

# Vernon County Multi-Hazards Mitigation Plan 2023-2027



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

Draft

## ABSTRACT

### VERNON COUNTY MULTI-HAZARDS MITIGATION PLAN 2023-2027

**Plan Purpose:** This plan's purpose is 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 Public Safety 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 to write the plan and facilitate public meetings.

**Plan Contact Information:** Brandon Larson, Vernon County Emergency Management Director  
Emergency Management Department  
400 Courthouse Square Suite 201  
Viroqua, WI 54665  
brandon.larson@vernonCounty.org  
Telephone: 608-637-5266

Mississippi River Regional Planning Commission  
1707 Main Street, Suite 435  
plan@mrrpc.com  
La Crosse, WI 54601  
Telephone: 608-785-9396

Draft

# Table of Contents

1.0 VERNON COUNTY MULTI-NATURAL HAZARDS MITIGATION PLANNING PROCESS .....	1
Disaster Mitigation Act of 2000-DMA2K.....	1
Plan Committees and Organizations.....	1
Public Involvement .....	2
Incorporated Plans, Studies, Reports, and Technical Data .....	4
Funding for the Vernon County All Hazards Mitigation Plan.....	4
Plan Contents.....	4
2.0 VERNON COUNTY PLANNING AREA.....	6
General Geography.....	6
Driftless Area.....	6
County Landscape.....	6
Demographic and Economic Profile.....	7
Table 2-1 Vernon County Population and Land Area Data .....	7
Table 2-2 Vernon County Housing and Housing Units Per Square Mile .....	8
Table 2-3 Employment by Industry.....	10
Table 2-4 Prominent Vernon County Employers .....	11
General Development Pattern .....	11
Table 2-5 Vernon County Land Use .....	12
3.0 VERNON COUNTY RISK ASSESSMENT .....	13
3.1 Vernon County - Hailstorm Risk Assessment.....	16
3.2 Vernon County - Lightning Storm Risk Assessment .....	18
3.3 Vernon County - Thunderstorm Risk Assessment .....	21
3.4 Vernon County - Tornado/High Winds Risk Assessment .....	24
3.5 Vernon County - Riverine/Flash Flooding/Storm Water Flooding Risk Assessment.....	27
3.6 Vernon County - Dam Failure Flooding Risk Assessment .....	32
3.7 Vernon County - Forest/Wildland Fire Risk Assessment.....	35
3.8 Vernon County - Heavy Snowstorm Risk Assessment .....	37
3.9 Vernon County - Ice Storm Risk Assessment .....	39
3.10 Vernon County - Blizzard Risk Assessment .....	41
3.11 Vernon County - Extreme Cold Risk Assessment .....	43
3.12 Vernon County - Earthquake .....	45
3.13 Vernon County - Extreme Heat Risk Assessment.....	47
3.14 Vernon County - Agricultural Risk Assessment .....	49
3.15 Vernon County - Drought Risk Assessment .....	51
3.16 Vernon County - Fog Risk Assessment.....	53

3.17 Vernon County - Landslide Risk Assessment .....	55
3.18 Vernon County - Subsidence Risk Assessment .....	57
3.19 Vernon County - Pandemic Flu Risk Assessment .....	59
3.20 Vernon County - Railroad Risk Assessment .....	62
3.21 Vernon County - River Traffic Risk Assessment .....	64
3.22 Vernon County - Climate Change.....	66
Table 3-1 Vernon County Local Official’s Hazard Risk Assessment Survey Results .....	69
Table 3-2 Vernon County Hazard Risk Assessment.....	70
Table 3-3 Vernon County Structures in the FEMA 100-Year Floodplain.....	71
Table 3-4 Vernon County Transportation Assessment .....	72
Table 3-5 Vernon County Business Vulnerability Assessment.....	73
Table 3-6 Vernon County Critical Facilities: Government and Military Facilities.....	73
Table 3-6 Vernon County Critical Facilities: Government and Military Facilities.....	73
Table 3-7 Vernon County Critical Facilities: Hospitals, Clinics, and Residential Care Facilities .....	74
Table 3-8 Vernon County Critical Facilities: Police and Fire Facilities.....	75
Table 3-9 Vernon County Critical Facilities: Schools.....	76
Table 3-10 Vernon County Critical Facilities: Wells .....	77
Table 3-11 Vernon County Critical Facilities: Wastewater Treatment Facility (WWTF) .....	78
Table 3-12 Vernon County Critical Facilities: Hazardous Material Sites .....	78
Table 3-13 Vernon County Critical Facilities: Dams .....	80
Table 3-14 Dam Failure Impact Summary.....	83
Map 3-1 Vernon County Critical Facilities (Government, Military, Wastewater Treatment Facilities, and Wells .....	84
Map 3-2 Vernon County Critical Facilities (Hospitals, Clinics, and Residential Care) .....	85
Map 3-3 Vernon County Critical Facilities (Police, Fire Departments, and Hazardous Material Sites) .....	86
Map 3-4 Vernon County Critical Facilities (Schools) .....	87
Map 3-5 Vernon County Critical Facilities (Dams) .....	88
Map 3-6 Vernon County Critical Facilities within FEMA 100-Year Flood Boundary .....	89
Map 3-7 Vernon County Highway Sites Impacted by Flooding .....	90
Map 3-8 Vernon County Communities at Risk for Wildfire .....	91
Map 3-9 8 PL-566 Dam Structures Map.....	92
<b>4. VERNON COUNTY MULTI-HAZARDS MITIGATION PLAN STRATEGIES.....</b>	<b>94</b>
Table 4-1 Vernon County Hazard Mitigation Goals .....	94
Table 4-2 Vernon County Hazard Mitigation Actions or Projects.....	95
Table 4-3 Vernon County Municipal Hazard Mitigation Actions or Projects .....	101
Table 4-4 Municipal Specific Hazard Mitigation Actions or Projects .....	104

Vernon County Plan Maintenance and Adoption Action Plan.....	114
Table 4-5 Vernon County Multi-Hazards Mitigation Plan Maintenance and Adoption Action Plan.....	115
APPENDIX – A.....	117
Table A-1 Risk Assessment Survey Mailing List.....	117
Table A-2 Project Needs Survey Mailing List.....	118
Table A-3 Survey Results.....	119
Table A-4 Municipalities Plan Adoption.....	120
APPENDIX - B.....	122
Table B-1 Hailstorm History and Frequency .....	122
Table B-2 Thunderstorm History and Frequency.....	122
Table B-3 Tornado/High Winds History and Frequency .....	124
Table B-4 Riverine/Flash Flooding History and Frequency .....	124
Table B-5 Heavy Snowstorm History and Frequency.....	126
Table B-6 Ice Storm History and Frequency.....	126
Table B-7 Blizzard History and Frequency .....	127
Table B-8 Extreme Cold History and Frequency .....	127
Table B-9 Extreme Heat History and Frequency.....	127
Table B-10 Drought History and Frequency.....	127
Table B-11 Railroad History and Frequency.....	127
APPENDIX – C.....	128
Risk Assessment Survey .....	128
Vernon County All-Natural Hazards Mitigation Project Need Survey .....	130
APPENDIX – D.....	136
Public Hearing Notice.....	136
Public Safety Committee Agenda .....	137
Mississippi River Regional Planning Commission Agenda .....	138
APPENDIX – E.....	140
Adoption Resolutions.....	140



## 1.0 VERNON 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, and wildfires need to be addressed in the risk assessment and vulnerability analysis sections of the Multi-Hazard Mitigation Plan. Manmade hazards such as hazardous waste spills are encouraged but not required to be addressed.
- The Act authorizes up to 7% 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 Vernon County Multi-Hazards Mitigation Plan 2023-2027 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: Bergen, Christiana, Clinton, Coon, Forest, Franklin, Genoa, Greenwood, Hamburg, Harmony, Hillsboro, Jefferson, Kickapoo, Liberty, Stark, Sterling, Union, Viroqua, Webster, Wheatland, Whitestown, the Villages of Chaseburg, Coon Valley, De Soto, Genoa, La Farge, Ontario, Readstown, Stoddard, Viola, and the Cities of Hillsboro, Viroqua, and Westby. The update of the plan was prepared under the guidance of two committees, the Local Emergency Planning Committee due to their familiarity with flooding issues and floodplain management and the Vernon County Public Safety Committee. Members of the Local Emergency Planning Committee and who they represent are as followed: Kevin Dean, Robert Moline, Ted Harris, Richard Wallin, David Robinson, Shawna McDowell, Chad Buros, Dan Schreiter, Stacie Sanborn, Loren Oldenburg, Amy Kleiber, Brandy Matthes, Charlie Jacobson, Phil Hewitt; Emergency Management Director Brandon Larson, and Sheriff Roy Torgerson. The members of the Vernon County Public Safety Committee are Will Beitlich, Frank Easterday, Charles Jacobson, Mary Henry, and Sandy Schweiger. The County Emergency Management Director also participated in committee meetings and served as a liaison between the Local Emergency Planning Committee, Public Safety Committee, and other local units of government in the county. The county, being a member of the Mississippi River Regional Planning Commission, contracted with them to facilitate the updating of the plan under the direction of the County Emergency Management 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.

Draft

### 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 Mayors. 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 3-2. The projects identified through this survey as well as projects identified through other means are listed in Section 4. A copy of this survey can be found in Appendix C.

In addition to the risk assessment survey, every municipality within Vernon County was emailed in October 2022 their hazard mitigation projects list from the previous 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 Conservationist. A second survey was emailed in March 2023 to those who did not respond to the first survey. A listing of who received this survey can be found in Table A-2, and a copy of the survey can be found in Appendix C. The projects identified through this process, as well as projects identified through other means are listed in Section 4.

### Public Safety Planning Committee Meetings

During the period in which the plan was being developed, the county Local Emergency Planning Committee and the Public Safety 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 is accepted at these meetings. A copy of a Public Safety Planning Committee meeting agenda can be found in Appendix D.

Public Meetings and Hearings. The county also sponsored a public meeting on June 12<sup>th</sup>, 2023 to present a draft of the Vernon County Multi-Hazard Mitigation Plan to the public. During this meeting, the results of the local official Hazard Risk Assessment Survey were presented (Table A-3) 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 Bergen, Christiana, Clinton, Coon, Forest, Franklin, Genoa, Greenwood, Hamburg, Harmony, Hillsboro, Jefferson, Kickapoo, Liberty, Stark, Sterling, Union, Viroqua, Webster, Wheatland, Whitestown, the Villages of Chaseburg, Coon Valley, De Soto, Genoa, La Farge, Ontario, Readstown, Stoddard, Viola and the Cities of Hillsboro, Viroqua, and Westby. In addition, these municipalities were mailed their project listing from the first plan and were asked to update this list. See Table A-3 for a listing of who responded to these surveys. Lastly, all 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 Vernon County, local business input was obtained from those business owners who are also on the various first responders, Town, Village, and City Boards. In addition, business owners were provided with 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 De Soto, Hillsboro, Kickapoo Area, La Farge, Viroqua, and Westby 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 through Class Two notices.

MRRPC Bimonthly Meetings. Beginning with the August 2022 MRRPC Bimonthly meeting and continuing until the final approval from FEMA, the Vernon 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
2021 State of Wisconsin Hazard Mitigation Plan	Provided dates and amounts of damage for the various natural hazards
National Climatic Data Center (NCDC)	Provided data for history and damage amounts for the various natural hazards
Hazard Analysis and Mitigation, Vernon 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, Vernon County WI, by NOAA/National Weather Service La Crosse, WI	Provided data for history and damage amounts for the various natural hazards
Wisconsin Department of Natural Resources Dam Database	Provided list of dams within Vernon County
Wisconsin Department of Administration, Hazard Material Site Database	Provided a list of hazardous material sites located within the County
World Health Organization COVID-19 Dashboard	Provided worldwide COVID-19 data
Wisconsin Department of Health Services	Provided Vernon County COVID-19 data

### Funding for the Vernon County All Hazards Mitigation Plan

In September 2022, the county received word that they were awarded a \$59,749.20 FEMA planning grant through the Pre-Disaster Mitigation Grant Program under BRIC 2021 to update their All-Hazards Mitigation Plan 2018-2022. FEMA will provide 75% (\$44,811.90) of the funds and the remaining 25% (\$14,937.30) will be provided by local match. On October 12, 2022, the Mississippi River Regional Planning Commission (MRRPC) signed a contract with Vernon 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, Vernon County’s Multi-Hazards Mitigation Plan is organized into the following five sections, 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 sections of the old plan were reviewed and updated. The following items were updated during this process:

Section 1: The Committees responsible for oversight of the plan update were changed from the County Emergency Management Committee to the Public Safety Committee and the Local Emergency Planning Committee. The survey information was updated and the table identifying who received surveys was updated;

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

Section 3: Updated risk assessments, historical data, vulnerability data (to include data up to 2022), 100-year floodplain data, flood potential, updated critical facilities tables and maps and added pandemic flu information, added train, and lock and dam hazards;

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

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

Draft



forested bluffs and goat prairies. The Kickapoo River, which traverses the county north to south is considered one of the best canoe rivers in Wisconsin.

## Demographic and Economic Profile

### Population

Vernon County experienced a growth in population from 30,442 in 2016 to 30,759 in 2020, a 1.0% increase. This rate of growth was higher than the State (0.9%) and lower than the Nation (2.5%.) City populations range from 1,357 in Hillsboro to 4,472 in Viroqua. Village populations range from 240 in Genoa to 930 in La Farge. Town populations range from 279 in Stark to 1,664 in Viroqua. The fastest growing city during this time was Westby, which grew 8.3%. The fastest growing village during this time was La Farge, which grew 24.3% (see note on De Soto). The fastest growing towns during this time were Kickapoo, Jefferson, and Bergen, which grew 33.4%, 18.0% and 16.7% respectively.

Table 2-1 Vernon County Population and Land Area Data

Jurisdiction	Population			Land Area (Sq. Miles)			
	2016	2020	# Change 16-20	% Change 16-20	Land	Water	Total
T. Bergen	1,245	1,453	208	16.7	34.22	18.57	52.79
T. Christiana	958	921	-37	-3.9	33.57	0.08	33.66
T. Clinton	1,320	1,239	-81	-6.1	35.88	0.01	35.89
T. Coon	714	769	55	7.7	34.85	0	34.85
T. Forest	720	794	74	10.3	35.96	0	35.96
T. Franklin	989	970	-19	-1.9	51.54	0.04	51.59
T. Genoa	738	798	60	8.1	34.99	1.33	36.33
T. Greenwood	970	754	-216	-22.3	35.8	0	35.8
T. Hamburg	1,089	1,076	-13	-1.2	35.81	0.01	35.82
T. Harmony	782	777	-5	-0.6	42.9	0	42.9
T. Hillsboro	675	738	63	9.3	35.61	0.03	35.64
T. Jefferson	996	1,175	179	18.0	46.93	0.09	47.01
T. Kickapoo	574	766	192	33.4	37.86	0.03	37.89
T. Liberty	273	283	10	3.7	23.05	0.01	23.06
T. Stark	329	279	-50	-15.2	34.42	0.01	34.43
T. Sterling	596	572	-24	-4.0	45.45	0	45.45
T. Union	821	801	-20	-2.4	35.76	0	35.77
T. Viroqua	1,918	1,664	-254	-13.2	48.34	0.03	48.37
T. Webster	1,253	840	-413	-33.0	35.41	0.01	35.42
T. Wheatland	588	532	-56	-9.5	26.52	1.1	27.62
T. Whitestown	605	526	-79	-13.1	35.01	0	35.01
<b>Town Totals</b>	<b>18,153</b>	<b>17,727</b>	<b>-426</b>	<b>-2.3</b>	<b>779.9</b>	<b>21.37</b>	<b>801.27</b>
V. Chaseburg	301	334	33	11.0	0.62	0	0.62
V. Coon Valley	702	937	235	33.5	1.08	0	1.08
V. De Soto (Pt.) *	188	391	203	108.0	0.99	0.05	1.04
V. Genoa	227	240	13	5.7	0.3	0	0.3
V. La Farge	748	930	182	24.3	1.04	0	1.04
V. Ontario	475	477	2	0.4	1.01	0	1.01
V. Readstown	479	418	-61	-12.7	1.79	0	1.79
V. Stoddard	879	815	-64	-7.3	0.6	0.09	0.69
V. Viola	344	274	-70	-20.3	0.65	0	0.65
C. Hillsboro	1,358	1,357	-1	-0.1	1.2	0.03	1.23
C. Viroqua	4,384	4,472	88	2.0	3.27	0	3.27
C. Westby	2,204	2,387	183	8.3	2.43	0	12.71

**Table 2-1 Vernon County Population and Land Area Data**

Jurisdiction	Population			Land Area (Sq. Miles)			
	2016	2020	# Change 16-20	% Change 16-20	Land	Water	Total
<b>City and Village Totals</b>	<b>12,289</b>	<b>13,032</b>	<b>743</b>	<b>6.0</b>	<b>14.97</b>	<b>0.17</b>	<b>15.14</b>
Vernon County	30,442	30,759	317	1.0	794.87	21.54	816.41
Wisconsin	5,754,798	5,806,975	52,177	0.9	54,310	11,888	65,498
United States	318,558,162	326,569,308	8,011,146	2.5	3,537,422	181,272	3,718,694

\*Part of the Village of De Soto is located in Crawford County and estimates from 2016 do not include Crawford County while 2020 data does. Part of the Village of Viola is located in Richland County.

Sources: 1) 2016 and 2020 American Community Survey 5-Year Estimates

2) Vernon County and Jurisdictions Land/Water Area: State of Wisconsin-Department of Administration, Demographic Services Center

3) Wisconsin and United States Land/Water Area: United States Census Bureau, 2000 Census of Population and Housing, Summary Population and Housing Characteristics

**Housing**

Between the 2016 and 2020, the rate of housing growth in Vernon County was greater than the state and less than the Nation. The number of housing units in the county increased from 13,807 in 2016 to 14,173 in 2020, an increase of 2.7%. The rate of increase for the State of Wisconsin was 2.3%, and the rate of increase for the Nation was 3.3%. The City of Viroqua with 2,292 housing units in 2020 had the most housing units of any community in the county. The municipality with the largest percentage increase during this time was the Town of Coon Valley, with a 35.8% increase in housing units.

**Table 2-2 Vernon County Housing and Housing Units Per Square Mile**

Jurisdiction	Housing Units				Housing Units Per Sq. Mile			
	2016	2020	# Change 16-20	% Change 16-20	2016	2020	# Change 16-20	% Change 16-20
T. Bergen	587	660	73	12.4	17.2	19.3	2.1	12.4
T. Christiana	386	422	36	9.3	11.5	12.6	1.1	9.3
T. Clinton	372	349	-23	-6.2	10.4	9.7	-0.6	-6.2
T. Coon	325	367	42	12.9	9.3	10.5	1.2	12.9
T. Forest	322	346	24	7.5	9.0	9.6	0.7	7.5
T. Franklin	469	428	-41	-8.7	9.1	8.3	-0.8	-8.7
T. Genoa	418	377	-41	-9.8	11.9	10.8	-1.2	-9.8
T. Greenwood	298	276	-22	-7.4	8.3	7.7	-0.6	-7.4
T. Hamburg	418	402	-16	-3.8	11.7	11.2	-0.4	-3.8
T. Harmony	315	321	6	1.9	7.3	7.5	0.1	1.9
T. Hillsboro	374	358	-16	-4.3	10.5	10.1	-0.4	-4.3
T. Jefferson	473	477	4	0.8	10.1	10.2	0.1	0.8
T. Kickapoo	337	288	-49	-14.5	8.9	7.6	-1.3	-14.5
T. Liberty	181	220	39	21.5	7.9	9.5	1.7	21.5
T. Stark	201	202	1	0.5	5.8	5.9	0.0	0.5
T. Sterling	277	301	24	8.7	6.1	6.6	0.5	8.7
T. Union	260	304	44	16.9	7.3	8.5	1.2	16.9
T. Viroqua	693	735	42	6.1	14.3	15.2	0.9	6.1
T. Webster	464	432	-32	-6.9	13.1	12.2	-0.9	-6.9
T. Wheatland	417	425	8	1.9	15.7	16.0	0.3	1.9
T. Whitestown	273	239	-34	-12.5	7.8	6.8	-1.0	-12.5
<b>Town Totals</b>	<b>7,860</b>	<b>7,929</b>	<b>69</b>	<b>0.9</b>	<b>10.1</b>	<b>10.2</b>	<b>0.1</b>	<b>0.9</b>
V. Chaseburg	146	148	2	1.4	235.5	238.7	3.2	1.4
V. Coon Valley	310	421	111	35.8	287.0	389.8	102.8	35.8

Table 2-2 Vernon County Housing and Housing Units Per Square Mile

Jurisdiction	Housing Units				Housing Units Per Sq. Mile			
	2016	2020	# Change 16-20	% Change 16-20	2016	2020	# Change 16-20	% Change 16-20
V. De Soto *	138	198	60	43.5	139.4	200.0	60.6	43.5
V. Genoa	113	117	4	3.5	376.7	390.0	13.3	3.5
V. La Farge	349	407	58	16.6	335.6	391.3	55.8	16.6
V. Ontario	225	231	6	2.7	222.8	228.7	5.9	2.7
V. Readstown	212	169	-43	-20.3	118.4	94.4	-24.0	-20.3
V. Stoddard	404	412	8	2.0	673.3	686.7	13.3	2.0
V. Viola **	131	127	-4	-3.1	201.5	195.4	-6.2	-3.1
C. Hillsboro	666	676	10	1.5	555.0	563.3	8.3	1.5
C. Viroqua	2,252	2,292	40	1.8	688.7	700.9	12.2	1.8
C. Westby	1,001	1,046	45	4.5	411.9	430.5	18.5	4.5
<b>City Totals</b>	<b>5,947</b>	<b>6,244</b>	<b>297</b>	<b>5.0</b>	<b>397.3</b>	<b>417.1</b>	<b>19.8</b>	<b>5.0</b>
<b>Vernon County</b>	13,807	14,173	366	2.7	17.4	17.8	0.5	2.7
<b>Wisconsin</b>	2,649,597	2,709,444	59,847	2.3	48.8	49.9	1.1	2.3
<b>United States</b>	134,054,899	138,432,751	4,377,852	3.3	37.9	39.1	1.2	3.3

\*Part of the Village of De Soto is located in Crawford County and estimates from 2016 do not include Crawford County while 2020 data does.

\*\*Part of the Village of Viola is located in Richland County.

Source: 2016 and 2020 American Community Survey 5-Year Estimates

**Table 2-3 Employment by Industry**

	Vernon County					Wisconsin					United States				
	2016 (1)		2020 (2)			2016 (1)		2020 (2)			2016 (1)		2020 (2)		
	No.	%	No.	%	% Change 16-20	No.	%	No.	%	% Change 16-20	No.	%	No.	%	% Change 16-20
Agriculture, forestry, fishing and hunting, and mining	873	9.5	704	7.3	-19.4	53,047	2.7	48,368	2.3	-8.8	2,087,123	2.0	1,984,462	1.8	-4.9
Construction	662	7.2	719	7.4	8.6	108,060	5.5	132,077	6.3	22.2	6,638,637	6.5	7,952,513	7.2	19.8
Manufacturing	1,803	19.6	1,885	19.4	4.5	461,873	23.6	468,663	22.5	1.5	13,071,635	12.8	13,436,247	12.2	2.8
Wholesale trade	389	4.2	344	3.5	-11.6	64,055	3.3	66,827	3.2	4.3	3,294,915	3.2	3,311,895	3.0	0.5
Retail trade	937	10.2	946	9.7	1.0	185,447	9.5	189,800	9.1	2.3	9,947,761	9.7	10,302,465	9.3	3.6
Transportation, warehousing, and utilities	492	5.3	564	5.8	14.6	94,370	4.8	106,807	5.1	13.2	5,789,434	5.7	6,626,804	6.0	14.5
Information	177	1.9	291	3.0	64.4	34,565	1.8	35,561	1.7	2.9	2,389,290	2.3	2,356,780	2.1	-1.4
Finance, insurance, real estate, and rental and leasing	410	4.5	418	4.3	2.0	143,193	7.3	150,507	7.2	5.1	7,914,878	7.7	8,497,181	7.7	7.4
Professional, scientific, management, administrative, and waste management services	370	4.0	431	4.4	16.5	160,519	8.2	186,275	8.9	16.0	11,867,171	11.6	13,566,708	12.3	14.3
Educational, health, and social services	2,028	22.0	2,426	25.0	19.6	401,905	20.5	434,847	20.9	8.2	22,257,766	21.7	24,327,133	22.0	9.3
Arts, entertainment, recreation, accommodation, and food services	350	3.8	266	2.7	24.0	98,122	5.0	101,342	4.9	3.3	6,728,828	6.6	7,010,179	6.4	4.2
Other services (except public administration)	407	4.4	290	3.0	28.7	69,596	3.6	74,173	3.6	6.6	4,335,052	4.2	4,561,835	4.1	5.2
Public Administration	302	3.3	419	4.3	38.7	85,479	4.4	87,837	4.2	2.8	6,140,318	6.0	4,561,835	4.1	-25.7
<b>Total Employees</b>	<b>9,200</b>		<b>9,703</b>		<b>5.5</b>	<b>1,960,231</b>		<b>2,083,084</b>		<b>6.3</b>	<b>102,462,808</b>		<b>110,349,048</b>		<b>7.7</b>

Source: 2016 and 2020 American Community Survey 5-Year Estimates

### Employment and Industry

Employment for those aged 16 and older in the county increased from 9,200 employees in 2016 to 9,703 employees in 2020, an increase of 5.5%. This increase in employment is less than both the state (6.3%) and the Nation (7.7%). The top three employment sectors in the county in 2020 were Educational, Health, and Social Services (25%), Manufacturing (19.4%), and Retail trade (9.7%). The employment sectors which experienced the most growth during this time period are as follows: Information (64.4%); Public Administration (38.7%); and other services (except Public Administration) (28.7%).

## Employers

The largest employer in the county is Vernon Memorial Healthcare (250-499 employees). There are 6 employers who employ between 100 and 249 people. All other employers in the county employ under 100 employees.

Table 2-4 Prominent Vernon County Employers

<i>Establishment</i>	<i>Service or Product</i>	<i>Number of Employees</i>
Vernon Memorial Healthcare	General Medical and Surgical Hospitals	250-499
Nelson Global Products Inc	Other Motor Vehicle Parts Manufacturing	100-249
Organic Valley	Process, Physical Distribution, and Logistics Consulting Service	100-249
Westby Area School District	Elementary and Secondary Schools	100-249
Vernon Manor	Vocational Rehabilitation Services	100-249
Gundersen St. Joseph's Hospital	General Medical Surgical Hospitals	100-249

*Source: Data Axle by Reference Solution, Database accessed 10/2022*

## General Development Pattern

### Land Use Trends

Real estate assessment records provide the most current land use information for the county. In 2021 Agricultural land totaled 273,496 acres or 66.5% of land use in the county. The second highest land use in the county was Agriculture Forest – 14.0%; followed by Undeveloped, 33,998 acres – 8.3%; Forest, 24,133 acres – 5.9%; Residential, 14,452 acres – 3.5%; and Other 5,580 acres – 1.4%. The rural nature of the county is clear, with 86.4% of the land being used for agriculture and forests.

Agricultural assessed land (Agriculture and Agriculture Forest categories) declined slightly between 2017 and 2021 – from 275,070 acres to 273,496 acres, a decrease of 0.5%. While the more urban forms of land use, Residential and Commercial increased over the same time. Residential land use increased by 6 acres and Commercial land use increased by 84 acres.

Table 2-5 Vernon County Land Use

Land Use Designation	2017		2021	
	Acres	% of County	Acres	% of County
Residential <sup>(1)</sup>	14,446	3.5	14,452	3.5
Commercial <sup>(1)</sup>	1,479	0.4	1,563	0.4
Manufacturing <sup>(1)</sup>	626	0.1	539	0.1
Agriculture <sup>(1)</sup>	275,070	66.3	273,496	66.5
Undeveloped <sup>(1)</sup>	33,547	8.1	33,998	8.3
Agriculture Forest <sup>(1)</sup>	59,265	14.3	57,787	14.0
Forest <sup>(1)</sup>	24,833	6.0	24,133	5.9
Other <sup>(2)</sup>	5,462	1.3	5,580	1.4
County Total <sup>(3)</sup>	414,728	100	411,548	100

(1) Wisconsin Department of Revenue Division of State and Local Finance - 2017 and 2021 Real Property Equalized Value and Acreage Figures

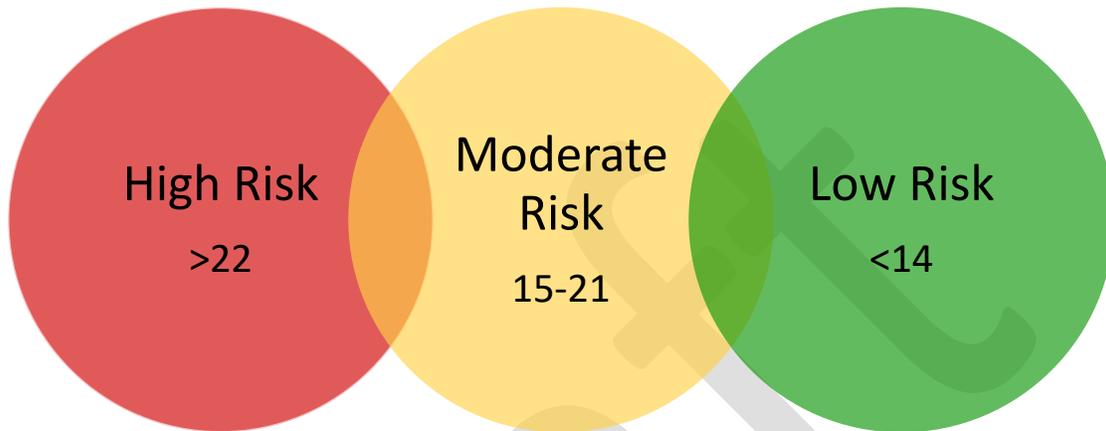
(2) Includes water areas but excludes the Mississippi River. Also includes tax exempt lands as identified by the Wisconsin Department of Revenue. These tax-exempt lands include city, village, town, county, state, and federally owned lands as well as: school districts, lake districts, sewer districts, 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.

(3) Includes total area of County - both land area and water area but excludes the water area of the Mississippi River.

Source: Wisconsin DNR

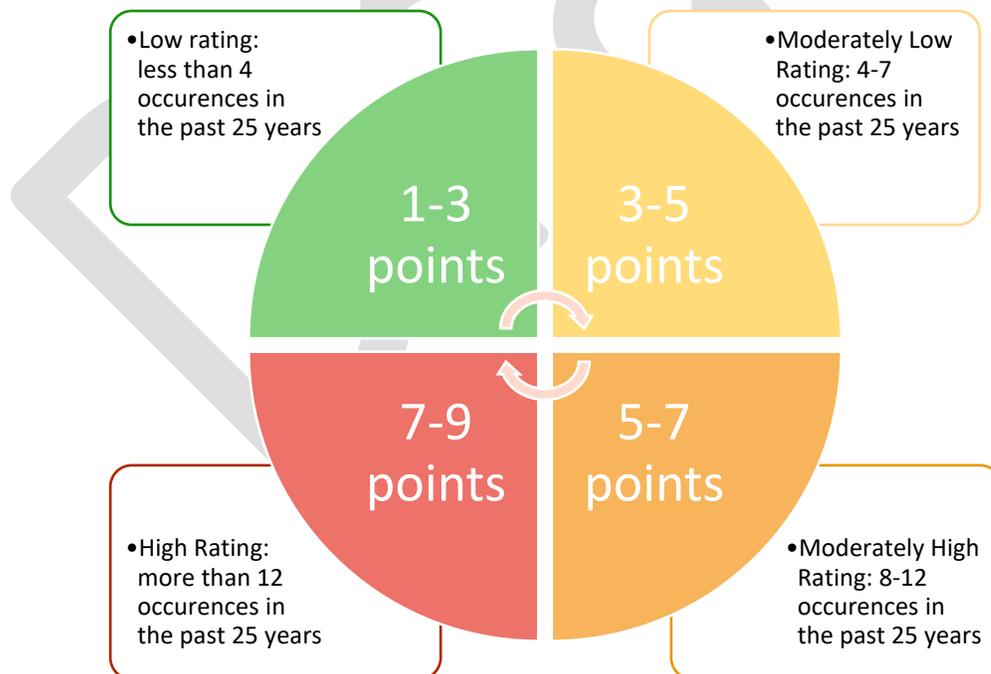
### 3.0 VERNON COUNTY RISK ASSESSMENT

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



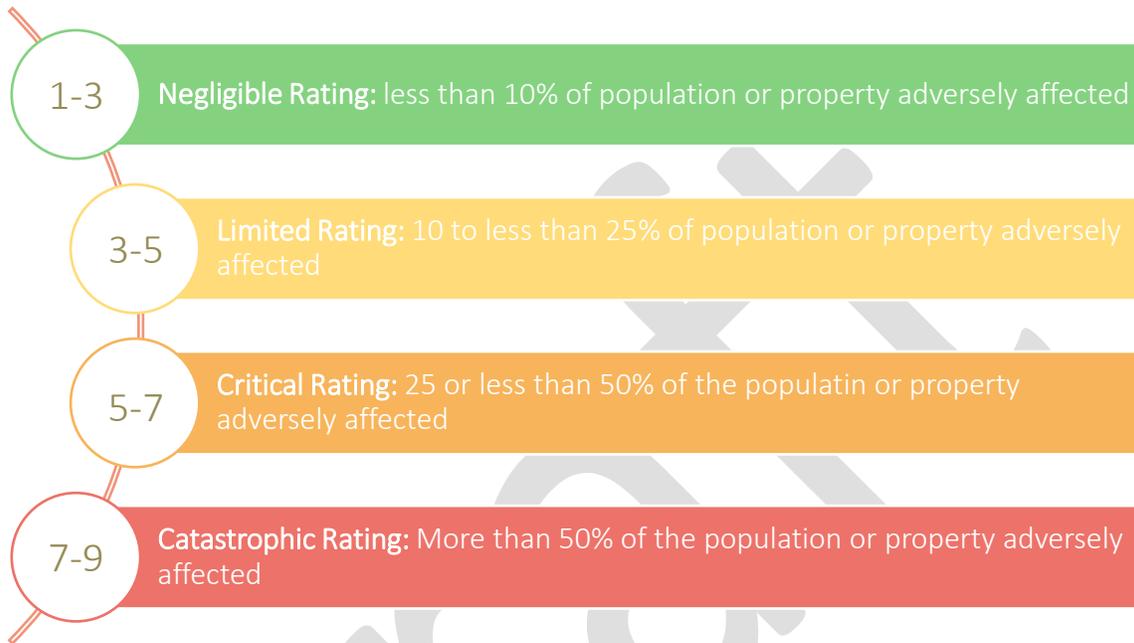
#### Historical Occurrence Rating Criteria

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



### Probability Rating Criteria

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



### Local Official Survey Rating Criteria

The local survey rating criteria is based off survey responses received by all County Board Supervisors, Village Presidents, Town Chairpersons, Schools, Mayors, Chiefs of Police, the Sheriff, Fire Department Chiefs in the county, and all Emergency Facilities in the county. They were asked to rank each natural hazard high, medium, or low as it pertains to their communities' health and safety. See Appendix C for survey. See Table 3-1 for survey response.

#### High

A majority of local officials were of the opinion that this hazard posed a high threat to threat to public health and safety (6-9 points)

#### Medium

A majority of local officials were of the opinion that this hazard posed a medium threat to public health and safety (3-6 points)

#### Low

A majority of local officials were of the opinion that this hazard posed a low threat to public health and safety (1-3 points)

### Risk Assessment Designation

The risk assessment designation is determined by adding the rating points assigned from historical occurrences, vulnerability, probability, and the local official survey factors. These summations for each hazard are then assigned a low, moderate, or high threat based on numerical rank. A 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 Vernon 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 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. Hailstorms form when subfreezing temperatures cause water in thunderstorm clouds to accumulate around an icy core. When strong underlying winds can no longer 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 United States 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, this coincides with 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  $\frac{3}{4}$  inch in diameter. Serious hailstorms with hailstones 1.5 inch or larger in diameter are not common.

Between 1960 and September of 2022 the NCDC reported 104 hailstorm events (Table B-1, Appendix B). Of these 70 events 20 events resulted in property damage and 12 had crop damage reported. The total property damage reported for the 20 events was \$372,000 and crop damage reported totaled \$404,100 during 12 events. Based upon this historical data, when Vernon County experiences a hailstorm large enough to cause property damage or crop damage the average amount of property damage to occur is \$18,600 and the average amount of crop damage is \$33,675. Between 1990 and 2022, Vernon County averaged 3 hailstorm events per year. Based upon these averages the county can expect to experience 15 hailstorms within the next 5-year period. If historical trends continue, the county can expect that approximately 20% of these storms will be strong enough to cause property damage. This would result in 3 storms causing \$55,800 in property damage during that same 5-year period. In addition, approximately 12% of the hailstorms would cause crop damage based on historic trends. This would result in 1.8 storms causing \$60,615 in crop damage during that same 5-year period.

## Hailstorm Vulnerability Assessment

Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Hazard Risk Assignment assigns hailstorms a risk factor of 24 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 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. 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 2022, county land use statistics indicated that 66% or 272,343 acres of county land were classified for agricultural use. Agriculture is a significant part of the county’s economy. The overall threat of hailstorms 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 coincides with the planting and harvesting of most crops in the county making those crops vulnerable to hailstorms.
Roads and Highways	Hail damage can occur to any vehicle exposed to elements, whether moving or parked. Hail, although when it is lying on the ground, can cause icing conditions, usually is melted before mitigation action such as sanding, salting, or plowing is done. It can occur in seasons when highway trucks are not set up for snow and ice control.
Railroads	Hail can cause cessation of rail work crews. Hail can cause damage to windshields and headlight covers of locomotives and Maintenance of Way (M of W) equipment. Hail can cause damage to signal lamp covers. Hail can also cause damage to building roofs.
Airway	Hail can cause damage to aircraft skin and control surfaces. Such damage may be critical to the safety and integrity of the aircraft and its control. Hail can cause icing and clogging of engines of small planes in flight. Hail can damage runway lighting fixtures.
Waterway	Hail can damage watercraft windows, lights, instruments, and communication devices.
Municipal Water	In the county there are 30 municipal wells and water systems in operation, see Table 3-10. 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 10 wastewater treatment facilities in operation in the county, see Table 3-11. The vulnerability of these facilities to hailstorms would be limited to the building roofs, windows, and electrical service and would not interrupt services provided by these facilities except in extreme cases.
Hazardous Material Sites	Hazardous material containers in transport can be breached by any accident to the transport mode caused by hail. Hazardous material in storage has no severe impacts caused directly by hail.

### Hailstorm Risk Assessment Designation

Hailstorm Historical Occurrence Rating: High - 9

Hailstorm Vulnerability Rating: Limited 4

Hailstorm Probability Rating: Likely - 7

Hailstorm Local Official Survey Rating: Medium - 4

**Hailstorm Risk Assessment Designation: High Risk - 24 points**

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

### 3.2 Vernon 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, lightning 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:

- Electrocutation/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 is not 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 quickly, 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) 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 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Hazard Risk Assignment 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 lightning 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, motors, and communications systems. See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	For most businesses 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 lightning 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, 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 lightning 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 lightning strikes. Tree plantations are also susceptible to fires caused 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 and similar structures.
Railroads	Severe lightning can be hazardous to railway track and 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 30 municipal wells and water systems in operation, see Table 3-10. These facilities vulnerable to lightning 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. The vulnerability of these facilities to lightning would include fire damage to facilities from lightning 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 minor 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: Low 3

**Lightning Storm Risk Assessment Designation: High Risk - 25 points**

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

Draft

### 3.3 Vernon 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  $\frac{3}{4}$  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 over 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.

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. 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 historical data in Appendix B, the NCDRC reported 144 thunderstorm events in Vernon County from 1960-2022. No damage amounts were reported before 1990. Since 1990 there have been 125 events which have caused \$1,596,050 in property damage, \$275,000 in crop damage. This creates an average of 3.9 events, \$49,877 in property damage and \$8,594 in crop damage per year. Using this data Vernon County can expect to have 19.5 thunderstorm events over the next 5 years causing \$249,385 in property damage and \$42,970 in crop damage.

Thunderstorm Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Hazard Risk Assignment assigns thunderstorms a risk factor of 26 indicating this natural hazard is a high risk to the County. Thunderstorms can produce heavy rains and downbursts that induce straight-line winds with high wind speeds. Buildings could be damaged by the high winds and temporary flooding could occur in low-lying areas where these facilities are located. Thunderstorms can also produce three violently destructive natural elements which include lightning, tornadoes, and hailstorms which are discussed separately in this Section. See Tables 3-6 through 3-9 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 crop, buildings, and livestock.
Roads and Highways Railroads	Heavy rain 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. 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 for 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 30 municipal wells and water systems in operation, see Table 3-10. The vulnerability of these facilities 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. 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 - 4

**Thunderstorm Risk Assessment Designation: High Risk - 26 points**

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

Draft

### 3.4 Vernon County - Tornado/High Winds Risk Assessment

**Tornado/High Winds Definition:** A tornado is a relatively short-lived storm composed of an intense rotating column of air, extending from a thunderstorm cloud system. It is nearly always visible as a funnel, although its lower end does not necessarily touch the ground. Average winds in a tornado, although never accurately measured, are between 100 and 200 miles per hour, but some may have winds exceeding 300 miles per hour. For standardization, the following are National Weather Service definitions of a tornado and associated terms:



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

A tornado path averages four miles but may reach up to 300 miles in length 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 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% 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, and mobile homes overturned	24%
F3	158 to 206 MPH	Exterior walls and roofs blown off homes. Metal buildings collapsed or are severely damaged. Forests and 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
<b>EF0</b>	60 to 85 MPH	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees	53.50%
<b>EF1</b>	86 to 110 MPH	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; broken windows	31.60%
<b>EF2</b>	111 to 135 MPH	Considerable damage. Roofs torn off well-constructed houses; foundations shifted; mobile homes destroyed; trees uprooted; cars lifted	10.70%
<b>EF3</b>	136 to 165 MPH	Severe damage. Entire stories of houses destroyed; damage to large buildings; trains overturned	3.40%
<b>EF4</b>	166 to 200 MPH	Devastating damage. Houses leveled and cars thrown	0.70%
<b>EF5</b>	> 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 Vernon County experienced 27 tornadoes from 1950 to 2022 (Table B-3, Appendix B). In 1998, High winds in Vernon and 13 other counties caused so much damage that the region received a Presidential Disaster Declaration. The history in Appendix B details tornadoes and high winds in the county from 1950 through 2022.

**Tornado Vulnerability Assessment**

Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. Critical facility's vulnerability to tornadoes and high winds could adversely affect 25% 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, Vernon 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 3-6 through 3-9 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	Light weight general aviation aircraft, typical of the type most likely to be based at, or using the Viroqua 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 United States 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 30 municipal wells and water systems in operation, see Table 3-10. 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 10 wastewater treatment facilities in operation in the County, 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.
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 Low - 5  
Tornado Vulnerability Rating: Critical - 6  
Tornado Probability Rating: Possible - 4  
Tornado Local Official Survey Rating: High - 7  
**Tornado Risk Assessment Designation: High Risk - 22 points**

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

### 3.5 Vernon 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, stormwater runoff, and ponding.



The effects of flooding can be devastating and can 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 Vernon County making low-lying areas in the county prone to flooding. In addition, other small rivers in Vernon County flood periodically. The Kickapoo River has a long history of flood events dating back to 1907. Heavy Rains on August 27th and 28th and September 3rd and 4th of 2018 caused extensive flooding in Vernon County. A presidential disaster was declared in October 2018. Vernon County has received thirteen Presidential Disaster Declarations since 1990

due to flooding, these were in: 1990; 1992; 1993; 1998; 2000; 2001; 2004; 2007; 2008; 2013; 2016; 2017, 2018, and 2019. For further information on historical flood, see Appendix B Table B-4.

**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 – Other Rivers:** Vernon County has developed Emergency Action Plans for all 22 of the PL 566 dams in the County. The Emergency Action Plans outline the physical conditions (heavy rainfall, rising flood pools, damage to dam components) that can trigger a 3-tier response of county Emergency Management systems to protect the lives and property of downstream residents. Included in the response is an evacuation plan for downstream residents. The county also has installed river gauges on the Kickapoo River and Brush Creek.

### **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 Corporation Counsel 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 being currently used is contemporary and understandable therefore no changes are proposed to it at this point in time. This ordinance was updated and adopted in 2012.

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.

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.

**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

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.

Flood Mitigation Projects in Vernon County: **Vernon County has a history of successful mitigation projects. Using a combination of FEMA, state, and local dollars the county has completed two voluntary buyouts and is in the process of completing a third. The first project was in the Village of La Farge which completed a voluntary buyout after severe flooding in 2007 and again in 2008. The village acquired and removed 19 residential structures for a total cost of \$969,800. A second project was a voluntary buyout in the Village of Chaseburg in 2009 – 2010. The Village spent \$1,461,000 acquiring and removing 12 residential and 4 commercial structures. A third voluntary buyout of structures located in the hydraulic shadow of the P.L 566 dams or in FEMA floodplains is currently being undertaken. Within the last 5 years the county has spent \$1,772,600 purchasing and removing the following: 6 homes in the Town of Webster; 1 home in the Town of Christiana; 1 home in the Village of Genoa; 2 homes in the Town of Viroqua and 7 homes in the Town of Harmony.**

### **Flooding Vulnerability Assessment**

Floodplain Structures and Assessed Values: Vernon County has a total of 262 parcels on which structures are located within the FEMA 100-year flood boundary. These 268 parcels have a total assessed land value of \$4,324,550; an assessed improvements value of \$16,267,100; and a total assessed value of \$20,591,650. The

Town of Wheatland (Battle Island) has the most parcels with 59 followed by the Village of La Farge with 31 parcels and the Town of Clinton with 30 parcels. These three municipalities account for 120 parcels or 45.8% of the total number of parcels and a total assessed value of \$2,323,500 or 53.7% of the County's total. Table 3- has a listing by municipality of the number of parcels in each municipality and the assessed value of all said parcels in municipality. 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 January 2018, there have been 15 structures that have had repetitive losses within the County. 10 are residential structures and 5 are commercial structures. These structures located in the Towns of Bergen, Clinton, Christiana, Harmony, Stark, Union, Wheatland, the Villages of Chaseburg, La Farge, and the City of Hillsboro.

Flood Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assessment assigns flooding a risk factor of 30 indicating this natural hazard is a high risk to the County. See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. In the county there are 22 businesses located in the floodplain. These businesses have an assessed value of \$2,755,400. Many of these businesses sustain flooding damage and economic losses 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 in 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 of 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 2022, land use statistics indicated that 66% or 272,343 acres of land in the county was 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 rivers is mostly agricultural and pastureland that is 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, and Kickapoo Rivers is a known factor, as well as the extent of flooding, or potential flooding, which has been delineated on maps. Several roadways in Vernon County are subject to flooding, either by the predictable advance notice rising of the Mississippi or Kickapoo 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 as the Mississippi is a known factor, and the extent of the flooding, or potential flooding, has been delineated on maps in Vernon County, the Burlington Northern-Santa Fe rail line runs along the Mississippi through the Villages of Stoddard, Genoa, and De Soto.
Airway	There is one airport in Vernon County. The Viroqua Municipal Airport is not located in a floodplain and therefore is not at high risk for flooding. However, in the event of flooding at the airport, light plane operation would not be possible due to the runway being inundated with water.

Waterway	The Mississippi River is the only commercially navigable waterway in Vernon County. Each Corps of Engineers Navigation Lock has a water elevation at which point the lock operations are stopped at 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 Vernon County reach of the Mississippi River. The lock closure river elevation at Dresbach Lock 7 is 646.5 feet above mean sea level. Lock and Dam 8, located at the Village of Genoa closure elevation is 635.9, and Lock 9 located about 2 miles below Lynxville is 631.0.
Municipal Water	In the county there are 30 municipal wells and water systems, see Table 3-10. 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. 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. Floodwater 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 - 6  
Riverine/Flooding Probability Rating: Likely - 7  
Riverine/Flooding Local Official Survey Rating: High - 8  
**Riverine/Flooding Risk Assessment Designation: High Risk - 30 points**

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

### 3.6 Vernon County - Dam Failure Flooding Risk Assessment

**Dam Failure Flooding Definition:** A dam failure involves the uncontrolled release of stored water due to the breach 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 water 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. Twenty-two dams in Vernon County were included in the study.

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.

There are 22 PL566 flood control dams in Vernon County. The EAP for these dams was updated on April 6<sup>th</sup>, 2021, and can be found in the Land Conservation Office at Vernon County. Two dams are breached from the 2018 flood (MIsna and Jersey Valley). Vernon County has applied for and received a grant to remove the MIsna dam. 14 of the 22 PL566 flood control dams will be scheduled for decommission in 2023 by FEMA. This is due to the dams meeting the criteria of being 50 years or older. See Map 3-9 for the locations of high hazard dams.

Vernon County is currently working on a watershed study with NRCS to evaluate the dams in the West Fork Kickapoo and Coon Creek Watersheds. The dams have a history of failure due to the stability of the

sandstone bedrock in the abutments of the dams. The preferred alternative at this time is dam removal. The federal government is hesitant to reinvest public dollars for dam repairs with the history of failure, downstream land uses and climate change. Jersey Valley may be removed or rebuilt because of the associated recreational value with the lake.

**Dam Failure Flooding History and Frequency:** Numerous damages in 2007 and 2008. Runge Hollow partial spillway failure in 2007. Jersey Valley and Misna dam breaches April 2018.

Flood Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assessment assigns Dam Failure Flooding a risk factor of 13 indicating this natural hazard is a low risk to the County. The "Dam Hazard Assessment" completed for eight PL566 dams in Vernon County showed that no critical facilities are located in the hydraulic shadows of dams. See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities. Hydraulic shadows of other dams in Vernon County are not known.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. The "Dam Hazard Assessment" completed for eight PL566 dams in Vernon County showed that there are no businesses located in the hydraulic shadows of dams. Hydraulic shadows of other dams in Vernon County are not known.
Agriculture	In 2022, county land use statistics indicated that 66% or 272,343 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 of a dam failure. The "Dam Hazard Assessment" completed for eight PL566 dams in Vernon 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 3-14). Hydraulic shadows of other dams in Vernon 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 Kickapoo River happens both with a certain regularity in terms of not being an "if," but a "when," and with a certain advance warning, perhaps weeks for the Mississippi but nonetheless, 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. Roads impacted can be seen in the EAP of the dams in Vernon County.
Railroads	There is one railroad line in Vernon County. The Burlington Northern and Santa Fe Railway's (BNSF) mainline between Chicago and the Twin Cities lies along the Mississippi River. Railways impacted can be seen in the EAP of the dams in Vernon County.
Airway	Viroqua airport is the public airport located in Vernon County. The "Dam Hazard Assessment" completed for twenty-two dams in Vernon County showed that no airports are located in the hydraulic shadows of the PL566 dams. Hydraulic shadows of other dams in Vernon 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 30 municipal wells and water systems, see Table 3-10. These facilities are usually located at higher elevations, which lessens their vulnerability to flooding or damage if a dam fails. The "Dam Hazard Assessment" completed for eight dams in Vernon

	County showed that no municipal water systems are located in the hydraulic shadows of the PL566 dams. Hydraulic shadows of other dams in Vernon County are not known.
Wastewater Treatment Facilities	There are 10 wastewater treatment facilities in operation in the County, see Table 3-11. These facilities can be located in low-lying areas especially gravity type systems making them vulnerable to flooding in event that a dam fails. Floodwater 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 Vernon County showed that no wastewater treatment facilities are located in the hydraulic shadows of the PL566 dams. Hydraulic shadows of other dams in Vernon 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 flooding.

**Dam Failure Risk Assessment Designation**

Dam Failure Historical Occurrence Rating: Low - 2

Dam Failure Vulnerability Rating: Limited - 4

Dam Failure Probability Rating: Possible - 3

Dam Failure Local Official Survey Rating: High - 8

**Dam Failure Risk Assessment Designation: Moderate Risk - 17 points**

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

### 3.7 Vernon 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 19.9% of the county or 81,920 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, as well as 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:** The 1976 drought created the most severe fire danger conditions in Wisconsin forests and grasslands since the 1930s. During 1976 a total of 4,144 fires occurred, the greatest number in any 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 Vernon County from 1976 through 2022. Vernon County does have mutual aid agreements between fire departments.

Because there have been no major forest fires in Vernon County in recent years there are no records of damage to property or crops. Due to this it is difficult to give a dollar amount of future fires.

Forest/Wildland Fires Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Forest/Wildland Fires a risk factor of 9 indicating this natural hazard is a low risk to the County. Critical facility's vulnerability to Forest/Wildland Fires is very negligible See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. 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 to warrant consideration of temporary emergence soil erosion control methods.
Railroads	Smoke from forest fires can adversely affect visibility for train operation, but this is an isolated occurrence and can be mitigated by notification of the railroad dispatcher. A decision to close the railroad temporarily can be made by railroad management. Following a major forest or wildland fire, 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 Vernon 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 Viroqua airport could become a major hub of air and ground activity. Highway traffic control by local officers in the vicinity of the airports might be needed.
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 30 municipal wells and water systems, see Table 3-10. The vulnerability of these facilities 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. The vulnerability of these facilities 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: Low – 2  
**Forest/Wildland Fires Risk Assessment Designation: Low Risk - 9 points**

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

### 3.8 Vernon 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 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.

NCDC records show 15 heavy snowstorm events in Vernon County during the 1990s and 21 in the 2000s, 10 in the 2010s, and 1 in the 2020s. Based on this data Vernon County can expect 1.6 winter storms a year which produce at least 6 inches of snow. Estimating potential future losses for winter storms is difficult. Typically, damages are minor and widespread. Costs such as additional snow removal time and minor auto accidents are the typical costs associated with heavy snowstorms and are not usually tracked at the county level. However, the NCDC report some damages, see Table B-5, Appendix B.

Heavy Snowstorm Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Heavy Snowstorm a risk factor of 25 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 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. 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. 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 Viroqua 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 Vernon County could cause light aircraft flying over the county to decide to land at Viroqua 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 close to navigation, and therefore presents 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 is one Corps of Engineers navigation lock, Lock and Dam 8, at the Village of Genoa.
Municipal Water	In the county there are 30 municipal wells and water systems, see Table 3-10. These facilities vulnerability to heavy snowstorms is negligible and would not cause interruption of services provided by these facilities.
Wastewater Treatment Facilities	There are 10 wastewater treatment facilities in operation in the County, see Table 3-11. 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: Limited - 4  
 Heavy Snowstorm Probability Rating: Likely - 7  
 Heavy Snowstorm Local Official Survey Rating: Medium - 5  
**Heavy Snowstorm Risk Assessment Designation: High Risk - 25 points**

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

### 3.9 Vernon 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 Vernon County along with 21 other counties, causing over \$50 million in property damage warranting a Presidential Disaster Declaration. The NCDRC reports that Vernon County experienced four ice storm events in the 1990s, five events in the 2000s, one in the 2010s, and none in the 2020s (Table B-6, Appendix B).

Ice Storm Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Ice Storm a risk factor of 16 indicating this natural hazard is a moderate 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 Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. 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 services 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 of 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 damage. Christmas tree farms and fruit tree orchards can suffer damage 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 obvious on the surface as snow. 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 weighed 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 makes it impossible to fly. Light planes in flight may have to make emergency landings at Viroqua 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 30 municipal wells and water systems, see Table 3-10. The vulnerability of these facilities 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. The vulnerability of these facilities to ice storms would be limited to such things as damage to building's roofs and loss of electrical service from downed power lines. Services provided by these facilities would not be interrupted except in extreme cases.
Hazardous Material Sites	Ice, like snow, is more harmful for the potential peripheral impacts than direct impact. Icy road conditions can make emergency vehicle response difficult.

**Ice Storm Risk Assessment Designation**

Ice Storm Historical Occurrence Rating: Moderately High - 6

Ice Storm Vulnerability Rating: Limited – 5

Ice Storm Probability Rating: Likely - 5

Ice Storm Local Official Survey Rating: Medium - 5

**Ice Storm Risk Assessment Designation: High Risk - 21 points**

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

### 3.10 Vernon County - Blizzard Risk Assessment

**Blizzard Definition:** Winter storms can vary in size and strength. A blizzard is the occurrence of sustained wind speeds in excess of 35 miles per hour accompanied by heavy snowfall or large amounts of blowing or drifting snow. True blizzards are rare in Wisconsin, however blizzard-like conditions often exist during heavy snowstorms when gusty winds cause severe blowing and drifting of snow.



Blizzard events have occurred in Vernon County - one blizzard event was recorded in 1996, one in 2007, and one in 2019. These have been reported by the NCDC (Table B-7, Appendix B).

Blizzard Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Blizzard a risk factor of 15 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 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. Blizzards with heavy snowfalls and strong wind speeds could cause structural damage to buildings because of inadequate snow load capacity. Roofing material could be blown off. Businesses and industries' vulnerability to blizzards could include economic loss and disruption of inputs and outputs.
Agriculture	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. 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	Icing on wings and elsewhere on the exterior of an aircraft makes it impossible to fly. Light planes in flight may have to make emergency landings at Viroqua 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 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 30 municipal wells and water systems, see Table 3-10. These facilities vulnerability to blizzards is negligible and would not be interrupted except in extreme cases.
Wastewater Treatment Facilities	There are 10 wastewater treatment facilities in operation in the County, see Table 3-11. 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: Medium - 6  
**Blizzard Risk Assessment Designation: Moderate Risk - 15 points**

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

### 3.11 Vernon County - Extreme Cold Risk Assessment

**Extreme Cold Definition:** Winters are often accompanied by 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 NCDC reported that Vernon County experienced a total of 16 extreme cold events since the mid-1990s. This averages out to be one event every 2 years.

Extreme Cold Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Extreme Cold a risk factor of 19 indicating this natural hazard is a moderate risk to the County. See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. 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 and fuel lines 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 are safety hazards to individual motorists if they have any vehicle mechanical problems, or a driving situation that forces them into the ditch or situation where the vehicle is inoperative. Exposure injury, or death, either in or out of the vehicle, can occur quickly. Adverse impact to the road infrastructure can include contraction of bridge joints; contribute to rock face collapse, and pavement cracking.
Railroads	Extreme cold causes contraction of welded continuous rails, and the imposition of a speed limit by the railroad companies. This speed reduction would impact operations on some railroads. The mechanical components of locomotives, rail cars, and railroad crossing gates can be adversely impacted by extreme cold. The extreme cold can impact railroad operating and maintenance crew's personal safety if they are exposed to the temperatures.
Airway	Extreme cold can adversely impact all 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 30 municipal wells and water systems, see Table 3-10. 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. 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 Risk - 19 points**

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

Draft

### 3.12 Vernon County - Earthquake Risk Assessment



**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 shifts 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 demolition of 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 than 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 Vernon County in recent history.

Earthquake Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Earthquake a risk factor of 4 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 Vernon County in recent history the risk to these facilities is insignificant. See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. Businesses’ vulnerability to earthquakes can range from nothing felt to total destruction and loss of life. Since no major earthquakes have occurred in Wisconsin or Vernon 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 Vernon 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	Extreme cold can adversely impact all the mechanical components of a light aircraft, including the engine and control surfaces. Planes in flight during extreme cold periods can experience engine icing.
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 30 municipal wells and water systems, see Table 3-10. These facilities vulnerability is negligible and would not interrupt services provided by the facilities except in extreme cases.
Wastewater Treatment Facilities	There are 10 wastewater treatment facilities in operation in the County, see Table 3-11. 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 Risk - 4 points**

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

### 3.13 Vernon 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 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 Appendix B-9 Vernon County has experienced 6 extreme heat events during the 1990s, one event in the 2000s and five in the 2010s (Table B-9, Appendix B). So far in the 2020s, no extreme heat events have been recorded. Southwestern Wisconsin logged the most heat wave days of all regions in the state during this time period.

Extreme Heat Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns extreme heat a risk factor of 18 indicating this natural hazard is a moderate risk to the County. See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. 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 30 municipal wells and water systems, see Table 3-10 This vulnerability of these facilities 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. These facilities vulnerability to extreme heat is negligible and would not interrupt services provided except in extreme cases.
Hazardous Material Sites	Hazardous material of various types could volatilize in extreme heat, especially if safety relief valves were not operating properly.

**Extreme Heat Risk Assessment Designation**

Extreme Heat Historical Occurrence Rating: Moderately High – 6

Extreme Heat Vulnerability Rating: Negligible - 2

Extreme Heat Probability Rating: Likely - 5

Extreme Heat Local Official Survey Rating: Medium - 5

**Extreme Heat Risk Assessment Designation: Moderate Risk - 18 points**

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

### 3.14 Vernon 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 in every five people. The United States Department of Commerce – Bureau of Economic Analysis reported that 12.3% of Vernon 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 total loss. Animal diseases in farm animals carry the potential of harming not only the animals' health, but also human health in some cases. Agricultural losses from floods include crop loss, soil erosion or property damage to farm structures and equipment. These are just some of the hazards that may affect agriculture.



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

There are many natural hazards that can affect agricultural production (droughts, floods, extreme temperatures, high winds, hail, insects) to name a few. Department of Revenue records show that in 2021 Vernon County had approximately 273,496 acres of agricultural land. Agricultural hazards can occur annually in the County.

Agricultural Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Agricultural a risk factor of 16 indicating this natural hazard is a moderate risk to the County. Critical facility’s vulnerability to agriculture is not applicable. See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. For most businesses and industries, vulnerability to agriculture production and raising of livestock would be negligible. Businesses and industries involved in the growth, production, processing, manufacturing, distribution and wholesale and retail sales of agricultural 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, and hail. This 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 30 municipal wells and water systems, see Table 3-10. These facilities vulnerability to agriculture is not applicable.
Wastewater Treatment Facilities	There are 10 wastewater treatment facilities in operation in the County, see Table 3-11. 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 are 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 Risk - 16 points**

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

### 3.15 Vernon 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 droughts 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 droughts 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 9<sup>th</sup> 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 Vernon and 63 other counties in the State. A Presidential Emergency Declaration was made for those counties. According to *Wisconsin Emergency Management's Hazard Analysis, December 2021*, Wisconsin's five most significant droughts in terms of severity and duration are: 1929-1934, 1987-1989, 2012, and 2021. Since 1970, there have been three events reported in Vernon County (Table B-10, Appendix B).

Drought Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Drought a risk factor of 16 indicating this natural hazard is a moderate risk 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 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. 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 having crop losses of 50% or more. All Wisconsin counties were designated eligible for drought assistance. The costs and losses to agriculture producers can include reduced yields and crop

loss, increased insect infestation and plant disease, increased irrigation, cost of new or supplemental water resource development, wind erosion of 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.
Railroads	Extended drought could increase the possibility of wildfires. The possible impact of wildfires on the Viroqua airports and on light plane travel has been discussed under that topic.
Airway	In the county there are 30 municipal wells and water systems, see Table 3-10. 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.
Waterway	There are 10 wastewater treatment facilities in operation in the County, see Table 3-11. The vulnerability of these facilities to droughts can include decreased water supply and diminished sewage flows. Services from facilities should not be interrupted except in extreme cases.
Municipal Water	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: Limited - 4

Drought Probability Rating: Possible - 3

Drought Local Official Survey Rating: Medium - 5

**Drought Risk Assessment Designation: Moderate Risk - 15 points**

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

### 3.16 Vernon 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 delays to trucking companies ranges from \$2.2 to \$3.5 billion annually (DOT, 2007). 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 Vernon County (NHTSA 2020).

Fog Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Fog a risk factor of 12 indicating this natural hazard is a low threat to the County. The vulnerability of critical facilities to fog is negligible and would not interrupt services provided by these facilities. See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. 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. 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 Viroqua 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 30 municipal wells and water systems, see Table 3-10. These facilities vulnerability to fog is negligible and would not interrupt services provided by these facilities.
Wastewater Treatment Facilities	There are 10 wastewater treatment facilities in operation in the County, see Table 3-11. 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 Risk - 12 points**

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

### 3.17 Vernon County - Landslide Risk Assessment

**Landslide Definition:** A landslide is a 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 historical information was found relating to landslides occurring in Vernon County. The majority of Vernon County is bluff land. There are slopes exceeding 30% on these bluff sides throughout the County. The areas with higher slope and runoff potential are more susceptible to landslides. The north easter part of Vernon County has a flatter terrain and is less susceptible to landslides.



In Wisconsin landslides are not often 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 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Landslide a risk factor of 11 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 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. For most businesses and industries vulnerability to landslides would be negligible except for buildings located next to steep slopes or bluffslands.
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	Landslides could cause parked planes to smash into one another and hangers or other structures could be damaged. Obviously, landslides would have no direct effect on an airborne aircraft, but runway damage could occur, with mud or debris covering it.
Waterway	A large landslide into a waterway could cause wave action, and 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 30 municipal wells and water systems, see Table 3-10. 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. 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 Risk - 11 points**

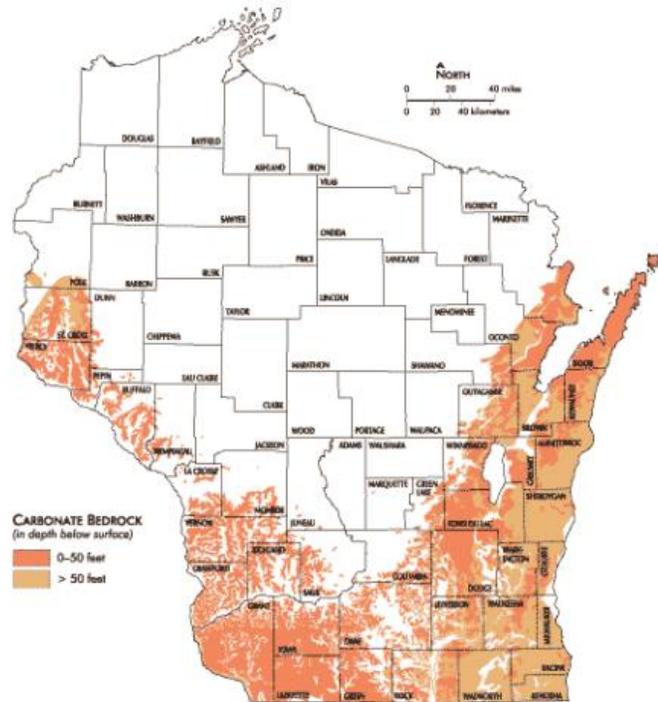
*\*See Table 3-2 for a detailed analysis to determine the above Risk Assessment Designation.*

### 3.18 Vernon 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 feature.

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 potential 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 Vernon County. The map above shows the location of carbonate bedrock in Vernon County. Carbonate bedrock is an indicator of higher risk of subsidence at a given location. As seen on the map, there are numerous places across the county with karst features susceptible to subsidence.



Karst potential in Wisconsin

Subsidence Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. The Natural Hazard Risk Assignment assigns Subsidence a risk factor of 10 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 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. 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 they have occurred in other areas, often happen suddenly, and a vehicle on the highway could fall into a hole opening beneath it. The danger of the large subsidence area remains a threat to an unsuspecting motorist, especially at night, until proper barricades can be put up. The threat of subsidence is greater on the ridge top and side hill areas than in the valleys.
Railroads	Subsidence along the railroad tracks could come from direct undermining of the banks by river action.
Airway	The Viroqua 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 30 municipal wells and water systems, see Table 3-10. Sinkholes can cause damage to structures and underground piping that carries the water supply. Wells can be contaminated by 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. 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 Risk - 10 points**

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

### 3.19 Vernon 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 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 6,879,677 deaths worldwide as of March 2023. COVID-19 is an ongoing pandemic worldwide. As of March 2023, Vernon County had 7,619 cases and 113 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.



Pandemic Flu Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) 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 services will be impacted by employees who are unable to come to work. See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. 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 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 crop 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 United States 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 infected people are a means of spreading a pandemic flu quickly throughout the United States 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 United States and the world. A way of slowing this spread will be to close 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 30 municipal wells and water systems, see Table 3-10. The vulnerability of these facilities 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. The vulnerability of these facilities 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 enough effective medications exist and that a feasible means of distributing them is in place.
3. Dismissal of students from school (including public and private schools, as well as colleges and universities) and school-based activities and closure of childcare programs, coupled with protecting children and teenagers through social distancing in the community to achieve reductions of out-of-school social contacts and community mixing.
4. Use of social distancing measures to reduce contact between adults in the community and workplace, including, for example, cancellation of large public gatherings and alteration of workplace environments and schedules to decrease social density and preserve a healthy workplace to the greatest extent possible without disrupting essential services. Enable institution of workplace leave policies that align incentives and facilitate adherence with the nonpharmaceutical interventions outlined above.

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

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

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

**Pandemic Risk Assessment Designation**  
 Pandemic Historical Occurrence Rating: Low - 2  
 Pandemic Vulnerability Rating: Critical - 6  
 Pandemic Probability Rating: Likely - 5  
 Pandemic Local Official Survey Rating: Low - 3  
**Pandemic Risk Assessment Designation: Moderate Risk - 16 points**

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

Case Fatality Ration	Category	Projected Number of Deaths United States 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*

### 3.20 Vernon 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 Vernon County there is only one rail line, the Burlington Northern-Santa Fe runs along the Mississippi River from the northern county line south to De Soto.



Train accidents are in most cases 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.

From 1980 to 2020 there have been 9 railroad accidents causing \$1,006,840 in total damages (Table B-11, Appendix B). Based on this data, in the next five years we can estimate 1 accident occurring with damages totaling an estimated \$111,871.

Railroad Vulnerability Assessment	
Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) schools. These facilities could be severely affected from a train derailment. The structures could be destroyed or damaged by an explosion from a derailment, they could be forced to evacuate, or they could be cut off due to road closures. See Tables 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. In Vernon County, the Burlington Northern-Santa Fe rail line runs through the Villages of Stoddard, Genoa, and De Soto. Due to the location and layout of these incorporated communities most 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. 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	State Highway 35 runs parallel to the Burlington Northern-Santa Fe rail line, a derailment causing an evacuation could shut down this significant roadway in the county. In addition to potential evacuations train derailments could potentially close roads which cross over tracks if the derailment would occur at these points.
Railroads	Train derailments have a huge impact on railroads as any derailment cases a shutdown of that line until the derailment can be cleared.

Airway	Train derailments impact on air travel 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 Burlington Northern-Santa Fe rail line runs along the Mississippi River. A train derailment along the line could potentially spill pollutants into the river. In addition, the rail line also runs adjacent to Lock and Dam 8 in Genoa. A derailment on these tracks alongside the lock could potentially damage or shut down the lock which would close the Mississippi River to all boat traffic both recreational and commercial.
Municipal Water	In the county there are 30 municipal wells and water systems, see Table 3-10. The vulnerability of these facilities 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. Two of these facilities are located in close proximity to rail lines, these facilities are located in the Villages of Stoddard and Genoa. 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.

**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

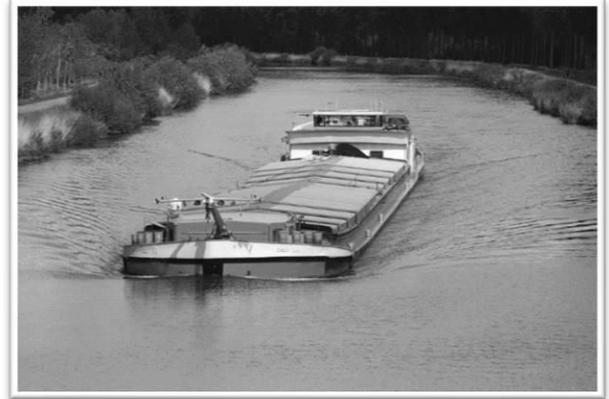
**Railroads Risk Assessment Designation: Low Risk - 14 points**

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

### 3.21 Vernon 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 Vernon County. The border starts at the Village of De Soto, river mile 667 and ends at river mile 691 at the Vernon/La Crosse county line, a total distance of 24 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 United States Army 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 24 miles of the Mississippi River which flows through Vernon County there is one Lock and Dam. Lock and Dam 8 is located at mile marker 679.



During the 2022 season, United States Army Corps of Engineers staff supported 1,591 commercial navigation lockages at Lock and Dam 8, near Genoa, Wisconsin, which is below the 10-year average of 1,792 lockages. The 2022 lockages supported more than 9 million tons, or approximately 5,404 barges of commodities shipped by the navigation industry. During the 2021 season, Corps staff supported 1,799 commercial lockages and the movement of more than 10 million tons of commodities.

In addition to the commercial lockages, Corps staff locked 2,513 recreation vessels during 1,079 lockages. To minimize lockages, the Corps tries to include multiple recreation vessels during a single lockage. There were an additional 24 lockages from various government agencies including the Corps.

**"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 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 the county when hazardous materials are being transported or how much is being transported. Without 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.

**River Traffic History and Frequency:**

No historical data is available. This will be improved in the future through the creation of the Northern Grain Belt Port Statistical Area, which was created precisely for this purpose – to create statistics on freight moving through the Mississippi River within the region.

### River Traffic Vulnerability Assessment

Critical Facilities	In the county 88 service orientated critical facilities were identified. These include (16) government and military facilities; (22) hospitals, clinics, and residential facilities; (23) police and fire facilities; and (27) 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 3-6 through 3-9 and Maps 3-1 through 3-4 for further information and location of these facilities.
Business and Industry	In Vernon County there are 599 businesses and industries that employ 7,550 people, with an annual payroll of approximately \$305 million, see Table 3-5. In Vernon County Lock and Dam 8 is located in the Village of Genoa. Due to its location, businesses and industries located within the Village of Genoa would 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 Vernon County lie in areas that would not be affected by a River Traffic accident.
Waterway	An accident on the Mississippi River would shut down the river to commercial traffic until the accident was cleaned up. This would not only affect the river traffic passing through Vernon County.
Municipal Water	In the county there are 30 municipal wells and water systems, see Table 3-10. The vulnerability of these facilities 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 10 wastewater treatment facilities in operation in the County, see Table 3-11. Four of these facilities are located along the Mississippi River, these facilities are located in Genoa and the Village of Stoddard. 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.

#### River Traffic Risk Assessment Designation

River Traffic Historical Occurrence Rating: No Data

River Traffic Vulnerability Rating: Negligible - 1

River Traffic Probability Rating: Unlikely - 1

River Traffic Local Official Survey Rating: Low - 1

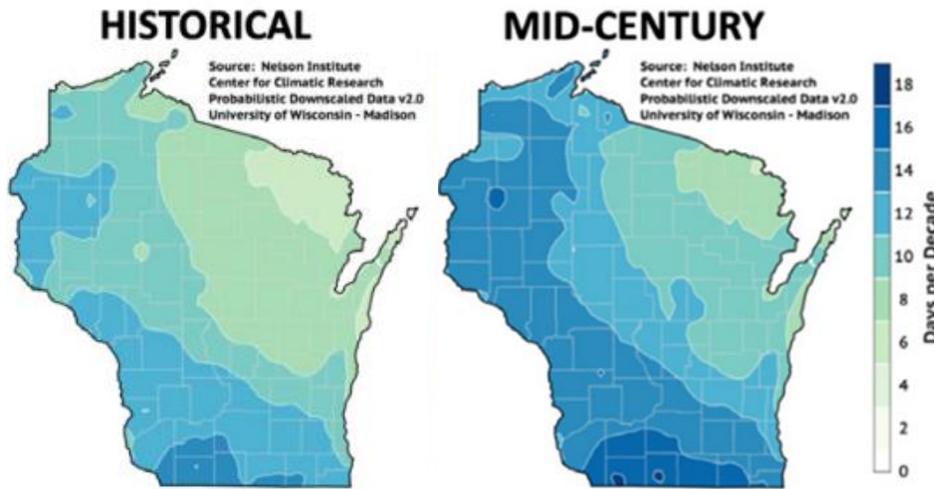
**River Traffic Risk Assessment Designation: Low Risk - 3 points**

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

### 3.22 Vernon County - Climate Change Risk Assessment

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

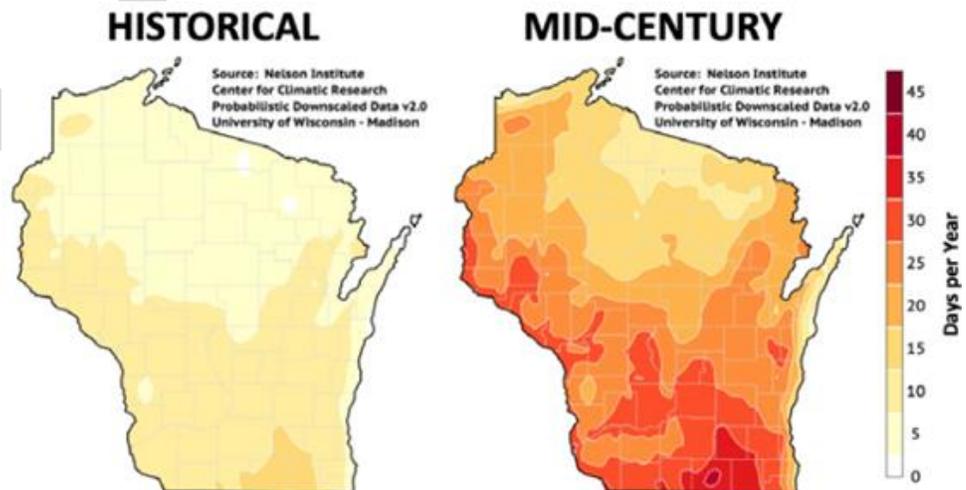


Extreme precipitation events will become more likely in the coming century. The frequency of days with 2 or more inches of precipitation in a 24-hour period is shown in these figures.

Source: 2021 Assessment Report: Wisconsin's Changing Climate, The Climate Explorer

Changes in temperature can increase the frequency and severity of extreme weather events. By mid-century, extreme heat days (days with temperatures over 90°F) will likely triple.

Source: 2021 Assessment Report: Wisconsin's Changing Climate, The Climate Explorer



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 Vernon 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 lakes and streams.
- Other potential impacts of concern for Vernon 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 Vernon 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 Vernon 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.

**Climate Change Risk Assessment Designation**

Climate Change Historical Occurrence Rating: No Data

Climate Change Vulnerability Rating: Limited - 3

Climate Change Probability Rating: Possible - 3

Climate Change Local Official Survey Rating: No Data

**Climate Change Risk Assessment Designation: Low Risk - 6 points**

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

**Table 3-1 Vernon County Local Official’s Hazard Risk Assessment Survey Results**

In 2022 the Vernon County Emergency Management Director 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 Chairpersons, Schools, 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 the results of this survey. Seventy-five surveys were mailed out and twenty-five were returned.

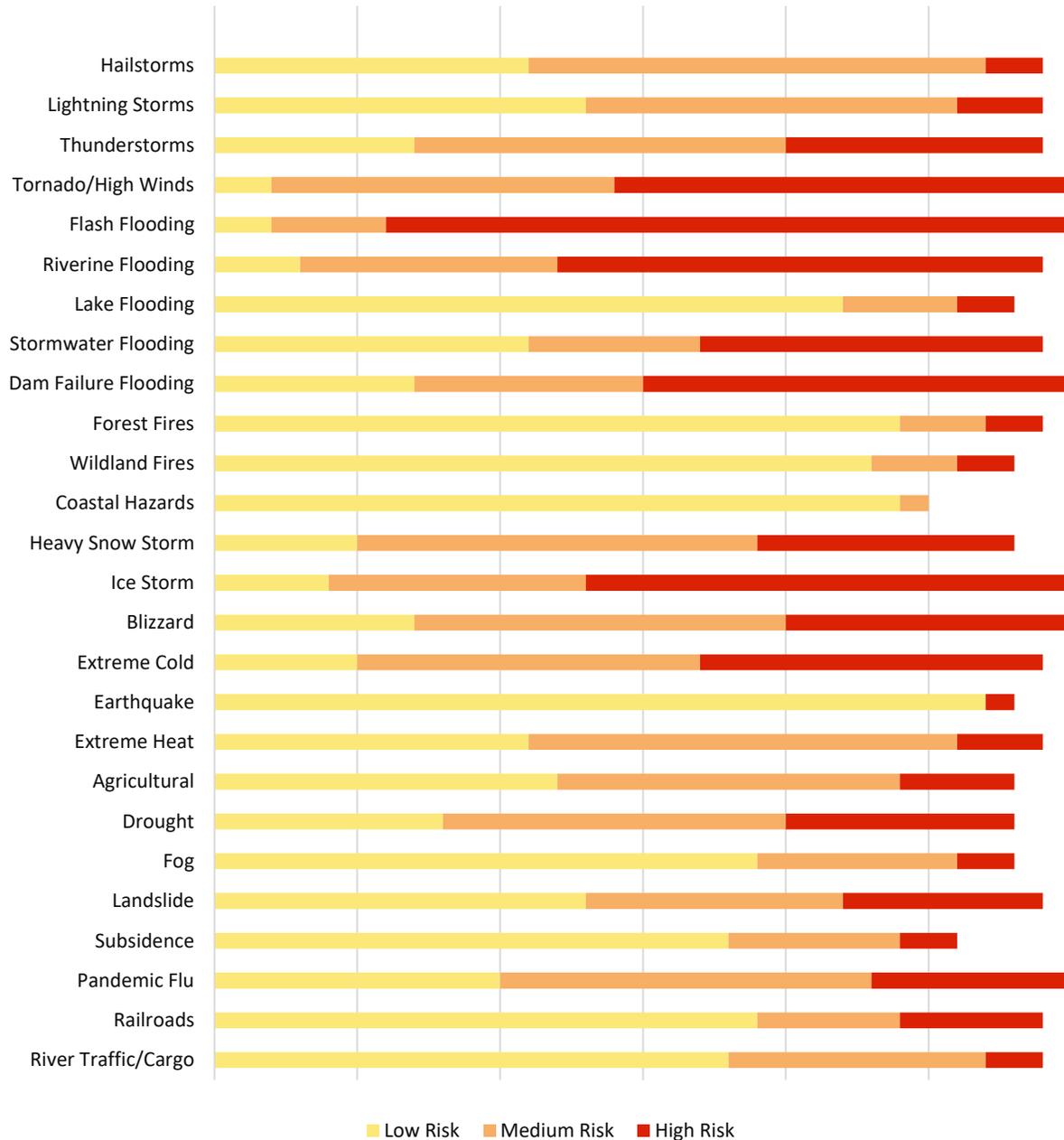


Table 3-2 Vernon County Hazard Risk Assessment

Natural Hazards:	<p><i>Historical Occurrence Rating Criteria:</i></p> <ul style="list-style-type: none"> <li>• &lt; 4 occurrences in the past 25 years: <i>Low rating, 1-3 points</i></li> <li>• 4-7 occurrences in the past 25 years: <i>Moderately Low rating, 3-5 points</i></li> <li>• 8-12 occurrences in the past 25 years: <i>Moderately High rating, 5-7 points</i></li> <li>• &gt;12 occurrences in the past 25 years: <i>High rating, 7-9 points</i></li> </ul>	<p><i>Vulnerability Rating Criteria:</i></p> <ul style="list-style-type: none"> <li>• &lt;10% of population or property adversely affected: <i>Negligible rating, 1-3 points</i></li> <li>• 10%-25% of population or property adversely affected: <i>Limited rating, 3-5 points</i></li> <li>• 25%- 50% of the population or property adversely affected: <i>Critical rating, 5-7 points</i></li> <li>• &gt;50% of the population or property adversely affected: <i>Catastrophic rating, 7-9 points</i></li> </ul>	<p><i>Probability Rating Criteria:</i></p> <ul style="list-style-type: none"> <li>• &lt;1% probability in the next 100 years: <i>Unlikely rating, 1-3 points</i></li> <li>• 1%-10% probability in the next year or at least one chance in next 100 years: <i>Possible rating, 3-5 points</i></li> <li>• 10%-100% probability in the next year or at least one chance in the next 10 years: <i>Likely rating, 5-7 points</i></li> <li>• Nearly 100% chance in the next year: <i>Highly Likely rating, 7-9 points</i></li> </ul>	<p><i>Local Official Hazard Survey Rating Criteria:</i></p> <ul style="list-style-type: none"> <li>• A majority of local officials were of the opinion that this hazard posed a “low” threat to health and public: <i>Low rating, 1-3 points</i></li> <li>• A majority of local officials were of the opinion that this hazard posed a “medium” threat to health and public safety: <i>Medium rating, 3-6 points</i></li> <li>• A majority of local officials were of the opinion that this hazard posed a “high” threat to health and public safety: <i>High rating, 6-9 points</i></li> </ul>	<p><i>Risk Factor Rating Total:</i></p>	<p><i>Risk Assessment Designation:</i></p> <ul style="list-style-type: none"> <li>• A combined risk factor rating of 14 points or less: <i>Low Threat</i></li> <li>• A combined risk factor rating of 15 to 21 points: <i>Moderate Threat</i></li> <li>• A combined risk factor rating of 22 points or greater: <i>High Threat</i></li> </ul>
Hailstorm	9	4	7	4	<b>24</b>	High
Lightning Storm	9	4	9	3	<b>25</b>	High
Thunderstorm	9	4	9	4	<b>26</b>	High
Tornado/High Winds	5	6	4	7	<b>22</b>	High
Riverine/Flash Flooding	9	6	7	8	<b>30</b>	High
Dam Failure Flooding	2	4	3	8	<b>17</b>	Moderate
Forest/Wildland Fires	2	2	3	2	<b>9</b>	Low
Heavy Snowstorm	9	4	7	5	<b>25</b>	High
Ice Storm	6	5	5	5	<b>21</b>	High
Blizzard	2	2	5	6	<b>15</b>	Moderate
Extreme Cold	6	3	5	5	<b>19</b>	Moderate
Earthquake	1	1	1	1	<b>4</b>	Low
Extreme Heat	6	2	5	5	<b>18</b>	Moderate
Agricultural	5	4	5	2	<b>16</b>	Moderate
Drought	3	4	3	5	<b>15</b>	Moderate
Fog	3	3	4	2	<b>12</b>	Low
Landslide	2	3	4	2	<b>11</b>	Low
Subsidence	2	3	4	1	<b>10</b>	Low
Pandemic Flu	2	6	5	3	<b>16</b>	Moderate
Railroads	4	2	5	3	<b>14</b>	Low
River Traffic	0	1	1	1	<b>3</b>	Low
Climate Change	0	3	3	1	<b>7</b>	Low

Table 3-3 Vernon County Structures in the FEMA 100-Year Floodplain

Municipality	Number of Parcels	2023 Land Value	2023 Assessed Improvements Value	Total Assessed Value
T. Bergen	17	\$290,400	\$1,644,300	\$1,934,700
T. Christiana	5	\$325,400	\$254,200	\$579,600
T. Clinton	30	\$251,450	\$3,570,400	\$3,821,850
T. Coon	5	\$132,500	\$670,000	\$802,500
T. Forest	20	\$73,800	\$524,400	\$598,200
T. Franklin	1	\$20,300	\$121,200	\$141,500
T. Genoa	1	\$17,400	\$48,900	\$66,300
T. Hamburg	2	\$102,100	\$177,100	\$279,200
T. Harmony	1	\$19,800	\$38,100	\$57,900
T. Jefferson	3	\$42,400	\$124,200	\$166,600
T. Kickapoo	5	\$79,000	\$550,700	\$629,700
T. Liberty	5	\$92,600	\$435,900	\$528,500
T. Stark	2	\$20,800	\$94,400	\$115,200
T. Sterling	4	\$76,100	\$257,500	\$333,600
T. Viroqua	2	\$33,400	\$273,500	\$306,900
T. Webster	8	\$97,800	\$257,800	\$355,600
T. Wheatland	59	\$1,902,400	\$2,918,800	\$4,821,200
T. Whitestown	2	\$4,800	\$5,500	\$10,300
V. Chaseburg	3	\$57,000	\$237,200	\$294,200
V. Genoa	14	\$285,900	\$1,195,800	\$1,481,700
V. La Farge	31	\$169,400	\$1,510,600	\$1,680,000
V. Ontario	11	\$64,500	\$90,100	\$154,600
V. Readstown	14	\$48,700	\$357,300	\$406,000
V. Viola	18	\$48,300	\$699,700	\$748,000
C. Hillsboro	5	\$68,300	\$209,500	\$277,800
<b>Vernon County Total</b>	<b>268</b>	<b>\$4,324,550</b>	<b>\$16,267,100</b>	<b>\$20,591,650</b>

Table 3-4 Vernon County Transportation Assessment

Municipality	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 Sante Fe Rail Miles	Total Rail Miles
T. Bergen	8.44	3.45	10.05	44.95		66.89	3.8	3.8
T. Christiana	7.53		10.35	56.32		74.20		0.0
T. Clinton			16.92	55.75		72.67		0.0
T. Coon	5.99	1.47	11.98	56.41		75.85		0.0
T. Forest	6.57	0.68	22.82	41.07		71.14		0.0
T. Franklin	14.02		17.41	65.55		96.98		0.0
T. Genoa	5.67	4.82	3.69	57.89		72.07	7.6	7.6
T. Greenwood	6.04		19.43	37.75		63.22		0.0
T. Hamburg	3.44	7.47	9.56	41.39		61.86		0.0
T. Harmony		6.92	16.96	52.15		76.03		0.0
T. Hillsboro	6.50	2.45	17.88	42.00		68.83		0.0
T. Jefferson		6.45	20.50	71.01		97.96		0.0
T. Kickapoo	14.90		11.58	50.25		76.73		0.0
T. Liberty	6.51		10.72	18.89		36.12		0.0
T. Stark	6.39	5.38	8.64	38.52		58.93		0.0
T. Sterling	7.51		14.97	61.72		84.20		0.0
T. Union		8.10	11.35	39.42		58.87		0.0
T. Viroqua	10.88	2.10	18.36	75.40		106.74		0.0
T. Webster		7.54	15.24	49.42		72.20		0.0
T. Wheatland	9.42		4.98	40.21		54.61	5.0	5.0
T. Whitestown	7.89	2.62	8.21	48.79		67.51		0.0
V. Chaseburg		1.17	0.54		1.67	3.38		0.0
V. Coon Valley	1.13	0.41	0.39		4.98	6.91		0.0
V. De Soto	2.31				3.11	5.42	0.2	0.2
V. Genoa	1.48	0.54			2.52	4.54	1.4	1.4
V. La Farge	1.13	1.13			7.89	10.15		0.0
V. Ontario	2.08	0.72	0.43		4.23	7.46		0.0
V. Readstown	3.00				6.31	9.31		0.0
V. Stoddard	0.93	0.50			4.80	6.23	2.2	2.2
V. Viola	1.47				3.18	4.65		0.0
C. Hillsboro	2.23		1.88		10.13	14.24		0.0
C. Viroqua	3.56	0.87	0.42		29.30	34.15		0.0
C. Westby	2.76				15.14	17.90		0.0
<b>County Total</b>	<b>149.78</b>	<b>64.79</b>	<b>285.26</b>	<b>1044.86</b>	<b>93.26</b>	<b>1637.90</b>	<b>20.2</b>	<b>20.2</b>

(2) There are five jurisdictional classifications: Interstate Highways (e.g. I94), State System Highways (e.g. USH 14-STH 171), County Highways (e.g. CTH B), Town Roads (e.g. Mound Ridge Rd), and Village/City Streets (e.g. 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 (e.g. USHs 14/61, STH 35, STH 27) or as Major/Minor collectors (e.g. STH 179). Some local roads that are not identified as state systems roads may be a "federal aid" road.

Table 3-5 Vernon County Business Vulnerability Assessment

<i>NAICS Code and Description</i>	<i>No. of Employees (1)</i>	<i>Annual Payroll (\$1,000) (2)</i>	<i>No. of Establishments</i>
<b>Vernon County Totals</b>	<b>7,550</b>	<b>305,346</b>	<b>599</b>
11 Agriculture, forestry, fishing and hunting	26	1,083	3
22 Utilities	103	9,776	3
23 Construction	264	16,658	73
31-33 Manufacturing	1,999	84,914	26
42 Wholesale trade	431	30,667	27
44-45 Retail trade	1,096	31,969	82
48-49 Transportation and warehousing	187	8,092	34
51 Information	175	7,466	16
52 Finance and insurance	282	12,363	34
53 Real estate, rental, and leasing	28	954	17
54 Professional, scientific, and technical services	160	6,824	37
56 Administrative, support, waste management, and remediation service	118	12,410	14
61 Educational services	71	1,228	10
62 Health care and social assistance	1,729	69,061	77
71 Arts, entertainment, and recreation	42	810	12
72 Accommodation and food services	630	6,496	58
81 Other services (except public administration)	230	4,320	72
99 Unclassified establishments	5	255	4
11 Agriculture, forestry, fishing, and hunting	26	1,083	3

Source: States 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.

Table 3-6 Vernon County Critical Facilities: Government and Military Facilities

<i>Critical Facility Name</i>	<i>Community</i>	<i>Address</i>	<i>Telephone</i>
Chaseburg Village Hall	Chaseburg	400 Depot Street	(608) 483-2660
Coon Valley Village Hall	Coon Valley	108 Roosevelt Street	(608) 452-3139
De Soto Village Hall	De Soto	115 Houghton Street	(608) 648-2700
Genoa Village Hall	Genoa	406 Main Street	(608) 689-2510
Hillsboro City Hall	Hillsboro	123 Mechanic Street	(608) 489-2521
La Farge Village Hall	La Farge	105 W Main Street	(608) 625-4422
National Guard Armory Viroqua	Viroqua	600 Dyson Street	(608) 637-7539
Ontario Village Hall	Ontario	205 State Street	(608) 337-4381
Readstown Village Hall	Readstown	116 N 4th Street	(608) 629-5627
Stoddard Village Hall	Stoddard	180 N Main Street	(608) 457-2136

**Table 3-6 Vernon County Critical Facilities: Government and Military Facilities**

<i>Critical Facility Name</i>	<i>Community</i>	<i>Address</i>	<i>Telephone</i>
Vernon County Courthouse	Viroqua	400 Courthouse Square, Room 108	(608) 637-5380
Vernon County Human Services	Viroqua	318 Fairlane Drive, Suite 100	(608) 637-5210
Vernon County Land and Water Conservation Building	Viroqua	220 Airport Road	(608) 637-5480
Viola Village Hall	Viola	106 W Wisconsin Street	(608) 627-1831
Viroqua City Hall	Viroqua	124 W Decker Street	(608) 637-7186
Westby City Hall	Westby	200 North Main Street	(608) 634-3214

See Map 3-1 for the location of these government and military facilities.

**Table 3-7 Vernon County Critical Facilities: Hospitals, Clinics, and Residential Care Facilities**

<i>Critical Facility Name</i>	<i>City</i>	<i>Address</i>	<i>Telephone</i>
Coulee View	Coon Valley	98 Hiawatha Street	(608) 637-6355
Gunderson St. Joseph's Hillsboro Clinic	Hillsboro	400 Water Avenue	(608) 489-8000
Gundersen St. Joseph's Hospital	Hillsboro	400 Water Avenue	(608) 489-8000
Milestone Senior Living	Hillsboro	504 Salsbery Circle	(608) 350-1567
Bethel Parkside	La Farge	315 W Adams Court	(608) 637-6344
La Farge Medical Clinic	La Farge	206 N Mill Street	(608) 625-2494
Sherry House Assisted Care	Readstown	440 E Center Street	(608) 629-5150
Creamery Creek - Stoddard	Stoddard	880 Broadway Street	(608) 457-2888
Pleasant Valley Seniors	Stoddard	W466 County Road K	(608) 878-6384
Viola House	Viola	509 S Wagoner Street	(608) 627-1111
Bethel Home & Services	Viroqua	614 S Rock Avenue	(608) 637-2171
Gundersen Viroqua Clinic	Viroqua	407 S Main Street	(608) 637-3195
Aspen Place CBRF	Viroqua	614 S Rock Street	(608) 637-2171
Bethel Oaks Memory Care	Viroqua	620 S Garfield Avenue	(608) 637-6310
Creamery Creek - Viroqua	Viroqua	1049 Chicago Avenue	(608) 638-1600
Hirsch Clinic	Viroqua	407 S Main Street	(608) 638-6003
Maplewood Terrace	Viroqua	620 Garfield Avenue	(608) 637-6344
Vernon Area Rehab Center Group Home	Viroqua	811 Rogers Avenue	(608) 637-2353
Vernon Manor	Viroqua	310 Fairlane Drive	(608) 637-5400
Vernon Memorial Hospital	Viroqua	507 S Main Street	(608) 637-2101
Bland Clinic Vernon Memorial Hospital	Westby	100 Melby Street	(608) 634-3316
Norseland Nursing Home	Westby	323 Black River Road	(608) 634-3747

See Map 3-2 for the location of these hospitals, clinics, and residential care facilities.

Table 3-8 Vernon County Critical Facilities: Police and Fire Facilities

<i>Critical Facility Name</i>	<i>City</i>	<i>Address</i>	<i>Telephone</i>
<b>Fire Departments</b>			
Coon Valley Volunteer Fire Department	Coon Valley	205 Anderson Street	(608) 452-3688
De Soto Volunteer Fire Department	De Soto	900 Main Street	(608) 648-3303
Genoa Volunteer Fire Department	Genoa	126 Main Street	(608) 689-2151
Hillsboro Area Fire Department	Hillsboro	PO Box 245	(608) 489-2908
La Farge Fire Department	La Farge	201 S Silver Street	(608) 625-2185
Ontario Fire Department	Ontario	205 State Street	(608) 337-4315
Readstown Fire Department	Readstown	105 N Railroad Street	(608) 629-5556
Stoddard-Bergen Volunteer Fire Dept	Stoddard	188 N Main Street	(608) 457-2118
Viola Fire Department	Viola	204 N Main Street	(608) 627-1631
Viroqua Fire Department	Viroqua	702 E Broadway	(608) 637-3118
Westby-Christiana Fire Protection District	Westby	511 Ramsland Street	(608) 634-4300
Wheatland Fire Department	De Soto	E2177 State Hwy 82	(608) 648-2600
Yuba Fire Department	Yuba	22153 Main Street	(608) 604-1890
<b>Police Departments</b>			
Coon Valley Police Department	Coon Valley	205 Anderson Street	(608) 452-3884
Hillsboro Police Department	Hillsboro	125 Mechanic Street	(608) 489-2800
La Farge Police Department	La Farge	201 S Cherry Street	(608) 625-4500
Ontario Police Department	Ontario	313 Main Street	(608) 337-4800
Readstown Police Department	Readstown	116 N 4th Street	(608) 629-5772
Stoddard Police Department	Stoddard	180 North Main Street	(608) 457-2123
Vernon County Sheriff's Office	Viroqua	1320 Bad Axe Court	(608) 637-2124
Viola Police Department	Viola	106 W Wisconsin Street	(608) 627-1831
Viroqua Police Department	Viroqua	702 East Broadway Street	(608) 637-2121
Westby Police Station	Westby	200 N Main Street	(608) 634-3416

See Map 3-3 for the location of these police and fire departments.

Table 3-9 Vernon County Critical Facilities: Schools

<i>Critical Facility Name</i>	<i>City</i>	<i>Address</i>	<i>Telephone</i>
<b>Public Schools</b>			
Coon Valley Elementary	Coon Valley	300 Lien Street	(608) 452-3143
De Soto Middle School	De Soto	615 Main Street	(608) 648-0100
De Soto High School	De Soto	615 Main Street	(608) 648-0101
Hillsboro Elementary School	Hillsboro	853 Hillsborough Avenue	(608) 489-2224
Hillsboro High School	Hillsboro	777 School Road	(608) 489-2221
Kickapoo Elementary	Viola	S6520 State Highway 131	(608) 627-1494
Kickapoo High School	Viola	S6520 State Highway 131	(608) 627-1494
Kickapoo Valley Forest School	La Farge	S3661 State Highway 131	(608) 639-0565
La Farge Elementary School	La Farge	301 W Adams Street	(608) 625-2400
La Farge High School	La Farge	302 W Adams Street	(608) 625-2401
La Farge Middle School	La Farge	303 W Adams Street	(608) 625-2402
Laurel High School	Viroqua	100 Blackhawk Drive	(608) 637-1614
Prairie View Elementary School	De Soto	E3245 County Road N	(608) 648-2227
Stoddard Elementary	Stoddard	300 N Cottage Street	(608) 457-2101
Viroqua High School	Viroqua	100 Blackhawk Drive	(608) 637-3191
Viroqua Middle School	Viroqua	101 Blackhawk Drive	(608) 637-3171
Viroqua Elementary	Viroqua	115 N Education Avenue	(608) 637-7071
Westby Elementary School	Westby	122 Nelson Street	(608) 634-0500
Westby High School	Westby	206 West Avenue South	(608) 634-3101
Westby Middle School	Westby	206 West Avenue South	(608) 634-3102
<b>Private Schools</b>			
Coon Valley Christian School	Westby	E5151 Nesselte Road	(608) 799-2086
Cornerstone Christian Academy	Viroqua	S3655 Duncan Lane	(608) 634-4102
Pleasant Ridge Waldorf School	Viroqua	431 E Court Street	(608) 637-7828
St. Charles Elementary School	Genoa	707 Eagle Street	(608) 689-2646
St. Matthew's Lutheran School	Stoddard	303 N Main Street	(608) 457-2700
Youth Initiative High School	Viroqua	500 E Jefferson Street	(608) 637-6445
Viroqua Area Montessori School	Viroqua	115 N Education Avenue	(608) 637-7071

See Map 3-4 for the location of these schools.

Table 3-10 Vernon County Critical Facilities: Wells

<i>Community</i>	<i>Construction Date</i>	<i>Well Bottom (ft)</i>	<i>Static Water Level (ft)</i>	<i>Well Status</i>
Bergen	10/1/1977	126.7	26.3	Active
Chaseburg	1/1/1972	222	43	Active
Coon Valley	8/2/1990	275	14	Active
Coon Valley	4/28/1975	278	0	Active
Franklin	9/1/1967	275	200	Active
Genoa	10/23/1990	165	38	Active
Genoa	11/7/1991	125	62	Active
Genoa	5/16/1967	85	40	Active
Genoa	1/1/1968	230	93	Active
Hillsboro	1/1/1951	327	60	Active
Hillsboro	1/1/1965		75	Active
Hillsboro	7/1/2009	205	61.5	Active
Hillsboro	10/10/2013	354	58.5	Active
La Farge	1/1/1964	417	12	Active
La Farge	11/22/1995	460	74	Active
La Farge	8/21/1996	271	77	Active
Ontario	1/1/1948	186	32.5	Active
Readstown	10/24/1984	320	21	Active
Stoddard	1/1/1940	152	38	Active
Stoddard	8/17/1995	152	36	Active
Viroqua	1/11/1994		475	Active
Viroqua	12/1/2003	1100	450	Active
Viroqua	7/24/2013	1155	490	Active
Westby	5/1/1959	1100	411	Active
Westby	1/1/1977	1110	453	Active

*Source: DNR Groundwater Retrieval Network Well Inventory (Well Use: Municipal Community or Other than Municipal Community and Well Status: Active)*

**Table 3-11 Vernon County Critical Facilities: Wastewater Treatment Facility (WWTF)**

<i>Critical Facility Name</i>	<i>Community</i>	<i>Address</i>	<i>Telephone</i>
Chaseburg Wastewater Treatment Facility	Chaseburg	400 Depot Street	(608) 483-2660
Coon Valley Wastewater Treatment Facility	Coon Valley	PO Box 129	(608) 452-3168
Hillsboro Wastewater Treatment Facility	Hillsboro	123 Mechanic Street	(608) 489-2521
La Farge Wastewater Treatment Plant	La Farge	PO Box 39	(608) 625-2333
Ontario Wastewater Treatment Facility	Ontario	205 State Street	(608) 337-4381
Readstown Wastewater Treatment Facility	Readstown	126 W Elmo St	(608) 629-5463
Stoddard Wastewater Treatment Facility	Stoddard	PO Box 236	(608) 457-2136
Viola Wastewater Treatment Facility	Viola	PO Box 38	(608) 627-1831
Viroqua Wastewater Treatment Facility	Viroqua	202 Main Street	(608) 637-3284
Westby Wastewater Treatment Facility	Westby	200 N Main Street	(608) 634-3214
Chaseburg Wastewater Treatment Facility	Chaseburg	400 Depot Street	(608) 483-2660

Source: Municipal Wastewater WPDES Permittees (WIDNR)

**Table 3-12 Vernon County Critical Facilities: Hazardous Material Sites**

<i>Facility/Site Name</i>	<i>Address</i>	<i>Municipality</i>
Army Corps of Engineers Lock & Dam #8	4405 State Highway 35	Genoa
AT&T	E5955 US Highways 14/61	Westby
ATI Forged Products	100 Jack Berg Lane	Coon Valley
Chaseburg Creamery	203 S Main Street	Chaseburg
Chaseburg Office & Warehouse	377 N Main Street	Chaseburg
City of Viroqua Airport	1320 Ellis W Road	Viroqua
City of Viroqua Sand/Salt Storage	602 N Rock Street	Viroqua
City of Westby	200 N Main Street	Westby
Consolidated Energy Company	215 Swiggum Road	Westby
Consolidated Energy Company	713 E Broadway Street	Viroqua
Dairyland Power Station #3	S4651 State Highway 34	Genoa
De Soto Salt Shed	E1715 Will Kumlin Road	De Soto
Dutch Hollow Shop	E12938 Dutch Hollow Road	La Farge
FERRELLGAS L. P.	E7584 County Road SS	Viroqua
Genoa National Fish Hatchery	S5631 State Highway 35	Genoa
Hillsboro – 702 United Cooperative	S729 County Road HH	Hillsboro
Hillsboro Equipment	E18898 Highways 33, 80, 82	Hillsboro
Hillsboro Street Department	101 Crest Avenue	Hillsboro
Kickapoo Area School District	S6520 State Highway 131	Kickapoo
Land O'Lakes - Hillsboro	186 E Main Street	Hillsboro
Mageland Oil & Fuels LLC	316 Railroad Avenue	Viroqua
Nelson Global Products Inc	1202 Nelson Parkway	Viroqua
Ornu Ingredients North America	1401 County Highway HH	Hillsboro
Premier Cooperative	107 Railroad Avenue	Viroqua

**Table 3-12 Vernon County Critical Facilities: Hazardous Material Sites**

<i>Facility/Site Name</i>	<i>Address</i>	<i>Municipality</i>
Premier Cooperative	405 S Main Street	Westby
Rock Solid Rental and Storage Solutions LLC	S1483 State Highway 27	Westby
Select Sires Inc.	E6975 Unseth Road	Westby
Sheldon's Asphalt Paving	E8004 State Highway 56	Viroqua
ST Genetics	E7001 Unseth Road	Westby
Town of Bergen	N2094 Proksch Road	Stoddard
Town of Christina	505 N Saugstad Road	Westby
Town of Clinton Shop	S945 County Road D	Cashton
Town of Franklin	S6635 Highway 22	Viroqua
Town of Genoa - Garage	S5165 S Creek Road	Genoa
Town of Greenwood	S4105 County Road C	Hillsboro
Town of Hamburg	S1594 County Highway K	Chaseburg
Town of Harmony	E2905 Newton Road	Genoa
Town of Hillsboro	S1504 Town Shop Road	Hillsboro
Town of Jefferson	S4020 County B	Viroqua
Town of Kickapoo	W Prairie Street	Readstown
Town of Stark	S3803 Corps Road	La Farge
Town of Sterling	E4621 State Highway 82	Viroqua
Town of Viroqua Shop	E7560E County Road	Viroqua
Town of Webster	E10614 Highway 82	La Farge
Town of Wheatland	E2176 State Highway 82	De Soto
Town of Whitestown	S1701 Sandhill Road	La Fare
Tractor Central LLC	S3050 US Highway 14	Westby
United Cooperative	198A E Madison Street	Hillsboro
Vernon County Highway Department	E428 Gianoli	Genoa
Vernon County Highway Department	602 N Main Street	Viroqua
Vernon County Highway Department	135 Railroad Ave	Viroqua
Vernon County Highway Department	S393 Railroad Ave	Viroqua
Vernon County Highway Department	S955 State Highway 162	Coon Valley
Vernon County Highway Department Hillsboro Shop	970 Crest Avenue	Hillsboro
Vesbach Oil & Propane Inc.	E7381 Swenson Road	Viroqua
Village of Coon Valley	205 Anderson Street	Coon Valley
Village of Readstown	116 N 4 <sup>th</sup> Street	Readstown
Viroqua Area Schools	115 N Education Ave	Viroqua
Wally's Tractor Repair	E10206A Kelbel Road	Cashton
Westby Area School District	206 W Avenue S	Westby
Westby Cooperative Creamery	401 S Main Street	Westby
Westby Cooperative Creamery DC	615 N Main Street	Westby
Westby Hardwood Products	105 Webster Street	Westby

See Map 3-3 for the location of these hazardous material sites.

Table 3-13 Vernon County Critical Facilities: Dams

<i>Dam Official Name</i>	<i>Dam Size Type</i>	<i>(1) ESTD Haz Rating Code</i>	<i>Down City Miles Amount</i>	<i>Down City Name</i>
Bad Axe 2	Large	L		2 Springville
Bad Axe 11	Large	L		3 Newton
Bad Axe 12	Large	L		4 Newton
Bad Axe 16	Large	L		
Bad Axe 17	Large	L		
Bad Axe 24	Large	L		
Bad Axe 33	Large	L	7	
Bad Axe 34	Large	L		
Bean, John	Small			
Benish, James Jr. #1	Small			
Benish, James Jr. #2	Small			
Berger, Alton	Small			
Brown, Bryce	Small			
Brudos, Robert	Small			
Buckles, George W.	Small			
Burch, Donald D.	Small			
Burkhardt, Orvil	Small			
Camp Creek	Unknown			
Cano, Joseph R.	Small			
Cass, Lyle	Small			
Charles Roberts	Large	S		
Chaseburg	Unknown			
Cole, Bruce C.	Small			
Coon Creek 14	Large	L		
Coon Creek 15	Large	L		
Coon Creek 16	Large	L		
Coon Creek 17	Large	L		
Coon Creek 41	Large	H		
Coon Valley	Unknown			
Cushman	Unknown			
Denman, Francis	Small			
Dewitt, Melvin L.	Small			
Dobbs, Roy	Small			
Dobbs, Stacy	Small			
Dregne, Clarence C	Small			
Erickson, Douglas	Small			
Erickson, Robert	Small			
Erickson, Sherman	Small			
Erickson, Paul D.	Small			
Erie Dam	Unknown			
Fowell	Small	L		0 Readstown
Frankel, Bertram	Small			
Fronk, Bernard	Small			

Table 3-13 Vernon County Critical Facilities: Dams

<i>Dam Official Name</i>	<i>Dam Size Type</i>	<i>(1) ESTD Haz Rating Code</i>	<i>Down City Miles Amount</i>	<i>Down City Name</i>
Fronk, Bernard	Small			
Genoa - Up	Unknown			
Genoa - Dn	Unknown			
Genoa Fish Hatchery Pond 3	Large	L		
Genoa Fish Hatchery Pond 1	Large	L		
Giles White	Large	L	0	Ontario
Hale, Al No.1	Small			
Hale, Al No.2	Small			
Hansen, Orbin	Small			
Hanson, David L.	Small			
Harris, Cyril	Small			
Helbing	Small	L		
Herbeck	Large	L		
Hillsboro	Large	H	0	Hillsboro
Holte, Chester	Small			
Hundt, John	Small			
Ilstrup, W.C.	Small			
Jaeger, John G.	Small			
Kalb, Walter	Small			
Keegan, Robert L.	Small			
Kirkland Enterprises	Small			
Klinkner	Large	H		
Kolowrat, Dennis No.1	Small			
Kolowrat, Dennis No.2	Small			
Kubarski	Small	L		
La Farge	Large	L	0	La Farge
Laflash, J.C.	Small			
Lawson	Small	L		
Lock and Dam No. 8	Large		6	Victory
Lorenz, Glenn E.	Small			
Manke, Clarice	Small			
Markiewicz, John	Small			
McClure	Small			
McDevitt, William	Small			
McDevitt, William P.	Small			
McGarry	Small	L		
Miller, Vilas	Small			
Mlsna	Large	H		
Munson, Palmer	Small			
Nickelotti, Phillip	Small			
O'Reilly, Roger	Small			
Offerdahl, Otis	Small			
Oium	Unknown	L	7	Coon Valley
Oldenburg, Wesley	Small			
Olson, Osmond	Small			

Table 3-13 Vernon County Critical Facilities: Dams

<i>Dam Official Name</i>	<i>Dam Size Type</i>	<i>(1) ESTD Haz Rating Code</i>	<i>Down City Miles Amount</i>	<i>Down City Name</i>
O'Reilly, Roger	Small			
Pedretti, Victor	Small			
Petniunas, Stanley	Small			
Puder, Bernard J.	Small			
Read, Charles	Small			
Rockton	Unknown			
Rose	Small	L		None
Rudie, Edwin No.2	Small			
Rudie, Edwin No.1	Small			
Schaefer	Small	L		
Schumacker, Harold	Small			
Scoville, Ed A. Sr.	Small			
Scoville, Edward A	Small			
Sebion, Claude M.	Small			
Sharratt, Thomas B.	Small			
Simonson	Large	L		
Smail, John	Small			
Solberg, Kenneth	Small			
Stanek, Paul F.	Small			
Starr, Robert A 3	Small			
Strasser, Rudolph	Small			
Thompson G.E.	Small			
Thompson, Roland	Small	L		4 Union Center
Village of Genoa Levee	Unknown			
Vosen, Robert	Small			
Vosseteig Dam	Small	L		
Waldenberger, Julius	Small			
Weber, Donald	Small			
West Fork Kickapoo 1	Large	H		4 Bloomingdale
West Fork Kickapoo 12	Large	L		
West Fork Kickapoo 16	Large	L		
West Fork Kickapoo 17	Large	L		
West Fork Kickapoo 3	Large	H		
West Fork Kickapoo 4	Large	L		
West Fork Kickapoo 5	Large	H		
Williams, Harlan	Small			
Winsand, Robert	Small			
Wisconsin Land Co.	Small	L		
Wistenberg, Wallace	Small			

See Map 3-5 for the locations of these dams.

Table 3-14 Dam Failure Impact Summary

<i>Dam Name</i>	<i>Roads Impacted</i>	<i># Bus./Ind. Impacted*</i>	<i>Agri. Crops Damaged**</i>	<i>Dam Hazard Rating</i>	<i>Emergency Evacuation Plan Recommended</i>
Bad Axe 2	Springville Rd, Miller Rd		\$32,000	High	Yes
Bad Axe 11	Irish Ridge Rd, CTH O, Upper Newton Rd, STH 56, North Ridge Rd		\$230,000	Significant	No
Bad Axe 12	Upper Newton Rd, CTHO, North Ridge Rd, STH 56		\$221,000	High	Yes
Bad Axe 16	Hornby Hollow Rd, CTH NN		\$63,000	High	Yes
Bad Axe 17	CTH NN		\$52,000	High	Yes
Bad Axe 24	Hornby Hollow Rd, CTH NN		\$14,000	Low	No
Bad Axe 33	CTH N, S. Creek Rd, Town Rd		\$164,000	Low	No
Bad Axe 34	CTH N, S. Creek Rd, Town Rd		\$164,000	Low	No
Coon Creek 14	None		\$5,000	Low	No
Coon Creek 15	CTH P, Town Rd	1	\$17,000	Low	No
Coon Creek 16	None		\$4,000	Low	No
Coon Creek 17	CTH P, Town Rd	1	\$8,000	Significant	No
Coon Creek 41	CTH P, Town Rd	1	—	High	Yes
W. Fork Kickapoo 1	Knapp Valley Rd, CTH P		\$89,000	High	Yes
W. Fork Kickapoo 3	CTH P, CTH S		\$17,000	High	Yes
W. Fork Kickapoo 4	CTH Y, CTH S, STH 82		\$134,000	High	Yes
W. Fork Kickapoo 5	CTH S, STH 82		\$134,000	High	Yes
W. Fork Kickapoo 12	67th Dr		\$5,000	Low	No
W. Fork Kickapoo 16	Town Rd, CTH S		\$18,000	Low	No
W. Fork Kickapoo 17	STH 56	2	\$209,000	Significant	No
W. F. Kickapoo-Klinkner	32nd Dr., Town Rd		\$14,000	High	Yes
W. F. Kickapoo-MIsna	Knapp Valley Rd, Town Rd		\$14,000	High	Yes

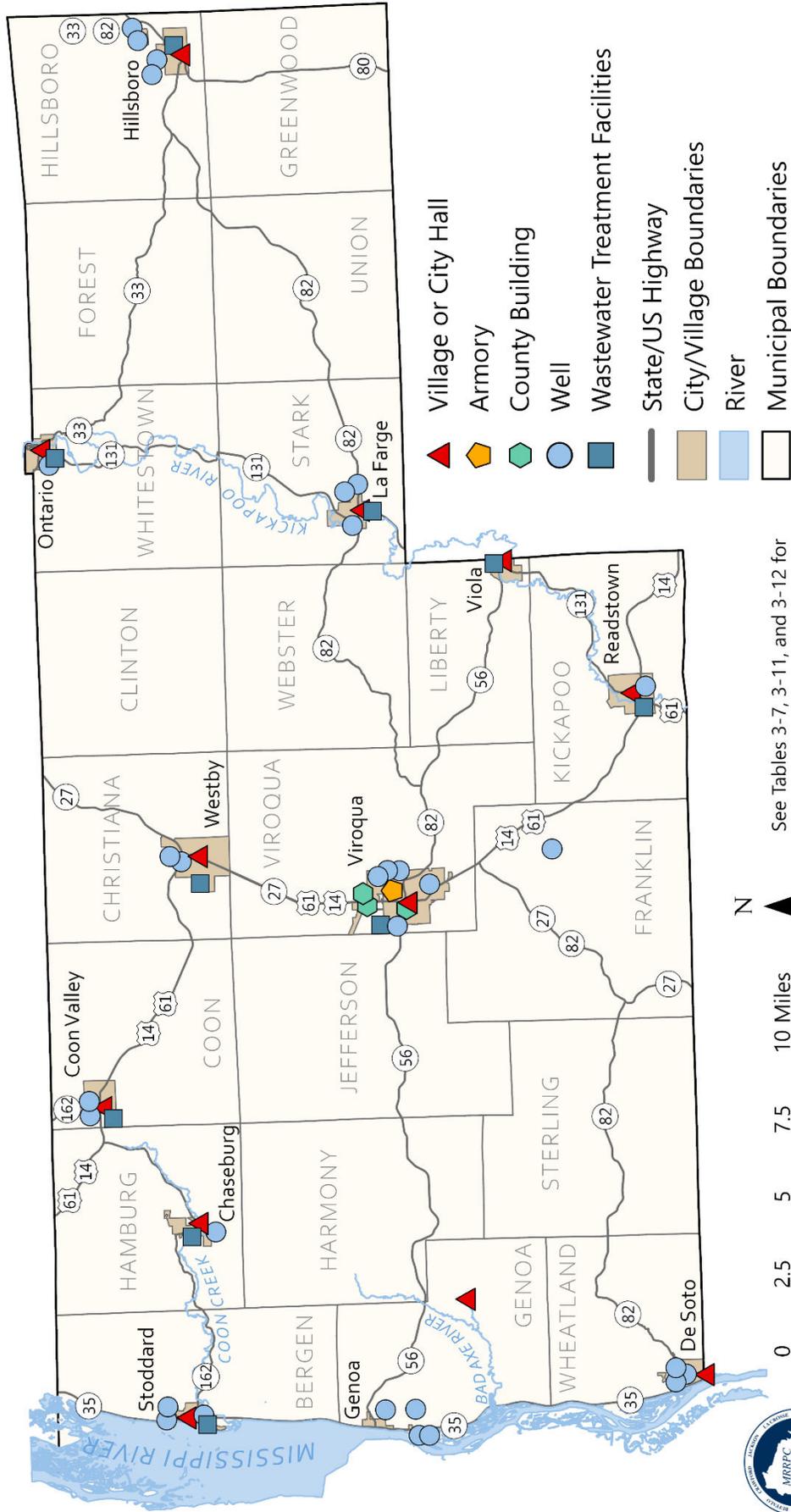
\* The same business/industry would be impacted by the failure of Coon Creek Dam 15, 17 or 41.

\*\* Impact in 1995 Dollars.

\*\*\* **The Dam Hazard Assessment for W. Fork Kickapoo 1 concluded that the dam's left abutment is highly conducive and susceptible to hydraulic fracturing and possible failure should the reservoir reach the top of the dam.**

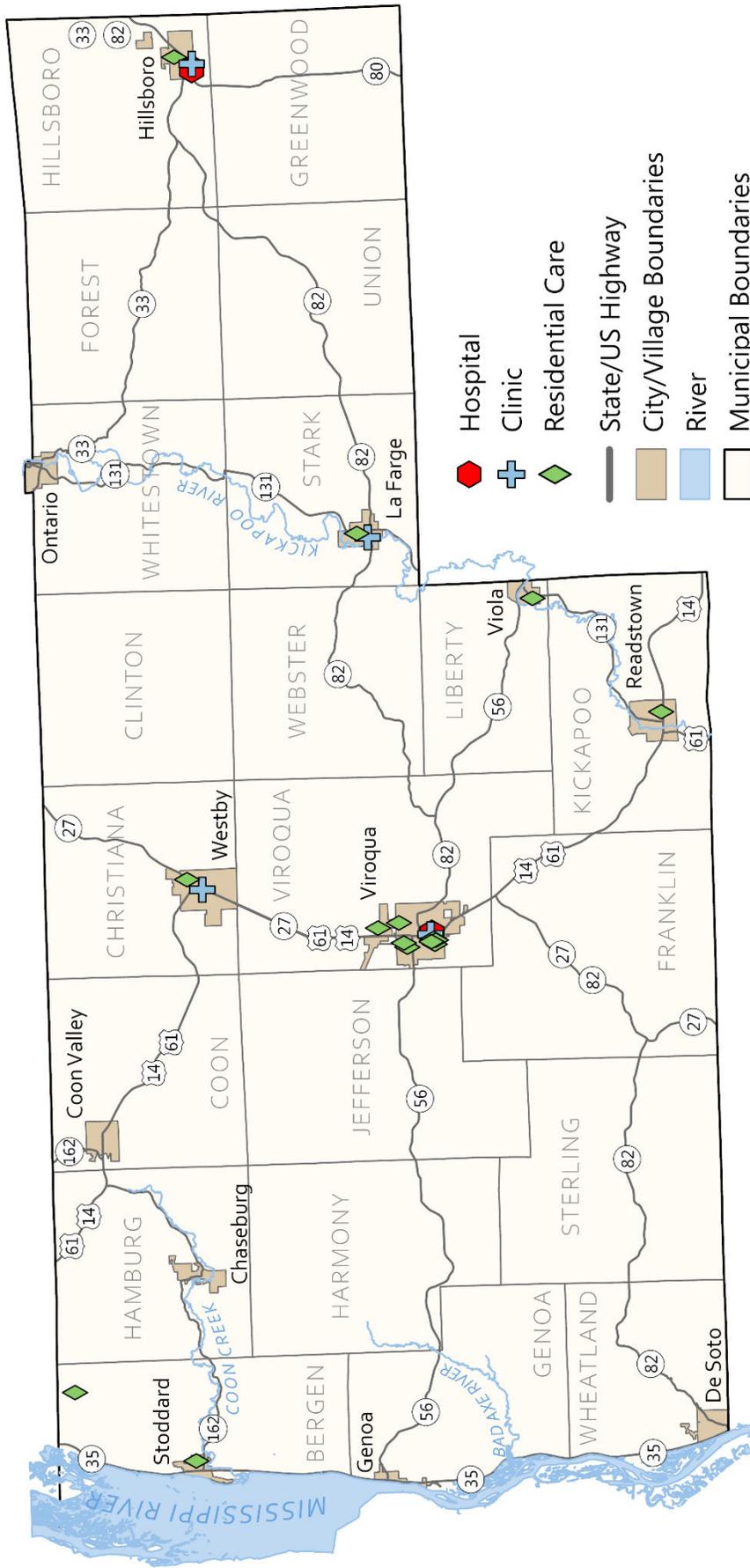
# Map 3-1 Vernon County Critical Facilities

## Government, Military, Wastewater Treatment Facilities, and Wells



See Tables 3-7, 3-11, and 3-12 for specific names and locations.

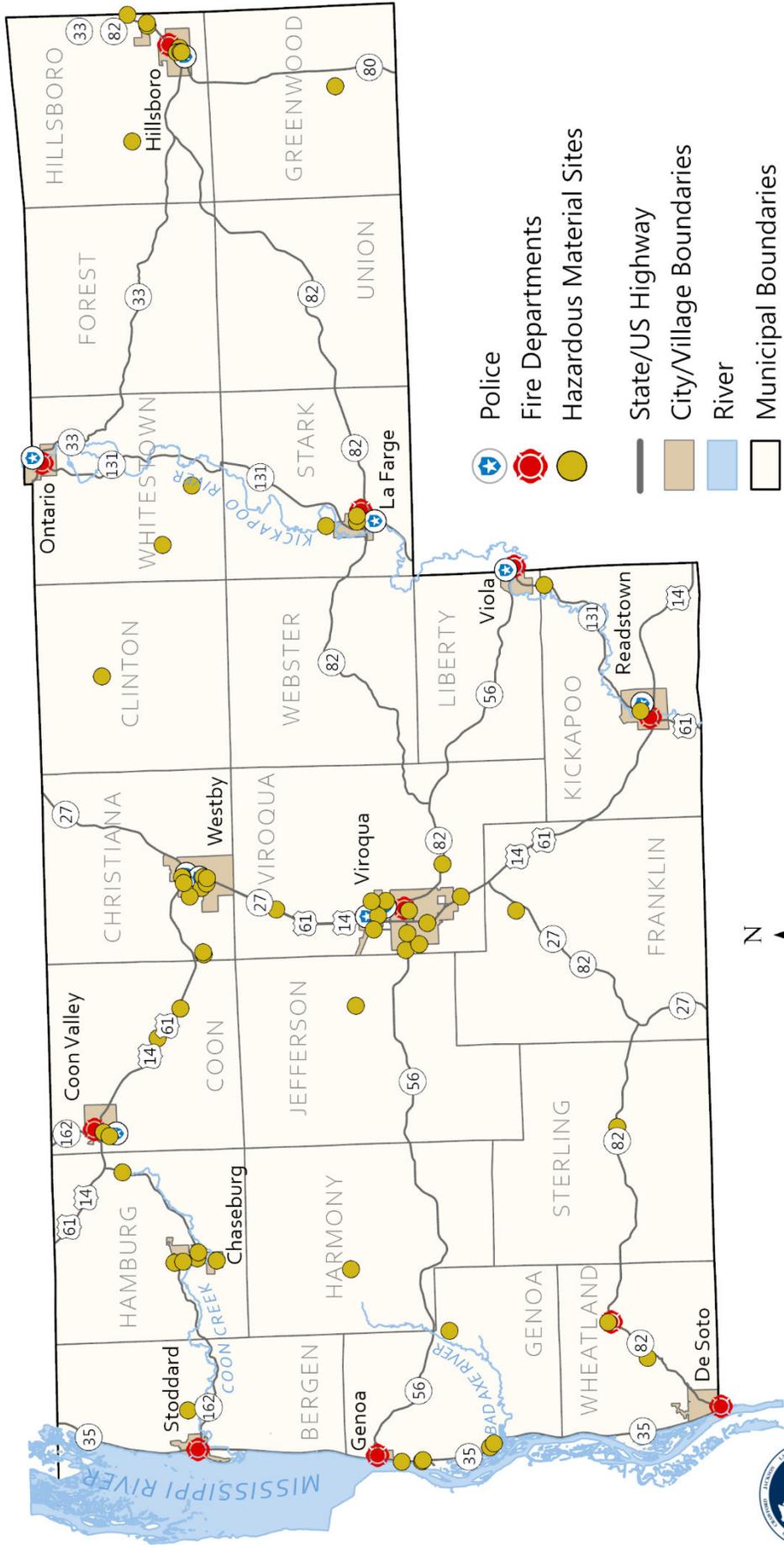
# Map 3-2 Vernon County Critical Facilities Hospital, Clinics, and Residential Care



See Table 3-8 for specific names and locations.

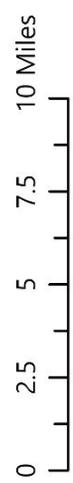
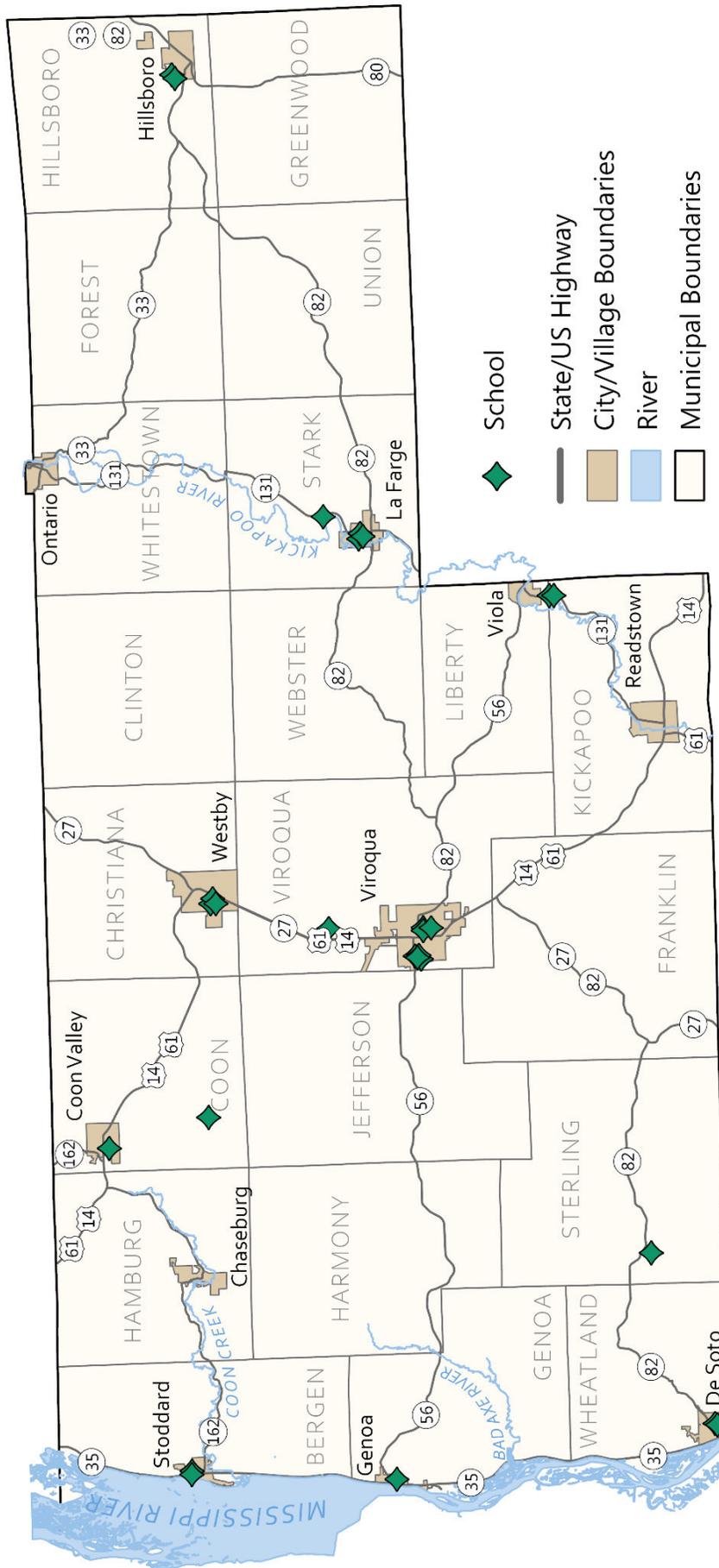
# Map 3-3

## Vernon County Critical Facilities Police, Fire Departments, and Hazardous Material Sites



See Tables 3-9 and 3-13 for specific names and locations.

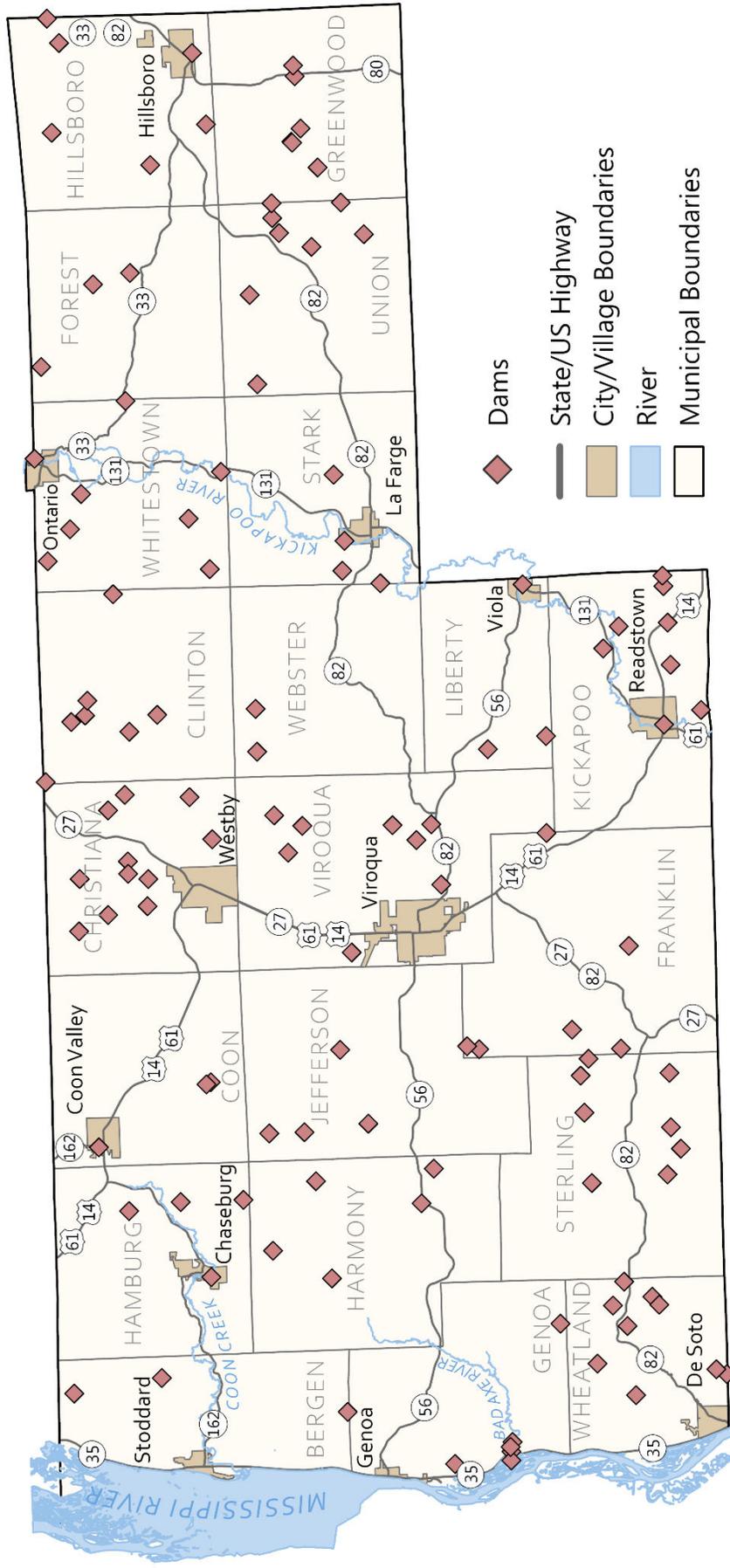
# Map 3-4 Vernon County Critical Facilities Schools



See Table 3-10 for specific names and locations.



# Map 3-5 Vernon County Critical Facilities Dams



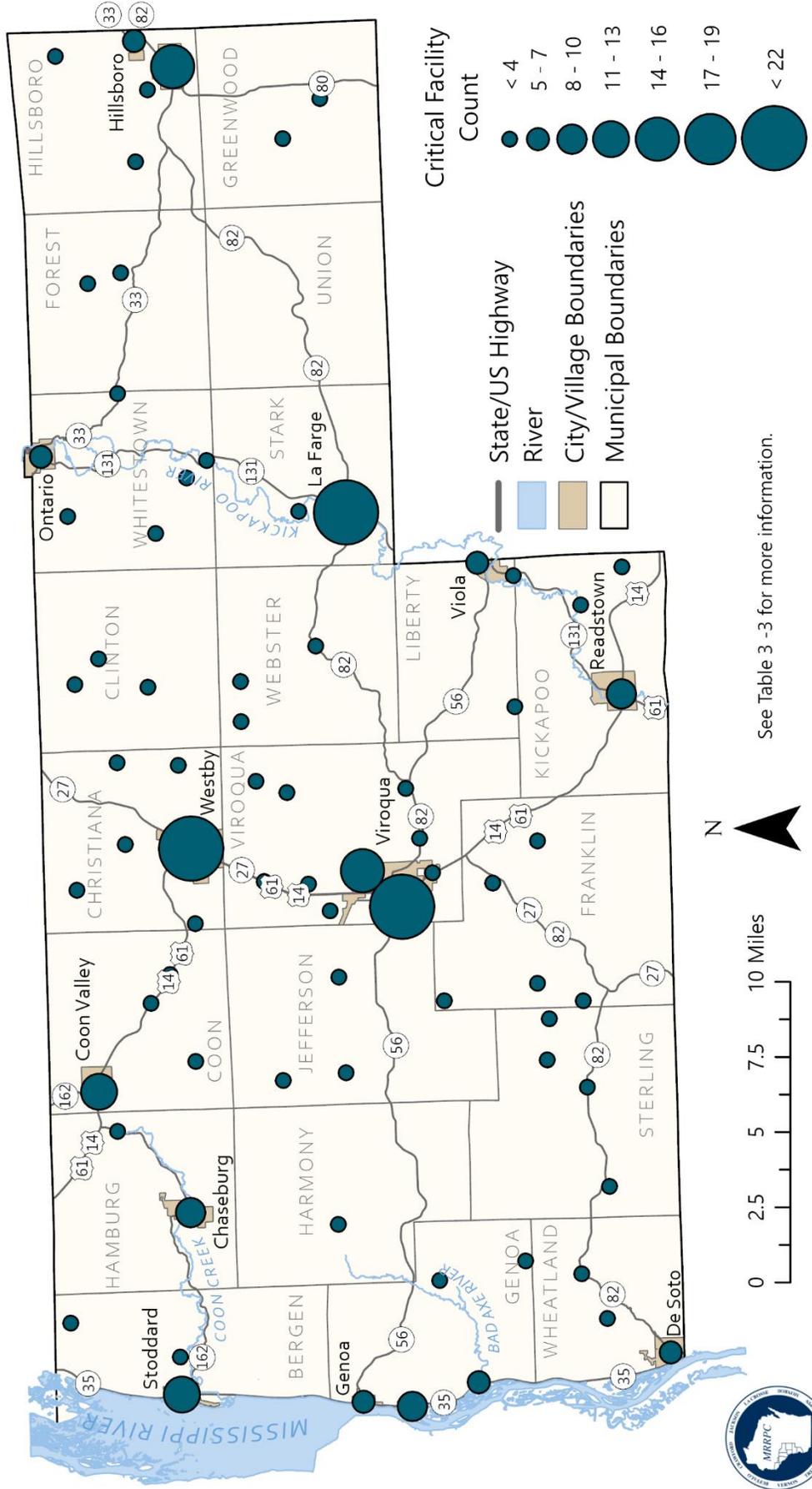
- ◆ Dams
- State/US Highway
- City/Village Boundaries
- River
- Municipal Boundaries



See Table 3 -14 for more information.

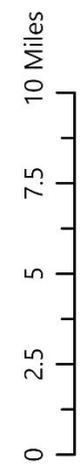
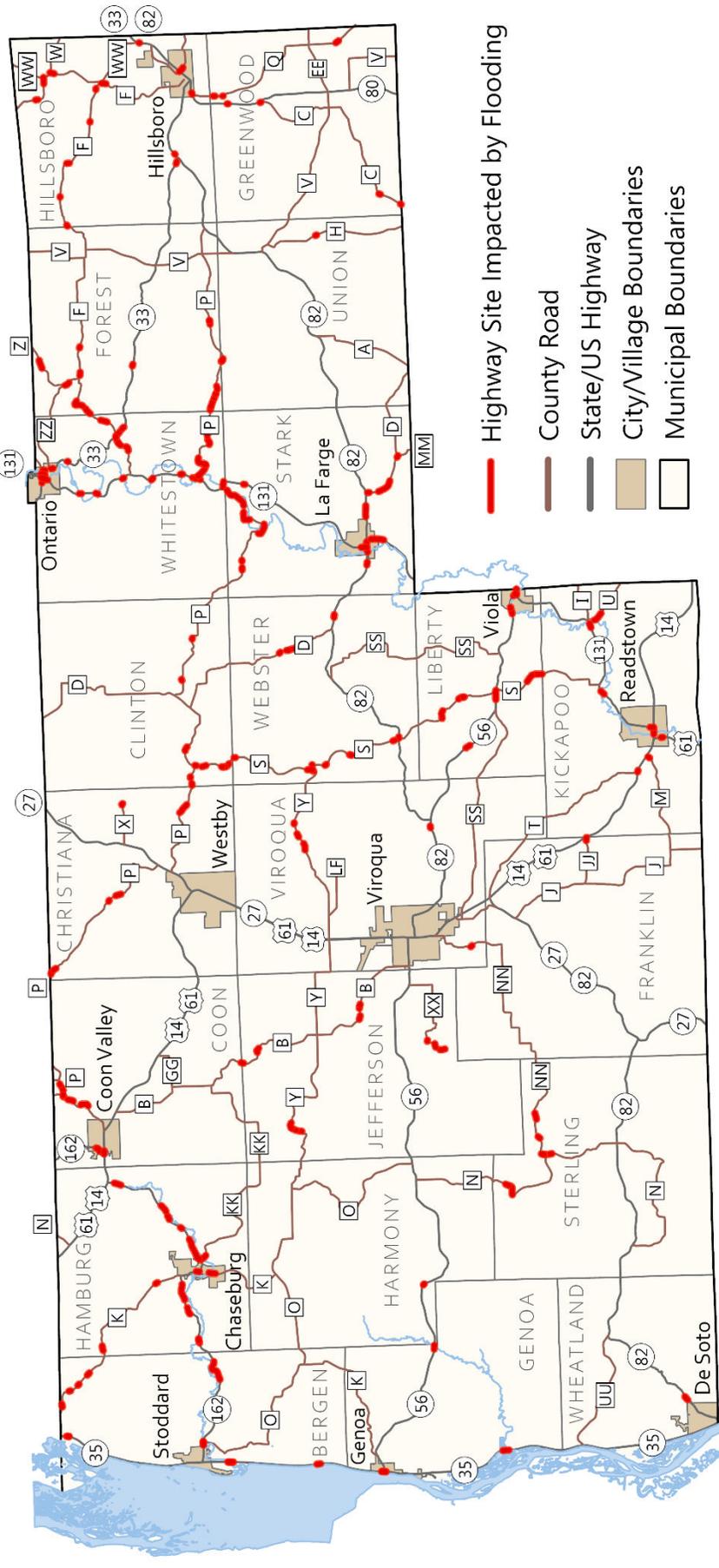


# Map 3-6 Vernon County Critical Facilities Structures within FEMA 100-Year Flood Boundary

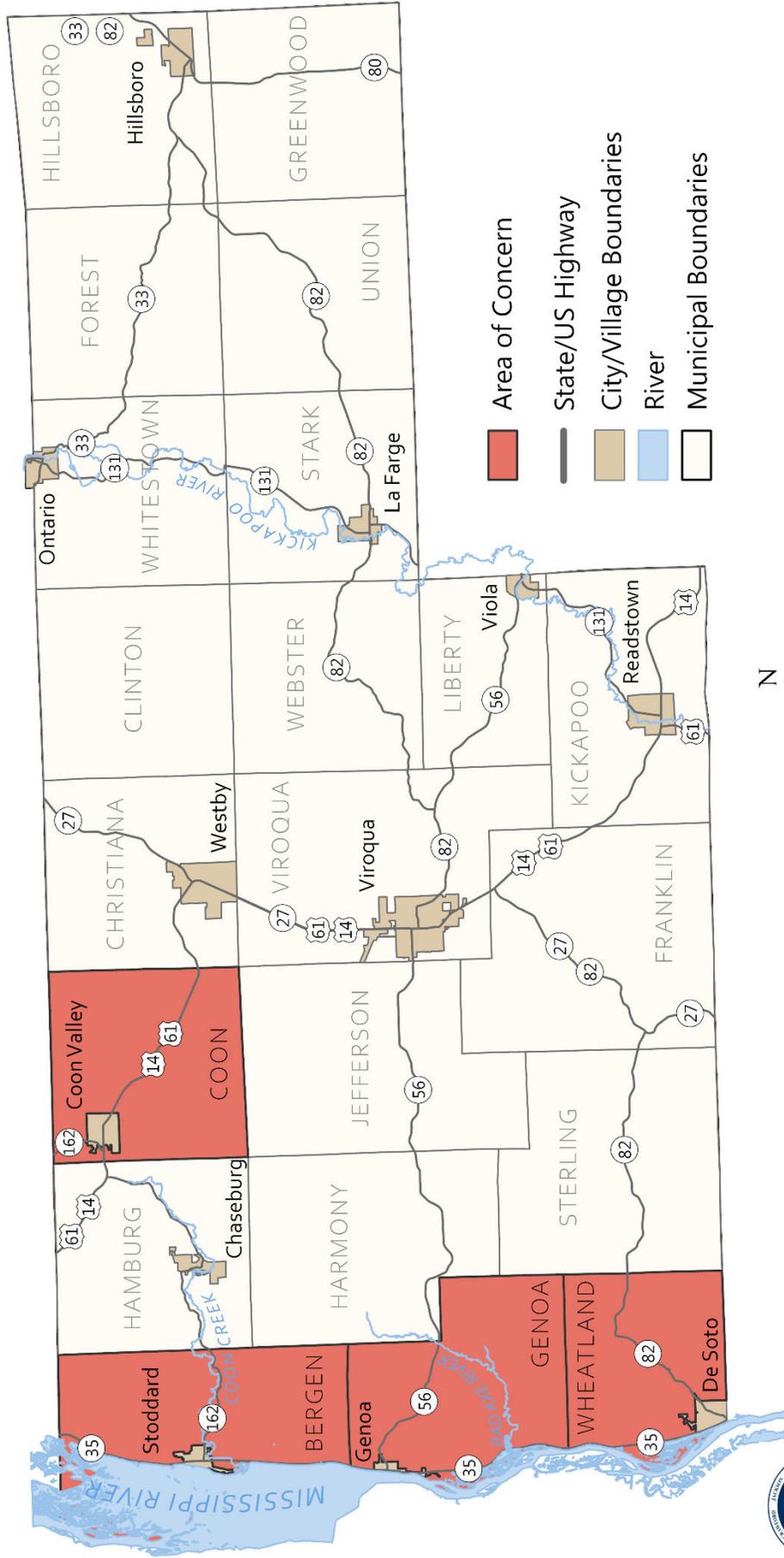


See Table 3 -3 for more information.

# Map 3-7 Vernon County State and County Trunk Highways Impacted by Flooding

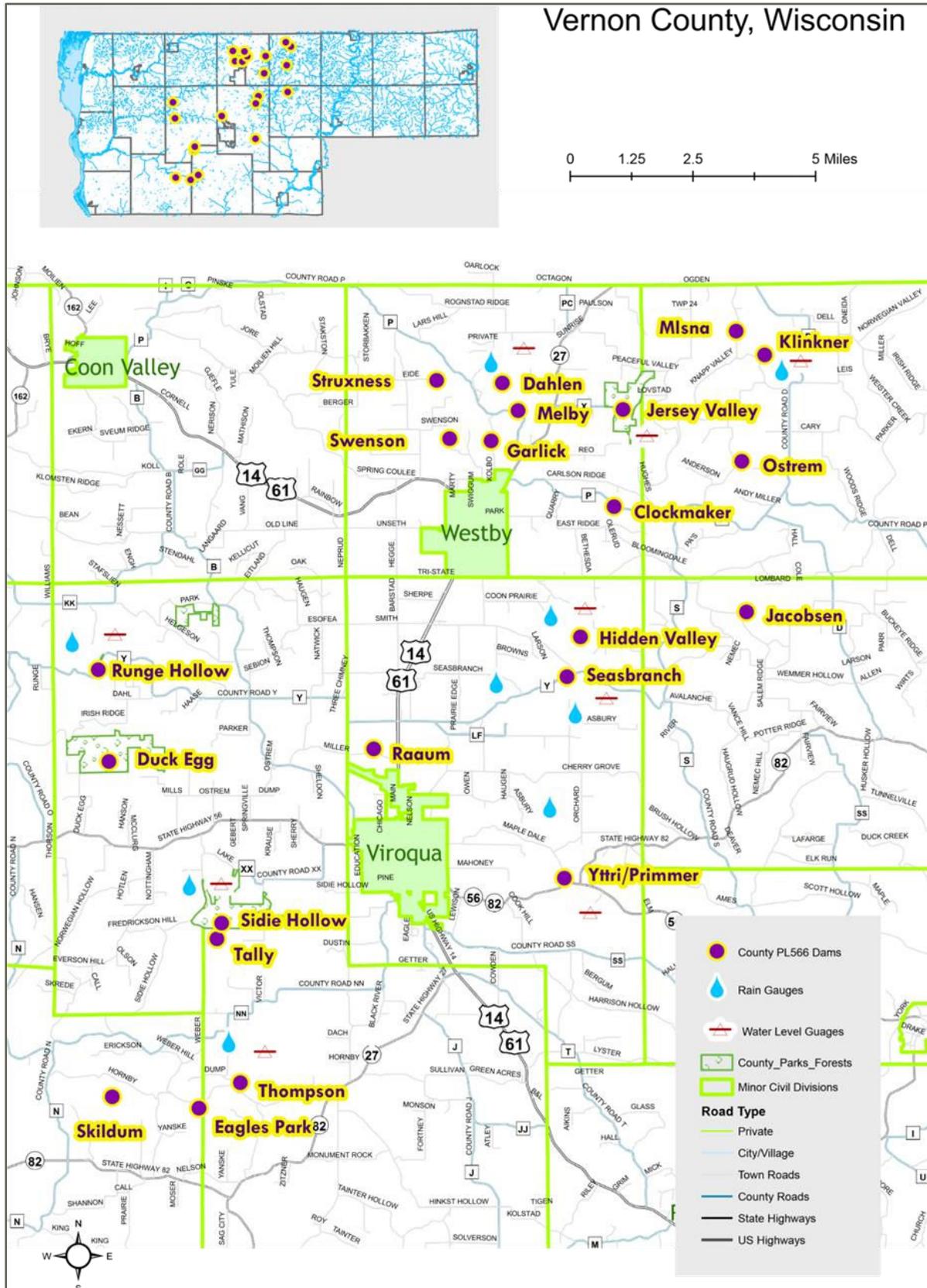


# Map 3-8 Vernon County Communities at Risk of Wildfire



# Map 3-9 8 PL-566 Dam Structures Map

## Vernon County, Wisconsin



Map prepared by the Vernon County Land and Water Conservation Department. The information depicted is based on a compilation of data from various sources and accuracies. The Vernon County LWCD is not responsible for any inaccuracies in this map and the data represented in this map should not be substituted for an actual survey performed by a Wisconsin Registered Land Surveyor. Cartographer: Monique Hassman, Intern

Draft

## 4. VERNON COUNTY MULTI-HAZARDS MITIGATION PLAN STRATEGIES

The County’s villages, cities, 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 serves as an overall strategy for hazard mitigation. These goals, actions and projects are the result of the public participation process outlined in Section 1 and the hazard risk assessment conducted in Section 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 will be completed to prioritize which projects would be completed. Due to reductions in budgets and loss of State Aids most projects listed in the Vernon County Multi-Hazards Mitigation Plan 2018 - 2022 have been carried over or deferred to this plan.

The Vernon 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 of the Mississippi River Regional Planning Commission and are eligible for planning assistance from that organization.

### Vernon County Specific Hazard Goals, Actions, and Projects

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

Table 4-1 Vernon County Hazard Mitigation Goals

<i>Hazard</i>	<i>Goal</i>
Flooding, Stormwater Drainage, and Dams	<i>Protect the health and safety of residents and property in high water events by improving infrastructure and warning and communication systems.</i>
Hail, Lightning, Thunderstorm, and Fog	<i>Inform residents on the dangers of hail, lightning, thunderstorm, and fog hazards and take actions to improve warning and communications and reduce losses from these hazards.</i>
Tornadoes and High Winds	<i>Protect the health safety and welfare of residents and property by improving emergency communication systems and shelters.</i>
Extreme Cold and Heat Event Hazards	<i>Provide educational information to the public on the dangers of extreme heat and cold to reduce future loss of life.</i>
Forest and Wildland Fire Hazards	<i>Protect residents and property from forest and wild land fires.</i>
Heavy Snow, Ice Storms, and Blizzards Hazards	<i>Inform the public about the threat of heavy snow, ice storms, and blizzards and take actions to improve warning and communications and reduce future losses from these hazards.</i>
Earthquake, Landslide and Subsidence Hazards	<i>Lessen the impact of earthquakes, landslides, and subsidence on persons and property.</i>
Agricultural and Drought Hazards	<i>Inform the public on the hazards associated with drought and provide information on methods to reduce water usage and minimize agricultural losses.</i>
Pandemic Flu Hazards	<i>Inform the public on the hazards associated with pandemic flu and provide information on methods to reduce future losses.</i>
Climate change	<i>Inform the public about the hazards associated with climate change and provide information on methods to reduce these impacts.</i>

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

**Table 4-2 Vernon County Hazard Mitigation Actions or Projects**

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>
County Coordinator				
Develop an Emergency Alert system for notification of county residents during emergencies	Existing county staff resources	Train Derailment		Carried over from previous plan
County Emergency Management Director				
Purchase a rescue/patrol boat for the Mississippi River.	Grants	Flooding, Stormwater Drainage, and Dam	2020	Carried over from previous plan
Identify buildings that would provide protection to the public in the event of a tornado or high winds.	Existing county staff resources	Tornadoes and High Winds	2012-2013	Carried over from previous plan
Upgrade/expand EOC building	Grants	Tornadoes and High Winds	2013-2014	Carried over from previous plan
Promote and maintain cooperative fire agreements among area fire departments and the Department of Natural Resources.	Existing county staff resources	Forest and Wildland Fire	Continual Program	Carried over from previous plan
Prepare timely releases that inform the public on actions and precautions they can take to minimize disruptions and losses	Existing county staff resources	Heavy Snow, Ice Storms, and Blizzards	Annually	Carried over from previous plan
Develop a sheltering plan	Existing county staff resources	Train Derailment		Carried over from previous plan
Update Emergency Operations Center – update staff and equipment, obtaining additional training	HMP grants	Train Derailment		Carried over from previous plan
Train additional drone operators	Grants	Severe Weather		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	Hail, Lightning, Thunderstorm, and Fog	Annual Program	Carried over from previous plan
Improve and update communication and advanced warning systems	Existing county staff resources	Tornadoes and High Winds	2012-2014	Carried over from previous plan In coordination with Emergency Management Committee
Improve communications between county and United States Army Corp of Engineers	Existing county staff resources	River Traffic	2019-2020	Carried over from previous plan In coordination with Lock Masters
Develop a procedure for disseminating public information during events	Existing county staff resources	All Hazards		Carried over from previous plan In cooperation with County Coordinator

Mitigation Action or Project	Funding Source(s)	Hazard	Project Timetable	Comments
Develop evacuation plans for the Village of Stoddard, Genoa, and De Soto	Existing county staff resources	Train Derailment		Carried over from previous plan In cooperation with City and Village officials
Consider developing an education/information program that informs agricultural producers and residents about water conserving measures and crop insurance.	Existing county staff resources	Agricultural and Drought	2012-2013	Carried over from previous plan in cooperation with City, Village and Town Officials
Additional training for emergency responders	Grants and BNSF	Train Derailment	Continual program	Carried over from previous plan in cooperation with first responders' organizations
Identify 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	Heavy Snow, Ice Storms, and Blizzards	2012 - 2013	Carried over from previous plan in cooperation with the County Highway Commissioner and Highway Committee
Investigate developing an inventory/prioritization of roads/road segments that have shoulders with slopes conducive to erosion and land/mud slides. The roads/road segments identified can be stabilized as funding becomes available.	Existing county staff resources	Earthquake, Landslide, and Subsidence	2013-2014	Carried over from previous plan in cooperation with the County Highway Commissioner and Public Safety Committee
<b>County Highway Department</b>				
Lower County Highway KK to lessen road damage due to flooding. Allowing flood waters to flow over the top of the road.	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As grant funding becomes available	Carried over from previous plan
Build a flood wall in County Highway P valley near the Village of Chaseburg to redirect flood waters.	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As grant funding becomes available	Completed
<del>Work to apply concrete spread over top of heavy riprap on the following county bridges: (Some of the bridges need riprap placed under them before concrete is spread. The concrete holds the riprap in place during high water.)</del>				Work on this project will be ongoing until completed. Projects will be worked on as funding becomes available. New projects listing
Install heavy riprap at all county bridges and at Under Flow structures prone to failing under extreme flooding conditions	Unknown	Flooding, Stormwater Drainage, and Dam Hazards	As budgets permit	Coordination with Emergency Management Committee
Purchase electronic highway signs for detours and road closures	Grants	Train Derailment		Carried over from previous plan
<b>County Land Conservation Department</b>				
Develop a landowner/farmer outreach program which will increase the number of practices that will retain water	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan

Mitigation Action or Project	Funding Source(s)	Hazard	Project Timetable	Comments
Develop a cost-share program for flood mitigation projects	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan
Conduct breach route and hydraulic shadow analysis of all 22 PL-566 Dam structures	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan
Update high water warning system	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan
Conduct a Cost-Benefit analysis of Best Management Projects. This could include smaller dam structures, berms, swales, terraces, prairie buffers, and other practices to retain water on the landscape	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan
Conduct a feasibility study on the development of cost-sharing program of Rain Gardens and other stormwater retention practices	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan
Map karst features within the County	Grants	Earthquake, Landslide, and Subsidence	As funding becomes available	Carried over from previous plan
Develop a procedure for prioritizing voluntary buyouts	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Coordinating with County Zoning Department
<b>County Land Conservation Office</b>				
Develop mapping and model flood mitigation priorities	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan
Utilize modeling, including EVAAL to identify priority areas for conservation and mitigation practices and projects	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan
Develop a road/culvert inventory and documenting of "digital dams" that interfere with watershed modeling	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan
Develop a strategy for changed practices (sizing, lowering roads, etc.) for roads and culverts	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan
Create a watershed-based engineering position to assist technicians (could be multi-County)	FEMA, Army Corp of Engineers, EPA, WI DNR, NRCS, DATCP county budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding can be obtained	Carried over from previous plan
Update aerial imagery	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available, 5 years, next would be 2025	New Project
Update Lidar imagery	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available, 10 years, next would be 2029	New Project

Mitigation Action or Project	Funding Source(s)	Hazard	Project Timetable	Comments
Acquire Ortho imagery	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	New Project
Create a new position within the Land Conservation Department for the purpose of: <ul style="list-style-type: none"> <li>mapping and documenting of current and historical flood damages.</li> <li>designing flood mitigation, water retention and conservation practices</li> </ul>	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Completed
Encourage periodic cutting of Conservation Reserve Program (CRP) land per program requirements	Existing county staff resources	Forest and Wildland Fire	Continual Program	Carried over from previous plan In cooperation with National Resource Conservation Service
<b>County Zoning Administrator</b>				
Continue to monitor and enforce N.R. 116 Floodplain, Shore Land - Wetland Regulations and any changes to it.	County Zoning Administrator	Flooding, Stormwater Drainage, and Dam Hazards	Annually	Carried over from previous plan
To maintain the County's compliance with the National Flood Insurance Program the county will undertake the following actions: <ol style="list-style-type: none"> <li>The County Zoning Administrator shall annually attend floodplain zoning seminars and workshops to keep informed on floodplain issues and regulations.</li> <li>The County Zoning Administrator shall report monthly on floodplain permit activity to the Emergency Management Committee.</li> <li>The County Zoning Administrator shall administer, enforce, and update the County's floodplain ordinance as prescribed by law.</li> </ol>	Existing county staff resources	Flooding, Stormwater Drainage, and Dam Hazards	Annually	Carried over from previous plan, relates to NFIP compliance
Work to reduce or eliminate repetitive loss or substantially damaged structures by undertaking the following: <ol style="list-style-type: none"> <li>The County 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 program as described above.</li> <li>Inform property owners through the annual Survey to act as a resource for information and answer questions on how to reduce future flood losses.</li> </ol>	Existing county staff resources	Flooding, Stormwater Drainage, and Dam Hazards	Biannually	Carried over from previous plan
Consider developing a County Driveway Ordinance that requires new driveways and access roads operable for large or emergency equipment during flood events.	Existing county staff resources	Flooding, Stormwater Drainage, and Dam Hazards	2019-2020	Carried over from previous plan In coordination with County Zoning Committee and Emergency Management Committee

Mitigation Action or Project	Funding Source(s)	Hazard	Project Timetable	Comments
Consider developing a zoning ordinance regarding width, slope, and maintenance of driveways.	Existing county staff resources	Earthquake, Landslide, and Subsidence	2012-2013	Carried over from previous plan In coordination with County Zoning Committee and Emergency Management Committee
Public Safety Committee				
Investigate the concept of a voluntary floodplain property buyout/relocation 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	Flooding, Stormwater Drainage, and Dam Hazards	Continual	Carried over, this project will be ongoing until all floodplain structures are mitigated
Promote the National Flood Insurance Program through community education	Existing county staff resources	Flooding, Stormwater Drainage, and Dam Hazards	Continual	Carried over from previous plan
Encourage the burying of electrical lines	Existing county staff resources	Hail, Lightning, Thunderstorm, and Fog	Continual Program	Carried over from previous plan
Encourage the burying of telecommunication lines	Existing county staff resources	Hail, Lightning, Thunderstorm, and Fog	Continual Program	Carried over from previous plan
Work on improving county wide emergency communications system.	Existing county staff resources	Hail, Lightning, Thunderstorm, and Fog	2012-2014	Partially completed. Continued from previous plan
Encourage the anchoring on new mobile home residences, carports, and porches.	Existing county staff resources	Tornadoes and High Winds	Continual Program	Carried over from previous plan
Encourage burying of underground power, cable, and telephone lines.	Existing county staff resources	Tornadoes and High Winds	Continual Program	Carried over from previous plan
Encourage the use of interlocked roofing shingles.	Existing county staff resources	Tornadoes and High Winds	Continual Program	Carried over from previous plan
Encourage the construction of safe rooms in mobile home parks and other residential structures subject to high winds.	Existing county staff resources	Tornadoes and High Winds	Continual Program	Carried over from previous plan
Participate in National Heat Awareness Day by distributing information regarding heat awareness	Existing county staff resources	Extreme Cold and Heat Event	Continual Program	New project
Continue support of the Salvation Army	Existing county staff resources	Extreme Cold and Heat Event	Continual Program	Carried over from previous plan
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 Public Safety Committee on potential changes to the County's Multi-Hazard Mitigation Plan. The Public Safety Committee shall recommend reaffirming, amending, or updating (rewriting) this plan to the County Board.	Existing county staff resources	Flooding, Stormwater Drainage, and Dam Hazards	After each flood disaster	Carried over from previous plan In coordination with County Zoning Administrator, County Emergency Management Director
Purchase mobile homes which can be used as temporary housing for displaced residents	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As grant funding becomes available	Carried over from previous plan

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>
				In coordination with Emergency Management Director
				Carried over from previous plan
Purchase water dams to be used as temporary flood protection	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As grant funding becomes available	In coordination with Emergency Management Director
				Carried over from previous plan
Develop a list of areas within the county which could be cut off from emergency vehicles during flooding and develop a plan to alleviate that problem	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	In coordination with Emergency Management Director
				Carried over from previous plan
Investigate developing a program that provides fans to the elderly in times of extreme heat.	Existing county staff resources	Extreme Cold and Heat Event	2013-2015	In cooperation with Emergency Management Director and Emergency Management Committee
				Carried over from previous plan
Identify buildings that could be used as shelters with appropriate heating, ventilation, and air conditioning for housing that segment of the population that are more vulnerable to extreme temperature events, such as the low income, elderly, and sick.	Existing county staff resources	Extreme Cold and Heat Event	2013-2015	In cooperation with Emergency Management Director and Public Safety Committee in conjunction with the cities, villages, and towns
Public Health Officer				
				Carried over from previous plan
Develop a pandemic flu plan listing specific actions and identifies emergency powers and who has the authority to use them.	Existing county staff resources	Pandemic Flu	2020-2022	In cooperation with City Officials, Village Officials, Emergency response personnel and local hospitals and clinics

## 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 Vernon County.

**Table 4-3 Vernon County Municipal Hazard Mitigation Actions or Projects**

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>
<b>City, Town, and Village Boards</b>				
Develop/maintain cooperative fire agreements with area fire departments and the Department of Natural Resources, as necessary.	Existing city, Town, and village staff resources	Forest and Wildland Fire	Continual Program	Carried over from previous plan
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	Earthquake, Landslide, and Subsidence	2019-2020	Carried over from previous plan
<b>County Emergency Management Director</b>				
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	Agricultural and Drought	2021-2022	Carried over from previous plan In cooperation with City, Village, and Town Officials.
Add a river gauging station near the Village of Ontario to monitor the river levels from the Brush Creek	Grants	Flooding, Stormwater Drainage, and Dam Hazards	2019-2020	Carried over from previous plan
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	Extreme Cold and Heat Event	2020-2021	Carried over from previous plan Coordinate with each municipal board or their designee
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	Hail, Lightning, Thunderstorm, and Fog Hazard	Annual Program	Carried over from previous plan Coordinating with City, Town, and Village Clerks
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/drifted snow	Existing county staff resources along with city, town and village staff and resources	Heavy Snow, Ice Storms, and Blizzards	2020 - 2021	Carried over from previous plan In cooperation with County Highway Commissioner and with City, Town, and Village Clerks
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	Heavy Snow, Ice Storms, and Blizzards	Annually	Carried over from previous plan Coordinating with City, Town, and Village Clerks
<b>Individual Municipal Boards</b>				

Mitigation Action or Project	Funding Source(s)	Hazard	Project Timetable	Comments
Encourage the burying of telecommunication lines	Existing city, village, Town, and county staff resources	Hail, Lightning, Thunderstorm, and Fog Hazard	Continual Program	Carried over from previous plan In conjunction with the County Emergency Management Committee
Encourage the burying of electrical lines	Existing city, village, Town, and county staff resources	Hail, Lightning, Thunderstorm, and Fog Hazard	Continual Program	Carried over from previous plan In conjunction with the County Emergency Management Committee
Require anchoring on new mobile home residences, carports, and porches.	Existing city, village, Town, and county staff resources	Tornadoes and High Winds	Continual Program	Carried over from previous plan In conjunction with the County Emergency Management Committee
Encourage the burying of underground power, cable, and telephone lines.	Existing city, village, Town, and county staff resources	Tornadoes and High Winds	Continual Program	Carried over from previous plan In conjunction with the County Emergency Management Committee
Encourage the use of interlocked roofing shingles.	Existing city, village, Town, and county staff resources	Tornadoes and High Winds	Continual Program	Carried over from previous plan In conjunction with the County Emergency Management Committee
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	Tornadoes and High Winds	Continual Program	Carried over from previous plan In conjunction with the County Emergency Management Committee
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	Tornadoes and High Winds	Continual Program	Carried over from previous plan In conjunction with the County Emergency Management Committee
Village/City Board or designee				
Continue to monitor and enforce N.R. 116 Floodplain, Shore Land - Wetland Regulations and any changes to it.	Existing village and city resources	Flooding, Stormwater Drainage, and Dam Hazards	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 shall biannually 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 Zoning Administrator 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	Existing village, city, and county staff resources	Flooding, Stormwater Drainage, and Dam Hazards	Biannually	Carried over from previous plan. In conjunction with the County Emergency Management Director and Zoning Administrator

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>
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.				
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	Flooding, Stormwater Drainage, and Dam Hazards	2018-2019	Carried over from previous plan In conjunction with the County Emergency Management Director and Zoning Administrator
Village/City Clerk or designee				
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 Vernon County Multi-Hazard Mitigation Plan. The Village Board shall recommend reaffirming, amending, or updating (rewriting) this plan to the County Emergency Management Director and the Public Safety 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	Flooding, Stormwater Drainage, and Dam Hazards	After each flood disaster	Carried over from previous plan In conjunction with the La Farge Village Board, Emergency Management Director, and Public Safety Committee
To maintain compliance with the National Flood Insurance Program the village/city will undertake the following actions: The Village/City Clerk or designee shall annually attend floodplain zoning seminars and workshops to keep informed on floodplain issues and regulations. The Village/City Clerk or designee shall report monthly on floodplain permit activity to the Village Board. 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	Flooding, Stormwater Drainage, and Dam Hazards	Annually	Carried over from previous plan, relates to NFIP compliance

## 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**

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>	<i>Responsible Official/Org.</i>
Village of Genoa					
Install flood control structures, ditch and woodland maintenance	FEMA grant and city budget	Flood, Stormwater Drainage, and Dam Hazards	2023, ongoing	New Project	Bad Axe Watershed Council
Clean out existing dam structures, practices that increase infiltration in uplands	FEMA grants and city budget	Flood, Stormwater Drainage, and Dam Hazard	2023, ongoing	New Project	Bad Axe Watershed Council
City of Hillsboro					
Add/update new Weather Sirens throughout city	Grant/city budget	Tornadoes and High Winds	2019	Carried over from previous plan	City Administrator
Add third tornado siren in north section of City	Grant/city budget	Tornadoes and High Winds	2019	Carried over from previous plan	City Administrator
Conduct a dam inspection and develop a dam maintenance and repair schedule	Grant/city budget	Flooding, Stormwater Drainage, and Dam Hazards	2020 - 2022	Carried over from previous plan	City Administrator
CTH FF/East Madison Street bridge expansion	City budget	Flooding, Stormwater Drainage, and Dam Hazards	2019 - 2021	Carried over from previous plan	City Administrator
Develop a dam Emergency Action Plan	Grants and city budget	Flooding, Stormwater Drainage, and Dam Hazards	2019 - 2021	Carried over from previous plan	City Administrator
Levee/floodproofing and stormwater improvements	City budget	Flooding, Stormwater Drainage, and Dam Hazards	2020 - 2022	Carried over from previous plan	City Administrator
Purchase backup generator	Grant/city budget	Tornadoes and High Winds	2019	Carried over from previous plan	City Administrator
Upgrade existing and purchase additional snow removal equipment	Grants/city budget	Heavy Snow, Ice Storms, and Blizzards	Continual	Carried over from previous plan Responsible official: Adam Sonntag 608-489-2350	City Administrator
City of Viroqua					
Add another emergency siren on the Northeast part of the city. Update/Replace current weather sirens.	FEMA grants and town budget	Tornadoes and High Winds	2019-2020	Carried over from previous plan	Fire Chief
Construct safe rooms for city residents	FEMA grants and town budget	Tornadoes and High Winds	2020	Carried over from previous plan	City Administrator

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>	<i>Responsible Official/Org.</i>
Identify and correct stormwater drainage issues around the city	City budget	Flooding, Stormwater Drainage, and Dam Hazards	2020 - 2022	Carried over from previous plan	Public Works Director
Purchase emergency backup generator for Public Safety Building	FEMA grants and town budget	Tornadoes and High Winds	2019	Carried over from previous plan	Police Chief
Purchase of an additional portable generator for the sewer system for flooding events	FEMA grants and city budget	Director of Public Works	2023-2026	New Project	Public Works Director
Remote monitoring cameras at water system wells and water towers	Grants	Director of Public Works	2023-2026	New Project	Public Works Director
Install flood control structures, ditch, and woodland maintenance	FEMA grants and city budget	Flood, Stormwater Drainage, Dam Failure	2023, ongoing	New Project	Bad Axe Watershed Council
Clean out existing dam structures, practices that increase infiltration in uplands	FEMA grants and city budget	Flood, Stormwater Drainage, and Dam Hazards	2023, ongoing	New Project	Bad Axe Watershed Council
City of Westby					
Construct new water tower	Grants and city budget	Forest and Wildland Fire, Agricultural and Drought	2019	Carried over from previous plan	Public Works Director
Cut heavy and dangerous trees down	FEMA grants and town budget	Tornadoes and High Winds	Continual Program	Carried over from previous plan	City Council
Melby Street and Ramsland Street storm sewer improvements	City budget	Flooding, Stormwater Drainage, and Dam Hazards	2019	Carried over from previous plan	Public Works Director
Purchase backup home generators for use by residents.	Grants and village budget	Extreme Cold and Heat Event	2019 - 2020	Carried over from previous plan	City Council
Purchase generator to run lift stations during power outages.	Grants and city budget	Flooding, Stormwater Drainage, and Dam Hazards	2019	Carried over from previous plan	City Council
Revise and Construct stormwater way on Willow, Bergum, and Highland Streets to accommodate more flow without flooding basements in this area	Grants and city budget	Flooding, Stormwater Drainage, and Dam Hazards	2021	Carried over from previous plan	City Engineer
West Avenue and Davidson Avenue storm sewer improvements	City budget	Flooding, Stormwater Drainage, and Dam Hazards	2019	Carried over from previous plan	Public Works Director
West Avenue South and Highland Street storm sewer improvements	City budget	Flooding, Stormwater Drainage, and Dam Hazards	2020	Carried over from previous plan	Public Works Director
City of Westby – Install flood control structures, ditch and woodland maintenance	FEMA grants and city budget	Flood, Stormwater Drainage, and Dam Hazards	2023, ongoing	New Project	Bad Axe Watershed Council
Clean out existing dam structures, practices that increase infiltration in uplands	FEMA grants and city budget	Flood, Stormwater Drainage, and Dam Hazard	2023, ongoing	New Project	Bad Axe Watershed Council

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>	<i>Responsible Official/Org.</i>
Hillsboro Schools					
Obtain a generator for school buildings for use as storm shelters	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	School Board
Brookwood School District					
Possible stormwater infrastructure on school grounds due to a newly constructed track and field/physical education space.	Grants	Flooding, Stormwater Drainage, and Dam Hazards	Fall 2023	Carried over from previous plan Responsible official: Travis Anderson (608) 337-4401	School Superintendent
Referendum project to construct a tornado "Safe Room" as a part of a FEMA grant our district will be awarded - construction at our school district site in Monroe City.	Grants	Tornadoes and High Winds	As funding becomes available	Carried over from previous plan Responsible official: Travis Anderson (608) 337-4401	School Superintendent
Town of Bergen					
Cedar Valley Road east end Sidehill and Road	Grants	Earthquake, Landslide, and Subsidence	As funding becomes available	Carried over from previous plan	Town Board
Continue to work with rail lines on developing an emergency response plan	Grants	Train Derailment	As funding becomes available	Carried over from previous plan	Town Board
Hilltop Road Spillway	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Identify and repair hillsides that continue to slide onto roads.	Town budget	Earthquake, Landslide, and Subsidence	As funding becomes available	Carried over from previous plan	Town Board
Move Cedar Valley Road East end	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Move Coon Creek on east end of Cedar Valley Road	Grants	Forest and Wildland Fire	As funding becomes available	Carried over from previous plan	Town Board
Move Coon Creek to South	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Purchase a modern fire truck for rural response	125000	Forest and Wildland Fire, Agricultural and Drought	As funding becomes available	Carried over from previous plan	Town Board
Repair Cedar Valley Road along Coon Creek	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Town of Christiana					

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>	<i>Responsible Official/Org.</i>
Road Improvements:					
1) Nyhus Road - replace or widen existing box culvert;					
2) East Ridge Hill - replace or widen cement box culvert;					
3) Lovaas Ridge Hill - replace bridge;					
4) Hegge Road – replace bridge;					
5) Unseth Road - replace bridge;					
6) Lars Hill Road - Make repairs to cement wing walls and replace guard rail on existing bridge;					
7) Nilsestuen Road - widen or replace cement box culvert.	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Town of Clinton					
Add extensions to culverts to get running water further from roads to reduce wash outs	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	2019	Carried over from previous plan	Town Board
Put aprons on more culverts to reduce brush and other debris flowing into and plugging them	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	2019	Carried over from previous plan	Town Board
Replace steel culvert with concrete culverts on roads with continuous water flow	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	2019	Carried over from previous plan	Town Board
Town of Coon					
Approach to Old Line Road will be corrected	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Investigate designating an emergency channel for emergency personnel communication	Existing town and county resources	Tornadoes and High Winds	2020	Carried over from previous plan	County Emergency Management Director
More training of emergency personnel for who provide emergency services in times of extreme heat and cold.	Existing Town Officials and county staff resources	Extreme Cold and Heat Event		Carried over from previous plan In collaboration with the County Emergency Management Committee	County Emergency Management Director
Strangstalien Valley Road - short bridge will be replaced with a box culvert	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Training of emergency personnel for the possibility of loss of communication due to loss of power	Existing town and county resources	Tornadoes and High Winds	As funding becomes available	Carried over from previous plan	County Emergency Management Director
Town of Forest					
Purchase new backhoe for snow removal	Grants and town budget	Heavy Snow, Ice Storms, and Blizzards	As funding becomes available	Carried over from previous plan	Town Board

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>	<i>Responsible Official/Org.</i>
Purchase new trucks for snow removal	Grants and town budget	Heavy Snow, Ice Storms, and Blizzards	As funding becomes available	Carried over from previous plan	Town Board
Purchase radio equipment and repeater tower for emergency communications	Grants and town budget	Heavy Snow, Ice Storms, and Blizzards	As funding becomes available	Carried over from previous plan	Town Board
Upsize culverts in Township to correct problem areas using steel and/or concrete box culverts	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Replace all fire number signs	Grants and town budget	Forest and Wildland Fire, Agricultural and Drought	As funding becomes available	Carried over from previous plan	Town Board
Town of Franklin					
Culvert replacement	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Berent Froiland (608) 391-0570	Town Chairperson
Purchase heavy equipment	Grants	Heavy Snow, Ice Storms, and Blizzards	As funding becomes available	Carried over from previous plan Responsible official: Berent Froiland (608) 391-0570	Town Chairperson
Weather spotters through Vernon Fire Department	Grants	Tornadoes and High Winds	As funding becomes available	Carried over from previous plan	Town Board
Town of Genoa					
Install flood control structures, ditch and woodland maintenance	FEMA grants and town budget	Flood, Stormwater Drainage, and Dam Hazards	2023, ongoing	New Project	Bad Axe Watershed Council
Clean out existing dam structures, practices that increase infiltration in uplands	FEMA grants and town budget	Flood, Stormwater Drainage, and Dam Hazards	2023, ongoing	New Project	Bad Axe Watershed Council
Town of Greenwood					
Purchase emergency signs and cones for road closures	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	2019	Carried over from previous plan	Town Board
Purchase flat bottomed boat for fire department/ first responders	Grants	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Yuba Fire/EMS
Town of Harmony					
Riprap deteriorating creek bank where Bad Axe River meets Newton Valley Road	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	2019	Completed from previous plan	Town Board
Upsize culvert on Newton Road and Munyon Lane	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	2019	Completed from previous plan	Town Board
Town of Stark					

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>	<i>Responsible Official/Org.</i>
Increase culvert sizes or raise roads along Weister Creek	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Install solar or wind backup power supply in the Town Hall for emergency shelter situations.	Grant and village budget	Extreme Cold and Heat Event	2019	Carried over from previous plan	Town Board
Purchase Road closed signs	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Town of Union					
Repair earthen berm and upsize culvert on Twin Ash Road	Town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Seal coat all remaining gravel roads	Town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Town of Viroqua					
Bridge improvement on Tri-State Road	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Bridge replacement on Deaver Lane over Bishop Creek	150000	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Chairperson
Road improvements: 1) Culvert improvement and road raising - Seasbranch Road; 2) Culvert improvement at M&T Rock Quarry	Grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	Unknown	Carried over from previous plan	Town Board
Install flood control structures, ditch and woodland maintenance	FEMA grants and town budget	Flooding, Storm Water Drainage, and Dam Hazard	2023, ongoing	New Project	Bad Axe Watershed Council
Clean out existing dam structures, practices that increase infiltration in uplands	FEMA grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	2023, ongoing	New Project	Bad Axe Watershed Council
Town of Wheatland					
Reconstruct 600 feet of Will Kumlin Road away from edge of deep ravine.	FEMA grants and town budget	Earthquake, Landslide, and Subsidence	2019 Construction Season	Carried over from previous plan	Town Board
Replace Terhune Road bridge.	FEMA grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Road Improvements: 1) Replace damaged box culvert and failing retaining wall in Victory 2) Also replace 2 ditch culverts along Stevens Road.	FEMA grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan In coordination with the Town Board or Town Chairperson	Town Board
Controlled burns	FEMA grants and town budget	Forest Fires and Wildfires	As funding becomes available	Spring of 2023, ongoing	Town of Wheatland Fire Department

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>	<i>Responsible Official/Org.</i>
Town of Whitestown					
Big Valley Bridge	FEMA grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Cut Off Bridge improvements	FEMA grants and town budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Town Board
Vernon Memorial Hospital					
Purchase backup generators for their outlying facilities	Grants and hospital budget	Flooding, Stormwater Drainage, and Dam Hazards	2019-2022	Carried over from previous plan	County Emergency Management Director
Village of Chaseburg					
Bank stabilization along Coon Creek, due to erosion and banks eroding trees lining the creek are beginning to fall into the creek and washing downstream to the STH 162 bridge forming a dam and causing additional flooding and road erosion	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Village Board
Obtain generator for Village Hall	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Village Board
Purchase a backup generator to replace the old unreliable one the village currently has	Grant and village budget	Extreme Cold and Heat Event	2019	Carried over from previous plan	Maintenance Department
Purchase a storm siren to serve the village and portions of the Town of Hamburg	Grants and village budget	Tornadoes and High Winds	As funding becomes available	Carried over from previous plan	Village Board
Purchase emergency backup generators for lift stations and well house	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Brian Dayton 608-483-2660	Maintenance Department
Purchase surge protectors for the sewer plant, well house, and village offices	Grants and village budget	Hail, Lightning, Thunderstorm, and Fog Hazard	2019	Carried over from previous plan Responsible official: Brian Dayton 608-483-2660	Maintenance Department
Sewage treatment plant upgrade and sewer line improvements	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Brian Dayton 608-483-2660	Maintenance Department
Waterline and stormwater control improvements	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Brian Dayton 608-483-2660	Maintenance Department

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>	<i>Responsible Official/Org.</i>
Village of Coon Valley					
Backup power generators (office/police department)	Grants	Tornadoes and High Winds	Grants	Carried over from previous plan Responsible official: Renita Williamson	Village Clerk
Backup power generators (wells, sewer, lift station)	Grants	Tornadoes and High Winds	Grants	Carried over from previous plan Responsible official: Renita Williamson	Village Clerk
Construct stormwater catch basins and upgrade existing pipes	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Renita Williamson	Village Clerk
Creek bank improvement along the Coon Creek in the handicap-accessible fishing area	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Renita Williamson	Village Clerk
New Emergency Weather Siren	Grants	Tornadoes and High Winds	Grants	Carried over from previous plan Responsible official: Renita Williamson	Village Clerk
Purchase a snowplow truck with a sander	Grants and village budget	Heavy Snow, Ice Storms, and Blizzards	2020	Carried over from previous plan	Village Clerk
Purchase needed equipment to allow the Village Hall to become a Heating and Cooling center	Grant and village budget	Extreme Cold and Heat Event	2019	Carried over from previous plan	Village Clerk
Replace existing siren	Village budget	Tornadoes and High Winds	As funding becomes available	Carried over from previous plan	Village Clerk
Safe room for severe weather	Grants	Tornadoes and High Winds	Grants	Carried over from previous plan Responsible official: Renita Williamson	Village Clerk
Update and raise lift stations	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Renita Williamson	Village Clerk
Village of De Soto					
Install backup generator at main lift station	Grants and village budget	Hail, Lightning, Thunderstorm, and Fog Hazard	2019	Carried over from previous plan	Village Board
Raise manhole elevations on manhole numbers 7B and 7C and install sealed covers.	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Maintenance Department
Replace 5,100 feet of sewer main due to infiltration and inflow problems	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	Unknown	Carried over from previous plan Responsible official: Dave Robertson 608-648-3388	Village Board
Village of La Farge					

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>	<i>Responsible Official/Org.</i>
Culvert Improvements, South Silver St, South Main Street.	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Public Works Manager
Develop renewable energy system to connect to village utility to provide a backup energy source	Grants and village budget	Tornadoes and High Winds	As funding becomes available	Carried over from previous plan	Public Works Manager
Drainage Channel Improvements, main drainage channel from N. Silver Street North Mill Street.	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Public Works Manager
Purchase additional warning siren for the North side of the village (Business Park area)	Grants and village budget	Tornadoes and High Winds	As funding becomes available	Carried over from previous plan	Public Works Manager
Purchase emergency generator for Well #2 and for an emergency shelter	Grants and village budget	Tornadoes and High Winds	As funding becomes available	Carried over from previous plan	Public Works Manager
Purchase equipment to create a public warning system (handheld radios for village employees to be used for emergencies)	Grants and village budget	Tornadoes and High Winds	As funding becomes available	Carried over from previous plan	Public Works Manager
Purchase NOAA weather radios to be distributed to village residents	Grants and village budget	Tornadoes and High Winds	As funding becomes available	Carried over from previous plan	Public Works Manager
Relocate electrical utility building	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Public Works Manager
Storm Water Improvements, South Silver St, South Mill Street.	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Public Works Manager
Warning and Communication Equipment - new signage, barricades, and traffic cones	Grants and village budget	Hail, Lightning, Thunderstorm, and Fog Hazard	As funding becomes available	Carried over from previous plan	Public Works Manager
Village of Readstown					
Construct a new storm shelter that would house an emergency response center and space for residents	Grants and village budget	Tornadoes and High Winds	2021	Carried over from previous plan	Village Board
Obtain generator for municipal buildings	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Village Board
Purchase a backup generator and an air conditioner for use in storm shelter	Grant and village budget	Extreme Cold and Heat Event	2019	Carried over from previous plan	Village Board
Purchase a generator for the EMS building	Grants and village budget	Tornadoes and High Winds	2020	Carried over from previous plan	Village Board
Village of Stoddard					
Install an additional water and sewer line crossing at Division St.	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Kent Hablestad	Village Administrator

<i>Mitigation Action or Project</i>	<i>Funding Source(s)</i>	<i>Hazard</i>	<i>Project Timetable</i>	<i>Comments</i>	<i>Responsible Official/Org.</i>
				(608) 457-2136	
Install larger outflow pipes for stormwater discharge under BNSF railroad tracks at Badger St.	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Kent Hablestad (608) 457-2136	Village Administrator
Purchase handheld multi-channel two-way radios	Grants and village budget	Hail, Lightning, Thunderstorm, and Fog Hazard	As funding becomes available	Carried over from previous plan Responsible official: Kent Hablestad (608) 457-2136	Village Administrator
Purchase new dump truck for snow removal	Grants and village budget	Heavy Snow, Ice Storms, and Blizzards	As funding becomes available	Carried over from previous plan Responsible official: Kent Hablestad (608) 457-2136	Village Administrator
Purchase new end loader for assistance in snow removal	Grants and village budget	Heavy Snow, Ice Storms, and Blizzards	As funding becomes available	Carried over from previous plan Responsible official: Kent Hablestad (608) 457-2136	Village Administrator
Replace water and sewer lines on Cottage St.	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Kent Hablestad (608) 457-2136	Village Administrator
Replace water and sewer lines on Main St. (State Highway 35).	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan Responsible official: Kent Hablestad (608) 457-2136	Village Administrator
Village of Viola					
Bury electrical lines	Grants and village budget	Heavy Snow, Ice Storms, and Blizzards	Continual	Carried over from previous plan	Village Board County Emergency Management Director
Construct a storm shelter for residents of the mobile home park.	Grants	Tornadoes and High Winds	2019	Carried over from previous plan	Village Board Director
During flooding events there is only one way out of the village and that is along an unpaved narrow local road. The village would like to have this road paved and widened to allow for better emergency vehicle access.	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	As funding becomes available	Carried over from previous plan	Village Board
Raise York Street 2 feet to allow access during moderate floods	Grants and village budget	Flooding, Stormwater Drainage, and Dam Hazards	When funding can be located	Carried over from previous plan	Village Board

Draft

## Vernon County Plan Maintenance and Adoption Action Plan

### **Plan Maintenance**

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

It has also been determined that the County Public Safety Committee will evaluate the plan after disasters to determine if the information, goals, and actions are still appropriate considering the given disaster. In addition, the committee shall evaluate the plan bi-annually to assess the following: are the goals and objectives addressing current or expected conditions; are the nature, magnitude, and/or type of risks changed; are current resources appropriate for implementing the plan; are there implementation problems, such as technical, political, legal, or coordination issues with other agencies; have agencies and other partners participated as proposed; have the risk of a hazards changed in an area due to development; and have outcomes happened as expected. When this plan is being considered for evaluation due to the annual evaluation policy or because of the post disaster evaluation policy, it will be the County Emergency Management Director’s responsibility to let stakeholders know through meeting notices and public announcements about the plan evaluation process and provide them with an adequate comment period if they cannot attend a plan evaluation meeting.

**Plan Coordination**

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

**Plan Approval Process**

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

**Adoption Resolutions**

The following table is the Vernon County Multi-Hazards Mitigation Plan Maintenance and Adoption Action Plan. The plan maintenance and adoption projects are detailed in Section 4. Vernon County’s Plan Maintenance and Adoption goal is: To provide a continual opportunity for local officials to update, maintain and implement the Vernon County Multi-Hazard Mitigation Plan.

**Table 4-5 Vernon County Multi-Hazards Mitigation Plan Maintenance and Adoption Action Plan**

<i>Plan Maintenance and Adoption Projects</i>	<i>Funding Source(s)</i>	<i>Responsible Official or Organization</i>	<i>Project Timetable</i>	<i>Comments</i>
---	--------------------------	---	--------------------------	-----------------

Continual monitoring of progress made toward achieving plan goals, projects, and action items by the Emergency Management Director	Existing county resources	County Emergency Management Director	Annually	See Section 4
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 Section 4
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, and Town Officials	Bi-annually	See Section 4
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 Section 4

Draft

## APPENDIX – A

Table A-1 Risk Assessment Survey Mailing List

Name	Title	Name	Title
Jeff Cermak	Bergen Town Chairperson	Chris Mussatti	De Soto First Responders
David Eggen	Christiana Town Chairperson	Kevin Dean	EMS Liaison-Vernon County
Cory Leis	Clinton Town Chairperson	Barry Witmer	Hillsboro Ambulance
Orlan Bakkum	Coon Town Chairperson	Steve Bass	Kickapoo Rescue Squad
Mark Davison	Forest Town Chairperson	Skip Oliphant	La Farge Ambulance
Berent Froiland	Franklin Town Chairperson	Ashley Thieman	Ontario Ambulance
Wilfred Fillback	Genoa Town Chairperson	Scott Wilson	Readstown Ambulance
James MIsna	Greenwood Town Chairperson	Brian Lehmann	Stoddard First Responders and Fire
Rod Erlandson	Hamburg Town Chairperson	Tom Tornstrom	Tri-State Ambulance
Lorn Goede	Harmony Town Chairperson	Kevin Dean	Westby First Responders
James Stekel	Hillsboro Town Chairperson	Kim Martinson	Wheatland First Responders

**Table A-1 Risk Assessment Survey Mailing List**

Name	Title	Name	Title
Don Langaard	Jefferson Town Chairperson	Rachel Kerian	Yuba First Responders
Jeff Clements	Kickapoo Town Chairperson	Al Erickson	Fire Chief, Cashton Fire Department
Terry Theis	Liberty Town Chairperson	Russ Cornford	Fire Chief, Coon Valley Fire
Keith Ashley-Wright	Stark Town Chairperson	Chris Mussatti	Fire Chief, De Soto Fire Department
Kevin Walleser	Sterling Town Chairperson	Mike Hanson	Fire Chief, Genoa Fire Department
Elgin Fanta	Union Town Chairperson	Mike Clark	Fire Chief, Hillsboro Fire Department
Phil Hewitt	Viroqua Town Chairperson	Philip Sittleburg	Fire Chief, La Farge Fire Department
John Young	Webster Town Chairperson	Kevin Knoll	Fire Chief, Ontario Fire Department
Jayne Ballwahn	Wheatland Town Chairperson	Randy Schwarz	Fire Chief, Readstown Fire
George Wilbur	Whitestown Town Chairperson	Jeff Liska	Fire Chief, Viola Fire Department
Mike Miller	Chaseburg Village President	Chad Buros	Fire Chief, Viroqua Fire Department
Karl Henrichsen	Coon Valley Village President	Spencer Lee	Fire Chief, Westby Fire Department
Joel Greiner	De Soto Village President	Shane Moen	Fire Chief, Yuba Fire Department
Richard Phillips	Genoa Village President	Kim Martinson	Fire Chief, Wheatland Fire
Cheryl Purvis	La Farge Village President	Philip Welch	Police Chief, Village of Coon Valley
Mark Smith	Ontario Village President	Vacant	Police Chief, Village of Readstown
Brian Gander	Readstown Village President	Rick Neidfeldt	Police Chief, City of Viroqua
Robert Wurtzel	Stoddard Village President	Vacant	Assistant Police Chief, City of Viroqua
Daren Matthes	Viola Village President	Pat Clark	Police Chief, City of Hillsboro
Joshua Finch	Administrator, City of Hillsboro	Steve Palmer	Police Chief, Village of La Farge
Justin Running	Mayor, City of Viroqua	Dave Rynes	Police Chief, Village of Ontario
Danny Hegerson	Mayor, City of Westby	Roy Torgerson	Vernon County Sheriff
Al Erickson	Cashton First Responders	Nate Campbell	Chief Deputy, Vernon County
Russ Cornford	Coon Valley First Responders	Scott Stuber	Police Chief, City of Westby
Chad Kanable	Police Chief, Village of Viola		

Table A-2 Project Needs Survey Mailing List

Name	Title	Name	Title
Jeff Cermak	Bergen Town Chairperson	Phil Hewitt	Viroqua Town Chairperson
David Eggen	Christiana Town Chairperson	John Young	Webster Town Chairperson
Cory Leis	Clinton Town Chairperson	Jayne Ballwahn	Wheatland Town Chairperson
	Coon Town Chairperson		Whitestown Town Chairperson
Orlan Bakkum		George Wilbur	Chairperson
Mark Davison	Forest Town Chairperson	Mike Miller	Chaseburg Village President
Berent Froiland	Franklin Town Chairperson	Karl Henrichsen	Coon Valley Village President
Wilfred Filback	Genoa Town Chairperson	Joel Greiner	De Soto Village President
	Greenwood Town Chairperson		Genoa Village President
James MIsna		Richard Phillips	
Rod Erlandson	Hamburg Town Chairperson	Cheryl Purvis	La Farge Village President
Lorn Goede	Harmony Town Chairperson	Mark Smith	Ontario Village President
James Stekel	Hillsboro Town Chairperson	Brian Gander	Readstown Village President
Don Langaard	Jefferson Town Chairperson	Robert Wurtzel	Stoddard Village President
Jeff Clements	Kickapoo Town Chairperson	Daren Matthes	Viola Village President
Terry Theis	Liberty Town Chairperson	Joshua Finch	Administrator, City Hillsboro
Keith Ashley-Wright	Stark Town Chairperson	Justin Running	Mayor, City Viroqua
Kevin Walleser	Sterling Town Chairperson	Danny Hegerson	Mayor, City Westby
Elgin Fanta	Union Town Chairperson		

Table A-3 Survey Results

Municipality	Risk Assessment Survey		Mitigation Projects Survey		
	Received Survey	Returned Survey	Received Survey	Returned Survey	Replied by individual meeting or phone conference
T. Bergen	X	X	X	X	
T. Christiana	X	X	X	X	
T. Clinton	X	X	X	X	
T. Coon	X	X	X	X	
T. Forest	X	X	X	X	
T. Franklin	X		X		
T. Genoa	X	X	X	X	
T. Greenwood	X	X	X	X	
T. Hamburg	X		X		
T. Harmony	X	x	X		
T. Hillsboro	X	X	X	X	
T. Jefferson	X	X	X	X	
T. Kickapoo	X	X	X		
T. Liberty	X		X		
T. Stark	X	X	X	X	
T. Sterling	X	X	X		
T. Union	X	X	X	X	
T. Viroqua	X	X	X	X	
T. Webster	X	X	X		
T. Wheatland	X	X	X	X	
T. Whitestown	X		X		

**Table A-3 Survey Results**

Municipality	Risk Assessment Survey		Received Survey	Mitigation Projects Survey	
	Received Survey	Returned Survey		Returned Survey	Replied by individual meeting or phone conference
V. Chaseburg	X	X	X		X
V. Coon Valley	X	X	X		X
V. De Soto	X	X	X	X	
V. Genoa	X	X	X	X	
V. La Farge	X	X	X		X
V. Ontario	X		X		X
V. Readstown	X	X	X	X	
V. Stoddard	X	X	X	X	
V. Viola	X	X	X	X	
C. Hillsboro	X	X	X	X	
C. Viroqua	X	X	X	X	
C. Westby	X	X	X	X	

**Table A-4 Municipalities Plan Adoption**

Municipality	Adopted 2018-2022	Adopted 2023-2027	Municipality	Adopted 2018-2022	Adopted 2023-2027
	Plan	Plan		Plan	Plan
Vernon County	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Town of Union	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Bergen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Town of Viroqua	<input type="checkbox"/>	<input type="checkbox"/>
Town of Christiana	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Town of Webster	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Clinton	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Town of Wheatland	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Coon	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Town of Whitestown	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Forest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Village of Chaseburg	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Franklin	<input type="checkbox"/>	<input type="checkbox"/>	Village of Coon Valley	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Genoa	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Village of De Soto	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Greenwood	<input type="checkbox"/>	<input type="checkbox"/>	Village of Genoa	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Hamburg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Village of La Farge	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Harmony	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Village of Ontario	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Hillsboro	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Village of Readstown	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Jefferson	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Village of Stoddard	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Kickapoo	<input type="checkbox"/>	<input type="checkbox"/>	Village of Viola	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Liberty	<input checked="" type="checkbox"/>	<input type="checkbox"/>	City of Hillsboro	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Stark	<input type="checkbox"/>	<input type="checkbox"/>	City of Viroqua	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Town of Sterling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	City of Westby	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The local units of government in Vernon County that adopted this plan are indicated with a check mark. The adoption resolutions from each local government are found in Appendix E.

Draft

## APPENDIX - B

Table B-1 Hailstorm History and Frequency

1960s	2 reported events by NCDC, 7/15/61, 7/17/63, 1.0-1.75" size hailstorms
1970s	6 reported events by NCDC, 10/3/73, 8/6/74, 4/17/75, 7/3/75, 8/24/75, 6/5/77, .75 to 1.75" size hailstorms
1980s	9 reported events by NCDC – 6/5/80, 7/15/80, 9/24/84, 8/12/95, 4/25/86, 5/8/88, 4/24/89, 7/8/89, 8/4/89, .75" to 2.75" size hailstorms
1990s	16 reported events by NCDC – (7/11/94 Esofea), (5/16/95 Coon Valley), (5/18/96 Stoddard-\$2,500 PD/\$600 CD), (7/5/97 Viroqua-\$8,000 CD), (8/3/97 Coon Valley-\$18,000 PD/\$35,000 CD and Viroqua-\$40,000 PD), (5/28/98 Ontario and West Prairie-\$18,000 CD and La Farge-\$25,000 PD and Hillsboro-\$13,500 PD), (6/20/98 Genoa-\$25,000 PD and Viroqua-\$40,000 PD/\$30,000 CD), (6/24/98 Genoa-\$18,000 PD and Westby-\$45,000 PD/\$50,000 CD), (7/20/98 Readstown-\$15,000 CD), (8/14/98 Viroqua-\$25,000 CD), .75" to 2.00" size hailstorms. Damage totals of \$227,000 PD and \$181,600 CD.
2000s	42 reported events by NCDC – (5/12/00 De Soto-\$10,000 PD), (5/18/00 Genoa and Chaseburg), (5/31/00 Victory-\$5,000 PD/\$10,000 CD), (9/11/00 Hillsboro), (4/6/01 Viroqua), (5/10/01 Stoddard-\$1,000 PD and Coon Valley-\$1,000 PD), (6/11/01 Ontario), (4/18/02 Hillsboro), (5/30/02 Readstown-\$4,000 CD), (7/31/03 De Soto), (5/21/04 Hillsboro, De Soto-\$1,000 PD, Retreat-\$1,000 PD, Liberty Pole and Viroqua-\$1,000 PD), (6/23/04 Victory), (7/19/04 Stoddard), (5/24/06 Hillsboro), (6/6/06 La Farge-\$1,000 PD), (6/25/06 Potts Corner), (7/1/06 Viroqua \$3,000 PD, \$7,000 CD), (8/23/06 Hillsboro-\$115,000 PD, \$200,000 CD), (8/24/06 Genoa and Victory), (8/25/06 Coon Valley, Viroqua-\$2,000 PD, \$3,000 CD), (5/24/07 Dilly), (9/21/07 Westby),(5/26/08 Folsom),(5/30/08 Stoddard and Westby), (6/07/08 Benders Corners), (6/28/08 Victory, De Soto, Red Mound, Retreat, Coon Valley and Readstown),(7/25/08 Viroqua), (4/24/09 Coon Valley) and (7/23/09 Readstown), 0.75" to 1.75" hail storms. Damage totals of \$140,000 PD and \$222,500 CD.
2010s	29 reported events by NCDC – (6/6/10 Stoddard), (9/4/12 Genoa, Victory and Red Mound), (4/3/13 Liberty), (7/22/13 Stoddard and Viroqua), ( 4/12/14 Valley, Hillsboro, La Farge, Westby, Stoddard, and Viroqua), (6/25/14 Hillsboro and Readstown areas), ( 7/7/14 Dilly), (4/9/15 Newry, Westby and Viroqua), (7/13/15 La Farge, Ross, Liberty), ( 5/25/16 Sugar Grove-\$5,000 PD and Hillsboro), (3/6/17 La Farge), (7/12/17 La Farge), (10/09/18 Readstown), (5/5/19 Liberty Pole), (5/16/19 Stoddard), 0.75" to 1.75" hail storms. Damage totals of \$5,000 PD.
2020s	9 reported events by NCDC – (5/2/21 Ontario), (6/17/21 Genoa), (7/27/21 Stoddard, De Soto, and Genoa), (8/7/21 Ontario and Dell), (5/19/22 Westby), (6/15/22 Stoddard) 0.75" to 1.50" hail storms

PD = Property Damage and CD = Crop Damage

Table B-2 Thunderstorm History and Frequency

1960s	3 reported events by NCDC – 5/22/62, 6/8/63, 8/25/65
1970s	6 reported events by NCDC – 6/20/74, 6/4/75, 8/24/75, 6/13/76, 7/6/77, 5/10/79 (61 knots)
1980s	10 reported events by NCDC – 7/19/80, 5/17/82, 7/3/83, 7/19/83, 8/7/84, 4/21/85, 7/9/85, 7/29/87, 7/24/88, and 8/4/89. Magnitude of winds for these events ranged from 52 knots to 78 knots.
1990s	43 reported events by NCDC – 4/27/90, 8/26/90, 4/8/91, 7/7/91, (7/11/94 Esofea and Viola-\$50,000 PD/\$50,000 CD and Ontario-\$5,000 CD and Hillsboro-\$5,000 CD), (7/19/94 Westby), (5/16/95

	<p>Westby-\$30,000 PD), (6/7/95 Viroqua-\$40,000 PD and Hillsboro-\$20,000 PD), (6/24/95 Bloomingdale), (7/27/95 Viroqua), (6/16/96 La Farge-\$10,000 PD/\$15,000 CD), (6/29/96 Genoa and Westby-\$30,000 PD), (8/7/96 La Farge-\$4,000 PD), (4/5/97 De Soto-\$7,00 PD and Romance-\$13,000 PD and Westby \$1,000 PD), (6/15/97 De Soto-\$20,000 PD and Victory-\$4,000 PD and Newry-\$35,000 PD), (7/26/97 Viroqua-\$10,000 PD and Ontario-\$22,000 PD), (5/19/98 Viroqua-\$5,000 PD), (5/30/98 Genoa-\$8,000 PD), (5/31/98 Viroqua-\$30,000 PD/\$15,000 CD and De Soto-\$25,000 PD), (6/18/98 Westby-\$60,000 PD), (6/20/98 Retreat-\$15,000 PD and Viroqua), (6/27/98 Stoddard-\$400,000 PD/\$53,000 CD and Viroqua-\$35,000 PD/\$10,000 CD and Newry-\$120,000 PD/\$30,000 CD and Hillsboro-\$90,000 PD/\$33,000 CD and Viroqua), (6/8/99 Stoddard-\$27,000 PD and Coon Valley-\$10,000 PD), (6/10/99 Genoa-\$20,000 PD), (7/8/99 Viroqua-\$10,000 PD/\$10,000 CD and Ontario-\$1,000 PD), Magnitude of winds for these 43 events ranged from 52 knots to 73 knots. Total damages: \$1,153,000 PD and \$226,000 CD.</p>
2000s	<p>47 reported events by NCDC – (6/1/00 Hillsboro-\$4,500 PD), (6/13/00 Westby-\$5,000 PD), (5/10/01 Coon Valley-\$500 PD), (6/11/01 Westby-\$350 PD), (6/18/01 Viroqua-\$1,000 PD), (4/18/02 Readstown), (7/30/02 Genoa-\$750 PD), (8/17/02 Retreat-\$750 PD), (7/4/03 Stoddard-\$1,750 PD/\$500 CD and Viroqua-\$2,000 PD/\$1,500 CD and Westby \$750 PD/\$2,000 CD), (7/31/03 De Soto), (3/30/05 Genoa-\$750 PD), (6/11/05 Ontario-\$300 PD), (6/29/05 De Soto-\$1,500 PD, Liberty Pole-\$2,000 PD, Readstown-\$750 PD, Viroqua-\$500 PD, Ontario-\$2,500 PD and Hillsboro-\$2,000 PD), (7/25/05 Red Mound-\$1,000 PD/\$3,000 CD, Genoa, Viroqua-\$2,000 PD/ \$2,500 CD and Liberty Pole-\$1,500 PD/ \$4,500 CD), (9/13/05 Genoa-\$2,500 PD and Chaseburg-\$3,000 PD/\$5,000 CD), (7/1/06 Viroqua-\$10,000 PD/\$2,000 CD), (7/20/06 Hillsboro-\$400 PD), (5/23/07 West Prairie-\$1,000 PD), (7/3/07 Valley-\$250 PD), (8/13/07 Hillsboro-\$1,000 PD), (8/14/07 Chaseburg-\$500 PD, and Purdy-\$800 PD), (8/21/07 Victory-\$10,000 PD, De Soto-\$2,500 PD, Viroqua-\$2,500 PD, West Prairie-\$13,000 PD and Rockton-\$3,000 PD), (9/21/07 Coon Valley-\$500 PD, Westby-\$10,000 PD and Coon Valley-\$500 PD), (5/30/08 Stoddard-\$500 PD and Ross-\$750 PD), (7/10/08 Stoddard-\$500 PD, Bloomingdale-\$4,500 PD and Viroqua-\$1,500 PD) and (7/27/09 La Farge-\$3,000 PD/ \$10,000 CD). Magnitude of winds for these 47 events ranged from 50 knots to 64 knots. Total damages: \$104,350 PD and \$31,000 CD.</p>
2010s	<p>24 reported events by NCDC – (6/23/10 Readstown-\$2,000 PD), (7/14/10 Esofea-\$500 PD, Springville-\$7,000 PD, Westby, and Viroqua-\$2,500 PD), (8/31/10 Liberty Pole-\$27,000 PD/\$1,000 CD), (4/10/11 Genoa-\$1,500 PD), (9/2/11 Stoddard-\$20,000 PD, Chaseburg-\$15,000 PD, Coon Valley-\$30,000 PD, Bloomingdale-\$5,000 PD), (Bud-\$1,000 PD, Westby-\$1,000 PD), (9/4/12 Genoa-\$10,000 PD, Red Mound-\$35,000 PD), (9/5/12 Victory-\$3,000 PD), (5/19/13 Westby-\$2,000 PD), (5/29/13 Viroqua-\$4,000 PD), (5/30/13 Bud), (6/21/13 Westby-\$3,000 PD), (7/22/13 Stoddard-\$1,000 PD), (6/16/14 Coon Valley, Hillsboro), (5/1/16 Mt. Tabor-\$1,000 PD/\$1,000 CD), (5/25/16 Readstown-\$2,000 PD, Sugar Grove-\$2,000 PD, Hillsboro-\$2,000), (6/30/16 Stoddard-\$1,000 PD, Viroqua-\$3,000 PD), (7/5/16 Victory-\$1,000 PD/\$16,000 CD), (3/6/17 Stoddard-\$2,000 PD, Chaseburg-\$2,000 PD, Bud-\$5,000 PD, Viroqua-\$5,000 PD, La Farge, Hillsboro-\$2,000 PD), (5/17/17 Hillsboro-\$3,000 PD, West Prairie-\$60,000 PD, Readstown-\$4,000 PD, Greenwood), (6/14/17 Kickapoo Center-\$1,000 PD, Ross-\$1,000 PD), (6/16/17 Coon Valley-\$12,000 PD, Liberty Pole-\$4,000 PD, La Farge-\$10,000 PD), (7/12/17 Viroqua-\$5,000 PD, Dell-\$3,000 PD), (7/19/17 Stoddard-\$4,000 PD, Chaseburg-\$15,000 PD, Readstown-\$5,000 PD, La Farge-\$5,000 PD), (6/3/18 La Farge-\$2,000 PD), (8/28/18 Viroqua-\$1,000 PD), (6/27/19 Viroqua-\$1,000 PD) Magnitude of winds for these 24 events ranged from 40 knots to 70 knots. Total damages: \$334,500 PD and \$18,000 CD.</p>
2020s	<p>11 reported events by NCDC – (6/2/20 Stoddard-\$3,000 PD, Coon Valley-\$2,000 PD, Ontario-\$2,000 PD, Mount Tabor-\$10,000 PD, Viroqua), (8/27/21 Liberty-\$5,000), (12/15/21 Viroqua, Liberty Pole, Ontario-\$5,000 PD), (6/15/22 La Farge-\$10,000 PD, Hillsboro-\$5,000 PD). Magnitude of winds for these 11 events ranged from 50 knots to 60 knots. Total damages: \$42,000 PD and \$0 CD.</p>

PD = Property Damage and CD = Crop Damage

**Table B-3 Tornado/High Winds History and Frequency**

1950s	1 reported event by NCDC – (9/19/57 \$25,000 PD) F1 Magnitude
1960s	5 reported events by NCDC – (5/8/64 \$250,000 PD), (4/19/66 \$250,000 PD), (3/31/67 \$25,000 PD), (6/8/67 \$25,000 PD), 8/6/68. Magnitude ranged from F0 to F2.
1970s	2 reported events by NCDC – 7/1/78, (8/9/79 \$250,000 PD). Magnitude ranged from F1-F2.
1980s	1 reported event by NCDC – (6/5/80 \$2.75 million-1 injury) Magnitude ranged from F2-F3.
1990s	5 reported events (2 tornadoes and 3 high wind) by NCDC – (4/20/92 Tornado F1-\$25,000 PD), (6/18/98 Tornado Retreat F1-\$100,000 PD/\$50,000 CD). (4/6/97 Winds of over 70 mph in Vernon and 4 other counties causing \$45,000 in PD); (6/27/98 Winds gusts of between 90 and 120 mph); and (11/10/98 Winds of up to 93 mph recorded, affected Vernon and 12 other counties, \$1.7 million PD/1injury/2deaths). Magnitude F1 and Winds ranged from 61 knots to 81 knots.  1 reported event reported by Wisconsin Emergency Management – 1998 High Winds and Severe Storms, \$11.1million in Public-Government Property and Facilities Damage and \$36.8 million in Private-Individual Property, Crop and Facilities Damage to Vernon and 13 other counties, <i>Presidential Disaster Declaration</i> .
2000s	7 reported events (4 tornadoes and 2 high winds) by NCDC – (7/26/00 Tornado Chaseburg F0-\$8,000 PD/\$12,000 CD) F0 Magnitude. (4/7/01 Winds of 60-70 mph in Vernon and 9 other counties, \$12,000 PD); (10/25/01 Winds of 40-50 mph in Vernon and 12 other counties, no damages recorded); (8/18/05 Tornado: Esofea F1, 1 injury, \$150,000 PD/\$50,000 CD; Liberty F2, \$800,000 PD/\$194,000 CD; Viola F1, 3 injuries, \$2.5 million PD, \$750,000 CD); (6/7/08 Tornado – Liberty Pole F0 - \$15,000 PD/\$10,000 CD) Winds ranged from 56 to 64 knots.
2010s	4 reported events (3 tornados and 1 high wind) by NCDC – (10/26/10 50 knot winds recorded in Vernon County-\$18,000 PD); (7/5/16 Tornado: Retreat EFO, \$5,000 PD), (5/24/19 Tornado: Coon Valley EFO 0, \$1,000 PD, \$4,000 CD); (7/18/19 Tornado: Bloomingdale EFO, \$40,000 PD). Total Damage \$64,000 PD, \$4,000 CD.
2020s	2 reported events (1 tornado and 1 high wind) by NCDC - (12/15/21 54 knot winds recorded in Vernon County-\$25,000 PD); (6/15/22 Tornado: La Farge E1, \$300,000 PD) Total Damage \$325,000 PD.

PD = Property Damage and CD = Crop Damage

**Table B-4 Riverine/Flash Flooding History and Frequency**

1950s	1 event reported by St. Paul Water Control Center Flood Information: 1951-Kickapoo River-Readstown, Gage Reading, 44.08’.
1960s	2 events: (1965 - Mississippi River Flood of Record, 638.37 MSL, Lock and Dam 8 Tailwater Gage, Genoa, WI- <i>Presidential Disaster Declaration</i> ), (1969 – Mississippi River Flood, 635.24 MSL, Lock and Dam 8 Tailwater Gage, Genoa, WI)
1970s	3 reported events by Wisconsin Emergency Management: (1971 - Mississippi River Flood, River Level 17.7’, and 623 MSL), (1975 – Mississippi River Flood, \$633,500-Public Gov’t Property and Facilities Damage and \$1.8 million Private-Individual Property, Crop and Facilities Damage to Vernon and 7 other counties), (1978 – Flooding and Tornadoes, \$11.7 million- Public Gov’t Property and Facilities Damage and \$40 million Private-Individual Property, Crop and Facilities Damage - to Vernon and fifteen other counties, <i>Presidential Disaster Declaration</i> ).

1980s	<p>1 reported event by Wisconsin Emergency Management: 1980 – High Winds/Heavy Rains/Tornadoes, \$3.5 million-Public Gov't Property and Facilities Damage and \$6.9 million Private-Individual Property, Crop and Facilities Damage to Vernon and 10 other counties.</p>
1990s	<p>5 reported events by NCDC: (2/20/94-Flood Rockton); (6/16/96-Flash Flood Victory, \$250,000 PD and \$250,000 CD); (4/3/97 – Mississippi River Flood, 3<sup>rd</sup> highest on record, \$1 million PD – to Vernon and five other counties); (6/27/98-Flash Flood Viroqua, \$12,000 PD); (7/20/99-Flash Flooding central portion of County, \$8,000 PD and \$3,000 CD).</p> <p>4 reported events by Wisconsin Emergency Management: (1990-Flooding/Tornadoes, \$4.6 million-Public Gov't Property and Facilities Damage and \$16.5 million Private-Individual Property, Crop and Facilities Damage - to Vernon and 16 other counties, <i>Presidential Disaster Declaration</i>), (1992 – Flooding/Kickapoo River Flood, \$1.9 million- Public Gov't Property and Facilities Damage and \$15.8 million Private-Individual Property, Crop and Facilities Damage - to Vernon and nine other counties, <i>Presidential Disaster Declaration</i>), (1993 –Flooding, Storms, Tornadoes, Heavy Rain/Mississippi River Flood, \$47 million- Public Gov't Property and Facilities Damage and \$700 million Private-Individual Property, Crop and Facilities Damage - to Vernon and 46 other counties, <i>Presidential Disaster Declaration</i>), (1996-Flooding/Severe Storms, \$4.7 million- Public Gov't Property and Facilities Damage and \$194 million Private-Individual Property, Crop and Facilities Damage - to Vernon and 14 other counties).</p>
2000s	<p>17 reported events by NCDC – (5/17/00 –Countywide Urban/small stream flood); (5/31/00 – Countywide Flash Floods, \$60,000 PD and \$20,000 CD); (6/1/00-Countywide Flooding due to heavy rains, \$3.5 million PD and \$500,000 CD); (7/26/00 – Countywide flash flooding, \$35,000 PD and \$15,000 CD); (4/10/01 – Mississippi River Flood, \$6.5 million PD – to Vernon and five other counties); (5/1/01-Mississippi River Flooding, \$7.5 million PD to Vernon and five other counties); (5/8/04 Southwest portion flashing flooding – 1 death, \$15,000 PD); (5/21/04 – Flooding along the Kickapoo River, \$27,000 C), Countywide flash flooding, \$250,000 PD, \$250,000 CD); (5/23/04 – Countywide flash flooding, \$125,000 PD, \$90,000 CD); (8/18/07 Stoddard, flash flood \$28.2 million PD, \$500,000 CD); (8/19/07 Coon Valley, flash flood, 2.0 million PD), Springville flash flood, \$150,000 PD, \$30,000 CD, Readstown flooding, \$150,000 PD, \$50,000 CD, Viroqua flooding, \$3.5 million PD, \$250,000 CD); (8/21/07 Stoddard flash flooding, \$2,000 PD); (8/27/07 La Farge flash flooding, \$1,000 PD); (8/27/07 Red Mound flash flooding, \$3,000 PD); (6/7/08 Ontario flooding, \$750,000 PD, \$250,000 CD, Stoddard flash flooding, 2.3 million PD, \$950,000 CD, Liberty flooding, \$800,000 PD, \$350,000 CD; La Farge flash flooding, \$500,000 PD, \$400,000 CD; (6/8/08 La Farge flooding, \$2.6 million PD, \$1.3 million CD, Readstown flooding, 1.0 million PD, \$500,000 CD, Coon Valley flooding, \$750,000 PD, \$250,000 CD, Hillsboro flooding, \$800,000 PD, \$300,000 CD, Valley flooding \$850,000 PD, \$300,000 CD, Hillsboro-Kickapoo area flooding, \$900,000 PD, \$300,000 CD); and (7/16/08 Green Wood flooding \$5,000 PD).</p> <p>5 reported events by Wisconsin Emergency Management: (1) 2000-Heavy rains/storms/flooding, \$37.6 million- Public Gov't Property and Facilities Damage and \$25.2 million Private-Individual Property, Crop and Facilities Damage - to Vernon and 29 other counties, <i>Presidential Disaster Declaration</i>. (2) 2001 –Flooding/Storms/Tornado, \$47.7 million- Public Gov't Property and Facilities Damage and \$56.1 million Private-Individual Property, Crop and Facilities Damage - to Vernon and 31 other counties, <i>Presidential Disaster Declaration</i>. (3) 5/19/04 through 7/3/04 severe storms and flooding impacted 37 Wisconsin Counties. A <i>Presidential Disaster Declaration</i> was declared, and Vernon County's local governments, individuals and businesses became eligible for grants and low interest loans. The damage assessment for publicly owned properties exceeded \$1.37 million. (4) 2007 –Flooding/Storms, \$13 million in assistance to Vernon and 13 other counties, <i>Presidential Disaster Declaration</i>. (5) June 2008 – an unprecedented amount of rain fell. A series of storms dating from June 5 – 12 caused widespread flooding that resulted in damage to thousands of</p>

	homes, businesses, and roads. Vernon County and 30 other counties received Presidential Disaster Declarations. Over \$96 million in disaster assistance was approved. Vernon County received over \$1.7 million in assistance from the Wisconsin Individual and Household programs.
2010s	30 reported events by NCDC – (5/25/10 Hillsboro); (6/23/10 Stoddard and Chaseburg-\$10,000 PD); (7/7/10 Kickapoo Center); (7/14/10 Hillsboro Kickapoo Area); (7/15/10 Hillsboro-\$2,000 PD, La Farge); (7/16/10 Kickapoo Center); (8/9/10 Chaseburg, La Farge); (8/13/10 Trippville-\$934,300 PD, Hillsboro, Rockton, La Farge, Readstown); (8/14/10 Liberty); (9/23/10 Ontario, Chaseburg); (9/24/10 Kickapoo Center); (3/22/11 Readstown); (3/23/11 Kickapoo Center); (6/18/11 West Prairie); (6/19/11 Retreat, Viroqua-\$1,000 PD, Bud-\$2,000 PD, West Prairie-\$5,000 PD, Readstown); (7/18/12 Viroqua); (4/10/13 Readstown, Potts Corner, Kickapoo Center); (6/21/13 Chaseburg, Genoa-\$2,000 PD); (6/22/13 De Soto-\$500,000 PD, Readstown); (3/27/14 Ontario); (3/28/14 Readstown, Viola); (4/14/14 Kickapoo Center); (6/1/14 Westby, Bloomingdale, Esofea, Bud, Ross); (12/14/15 Kickapoo Center, Ontario); (12/15/15 Readstown); (9/7/16 Bud, Viroqua, Readstown, Kickapoo Center); (9/9/16 Avalanche); (9/22/16 Viroqua-\$9,866,000 PD and one death, Readstown, La Farge, Kickapoo Center, Ontario); (7/12/17 Coon Valley); (7/20/17 Ontario, Readstown, Stoddard-\$778,000 PD and \$5,300,000 CD, Kickapoo Center, La Farge); (8/27/18 Victory-\$28,300,000 PD, \$250,000 CD); (9/3/18 Folsom-\$750,000 PD, \$105,000 CD, Genoa-\$2,000 PD, Esofea, Coon Valley-\$25,000 PD, \$5,000 CD); (7/19/19 Mount Tabor-\$345,000 PD, \$440,000 CD); and (9/19/19 Ontario-\$5,000 PD) Totals \$40,050,000 PD and \$4,400,000 CD, one death.
2020s	2 reported events by NCDC - (8/7/21 Dell-\$25,000 PD, \$205,000 CD); (8/28/21 Folsom-\$10,000 PD, \$425,000 CD) Totals \$35,000 PD and \$630,000 CD.

PD = Property Damage and CD = Crop Damage

**Table B-5 Heavy Snowstorm History and Frequency**

1990s	14 reported events by NCDC – 1/13/93, 1/16/94, 1/26/94, 2/22/94, 2/25/94, 3/6/95, 4/9/95, 11/26/95, 1/18/96, 12/23/96, 2/4/97, 3/13/97, 3/8/98, 1/1/99
2000s	21 reported events by NCDC – 12/11/00, 12/18/00, 12/28/00, 3/1/02, 4/7/03, 12/9/03, 2/5/04, 1/4/05, 1/21/05, 3/17/05, 2/15/06, 2/23/07, 3/1/07, 4/10/07, 12/22/07, 2/17/08, 12/8/08, 12/19/08, 12/20/08, 12/8/09, 12/23/09.
2010s	10 reported events by NCDC – 1/6/10, 12/3/10, 12/20/10, 3/5/13, 3/22/15, 12/10/16, 1/24/17, 3/12/17, 4/3/18, 4/18/18, 1/18/19, and 1/27/19.
2020s	1 reported event by NCDC – 2/9/20

**Table B-6 Ice Storm History and Frequency**

1970s	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 Vernon and 21 other counties, <i>Presidential Disaster Declaration</i> .
1990s	4 events reported by NCDC – (1/26/94 heavy snow/ice storm); (12/13/95 glaze); 2/26/96; (1/4/98 Vernon and 11 other counties, \$67,000 PD, 14 injuries)
2000s	5 events reported by NCDC – 2/24/01, 12/1/07, 1/3/09, 2/26/09, 3/8/09
2010s	1 event reported by NCDC – 1/24/10

**Table B-7 Blizzard History and Frequency**

1990s	1 event reported by NCDC – 1/26/96
2000s	No events reported by NCDC
2010s	1 event reported by NCDC – 12/11/10

**Table B-8 Extreme Cold History and Frequency**

1990s	5 reported events by NCDC: 1/13/94, 12/9/95, 1/29/96, 2/1/96, (1/16/97 wind chills of 30-50 below zero)
2000s	6 reported events by NCDC: 1/30/08, 2/10/08, 12/14/08, 12/21/08, 1/14/09 and 12/10/09.
2010s	5 reported events by NCDC: 1/1/10, 3/7/13, 1/5/14, 1/27/14, and 1/29/19.

**Table B-9 Extreme Heat History and Frequency**

1990s	6 reported events by NCDC: 6/14/94, 7/13/95 (57 deaths in state), 10/12/95, 7/4/99–7/5/99, 7/23/99, 7/28/99
2000s	1 reported event by NCDC: 7/31/01 through first week and a half of August
2010s	3 reported events by NCDC: 7/17/11 (\$8,000 PD), 6/29/18, and 7/19/19
2020s	No events reported

**Table B-10 Drought History and Frequency**

1970s	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 Vernon and 63 other counties, Presidential Emergency Declaration.
1980s	1 event report by Wisconsin Emergency Management, <i>Hazard Analysis, November 2002</i> - One of the most severe droughts on record for the state - 1987-1998 drought 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.
1990s	No events reported
2000s	No events reported
2010s	2 events reported by NCDC: 7/12 thru 10/12 and 9/13 thru 10/13
2020s	1 event reported by NCDC: 6/15/21

**Table B-11 Railroad History and Frequency**

1980s	3 accidents reported by the Federal Railroad Administration: 1980 one derailment - \$164,000 total damage; 1986 one derailment - \$470,240 total damage; 1987 one derailment - \$8,000 damages.
1990s	5 accidents reported by the Federal Railroad Administration: 1990 three derailments - \$344,100 total damages; 1994 one derailment - \$1,000 in damages; 1996 one derailment - \$6,500 in damages.
2000s	No accidents reported by the Federal Railroad Administration.
2010s	1 accident reported by the Federal Railroad Administration: 2011 one derailments - \$13,000 in damages.

Source: Federal Railroad Administration, Office of Safety Analysis

## APPENDIX – C

### Risk Assessment Survey

#### MEMORANDUM

Date: October 24, 2022  
To: All chief elected officials of local governments of Vernon County and Emergency Response Personnel  
From: Brandon Larson, Emergency Management Director  
Subject: Vernon County Hazard Mitigation Information

Vernon County is in the process of updating the existing Vernon County Hazard Mitigation Plan. A Hazard Mitigation Plan is a 5-year plan that describes the hazards that occur in Vernon 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, snow storms, 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; updated 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) 637-5266 or Staff with the Mississippi River Regional Planning Commission (MRRPC) at (608) 785-9396. MRRPC staff are also available to meet with your municipality for further explanation if necessary.

Thank you for your time in this manner.

Brandon Larson

**VERNON 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 Lightning 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 Vernon 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.

<b>NATURAL HAZARDS - Each natural hazard should receive either a low, medium, or high risk rating check mark.</b>	<b>Low Risk Rating ✓</b> 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.	<b>Medium Risk Rating ✓</b> 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.	<b>High Risk Rating ✓</b> 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 Brandon Larson County Emergency Management Director, Vernon Emergency Management Office, 400 Courthouse Square Suite 201, Viroqua, WI 54665 by **December 31, 2022.**

## Vernon County All-Natural Hazards Mitigation Project Need Survey

Vernon County is updating the Vernon County Multi- Hazards Mitigation Plan 2018-2022. 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, stormwater 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, stormwater, water line and sewer line improvements, and dam inspection or maintenance projects.)

Proposed flooding, stormwater 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.			

9. Does your local unit of government or organization you represent have any pandemic flu mitigation projects you would like to undertake? If so, describe below. (Examples of these types of projects could include: health plan, protective equipment, shelters, training, etc.)

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 Brandon Larson County Emergency Management Director, Vernon Emergency Management Office, 400 Courthouse Square Suite 201, Viroqua, WI 54665 **by December 31, 2022.**

Draft



## Public Safety Committee Agenda



400 Courthouse Square, Suite 201  
Viroqua, Wisconsin 54665  
Brandon Larson, WCEM, Director  
Telephone: (608) 637-5266



1320 Bad Axe Court  
Viroqua, Wisconsin 54665  
John B. Spears, Sheriff  
Nathan Campbell, Chief Deputy Sheriff  
Telephone: (608) 637-2123

---

### AGENDA PUBLIC SAFETY COMMITTEE MEETING

---

If you wish to listen or participate in this meeting you can do so by clicking on this link:

<https://vernoncounty-org.zoom.us/j/99100732789?pwd=SmFPS0ltUjFlxTmo2aHpuTy91OHZ3UT09>

Meeting ID Code: 991 0073 2789

Password: 670810

OR You can listen by dialing number: 1-312-626-6799 (Chicago) and enter the access code when requested.  
Please remember to Mute your phone/microphone until you need to speak and turn off your camera if you do not wish to be seen.

---

The Public Safety Committee meeting will be held on **Thursday, October 13, 2022 at 9:30 a.m.** in the **Conference Room** of the Sheriff's Office, 1320 Bad Axe Court, Viroqua, Wisconsin and via ZOOM Conference Call.

The Agenda will include:

1. Call to Order – Chairman
2. Affirmation of Proper Public Notice of Meeting
3. Audience to Visitors – Please limit comment(s) to four (4) minutes
4. Review minutes from previous meeting – Action Item
5. Review and vote on Invoices – Sheriff – Action Item
6. Review and vote on Invoices – Emergency Management – Action Item
7. Sheriff's Activity Report
8. Emergency Management Director's Report
9. Multi Hazard Mitigation Plan – Discussion and Approval – Action Item
10. Opioid Epidemic Abatement Funds - Discussion
11. Any other items for consideration for next meeting
12. Confirm next meeting date
13. Adjournment

# Mississippi River Regional Planning Commission Agenda



## MISSISSIPPI RIVER REGIONAL PLANNING COMMISSION

1707 Main Street, Suite 435  
La Crosse, WI 54601  
Phone: (608) 785-9396  
Email: [plan@mrrpc.com](mailto:plan@mrrpc.com)  
Website: [mrrpc.com](http://mrrpc.com)

James Kuhn, Cashton, WI  
Chairman  
Bill E. Schroeder, Hager City, WI  
Vice Chairman  
Vicki Burke, Onalaska, WI  
Secretary & Treasurer  
Dave Bonifas, La Crosse, WI  
Director

### MISSISSIPPI RIVER REGIONAL PLANNING COMMISSION BIMONTHLY MEETING NOTICE AND AGENDA

10:00 AM, Wednesday, October 12, 2022, at AmeriClnn, 1835 Rose Street, La Crosse, WI 54603

Note: We will be meeting in person.  
If you are unable to attend in person, you can also attend via Zoom.

Direct Link: <https://us02web.zoom.us/j/89034593579?pwd=SVVqYzZtdjJlqWZmN3pGdThscWRpdz09>

Go to: Zoom.us, click on join a meeting  
Meeting ID: 890 3459 3579 | Passcode: 328481  
By Phone: 1.312.626.6799 – Enter Meeting ID: 890 3459 3579 - Passcode: 328481

#### < MRRPC BIMONTHLY MEETING AGENDA >

1. Roll call and guest introductions.
2. Decision on August 10, 2022, Bimonthly Meeting Minutes
3. Decision on Treasurer's Report: (a) August 2022, September 2022 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) Disaster Recovery Microloan Fund, (5) CARES Act RLF, (6) WEDC Main Street Bounce back Grant. VB/DB
4. Presentation by Dan Baumann, Secretary's Director WI DNR. Statewide Flood Resiliency
5. Decision on Accounting and Bookkeeping firms. DB
6. Decision on Resolution regarding the WI DOT 2023 Workplan. BG
7. SMRT Bus Update. BG
8. Build Grant Update. BG
9. Decision on Crawford County Multi-Hazard Mitigation Plan Contract. AN
10. Decision on Vernon County Multi-Hazard Mitigation Plan Contract. AN
11. WEDC Mainstreet Bounce Back Grants. DB
12. Director search update. DB
13. Closed Session: The Commission will entertain a motion to enter into closed session pursuant to Wisconsin Statutes 19.85(1) (c) considering employment, promotion, compensation or performance evaluation data of any public employee over which the governmental body has jurisdiction or exercises responsibility, to wit: Decisions on Filling Staff Positions. The Commission will reconvene to open session at the conclusion of the closed session and finalize any action needed.

14. Commissioners' questions and comments on the projects or subjects listed in the written staff report.
15. Reports from Commissioners.
16. New Business.
17. Adjourn.

#### Commissioners

Buffalo County Mary Anne McMillan Urell Del Twiatt John Schlesselman	La Crosse County Vicki Burke Sharon Hampson Robin Schmidt	Pierce County Richard Purdy William Schroeder Neil Gulkranson
Crawford County Don Stirling Gerald Krachey Michael Higgins	Monroe County Toni Wissesstad James Kuhn Cedric Schnitzler	Trempealeau County Patrick Sorge Ernest Vold Phillip Borson
Jackson County Ron Carney Brad Chown Tom Cooper	Pepin County John Andrews Chris Kees Winkler James Kraft	Vernon County Herb Cornell Jo Ann Nickelatti Nancy Jaekel

Staff  
Dave Bonifas, Director  
Abbeley Nicowander, Senior Planner  
Bob Golnik, Senior Planner  
Sarah Ofte, Administrative Assistant

*Non-Discrimination Policy Statement. The MRRPC operates its employment, programs, and services without regard to race, color, age, sex, disability, low income, limited English proficiency, and national origin in accordance with the Title VI of the Civil Rights Act. If you have a disability and need assistance participating in the meeting, please contact Sarah Ofte at 608.785.9396 or at [plan@mrrpc.com](mailto:plan@mrrpc.com) at least twenty-four hours prior to the meeting.*

*Providing Planning and Economic Development Services to Improve the Environment, Economy and Quality of Life  
•Land Use Planning and Zoning Assistance •Transportation Planning •Economic Development Planning •Recreation Planning •Business Lending •GIS Mapping  
•Grant Writing •Economic Data Dissemination •Assist Local Interests in Responding to State, Federal and Private Programs  
•Advise on Local and Regional Planning Issues •Coordinating Programs and Activities •Advocate on Issues Affecting the Region*

Draft

**APPENDIX – E**  
Adoption Resolutions

Draft