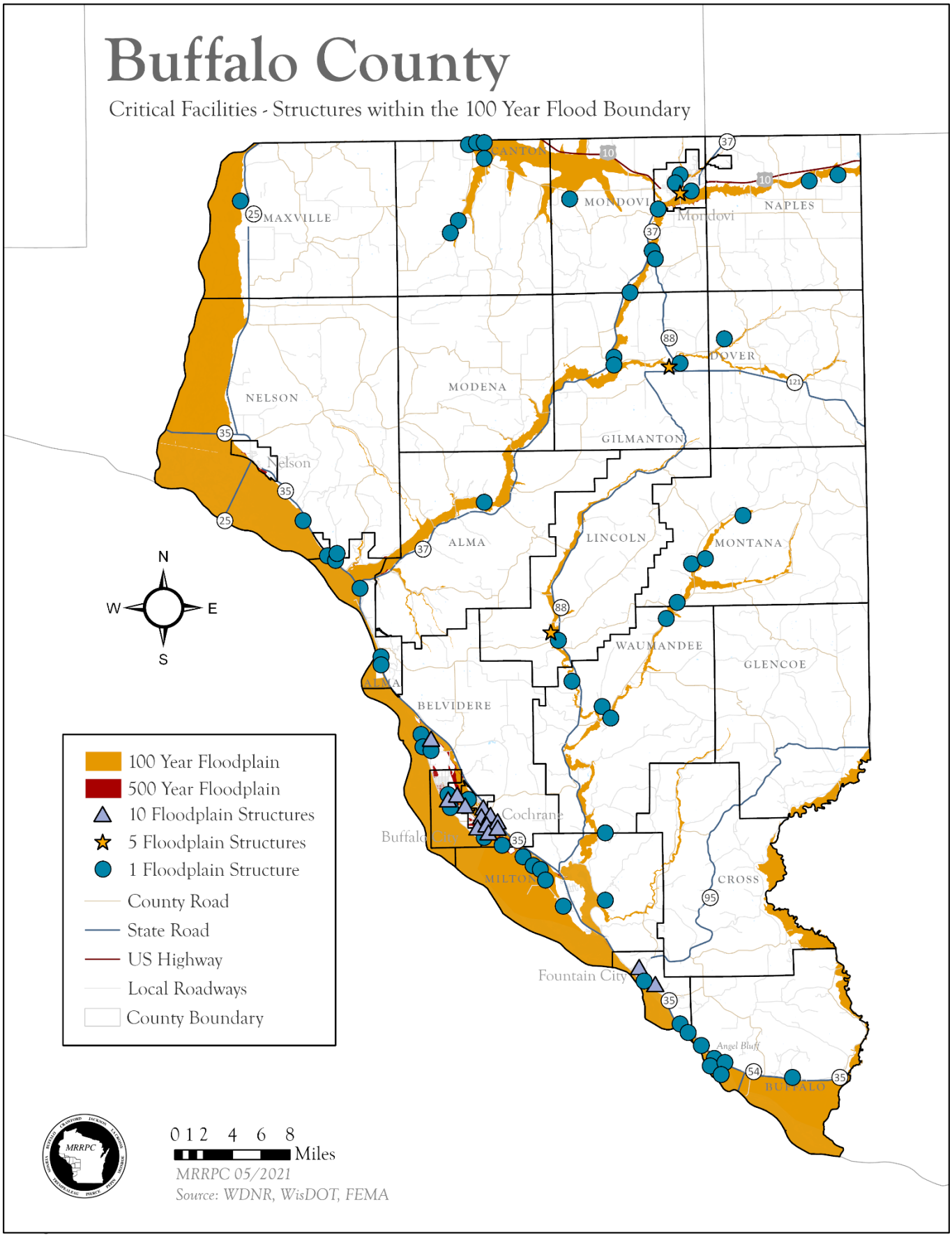
Map 3.4 Buffalo County Critical Facilities – Schools



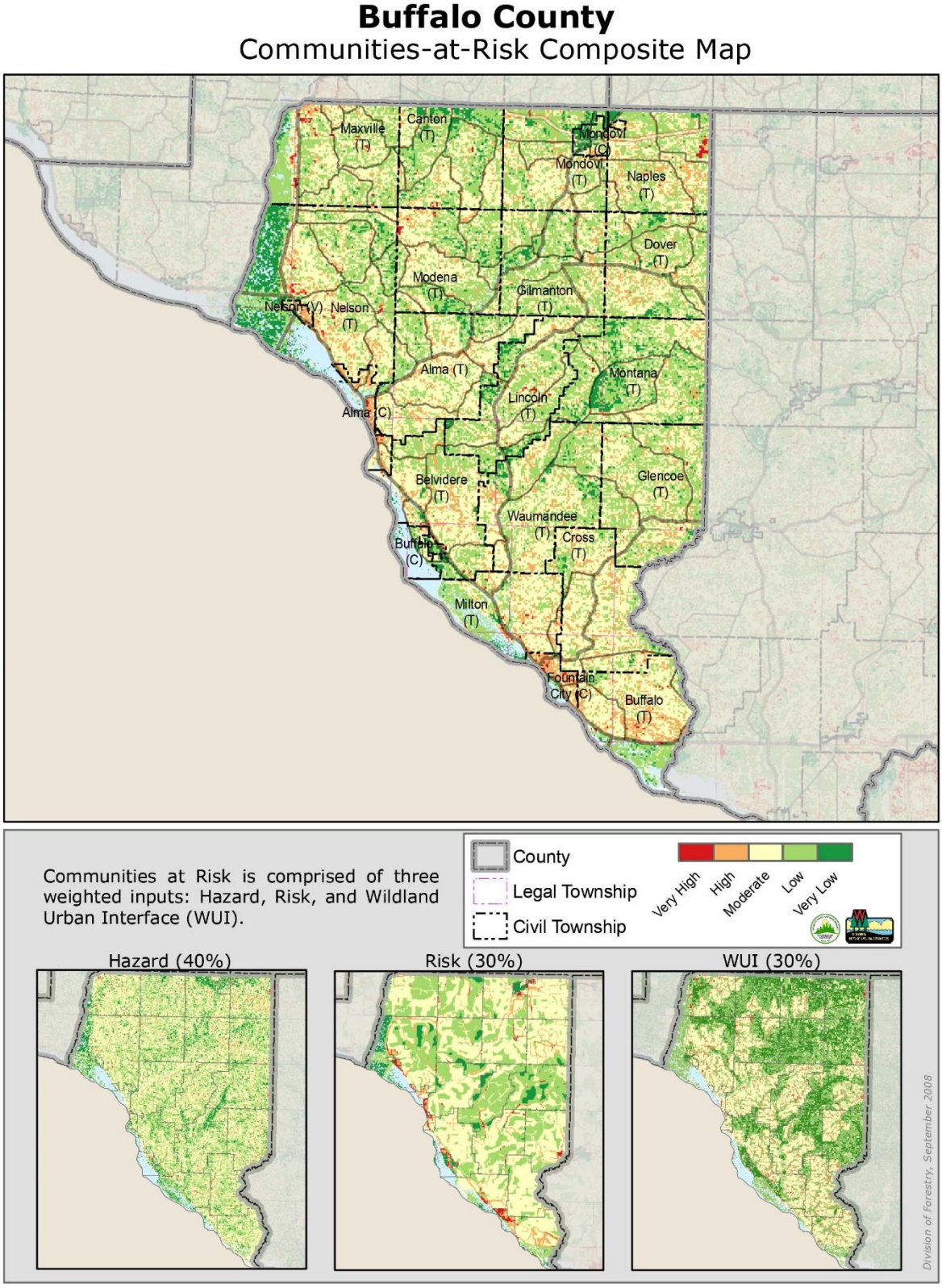
Map 3.5 Buffalo County Critical Facilities – Dams



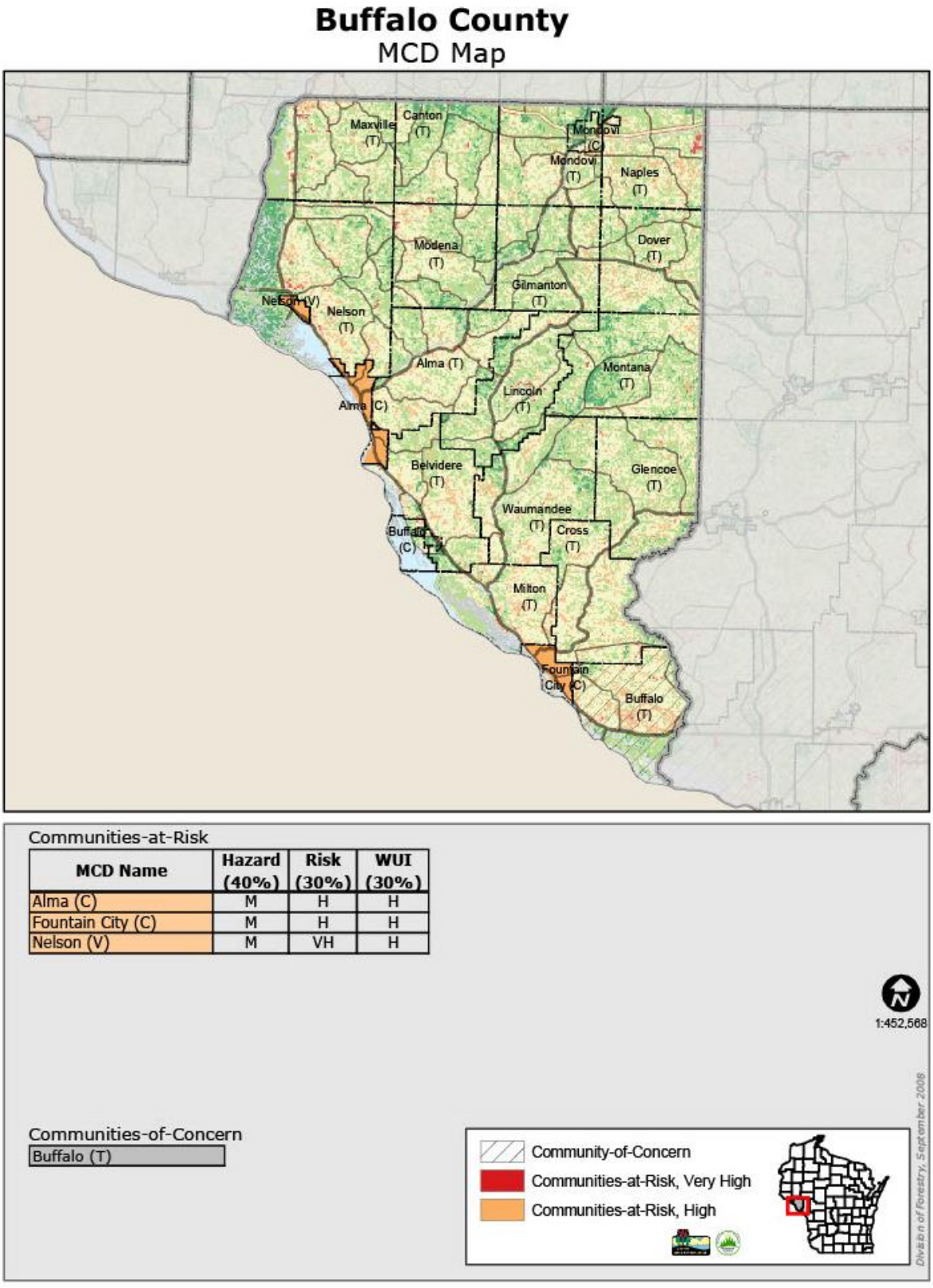
Map 3.6 Buffalo County Critical Facilities – Structures within the FEMA 100-Year Flood Boundary



Map 3.7 Buffalo County Communities at Risk of Wildfires



Map 3.8 Buffalo County MCD Wildfire Map



4. BUFFALO 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 actually 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 Buffalo County Multi-Hazards Mitigation Plan 2016 - 2020 have been carried over or deferred to this plan.

The Buffalo County Emergency Director 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 Cities 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 members in the Mississippi River Regional Planning Commission and are eligible for planning assistance from that organization.

Buffalo County Specific Hazard Goals, Actions, and Projects

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

Table 4-1 Buffalo 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.*
Pandemic Flu Hazards	*Inform the public on the hazards associated with pandemic flu and provide information on methods to reduce future losses.*

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

Table 4-2 Buffalo 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	Emergency Management Committee	Continual	Carried over, this project will be on-going until all floodplain structures are mitigated
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
Work to reduce or eliminate repetitive loss or substantially damaged structures by undertaking the following: • The Zoning Administrator 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. • 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	County Zoning Administrator	Biannually	Carried over from previous plan
Update and amend Floodplain Zoning Ordinance	Existing County staff resources	County Zoning Administrator	2022-2023	New Project
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	Local Emergency Planning Committee	2018-2019	Deferred
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 Director & County Highway Dept.	Continual Program	Carried over from previous plan

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
To maintain the County's compliance with the National Flood Insurance Program the County will undertake the following actions: 1) The County Zoning Administrator shall annually attend floodplain zoning seminars and workshops to keep informed on floodplain issues and regulations 2) The County Zoning Administrator shall report quarterly on floodplain permit activity to the Local Emergency Planning Committee 3) The County Zoning Administrator shall administer, enforce and update the County's floodplain ordinances as prescribed by law.	Existing County staff resources	County Zoning Administrator	Continual Program	Carried over from previous plan, relates to NFIP compliance
Research the Civilian Conservation Corp dam/dike/detention projects within Buffalo County. Identify these projects and inspect them.	Existing County staff resources	Emergency Management Director, Land Information Officer, Land and Water Conservation Dept.	2015-2019	Deferred
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 Director 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, County Local Emergency Planning Committee, County Emergency Management Director	After each flood disaster	Carried over from previous plan
Purchase emergency response vehicle large enough to haul emergency response trailer	Grants	County Emergency Management Director	2017	*Completed*
Hail, Lightning, Thunderstorm and Fog Hazard				
Encourage the burying of electrical lines	Existing County staff resources	Local Emergency Planning Committee	Continual Program	Carried over from previous plan
Encourage the burying of telecommunication lines	Existing County staff resources	Local Emergency Planning 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 Director	Annual Program	Carried over from previous plan
Tornadoes and High Winds				
Require anchoring on new mobile home residences, carports and porches.	Existing County staff resources	County Local Emergency Planning Committee	Continual Program	Carried over from previous plan

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Encourage the burying of underground power, cable and telephone lines.	Existing County staff resources	County Local Emergency Planning Committee	Continual Program	Carried over from previous plan
Encourage the use of interlocked roofing shingles.	Existing County staff resources	County Local Emergency Planning 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 County staff resources	County Local Emergency Planning 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 County staff resources	County Local Emergency Planning Committee	Continual Program	Carried over from previous plan
Purchase NOAA All Hazards radios for county residents	Grants	County Local Emergency Planning Committee	Continual Program	Carried over from previous plan
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 population that are more vulnerable to extreme temperature events, such as the low income, elderly, and sick and biannually update this list.	Existing County staff resources	County Emergency Management Director and the County Local Emergency Planning Committee	Continual Program	*Completed*
Update the list of identified buildings to be used as shelters	Existing County staff resources	County Emergency Management Director and the County Local Emergency Planning Committee	Continual Program	New Project
Continue support of the Salvation Army and similar programs	Existing County staff resources	County Emergency Management Director and the County Local Emergency Planning Committee	Continual Program	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 Director and the County Local Emergency Planning Committee	Continual Program	Changed timetable to continuous from specific year
Forest and Wildland Fire				
Develop/maintain cooperative fire agreements with area fire departments and the Department of Natural Resources as necessary.	Existing County staff resources	County Emergency Management Director	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 Director and NRCS	Continual Program	Carried over from previous plan

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
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 Director	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 Highway Commissioner and Village Officials	2016	Deferred
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 Village staff resources	County Highway Commissioner and Village Officials	2016-2017	Deferred due to prioritization of projects within Highway department
Continue to regulate/limit development on steep slopes and bluffs. Additionally limit the slope of new driveways.	Existing County staff resources	County Zoning Administrator	Continual Program	Continual
Agricultural and Drought				
Develop an education/information program that informs agricultural producers and residents about water conserving measures and crop insurance.	Existing County staff resources	NRCS and UW Extension in cooperation with City, Village and Village Officials	2015-2016	Deferred
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	Public Health officer in cooperation with City Officials, Village Officials, Emergency response personnel and local hospitals and clinics	2017-2018	Deferred
Train Derailment				
Develop evacuation plans for the Village of Nelson, Village of Cochrane, City of Alma, City of Buffalo City and City of Fountain City	Existing County staff resources	County Emergency Management Director in cooperation with city and village officials	2017-2018	Deferred, but was part of Full-Scale exercise discussion
Additional training for emergency responders	Grants and BNSF	County Emergency Management Director in cooperation with first responders organizations	Continual program	Held ICS 300 course in 2019; intend to continue into future
Encourage legislation to require rail companies to upgrade rail lines and equipment	Existing County staff resources	County Administrator	2016	Deferred due to prioritization and pandemic

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Develop a procedure for disseminating public information during events	Existing County staff resources	County Emergency Management Director and the County Administrator	2017	*Completed; AlertSense notification system*
Develop a sheltering plan	Existing County staff resources	County Emergency Management Director	2017	*Completed for Courthouse*
Purchase electronic highway signs for detours and road closures	Grants	County Highway Dept.	2018	*Completed; 2021*
Develop an Emergency Alert system for notification of County residents during emergencies	Existing County staff resources	County Administrator	2018	*Completed; Purchased AlertSense*
Update Emergency Operations Center – update staff and equipment, obtaining additional training	HMP grants	County Emergency Management Director	2014	Deferred; awaiting required impact studies
Purchase a drone – to be used to access derailment site without jeopardizing humans, also can be used to get aerial views of accident site	Grants	County Emergency Management Director	2018	Deferred due to budget constraints
River Traffic				
Improve communications between County and US Army Corp of Engineers	Existing County staff resources	County Emergency Management Director and Lock Masters	2017-2018	*Completed; USACE has compatible portable radios so they now communicate with local emergency response agencies*
Develop sheltering plan for the City of Alma	HMP grants	County Emergency Management Director and City officials	2018	Deferred

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 Buffalo County.

Table 4-3 Buffalo County Municipal 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				
In conjunction with the County investigate the concept of a voluntary floodplain property buyout program through a survey of	Existing Village and	County Emergency Management Director	Continual	Continual program,

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
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.	County staff resources to investigate	to serve as coordinator		determine interest on an area by area basis
Continue to monitor and enforce N.R. 116 Floodplain, Shore Land - Wetland Regulations and any changes to it.	Existing Village and City resources	Village or City Board or designee	Annually	Continual Program
Work to reduce or eliminate repetitive loss or substantially damaged structures by undertaking the following: 1) The Village or City Clerk or designee biannually shall provide a list of owners of repetitive loss structures or substantially damaged structures within the Village or City to the County Emergency Management Director. The County Emergency Management Director will then 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. 2) 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 Village, City and County staff resources	Village or City Board or designee and the County Emergency Management Director	Biannually	Carried over from previous plan
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 Village, City and County staff resources	Village or City Board or designee and the County Emergency Management Director	2015-2016	Deferred, relates to NFIP compliance
To maintain compliance with the National Flood Insurance Program the Village/City will undertake the following actions: 1) The Village/City Clerk or designee shall annually attend floodplain zoning seminars and workshops to keep informed on floodplain issues and regulations. 2) The Village/City Clerk or designee shall report monthly on floodplain permit activity to the Village Board. 3) The Village/City Clerk or designee shall administer, enforce and update the municipality's floodplain ordinance as prescribed by law.	Existing Village/City staff and resources	Village/City Clerk or designee	Annually	Carried over from previous plan, relates to NFIP compliance
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 Village/City Clerk or designee shall meet and report in a timely manner to the Village/City Board on potential changes to the Village's portion of the Buffalo County Multi-Hazard Mitigation Plan. The Village Board shall recommend to reaffirm, amend or update (rewrite) this plan to the County Emergency Management Coordinator and the Emergency Management Committee. 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 Village and County staff resources	Village Clerk or designee, Village Board, Emergency Management Coordinator, Emergency Management Committee	After each flood disaster	Carried over from previous plan

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
Identify and upgrade/improve or replace existing culverts and bridges that are causing flooding issues or concerns as funding becomes available		Individual municipal boards in conjunction with the Emergency Management Director and County Highway Department	Continual Program	Carried over from previous plan
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 Emergency Management 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 Emergency Management 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 City, Village, Town and County staff resources	County Emergency Management Director coordinating with City, Town and Village Clerks	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 Emergency Management 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 Emergency Management Committee	Continual Program	Carried over from previous plan
Encourage the use of interlocked roofing shingles.	Existing City, Village, Town and County staff resources	Individual municipal Boards in conjunction with the County Emergency Management 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 Emergency Management Committee	Continual Program	Carried over from previous plan

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
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 Emergency Management Committee	Continual Program	Carried over from previous plan
Purchase NOAA All Hazards radios		Individual municipal Boards in conjunction with the County Local Emergency Planning Committee	Continual Program	
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 shelters 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	County Emergency Management Director will coordinate with each municipal board or their designee	2007-2008	Completed
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 along with City, Town and Village staff and resources	County Emergency Management Director coordinating with City, Town and Village Clerks	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 City, Town and Village staff and resources	County Emergency Management Director and County Highway Commissioner coordinating with City, Town and Village Clerks	2016	Deferred from previous plan, project was not budgeted for in either Highway or Emergency Management department
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	City, Town or Village Board or designee	2014-2015	Deferred due to prioritization of projects within Highway department

Mitigation Action or Project	Funding Source(s)	Responsible Official or Organization	Project Timetable	Comments
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	2015-2016	Deferred: Need to consult with UW-Extension office; propose cooperative effort

Individual Municipal Projects

The following is a list of Multi-Hazard Mitigation Actions and Projects which individual municipalities have identified.

Table 4-4 Municipal Specific Hazard Mitigation Actions or Projects

Mitigation Action or Project	Responsible Official or Organization	Project Timetable	Comments
Flooding, Storm water Drainage, and Dam Hazards Actions and Projects			
Town of Alma – Culvert improvement	Town Board	2016-2017	Deferred
Town of Alma – Rehab Ebersoll bridge	Town Board	2016-2017	Deferred
Town of Belvidere – Conduct hydraulic shadow mapping on Rose Valley Dam	Town Board	2016-2017	Deferred
Town of Buffalo – Increase culvert size and improve road ditching	Town Board		Ongoing
Town of Canton – Remove silt from ditches	Town Board		Ongoing
Town of Cross – Perform maintenance and erosion control on 2 dams on River Road	Town Board	2016	Deferred
Town of Cross – Rehab 2 culverts on Mustang Road	Town Board	2017	Deferred
Town of Dover - Culvert maintenance and replacement	Town Board	2022	New Project
Town of Dover – Bridge maintenance and repair	Town Board	2022	New Project
Town of Lincoln – Bridge replacement	Town Board	2017-2018	Deferred
Town of Modena – Hansen Bluff Road, replace culvert and raise the road	Town Board	2017-2019	Deferred
Town of Milton – Bridge improvements and maintenance	Town Board	Annually	New Project
Town of Milton – Culvert replacements	Town Board	2021	New Project
Town of Montana – Streambank restoration	Town Board		New Project
Town of Montana - Floodplain mapping	Town Board	2021-2023	New Project
Town of Waumandee – Raise Fimian Road	Town Board		Deferred
Village of Cochrane – Add second water line under railroad tracks to ensure continuous water supply	Village Board	2020	Deferred
Village of Cochrane – Update water and sewer lines as streets are improved	Village Board		Continuing project from previous plan, some lines have been updated

Village of Nelson – Stormwater management – maintenance and repair of structures	Village Board		New Project
City of Fountain City – Raise Siebenaler road to prevent road flooding	City Board		New Project
City of Fountain City – Install culverts on Baertsch Valley Road to prevent flow	City Board		New Project
City of Fountain City – Purchase generators and pumps	City Board		Deferred, generator purchased but still need pumps
City of Fountain City – Purchase electronic road closure and warning signs	City Board		Deferred
City of Fountain City – Develop evacuation plan	City Board		Deferred
City of Fountain City – Televise sewer lines and develop replacement/repair plan	City Board		Deferred
City of Fountain City - Add additional stormwater drainage ditches	City Board		Deferred from previous plan
City of Fountain City - Upgrade existing sewer plant to handle additional flow during flooding	City Board		Deferred from previous plan
Hail, Lightning, Thunderstorm and Fog Hazard			
Town of Modena – Install town wide severe weather warning system	Town Board		Deferred
City of Fountain City – Install city wide severe weather warning system	City Mayor		Deferred from previous plan
City of Fountain City – Improve/upgrade city's communication capabilities	City Board		Deferred
City of Mondovi – Lightning protection on city buildings	City Mayor		Deferred
Tornadoes and High Winds			
Town of Buffalo – Install steel roofing on all town buildings	Town Board		New Project
Town of Buffalo – Assess and remove tree subject to impede roadways or houses in the event of high wind conditions	Town Board		New Project
Town of Buffalo – Install storm warning siren at Town Hall and community Park	Town Board		Deferred
Town of Buffalo – Purchase all weather radios for Town Supervisors and Officers	Town Board		Deferred
Town of Buffalo – Modify town hall to serve as a storm shelter	Town Board		Deferred
Town of Buffalo – Purchase backup generator for Town Hall	Town Board		Deferred
Town of Dover - Purchase backup power generator	Town Board	2021-2022	New Project
Town of Modena – install a hookup for a generator at the Town Hall	Town Board		Deferred
Town of Modena – Have a planning area for central command center to meet citizen needs	Town Board		New Project
City of Fountain City – Install and purchase a storm warning siren system	City Fire Department		New Project
City of Fountain City – Construct safe room for mobile home park	City Board		Deferred
City of Fountain City – Develop a debris plan	City Board		Deferred
Extreme Cold and Heat Event			

Town of Buffalo – consider adoption of Town Hall as a shelter	Town Board		New Project
Town of Lincoln – Develop a call/email list of town residents	Town Board	2017	Deferred
Town of Naples – Install air conditioning in Town Hall so that it can be used as a shelter during extreme heat events	Town of Naples Town Board	2008 – 2009	Deferred from previous plan
Town of Modena – Install air conditioning at Town Hall	Town Board		Deferred
City of Fountain City – Purchase backup generator for water plant	City Mayor		Deferred from previous
City of Fountain City – Update auditorium to include showers, cots, blankets and other items needed during these events so that the auditorium can be used as a safe place to go	City Mayor		Deferred from previous plan
City of Fountain City – Develop a calling tree with local organizations	City Mayor		Deferred
City of Mondovi – Improve electrical services at Marten Center so that a backup generator can be hooked up to power the center	City Mayor		Deferred
Forest and Wildland Fire			
Town of Buffalo – Reroof park building and Town Hall with metal non-combustible material	Town Board		*Completed*
Town of Buffalo – Remove dead and dying trees including removal of roadside brush	Town Board		New Project
Town of Lincoln – Replace Fire Brush buggy	Town Board		Deferred
Town of Modena – Increase fire protection with equipment, personnel, and training	Town Board		New Project
Town of Montana – Prevent pine tree planting close to roadways	Town Board		New Project
City of Fountain City – Develop evacuation plan	City Mayor		Deferred from previous plan
City of Fountain City – Add a new well	City Mayor		Deferred from previous plan
City of Fountain City - Purchase a firefighting truck with water tank and pump	City Fire Department		New Project
City of Fountain City – Purchase a gator for accessing fires on hillsides within the city.	City Mayor		Deferred
Heavy Snow and Ice Storms and Blizzard			
Town of Alma – Purchase new snowplow truck with a wing	Town Board	2018	Deferred
Town of Belvidere – Create payment for farmers along Belvidere Ridge to leave crop (4-6 rows) up to prevent drifting	Town Board	Ongoing	New Project
Town of Buffalo – replace dead and dying trees in town which act as a living snow fence	Town Board		Ongoing
Town of Buffalo – Create a road maintenance agreement with provider that follows "if it is slick" scrape and sand.	Town Board		New Project
Town of Dover – Create structure to house sand	Town Board	2022	New Project
Town of Mondovi – Purchase snow plow	Town Board	2017	Deferred from previous
Town of Mondovi – Purchase high quality, durable cover for the	Town Board	2016	

City of Fountain City – Purchase together with the Village of Cochrane - additional larger snow removal equipment to be shared between	City Mayor		Deferred
City of Mondovi – Purchase skid steer to remove heavy snow	City Mayor		Deferred
Earthquake, Landslide and Subsidence			
City of Fountain City – Monitor and mitigate potential threats from rock ledge overhanging River Road			New Project
Agricultural and Drought			
Town of Buffalo – Develop a long-range plan for water storage	Town Board		Deferred
City of Fountain City - Develop a drought water ordinance that would go into effect during periods of drought	City Board		Deferred from previous plan
Train Derailment			
City of Fountain City – Purchase a larger bobcat to assist in debris removal	City Board		Deferred
City of Fountain City – Additional training for emergency response personnel	City Board		Deferred
City of Fountain City – Upgrade crossing gates within the city	City Board		Deferred
River Traffic			
City of Alma – Install fire hydrant on river side of railroad tracks near lock and dam	Lock Master with the City Board		Deferred
City of Alma – Additional training for emergency response personnel in conjunction with Lock and Dam personnel	Lock Master with local first responders		Deferred
City of Alma – Develop an emergency notification system for notifying city residents in the event of an anhydrous ammonia leak on a tow	City Board		Deferred

Buffalo County Plan Maintenance and Adoption Action Plan

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

Table 4-5 Buffalo 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 Director	Annually	See Chapter 5
Post disaster Multi-Hazard Mitigation Plan review and comment period for plan stakeholders	Existing County staff resources	County Emergency Management Director 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 Director 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 Director in cooperation with County, City, Village and Town Officials	After plan modification	See Chapter 5

APPENDIX – A

Survey Mailing Lists

Each member of the Local Emergency Planning Committee (LEPC) also received surveys at the meeting and were encouraged to fill it out. Table A-1 lists the members of the LEPC.

Table A-1 Risk Assessment Survey Mailing List

Name	*Representing*	*Name*	*Representing*
Thomas Huber	Alma Town Chairman	Alan Norby	Mondovi Town Chairman
Ron Speltz	Belvidere Town Chairman	Jimmy Ellis	Montana Town Chairman
Steve James	Buffalo Town Chairman	Dennis M. Olson	Naples Town Chairman
Tony Poeschel	Canton Town Chairman	Brad Mikelson	Nelson Town Chairman
Leonard Litscher	Cross Town Chairman	Rick Reuter	Waumandee Town Chairman
Dean Hestekin	Dover Town Chairman	David Busch	Cochrane Village President
Jamey Davis	Gilmanton Town Chairman	Brian Glass	Nelson Village President
Cletus Foegen	Glencoe Town Chairman	Leighton Wilkie	Alma Mayor
Bruce Auseth	Lincoln Town Chairman	Kevin Mack	Buffalo City Mayor
Dan Weisenbeck	Maxville Town Chairman	Gwen Katula	Fountain City Mayor
Ben Adank	Milton Town Chairman	Brady Weiss	Mondovi Mayor
Dale D. Klopp	Modena Town Chairman		

Table A-2 Municipal Survey Results

Municipality	Risk Assessment Survey		Mitigation Projects Survey		
	Received Survey	Returned Survey	Received Survey	Mailed Survey Back	Replied by individual meeting
T. Alma	X		X	X	
T. Belvidere	X	X	X	X	
T. Buffalo	X	X	X	X	X
T. Canton	X	X	X		X
T. Cross	X	X	X	X	
T. Dover	X		X	X	
T. Gilmanton	X		X	X	
T. Glencoe	X	X	X	X	
T. Lincoln	X	X	X	X	
T. Maxville	X	X	X	X	
T. Milton	X	X	X	X	
T. Modena	X	X	X	X	
T. Mondovi	X	X	X	X	
T. Montana	X	X	X	X	
T. Naples	X		X	X	
T. Nelson	X		X	X	
T. Waumandee	X		X	X	
V. Cochrane	X		X	X	
V. Nelson	X	X	X		
C. Alma	X	X	X		X
C. Buffalo City	X		X		X
C. Fountain City	X	X	X		X
C. Mondovi	X		X		X

APPENDIX - B

Storm Events Data Tables

Table B-1 Hailstorm History and Frequency

1960's:	0 reported events by NCDC
1970's:	4 reported events by NCDC -7/16/72, 07/03/73, 7/29/73, 6/05/77, .75 to 4" size hailstorm
1980's:	6 reported events by NCDC –7/09/84, 7/04/85,5/23/89, 5/29/89 (twice), 8/04/89, .75" to 1.75" size hailstorm
1990's:	25 reported events by NCDC – (8/09/90 Buffalo County), (8/29/90 Buffalo County twice), (4/30/94 WIZ-032-033-035), (8/13/95 Cochrane), (5/19/96 Nelson), (8/25/96 Maxville), (8/26/96 Mondovi), (9/10/96 Montana), (7/1/97 Mondovi twice- $10,000 PD), (7/17/97 Alma), (7/17/97 Nelson- $10,000 PD), (8/23/97 Waumandee- $25,000 CD), (8/23/97 Fountain City-$25,000 PD), (9/1/97 Montana- $25,000 CD), (3/29/98 Cochrane $10,000 PD), (3/29/98 Alma), (3/29/98 Nelson), (5/28/98 Nelson- $15,000 CD), (6/24/98 Cochrane- $10,000 PD), (6/24/98 Alma), (9/26/98 Mondovi- $15,000 CD), (6/5/99 Nelson- $25,000 CD) .75" to 2.00" size hailstorm
2000's:	48 reported events by NCDC – (8/26/00 Alma- $8,000 PD), (8/26/00 Buffalo City), (9/10/00 Fountain City), (9/10/00 Montana-$10,000 CD), (9/10/00 Mondovi- $3,000 CD), (9/11/00 Fountain City- $5,000 PD), (5/1/01 Bluff- $1000), (5/9/01 Nelson), (5/9/01 Montana-$2,000 PD), (6/11/01 Mondovi- $1,000 PD), (6/11/01 Nelson), (6/11/01 Buffalo City- $1,000 PD), (6/11/01 Fountain City), (6/16/01 Nelson- $2,000 PD), (6/17/01 Buffalo City), (6/17/01 Buffalo City - $1,000 PD) (6/17/01 Fountain City- $6,000 PD), (6/18/01 Mondovi- $1,000 PD), (6/18/01 Nelson), (6/18/01 Cochrane- $1,000 PD), (4/18/02 Gilmanton), (5/8/02 Fountain City- $1,000 PD), (5/26/02 Mondovi), (7/28/02 Mondovi), (7/30/02 Buffalo City- $1,000 PD), (9/29/02 Mondovi), (9/30/02 Waumandee twice- $1,000 PD $3,000 CD), (7/31/03 Mondovi- $1,000 PD), (5/9/04 Nelson), (5/9/04 Montana), (6/23/04 Mondovi), (6/7/05 Waumandee), (6/11/05 Alma), (8/9/05 Mondovi), (8/24/06 Mondovi- $2,000 PD $8000 CD), (8/24/06 Maxville), (8/24/06 Alma- $2,000 CD), (8/24/06 Modena twice), (4/30/07 Alma), (8/11/07 Garden Valley), (9/21/2007 Fountain City - $3,000 PD), (5/25/2008 Mondovi), (6/7/2008 Nelson), (7/10/2008 Fountain City), (7/11/2008 Cochrane), (4/24/2009 Mondovi) .75'' to 1.75'' size hailstorm
2010's:	29 Reported events by NCDC – (6/25/2010 Buffalo City), (9/26/2010 Gilmanton); (4/10/2011 Nelson); (4/10/2011 Mondovi); (5/26/2012 Nelson); (5/26/2012 Tell-$3,500 PD), (5/31/2013 Fountain City), (5/31/2013 Waumandee); (8/6/2013 Nelson); (7/7/2014 Modena), (6/29/2015 Montana); (7/13/15 Glencoe); (4/9/17 Buffalo City); (4/9/17 Montana); (5/15/17 Fountain City); (5/16/17 Gilmanton); (6/16/17 Cochrane); (6/16/17 Fountain City); (6/16/17 Waumandee $425,000 PD $664,000 CD); (6/16/17 Montana $10,000 PD $338,000 CD); (7/6/17 Buffalo City $34,000 PD $266,000 CD); (7/6/17 Fountain City); (7/6/17 Dodge $13,000 PD $266,000 CD); (6/30/18 Buffalo City); (8/1/18 Gilmanton); (8/5/19 Nelson $30,000 PD $23,000 CD); (8/5/19 Alma $60,000 PD $23,000 CD) 0.75" to 2.00" size hailstorms
2020's:	1 Reported event by NCDC – (6/2/20 Dodge $115,000 PD $3,000 CD)

PD = Property Damage and CD = Crop Damage

Table B-2 Thunderstorm History and Frequency

1960's	1 reported event by NCDC – 6/19/63

1970's:	6 reported events by NCDC- (5/21/70), (7/01/70), (7/29/70), (6/20/74- twice), (7/3/79) One recorded magnitude of 52 knots.
1980's:	10 reported events by NCDC – (7/15/80), (6/14/81), (7/25/82), (7/3/83- twice), (7/19/83 twice), (4/27/84), (7/15/86), (8/17/86). Magnitude of winds for these events ranged from 52 knots to 70 knots.
1990's:	38 reported events by NCDC- (6/13/91), (6/17/92), (5/10/93 Gilmanton), (8/18/93 Fountain City – twice- $10,000 CD), (5/30/94 Mondovi- $1,000 CD), (8/12/95 Mondovi), (5/19/96 Nelson $85,000 PD), (5/19/96 Alma), (6/29/96 Mondovi), (8/7/96 Alma- $5,000 PD), (8/7/96 Fountain City), (8/25/96 Mondovi), (1/16/97), (4/5/97 Buffalo City- $8,000 PD), (6/28/97 Mondovi- $1,000 PD), (6/28/97 Alma- $3,000 PD, $1,000 CD), (8/15/97 Fountain City- $8,000 PD), (9/1/97 Montana- $12,000 PD), (5/15/98 Fountain City- $10,000 PD), (5/30/98 Alma- $17,000 PD), (5/30/98 Cochrane- $40,000 PD), (6/25/98 Mondovi- $5,000 PD), (6/26/98 Nelson- $30,000 PD), (6/26/98 Mondovi-twice- $56,000 PD $70,000 CD), (6/27/98 Buffalo City- $3,000 PD $2,000 CD), (6/27/98 Cochrane- $2,000 PD $1,000 CD), (6/27/98 Fountain City- $6,000 PD $1,000 CD), (8/9/98 Fountain City - $2,000 PD), (11/10/98 - $1,700,000 PD), (6/5/99 Alma- $80,000 PD), (6/5/99 Lookout- $50,000 PD), (6/5/99 Mondovi- $60,000 PD), (6/6/99 Mondovi- twice- $40,000 PD), (6/6/99 Buffalo City- $5,000 PD), (6/6/99 Maxville- $25,000 PD). Magnitude of winds for these 38 events ranged from 50 knots to 81 knots. (TOTAL: $2,194,000 PD, $86,000 CD)
2000's:	30 reported events by NCDC – (6/10/00 Mondovi- $1,000 PD), (7/9/00 Fountain City- $3,000 PD), (4/7/01- $12,000 PD), (6/17/01 Mondovi), (6/17/01 Buffalo City), (10/25/01), (5/8/02 Urne- $1,000 PD), (5/8/02 Modena- $6,000 PD), (6/25/02 Alma), (7/21/02 Cream), (7/28/02 Nelson- $1,000 PD), (9/2/02 Alma- $1,000 PD), (6/23/04 Montana- $12,000 PD), (6/11/05 Fountain City- $1,000 PD), (6/20/05 Nelson), (7/23/05 Nelson- $10,000 PD), (8/9/05 Nelson $1,000 PD $3,000 CD), 7/19/06 Waumandee- $1,000 PD), (8/24/06 Mondovi- $3,000 PD $3,000 CD), (8/24/06 Modena- $2,000 PD $3,000 CD), (8/24/06 Nelson), (5/23/07 Urne - $1,000 PD), (5/23/07 Mondovi $1,000 PD), (6/7/07 Montana - $750 PD), (8/11/07 Buffalo City - $2,500 PD), 8/13./07 Mondovi - $500 PD), (7/10/08 Mondovi - $1,000 PD), (7/10/08 Buffalo City), (7/25/08 Nelson), (5/13/09 Cochrane - $500 PD). Magnitude of winds for these 30 events ranged from 50 knots to 70 knots) (TOTAL: $62,250 PD, $9,000 CD)
2010's	27 reported events by NCDC – (6/17/10 Fountain City - $2,000 PD), (6/25/10 Alma - $2,000 PD), (7/14/10 Waumandee - $12,000 PD), (7/14/10 Buffalo City - $1,000 PD), (7/24/10 Mondovi - $35,000 PD), (8/13/10 Nelson - $2,000 PD), (5/5/12 Alma - $20,000 PD), (8/15/12 Fountain City - $3,000 PD), (5/19/13 Cochrane - $15,000 PD), (5/19/13 Gilmanton - $12,000 PD), (6/21/13 Mondovi - $3,000 PD), (7/18/15 Buffalo City - $10,000 PD), (7/18/15 Fountain City - $500 PD), (7/5/16 Maxville - $7,000 PD), (7/5/16 Alma - $15,000 PD), (7/5/16 Mondovi - $2,000 PD), (3/6/17 Mondovi - $500 PD), (6/16/17 Fountain City - $1,000 PD), (7/18/17 Fountain City - $1,000 PD), (7/19/17 Alma - $3,000 PD), (6/17/18 Glencoe - $5,000 PD), (7/12/18 Mondovi - $3,000 PD), (9/20/18 Alma - $2,000 PD), (7/4/19 Mondovi - $12,000 PD $5,000 CD), (9/24/19 Alma - $2,000 PD), (9/24/19 Modena - $2,000 PD) (Magnitude of winds for these 27 events ranged from 50 knots to 61 knots) (TOTAL: $173,000 PD, $5,000 CD)
2020's	1 reported event by NCDC (5/26/20 Fountain City - $2,000 PD)

PD = Property Damage and CD = Crop Damage

Table B-3 Tornado/High Winds History and Frequency

1950's:	2 reported events by NCDC – (5/10/53- $2,500,000 PD, F4), (5/5/59, FO).
1960's:	3 reported events by NCDC – (6/28/60- $25,000 PD, F2), (5/23/64- $25,000 PD, F1), (6/20/64, F1).

1970's:	0 reported events by NCDC
1980's:	4 reported events by NCDC – (6/14/81- Hurricane force winds), (5/17/82- 3 Injuries, $2,500,000 PD, F2), (4/27/84- Hurricane force winds), (6/17/84- $3,000 PD, F0).
1990's:	8 reported events by NCDC – (9/9/90 $ 2,500,000 PD, F1), (10/08/92- $25,000 PD, F0), (5/19/1996 Nelson- 2 injuries, $85,000 PD), (5/19/96 Alma) (3/29/98 Maxville, F0), (5/15/98 Mondovi- $20,000 PD, F0), (11/10/98 High winds- $1,700,000 PD for entire area), (7/8/99 Mondovi- $1,000,000 PD $35,000 CD, F1).
2000's:	3 reported events by NCDC- (4/7/01 High winds - $1,500 PD), (6/11/2001 Urne- $3,500 CD, F0), (10/25/01 High winds).
2010's	2 reported events by NCDC – (6/17/10 Cream - $208,000 PD Magnitude EF1), (10/26/10 High winds - $4,000 PD for whole entire area), (7/5/16 Cream - $260,000 PD Magnitude EF1), (7/5/16 Garden Valley - $235,000 PD Magnitude EF1)

PD = Property Damage and CD = Crop Damage

Table B-4 Riverine/Flash Flooding History and Frequency

1950's:	No information Available from NCDC
1960's:	1965 Historical high-water marks along the Mississippi River
1970's:	5 reported events by Wisconsin Emergency Management: 1971, (1973- Presidential Disaster Declaration), 1975, (1975-Presidential Disaster Declaration), (1978 Presidential Disaster Declaration).
1980's	1 reported event by Wisconsin Emergency Management: 1980. 5 reported events by NCDC: (2/21/94 Dodge), (3/7/94 Dodge), (3/13/95), (4/3/97 Buffalo and 5 other counties- $1,000,000 PD), (8/23/97 Fountain City- $35,000 PD).
1990's:	2 reported events by Wisconsin Emergency Management: 1992, 1993. 6 reported events by NCDC: (2/21/94 Dodge), (3/7/94 Dodge), (3/13/95), (4/3/97 Buffalo and 5 other counties- $1,000,000 PD), (8/23/97 Fountain City- $35,000 PD), (6/26/98 Alma- $13,000 PD),
2000's:	10 reported events by NCDC: (4/10/2001 multi-county area- $6,500,000 PD), (5/1/01 Multi-county area- $7,500,000 PD), (6/17/01 West Portion- $3,000 PD), (6/25/02 Modena - $4,500 PD), (5/9/04 North Portion of County PD $5,000), (3/13/07 Dodge), (7/22/07 Buffalo City PD $3,000), (7/22/07 Mondovi PD $10,000 CD $1,000), (8/8/09 Mondovi - $1,200 PD, $16,000 CD), (8/14/09 Mondovi - $10,000 PD).
2010's:	11 reported events by NCDC: (6/25/10 Fountain City), (6/25/10 Alma - $150,000 PD), (8/13/10 Waumandee - $50,000 PD), (8/13/10 Praag & Trevino - $113,000 PD), (8/31/10 Tell), (9/23/10 Garden Valley - $10,000 PD), (8/11/16 Mondovi – $4,180,000 PD), (8/11/16 Urne - $500,000 PD), (8/19/16 Mondovi), (7/19/17 Buffalo City - $500,000 PD $2,900,000 CD), (6/18/18 Gilmanton - $2,000 PD)
2020's:	1 reported event by NCDC: (6/9/20 Cochrane - $10,000 PD $8,000 CD)

PD = Property Damage and CD = Crop Damage

Table B-5 Heavy Snowstorm History and Frequency

1990's:	3 reported events by NCDC – 1/18/96; 3/24/96; 1/24/97
2000's:	6 reported events by NCDC – 1/2/00; 1/12/00; 12/14/05; 11/10/06; 1/14/07; 3/21/08.
2010's	9 reported events by NCDC - 12/3/10; 3/4/13; 5/2/13; 1/14/14; 12/10/16; 4/3/18; 1/27/19; 2/2/19; 12/30/19
2020's	1 reported event by NCDC - 2/9/20

Table B-6 Ice Storm History and Frequency

1970's:	1 event reported by Wisconsin Emergency Management – 3/76, devastating ice storm, $8.5 million-Public Gov't Property and Facilities Damage and $42 million Private-Individual Property, Crop and Facilities Damage to Buffalo and 21 other counties, *Presidential Disaster Declaration*.
1990's:	3 events reported by NCDC – (1/26/94 heavy snow/ice storm); (12/13/95 glaze); (1/4/98 Buffalo & 11 other counties, $67,000 PD, 14 injuries)
2000's:	3 events reported by NCDC – 1/29/01; 2/24/01; 1/1/05
2010's	1 reported event – 4/11/13

Table B-7 Blizzard History and Frequency

1990's:	1 event reported by NCDC – 1/26/96
2000's:	1 event reported by NCDC – 2/24/07
2010's:	1 event reported by NCDC – 1/23/19

Table B-8 Extreme Cold History and Frequency

1990's:	3 reported events by NCDC: 2/10/95, 12/9/95, 1/16/97 wind chills of 30-50 below zero
2000's:	4 reported events by NCDC: 2/2/07, 1/29/08, 2/10/08, 1/14/09
2010's	3 reported events by NCDC: 1/5/14, 1/27/14, 1/29/19

Table B-9 Extreme Heat History and Frequency

1990's:	6 reported events by NCDC: (7/13/95 -57 deaths in state), 7/30/95, 10/12/95, 7/4/99–7/5/99, 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:	5 reported events by NCDC: 7/17/11, 7/2/12, 7/21/16, 6/29/18, 7/19/19

Table B-10 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 Buffalo 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, which 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 events reported by NCDC
2000's:	No events reported by NCDC
2010's:	2 events reported by NCDC, 1/1/17, 2/1/14

Table B-11 Railroad History and Frequency

1980's:	9 accidents reported by the Federal Railroad Administration: 1980, derailment with 8 hazmat cars either derailed or damaged - $222,000 total damage; 1981 two derailments and one fire - $379,000 total damage; 1982 one derailment and one raking collision - $6,200; 1983 two derailments - $31,000 total damages; 1985 one derailment $41,000 total damages.

1990's:	6 accidents reported by the Federal Railroad Administration: 1991 one derailment and obstruction impact - $1,130,000 total damages; 1992 one fire - $8,000 total damages; 1993 one derailment - $23,000 total damages; 1996 one derailment - $226,000 total damages; 1997 one raking collision - $6,500 total damages.
2000's:	2 accidents reported by the Federal Railroad Administration: 2001 one derailment - $64,000 total damages; 2009 one obstruction impact – total damages $41,000.
2010's:	1 accident reported by the Federal Railroad Administration: 2015 one derailment, 13 hazmat cars derailed or damaged with 5 releasing contents. Partial evacuation in the City of Alma - $2,110,000 total damages.

Source: Federal Railroad Administration, Office of Safety Analysis

APPENDIX – C

Risk Assessment Survey

MEMORANDUM

Date:	March 24, 2021
To:	All chief elected officials of local governments of Buffalo County and Emergency Response Personnel
From:	Bruce Fuerbringer, Emergency Management Director
Subject:	Buffalo County Hazard Mitigation Information

Buffalo County is in the process of updating the existing Buffalo County Hazard Mitigation Plan. A Hazard Mitigation Plan is a 5-year plan that describes the hazards that occur in Buffalo County and lists strategies, goals, and projects which eliminate or minimize the loss of life or structures in the event of a hazard occurring. The plan covers 19 different natural hazards, i.e. tornadoes, hail, severe winds, flooding, extreme heat or cold, drought, snowstorms, etc. and 2 manmade hazards, trains and barges.

We are asking for your assistance with the update by completing the two enclosed surveys. The first is the Risk Assessment Survey which asks you to rate on a Low, Medium, or High level how the different hazards affect your community. The second survey is intended to provide potential mitigation projects that will eliminate or minimize the loss of life or structures in the event of a hazard occurring.

Identifying a project in the survey will be interpreted as something needed to meet a local need and not as a commitment to undertake it. Projects you list have the potential to become eligible for funding from Federal and State grant programs. Requirements for most Federal and State grant programs often include the listing of projects in an approved hazard mitigation plan. Some examples of potential projects are the raising of roads or increased culvert sizes on roads that flood in early spring cutting off residents or emergency response vehicles. Other potential needs would be severe weather shelters; update ordinances regarding building construction, additional flood warning, or flood insurance. These are only a few of the possible mitigation ideas. Additional ideas can be found on the project survey. Please do not limit your ideas to the ones provided.

If you have any questions or would like additional information, please contact me at (608) 685-6298 or Abbey Nicewander with the Mississippi River Regional Planning Commission at (608) 785-9396. Abbey is also available to meet with your municipality for further explanation if necessary.

Thank you for your time in this manner.

Bruce Fuerbringer

BUFFALO 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 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 Lighting Storms will probably have a medium harmful affect on your community in comparison to the other hazards listed. This survey is one of the methods Buffalo 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 either 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 affect on health and public safety in your community 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 affect on health and public safety in your community 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 affect on health and public safety in your community in comparison to the other hazards listed in column one.
Hail Storms			
Lightning Storms			
Thunderstorms			
Tornado/High Winds			
Flash Flooding			
Riverine Flooding			
Lake Flooding			
Stormwater Flooding			
Dam Failure Flooding			
Forest Fires			
Wildland Fires			
Coastal Hazards			
Heavy Snow Storm			
Ice Storm			
Blizzard			
Extreme Cold			
Earthquake			
Extreme Heat			
Agricultural			
Drought			
Fog			
Landslide			
Subsidence			
Pandemic Flu			
Railroads			
River Traffic / Cargo			

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 Bruce Fuerbringer Buffalo County Emergency Management Director, Buffalo Emergency Management Office, 407 S. 2nd Street, PO Box 494 Alma, Wisconsin 54610 **by June 7, 2021.**

Buffalo County All-Natural Hazards Mitigation Project Need Survey

Buffalo County is updating the Buffalo County Multi- Hazards Mitigation Plan 2021-2025. A key part of this plan is the identification of policies, programs and projects from throughout the county that will reduce losses from future natural hazards. 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.			
d.			

2. Does your local unit of government or organization you represent have any hail, thunderstorm, lightning or 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.			
d.			

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.			
d.			

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.			
d.			

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.			
c.			
d.			

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.			
c.			
d.			

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.			
c.			

d.			

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.			
c.			
d.			

Please return this survey to Bruce Fuerbringer Buffalo County Emergency Management Director, Buffalo Emergency Management Office, 407 S. 2nd Street, PO Box 494 Alma, Wisconsin 54610 by **June 7, 2021.**

APPENDIX – D

Public Hearing Notice

NOTICE OF PUBLIC HEARING

ON 2021-2025 All-Hazards Mitigation Plan

Notice is here by given that the Local Emergency Planning Committee will hold a public hearing on October 27th, 2021 at 1 pm **in the Third Floor Board Room, Buffalo County Courthouse, Alma, Wisconsin, at which time the following will be heard:**

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, Buffalo 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. An online version can be found at https://bit.ly/3Er5tbu. For those individuals who cannot attend this meeting and want to provide written comments, please submit them by October 25th, 2021, to: Lucas Teska, Buffalo County Emergency Management Director, 407 S. 2nd St. Alma, WI 54610."

Lucas Teska

Buffalo County Emergency Management Director

County of Buffalo
Alma, Wisconsin
Notice of Public Meeting

Committee:	**Buffalo County Local Emergency Planning Committee**
Date:	**Thursday, August 26, 2021**
Time:	**2:00 PM**
Location:	~~**Second Floor Conference Room, Emergency Operations Center**~~ **3rd Floor County Board Room** Click here to join the meeting

Meeting Agenda ~ Amended

1. Call to Order/Roll Call	**2:00 p.m.**
2. Approval of Minutes: January 21, 2021	
3. Citizen Comments Regarding Posted Agenda Items	
4. Review/Discussion/Action: LEPC Financial Report	
5. Review/Discussion/Action: 2021 Budget Proposal	
6. Review/Discussion/Action: Hazard Mitigation Plan Update	
7. Review/Discussion/Action: Spill Report	
8. Review/Discussion/Action: Introduction of new Emergency Management Director	
9. Review/Discussion/Action: LEPC Member Reports	
10. Review/Discussion/Action: LEPC Chair Report	
11. Establish Next Meeting Date and Identify Specific Agenda Items	
12. Adjournment	
DATE NOTICE WAS EMAILED, MAILED AND POSTED:	**August 16 , 2021**

NOTICE SENT TO: Mailed: Committee Members; **Emailed:** County Clerk's Office, Brommerich News Service, Alma City Clerk, Buffalo City Clerk, Fountain City Clerk, Mondovi City Clerk

BOARD MEMBERS: If unable to attend, please contact the Chairperson or the Administration Office.

PERSONS WITH DISABILITIES: If you require special accommodations in order to attend this meeting, please contact the County Administration Office at (608) 685-6234.

PUBLIC ACCESS TO BUFFALO COUNTY COURTHOUSE: The SOUTH Entrance will be the only access to the courthouse building after 4:30 p.m.

MEETING CALLED BY:	**Tom Hentges**
	Chair, Buffalo County Local Emergency Planning Committee Signed: _____ Bruce A. Fuerbringer, LEPC Emergency Coordinator

MISSISSIPPI RIVER REGIONAL PLANNING COMMISSION
1707 Main Street, Suite 435
La Crosse, WI 54601
Phone: (608) 785-9396
Email: plan@mrrpc.com
Website: mrrpc.com

MISSISSIPPI RIVER REGIONAL PLANNING COMMISSION
BIMONTHLY MEETING NOTICE AND AGENDA (Revised)
10:00 AM, Wednesday, December 11, 2019 at AmericInn,1835 Rose Street, La Crosse, WI 54601

< MRRPC BIMONTHLY MEETING AGENDA >

1. Roll call and guest introductions
2. Decision on October 9, 2019 Bimonthly Meeting Minutes
3. Decision on Treasurer's Report: (a) October 2019 and November 2019 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, (6) Disaster Recovery Microloan Fund. VB/GF
4. Presentation on USDA-Rural Development Administration programs by a Frank Frassetto, Wisconsin Director of USDA-Rural Development.
5. U.S. Department of Commerce – Economic Development Administration Performance review preparation for February 12, 2020 meeting. DB
6. Update on submission of an EDA grant application to fund economic recovery planning, engineering and administration activities for the communities of Ontario, La Farge, Viola and Readstown with MRRPC serving as the applicant and grant administrator. GF
7. Report on Disaster Recovery Microloan Program Lending to Businesses. And Decision on Per Diems for CMV Board members for participating in review of 16 loan applications. SO
8. Report on status City of Mondovi and City of Westby Federal EDA Industrial Park Grant Applications. AN
9. Decision resolution regarding the Wisconsin DOT planning grant work program. DB
10. Report and acceptance of Executive and Administrative Committee minutes and announcement of new Executive Director, and new Senior Planner: GF
11. Decision on Federal Grant Policies and Procedures Manual. GF
12. Decision on check signing authority.GF
13. Status of hiring new Senior Planner.GF
14. Commissioners' questions and comments on the following projects or subjects listed in the written staff report:
    a. Trempealeau County Hazard Mitigation Plan. DB
    b. Monroe County Hazard Mitigation Plan. DB
    c. Jackson County Hazard Mitigation Plan Contract. DB
    d. La Crosse County Hazard Mitigation Plan Contract. DB
    e. Scenic Mississippi Regional Transit (SMRT) bus serving Crawford, Monroe, La Crosse and Vernon counties. DB
    f. La Crosse County Outdoor Recreation Plan. DB
    g. Report on the Wisconsin Department of Administration's proposed Community Development Block Grant (CDBG) Close Grant program. GF
    h. Buffalo County Hazard Mitigation Grant submittal DB
15. Old Business
16. New Business
17. 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	Vacant	Vacant
Crawford County	**Monroe County**	**Trempealeau County**
Greg Russell	Sharon Folcey	Margaret Baecker
Gerald Krachey	James Kuhn	Ernest Vold
James Czajkowski	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, Senior Planner
Greg Flogstad, Director
Abbey Nicewander, Senior Planner
Sarah Ofte, Administrative Assistant

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