FLORENCE COUNTY, WISCONSIN
HAZARD MITIGATION PLAN

2018 - 2022

PREPARED BY:

FLORENCE COUNTY
HAZARD MITIGATION PLAN STEERING COMMITTEE

WITH ASSISTANCE FROM:

BAY LAKE
Regional Planning Commission | Since 1972

FLORENCE COUNTY, WISCONSIN
2018

FLORENCE COUNTY BOARD MEMBERS

DISTRICT 1
Sherry Johnson

DISTRICT 2
Mark Wenzel

DISTRICT 3
Holly Wahlstrom-Stratton

DISTRICT 4
Gary Steber

DISTRICT 5
Larry Dzekute

DISTRICT 6
Ronald Erickson

DISTRICT 7
Edward Wenger

DISTRICT 8
Edwin Kelley (Vice-Chair)

DISTRICT 9
Jeanette Bomber (Chair)

DISTRICT 10
Larry Neuens

DISTRICT 11
Fran Modschiedler

DISTRICT 12
Susan Theer

FLORENCE COUNTY EMERGENCY MANAGEMENT DIRECTOR

Dave Gribble

HAZARD MITIGATION PLAN STEERING COMMITTEE

COUNTY HIGHWAY COMMISSIONER
Jeff DeMuri

FLORENCE UTILITIES/WPPI ENERGY
Bob Friberg

COUNTY EMERGENCY MANAGEMENT DIRECTOR
Dave Gribble

WE ENERGIES
Ryan Grondin

USFS FIRE
Jessee Harrand

COUNTY BOARD SUPERVISOR
Edwin Kelley

COUNTY HEALTH DEPARTMENT
Amber Kolberg

BAY-LAKE REGIONAL PLANNING COMMISSION
Angela Kowalzek-Adrians

COUNTY TREASURER/PROPERTY LISTER/LIO
Donna Liebergen

USFS
Scott Linn

COUNTY SHERIFF
Jeff Rickaby

COUNTY HEALTH DEPARTMENT
Annette Seibold

COUNTY FOREST ADMINISTRATOR
Pat Smith

COUNTY ZONING ADMINISTRATOR
Scott Wolf

COUNTY ZONING ADMINISTRATOR (RETIRED)
Rich Wolosyn

WISCONSIN DNR FORESTER
Tyler Wood

Florence County, Wisconsin
Hazard Mitigation Plan 2018-2022

Adopted August 21, 2018

Prepared by:

Florence County Hazard Mitigation Plan Steering Committee

With assistance from:

Bay-Lake Regional Planning Commission
425 S Adams St, Suite 201
Green Bay, WI 54301
(920) 448-2820
www.baylakerpc.org

BAY LAKE Regional Planning Commission | Since 1972

TABLE OF CONTENTS

RESOLUTION OF ADOPTION VI

WEM APPROVAL LETTER VII

EXECUTIVE SUMMARY VIII

PLAN UPDATE SUMMARY VIII

SECTION 1: INTRODUCTION 1-1

PURPOSE OF THE PLAN 1-1

Disaster Mitigation Act of 2000 1-1

Plan Funding 1-2

Plan Elements 1-2

PLANNING PROCESS 1-3

Hazard Mitigation Plan Steering Committee 1-4

Hazards to be Addressed 1-4

Plan Review 1-5

Public Involvement 1-5

Neighboring Jurisdictions 1-5

Plan Contact Information 1-5

SECTION 2: PLANNING AREA 2-1

GENERAL GEOGRAPHY 2-1

DEMOGRAPHIC PROFILE 2-2

Population Trends 2-2

Population Projections 2-3

Housing Trends 2-4

EMPLOYMENT CHARACTERISTICS 2-4

GENERAL DEVELOPMENT PATTERN 2-6

SECTION 3: RISK ASSESSMENT 3-1

NATURAL HAZARD IDENTIFICATION 3-1

Hazard Risk Assessment Prioritization 3-1

Natural Hazard Events Historical Summary 3-2

Disaster Declaration History 3-3

Other Natural Hazards Determined Not to Pose a Significant Risk 3-3

RISK AND VULNERABILITY ASSESSMENT 3-5

Critical Facilities 3-5

HAZARD PROFILES 3-7
Tornado and Strong Wind *3-7*
Flooding *3-10*
Winter Storm *3-14*
Wildland Fire *3-16*
Extreme Cold *3-18*
Drought *3-20*
Lightning *3-22*
Excessive Heat *3-23*
Hail *3-25*
Dense Fog *3-26*
Dam Failure *3-28*
NATURAL HAZARDS AND CLIMATE CHANGE 3-31
Vulnerabilities *3-31*
Potential Impacts *3-32*
Solutions/Adaptations *3-33*
SECTION 4: MITIGATION STRATEGY 4-1
INTRODUCTION 4-1
MITIGATION GOALS 4-1
HAZARD MITIGATION STRATEGIES 4-2
Prioritization Process *4-2*
Cost-Benefit Review *4-2*
COMPLETED MITIGATION ACTIONS 4-2
POLICIES, PROGRAMS, AND RESOURCES FOR MITIGATION 4-7
POTENTIAL FUNDING SOURCES FOR MITIGATION 4-9
Federal Programs *4-9*
State of Wisconsin Programs *4-11*
SECTION 5: PLAN MAINTENANCE AND ADOPTION PROCESS 5-1
PLAN ADOPTION PROCESS 5-1
PLAN MAINTENANCE 5-1
Plan Monitoring, Evaluation, and Updating *5-1*
Additional Plan Review *5-2*
PLAN COORDINATION 5-2

TABLES

TABLE 1: HAZARD MITIGATION PLAN 2018-2022 UPDATE SUMMARY, FLORENCE COUNTY VIII
TABLE 2: MITIGATION STRATEGY 2018-2022 UPDATE SUMMARY, FLORENCE COUNTY IX
TABLE 1-1: FLORENCE COUNTY, WISCONSIN HAZARD MITIGATION PLAN STEERING COMMITTEE 1-4
TABLE 2-1: JURISDICTION SIZE, FLORENCE COUNTY 2-1
TABLE 2-2: POPULATION, 1950-2010, FLORENCE COUNTY 2-2
TABLE 2-3: POPULATION CHANGE, 1990-2010, FLORENCE COUNTY 2-3
TABLE 2-4: POPULATION PROJECTIONS, 2010-2040, FLORENCE COUNTY 2-4
TABLE 2-5: HOUSING UNITS, 1990-2010, FLORENCE COUNTY 2-4
TABLE 2-6: AVERAGE CIVILIAN LABOR FORCE ESTIMATES, 2000-2016, FLORENCE COUNTY 2-6
TABLE 2-7: LAND USE, 2009, FLORENCE COUNTY 2-6
TABLE 3-1: RISK ASSESSMENT RANKING 3-1
TABLE 3-2: NATURAL HAZARD OCCURRENCES DATA, 1995-2011, FLORENCE COUNTY 3-3
TABLE 3-3: NUMBER OF CRITICAL FACILITIES BY TYPE, FLORENCE COUNTY 3-6
TABLE 3-4: CRITICAL FACILITY TYPES WITHIN THE 100-YEAR FLOODPLAINS, FLORENCE COUNTY 3-12
TABLE 4-1: HAZARD MITIGATION STRATEGY, 2018-2022, FLORENCE COUNTY 4-3

FIGURES

FIGURE 2-1: FLORENCE COUNTY, WISCONSIN 2-1
FIGURE 2-2: POPULATION TRENDS, 1950-2010, FLORENCE COUNTY 2-3
FIGURE 2-3: UNEMPLOYMENT RATE, 2000-2016, FLORENCE COUNTY 2-5
FIGURE 3-1: TORNADO MAGNITUDE MEASUREMENT, EF SCALE 3-8

MAPS

MAP 2-1: LAND USE, FLORENCE COUNTY 2-7
MAP 3-1: CRITICAL FACILITIES, FLORENCE COUNTY 3-35
MAP 3-2: 100-YEAR FLOODPLAINS, FLORENCE COUNTY 3-36
MAP 3-3: IMPROVED PARCELS WITHIN FLOODPLAINS, FLORENCE COUNTY 3-37
MAP 3-4: CRITICAL FACILITIES WITHIN THE 100-YEAR FLOODPLAINS, FLORENCE COUNTY 3-38
MAP 3-5: AREAS OF GREATEST WILDLAND FIRE RISK, FLORENCE COUNTY 3-39
MAP 3-6: DAMS, FLORENCE COUNTY 3-40

APPENDICES

APPENDIX A: CRITICAL FACILITIES A-1
APPENDIX B: MEETING SIGN-IN SHEETS B-1
APPENDIX C: PUBLIC MEETING NOTICE C-1

Resolution #2018-15

A RESOLUTION adopting the *Florence County, Wisconsin Natural Hazards Mitigation Plan (2018)*.

WHEREAS, Florence County recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an adopted natural hazards mitigation plan is required as a condition of future grant funding for mitigation projects.

NOW, THEREFORE BE IT RESOLVED, that the County Board of Florence County, Wisconsin, hereby adopts the *Florence County Natural Hazards Mitigation Plan (2018)* as an official plan; and

BE IT FURTHER RESOLVED, that upon approval of the *Florence County, Wisconsin Hazard Mitigation Plan (2018)*, the Florence County Emergency Management Office will submit the Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final approval, as required under the Hazard Mitigation Grant Program.

I HEREBY CERTIFY that the foregoing Resolution was duly passed by the County Board of Florence County, Wisconsin, on the **21st day of August, 2018.**

Jeanette Bomberg, County Board Chair

Donna Trudell, County Clerk

STATE OF WISCONSIN
DEPARTMENT OF MILITARY AFFAIRS
DIVISION OF EMERGENCY MANAGEMENT

Brian M. Satula
Administrator

Scott Walker
Governor

August 28, 2018

Mr. David Gribble, Director
Florence County Emergency Management
P.O. Box 678
Florence, WI 54141

Dear David:

It gives me great pleasure to inform you that the *Florence County Multi-Jurisdictional Hazard Mitigation Plan* has officially been approved for the County by the Federal Emergency Management Agency. The plan complies with the requirements of the Disaster Mitigation Act of 2000. The County is eligible to apply for funding through the Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, and Flood Mitigation Assistance program through August 24, 2023, for projects identified in the Plan.

With the FEMA Meets Requirements letter you received the Local Hazard Mitigation Plan Review Tool which includes recommended revisions for the required five-year update.

Congratulations on the approval of the Plan! I also want to commend the County for its commitment to mitigation and reducing future disaster losses, and I look forward to working with you in the future.

If you have any questions, please call me at (608) 888-5292 or Katie Sommers at (608) 242-3222.

Sincerely,

Robyn Wiseman, CFM
State Hazard Mitigation Officer
Wisconsin Emergency Management

Enclosure

Cc: Teresa Erler, Northeast Regional Emergency Management Director
Janell Rucinski, Northeast Regional Office Operations Associate
Angela Kowalzek-Adrians, Bay-Lake Regional Planning Commission

2400 Wright St. PO Box 7865 Madison, WI 53707-7865 24 Hour Emergency Hotline 1-800-943-0003

PLAN UPDATE SUMMARY

The following table (Table 1) helps identify the updates made to the previous Florence County, Wisconsin Hazard Mitigation Plan (2013-2018).

Table 1: Hazard Mitigation Plan 2018-2022 Update Summary, Florence County

Plan Section	Description of Update
Section 1: Introduction	Updated planning process participants and planning process.
Section 2: Planning Area	Updated demographic data.
Section 3: Risk Assessment	Updated hazard prioritization, occurrence data, critical facilities, and hazard maps.
Section 4: Mitigation Strategy	Revised goals and updated the Mitigation Strategy and completed mitigation actions.
Section 5: Plan Maintenance and Adoption Process	Updated plan adoption information, plan maintenance process, future plan update schedule, and plan coordination.
Appendix A: Meeting Sign-in Sheets	Updated with copies of sign-in sheets from plan update meetings.

The following table (Table 2) helps identify the updates made to the previous Florence County, Wisconsin Mitigation Strategy.

Table 2: Mitigation Strategy 2018-2022 Update Summary, Florence County

Mitigation Strategy Sections	Description of Update
All Hazards	
Mutual aid agreement with Wisconsin Public Service to help keep debris off power lines.	Removed. No longer relevent.
Identify areas of need for burying power lines.	Changed Project Timetable from "2012-2017" to "2018-2022."
Bury power lines in areas of need.	Changed Project Timetable from "2012-2017" to "2018-2022."
Feasibility of partnering with power utilities in county on burying power lines.	Removed. No longer relevent.
Acquire emergency notification system (e.g. Code Red).	Completed.
Undertake outreach efforts to encourage the public to sign up for notifications through the Emergency Notification System.	Addition.
Tornadoes and Strong Wind (changed to include Strong Wind)	
Undertake effort to add all manufactured and mobile home park residents to Code Red to receive severe weather notifications.	Addition.
Identify emergency shelter availability in County and review location gaps.	Changed Project Timetable from "Ongoing" to "2018-2022."
Enhanced construction standards and techniques.	Changed Priority from "Low" to "Medium."
Continue to review building codes.	Addition.
Flooding	
Acquire countywide LiDAR mapping.	Completed.
Acquisition and relocation.	Changed Project Timetable from "Ongoing" to "As needed." Changed Priority from "Medium" to "Low."
Flood insurance rate map (FIRM) amendments and revisions.	Changed Priority from "Low" to "Medium."
Individual property measures for basements.*	Changed Priority from "Low" to "Medium."
Identify culverts that need improvement/ replacement.	Addition.
Replace/improve failing culverts.	Addition.
Acquire building footprints.	Addition.
Acquire updated certified floodplain maps based on new LiDAR.	Addition.
Lightning (changed so that thunderstorms are not included)	
Ensure proper grounding of new buildings.	Addition.
Excessive Heat	
Provide sheltering and water supplies for vulnerable populations.	Addition.
Hail (addition)	
Continue to review building codes.	Addition.

SECTION 1: INTRODUCTION

PURPOSE OF THE PLAN

The primary focus of the *Florence County Natural Hazards Mitigation Plan 2018-2022* is to evaluate the planning area's potential exposure to natural hazards and to identify appropriate mitigation strategies. Consistent with the Code of Federal Regulations (44 CFR Part 201.6), the County decided to limit the scope of this planning effort to natural hazards at this time, though this plan conforms to Federal Emergency Management Agency (FEMA) requirements for local hazards mitigation planning.

This plan provides County-level information on areas of risk, magnitude of risk, and strategies for reducing this risk. Through the process of developing this plan, the County addressed issues related to the protection of lives and property from natural hazards, the protection of critical facilities, and the reduction of community and taxpayer costs associated with disaster relief and rescue efforts. Completion and approval of the plan makes Florence County eligible to apply for future FEMA disaster relief and mitigation project funds, helping the County to implement their recommended mitigation strategies.

Disaster Mitigation Act of 2000

The development and update of the *Florence County Hazard Mitigation Plan* is in response to passage of the Disaster Mitigation Act of 2000. This act was signed into law in October of 2000. The Act attempts to stem the losses from disasters, reduce future public and private expenditures, and speed up response and recovery from disasters. The Act (Public Law 106-390) was amended by the Robert T. Stafford Relief and Emergency Assistance Act. The following is a summary of the parts of the Disaster Mitigation Act of 2000 that pertain to local governments and tribal organizations:

- The Act establishes a new requirement for local governments and tribal organizations to prepare an All Hazards Mitigation Plan in order to be eligible for funding from FEMA through the Pre-Disaster Mitigation Assistance Program and the Hazard Mitigation Grant Program.
- The Act establishes a requirement that natural hazards need to be addressed in the risk assessment/vulnerability analysis part of the All Hazards Mitigation Plan. Man-made/technological hazards are encouraged, but not required, to be addressed.
- The Act authorizes up to seven percent of Hazard Mitigation Grant Program funds available to a state after a federal disaster to be used for development of state, local and tribal organization All Hazards Mitigation Plans.
- The Act established 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 the FEMA Hazard Mitigation Grant Program; this deadline was November 1, 2003, for the Pre-Disaster Mitigation Program.
- If a plan is not prepared by November 1, 2004, and a major disaster is declared, in order for a local government or tribal organization to be eligible to receive

funding through the Hazard Mitigation Grant Program, they must agree to prepare an All Hazards Mitigation Plan within one year.

- In addition, by not having a current, FEMA-approved, and adopted hazard mitigation plan, local and tribal governments cannot utilize funding through the Pre-Disaster Mitigation Grant Program.

Plan Funding

In January 2017, Florence County received a FEMA Pre-Disaster Mitigation (PDM) planning grant to develop an update to the hazard mitigation plan in the amount of $35,477. Through the grant (Agreement #: PDMC-PL-05-WI-2016-002), FEMA provided 73 percent of the funds ($26,017), while 27 percent ($9,430) was required to be the local match.

Florence County entered into a contract (#16024-03) with the Bay-Lake Regional Planning Commission to prepare the update to the hazard mitigation plan.

Plan Elements

The *Florence County, Wisconsin Hazard Mitigation Plan 2018-2022* was divided into five sections in order to address FEMA's local mitigation plan requirements. The five section are as follows:

- Section 1 – Introduction (Planning Process) provides background information on hazard mitigation planning, and will detail the planning process undertaken to update the plan. The public will be encouraged to participate throughout the process culminated by a public open house to be held prior to plan completion.
- Section 2 – Planning Area provides a description of the County, including demographic information such as changes in population, households, and employment data; population estimates for the County; county land use changes; and development trends occurring throughout the County.
- Section 3 – Risk Assessment identifies and reevaluates the hazard risks applicable to the planning area. For each of the hazards, the frequency and the probability of future events is evaluated, followed by a description and quantification of the planning area's vulnerability to each hazard. For each hazard that requires mapping, the hazard area is identified using GIS. Infrastructure and critical facilities mapping was developed using the current data. Estimates were derived for potential dollar losses of buildings, infrastructure, and critical facilities for each hazard mapped.
- Section 4 – Mitigation Strategy details mitigation strategies developed to address each hazard. The identified mitigation strategies focus on reducing or avoiding long-term vulnerabilities to hazards, and identity plans, programs, and projects that reduce the impact of each hazard. The mitigation action plan describes desired mitigation projects, the estimated costs, the responsible agencies, and the timeline for implementation.
- Section 5 – Plan Maintenance and Adoption Process provides a description of the plan adoption and outlines the strategy for monitoring, evaluating, and updating the plan.

PLANNING PROCESS

Development of the *Florence County, Wisconsin Hazard Mitigation Plan 2018-2022* was based on the planning requirements and guidance provided by FEMA and Wisconsin Emergency Management (WEM). Following these requirements and guidance, the plan meets the requirements of the Disaster Mitigation Act of 2000. Since the WEM guidance for hazard mitigation plans recommends that planning areas "be consistent with a community's comprehensive planning boundary," the planning area for this plan is the entirety of Florence County, which includes the Towns of Aurora, Commonwealth, Fern, Fence, Florence, Homestead, Long Lake, and Tipler, making this a multi-jurisdictional plan.

The plan was developed over an 18-month process beginning in April 2017. Professional planning support was provided by the Bay-Lake Regional Planning Commission. Public review and input was encouraged at all meetings and through a public informational meeting to present the plan goals, the mitigation action plan, and mapped hazard areas.

Development of the plan was structured along a five-phase planning process:

Phase I: Pre-planning and review of steering committee appointments

Phase II: Reassessing risks and critical facilities

Phase III: Updating the mitigation action plan

Phase IV: Reviewing the policies and procedures for plan implementation

Phase V: Documenting the planning process and plan adoption

Phase I involved initial conversations and meetings aimed at reviewing the previous steering committee appointments, reconvening the steering committee, and outlining the planning process and responsibilities of the steering committee.

Phase II was comprised of a meeting with the steering committee to reassess natural hazards and potential risks to the County, and reassessing identified critical facilities.

Phase III involved updating the mitigation action plan to address identified risks including removing completed tasks and adding new mitigation methods to address risks.

Phase IV involved reviewing the policies that affect plan implementation and the procedures that would be followed to implement the plan.

Phase V involved documenting the planning process, developing a complete draft of the plan, and plan adoption.

The plan maps were completed using the Bay-Lake Regional Planning Commission's Geographic Information System (GIS), allowing greater manipulation and analysis from the use of a consistent base map. The FEMA HAZUS software was not utilized due to the availability of current local data and differences between census boundaries and locally available map features. Maps included in this plan are for general planning purposes only, and are not for legal or formal survey purposes.

Plan development was completed with the adoption of the plan by resolution at the Florence County Board meeting on August 21, 2018.

Hazard Mitigation Plan Steering Committee

Florence County established a Hazard Mitigation Plan Steering Committee for the plan update. Table 1-1 provides a list of the committee members. The steering committee was responsible for providing input, helping to guide the planning process, and reviewing draft chapters of the plan.

Committee members were selected from relevant County departments involved in emergency management issues, local electrical and gas utilities, and the Florence County Emergency Management Director. Members of the steering committee were very knowledgeable about the issues and concerns of County residents.

Table 1-1: Florence County, Wisconsin Hazard Mitigation Plan Steering Committee

Name	Affiliation
Jeff DeMuri	County Highway Commissioner
Bob Friberg	Florence Utilities/WPPI Energy
Dave Gribble	County Emergency Management Director
Ryan Grondin	WE Energies
Jesse Harrand	USFS Fire
Edwin Kelley	County Board Supervisor
Amber Kolberg	County Health Department
Angela Kowalzek-Adrians	Bay-Lake Regional Planning Commission
Donna Liebergen	County Treasurer/Property Lister/LIO
Scott Linn	USFS
Jeff Rickaby	County Sheriff
Annette Seibold	County Health Department
Pat Smith	County Forest Administrator
Scott Wolf	County Zoning Administrator
Rich Wolosyn	County Zoning Administrator (retired)
Tyler Wood	Wisconsin DNR Forester

Hazards to be Addressed

The plan steering committee assessed natural hazard occurrences and impacts for the past 20 years to derive a prioritization of the natural hazards that impact the planning area. Based on the results of this assessment, the following natural hazards will be the focus of this plan. The hazards are listed in the derived order of priority.

1. Tornado and Strong Wind
2. Flooding (including flash, riverine, lake, and stormwater)
3. Winter Storm (includes heavy snow, ice storm, and winter weather)
4. Wildland Fire
5. Extreme Cold (includes cold/wind chill)
6. Drought

7. Lightning
8. Excessive Heat
9. Hail
10. Dense Fog
11. Dam Failure

Plan Review

The steering committee reviewed and updated each section of the plan as part of the plan update process. The steering committee held four meetings to update the plan: April 27, 2017; June 13, 2017; September 19, 2017; and February 15, 2018. Additional plan review through e-mail occurred outside of these meetings. Copies of the sign-in sheets are included in Appendix A.

Public Involvement

Steering Committee Meetings

Opportunities for public comment during the drafting stage of the plan were held at all meetings of the steering committee, which were all open to the public. No comments were provided by the public at these meetings.

Public Informational Meeting

An informational meeting was held for the public on May 15, 2018 at the Florence County Courthouse. This meeting was held to provide an opportunity for the public to review and comment on the draft plan and maps. No comments were provided by the public at this meeting.

Both the steering committee meetings and the public informational meeting were open to the public, notices were posted at the Florence County Courthouse and notice was provided to local media.

County Board Meeting

On August 21, 2018, the Florence County Board adopted the plan, *Florence County, Wisconsin Natural Hazards Mitigation Plan 2018-2022*, at a meeting open to the public. A copy of the resolution of adoption can be found at the front of this plan on page vi.

Neighboring Jurisdictions

Prior to the public informational meeting, a final draft of the *Florence County, Wisconsin Hazard Mitigation Plan 2018-2022* was sent to the emergency management directors in Marinette, Forest, Dickinson (MI), and Iron (MI) counties for their review and comment. No comments were received.

Plan Contact Information

David Gribble, Director
Florence County Emergency Management
P.O. Box 678
Florence, WI 54121
(715) 528-3346
dgribble@co.florence.wi.us

GENERAL GEOGRAPHY

Florence County is located in northeastern Wisconsin on the Wisconsin border with the Upper Peninsula of Michigan, about 2 hours north of Green Bay.

Forest County lies to the west, Marinette County to the south, Dickinson County (MI) to the east, and Iron County (MI) to the north.

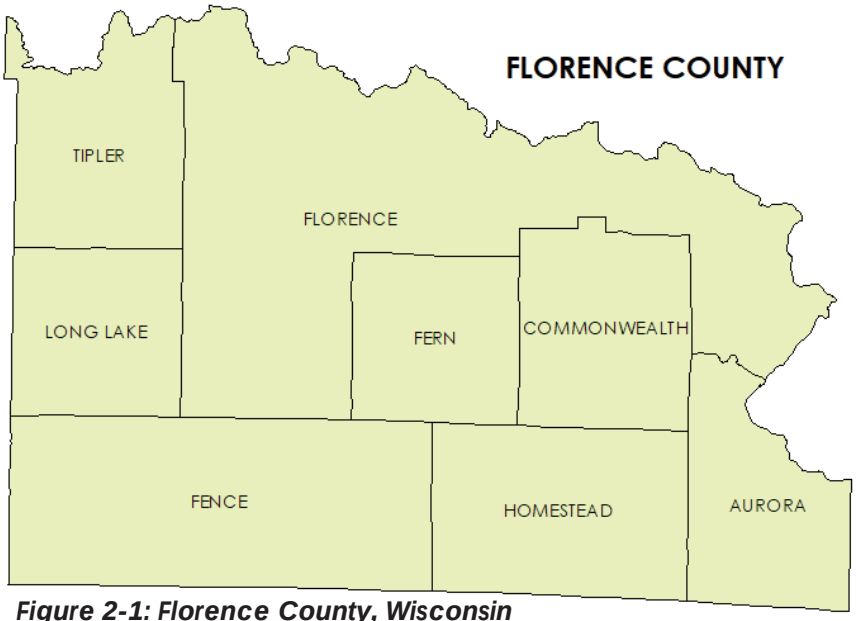
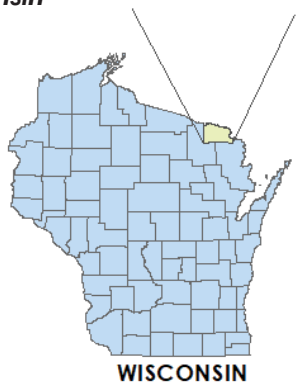


Figure 2-1: Florence County, Wisconsin

The planning area for the *Florence County Hazard Mitigation Plan 2018-2022* completely covers Florence County and includes all of the towns within the county. The County does not have any incorporated communities. The towns of Florence County includes Aurora, Commonwealth, Fence, Fern, Florence, Homestead, Long Lake, and Tipler.



Florence County is approximately 500 square miles in size (Table 2-1). Eighty percent of the county is forested. The western quarter of the county is within Chequamegon-Nicolet National Forest. The Town of Florence is the largest and the most populated town in the county. The Town of Florence is also the county seat and the hub of county services in Florence County.

Table 2-1: Jurisdiction Size, Florence County

Jurisdiction	Area		Percent of Planning Area
	Sq Miles	Acres	
Aurora	38.3	24,535	7.7%
Commonwealth	43.0	27,535	8.7%
Fence	90.2	57,701	18.1%
Fern	35.0	22,376	7.0%
Florence	157.5	100,799	31.7%
Homestead	54.4	34,799	10.9%
Long Lake	35.7	22,871	7.2%
Tipler	43.3	27,685	8.7%
Florence County	**497.4**	**318,301**	**100.0%**

Source: Bay-Lake Regional Planning Commission, 2017.

DEMOGRAPHIC PROFILE

Population Trends

From 1950 to 2010, Florence County has grown by 667 persons (17.8 percent). The County's growth has fluctuated over time with a downward trend from 1950 to 1970, when the county was at its lowest population of 3,298 persons. From 1970 to 2000, Florence County saw gains in population of more than 10 percent per decade. However, in 2010 population dipped by 13 percent to its current number of 4,423 persons.

Tables 2-2 and 2-3 and Figure 2-1 indicate the historic Census population counts by municipality in Florence County. Most of the permanent population resides primarily in the eastern half of the county, within the towns of Aurora and Florence. Since 1950, the towns of Florence and Aurora have comprised over 50 percent of the county's population. Areas of population concentration include the unincorporated communities of Florence, Aurora, Commonwealth, Spread Eagle, Long Lake, Tipler, and Fence. In addition, concentrations of population, especially seasonal residents, are associated with bodies of water such as the Spread Eagle Chain of Lakes and Keyes Lake.

The Town of Florence has seen the greatest percent growth in population since 1950. The county as a whole has seen an increase of 18 percent or more than 660 people since 1950. Nearly every town in Florence County, except Fern (which only gained six people), saw a decrease in population from 2000 to 2010.

It is worth noting that Florence County officials believe that the 2010 U.S. Census data was incorrectly recorded as lower than actual. It is suspected that Census data collectors may have counted permanent residents as seasonal.

Table 2-2: Population, 1950-2010, Florence County

Jurisdiction	Year							1950-2010 Change	
	1950	1960	1970	1980	1990	2000	2010	Number	Percent
Aurora	951	914	920	1,050	1,036	1,186	1,036	85	8.9
Commonwealth	328	314	254	369	407	419	399	71	21.6
Fence	275	195	191	192	222	231	192	-83	-30.2
Fern	105	67	61	111	112	153	159	54	51.4
Florence	1,257	1,251	1,262	1,809	2,097	2,319	2,002	745	59.3
Homestead	348	302	258	272	337	378	336	-12	-3.4
Long Lake	211	211	190	199	205	197	157	-54	-25.6
Tipler	281	183	162	170	174	205	142	-139	-49.5
Florence County	**3,756**	**3,437**	**3,298**	**4,172**	**4,590**	**5,088**	**4,423**	**667**	**17.8**

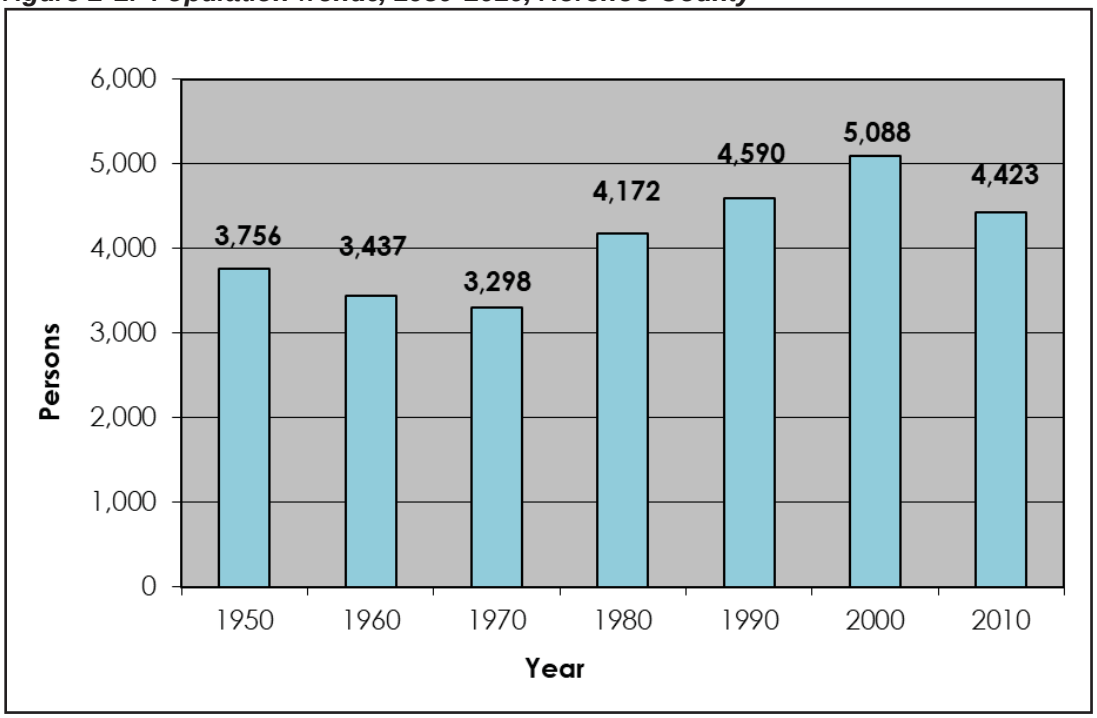
Source: U.S. Census General Population Characteristics 1840-1970, U.S. Census 1980-2010.

Table 2-3: Population Change, 1990-2010, Florence County

Jurisdiction	Population						Change			
	1990		2000		2010		1990-2000		2000-2010	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent Change	Number	Percent Change
Aurora	1,036	22.6%	1,186	23.3%	1,036	23.4%	150	14.5	-150	-12.6
Commonwealth	407	8.9%	419	8.2%	399	9.0%	12	2.9	-20	-4.8
Fence	222	4.8%	231	4.5%	192	4.3%	9	4.1	-39	-16.9
Fern	112	2.4%	153	3.0%	159	3.6%	41	36.6	6	3.9
Florence	2,097	45.7%	2,319	45.6%	2,002	45.3%	222	10.6	-317	-13.7
Homestead	337	7.3%	378	7.4%	336	7.6%	41	12.2	-42	-11.1
Long Lake	205	4.5%	197	3.9%	157	3.5%	-8	-3.9	-40	-20.3
Tipler	174	3.8%	205	4.0%	142	3.2%	31	17.8	-63	-30.7
Florence County	**4,590**	**100.0**	**5,088**	**100.0**	**4,423**	**100.0**	**498**	**10.8**	**-665**	**-13.1**

Source: U.S. Census 1990-2010.

Figure 2-2: Population Trends, 1950-2010, Florence County



Source: U.S. Census General Population Characteristics 1840-1970, U.S. Census 1980-2010.

Population Projections

Overlooking the population dip in 2010, Florence County has seen a slow, but steady growth in its population since 1970. According to the Wisconsin Department of Administration (WDOA), the county's population is expected to increase to 4,030 persons by the year 2040 (Table 2-4). The WDOA projections are based on the 2010 Census, which showed a population decrease. Additionally, WDOA figures do not include seasonal residents; and it is estimated that the seasonal population could increase the county's total population by as much as 20 to 25 percent.

Table 2-4: Population Projections, 2010-2040, Florence County

Jurisdiction	Census 2010	WDOA Projections						2010-2040 Change	
		2015	2020	2025	2030	2035	2040	Number	Percent
Aurora	1,036	1,000	1,020	1,050	1,055	1,035	965	-71	-6.9
Commonwealth	399	390	405	425	435	440	415	16	4.0
Fence	192	185	190	195	195	190	175	-17	-8.9
Fern	159	160	170	185	195	200	195	36	22.6
Florence	2,002	1,910	1,930	1,965	1,950	1,895	1,735	-267	-13.3
Homestead	336	325	330	340	345	340	315	-21	-6.3
Long Lake	157	150	150	150	150	140	125	-32	-20.4
Tipler	142	135	135	135	130	120	105	-37	-26.1
Florence County	**4,423**	**4,255**	**4,330**	**4,445**	**4,455**	**4,360**	**4,030**	**-393**	**-8.9**

Source: Wisconsin Department of Administration, Official Municipal Population Projections, 2010-2040.

Housing Trends

From 1990 to 2010, Florence County gained 1,005 housing units. Growth has occurred consistently at a rate of approximately 12 percent per decade for the county (Table 2-5). However, the towns in the county saw a bit more fluctuation from decade to decade. The Town of Florence held the greatest percentage of housing units in the county (more than three times that of other towns in the county) over all decades from 1980 to 2010. This is due to its large size, as well as to the hub of county activity being located in the eastern part of the town.

***Table 2-5:* Housing Units, 1990-2010, Florence County**

Jurisdiction	Housing Units						Change			
	1990		2000		2010		1990-2000		2000-2010	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent Change	Number	Percent Change
Aurora	466	12.5	535	12.6	590	12.3	69	14.8	55	10.3
Commonwealth	333	8.6	326	7.7	378	7.9	-7	-2.1	52	16.0
Fence	344	8.6	373	8.8	445	9.3	29	8.4	72	19.3
Fern	281	7.5	334	7.9	373	7.8	53	18.9	39	11.7
Florence	1,538	42.4	1,724	40.7	1,892	39.6	186	12.1	168	9.7
Homestead	316	7.5	351	8.3	401	8.4	35	11.1	50	14.2
Long Lake	274	7.8	296	7.0	343	7.2	22	8.0	47	15.9
Tipler	223	5.1	300	7.1	358	7.5	77	34.5	58	19.3
Florence County	**3,775**	**100.0**	**4,239**	**100.0**	**4,780**	**100.0**	**464**	**12.3**	**541**	**12.8**

Source: U.S. Census 1980-2010.

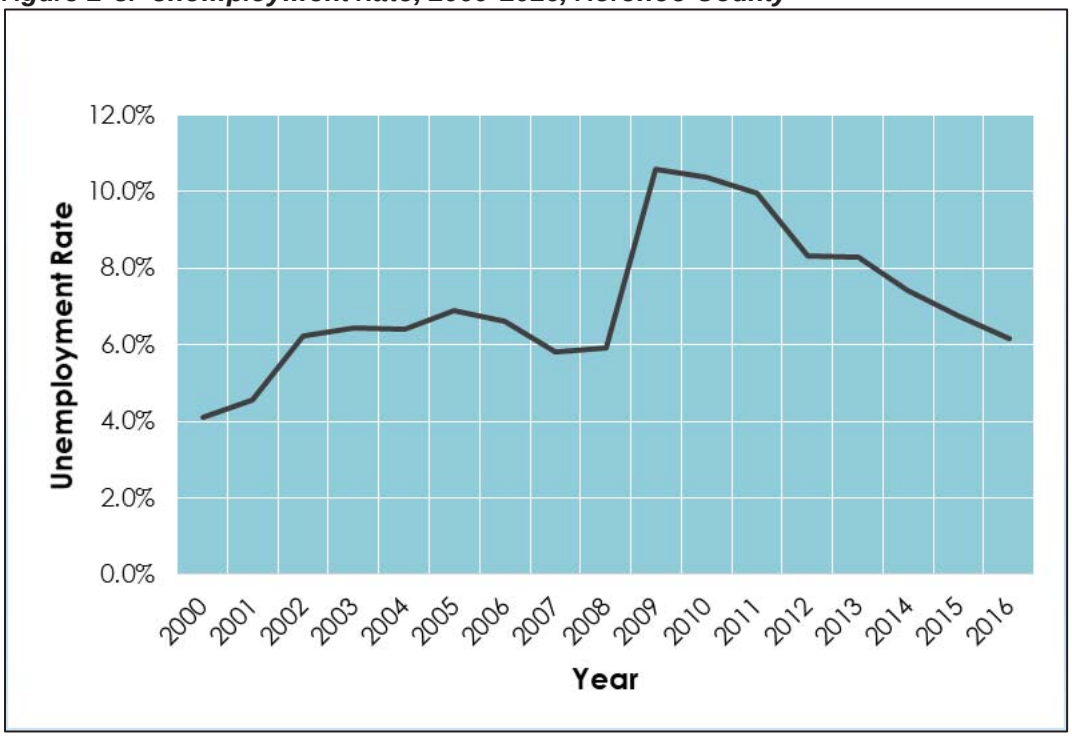
EMPLOYMENT CHARACTERISTICS

As a result of the recession that affected the entire country between 2008 and 2009, there was a significant jump in the county's unemployed during that time. The unemployment rate reached its highest level, 10.6 percent during this period. The county has mostly recovered from the recession's impacts (Figure 2-2).

Table 2-6 provides average civilian labor force estimates for Florence County from 2000 to 2016. The civilian labor force is comprised of employed persons and those seeking

employment, and excludes persons in the armed forces and those under age 16. Variations in the number of persons in the labor force are the result of many factors. Shifts in the age and sex characteristics of the population, changes in the number of residents aged 16 and over, and the proportion of this group working or seeking employment are all factors affecting the size of the labor force.

Figure 2-3: Unemployment Rate, 2000-2016, Florence County



Source: Wisconsin Department of Workforce Development, Office of Economic Advisors, 2000-2016.

Table 2-6: Average Civilian Labor Force Estimates, 2000-2016, Florence County

Year	Civilian Labor Force	Unemployed	Unemployment Rate	Employed
2000	2,630	108	4.1%	2,522
2001	2,664	122	4.6%	2,542
2002	2,736	171	6.3%	2,565
2003	2,667	172	6.4%	2,495
2004	2,631	169	6.4%	2,462
2005	2,570	177	6.9%	2,393
2006	2,599	172	6.6%	2,427
2007	2,509	146	5.8%	2,363
2008	2,455	145	5.9%	2,310
2009	2,411	255	10.6%	2,156
2010	2,247	233	10.4%	2,014
2011	2,211	220	10.0%	1,991
2012	2,211	184	8.3%	2,027
2013	2,198	182	8.3%	2,016
2014	2,207	164	7.4%	2,043
2015	2,216	150	6.8%	2,066
2016	2,210	136	6.2%	2,074

Source: Wisconsin Department of Workforce Development, Office of Economic Advisors, 2000-2016.

GENERAL DEVELOPMENT PATTERN

The most recent detailed field inventory of land uses in the county was conducted in 2009 by the Bay-Lake Regional Planning Commission (Map 2-1). Using GIS, land uses were tabulated to calculate the total area of Florence County at 318,349 acres, or approximately 497 square miles (Table).

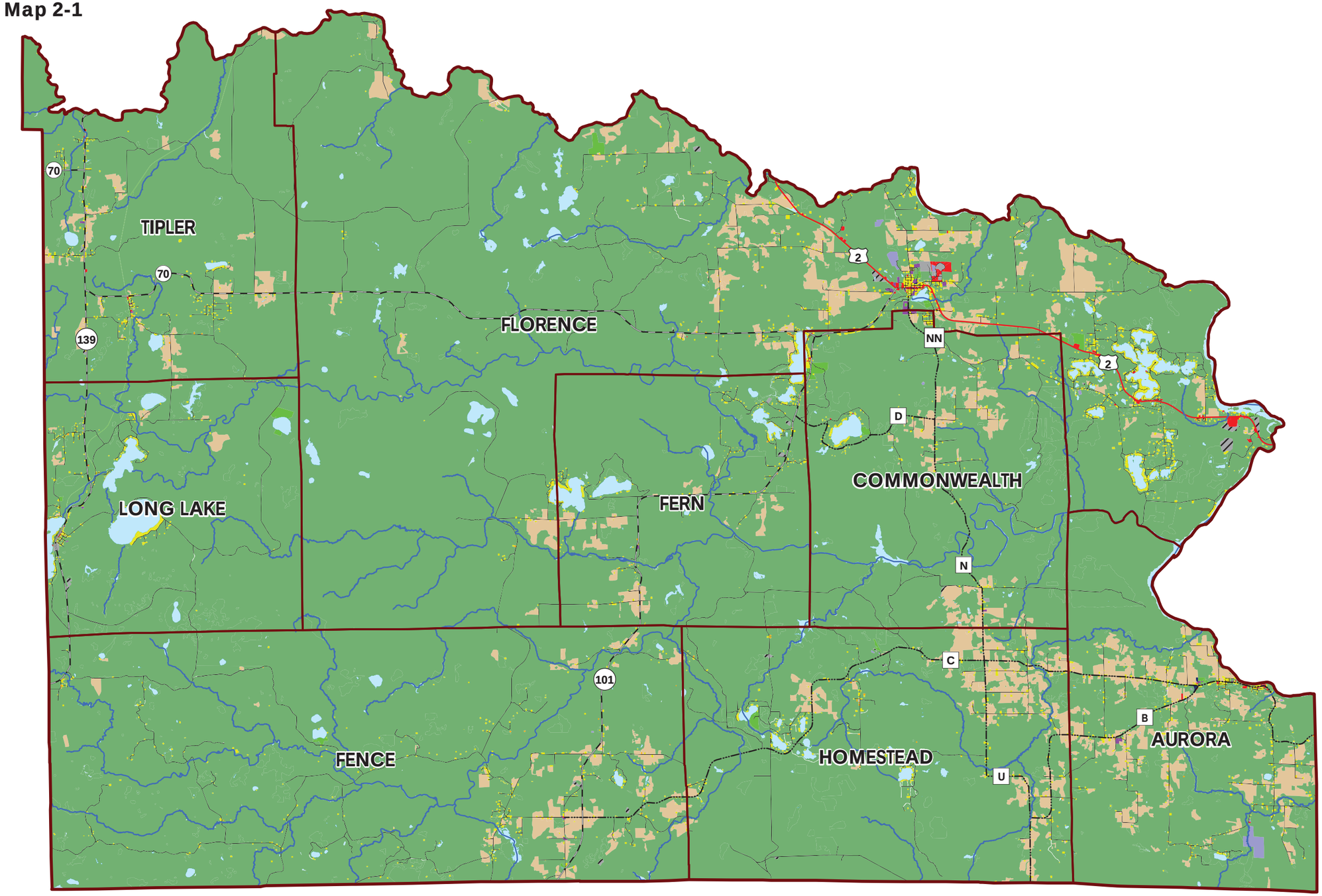
The vast majority of the county is comprised of woodlands with nearly 275,000 acres (86%) of the land. Agricultural land (crops and pasture) comprise nearly 15,000 acres (5%). Approximately 9,500 acres (3%) of Florence County is developed. Developed land is comprised of residential, commercial, industrial, transportation, communications/ utilities, institutional/governmental, and recreation.

Table 2-7: Land Use, 2009, Florence County

Land Use Type	Total (acres)	Total Land (%)
Residential	3,462	1.1
Commercial	237	0.1
Industrial	343	0.1
Transportation	4,454	1.4
Communications/Utilities	225	0.1
Institutional/Governmental	118	0.0
Recreational	654	0.2
Agricultural	14,989	4.7
Woodlands	274,907	86.4
Other Natural Areas	11,068	3.5
Water Features	7,893	2.5
Total	**318,349**	**100.0**

Source: Bay-Lake Regional Planning Commission, 2009.

Map 2-1



DISCLAIMER:
This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. Bay-Lake RPC is not responsible for any inaccuracies herein contained.

A risk assessment was been prepared for Florence County in order to provide an effective evaluation of potential hazard mitigation measures and develop useful strategies to address the risks associated with the identified natural hazards. The risk assessment identifies the hazards determined to pose the greatest risk to residents of the county, to profile the extent and severity of past natural hazard events that have affected the county, and to assess the vulnerability of the county to the risk of future natural hazard events.

NATURAL HAZARD IDENTIFICATION

Although the county could potentially be at risk from several distinct hazards, this plan focuses on addressing the hazards that pose the greatest risk to people and property in the county. Identification of the natural hazards to be addressed was based on a query of the natural hazards that have impacted the county in the past, as determined from historical hazard occurrences data from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC).

Hazard Risk Assessment Prioritization

To develop a hazard risk assessment prioritization for natural hazards, the steering committee participated in a consensus-based prioritization exercise. The steering committee used the number and frequency of occurrences, the number of injuries and deaths, the estimated costs of damages from the NCDC data, and professional knowledge and experience to guide the ranking of the natural hazards found in Table 3-1**Error! Not a valid bookmark self-reference.**.

Table 3-1: Risk Assessment Ranking

Hazard	Priority Rank (Highest to Lowest)
Tornado and Strong Wind	1
Flooding	2
Winter Storm	3
Wildland Fire	4
Extreme Cold	5
Drought	6
Lightning	7
Excessive Heat	8
Hail	9
Dense Fog	10
Dam Failure	11

Source: Florence County Hazard Mitigation Plan Steering Committee, 2017.

Ranking the potential risks associated with each natural hazard helped the steering committee prioritize the mitigation strategies that were addressed later in the process. The following natural hazards combined more than one listing from the NCDC data for consistency (the additional listings are provided in parenthesis).

- Tornado and high wind (including strong wind, thunderstorm wind);
- Flooding (including flash, riverine, lake, and stormwater flooding);
- Winter Storms (includes heavy snow, ice storm, and winter weather);
- Extreme Cold (includes frost/freeze, cold/wind chill, and wind chill);
- Excessive Heat (includes extreme heat and heat); and
- Dense Fog (includes fog)

Natural Hazard Events Historical Summary

A query of historical hazard events from January 1, 1997 through April 30, 2016 (19.25 years) resulted in 405 events (Table). The data was compiled from NCDC, Wisconsin Department of Natural Resources (WDNR), and U.S. Forest Service (USFS). NCDC publishes National Weather Service (NWS) data describing past weather events and the resulting deaths, injuries, and damages associated with each of these events. Event occurrence information is available at a local, county, or regional level – depending on the area covered by the hazard event. WDNR and USFS compile data annually on wildland fire occurrences.

The hazard occurrence data shows that of the 405 events, the natural hazards occurring most frequently in Florence County from January 1997 to April 2016 include: wildland fire (240 events), winter storm (61 events), tornado and strong wind (40 events), and drought (23 events). Other hazard events in the county since 1997 include hail (18 events), extreme cold (9 events), flooding (7 events), dense fog (5 events), lightning (1 event), and excessive heat (1 event).

Some of the recorded hazard events may not have been specific to Florence County, as they may have been recorded for a larger regional area, or statewide. Additionally, some of the common hazard events, such as lightning, may only get reported to the NCDC if it was an extreme events that caused property damage, injury, or death.

There have been two deaths and one injury from natural hazard in Florence County in the last 19 years. One death occurred in a 2014 wildland fire. The other death occurred on January 24, 2009 during an extreme cold event. The death was a result of a woman slipping on ice, injuring her leg, and being unable to move to safety before freezing to death. The one injury occurred in a 2011 wildland fire.

By far, the costliest hazard event in terms of property damage (includes crop damage) since 1997 has been a flash flood that occurred on July 15, 1999. The flooding damage exceeded $1.5 million. An estimated 50 to 75 miles of roads required repairs, including U.S. Highways 2 and 141 and state highways 70 and 101. A total of 49 homes and two businesses suffered some water damage. The damage was mainly confined to basements with minimal first floor inundation. Other costly hazards since 1997 include tornado and strong wind ($310,500) and lightning ($162,000).

Table 3-2: Natural Hazard Occurrences Data, 1995-2011, Florence County

Natural Hazard	# of Events[1]	Avg #/Year	Risk[2]	Deaths	Injuries	Property Damage[3,4]
Tornado and Strong Wind	40	2	High	0	0	$310,500
Flooding	7	0	Low	0	0	$1,581,000
Winter Storm	61	3	High	0	0	$0
Wildland Fire	240	12	High	1	1	ND
Extreme Cold	9	0	Low	1	0	$0
Drought	23	1	Moderate	0	0	$0
Lightning	1	0	Low	0	0	$162,000
Excessive Heat	1	0	Low	0	0	$0
Hail	18	1	Moderate	0	0	$0
Dense Fog	5	0	Low	0	0	$0
Dam Failure	0	0	Low	0	0	$0
Total Events	**405**	**--**	**--**	**2**	**1**	**$2,053,500**

ND = No data

1. January 1, 1997 to April 30, 2016 (19.25 years)
2. Risk based on occurrences per year: High >2; Moderate 1-2; and Low<1
3. No crop damages have been recorded during timeframe.
4. Does not factor in private losses for most occurrences.

Source: NOAA/NCDC, 2017; Wisconsin Department of Natural Resources, 2017; U.S. Forest Service, 2017; and Bay-Lake Regional Planning Commission, 2017.

Disaster Declaration History

There have been 18 major (federal) disaster declarations issued for Wisconsin since 1997. Florence County was included in two of the disaster declarations.

In August 1999, Florence County was included in a major disaster declaration that was issued because of damage to public property resulting from severe thunderstorms, straight-line winds, and flooding that occurred over a period from July 4 to July 31, 1999 and affected ten counties and one tribe in northern Wisconsin (DR-1284).

In July 2016, Florence County was included in a major disaster declaration that was issued because of damage resulting from severe storms and flooding that occurred over the period from July 11 to July 12, 2016 and affected eight counties and one tribe in northern Wisconsin (DR-4276).

In June 2017, Florence County qualified and applied for funding under the Wisconsin Disaster Fund for flooding.

Other Natural Hazards Determined Not to Pose a Significant Risk

Coastal hazards, landslides and land subsidence, and earthquakes have been determined to have minimal likelihood of occurring in Florence County. Therefore, a full risk assessment for these hazards have been excluded, but are briefly described here.

Coastal Hazards

Great Lakes communities in Wisconsin experience a wide range of natural hazards that include flooding from upland runoff, high and low lake levels, severe storms, storm waves and storm surge, shoreline erosion, ice heaves, landslides, and rare, large edge waves (seiches) usually associated with low-pressure systems or cold fronts.

As Florence County is an inland county with no Great Lakes shoreline, coastal hazards pose no threat to the county.

Landslides and Land Subsidence

The term "landslide" includes a wide range of ground movement, including rock falls, deep failure of slopes and shallow debris flows. Although gravity acting on an overly steep slope is the primary reason for a landslide, there can be other contributing factors, such as erosion by rivers, excess weight from the accumulation of rain or snow, or man-made and other structures stressing weak slopes to the point of failure. In addition, slope material that becomes saturated with water may develop a debris flow or mudflow.

The U.S. Geological Survey *Landslide Overview Map of the Coterminous United States* identifies no large-scale landslide risks for most of the county. The majority of the land within the county does not involve steep slopes and does not pose a landslide risk. While there are steeper portions of the county, the soils involved pose more of a gradual erosion risk, as opposed to the sudden, large-scale movement of ground associated with landslide hazards. Hillside erosion (minor landslides) within the county is very uncommon, and is the result of man-made impacts, such as the removal of vegetation. Hillside erosion has not posed substantial risk to life or property, and has been largely mitigated through subdivision law, site plan review and erosion control plans for construction sites.

Land subsidence is an event in which a portion of the land surface collapses or settles. Common causes of subsidence are location in an area with karst topography or location in an area where large amounts of groundwater have been withdrawn. Florence County is not an area of particularly karst topography, nor is there an overuse of groundwater for purposes of providing potable drinking water, industrial usage, or agricultural production, which could lead to land subsidence.

There are no records of substantial damage or injury from large landslides or land subsidence within the county, therefore they pose minimal threat to the county.

Earthquakes

According to the U.S. Geological Survey (USGS), there have been 19 earthquake events in Wisconsin. The closest of these to the county occurred in northern Ozaukee County (Lake Church) in 1956, as well as in Fond du Lac County in 1922. Where readings were available, these events were relatively small, most being 3.0 to 4.2 on the Richter Scale in intensity, and the largest being an intensity of 5.3 (Beloit, 1909), which may be strong enough to crack some plaster, but typically does not cause serious damage. Due to

the lack of recent events, some geologists question whether many of these events were true earthquakes, but rather were quarry collapses, blasts, etc.[1]

The nearest active earthquake fault outside of Wisconsin is the New Madrid Fault, which stretches from northeast Arkansas to southern Illinois. Florence County falls within the lowest earthquake hazard shaking area, which represents the levels of horizontal shaking which have a 1-in-50 chance of being exceeded in a 50 year period. Similarly, Florence County falls within a 0%g to 1%g peak ground acceleration (PGA) zone as shown on the USGS PGA values map with a 10 percent chance of being exceeded over 50 years. Therefore, the county is considered unlikely to be substantially affected by earthquakes in the long-term future. The earthquake threat to the county is very minimal.

RISK AND VULNERABILITY ASSESSMENT

The risk and vulnerability assessment is intended to describe the frequency, severity, and probability of future occurrence of natural hazards that could impact the planning area. The following hazard profiles describe the characteristics of each natural hazard and how they have historically affected the population, infrastructure, and environment of the planning area, and the potential risk to the population and property.

Critical Facilities

Although the risk assessment focuses on the risk potential to the overall planning area, critical facilities are of particular concern. Critical facilities are necessary to preserve health, welfare, and quality of life in the county, and fulfill important public safety, emergency response, and/or disaster recovery functions, or they house vulnerable populations (such as schools, childcare, and manufactured housing communities).

Florence County defined five overarching category types for critical facilities, including Structure, Recreation, Building, Utility, and Emergency Service. Each category has subcategory types to further define the critical facility. For example, culverts, bridges, and dams are critical facility types under the Structure category.

Table 3-3 lists the critical facility types identified for the county and the count of each critical facility type by category (Map 3-1). There are 194 critical facilities in Florence County.

[1] Dutch, Steve; University of Wisconsin – Green Bay; https://www.uwgb.edu/dutchs/GeologyWisconsin/wieqks.htm; 1999.

Table 3-3: Number of Critical Facilities by Type, Florence County

Critical Facility Type	Count
Structure	**57**
Bridge	19
Culvert	30
Dam	8
Recreation	**56**
Boat Launch	33
Campgrounds	9
Fairgrounds	1
Primitive Campsite	7
Recreation Bridge	6
Building	**34**
Clinic	1
Courthouse	1
Daycare	1
DNR Natural Resource Center	1
Library	1
Mobile Home Park	3
Municipal Garage	7
Post Office	3
Recycling Facility	1
School	3
Town Hall	8
Waste Disposal/Demolition Disposal	1
Vulnerable Population	3
Utility	**24**
Communication	9
Fuel	2
Power Generation	7
Waste Water Treatment Plant	2
Water	4
Emergency Service	**23**
Dry Hydrant	13
Fire and EMT	6
Pump Station	3
Sheriff Department/Jail	1
Total	**194**

Source: Bay-Lake Regional Planning Commission, 2017.

HAZARD PROFILES

Hazard profiles are intended to describe the frequency, severity, and probability of natural hazards that could impact Florence County. These hazard profiles describe the cause and characteristics of past natural hazards, and how they have impacted the population, infrastructure, and environment of the county. The potential risks are evaluated to determine their likelihood of reoccurrence and to gauge the impacts to people and property from each hazard.

Hazard probabilities are represented as high, moderate, and low. High probability hazards are defined as natural hazards that occur an average of more than two times per year; moderate probability hazards are those that occur an average of one to two times per year; and low probability hazards occur less frequently than once per year.

Tornado and Strong Wind

Description of Hazard

A tornado is a relatively short-lived storm comprised of an intense rotating column of air, extending from a thunderstorm cloud system. Tornadoes come in many shapes and sizes, but they are typically in the form of a visible condensation funnel, whose narrow end touches the earth and is often encircled by a cloud of debris and dust. Most tornadoes have wind speeds less than 110 miles per hour, are about 250 feet across, and travel a few miles before dissipating. The most extreme tornadoes can attain wind speeds of more than 300 miles per hour, stretch more than two miles across, and stay on the ground for dozens of miles.

The destructive power of the tornado results primarily from strong wind velocities and sudden changes in pressure. Wind and pressure differentials probably account for most of the damage caused by tornadoes. Since tornadoes are generally associated with severe storm systems, hail, torrential rain, and intense lightning usually accompany them. Depending on their intensity, tornadoes can uproot trees, down power lines and destroy buildings. Flying debris can cause serious injury and death. Figure 3-1 shows the Enhanced Fujita Scale (EF Scale), which is recognized as the acceptable tornado magnitude measurement rating.

The United States has been divided into four zones that geographically reflect the number and strength of extreme wind. Wisconsin lies along the northern edge of Zone IV, the nation's maximum frequency zone for tornadoes (commonly known as "tornado alley"), which extends northeastward from Oklahoma into Iowa and then across to Michigan and Ohio. Zone IV includes most of the southern two-thirds of Wisconsin and has experienced the strongest tornado activity that has affected the entire U.S., with wind speeds of up to 250 miles per hour being recorded at some point. This zone includes Florence County.

Wisconsin's tornado season runs from the beginning of April through September, but tornadoes have occurred in Wisconsin in every month except February. The most severe tornadoes statewide typically occur during the months of April, May, and June. Personal property damage, deaths, and injuries have and will continue to occur due to tornado events in Wisconsin.

Figure 3-1: Tornado Magnitude Measurement, EF Scale

EF Rating	Wind Speeds	Expected Damage	
EF-0	65-85 mph	'Minor' damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.	
EF-1	86-110 mph	'Moderate' damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.	
EF-2	111-135 mph	'Considerable' damage: roofs torn off well constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.	
EF-3	136-165 mph	'Severe' damage: entire stories of well constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.	
EF-4	166-200 mph	'Extreme' damage: Well constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.	
EF-5	> 200 mph	'Massive/incredible' damage: Well constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.	

Source: NOAA National Weather Service, 2011.

Strong winds, including thunderstorm winds and high winds can often be just as damaging as a tornado. Strong winds are most likely to happen in the spring and summer months and during the afternoon and evening hours, but can occur throughout the year and at all hours.

Strong winds include downburst winds and high winds. Downburst winds are strong, concentrated, straight-line winds created by falling rain and sinking air that can reach speeds of 125 miles per hour. High winds are high speeds winds that can be as damaging as a tornado, but remain nearly straight line and are not the rotating column of air that is characteristic of a tornado.

The National Weather Service classifies a thunderstorm as severe if its winds reach or exceed 58 miles per hour, produces a tornado, or drops surface hail at least 0.75 inch in diameter. Compared with other atmospheric hazards (such as winter low pressure systems), individual thunderstorms affect relatively small geographic areas. The average thunderstorm system is approximately 15 miles in diameter, covers 75 square miles, and lasts less than 30 minutes at a single location. However, weather-monitoring reports

indicate that coherent thunderstorm systems can travel intact for distances in excess of 600 miles.

Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Florence County has experienced 40 tornado or strong wind events in the last 19 years from January 1, 1997 to April 30, 2016. One was an F-1 in Spread Eagle on September 30, 2002 and the other was an EF-0 in Long Lake on April 10, 2011.

Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Florence County experiences approximately two tornado or strong wind events every year.

Probability of Hazard Occurring in the Future

Based on the hazard frequency, Florence County is considered to have a **high** probability of experiencing a tornado or strong wind event in any given year.

Areas at Greatest Risk

Tornadoes and strong winds have no defined hazard area within the county. Past events have been relatively uniform across the planning area; however, mobile and manufactured home residents (especially those without tie-downs) are most vulnerable to death, injury, and property damage from tornadoes and strong winds. Therefore, mobile/manufactured home parks in the planning area are the areas of greatest risk from this hazard.

Impacts from Hazard

Death and Injury

No deaths or injuries have been reported from tornado or significant strong wind events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016, according to NCDC data.

Structures at Risk

Although tornadoes and strong wind events strike at random, making all buildings vulnerable, there are three types of structures that are most likely to suffer damage. These structure types include mobile/manufactured homes, homes on crawlspaces (because they are more susceptible to lift), and buildings with large spans (such as airplane hangars, gymnasiums and factories).

Structures within the direct path of a tornado vortex or strong straight line winds can be reduced to rubble. However, structures adjacent to the path of the tornado are often severely damaged by strong winds flowing into the tornado vortex (these winds are known as inflow winds). It is here, adjacent to the tornado's path, where the building type and construction techniques are critical to the structure's survival.

Street signs often face disrepair after tornadoes and strong winds, and debris often litter streets and highways following an occurrence, requiring clean-up. Downed trees can be problematic in terms of impacting infrastructure (transportation) as well as critical facilities.

Critical Facilities

Hospitals can see increases in patient load following tornadoes and strong winds. Schools can sustain damage, and if they do not sustain damage, they often function as temporary shelters in the aftermath. Police and fire departments often see an increased workload during and after the event. Powerlines and communication towers are at risk of being blown down.

Any critical facility in the planning area is capable of being hit. However, schools are a main concern because they have large numbers of people present, either during school or as a storm shelter; and they have large span areas, such as gyms and theaters.

Economic Impacts

The major impact of a tornado or strong wind event on the local economy is damage to businesses and infrastructure. A heavily damaged business, especially one that was struggling to make a profit, often has to be closed.

Infrastructure damage is usually limited to above ground utilities, such as power lines. Damage to utility lines can usually be repaired or replaced relatively quickly. Damage to roads and to railroads is localized, so if these facilities cannot be repaired promptly, alternate transportation routes are usually available.

Public expenditures include search and rescue, shelters and emergency protection measures. The largest public expenses are for repairs to public facilities and clean up and disposal of debris. Most public facilities are insured, so the economic impact on the local treasury is likely to be small. Clean up and disposal can be a larger problem, especially if there is limited landfill capacity near the damage site.

Property Damage

Reported property damage from tornadoes and strong wind for Florence County has totaled approximately $310,500 over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data.

Estimate of Potential Dollar Losses

Since mobile/manufactured homes are the most vulnerable to tornadoes and strong wind, a "worst case scenario" for this hazard would involve the total destruction of all homes in the three mobile/manufactured home parks in the county (Paragon Meadow, Woodlawn Court/Keyes Lake, and Golden Eagle Park). In this "worst case scenario," the total destruction of all buildings and facilities in the three mobile home parks (valued at approximately $248,300) would occur, along with an additional 50 percent of the building value as the estimated value of building contents ($124,150), for total "worst case scenario" damages of $372,450.

Flooding

Description of Hazard

Floods happen when the water draining from a watershed, whether from rainfall or melting snow, exceeds the capacity of the river or stream channel to hold it. Water overflows onto the nearby low-lying lands (floodplains). In hilly and mountainous areas

flooding is likely to be rapid, deep, and dangerous. In relatively flat floodplains, land may stay covered with shallow, slow moving water for days or even weeks.

Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Florence County has experienced seven significant flooding events in the last 19 years from January 1, 1997 to April 30, 2016. Some of these reported occurrences may not have been localized to Florence County, and may have been recorded for a larger regional area.

Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Florence County experiences approximately one significant flooding event every 2.5 years.

Probability of Hazard Occurring in the Future

FEMA uses the "base" flood as the basis for its regulatory requirements and flood insurance ratings. The hazards mitigation plan also uses the base flood for planning purposes. The base flood is the one percent chance flood, or the flood that has a one percent (one out of 100) chance of occurring in any given year. The one percent chance flood is commonly referred to as the "100-year flood."

Based on the hazard frequency, Florence County is considered to have a **low** probability of sustaining a 100-year flood in any given year.

Areas at Greatest Risk

The areas at greatest risk from flooding include the "100-year floodplain" areas of Florence County. FEMA Flood Insurance Rate Maps also call this the Special Flood Hazard Area, or "A Zone." The base floodplains for the planning area are shown in Map 3-2. Properties that potentially lie within the floodplain and would be affected by the 100-year flood are shown in Map 3-3.

Impacts from Hazard

Death and Injury

No death or injuries from flooding has been reported for Florence County over the last 19 years from January 1, 1997 to April 30, 2016, according to NCDC data.

Structures at Risk

Analysis of the parcel data overlaid within the 100-year floodplains (Map 3-3), indicates that 957 structures (i.e. parcels with improvements) could potentially be impacted by the base flood in the planning area.

A review of FEMA flood insurance claims from January 1, 1978 through March 31, 2017, indicates that there was one claim in Florence County in the amount of 4,848.70 (NFIP, WR2C1040).

Repetitive Loss Properties

Repetitive loss structure is a term that is usually associated with the National Flood Insurance Program (NFIP) to describe a structure, covered by a contract of flood insurance under the NFIP, that has suffered flood damage on two or more occasions over a 10-year period ending on the date when a second claim is made, in which the cost to repair the flood damage, on average, equals or exceeds 25 percent of the market-value of the structure at the time of each flood loss event. For the Community

Rating System (CRS) of the NFIP, a repetitive loss property is any property, which the NFIP has paid two or more flood claims of $1,000 or more in any, given 10-year period since 1978. A repetitive loss structure is important to the NFIP, since structures that flood frequently put a strain on the flood insurance fund. It should also be important to a community because residents' lives are disrupted and may be threatened by the continual flooding.

According to FEMA, there are no repetitive loss properties in Florence County.

Critical Facilities

Analysis of the critical facilities overlaid with the 100-year floodplains (Map 3-4), indicates that there are 43 critical facilities potentially located within 100-year floodplains in Florence County. Table lists the critical facility types of those facilities potential within the 100-year floodplains.

Table 3-4: Critical Facility Types within the 100-Year Floodplains, Florence County

Critical Facility Type	Count of Type
Culvert	11
Bridge	5
Power Generation	4
Dry Hydrant	3
Mobile Home Park	3
Campgrounds	3
Town Hall	3
Communication	2
Boat Launch	2
Pump Station	1
Dam	1
School	1
Waste Water Treatmen	1
Municipal Garage	1
Primitive Campsite	1
Fuel	1
Total	**43**

Source: Bay-Lake Regional Planning Commission, 2017.

Property Damage

Reported property damage from flooding in Florence County has totaled approximately $1,581,000 over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data. Some of this reported property damage may not have been localized to Florence County, and may have been recorded for a larger regional area.

Transportation Route Interruptions

Loss of road access is a major flood impact that affects all residents and businesses, not just those who own property in the floodplain. Sometimes, the loss is temporary, such as during a flood. However, on some occasions, the loss of transportation lasts well after the disaster. When roads, bridges, or railroads are washed out by a flood, it can be weeks or months before they are repaired and reusable. A key evacuation and safety concern is when roads and bridges are underwater. Generally, the larger the road, the more likely it is to not flood, but this is not always the case.

Analysis of the GIS data of critical facilities within the floodplain (Map 3-4), finds 12 culverts and six bridges that could potentially be underwater during a base flood. In addition to the sites shown on the map, there may be a number of additional bridges and culverts in areas that are not included in the mapped 100-year flood zones, such as areas located along small tributary streams.

Estimate of Potential Dollar Losses

The following is an estimate of potential dollar losses to vulnerable structures. "Vulnerable structures" are those structures located in the 100-year flood hazard area, as identified in Map 3-2. Since building height data is unavailable, a "worst case scenario" of total structural damage for all buildings in all of the flood zones of the planning area was assumed in estimating potential dollar losses to vulnerable structures. Building height/elevation data should be collected in the future in order to better assess the risks of damage to structures because of the flood hazard. The parcel map and the 100-year floodplains (Map 3-2) were merged to determine at-risk structures in the planning area (Map 3-3). This information was obtained from a Florence County database on assessed values of real property.

It is estimated that over $92,523,000 in losses would occur with the 100-year flood in zones projected to be impacted by the 100-year flood in a "worst case scenario" of total structural damage for buildings in all of the flood zones in the county.

This estimate of potential dollar losses only includes the cost of damage to structures themselves, and may not account for damage to personal property inside or adjacent to vulnerable structures.

In addition, there may be areas outside the 100-year flood zones that will flood during an event of that magnitude (or even of lesser magnitude); this planning process has no way of knowing the susceptibility of flooding outside of flood events that have been previously mapped by other governmental agencies.

Development in Areas Subject to Flooding

Through county zoning, development in floodplains, watersheds, and natural resource areas has been kept to a minimum. Florence County has a Shoreland and Wetland Ordinance, and a Floodplain Ordinance. These ordinances can be useful tools in keeping inappropriate development out of many flood hazard zones in the county.

NFIP Participation

Florence County has participated in the FEMA National Floodplain Insurance Program (NFIP) since May 1978 by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in the county.

Winter Storm

Description of Hazard

Winter storms can vary in size and strength, and can include heavy snow storms, blizzards, freezing rain, sleet, ice storms and blowing and drifting snow conditions. Extremely cold temperatures accompanied by strong winds can result in wind chills that cause bodily injury such as frostbite and death. Winter storms can occur as a single event or they can occur in combination, which can make an event more severe. For example, a moderate snowfall could create severe conditions if it were followed by a freezing rain and subsequent extremely cold temperatures. The aftermath of a winter storm can impact a community or region for weeks, and even months.

A variety of weather phenomena and conditions can occur during winter storms. For purposes of classification, the following are National Weather Service approved descriptions of winter storm elements:

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

Winter Storm – the occurrence of heavy snowfall accompanied by significant blowing snow, low wind chills, sleet or freezing rain.

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

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

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

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

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

Much of the snowfall in Wisconsin occurs in small amounts of between one and three inches per occurrence. Heavy snowfalls (producing at least eight to ten inches of accumulation) happen on the average only five times per season. True blizzards are rare in Wisconsin, and are more likely to occur in northwestern Wisconsin than in southern portions of the state, even though heavy snowfalls are more frequent in southeastern Wisconsin. However, blizzard-like conditions often exist during heavy snow storms when gusty winds cause the severe blowing and drifting of snow.

Both ice and sleet storms can occur at any time throughout the winter season from October into 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 season, there are three to five 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 the

ice. There are also between three and five instances of glazing (less than one quarter inch of ice) throughout Wisconsin during a normal winter.

Winter storms present a serious threat to the health and safety of affected citizens, and can result in significant damage to property. This can occur when the heavy snow or accumulated ice causes structural collapse of buildings, downs power lines, severely affects electrical power distribution, or cuts off people from assistance or services.

Winter storms in Wisconsin are caused by Canadian and Arctic cold fronts that push snow and ice deep into the interior of the United States.

Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Florence County has experienced 61 significant winter storm events in the last 19 years from January 1, 1997 to April 30, 2016. Many of these hazard events may not have been localized to Florence County, and may have been recorded for a larger regional area.

Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Florence County experiences approximately three significant winter storm events per year.

Probability of Hazards Occurring in the Future

Based on the hazard frequency, Florence County is considered to have a **high** probability of experiencing a significant winter storm event in any given year.

Winter storms tend to be a regional phenomenon in that they affect much of northeastern Wisconsin on nearly all of the occasions in which they affect Florence County.

Areas at Greatest Risk

Winter storms have no defined hazard area within the planning area. Past events have been relatively uniform across the planning area or the larger regional area.

Impacts from Hazard

Death and Injury

No deaths or injuries have been reported from significant winter storm events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data.

Structures at Risk

Occasionally, heavy snow or accumulated ice will cause structural collapse of buildings (particularly roofs), but most buildings are now constructed with low temperatures, snow loads and ice storms in mind. In addition, with the modern focus on energy conservation, buildings are much better insulated than they were in the past. Therefore, for the most part, winter storms do not have a major impact on buildings in the planning area.

The major impacts of winter storms on infrastructure are to utilities and roads. Power lines and tree limbs can be coated with heavy ice in some winter storms, resulting in disrupted power and telephone service, often for days. Cable and satellite television services can also be negatively impacted in certain winter storm events. In the case of

transportation, even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.

Critical Facilities

Street and road crews have an increased burden of snow removal (and salting in the case of ice storms) during and after winter storms. In some cases, winter storms can be so severe that these crews have to be called off the road for a period of time.

Hospitals and clinics can treat additional patients for frostbite, pedestrian and vehicular accident injuries, and conditions resulting from the shoveling of heavy snow during and following winter storms. Sometimes, these very hospitals and clinics have difficulty getting their own staff to report to work because of the storm, which increases the work load for the staff who is already there (double shifts, etc.).

Police department staff needs to respond to more accidents. Utility and telephone companies need to respond to downed electrical and telephone lines, especially in the case of ice storms. Rescue services can receive more calls because of accidents or health related circumstances. Schools may need to have early dismissal or cancel classes altogether. Shelters may take in additional homeless persons during winter storm events as well, although this has been less of an issue in Florence County than it is in larger cities.

Economic Impacts

Loss of power often means that businesses and manufacturing concerns must close down. Loss of access due to snow or ice covered roads can have a similar effect, especially when trucks cannot travel on major thoroughfares to make "just in time" deliveries to business and industry in the planning area. The effects are particularly difficult when the storm is widespread.

Property Damage

No property damages have been reported from winter storm events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data.

Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for winter storm events, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from winter storms has been minimal over the past 19 years.

Wildland Fire

Description of Hazard

A wildland fire is any instance of unplanned burning in brush, marshes, grasslands, or field lands. Typical causes of these fires are lightning, human carelessness, or arson. The county has large expanses of forested areas that could be susceptible to wildland fires. Wildland fires can occur at any time of the year and during any time of the day. The primary factors that can contribute to the start of a wildland fire are land use, vegetation, amount of combustible materials present, and weather conditions such as wind, low humidity, and

lack of precipitation. Generally, fires are more likely when vegetation is dry from a winter with little snow or a spring and summer with sparse rainfall. As fires remain a possibility, fire stations in Florence County are prepared to respond in accordance with established response procedures, while local zoning setback controls and building codes provide additional mitigation measures.

Previous Significant Hazard Occurrences

Data on wildland fire occurrences was compiled from the WDNR for wildland fires in Florence County from 1997 and 2017. Additionally, data was compiled from the USFS on wildland fire occurrences in the Florence County portion of the Chequamegon-Nicolet National Forest from 1997 to 2012. The combined WDNR and USFS wildland fire data indicates that 240 wildland fire events have affected the county over the last 19 years, with an average affected size of 1.4 acres.

Hazard Frequency

Based on previous hazard occurrences as reported by the WDNR and USFS, Florence County experiences approximately 12 wildland fire events every year.

Probability of Hazard Occurring in the Future

According to the WDNR, Florence County lies within an "intensive protection area." Intensive protection areas are the most heavily forested and contain the most fire hazards and risk in the state. They have more DNR fire suppression resources and ranger stations. Fire detection is accomplished with aerial detection and citizen reporting. The most restrictive debris burning laws are in effect, which are regulated by the DNR and require a burning permit for debris burning whenever the ground is not snow covered throughout the year. Overall, the probability of a naturally occurring wildland fire is **high** for the county.

Areas at Greatest Risk

Map 3-5 shows areas of greatest fire risk. These areas were delineated through a collaborative process by the Florence County Forester, the Wisconsin DNR Forest Manager, and the USDA Forest Service Manager during development of the initial hazard mitigation plan. The assessed risk areas were determined based on the concentration of fires, as well as the amount of urban development that has taken place in the area. Other areas vulnerable to fire include woodlands and grasslands. Florence County contains 274,907 acres of woodlands (based on 2009 land use data, shown in Table).

Impacts from Hazard

Death and Injury

Over the last 19 years from January 1, 1997 to April 30, 2016, wildland fires in Florence County resulted in one death (in 2014) and one injury (in 2011).

Structures at Risk

Homes and other structures located within the Wildland Urban Interface (WUI) are at high risk to damage from wildland fires. The WUI refers to the zone of transition between forestland/wildland and human development. The wildland fire risk increases in the WUI because buildings are typically surrounded by fuel sources such as uncut grass, a buildup of dead leaves, flammable vegetation, and dead branches. Structures

constructed from materials that may melt or ignite when exposed to a fire present a high risk. In general, the potential for property damage from wildland fires increases as more development occurs on wooded lands.

Residential housing is typically the most dominant type of structure found within the WUI. Though many parts of a home can be affected by wildfire damage, the roof is the most exposed portion of the building and is more at risk from flying embers. Attics may also be affected by airborne embers that enter through open eaves and vents. Structures attached to homes, such as decks, garages, and fences, can also carry a fire into a home.

Critical Facilities

Police, fire, and emergency response personnel are greatly affected by wildland fires – suffering increased workloads during and after events. Hospitals can see increases in patient load resulting from burn related injuries and individuals suffering from the effects of smoke inhalation. Schools, if not affected by a fire, could potentially be used as temporary shelter for individuals that cannot return to their homes. All critical facilities located in the path of a wildland fire can be affected structurally and functionally if evacuation is deemed necessary.

Economic Impacts

Fires can have an extensive impact on the economy of an affected area by causing thousands of dollars in damages to citizens through loss of private property. Major direct costs associated with wildland fires are incurred by the salvage and removal of downed timber and debris; restoration of the burned area; and reconstruction. Wildland fires can also have a significant impact on local agriculture. Fires will strip the land of vegetation as well as harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life.

Property Damage

Property damage data is unavailable for wildland fire events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016.

Estimate of Potential Dollar Losses

Based on the land use data of the areas at greatest fire risk overlaid with parcel data (Map 3-5), there are 498 parcels with structures within the areas of greatest wildland fire risk throughout Florence County from wildland fires. The value of all structures within the areas of greatest wildland fire risk in Florence County is estimated at $38,813,800. This information was obtained from Florence County databases on improved values of real property.

Extreme Cold

Description of Hazard

Dangerously cold conditions can be the result of extremely cold temperatures, or the combination of cold temperatures and high winds. The combination of cold temperatures and wind creates a perceived temperature known as “wind chill.” Whenever temperatures drop well below normal and as wind speed increases, heat can leave your body more rapidly. As winds increase, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the

internal body temperature. This weather related condition may lead to serious health problems. Extreme cold is a dangerous situation that can cause health emergencies for susceptible people, such as those without shelter, those who are stranded outdoors or in a disabled car, or those who live in a home that is poorly insulated or without heat.

Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Florence County has experienced nine extreme cold events in the last 19 years from January 1, 1997 to April 30, 2016. Many of these hazard events may not have been localized to Florence County, and may have been recorded for a larger regional area.

Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Florence County experiences approximately one significant extreme cold event every 2.5 years.

Probability of Hazard Occurring in the Future

Based on the hazard frequency, Florence County is considered to have a **low** probability of experiencing a significant extreme cold event in any given year.

Areas at Greatest Risk

Extreme cold events have no defined hazard area within the planning area. Past events have been relatively uniform across the planning area.

Impacts from Hazard

Death and Injury

One death and no injuries have been reported from significant extreme cold events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data. The death occurred on January 24, 2009 as a result of a woman slipping on ice, injuring her leg, and being unable to move to safety before freezing to death.

Structures at Risk

Extreme cold conditions can result in burst water pipes. In addition, it is more expensive to heat homes and other buildings during extreme cold events. Sometimes, residents of the planning area might consider use of space heaters during an extreme cold event. However, use of space heaters comes with its own risks, including a higher probability of fire to a structure if used improperly.

Public domain water pipes can burst in extreme cold conditions, which can also ruin the street above the water pipes. In addition, damage to fiber optic cables can occur during extreme cold episodes, which can negatively affect commerce and hospitals in the planning area.

Critical Facilities

All buildings involving critical facilities will have greater heating expenses during an extreme cold event. Increased demand will also affect We Energies, the local natural gas energy utility serving the planning area. Hospitals and clinics may be asked to treat patients exposed to the extreme cold conditions. Emergency shelters may take in additional individuals during the extreme cold event. Area schools may cancel classes or call for early dismissal in extreme cold events. The Florence Water Utility may need to repair damaged water mains caused by the extreme cold. Local fire departments and

rescue services may also deal with direct or indirect consequences of the extreme cold event.

Economic Impacts

Economic impacts of extreme cold events can include lack of motivation to participate in the local economy unless absolutely necessary during the event. Utility bills following the event will also be higher, which will give the consumer less ability to purchase discretionary goods about a month after the event (unless that consumer is on a monthly even payment plan with the local utility). If area school districts need to call off school early on extremely cold days, there may be expenses involved with early busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Non-profit organizations will incur expenses in the provision of emergency shelters. The private sector incurs economic losses and production decreases during an extreme cold event.

Property Damage

No property damages have been reported from extreme cold events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data.

Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for extreme cold events, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from extreme cold has been minimal over the past 19 years.

Drought

Description of Hazard

A drought is an extended period of unusually dry weather, which may be accompanied by extreme heat. There are basically two types of drought in Wisconsin: agricultural drought and hydrologic drought. Agricultural drought is a dry period of sufficient length and intensity that markedly reduces crop yields. Hydrologic drought is a dry period of sufficient length and intensity to affect lake and stream levels as well as the height of the groundwater table. These two types of drought may, but do not necessarily, occur at the same time. The severity of a drought depends on a number of factors including duration, intensity, geographic extent, and regional water supply demands by humans and vegetation.

In general, droughts have the greatest impact on agriculture. Small droughts of limited duration can significantly reduce crop growth and yields. More substantial drought events can decimate croplands and can result in a total loss. Droughts can also greatly increase the risk of forest fires and wildfires because of extreme dryness. In addition, the loss of vegetation in the absence of sufficient water can result in flooding, even from average rainfall, following drought conditions.

Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Florence County has experienced 23 significant drought events in the last 19 years from January 1, 1997 to

April 30, 2016. Many of these hazard events may not have been localized to Florence County, and may have been recorded for a larger regional area.

Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Florence County experiences approximately one significant drought event every year.

Probability of Hazards Occurring in the Future

The future incidence of drought is highly unpredictable, as its occurrence is based on weather patterns, making it difficult to determine probability with any accuracy. Droughts tend to be a regional phenomenon in that they affect much of northeastern Wisconsin on nearly all of the occasions in which they affect Florence County. However, based strictly on the hazard frequency, Florence County is considered to have a **moderate** probability of experiencing a significant drought event in any given year.

Areas at Greatest Risk

Droughts have no defined hazard area within the planning area. Past events have been relatively uniform across the planning area. However, agricultural croplands are most vulnerable to losses from drought events. Florence County contains 14,989 acres of agricultural lands (based on land use data shown in Table).

Impacts from Hazard

Death and Injury

No deaths or injuries have been reported from drought events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016, according to NCDC data.

Structures at Risk

There are no direct impacts to buildings from a drought event. In terms of infrastructure, droughts have the most impact on municipal water supplies. Droughts will likely cause a shortage of water for human, industrial, and agricultural consumption, as wells and other water reserves may dry up. Also, water quality is generally an issue before and after a drought event, which may place an additional burden on wastewater treatment facilities.

Critical Facilities

In drought conditions, water shortages may occur and affect the amount of water available for human consumption. Hospitals may be called upon to treat individuals suffering from dehydration as a result. Parks that provide recreational water facilities are likely to experience increased usage during times of drought as well.

There are few other direct impacts on critical facilities as a result of drought conditions. However, droughts can trigger other natural and man-made hazards, such as wildfires and post-drought flooding, which can have an impact on these facilities.

Economic Impacts

Wisconsin is most susceptible to agricultural drought. Even small droughts of limited duration can significantly reduce crop growth and yields, which adversely affects farm income. Substantial drought events can lead to complete crop decimation, resulting in total loss. During severe drought periods farmers are often forced to seek financial assistance from the government to supplement lost income.

Livestock can also be adversely affected by droughts. Lack of water can lead to animal deaths. In addition, as drought conditions are often accompanied by periods of prolonged sunshine and high temperatures, animals are at risk to overexposure and heatstroke. Death of livestock can also lead to substantial loss of income for farmers.

Drought can also affect local commercial and industrial businesses. During times of severe drought, limitations are often placed on water usage. These limitations could have a negative impact on businesses such as car washes and landscapers as they will likely be unable to provide services to their customers. It is also likely that areas depending on tourism will see fewer people traveling to their area in times of drought. Industries which utilize large amounts of water in processing materials may also be subject to these limitations, which could potentially reduce their production capabilities.

Property Damage

No property damage has been reported from drought events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data.

Estimate of Potential Dollar Losses

Agricultural croplands are most vulnerable to losses from drought events. A "worst case scenario" would involve the total destruction of all 14,989 acres of agricultural lands in the county (based on 2009 land use data, shown in Table). The USDA conducts a Census of Agriculture every 5 years based on a sample of farms to estimate the market value of agricultural land and buildings[2]. Based on the 2012 Census of Agriculture, the average value per acre of agricultural land in Florence County was $3,115. Therefore, it can be estimated that if this "worst case scenario" were to occur, the total destruction of all agricultural land in Florence County would cause a loss of $ 46,690,735.

Lightning

Description of Hazard

Lightning, which occurs during all thunderstorms, can strike anywhere. Generated by the buildup of charged ions in a thundercloud, the discharge of a lightning bolt interacts with the best conducting object or surface on the ground. The air in the channel of a lightning strike reaches temperatures higher than 50,000 degrees Fahrenheit. The rapid heating and cooling of the air near the channel causes a shock wave which produces thunder.

Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Florence County has experienced one significant lightning events in the last 19 years from January 1, 1997 to April 30, 2016.

Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Florence County experiences approximately one significant lightning event every 10 years.

[2] *2012 Census of Agriculture Volume 1, Chapter 2: County Level Data,* Table 8, May 2014.

Probability of Hazard Occurring in the Future

Based on the hazard frequency, Florence County is considered to have a **low** probability of experiencing a significant lightning event in any given year.

Areas at Greatest Risk

Based on review of the historic patterns of lightning events, there are no specific areas that are a higher than average risk. The events are relatively uniform throughout Florence County.

Impacts from Hazard

Death and Injury

No deaths or injuries from lightning events have been reported for Florence County over the last 19 years from January 1, 1997 to April 30, 2016, according to NCDC data.

Structures at Risk

Lightning can cause direct damage to structures (especially those without lightning protection systems), and can cause fires that damage trees and structures. Downed trees and limbs can damage to structures during lightning events.

Critical Facilities

With sufficiently severe lightning events, police and fire departments can see an increased workload, and hospitals can see increases in patient load. Emergency operations can be disrupted as lightning can affect radio and cellular communications, as antennas are a prime target for lightning.

Property Damage

Reported property damage from significant lightning events for Florence County has totaled approximately $162,000 over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data.

Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for lightning events, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from lightning has been minimal over the past 19 years.

Excessive Heat

Description of Hazard

Excessive heat (often referred to as a heat wave) is primarily a public health concern. During extended periods of very high temperatures or high temperatures with high humidity, individuals can suffer from several ailments, including heat exhaustion and heat stroke. Heat stroke is a particularly 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, which can cause power outages and brown outs. A by-product of this hazard in Florence County often involves periods of high heat with loss of power. The elderly, disabled, and other vulnerable populations are especially susceptible to excessive heat.

Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Florence County has experienced one significant excessive heat events in the last 19 years from January 1, 1997 to April 30, 2016.

Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Florence County experiences approximately one significant excessive heat event every ten years.

Probability of Hazard Occurring in the Future

Based on the hazard frequency, Florence County is considered to have a **low** probability of experiencing a significant excessive heat event in any given year.

Excessive heat episodes tend to be a regional phenomenon in that they affect much of northeastern Wisconsin on nearly all of the occasions in which they affect the planning area.

Areas at Greatest Risk

Excessive heat events have no defined hazard area within the planning area. Past events have been relatively uniform across the planning area.

Impacts from Hazard

Death and Injury

No deaths or injuries have been reported from significant excessive heat events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data.

Structures at Risk

While there are no direct impacts on buildings, periods of excessive heat can impact the ability of buildings to be comfortable and safe for human habitation. Periods of excessive heat usually result in high electrical consumption for air conditioning, which can cause power outages and brown outs.

There are few impacts of excessive heat on publicly owned infrastructure. One impact that excessive heat can have on publicly owned infrastructure involves the buckling of certain streets and highways, which need to be repaired immediately.

Critical Facilities

Utilities may see peak demand for electricity during excessive heat episodes. There have been fears that an excessive heat episode could cause the power grid to collapse in a manner similar to what was experienced in the northeastern United States and in eastern Canada in the summer of 2003. Hospitals and clinics will like experience an increased demand due to heat related illnesses during an excessive heat episode. In some cases, rescue services will experience an increased demand due to these same heat related illnesses. If school is in session during the excessive heat episode, area school districts may dismiss classes early in the day, at least in older schools without air conditioning. Emergency shelters will experience higher demand during the excessive heat episode, with some emergency shelters being set up specifically in response to the episode. Finally, there is likely to be increased water demand during the

episode, both for human consumption as well as for lawn watering in the event that the excessive heat episode includes a drought.

Economic Impacts

Economic impacts of an excessive heat episode which can affect private businesses and consumers include higher electrical consumption and increased demands for medical treatment. Local governments may need to incur expenses when repairing streets and highways in the planning area that have been damaged due to buckling. If area school districts need to call off school early on excessive heat days, there may be expenses involved with early busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Non-profit organizations will incur expenses in the provision of emergency shelters. The Florence Water Utility will incur the expenses involved with additional demand for water during excessive heat episodes, and these expenses will be passed on to area consumers.

One less tangible economic impact of excessive heat involves lower productivity from persons who must work outside or in less than ideal conditions. In addition, people will be less motivated to shop at local businesses and may defer non-essential activities until the heat episode is over, negatively impacting the local economy. Excessive heat can negatively impact agriculture in the surrounding area when combined with drought.

Property Damage

No property damage has been reported from excessive heat events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data.

Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for excessive heat events, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from excessive heat has been minimal over the past 19 years.

Hail

Description of Hazard

Hailstones are ice crystals that form within a low pressure front due to warm air rising rapidly into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation. The size of hailstones is a direct function of the severity and size of the storm. Significant damage does not result until the hailstones reach 1.5 inches in diameter, which occurs in less than half of all hailstorms.

Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Florence County has experienced 18 significant hail events in the last 19 years from January 1, 1997 to April 30, 2016.

Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Florence County experiences approximately one significant hail event per year.

Probability of Hazard Occurring in the Future

Based on the hazard frequency, Florence County is considered to have a **moderate** probability of experiencing a significant hail event in any given year.

Areas at Greatest Risk

Based on review of the historic patterns of hail, there are no specific areas that are a higher than average risk. The events are relatively uniform throughout Florence County.

Impacts from Hazard

Death and Injury

No deaths or injuries from hail have been reported for Florence County over the last 19 years from January 1, 1997 to April 30, 2016, according to NCDC data.

Structures at Risk

Hail can inflict severe damage to roofs, windows, and siding, depending on hailstone size and winds.

Critical Facilities

With sufficiently severe hail events, police and fire departments can see an increased workload, and hospitals can see increases in patient load.

Property Damage

No property damage has been reported from hail for Florence County over the last 19 years from January 1, 1997 to April 30, 2016 according to NCDC data.

Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for hail, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from excessive heat has been minimal over the past 19 years.

Dense Fog

Description of Hazard

Fog is a collection of liquid water droplets or ice crystals suspended in the air at or near the ground. While fog is a type of stratus cloud, the term "fog" is typically distinguished from the more generic term "cloud" in that fog is low-lying, and the moisture in the fog is often generated locally (such as from a nearby body of water, like a lake or stream, or from nearby moist ground or marshes). Fog is distinguished from mist because it has greater density and lower visibility than mist.

Dense fog is a hazard mainly because of reduced visibility. Airport delays, automobile accidents, ship wrecks, plane crashes, and many other problems are frequently caused by fog. The National Weather Service forecasts fog and issues dense fog advisories when visibility is decreased to less than one quarter of a mile. These advisories alert travelers to potentially dangerous conditions. Traveling in fog requires reduced speed and careful navigation. At night, traveling in fog is especially dangerous because darkness combines with fog to reduce visibility even more. In addition, light from automobile headlights and other navigational lights is scattered off the water droplets of the fog, limiting sight to only a short distance. In response to this problem,

automobiles are often equipped with specially designed lights that illuminate a usually dry (and therefore clear) area just above the roadway surface.

Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Florence County has experienced five significant dense fog events in the last 19 years from January 1, 1997 to April 30, 2016.

Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Florence County experiences approximately one significant dense fog event every four years.

Probability of Hazard Occurring in the Future

Based on the hazard frequency, Florence County is considered to have a **low** probability of experiencing a significant a dense fog event in any given year.

Areas at Greatest Risk

Portions of the planning area along waterways, wetlands, and low lying areas can be at greater risk for dense fog under certain meteorological conditions. However, no portion of the planning area is free of the possibility of experiencing dense fog events. Fog events can often be a regional phenomenon in that they affect much of the northeastern Wisconsin on many of the occasions in which they affect Florence County.

Impacts from Hazard

Death and Injury

No deaths or injuries have been reported from significant fog events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016, according to NCDC data.

Structures at Risk

There are no direct impacts to buildings from a fog event. The main structures impacted are those associated with infrastructure during a fog event from vehicle accidents. This can result in rescue services helping injured drivers and passengers, clean-up of the affected portions of the street and highway network, and temporary rerouting of motorists after some incidents. In addition, motorists often must travel at slower speeds when fog is in the area, which adds travel time and can lead to vehicular congestion in cases where it would normally not occur.

In fog events during the winter, icing can sometimes be a problem. Power lines and tree limbs can be coated with heavy ice in some winter fog events, resulting in disrupted power and telephone service. In addition, in fog events during the winter, even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.

Critical Facilities

Law enforcement will be asked to respond to an increased number of accidents during many fog events. Hospitals and clinics may be asked to treat individuals injured in accidents that likely would have not occurred in the absence of the fog event. Rescue services may be called to respond to accidents that resulted from the fog event. The starting time for schools may be delayed by the fog event for the safety of students and

all involved. Courtrooms may see increased adjudication of traffic law violations resulting from accidents occurring during the fog event. Municipal public works and county highway departments may need to perform emergency repairs to streets and highways in worst-case scenario accidents resulting from the fog event. Airports can experience flight delays and cancellations during certain fog events.

Economic Impacts

There are economic costs in the accidents caused by fog events. Vehicular accidents almost always involve property damage, and some vehicular accidents during fog events involve injuries and/or fatalities. All of these consequences to vehicular accidents have costs both to the individual involved and to society. Fog events can also cost businesses in lost time involving late workers and/or late shipments. If area school districts need to delay school during a fog event, there may be expenses involved with delayed busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Airline delays due to fog have economic impacts for travelers as well as for commerce. There are additional economic impacts if the fog event occurs in conjunction with the icing of power lines in cases where the power lines are damaged and residents lose power.

Property Damage

No property damages have been reported from dense fog events for Florence County over the last 19 years from January 1, 1997 to April 30, 2016, according to NCDC data.

Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for dense fog events, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from fog have been minimal over the past 19 years.

Dam Failure

Description of Hazard

A "dam" is an artificial barrier, together with its appurtenant works, constructed in or across a waterway for the primary purpose of impounding or diverting water. Dam failure can occur for a number of reasons, including overtopping caused by floods that exceed the capacity of the dam, deliberate acts of sabotage, structural failure of materials used in dam construction, movement and/or failure of the foundation supporting the dam, settlement and cracking of concrete or embankment dams, piping and internal erosion of soil in embankment dams, or inadequate maintenance and upkeep. In extreme cases, dam failure can occur with little warning and can result in the loss of life and significant property damage in areas downstream of the dam. Other failures and breaches can take much longer to occur.

There are approximately 3,900 dams in existence in the State of Wisconsin. Since the late 19th century, more than 900 dams have been built, then washed out or removed.

Almost 60 percent of the dams in Wisconsin are owned by a former company or private individual, 9 percent by the State of Wisconsin, 17 percent by a municipality such as a town or county government, and 14 percent by other ownership types.

The federal government has jurisdiction over dams in Wisconsin that produce hydroelectricity - approximately 5 percent or nearly 200 dams. The Wisconsin Department of Natural Resources regulates the rest of the dams.

A dam with a structural height of over 6 feet and impounding 50 acre-feet or more, or having a structural height of 25 feet or more and impounding more than 15 acre-feet is classified as a large dam. There are approximately 1,160 large dams in the State of Wisconsin[3].

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

The WDNR regulates the permitting of new dam construction, repairs, reconstruction, ownership transfers, water levels, and abandonment. Many dams in the state have been in place since the late 1800s, and a great deal of time must be invested in inspecting aging dams and making sure they comply with public safety requirements, and environmental regulations.

Previous Significant Hazard Occurrences

There have been no significant dam failures in Florence County in the last 19 years from January 1, 1997 to April 30, 2016.

Hazard Frequency

There have been no significant dam failures in Florence County in the last 19 years from on which to base a hazard frequency.

Probability of Hazard Occurring in the Future

Based on the hazard frequency information available, Florence County is considered to have a **low** probability of experiencing a dam failure event in any given year.

Areas at Greatest Risk

As identified by the WDNR, there are a total of 30 dams in Florence County. Of these, nine are classified by the WDNR as large dams, meaning they have a structural height of over six feet and impound 50 acre-feet or more. The rest of the dams located in the county are regarded as small dams.

The WDNR assigns hazard ratings to large dams within the state based on existing land use and land use controls (zoning) downstream of the dam. A high hazard rating indicates that a failure would likely result in loss of life. A significant hazard rating indicates that a failure could result in significant property damage. A low hazard rating is given when a failure would result in only minimal property damage and loss of life is unlikely.

Map 3-6 displays the hazard ratings of the small and large dams in the county. In Florence County, there are two dams that have a high hazard rating and one with a significant hazard rating. The Brule and Twin Falls dams are large dams with “high”

[3] http://dnr.wi.gov/topic/Dams/DamsOverview.html; WDNR; revised July 7, 2015; retrieved July 6, 2017.

hazard ratings, and the Kingsford dam is a large dam with a "significant" hazard ratings. Additionally, the Michigamme Falls dam, located in Iron County, Michigan poses a significant risk to Florence County. These four dams are owned by WE Energies.

The areas of greatest risk from dam failure are those areas within the hydraulic shadow of dam of these three dams. The hydraulic shadow of the dam is the area of land downstream from a dam that would be inundated by water upon failure of the dam during the regional flood (100-year flood).

WE Energies has prepared a Short Form Emergency Action Plan that outlines the action plan for the evacuation and/or notification of affected private partied in the event of flooding or failure of a dam. Each plan assesses a "worst-case" scenario for dam failure at the time of the normal flow or sunny day failure, failure during a 100-year flood, and a failure during the flood designated as the Inflow Design Flood (IDF) - the flood flow above which the incremental increase in water surface elevation due to the failure of a dam is no longer considered to present an unacceptable threat to downstream life and property. These assessments include the identification of all dams located upstream and downstream of the dam, identification of communities located downstream of the dam, coordination of responsibilities under the Emergency Action Plan, and evacuation maps. Copies of the plans are available at the office of the Florence County Emergency Management Director and the Florence County Sheriff's office.

Two additional dams, which are outside the county, would impact the county include the Way Dam in Crystal Falls, Michigan; and Peavy Falls in Randville, Michigan.

Impacts from Hazard

Structures at Risk

Florence County would be affected if one or more of the electric power generating dams in the county was to fail. Though electric power generating dams within the area are the greatest concern, consistent maintenance keeps them in good shape; therefore, the probability of dam failure is low. There has never been a problem at any of the major electric power generating dams and there is no history of dam failure for the three dams that are rated as "High" or "Significant" within the county. The risk of loss of life or significant property damaged is considered to be very low.

Analysis of Shadow of the Dam data obtained from WE Energies indicates that 220 structures (as determined by properties with improved values from county parcel data) could potentially be impacted by the dam failure flooding in the planning area.

Florence County also has a few recreational dams. If any of the recreational type dams failed, the runoff would hardly be noticed downstream. Recreational dams have developed leaks on occasion but have not caused any flooding problems. However, undetected failure of Halls Creek dam could cause overtopping of Pine Dam.

Critical Facilities

Critical facilities that could be impacted by dam failure flooding include dams and any other critical facilities located within the hydraulic shadow of the dam. There are five critical facilities within these areas in Florence County; however, they are all water-dependent facilities. They include a dam, two bridges, a boat ramp, and a pump station.

Economic Impacts

Floods cause problems for businesses and industry. Businesses disrupted by floods may have to be closed. Public expenditures on flood fighting, sandbags, fire department calls, clean up, and on repairs to damaged public property affect all residents of the planning area, not just those in the shadow of the dam.

Estimate of Potential Dollar Losses

There are 220 structures that would be impacted by dam failure at the four high and significant risk dams in the county. "Vulnerable structures" are those structures within the hydraulic shadow of the dam. Since there is no reliable building height data for all buildings in Florence County, a "worst case scenario" of total structural damage for buildings in all of the hydraulic shadow of the dam areas was assumed in estimating potential dollar losses to vulnerable structures. It is estimated that nearly $18 million in losses of improvements would occur with a "worst case scenario" of total loss of all structures in all of the shadow of the dam areas of the planning area. This information was obtained from a Florence County database on fair market and assessed values of real property (structures and land) overlaid on Shadow of the Dam mapping from WE Energies. The potential dollar losses estimate is for damage to the structures themselves, and does not account for damage to personal property inside or adjacent to vulnerable structures.

NATURAL HAZARDS AND CLIMATE CHANGE

Hazard profiles provide information and predictions based on past hazard occurrence data. Climate change may make past trends unreliable sources for predicting future impacts, frequency, probability, and vulnerabilities. Climate change has and will continue to impact average annual temperatures causing increased frequency in heat waves; increased frequency and intensity of severe rainstorms; shorter, warmer winters with decreased lake ice cover; increased drought frequency, and other impacts. In general, Florence 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 30-50 years, Florence's climate will resemble that of current Toledo, Ohio.[4]

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 snow pack, and late winter rainfall, may result in high regional groundwater tables and lake levels, and saturated soil conditions.[5]

Vulnerabilities

Local and state government and private sector developers make significant investments in long-lived infrastructure that controls or is affected by stormwater runoff from large rainfalls. Likewise, municipal wastewater treatment plant operators make substantial long-term investments in their system capacity that anticipates

---

[4] Wisconsin Initiative on Climate Change Impacts, Interactive Mapping Tool, http://www.wicci.wisc.edu/climate-map.php.

[5] Wisconsin Initiative on Climate Change Impacts, Stormwater Working Group, http://www.wicci.wisc.edu/stormwater-working-group.php#2.

development, but not increased stormwater inflow and groundwater infiltration. This infrastructure is designed using standards based on rainfall data from the latter half of the 20th century. By having assumed "stationarity" of climate in the design of our infrastructure, Florence County is now vulnerable to the potential impacts from more intense rainfall events and elevated groundwater.

In summary, our previous investment in public safety and environmental protection risks being overwhelmed by precipitation impacts that are beyond those anticipated by past infrastructure designers and water resource managers.[6]

Potential Impacts

The 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 Florence County with regard 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 are contaminated by flood waters and high groundwater;
- Impoundments and stormwater detention ponds fail more frequently;
- Raingardens and other biofiltration best management practices (BMPs) fail due to saturated soil conditions;
- Increased erosion of slopes by intense rainfall events leads to high sediment and phosphorus loading to surface waters;
- Runoff of manure from fields, and accompanying fish kills, are more frequent;
- Stormwater inflow and groundwater infiltration to sanitary sewers, results in untreated municipal wastewater flowing into to lakes and streams.

Other potential impacts of concern for Florence County include:

- Warmer nighttime temperatures might lead to more extreme heat waves, increasing the risk for heat stroke in some populations. At the same time, observed and projected trends show fewer cold temperature extremes, which may mean reduced health risks due to exposure in the winters.
- 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.

[6] Ibid.

- Changes in temperatures and precipitation could result in an increase in disease-carrying insects, including ticks and mosquitoes. This means people may be at 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.

Solutions/Adaptations

Although the impacts of climate change are already being seen in Wisconsin, there are things Florence 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 Florence 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 beach improvement projects that reduce stormwater runoff to beaches and nearshore waters and integrate natural infiltration features such as vegetated swales.
- Improve or restore natural shore 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 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.

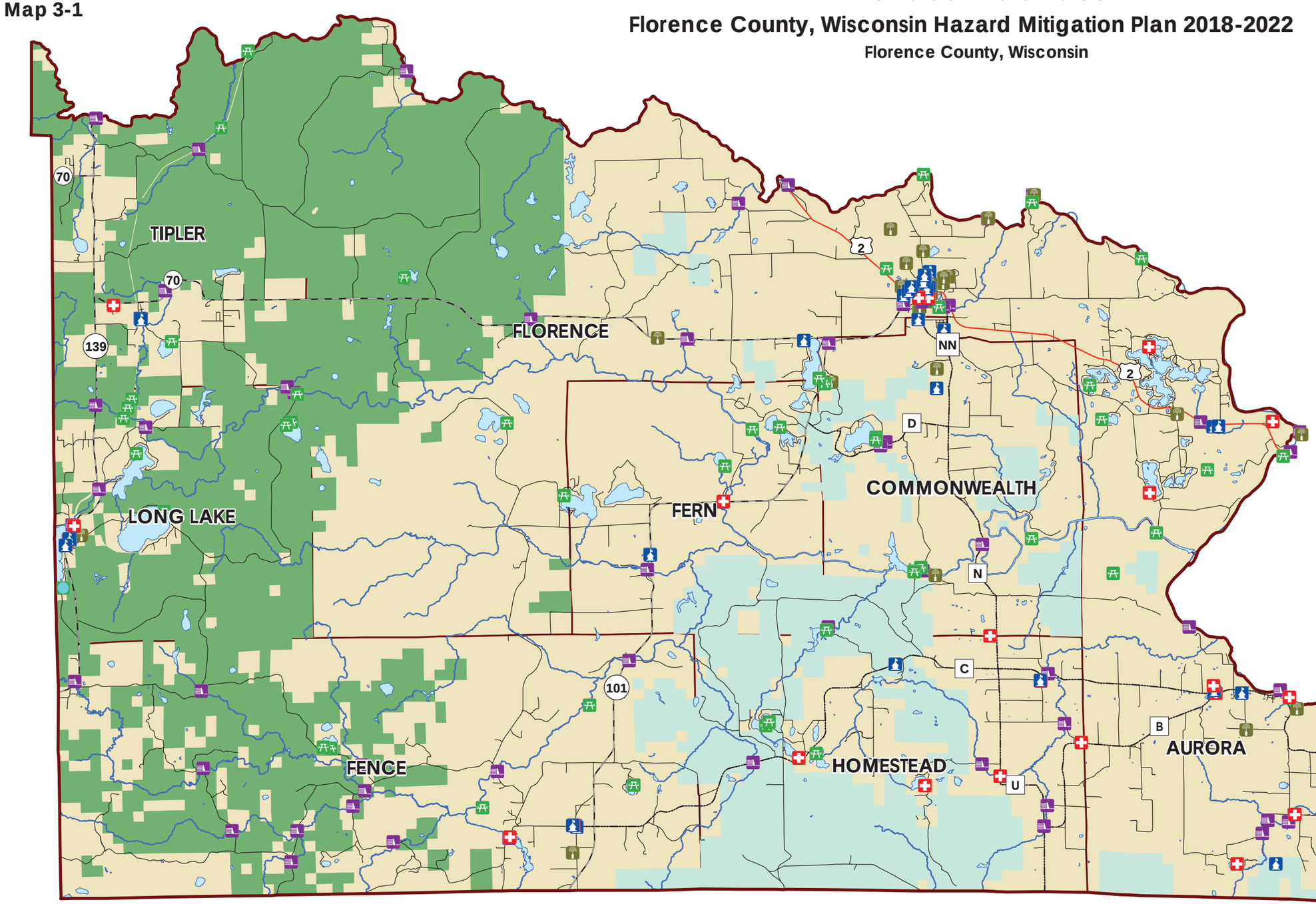
- Design port and harbor infrastructure that can accommodate increased variability in lake levels, e.g. harbor slips that float.
- Use a risk/consequence approach to evaluating and modifying existing infrastructure to accommodate observed and predicted changes in climate.
- Develop and evaluate alternative 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.

Map 3-1

Critical Facilities

Florence County, Wisconsin Hazard Mitigation Plan 2018-2022

Florence County, Wisconsin



Legend

Critical Facilities

- Building
- Emergency Service
- Recreation
- Structure
- Utility

Base Map Features

- Community Boundary
- Surface Water
- National Forest
- County Forest
- U.S. Highway
- State Highway
- County Highway
- Local Road

N

0 0.5 1 2 3 4

Miles

BAY-LAKE REGIONAL PLANNING COMMISSION
Brown • Door • Florence • Kewaunee • Manitowoc • Marinette • Oconto • Sheboygan

Source: WDNR, 2009; Florence County 2008, 2012; Bay-Lake Regional Planning Commission, 2017.

DISCLAIMER:
This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. Bay-Lake RPC is not responsible for any inaccuracies herein contained.

Map 3-2

Floodplains

Florence County, Wisconsin Hazard Mitigation Plan 2018-2022

Florence County, Wisconsin

TIPLER
FLORENCE
COMMONWEALTH
FERN
LONG LAKE
FENCE
HOMESTEAD
AURORA
70
139
2
NN
D
N
C
101
B
U

Legend

- 100-Year Floodplains
- Surface Water

Base Map Features

- Community Boundary
- U.S. Highway
- State Highway
- County Highway
- Local Road

N

0 0.5 1 2 3 4
Miles

BAY-LAKE REGIONAL PLANNING COMMISSION
Brown•Door•Florence•Kewaunee•Manitowoc•Marinette•Oconto•Sheboygan

Source: FEMA, 1978; Florence County 2008, 2012; Bay-Lake Regional Planning Commission, 2017.

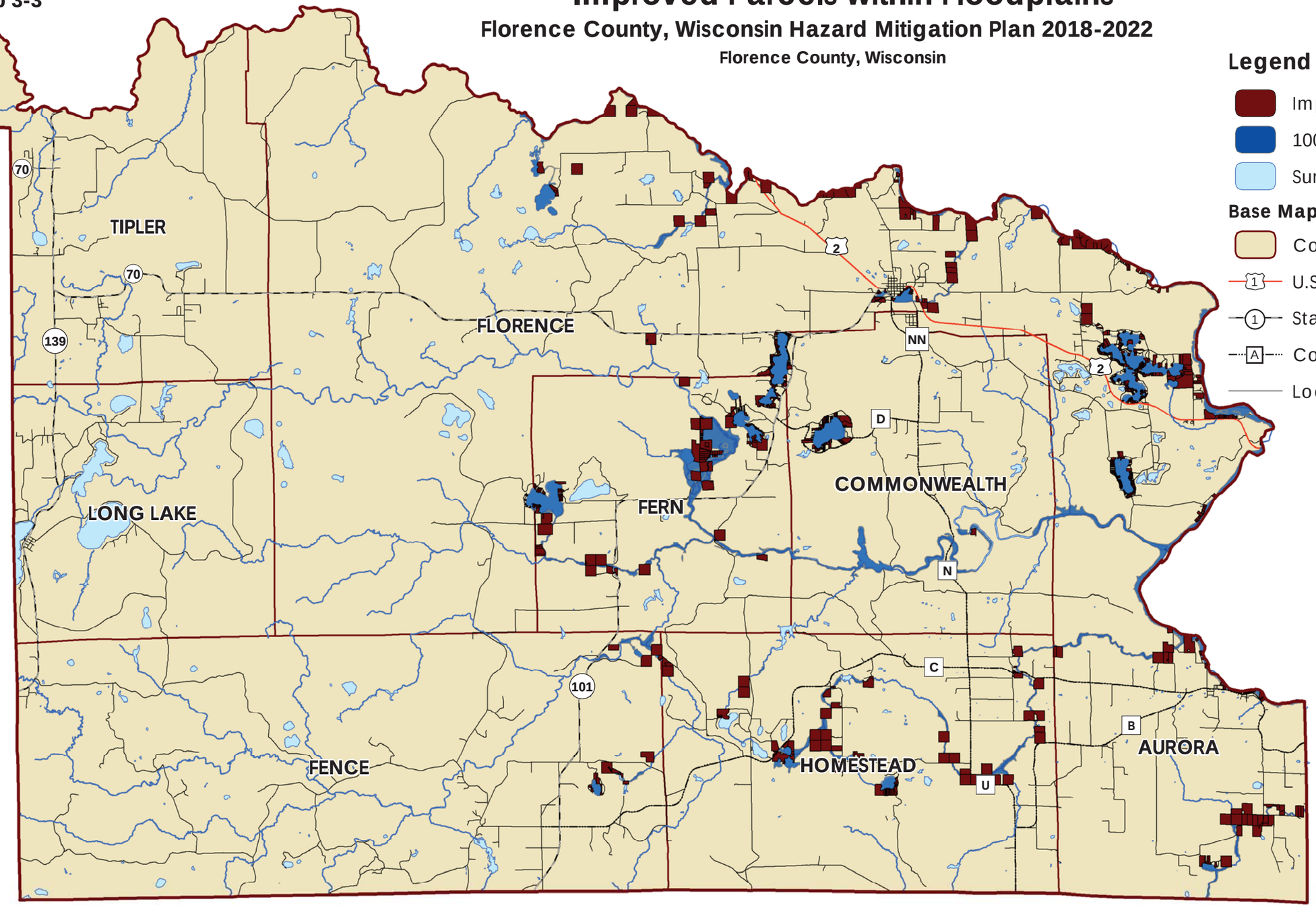
DISCLAIMER:
This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. Bay-Lake RPC is not responsible for any inaccuracies herein contained.

Map 3-3

Improved Parcels within Floodplains

Florence County, Wisconsin Hazard Mitigation Plan 2018-2022

Florence County, Wisconsin



Legend

- Improved Parcels in Floodplains
- 100-Year Floodplains
- Surface Water

Base Map Features

- Community Boundary
- U.S. Highway
- State Highway
- County Highway
- Local Road

N

0 0.5 1 2 3 4

Miles

BAY-LAKE REGIONAL PLANNING COMMISSION

Brown • Door • Florence • Kewaunee • Manitowoc • Marinette • Oconto • Sheboygan

Source: FEMA, 1978; Florence County 2008, 2012; Bay-Lake Regional Planning Commission, 2017.

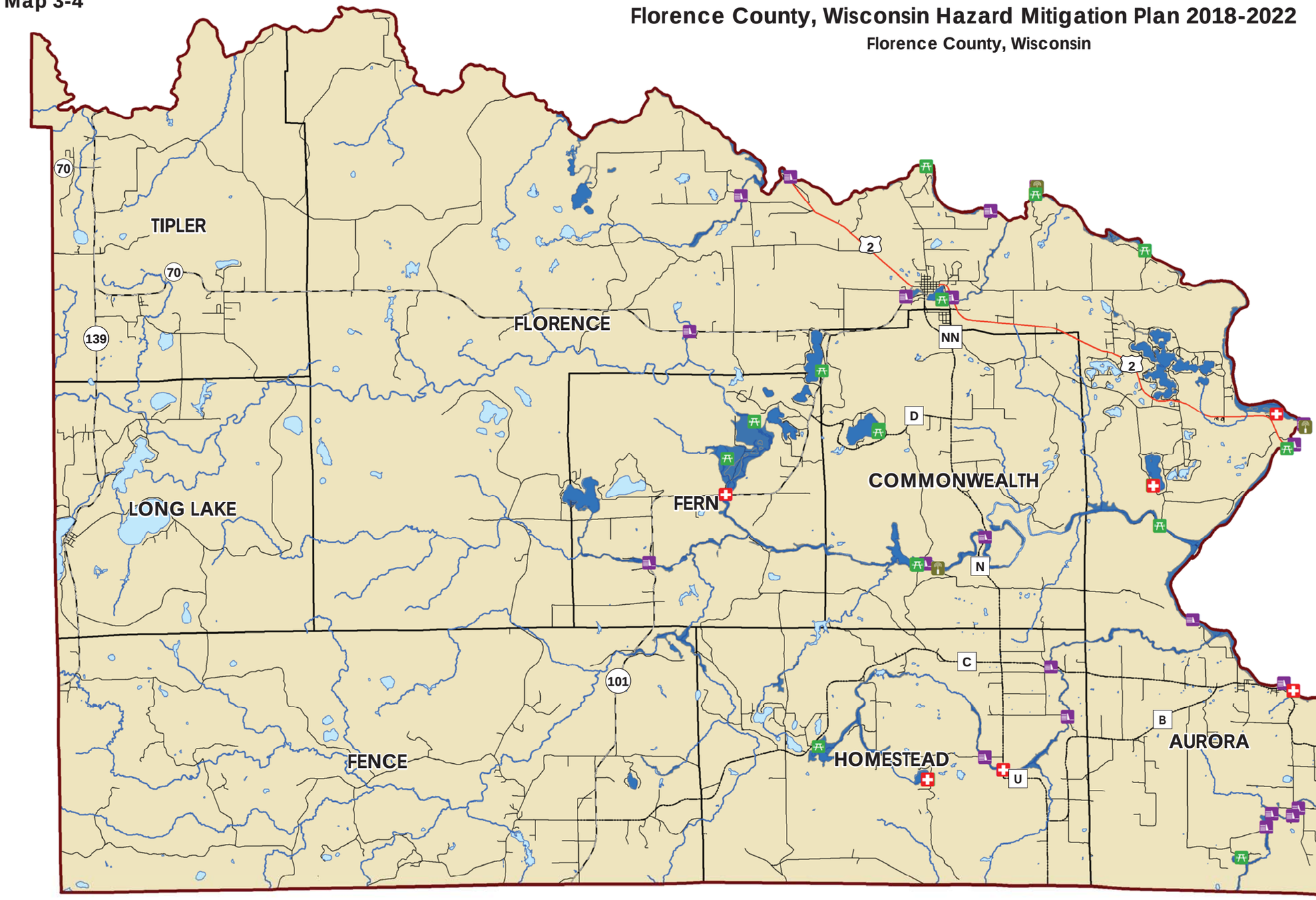
DISCLAIMER:
This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. Bay-Lake RPC is not responsible for any inaccuracies herein contained.

Map 3-4

Critical Facilities within the 100-Year Floodplains

Florence County, Wisconsin Hazard Mitigation Plan 2018-2022

Florence County, Wisconsin



Legend

Critical Facilities

- Emergency Service
- Recreation
- Structure
- Utility
- 100-Year Floodplains
- Surface Water

Base Map Features

- Community Boundary
- U.S. Highway
- State Highway
- County Highway
- Local Road

N

0 0.5 1 2 3 4

Miles

BAY-LAKE REGIONAL PLANNING COMMISSION

Brown•Door•Florence•Kewaunee•Manitowoc•Marinette•Oconto•Sheboygan

Source: FEMA, 1978; Florence County 2008, 2012; Bay-Lake Regional Planning Commission, 2017.

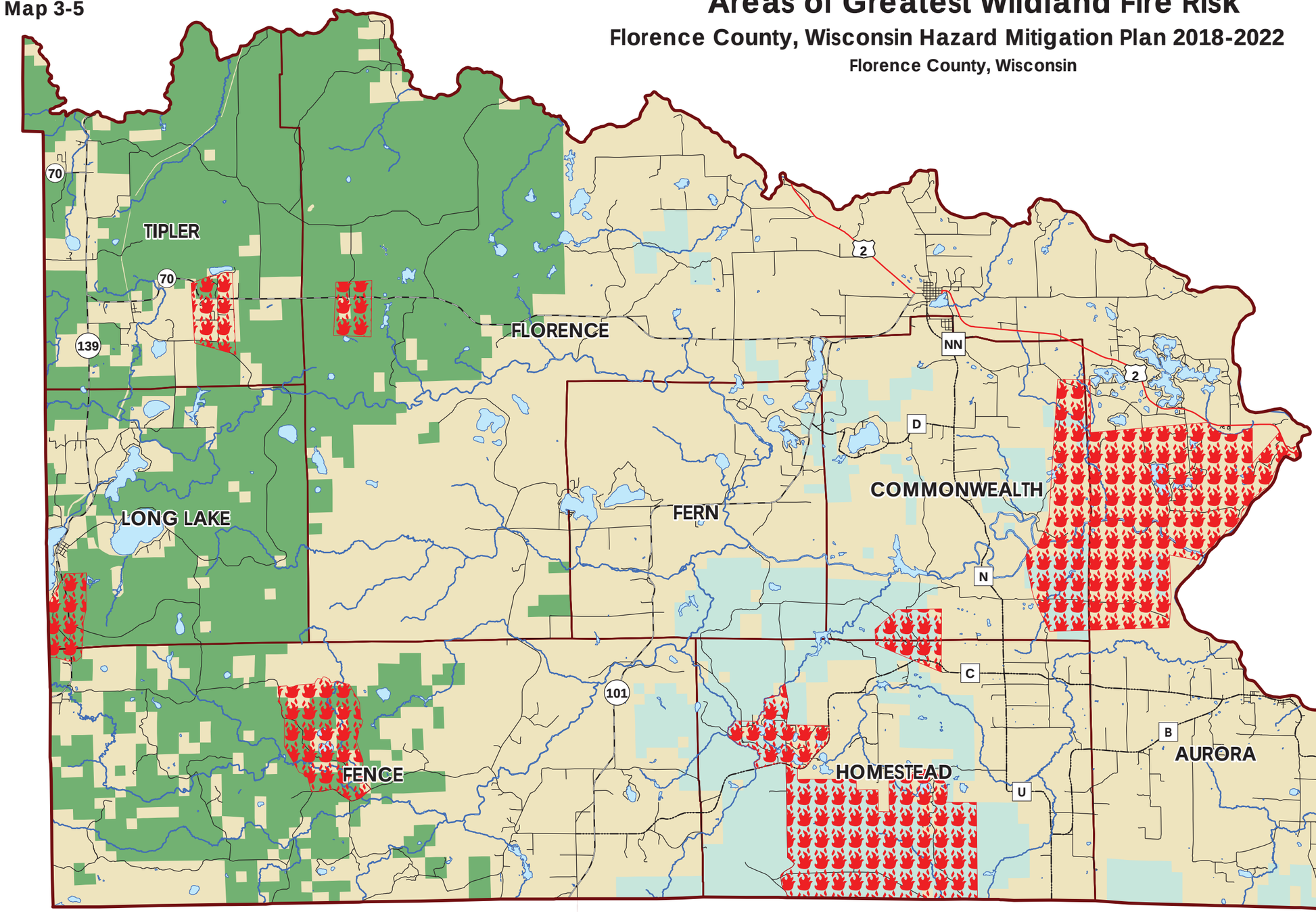
DISCLAIMER:
This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. Bay-Lake RPC is not responsible for any inaccuracies herein contained.

Map 3-5

Areas of Greatest Wildland Fire Risk

Florence County, Wisconsin Hazard Mitigation Plan 2018-2022

Florence County, Wisconsin



Legend

- Areas of Greatest Risk*

Base Map Features

- Community Boundary
- Surface Water
- National Forest
- County Forest
- U.S. Highway
- State Highway
- County Highway
- Local Road

*As defined by the Florence County Forester, Wisconsin DNR Forest Manager, and USDA Forest Service Manager (2006)

N

0 0.5 1 2 3 4

Miles

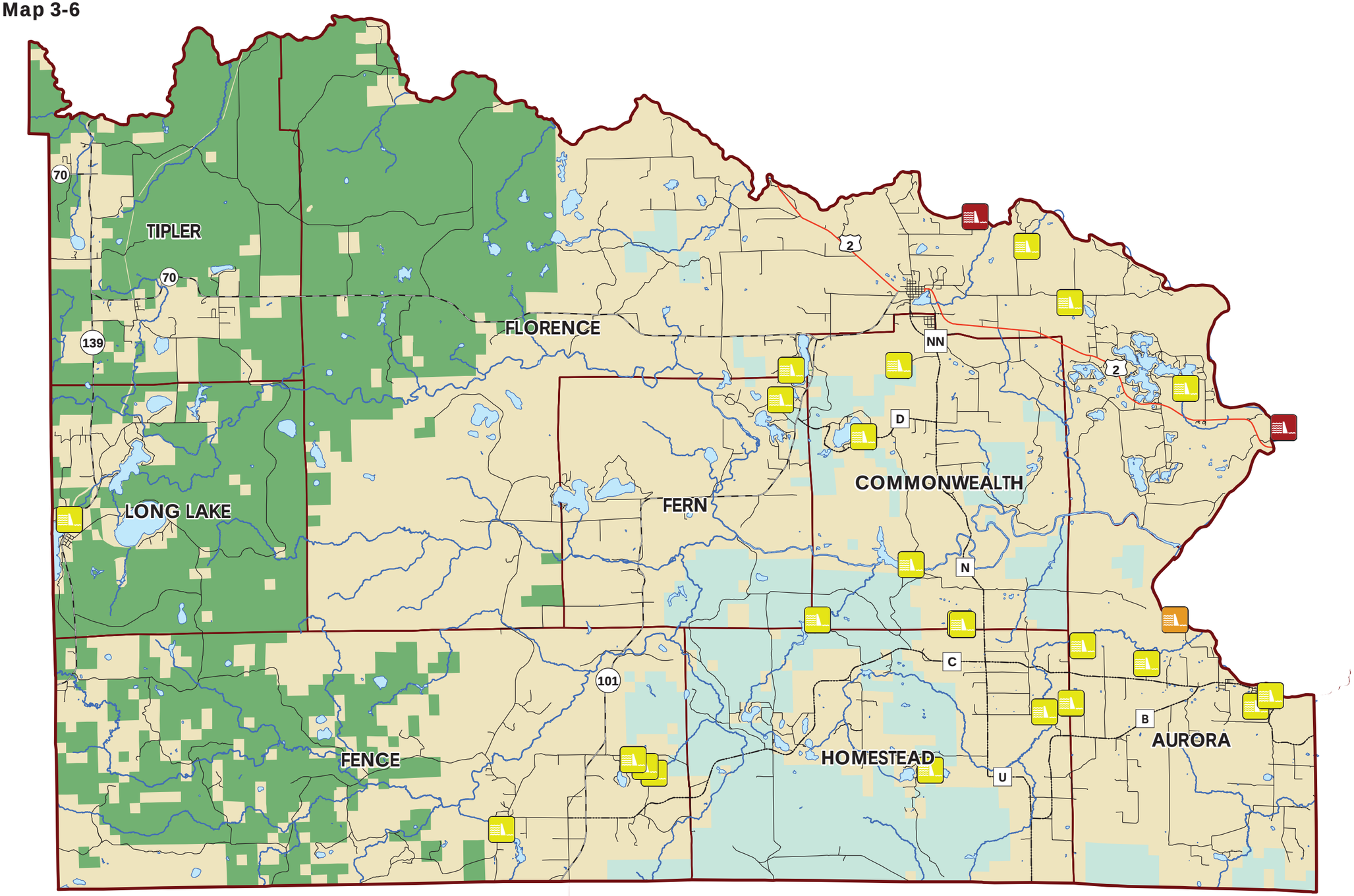
BAY-LAKE REGIONAL PLANNING COMMISSION

Brown • Door • Florence • Kewaunee • Manitowoc • Marinette • Oconto • Sheboygan

Source: Florence County 2006, 2008, 2012; Bay-Lake Regional Planning Commission, 2017.

DISCLAIMER:
This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. Bay-Lake RPC is not responsible for any inaccuracies herein contained.

Map 3-6



DISCLAIMER:
This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. Bay-Lake RPC is no

SECTION 4: MITIGATION STRATEGY

INTRODUCTION

As defined by the Disaster Mitigation Act of 2000, mitigation is a "sustained action that reduces or eliminates long-term risk to people and property from hazards and their effects." Mitigation planning is the systematic process of learning about the hazards that can affect the planning area, setting clear goals, identifying appropriate actions, and following through with an effective mitigation strategy. Mitigation encourages long-term reduction of hazard vulnerability and can reduce the enormous cost of disasters to the government and property owners. Mitigation can also protect critical community facilities and infrastructure; reduce exposure to liability; and minimize community disruption.

The mitigation strategy outlines the general goals to be achieved through the implementation of the Florence County hazard mitigation plan. From the identified hazard mitigation goals, a mitigation strategy was developed to identify specific projects and activities that could help achieve the County's hazard mitigation goals to make them safer and better prepared for disasters.

This chapter includes a discussion of the mitigation efforts that are underway, the County's plan to implement additional identified mitigation actions, an assessment of the County's pre- and post-disaster hazard management policies, programs, and capability to mitigate hazards, and an evaluation of the current and potential sources of federal, state, or private funding to implement mitigation activities.

MITIGATION GOALS

The following mitigation goals were developed to set general guidelines to help Florence County officials mitigate hazards. These goals are broad in order to apply to all of the hazards addressed in the plan.

Goal 1: Minimize the threats to human life, health, safety, property damage, and the economy through public education and interagency cooperation.

Goal 2: Reduce the impacts that natural hazards have on people, property, infrastructure, and the environment, through:

- disaster preparedness;
- forecasting and warning systems; and
- emergency plans

Goal 3: Reduce the impacts that floods have on people, property and the environment, through:

- disaster preparedness;
- the use of floodplain regulations (zoning ordinances, subdivision regulations, building codes, etc.);
- the use of development and redevelopment policies;
- the use of wetland regulations;
- the use of tax adjustments;
- informing and educating the public;

- the use of environmental corridors, open space, and wetland and riparian restoration;
- acquisition and relocation of structures in flood prone areas;
- individual protection measures;
- flood forecasting and warning systems (National Weather Service - Advanced Hydrologic Prediction Service);
- emergency plans;
- flood insurance (including maintaining compliance with National Flood Insurance Program regulations); and
- structural measures (dams, reservoirs, dikes, levees, floodwalls, channel alterations, land treatment measures, on-site detention, etc.).

HAZARD MITIGATION STRATEGIES

The hazard mitigation strategies form the core of the hazard mitigation plan. Table 4-1 lists the mitigation strategies developed for Florence County. The table lists the hazard type, associated mitigation measures, the estimated costs of each project (where known), responsible entities for each mitigation measure identified, the project timetable, and project prioritization. The identified actions/projects aim to reduce the effects of hazards on the population, services, and existing and new buildings and infrastructure. An asterisk ("*") in the table denotes activities that address NFIP requirements.

The County Emergency Management Department will track the implementation of mitigation actions over time. Information on completed or revised actions will be documented in future five-year updates of the County hazard mitigation plan.

Prioritization Process

In developing the mitigation strategy, members of the plan steering committee considered, from their perspective, the various proposed action items and came to consensus regarding how each would be prioritized. The prioritization process included assigning a rank of "high," "moderate" or "low" to each strategy based on need, funding, cost-benefit, and anticipated political support.

Cost-Benefit Review

In developing this mitigation strategy, members of the plan steering committee considered, from their perspective, the costs and benefits of the various proposed action items. The cost-benefit review was a factor of the prioritization process. Full cost-benefit calculations were not prepared for each strategy item included in the plan. A detailed cost-benefit analysis for a strategy will be undertaken during the project development process when implementation is being pursued.

COMPLETED MITIGATION ACTIONS

Florence County has been able to complete two mitigation actions identified in the previous hazard mitigation plan including acquiring an emergency notification system (e.g. Code Red), countywide LIDAR mapping, and an emergency generator was acquired in the Town of Florence.

Table 4-1: Hazard Mitigation Strategy, 2018-2022, Florence County

Hazard Type	Mitigation Measures	Budget	Responsible Party	Project Timetable	Priority	Notes
All Hazards	Acquisition of emergency power generators for critical facilities.	Cost to be determined	County Emergency Management, and critical facilities managers	Ongoing	High	For use at critical facilities where health and safety would be impacted during power supply interruptions. Some have been installed, but more are needed.
	Identify areas of need for burying power lines.	Covered under existing budgets	County Emergency Management, WPS, Florence Utilities, and WE Energies	2018-2023	High	Address recurring (prolonged) power outage issues.
	Bury power lines in areas of need.	Covered under existing budgets	County Emergency Management, WPS, Florence Utilities, and WE Energies	2018-2023	High	Address recurring (prolonged) power outage issues. Some have been completed, but more is needed.
	Severe weather spotter classes.	Covered under existing budgets	Bay College and NOAA NWS	Ongoing	Medium	Held regularly online and at Bay College.
	Continue to provide severe weather outreach.	Covered under existing budgets	County Emergency Management, and Wisconsin Emergency Management	Ongoing	Medium	Severe Weather Awareness Week held annually.
	Undertake outreach efforts to encourage the public to sign up for notifications through Code Red.	Covered under existing budgets	County Emergency Management	Ongoing	Medium	Code Red is a automated Emergency Notification System in the county that enables subscribers to receive severe weather notifications.
	Continue to provide weather radio warning messages.	Covered under existing budgets	NOAA NWS	Ongoing	Medium	
Hazard Type	**Mitigation Measures**	**Budget**	**Responsible Party**	**Project Timetable**	**Priority**	**Notes**
Tornado and Strong Wind	Undertake effort to ensure all manufactured and mobile home park residents are subscribed to Code Red.	Covered under existing budgets	County Emergency Management	Ongoing	High	

Table 4-1: Hazard Mitigation Strategy, 2018-2022, Florence County (cont'd)

Hazard Type	Mitigation Measures	Budget	Responsible Party	Project Timetable	Priority	Notes
Tornado and Strong Wind (cont'd)	Identify emergency shelter availability in County and review location gaps.	Covered under existing budgets	County Emergency Management, American Red Cross, and towns	2018-2023	Medium	Provide safe rooms for manufactured and mobile home parks, and campgrounds.
	Provide and promote tornado awareness training.	Covered under existing budgets	NOAA NWS and Wisconsin Emergency Management	Ongoing	Medium	
	Encourage use of tie-downs with ground anchors for manufactured and mobile homes.	Covered under existing budgets	County Emergency Management, and towns	Ongoing	Medium	New manufactured homes come with a setup package that includes tie-downs. Insurance companies promote its use.
	Enhanced construction standards and techniques.	Covered under existing budgets	County Emergency Management, and County Zoning	Ongoing	Medium	Handled through building code.
	Continue to review building codes.	Covered under existing budgets	County Zoning	Ongoing	Medium	Keep with current construction standards.
Flooding	Acquire updated certified floodplain maps based on new LiDAR.*	Cost to be determined	County Zoning	2018-2023	High	
	Identify culverts that need improvement/ replacement.	Cost to be determined	County Emergency Management, and County Highway	2018-2023	High	
	Replace/improve failing culverts.	Cost to be determined	County Emergency Management, and County Highway	2018-2023	High	
	Continue disaster preparedness planning and activities.	Covered under existing budgets	County Emergency Management	Ongoing	High	
	National flood insurance program.*	Covered under existing budgets	Federal Emergency Management Agency, County Zoning, and towns	Ongoing	High	Enforcement of floodplain management regulations consistent with NFIP requirements.

***Meets NFIP Requirements**

Table 4-1: Hazard Mitigation Strategy, 2018-2022, Florence County (cont'd)

Hazard Type	Mitigation Measures	Budget	Responsible Party	Project Timetable	Priority	Notes
Flooding (cont'd)	Stormwater management.	Covered under existing budgets	County Zoning, and WDNR	Ongoing	High	Involves implementation of stormwater management ordinances.
	Preservation of natural resources in floodplains.*	Covered under existing budgets	County Zoning	Ongoing	High	County Zoning can provide technical advice.
	Acquire building footprints.*	$25,000	County Zoning	2018-2023	Medium	
	Flood forecasting and warning system, and emergency plans.	Covered under existing budgets	NOAA NWS, County Emergency Management, and We Energies	Ongoing	Medium	
	Floodproofing techniques.*	Cost to be determined	County Zoning	Ongoing	Medium	County assistance in floodproofing existing structures would only occur if grants become available.
	Orthophotography base maps of the county.	Cost to be determined	County Zoning	Ongoing	Medium	
	Provide information to property owners located in the floodplain.*	Covered under existing budgets	County Zoning	Ongoing	Medium	As requested. Part of Flood Mitigation Plan and making new maps.
	Annual review of flood mitigation plan.*	Covered under existing budgets	County Zoning	Ongoing	Medium	
	Flood insurance rate map (FIRM) amendments and revisions.*	Cost to be determined	County Zoning, and WDNR	2022	Medium	
	Individual property measures for basements.*	Cost to be determined	County Zoning	Ongoing	Medium	Handled through building inspections.
	Acquisition and relocation.*	Cost to be determined	County Zoning	As needed	Low	
Winter Storm	Educate the public about the priority policy for salting and plowing streets and highways.	Covered under existing budgets	County Highway Department	Ongoing	High	The policy gives top priority to highly traveled principal arterials, and gives lowest priority to llocal roads.

***Meets NFIP Requirements**

Table 4-1: Hazard Mitigation Strategy, 2018-2022, Florence County (cont'd)

Hazard Type	Mitigation Measures	Budget	Responsible Party	Project Timetable	Priority	Notes
Winter Storm (cont'd)	Promote winter storm hazard awareness.	Covered under existing budgets	County Emergency Management, and American Red Cross	Ongoing	Medium	
Wildland Fire	Educate the public about fire prevention.	Covered under existing budgets	County Fire Response Unit, WDNR, and USFS	Ongoing	Medium	Wildland Urban Interface education handouts distributed. Fire Prevention Week annually. Booth at Florence County Fair.
Extreme Cold	Publicize extreme cold events.	Covered under existing budgets	County Emergency Management, and American Red Cross	Ongoing	Medium	Covered under winter weather awareness education.
Drought	Educate the public about fire prevention.	Covered under existing budgets	County Fire Response Unit, WDNR, and USFS	Ongoing	Medium	Distribute Wildland Urban Interface education info. Fire Prevention Week annually. Booth at Florence County Fair.
Lightning	Ensure proper grounding of new buildings.	Covered under existing budgets	County Zoning	Ongoing	High	
	Continue to review building codes.	Covered under existing budgets	County Zoning	Ongoing	Medium	Keep with current construction standards.
Excessive Heat	Provide sheltering and water supplies for vulnerable populations.	Covered under existing budgets	County Emergency Management, County Health, and American Red Cross	Ongoing	High	Open cooling shelter and distrubute water to vulnerable populations during power outages with high heat index.
	Publicize excessive heat events.	Covered under existing budgets	County Health	Ongoing	High	
	Provide cooling shelters throughout the county.	Covered under existing budgets	County Emergency Management, County Health, and County Sheriff	Ongoing	Medium	
Hail	Continue to review building codes.	Covered under existing budgets	County Zoning	Ongoing	Medium	Keep with current construction standards.

Table 4-1: Hazard Mitigation Strategy, 2018-2022, Florence County (cont'd)

Hazard Type	Mitigation Measures	Budget	Responsible Party	Project Timetable	Priority	Notes
Dense Fog	Publicize fog events.	Covered under existing budgets	County Emergency Management, NOAA NWS, and local media	Ongoing	Medium	
Dam Failure	Maintain dam failure warning systems and emergency plans.	Covered under existing budgets	We Energies, and County Emergency Management	Ongoing	Medium	WE Energies has plans in place that address specific actions and notifications in case of dam failure.
	Continue to provide automated dam failure warning calls.	Covered under existing budgets	We Energies	Ongoing	Medium	Service provided in sparsely populated areas outside the range of sirens.

POLICIES, PROGRAMS, AND RESOURCES FOR MITIGATION

Florence County has a number of authorities that enforce policies, execute programs, and provide resources that support the mitigation action plan for reducing potential losses identified in the risk assessment.

These authorities have the ability to expand or modify their programs when needed to improve existing tools to address mitigation. Florence County has taxing authority through property taxes to raise funds for the purpose of hazard mitigation. Additional funding sources for hazard mitigation actions are available from a number of federal and state grant programs.

These authorities have been identified under the responsible parties (where applicable) in the mitigation strategy (Table 4.1), and include the following:

Florence County Zoning

- Relevant policies and programs include planning and zoning (including enforcement of county shoreland and floodplain management regulations).

Fire Departments

- Relevant policies and programs include coordinating emergency preparedness, mitigation, response, and recovery efforts.

Florence County Emergency Management

- Relevant policies and programs include coordinating effective disaster response and recovery efforts in the county through response, recovery, planning, training, and exercises, and mitigation.

Florence County Forestry and Parks Department

- Relevant policies and programs include management of trails, campgrounds, parks and boat landings, assisting in the safety of the recreational users of the county, provide an overall knowledge of the county land base and location of facilities throughout the county, assisting with GIS mapping, and land management.

Florence County Highway Department

- Relevant policies and programs include road maintenance, stormwater management, and management of salt storage for winter storms.

Florence County Health Department

- Relevant policies and programs focus on protecting and promoting the health and safety of the people in the county in cooperation with community partners (includes assisting citizens with emergency preparedness).

Wisconsin Emergency Management

- Relevant policies and programs include supporting effective disaster response and recovery efforts in support of local government through planning, training, and exercises.

Wisconsin Department of Natural Resources

- Relevant policies and programs include regulation enforcement of state shoreland and floodplain management rules, and wildland fire response and education.

Florence Utilities, WE Energies, and American Transmission Company (ATC)

- Relevant policies and programs include maintaining electrical power and transmission facilities.

American Red Cross

- Relevant policies and programs include disaster relief and educational programs that promote health and safety.

National Weather Service (Green Bay Regional Office)

- Relevant policies and programs include publicizing information, and providing outreach and education about hazardous weather.

USDA Forest Service

- Relevant policies and programs include reducing hazardous fuels (vegetation) and wildland fire response in the Chequamegon-Nicolet National Forest, which encompasses approximately the western third of the county.

POTENTIAL FUNDING SOURCES FOR MITIGATION

Funding for hazard mitigation programs and projects can come from a number of sources both public and private. Non-local funding can come from a number of sources, either in the form of a grant or a loan. The following text provides a description of a number of potential grant programs available to Florence County (or other entities seeking to carry out hazard mitigation actions) for funding future mitigation actions identified in this plan:

Federal Programs

EDA Public Works and Development Facilities

These funds are available for local units of government to enhance regional competitiveness and promote long-term economic development in regions experiencing substantial economic distress. EDA provides Public Works investments to help distressed communities and regions revitalize, expand, and upgrade their physical infrastructure to attract new industry, encourage business expansion, diversify local economies, and generate or retain long-term private sector jobs and investment.

FEMA Assistance to Firefighters Grant

The primary goal of the Assistance to Firefighters Grants (AFG) is to meet the firefighting and emergency response needs of fire departments and nonaffiliated emergency medical services organizations. The AFG program helps firefighters and other first responders to obtain critically needed equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards. The National Preparedness Directorate in the Federal Emergency Management Agency administers the grants in cooperation with the U.S. Fire Administration.

The Fire Prevention and Safety Grants (FP&S) are part of the Assistance to Firefighters Grants (AFG) and are under the purview of the National Preparedness Directorate in the Federal Emergency Management Agency. FP&S grants support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations and mitigate high incidences of death and injury.

FEMA Flood Mitigation Assistance Program

The Flood Mitigation Assistance (FMA) program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FEMA provides FMA funds to assist States and communities with implementing measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program. Eligible activities include: acquisition, relocation, elevation, and flood-proofing of flood-prone insured properties; flood mitigation planning; and technical assistance. In order to be eligible for funding through this program the local government must be in compliance with the National Flood Insurance Program.

FEMA Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Eligible activities include: flood proofing; acquisition and relocation of flood prone properties; elevation of flood prone properties; retrofitting properties to be wind resistant; stormwater improvements; and education and awareness. In order to be eligible for funding through this program, the local government must be in compliance with the National Flood Insurance Program. All projects must be cost-effective, environmentally sound, and solve a problem. Funds area available any time after a Presidential Disaster Declaration has been made in the State of Wisconsin.

FEMA Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds. Grant funds can be used to cover management costs, information dissemination, planning, technical assistance, and mitigation projects. In order to be eligible for funding through this program the local government must be in compliance with the National Flood Insurance Program. All projects must be cost-effective and environmentally sound.

Pipeline and Hazardous Materials Safety Administration, Hazardous Materials Emergency Preparedness

The Hazardous Materials Emergency Preparedness (HMEP) grant program is intended to provide financial and technical assistance as well as national direction and guidance to enhance State, Territorial, Tribal, and local hazardous materials emergency planning and training. The HMEP Grant Program distributes fees collected from shippers and carriers of hazardous materials to emergency responders for hazmat training and to Local Emergency Planning Committees (LEPCs) for hazmat planning.

U.S. Department of Education School Emergency Response and Crisis Management Plan Discretionary Grant Program

This grant program is designed to provide funds to Local Education Agencies (LEA) to strengthen and improve their emergency response and crisis plans, at the district and school-building level. Grantees are required to address all four phases of crisis planning: prevention and mitigation, preparedness, response, and recovery. In addition, LEAs are required to form partnerships and collaborate with community organizations, local law enforcement agencies, heads of local governments, and offices of public safety, health, and mental health as they review and revise school crisis plans. Plans must be coordinated with state or local homeland security plans and support implementation of the National Incident Management System (NIMS). Grant funds may be used for the following activities: training school safety teams and students; conducting building and

facilities audits; communicating emergency response policies to parents and guardians; implementing an Incident Command System (ICS); purchasing school safety equipment (to a limited extent); conducting drills and tabletop simulation exercises; and preparing and distributing copies of crisis plans.

State of Wisconsin Programs

WDNR Lake Planning Grant Program

Counties, towns, cities, villages, tribes, qualified non-profit conservation organizations, qualified lake associations, school districts (in partnership with another eligible party), public inland lake protection and rehabilitation districts, town sanitary districts, and other local governmental units that are established for the purpose of lake management, are eligible to apply for funding to collect and analyze information needed to protect and restore lakes and their watersheds.

Eligible activities include: gathering and analysis of physical, chemical, and biological information on lakes; describing present and potential land uses within lake watersheds and on shorelines; reviewing jurisdictional boundaries and evaluating ordinances that relate to zoning, sanitation, or pollution control or surface use; assessments of fish, aquatic life, wildlife, and their habitats; and developing, evaluating, publishing, and distributing alternative courses of action and recommendations in a lake management plan.

WDNR Municipal Flood Control Grant Program

The Wisconsin Department of Natural Resources, Bureau of Community Financial Assistance and Bureau of Watershed Management, offers this grant assistance package to all cities, villages, towns, Indian Tribes, and metropolitan sewerage districts concerned with municipal flood control management in the State of Wisconsin. Assistance is provided with the availability of Acquisition and Development grants for purchasing property or vacant land, structure removal, construction or other development costs and with Local Assistance Grants for providing administrative support activities.

WDNR River Planning Grant Program

Under this grant program, counties, cities, towns, villages, tribes, other local governmental units, qualified river management organizations, and qualified nonprofit conservation organizations are eligible to apply for funding under this program. Projects funded by this program must be designed to collect, assess and disseminate information on riverine ecosystems; assist in developing organizations to help manage rivers; assist the public in understanding riverine ecosystems; and/or create management plans for the long term protection and improvement of riverine ecosystems. Eligible activities include: organizational development for existing river protection/improvement organizations; assistance with the formation of a qualified river management organization; public education projects; and planning and assessment projects. Capital improvement projects are not eligible for funding under this grant.

WDNR Volunteer Fire Assistance Grant

Volunteer Fire Assistance (VFA) grants are available to Wisconsin county/area fire associations statewide. Grant funding is intended to support wildland fire suppression capabilities in an area through broad-ranging projects of benefit to all of the local fire

departments. Successful applications will have a positive impact on the prevention, detection, and suppression of wildland fires in all of the communities served by a county/area fire association. Grant funds can be used for: fire fighter safety; fire fighter training; fire prevention (particularly in the Wildland Urban Interface); dry hydrants and other water resources; mapping; enhanced communications; wildland fire suppression equipment; and the organization of a new fire department.

WDOA, Division of Housing and Intergovernmental Relations, Emergency Housing Grant Program

This program makes available funds for acquisition, rehabilitation, and/or demolition projects after a disaster event has occurred. These funds can be used as a local match to receive FEMA mitigation funds. The project must be used to benefit low to moderate-income individuals.

WEM EPCRA Grants

Wisconsin Emergency Management offers three grants administered by the EPCRA program.

1. Planning Grant
    - The Planning Grant and the Emergency Management Performance Grant (EPMG) share the same plan of work.
    - Local Emergency Planning Committees (LEPCs) must complete plan-of-work components to be reimbursed.
    - Award is based on the annual Planning Grant Formula.
    - Funded by EPCRA program revenue (fees).
2. Computer & Hazmat Equipment
    - Maximum total award for counties with an eligible hazardous materials team is $10,000.
    - Counties without a county level team are eligible for the computer portion only.
    - The grant requires a 20% cash or in-kind match.
    - Award criteria is based on an approved equipment list and funding available.
    - Funding comes from state general revenue (GPR).
3. Hazardous Materials Emergency Preparedness (HMEP) Sub-Grant
    - Training and Planning grant funded by US DOT (EPCRA administers the planning portion).
    - Purpose is to improve the delivery of EPCRA and enhance planning efforts with a focus on transportation.
    - Training grants are to be used by HMEP subgrantees for the funding of training activities that enhance the capabilities of states, territories, and Native American governments.
    - Training should be developed and delivered in accordance with requirements for emergency responders under National Fire Protection Association (NFPA) standard 472.

- Training grants are to be used by HMEP subgrantees for training public sector employees to respond safely and efficiently to accidents and incidents involving the transportation of hazardous materials.

Wisconsin Disaster Fund

The Wisconsin Disaster Fund (WDF) is a state-funded reimbursement program intended to assist county, local, and tribal units of government recoup costs incurred in responding to, and recovering from natural disasters. The WDF is administered within the Recovery Section of WEM. The state reimburses up to 70% of eligible costs, with the local government is responsible for the remaining share. The fund does not cover losses suffered by individuals, businesses, or the agricultural sector, or those covered by insurance. It also does not provide management or administrative costs for the applicants.

WDF is modeled after FEMA's Public Assistance Program and is guided by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended.

In order to be eligible for the WDF, the following steps must occur:

- The local unit of government (city, village, county) has declared a "State of Emergency," according to their own policies and procedures.
- The applicant must show that Federal Disaster Assistance is NOT available.
- Recovery costs meet or exceed the countywide per capita damage threshold.

SECTION 5: PLAN MAINTENANCE AND ADOPTION PROCESS

PLAN ADOPTION PROCESS

The Florence County Hazard Mitigation Plan development process was guided by the County Hazard Mitigation Plan Steering Committee over an 18-month timeframe, with professional planning support from the Bay-Lake Regional Planning Commission. See Table 1-1 for the list of Steering Committee members.

Both WEM and FEMA reviewed a final draft of the County's hazard mitigation plan prior to adoption by the Florence County Board. Comments received from WEM and FEMA were reviewed by the Steering Committee and necessary revisions were made. The plan was adopted by resolution by the Florence County Board on August 21, 2018. The resolution adopting the plan can be found on page vi, just after the Table of Contents. After the plan was adopted by the Florence County Board, it was approved by WEM and FEMA. Approval letters from WEM and FEMA can be found on page vii.

PLAN MAINTENANCE

Planning is an ongoing process, and this plan should grow and adapt in order to keep pace with growth and change in the planning area and its local jurisdictions. The Disaster Mitigation Act of 2000 requires that local plans be evaluated and updated at least every five years in order to remain eligible for assistance.

Plan Monitoring, Evaluation, and Updating

This Florence County Hazard Mitigation Plan is an update to the 2013 plan, and will continue to be monitored, evaluated, and updated by Florence County.

Plan monitoring will occur every five years and will involve convening the steering committee to review the identified mitigation strategies and track the progress towards implementation.

Plan evaluation will include an assessment the effectiveness of the plan at achieving the stated goals by convening the steering committee every five years to review the plan and ensure all information is still relevant and applicable.

Plan updating will occur every five years and will involve the collection of the most current data to support the plan and the development of new mitigation strategies and an implementation plan. This planning effort will be comprehensive, and will incorporate opportunities for public involvement to meet all requirements of 44 CFR Part 201.6 and/or any applicable requirements or regulations developed over the next five years.

The plan monitoring, evaluation, and updating will be coordinated by the Florence County Emergency Management Director, and approved by the County Board. All meetings to monitor, evaluate, and/or update the plan will be subject to the Wisconsin Open Meeting Law, and will be properly noticed to allow for public involvement and comment. All municipalities will be encouraged to participate in the process and adopt the plan update.

Additional Plan Review

Within three to six months following a significant natural hazard event (as determined by the Florence County Emergency Management Director), a special post-disaster review will occur. The Florence County Emergency Management Director shall collect information concerning the disaster. Information will be gathered from local law enforcement personnel, fire department personnel, disaster response personnel, Wisconsin Emergency Management staff, FEMA staff, affected citizens, and any other pertinent entities. This information shall be provided to the Steering Committee for review.

At a public meeting, the Steering Committee will analyze the contributing factors to the impact(s) of the hazard event, the likelihood of the event recurring, and any strategies that should be implemented to mitigate the impact(s) in the future. The County Emergency Management Director will have primary responsibility for establishing post-disaster review meeting dates, distributing related materials, facilitating the meetings, and advertising these special meetings to affected county department heads, citizens, and community groups, so that additional input and comment can be received. Special post-disaster review meetings shall be subject to the Wisconsin Open Meeting Law and shall be properly noticed to allow for public involvement and comment.

The Steering Committee may choose to revise or amend the existing County plan based on what is learned in the review process. Any recommended changes to the plan shall be forwarded to the Florence County Board for its action and consideration.

PLAN COORDINATION

The identified mitigation strategies (provided in Chapter 4) are tied to related plans and policies. As the county and jurisdictions in the planning area develop or update their comprehensive plans, incorporation of this hazard mitigation plan is highly recommended. The Wisconsin comprehensive planning law includes a detailed description of elements that need to be addressed in all comprehensive plans. The following items must be considered when incorporating this hazard mitigation plan into the required elements of local comprehensive plans for jurisdictions in the planning area:

Issues and Opportunities Element – A summary of major hazards that local governments are vulnerable to, and opportunities to mitigate future losses from hazards.

Housing Element – An inventory of the properties within floodplain boundaries, the location of manufactured homes, recommendations concerning building codes, shelter opportunities, and a survey of homeowners that may be interested in a voluntary buyout and relocation program.

Transportation Element – Identify any transportation routes or facilities that are vulnerable during hazards events such as flooding.

Agricultural, and Natural and Cultural Resources Element – Identify floodplains and agricultural areas that are vulnerable during hazard events. Incorporate recommendations on how to mitigate future losses to these areas.

Economic Development Element – Describe the impacts of hazards on area businesses and commerce.

Intergovernmental Cooperation Element – Identify intergovernmental police, fire and rescue service sharing agreements that are in effect or which may merit further investigation, and consider cost sharing and resource pooling of government services and facilities.

Land Use Element – Describe how flooding has impacted land uses and what is being done to mitigate negative land use impacts from flooding; map and identify natural hazard areas, such as floodplains and soils with limitations.

Implementation Element – Include recommended actions from this plan in the implementation element of comprehensive plans of jurisdictions within the planning area.

To maximize coordination with other related plans for Florence County, mitigation strategies recommended in this plan have been and should continue to be considered when developing capital improvement plans, stormwater management plans, or flood mitigation plans.

A number of plans, reports, and technical data were referenced and incorporated into the Florence County Hazard Mitigation Plan. It is recommended that similar materials be referenced when completing any updates to the hazard mitigation plan.

The following is a comprehensive list of the data and reports that were utilized in plan development:

Population, housing, and employment data from the Bureau of the Census (2000 and 2010);

Land use inventory data (2010, East Central Wisconsin Regional Planning Commission);

Resource Guide to All Hazards Mitigation Planning in Wisconsin (AWRPC, 2003);

Local Hazard Mitigation Plan Review Crosswalk, Completed for Florence County in March 2011 was used to ensure recommended revisions were addressed;

State of Wisconsin Hazard Mitigation Enhanced Plan (2011) was used to develop hazard descriptions for the risk assessment;

FEMA *Local Mitigation Planning Handbook* (2013) was used to ensure the plan contained all required information;

Past hazard occurrences were obtained from National Oceanic and Atmospheric Administration (NOAA) – National Climatic Data Center – severe weather event data (January 2000 – December 2015);

U.S. Geological Survey maps on earthquakes were used to describe the hazard;

FEMA Flood Insurance Studies and FEMA Flood Insurance Rate Maps (FIRMs) were used to map floodplain areas;

Parcel data from Florence County was used to determine impacts of hazards with defined areas;

Assessed valuation data from Florence County was used to derive estimates of potential dollar losses;

Local municipal comprehensive plans contributed to the development of the mitigation action plan; and

FEMA *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards* (2013) contributed to the development of the mitigation action plan.

APPENDIX A: CRITICAL FACILITIES

Table A-1: Critical Facilities, Florence County

Type	Category	Name	Address
Boat Launch	Recreation	North Lake	
Boat Launch	Recreation	Fisher Lake	
Boat Launch	Recreation	Keyes Lake	
Boat Launch	Recreation	Lake Emily	
Boat Launch	Recreation	Lake of Dreams	
Boat Launch	Recreation	Fay Lake	
Boat Launch	Recreation	Halsey Lake	
Boat Launch	Recreation	Aurora Public Landing (Menominee R.)	
Boat Launch	Recreation	Fisher Lake	
Boat Launch	Recreation	Lake Ellwood	
Boat Launch	Recreation	Anna Lake	
Boat Launch	Recreation	Sea Lion Lake	
Boat Launch	Recreation	Siedel Lake	
Boat Launch	Recreation	Patten Lake	
Boat Launch	Recreation	Lunds Lake	
Boat Launch	Recreation	West Bass Lake	
Boat Launch	Recreation	Bass Lake	
Boat Launch	Recreation	Bush Lake	
Boat Launch	Recreation	Sand Lake	
Boat Launch	Recreation	Morgan Lake	
Boat Launch	Recreation	Long Lake	
Boat Launch	Recreation	Cosgrove Lake	
Boat Launch	Recreation	Halls' Creek Flowage	
Boat Launch	Recreation	Lost Lake	
Boat Launch	Recreation	Savage Lake	
Boat Launch	Recreation	Kingsford Flowage	
Boat Launch	Recreation	Pine R.	Pine R. Flowage/Pine Backwaters Rd
Boat Launch	Recreation	Pine R.	Pine R. Flowage/Pine R. Rd
Boat Launch	Recreation	Brule R.	Brule R./Brule Landing Rd
Boat Launch	Recreation	Pine R./We Energies #5	Pine R./Town Rd DD
Boat Launch	Recreation	Menominee R./We Energies #33	Menominee R./Twin Falls Rd
Boat Launch	Recreation	Menominee R.	Menominee R./Woods Rd
Boat Launch	Recreation	Brule R.	Brule R./Camels Clearing Rd
Bridge	Structure	P190024/Newald Tower Rd	Newald Tower Rd/Popple R.
Bridge	Structure	B190011/STH 139	STH 139/Brule R.
Bridge	Structure	B190007/STH 139	STH 139/Pine R.
Bridge	Structure	B190009/Fay Lake Rd	Fay Lake Rd/Pine R.
Bridge	Structure	B190004/STH 139	STH 139/Railroad
Bridge	Structure	B190005/STH 139	STH 139/Popple R.
Bridge	Structure	B190008/Morgan Lake Rd	Morgan Lake Rd/Popple R.
Bridge	Structure	B190001/STH 101	STH 101/Popple R.
Bridge	Structure	B190660/USH 2	USH 2/Brule R.
Bridge	Structure	B190013/CTH N	CTH N/Pine R.
Bridge	Structure	B190012/CTH N	CTH N/Little Popple R.
Bridge	Structure	B190509/STH 101	STH 101/Pine R.
Bridge	Structure	P190904/Newald Tower Rd	Newald Tower Rd/South Branch Popple R.
Bridge	Structure	P190013/Forest Road 2446	Forest Road 2446/Brule R.
Bridge	Structure	B190003/CTH N	CTH N/Menominee R.
Bridge	Structure	B190006/USH 2	USH 2/Menominee R.
Bridge	Structure	P190902/Rock Creek Rd	Rock Creek Rd/South Branch Popple R.
Bridge	Structure	P190901/Twin R.s Rd	Twin R.s Rd/Popple R.
Bridge	Structure	P190027/E Lost Lake Rd	E Lost Lake Rd/Pine R.
Campgrounds	Recreation	Lake Emily Park	Emily Park Ln
Campgrounds	Recreation	Camping in the Clouds	4080 USH 2
Campgrounds	Recreation	Keyes Peak Campground	4918 STH 101
Campgrounds	Recreation	Lost Lake	Lost Lake/Lost Lake Rd
Campgrounds	Recreation	Morgan Lake	9348 Morgan Lake Rd

Table A-1: Critical Facilities, Florence County (cont'd)

Type	Category	Name	Address
Campgrounds	Recreation	We Energies Camp Site #34	Pine R. Rd/Pine R. Flowage
Campgrounds	Recreation	Chipmunk Rapids	Lost Lake Rd
Campgrounds	Recreation	West Bass Lake	County Park Rd
Campgrounds	Recreation	We Energies Camp Site #24	Pine R. Flowage/Pine Backwaters Rd
Clinic	Building	Florence Medical Clinic	1010 Olive Ave
Communication	Utility	Fence State Tower	355 Memory Ln
Communication	Utility	Aurora Cell Tower	793 Skyline Dr
Communication	Utility	Communication Tower - Commonwealth	Off CTH N - Commonwealth
Communication	Utility	Niagara Telephone	517 Norway St
Communication	Utility	Florence	5509 CTH N
Communication	Utility	Spread Eagle Cell Tower	4456 Lake Ellwood Rd
Communication	Utility	Hwy C Cell Tower	3545 CTH C
Communication	Utility	Long Lake Cell Tower	11750 Halsey Lake Rd
Communication	Utility	Ski Hill Cell Tower	5014 STH 101
Courthouse	Building		501 Lake Ave
Culvert	Structure		Pemenee Dr/North Branch Pemebonwon R.
Culvert	Structure		USH 2/141/Spread Eagle Outlet
Culvert	Structure		Harding Rd/Montagne Creek
Culvert	Structure		USH 2/141/Fisher Creek
Culvert	Structure		STH 101/Woods Creek
Culvert	Structure		STH 70/Johnson Creek
Culvert	Structure		Miller Rd/Little Popple R.
Culvert	Structure		Carlson Rd/South Branch Little Popple R.
Culvert	Structure		CTH U/Little Popple R.
Culvert	Structure		CTH D/Unnammed Creek
Culvert	Structure		STH 70/Wakefield Creek
Culvert	Structure		CTH D/Unnammed Creek
Culvert	Structure		Quiinnesec St/Unnamed Creek
Culvert	Structure		STH 70/101/Unnamed Creek
Culvert	Structure		STH 70/101/Unnamed Creek
Culvert	Structure		Fisher Lake Rd/Fisher Creek
Culvert	Structure		E Fischer Lake Pkwy/Crossett Creek
Culvert	Structure		E Fischer Lake Pkwy/N Branch Pemebonwon R.
Culvert	Structure		Rice Rd/North Branch Pemebonwon R.
Culvert	Structure		Burma Rd/Little Popple R.
Culvert	Structure		CTH U/South Branch Little Popple R.
Culvert	Structure		CTH C/Lamon Tangue Creek
Culvert	Structure		Morgan Lake Rd/Riley Creek
Culvert	Structure		Morgan Lake Rd/Morgan Creek
Culvert	Structure		Rock Creek Rd/Rock Creek
Culvert	Structure		Twin R.s Rd/South Branch Popple R.
Culvert	Structure		Newald Tower Rd/Simpson Creek
Culvert	Structure		Lost Lake Rd/Chipmunk Creek
Culvert	Structure		Wisconsin Creek Rd/Wisconsin Creek
Culvert	Structure		STH 70/Sevenmile Creek
Dam	Structure	Kingsford Hydro Dam	Menominee R.
Dam	Structure	Brule Hydro Dam	Brule R.
Dam	Structure	Twin Falls Hydro Dam	566 USH 2
Dam	Structure	Pine R. Hydro Dam	Pine R.
Dam	Structure	Michigamme Falls Hydro Dam	Menominee R.
Dam	Structure	Long Lake Outlet	Long Lake
Dam	Structure	Halls Creek Flowage	Halls Lake
Dam	Structure	Mud Creek	Mud Lake
Daycare	Building	Auntie M's	900 Chapin St
DNR Natural Resource Center	Building	ICP Site	5628 Forestry Dr
Dry Hydrant	Emergency Service	Dry Hydrant	Forest Ln/Pond
Dry Hydrant	Emergency Service	Dry Hydrant	East Bass Boat Landing/Bass Lake
Dry Hydrant	Emergency Service	Dry Hydrant	Rock Creek Rd/Mud Lake
Dry Hydrant	Emergency Service	Dry Hydrant	North Shore Rd/Long Lake
Dry Hydrant	Emergency Service	Dry Hydrant	Park Rd/Fishcher Lake

Table A-1: Critical Facilities, Florence County (cont'd)

Type	Category	Name	Address
Dry Hydrant	Emergency Service	Dry Hydrant	Roach Rd/Pond
Dry Hydrant	Emergency Service	Sand Lake Dry Hydrant	Sand Lake Park Rd/Sand Lake
Dry Hydrant	Emergency Service	CTH U Dry Hydrant	CTH U/Little Popple R.
Dry Hydrant	Emergency Service	Engel's Pond Dry Hydrant	Miller Rd/Pond
Dry Hydrant	Emergency Service	Pembonwon R. Dry Hydrant	Pemenee Dr/North Branch Pemebonwon R.
Dry Hydrant	Emergency Service	Dry Hydrant	Twin Fall Boat Launch
Dry Hydrant	Emergency Service	Dry Hydrant	Roosevelt Ln/Spread Eagle Chain Lake
Dry Hydrant	Emergency Service	Dry Hydrant	Lake Ellwood
Fairgrounds	Recreation	Florence County Fairgrounds	5505 CTH N
Fire and EMT	Emergency Service	Aurora Fire Department	1942 Calvary Dr
Fire and EMT	Emergency Service	Homestead Fire Department	2809 Church Rd
Fire and EMT	Emergency Service	Long Lake Fire Department/Rescue Squad	3346 STH 139
Fire and EMT	Emergency Service	Florence VFD	749 Central Ave
Fire and EMT	Emergency Service	Florence Rescue Squad Station	747 Lake Ave
Fire and EMT	Emergency Service	Fence Fire Department	7228 Morgan Lake Rd
Fuel	Utility	Propane Tank(s)	5799 In Com Dr
Fuel	Utility	Natural Gas Meter Station	STH 70
Library	Building	Florence County Library	400 Olive Ave
Mobile Home Park	Building	Paragon Meadow	USH 2/Paragon Meadows Ln
Mobile Home Park	Building	Woodlawn Court/Keyes Lake	John Bradely Ln/Bonnie View Rd
Mobile Home Park	Building	Golden Eagle Park	USH 2/Circle Dr
Municipal Garage	Building	Florence County Highway Shop	5471 CTH N
Municipal Garage	Building	Long Lake Town Garage	STH 139
Municipal Garage	Building	Tipler Town Garage	11102 Dream Lake Rd
Municipal Garage	Building	Fern Town Garage	3213 Town Hall Rd
Municipal Garage	Building	Fence Town Garage	7228 Morgan Lake Rd
Municipal Garage	Building	Homestead Town Garage	4185 CTH C
Municipal Garage	Building	Florence Town Garage	950 Olive Ave
Vulnerable Population	Building	Florence Health Services	5778 Chapin St
Post Office	Building	Fence	603 Memory Ln
Post Office	Building	Florence	540 Central Ave
Post Office	Building	Long Lake	3357 STH 139
Power Generation	Utility	Florence Substation	USH 2/Florence
Power Generation	Utility	Florence Utilities	501 Spring Ave
Power Generation	Utility	We Energies	Power Dam Rd
Power Generation	Utility	Twin Falls Hydro Dam	Bass Lake Rd
Power Generation	Utility	Aspen Substation	4002 Garretts Ln
Power Generation	Utility	Brule Hydro Dam	Brule Dam Rd
Power Generation	Utility	Michigamme Falls Hydro Dam	Lower Dam Rd
Primitive Campsite	Recreation	Barrens/Roaches Lane	
Primitive Campsite	Recreation	Apple_Pine	Pine R.
Primitive Campsite	Recreation	9-Day	Popple R.
Primitive Campsite	Recreation	Oxbow	Pine R./Johnson Creek Rd
Primitive Campsite	Recreation	Bodeline	
Primitive Campsite	Recreation	Camp One Campsite	Popple R.
Primitive Campsite	Recreation	Perch Lake	Forest Rd 2150
Pump Station	Emergency Service	Fire Dept Pump Station	CTY N/Menominee R.
Pump Station	Emergency Service	Fire Dept Hillcrest Pump Station	Calvary Dr
Pump Station	Emergency Service	Fire Dept Pump Station	STH 101/Pine R.
Recreation Bridge	Recreation	Brule R.	Nicolet Trail/Brule R.
Recreation Bridge	Recreation	Wisconsin Creek	Nicolet Trail/Wisconsin Creek
Recreation Bridge	Recreation	Johnson's Creek North	Nicolet Trail/Johnson's Creek
Recreation Bridge	Recreation	Johnson's Creek South	Nicolet Trail/Johnson's Creek
Recreation Bridge	Recreation	Pine R.	Nicolet Trail/Pine R.
Recreation Bridge	Recreation	Long Lake South	Nicolet Trail/Long Lake
Recycling Facility	Building	County Recycling	W3850 CTH N
School	Building	Florence High/Middle School	400 Olive Ave
School	Building	Florence Elementary School	5844 Bill Anderson Dr
School	Building	NWTC	1952 Calvary Dr
Sheriff Department/Jail	Emergency Service		501 Lake Ave

Table A-1: Critical Facilities, Florence County (cont'd)

Type	Category	Name	Address
Town Hall	Building	Commonwealth Town Hall	113 South St
Town Hall	Building	Fern Town Hall	3213 Town Hall Rd
Town Hall	Building	Aurora Town Hall	1942 Calvary Dr
Town Hall	Building	Fence Town Hall/ICP Site	588 Memory Ln
Town Hall	Building	Homestead Town Hall/ICP Site	2809 Church Rd
Town Hall	Building	Florence Town Hall	749 Central Ave
Town Hall	Building	Long Lake Town Hall	19207 STH 139
Town Hall	Building	Tipler Town Hall	11102 Dream Lake Rd
Vulnerable Population	Building	Chapin Heights Apartments	5838 Chapin St
Vulnerable Population	Building	Stoney Brook Apartments	1930 Grandview Dr
Waste/Demolition Disposal	Building		630 E Fischer Lake Pkwy
Waste Water Treatment Plant	Utility	Florence Wastewater Treatment Plant	Lagoon Rd
Waste Water Treatment Plant	Utility	Aurora Wastewater Treatment Plant	306 Laguna Dr
Water	Utility	S Industrial Park Well	5765 Tower Dr
Water	Utility	Mud Lake	3785 Toppe Rd
Water	Utility	S Business Park	3592 Brewery Ln
Water	Utility		Bill Anderson Dr/Behind High School

APPENDIX B: MEETING SIGN-IN SHEETS

In order to assist in plan development, Florence County established a Hazard Mitigation Plan Steering Committee. Table 1-1 lists the members of the Steering Committee. The plan steering committee met on four occasions: April 27, 2017; June 13, 2017; September 19, 2017; and February 15, 2018. This Appendix contains the sign-in sheets from each of these meetings to verify attendance and participation by Committee members.

The sign-in sheet from the May 15, 2018 public informational meeting is also included.

Steering Committee Meeting
4-27-17

Name	Agency
Dan Tyble	Florence Co. EM
Tyler Ward	WIDNR
Pat Smith	Florence City F+P
Donna Siebergen	Property Listing / Land Information
Ruth Wolosyn	
ED KELLEY	
Angela Kowalzek-Adrians	Bay-Lake RPC
Jeff Bel	NIBBWAY
John (Bo) Queen	USFS
Ryan Cronquist	We Energies
Annette Seibold	Health
Amy Everette	Health Dept.

Steering Committe Meeting 6 4-13-17

Name	Agency
David Gribble	Em. Director.
Rich Wolosyn	Cty. Zoning
TYLER WOOD	WI DNR
Scott Linn	USFS
Angela Kowalzek-Adrians	Bay-Lake RPC
Donna Sielergen	Treasurer/Property Lister/Cl

Steering Committee Meeting 9-19-17

Name	Agency
David Gribble	Florence Co. EM
Jeff DeMuri	Florence Co Hwy
Pat Smith	Florence City Forestry
Bob FRIBERG	Florence Utilities
Angela Kowalzek-Adrians	Bay-Lake RPC
RYAN GROWDON	We Energies

Florence County Hazard Mitigation Plan 2018-2023

Steering Committee Sign-In

Date: 2/15/18

Name	Affiliation
Angela Kowalzek-Adrians	Bay-Lake RPC
Jeff DeMuri	Highway
TYLER WOOD	WI DNR
Pat Smith	F+P
SCOTT WOLF	Zoning
Bob Fairbairn	Florence Utilities
Amber Kolberg	Health Dept.
Annette Seibold	Health Dept.
David Gribble	Emergency Mgt.
Jesse Harrand	USFS - Fire
Donna Siebarger	Co Treasurer / Property Lister / LIO

Florence County Hazard Mitigation Plan

Open House/Public Informational Meeting Sign-In

May 15, 2018

Name	Affiliation or Address
Larry Nelons	County Sup'r.
Larry Dzekute	Co Bd
Susan Theer	County Supervisor
Donna Trudell	County Clerk / Admin Coordinator
Ken Davis	County Supervisor
David Gribble	Florence Co EM
Holly Stratton	Co. Supervisor

NOTICE OF PUBLIC INFORMATIONAL MEETING

Florence County Hazard Mitigation Plan Update

PLEASE TAKE NOTICE THAT a *Public Informational Meeting* has been scheduled in **Florence** for Tuesday, **May 15, 2018** to provide information about the county's hazard mitigation plan update. This informational meeting will be held from **6:00 p.m. to 6:30 p.m.** at the **Florence County Courthouse** in the second floor conference room located at **501 Lake Avenue**.

Hazard mitigation planning involves developing a set of actions designed to reduce or eliminate long-term risk to people and property from natural hazards and their effects.

This informational meeting will provide interested individuals with an overview of the plan, a draft plan for review, display maps from the plan, and an opportunity to comment. A copy of the draft plan can downloaded for review in advance at: https://tinyurl.com/y78amzxm.

For additional information, you can contact Angela Kowalzek-Adrians with the Bay-Lake Regional Planning Commission at AngelaKA@baylakerpc.org or 920-448-2820, Ext. 106.

Any person wishing to attend this meeting who, because of a disability, requires special accommodations, please contact Jerri Meyer, County Clerk, at (715) 528-3201at least two working days prior to the meeting so that arrangements can be made.

# # #