WISCONSIN
Calumet
County

Hazard Mitigation Plan

Calumet County, Wisconsin

EPTEC, INC
Lenora G. Borchardt
7027 Fawn Lane
Sun Prairie, WI53590-9455
608-358-4267
LenoraBorchardt@hotmail.com

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Acronyms

ACE	Army Corps of Engineers
ADA	Americans with Disabilities Act
ARC	American Red Cross
ARES	Amateur Radio Emergency Services
ASCS	Agriculture Stabilization and Conservation Service
ASL	Above Sea Level
ASPR	Assistant Secretary for Preparedness and Response
CAD	Computer Aided Dispatch
CAR	Communities-At-Risk
CBRNE	Chemical, Biological, Radiological, Nuclear, or Explosive
CDBG	Community Development Block Grant
CERT	Community Emergency Response Team
CFR	Code of Federal Regulations
CI	City
CO	County
COAD	Community Organizations Active in Disaster
COOP/COG	Continuity of Operations & Continuation of Government
CTH	County Highway
DFIRM	Digital Flood Insurance Rate Map
DHS	U.S. Department of Homeland Security
DNR	Wisconsin Department of Natural Resources
DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOT	Department of Transportation
DPW	Department of Public Works
DTM	Digital Terrain Maps
EAP	Emergency Assistance Program or Emergency Action Plan
EF	Enhanced Fujita Scale
EHS	Extremely Hazardous Substance
EM	Emergency Management
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EOC	Emergency Operations Center
EOP	Emergency Operating Procedure
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
F	Fahrenheit or Fujita Scale

FCC	Federal Communications Commission
FCIC	Federal Crop Insurance Corporation
FD	Fire Department
FEMA	Federal Emergency Management Agency
FIRMS	Flood Rate Insurance Maps
FMA	Flood Mitigation Assistance
FOIA	Freedom of Information Act
FOUO	For Official Use Only
FSA	Farm Service Agency
GIS	Geographic Information System
HazMat	Hazardous Materials
HazMit	Hazard Mitigation
HAZUS	Hazards United States
HAZUS-MH	Hazards United States Multihazard
HMGP	Hazard Mitigation Grant Program
HUD	U.S. Department of Housing and Urban Development
HVA	Hazard Vulnerability Analysis
HWY	Highway
ICS	Incident Command System
LE	Law Enforcement
LEPC	Local Emergency Planning Committee
LIDAR	Laser Imaging Detection and Ranging
LM/Z	Calumet County Land Management/Zoning Department
LPDM	Lagrangian particle dispersion
MABAS	Mutual Aid Box Alarm System
MAP	FEMA's Risk Mapping, Assessment and Planning
MHz	Megahertz
MMI	Modified Mercalli Intensity Scale
MOU	Memorandum of Understanding
MPH	Miles Per Hour
MSDS	Material Safety Data Sheet
NFIA	National Flood Insurance Act
NFIF	National Flood Insurance Fund
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NIDIS	National Integrated Drought Information System
NIMS	National Incident Management System

NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NRP	National Response Plan
NWS	National Weather Service
OJA	Office of Justice Assistance
PA	Public Address (System)
PDM	Pre-Disaster Mitigation
PGA	Peak Ground Acceleration
PH	Public Health
PSA	Public Service Announcement
POW	Plan of Work
RACES	Radio Amateur Civil Emergency Service
RES1	Single Family Dwelling
RES2	Manufactured Housing
RFC	Repetitive Flood Claims
SARA	Superfund Amendments and Reauthorization Act
SBA	Small Business Administration
SMART	Spatial Management, Analysis and Resource Tracking
SPI	Standardized Precipitation Index
SRL	Severe Repetitive Loss
STH	State Highway
SWAT	Special Weapons and Tactics
TN	Township
UASI	Urban Area Security Initiative
UC	Unified Command
USDA	U.S. Department of Agriculture
USFS	U.S. Forestry Service
USGS	U.S. Geological Survey
USH	U.S. Highway
UW	University of Wisconsin
UW Ext	University of Wisconsin – Extension Office
VHF	Very High Frequency
VI	Village
VOAD	Voluntary Organizations Active in Disaster
WEM	Wisconsin Emergency Management
WISP	Wisconsin Irrigation Scheduling Program

Introduction and Background

The Calumet County Hazard Mitigation Plan is intended to provide strategies for reducing susceptibility to future damages to public and private infrastructure in the county. The Calumet County Emergency Management Office received a hazard mitigation update planning grant in 2018. This grant program is sponsored by the U.S. Department of Homeland Security - Federal Emergency Management Agency (FEMA) and is administered by the Wisconsin Department of Military Affairs - Wisconsin Emergency Management (WEM). The procedures utilized in preparing this plan are based on guidance provided by FEMA and WEM and should therefore be considered consistent with the requirements and procedures in the Disaster Mitigation Act of 2000.

Section 409 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (P.L. 93-228, as amended) is the impetus for involvement of state and local governments in evaluating and mitigating natural hazards as a condition of receiving federal disaster assistance. Federal Emergency Management Agency (FEMA) rules for implementing Section 409 are in 44 CFR Part 206 Subpart M.

Section 409 states that the county is obligated to try to reduce damage susceptibility to any hazard that has received relief funding in the past. Developing a hazard mitigation plan provides an opportunity for communities to meet this requirement by developing strategies for reduction of potential losses from future natural disasters. Hazard mitigation planning is the process of developing a set of actions designed to reduce or eliminate long-term risk to people and property from hazards and their effects. Completion of this plan should put Calumet County in an advantageous position when competing for pre- and post-disaster mitigation project dollars because projects have been pre-identified. The cooperation of government, private and volunteer agencies is essential in mitigation efforts and over the long term it is hoped that implementation of this plan will save taxpayer dollars because less money is needed for post-disaster recovery activities. Furthermore, mitigation planning measures incorporated in economic or community development goals support more comprehensive and effective government.

This plan evaluates the risks that all natural hazards pose to the citizens and property of Calumet County by presenting:

- A profile and analysis of past hazardous events
- An assessment of vulnerability of community assets
- Potential hazard mitigation strategies
- Methods for building community support and ensuring plan adoption

Plan Overview

The Calumet County Hazard Mitigation Plan provides background information on Calumet County and identifies those hazards that have occurred or could occur in the county. It includes a description of each hazard, its frequency of occurrence, appropriate actions in case of emergency and possible steps to mitigate the hazard. These hazards are the basis for the development of all county emergency plans.

A well-prepared plan allows emergency management to act swiftly and efficiently in the event of a hazard, reducing the damage and the cost incurred from displacing residents and businesses. Hazard mitigation activities will be emphasized in the plan as a major component of overall emergency management. The plan is intended to provide strategies for reducing future damages to public and private infrastructure in the county.

Previous Planning Efforts and Legal Basis

The Calumet County Emergency Management Office has incorporated a hazard vulnerability analysis (HVA) that identifies all likely natural hazards that might or have occurred within the county into this plan; it is based on the State of Wisconsin's HVA.

There have also been plans and ordinances completed by individual Calumet County departments or municipalities, some of these were used as reference materials for this plan, including:

Calumet County [1]

Chapter 10	Buildings and Building Regulations
Chapter 36	Land Preservation

[1] www.co.calumet.wi.us/DocumentCenter/View/2926

Chapter 51	Floodplain
Chapter 52	Shoreland Zoning
Chapter 62	Land Division
Chapter 82	Zoning

City of Appleton [2]

Chapter 04	Buildings
Chapter 09	Licenses, Permits
Chapter 11	Mobile Homes
Chapter 17	Subdivisions
Chapter 23	Zoning
Chapter 24	Erosion Control

City of Brillion [3]

Chapter 14	Buildings and Building Regulations
Chapter 38	Floods
Chapter 54	Mobile Homes
Chapter 86	Subdivisions
Chapter 106	Zoning

City of Chilton [4]

Chapter 6	Licenses and Permits
Chapter 10	Building Regulations
Chapter 16	Zoning Code
Chapter 17	Subdivision and Platting
Chapter 19	Floodplain Zoning
Chapter 20	Construction and Effect of Ordinances
Chapter 24	Shoreland-Wetland Zoning

City of Kaukauna [5]

Chapter 12	Licenses and Permits
Chapter 14	Building Code
Chapter 15	Historic Preservation
Chapter 16	Shoreland and Wetlands Zoning
Chapter 17	Zoning Code
Chapter 18	Subdivision and Platting
Chapter 20	Floodplain Zoning
Chapter 22	Stormwater Management

[2] https://www.appleton.org/government/municipal-code
[3] https://library.municode.com/wi/brillion/codes/code_of_ordinances
[4] https://chilton.govoffice.com/index.asp?Type=B_BASIC&SEC={629A7036-D854-433E-8A09-563178ABB024}
[5] https://library.municode.com/wi/kaukauna/codes/code_of_ordinances

Chapter 25	Construction and Effect of Ordinances

City of Kiel [6]

Chapter 12	Licenses and Permits
Chapter 14	Building Code
Chapter 17	Zoning Code
Chapter 18	Subdivision and Platting
Chapter 20	Floodplain Zoning
Chapter 23	Shoreland-Wetland Zoning
Chapter 25	Construction and Effect of Ordinances
Chapter 26	Historic Preservation

City of Menasha [7]

Title 13-1	Zoning Code
Title 13-2	Shoreland-Wetland Zoning
Title 14	Subdivision Regulations
Title 15	Building Code

City of New Holstein [8]

Chapter 10	Licenses and Permits
Chapter 11	Building Regulations
Chapter 12	Zoning Code
Chapter 16	Subdivision Regulations
Chapter 20	Construction and Effect of Ordinances

Note that the cities of Appleton, Kaukauna, Kiel and Menasha are only partially located in Calumet County.

Town of Brillion [9]

Ordinance 2010-06	Building Information Permit Ordinance
Ordinance 2014-04	New Subdivision – Curb and Gutter
Resolution 2006-07	Adopting 2006 Calumet County All-Hazards Mitigation Plan

Town of Charlestown [10]

Resolution 2010-2	Resolution to Adopt Comprehensive Zoning

[6] https://ci.kiel.wi.us/municipal-code
[7] http://www.cityofmenasha-wi.gov/departments/city_clerk/city_code.php#
[8] http://ci.newholstein.wi.gov/important-documents.html
[9] http://www.townofbrillion.com/ordinances-and-resolutions
[10] https://www.townofcharlestown.com/ordinances/

Town of Chilton [11]

Adopted 2-27-12	Zoning Ordinance

Town of Rantoul [12]

Ordinance 2011-06	Zoning

Town of Stockbridge [13]

Adopted 8-28-12	Non-Metalling Mining
Ordinance 2007-07	Adopt 2025 Comprehensive Plan
Ordinance 2006-01	Adoption of State Building Code
Ordinance 2004-01	Adoption of Wisconsin Uniform Dwelling Code

The Towns of Brothertown and Woodville have no online ordinances. The Town of New Holstein [14] has no relevant ordinances available online.

Village of Harrison [15]

Chapter 103	Buildings and Building Regulations
Chapter 105	Construction Site Erosion Control Zoning
Chapter 107	Mobile Homes and Mobile Home Communities
Chapter 113	Stormwater Management and Illicit Discharge
Chapter 115	Land Division
Chapter 117	Zoning

Village of Hilbert [16]

Chapter 7	Licenses and Permits
Chapter 8	Building Regulations
Chapter 9	Zoning Code
Chapter 10	Floodplain Zoning Ordinance

Village of Potter [17]

Ordinance 1981-5	Prohibiting Mobile Homes and The Moving of Pre-Existing Buildings Within the Village
Ordinance 1983-8	Floodplain Zoning

[11] https://www.townofchilton.com/ordinances/
[12] https://www.townofrantoul.com/zonning/
[13] http://townofstockbridge.org/ordinances-resolutions/
[14] http://www.townofnewholstein.com/town-ordinances.php
[15] https://library.municode.com/wi/harrison,_calumet_co/codes/code_of_ordinances
[16] http://villageofhilbert.com/ordinances.htm
[17] http://www.villageofpotter.com/ordinances.php

Ordinance 1991-1	Floodplain and Shoreland-Wetland Zoning
Ordinance 2005-2	UDC Building Code
Ordinance 2006-1	UDC Building Code
Ordinance 2007-1	Adopt 2025 Comprehensive Plan
Ordinance 2009-1	Floodplain
Ordinance 2009-2	Construction and the Effect of Ordinances

Village of Sherwood [18]

Chapter 6	Licenses, Permits and Regulations
Chapter 21	Shoreland-Wetland Zoning
Chapter 22	Zoning
Chapter 23	Building Codes
Chapter 24	Subdivision and Platting
Chapter 25	Construction and Effect of Ordinances

Village of Stockbridge [19]

Chapter 13	Building Code
Chapter 15	Mobile Home and Mobile Home Park Regulations
Chapter 16	Floodplain Zoning
Chapter 19	Subdivision
Chapter 24	Zoning Code
Chapter 25	Shoreland-Wetland Zoning

The local hazard vulnerability analysis serves as the starting point for the hazard mitigation plan. Other data on historical events is gathered from the National Weather Service's storm report database[20], recent news reports, local resources (e.g., website; local community ordinances, local plans such as the comprehensive plan, stormwater management plans), the FEMA Region V mitigation survey and from the memories of the local planning team members. Team members are presented with this educational background data and asked to rank their concern (likelihood of future occurrences and amount of disruption/damage should it occur) on a five-point scale (very high, high, medium, low, very low). From that, team members, members of the community, survey respondents and other planning participants are asked to determine hazard mitigation strategies that might benefit their communities. Local existing plans are referenced again at this time, with the members and authors of these plans (e.g., comprehensive, stormwater management) serving as core

[18] https://ecode360.com/SH3505
[19] http://www.villageofstockbridge.org/code-of-ordinances.html
[20] https://www.ncdc.noaa.gov/stormevents/

members of the workgroup committee. The selected mitigation strategies are recorded and detail in each chapter as well as in the table in Appendix E.

Mitigation strategies are reviewed over the five years of the plan's life by the leadership staff from the applicable departments (e.g., Emergency Management, Sheriff's Office/Communications, Highway, Land and Water Conservation, Planning and Zoning) with the elected leaders from the jurisdictions to triage projects and determine what can and should be done within the planning period. These options are usually discussed in open meetings prior to implementation, as required by Wisconsin state law. The determining factor for most projects is obviously budget availability. The units of government have several options for funding implementation including grants, special taxing authority (for the project and/or any matching funds), general purpose revenue from existing budgets and regulatory authority, which can be used to require that an individual or business complete the project using their funds. The units of government use or improve, if necessary, the mechanisms described above to ensure the implementation of hazard mitigation ideas.

Plan Preparation, Adoption and Maintenance

The Calumet County Emergency Management Director contracted with Emergency Planning, Training and Exercise Consulting (EPTEC, Inc.) to draft this plan. A Hazard Mitigation Committee was organized to oversee the completion of this plan. The committee members include:

- Bernie Sorenson, Calumet County Emergency Management Director
- Greg Britturcher, Calumet County
- Mary Kohrell, Calumet County
- Todd Romenesko, Calumet County
- Patricia Winkler, Calumet County
- Tim Hanna, City of Appleton
- Gary Deitur, City of Brillion
- Chris Marx, City of Chilton
- Brian Ready, City of New Holstein
- Dianne Reese, City of New Holstein
- Jamie Aulik, City of Kiel
- Roger Kaas, Village of Sherwood
- Greg Zickuhr, Village of Stockbridge
- Laura Jungwirth, Village of Harrison

- Dennis DuPrey, Village of Hilbert
- Charles Fochs, Village of Hilbert
- Gary Lemke, Village of Potter
- Chuck Schneider, Town of Brothertown
- Gary Winkler, Town of New Holstein
- Lenora Borchardt, EPTEC, INC (Contractor)

An informational brochure was created and copies were distributed throughout the community at local community gathering points such as municipal halls, libraries, etc. Meetings were held with chief elected officials from the municipalities to explain and gather input regarding the program (e.g., previous occurrences, mitigation strategies.) The FEMA Region V survey was sent to the clerk and chief elected official of every municipality (town, village and city) as well as key county departments (e.g., planning, highway) for completion; surveys were received back from county offices and the incorporated municipalities as well as many of the unincorporated towns. The compiled results of the surveys, along with the cover letter, are in Appendix G.

The committee met to evaluate and incorporate input from local officials and then to review and provide input on the progress of the plan. A public notice was placed in the newspaper to invite members of the public, local officials, academia and business and industry leaders to review the plan. A working draft of the draft plan was distributed to the County Emergency Management Directors from the contiguous counties (i.e., Brown, Fond du Lac, Manitowoc, Outagamie, Sheboygan and Winnebago Counties). No comments or edits were received. Unfortunately, although multiple attempts and invitations were made to members of the public, no public comments were received. OR: Comments received were reviewed and incorporated into the plan as appropriate. A copy of the mitigation brochure and a list of meeting dates and informational sessions to gather public and official input can be viewed in Appendix G.

The Calumet County Hazard Mitigation Plan Workgroup reviewed the past events records (generally gathered from the National Weather Service) and a consensus was reached on the anticipated probability of future events. This probability was designated as "very high," "high," "medium," "low" or "very low" by the workgroup based on their evaluation and experience with the data.

The hazard mitigation strategies from the previous version of this plan were reviewed and progress is reported in Appendix D. The workgroup

also, after reviewing the draft plan, selected the potential new mitigation projects, which are listed in Appendix E (Summary of Mitigation Strategies) and discussed in more detail in each chapter's Hazard Mitigation Strategies section. The workgroup participants were given the *Mitigation Ideas: Possible Mitigation Measures by Hazard Type* (Mitigation Ideas, FEMA-R5, 9/02) booklet as an aid to generating ideas. All of the ideas generated during the workgroup meetings were incorporated into the plan and can be found in the Hazard Mitigation Strategies section of each chapter and are summarized in Appendix E. Based on the information collected, each of these projects was assigned a "very high," "high," "medium," "low" or "very low" priority based on the workgroup's internal consensus assessment during a discussion of the balances of risk, reward, cost effectiveness (cost benefit) and likelihood of local will and funding (local or grant) to complete the strategy.

The municipal leaders were briefed regarding the need to formally adopt this plan as a prerequisite for future mitigation funding eligibility. A draft was sent to Wisconsin Emergency Management (WEM) for review and tentative approval. Based on WEM's comments, a final draft plan was completed and forwarded to FEMA for determination of approvability. Once deemed approvable by FEMA, a general meeting was held to review the plan with members of the public, local officials, academia and business and industry leaders. Information and adoption paperwork was provided to the municipal leaders advising them of the need to formally adopt this plan as a prerequisite for future mitigation funding eligibility.

A resolution also has been passed by the Calumet County Board; the Cities of xxx; the Villages of xxx; and the Towns of xxx. The XX of xxxx did not adopt the plan. Note that this plan does include considerations for the Cities of Appleton, Kaukauna, Kiel and Menasha even though only a portion of each city is in Calumet County. The City of Appleton is shared with Outagamie and Winnebago Counties; the City of Kaukauna is shared with Outagamie County; the City of Kiel is shared with Manitowoc County; and the City of Menasha is shared with Winnebago County. Of these communities, the Cities of xxx did not fully participate in the Calumet County planning process but did adopt the plan. The elected officials of the Village of xxx, which is wholly in Calumet County, also chose not participate but also did adopt the plan. Scanned copies of the adoption resolutions can be found in Appendix C. The final plan has been submitted to WEM for review and certification and notice of acceptance has been received of FEMA plan approval as of XXX.

The Disaster Mitigation Act of 2000 requires the monitoring, evaluation and updating of the hazard mitigation plan every five years. This hazard mitigation plan is designed to be a "living" document and therefore will be reviewed and updated within five years from its approval date. The Calumet County Hazard Mitigation Plan Workgroup will provide leadership and guidance throughout the plan's life cycle (i.e., monitoring, evaluating and updating). Updates will allow municipal leaders and the public to provide input into the process. The public will be notified of this opportunity via public notices.

The process for integrating hazard mitigation actions into other planning mechanisms will be led by the County Emergency Management Director. As he receives information between the five-year update periods (e.g., comprehensive or capital improvement plans) that might be included, it will be added to Appendix H: Inter-Revision Updates. Calumet County Emergency Management maintains responsibility and is the point of contact for all issues (e.g., monitoring, updating and evaluating the effectiveness) relating to this plan. Municipalities can contact the County Emergency Management Director to add updated local information to Appendix H at any time. Furthermore, the County Emergency Management Director will include in the Plan-of-Work activities program the distribution of an annual letter and media press release that reaches out to the plan's stakeholders (county offices, municipalities, the public, etc.). The communications will inquire whether there are any new elements for the mitigation plan as well as asking if there are any plans (new or updates) in which the mitigation plan can and/or will be used as a source plan. Comments will be received and discussed at the county's Emergency Management committee meeting. Note that after a disaster, the Emergency Management committee may also meet to discuss mitigation strategies that might be applicable. These same stakeholders will be invited to fully participate in the five-year plan update, which will be detailed in the updated plan documents and will fully conform to FEMA's requirements.

During the plan's lifecycle, the county and incorporated municipalities will consider the strategies listed in Appendix E as they annually prioritize "regular" maintenance projects, as they set their annual budgets, after a disaster period and as grants become available that might help off-set the costs of some of the strategies listed within the plan. The latter will be instigated by notice of these opportunities by the County Emergency Management Director. These projects will be reported in the annual letter to the County Emergency Management Director. The Director will keep and compile the inter-revision data for inclusion in the five-year

update, which will be coordinated through County Emergency Management beginning at least 18 months prior to expiration and at which time they will report on their progress towards meeting the hazard mitigation goals. The update will bring together many of the same workgroup members as well as any new stakeholders (e.g., elected officials, businesses, academia, members of the public) who respond to the invitation to participate and have an interest in mitigation planning.

The plan participants also recognize this document as an important planning tool within the community and will use this plan as a reference as they complete other related planning. The county Emergency Management Director as well as the Calumet County Land and Water Conservation and Planning and Zoning Departments will use this plan as they update the Calumet County Comprehensive Plan as well as community ordinances such as zoning, shoreland, floodplain, wetland, etc., and in other stand-alone plans such as those for park and recreation, sustainability, and farmland preservation and will refer to it as they are involved in the planning and other preparedness activities of their municipalities.

Many of these plans are on a regular updating cycle and as they come up for renewal, emergency management will be notified and provide any relevant planning materials (from the hazard mitigation plan and any additional information received since the plan's approval). Municipalities with planning departments have also committed to referring to the mitigation plan in their zoning updates, flood and shoreland planning, and in their comprehensive plans. After this plan has passed its reviews from Wisconsin Emergency Management (WEM) and the Federal Emergency Management Agency (FEMA) and is approved, the municipalities will receive a copy and the master plan will be kept at the County Emergency Management office. They have committed to using and referring to the mitigation plan as they complete their regularly scheduled reviews and updates of the aforementioned plans. Calumet County Emergency Management will also refer to this plan in their emergency preparedness activities.

Physical Characteristics of Calumet County

General Community Introduction

Calumet County was organized in 1836 under the laws of Wisconsin Territory. In 1840, Calumet County's territory was declared to be non-existent and it reverted back to Brown County. It was reestablished on February 18, 1842 when the Act declaring Calumet County non-existent was rescinded.

The county's population at the time of incorporation was 275. By 1850 it had risen to 1,753. The county seat, originally located in Stockbridge, was moved to Chilton in 1856. By 1860 the population had grown to 7,895. Notwithstanding the Civil War, the population continued to grow. In 1870 the county's population had risen to 12,335. Despite poor wheat yields due to disease and drought, the population increased to 16,631 in 1880. After 1880, however, the population remained constant until the early 1960s. Explanations for this lack of growth include the outward migration of the wheat farmers and the lack of urban centers that supported employment opportunity beyond agriculture. After World War II, growth in the manufacturing sector in the county economy and general economic development in the Fox Valley area stimulated population growth. People began to migrate from the major city centers to the rural areas as automobiles were affordable and developing road networks made for easier commutes. Combined with the proximity to employment both locally and in the Fox Valley, Calumet County became an appealing location to both live and work. These same trends continue to drive population growth. [21]

Plan Area

Calumet County covers approximately 324 square miles or 207,360 acres with rivers, streams and lakes accounting for about 49,314 acres of the total. [22] Calumet County is home to approximately 50,089 people according to 2019 U.S. Census Bureau estimates. [23]

[21] 2025 Comprehensive Plan https://www.calumetcounty.org/183/Comprehensive-Planning
[22] 2025 Comprehensive Plan https://www.calumetcounty.org/183/Comprehensive-Planning
[23] https://www.census.gov/quickfacts/fact/table/calumetcountywisconsin,US/PST045219

Calumet County lies within the Eastern Ridges and Lowlands geographical province.[24] Topographic features are distinct, but they are low. Alternate weak and resistant rock layers are carved by streams and weather into a belted plain. This plain has parallel strips of upland and lowland corresponding to the more important resistant and weak strata. The uplands are called cuestas. A cuesta is a ridge which has a steep escarpment on one side and a long gentle slope of the other. The topography of the Eastern Ridges and Lowlands is controlled by cuestas. The Magnesian Cuesta runs through Dodge County. The cuesta of Lower Magnesian limestone varies in elevation from 724 feet above mean sea level (MSL) in Marinette County (near Pound) to 1240 feet above MSL in Dane County (at Lutheran Hill), showing a general increase in height from northeast to southwest.[25]

Calumet County is bordered on the east by Manitowoc County; on the northeast by Brown County; on the northwest by Outagamie County; on the southeast by Sheboygan County; on the southwest by Fond du Lac County; and on the west by Winnebago County.

In Wisconsin, there are three types of sub-county, full-service local government units: towns, which are unincorporated, and villages and cities, which are incorporated. Calumet County contains the Cities of Brillion, Chilton and New Holstein, as well as portions of the Cities of Appleton, Kaukauna, Kiel and Menasha; the Villages of Harrison, Hilbert, Potter, Sherwood and Stockbridge; and the Towns of Brillion, Brothertown, Charlestown, Chilton, New Holstein, Rantoul, Stockbridge and Woodville. Note that the former Town of Harrison has been incorporated into the Village of Harrison. See Appendix A for a map of Calumet County. The county and all of its municipalities have adopted the plan. Copies of the adoptions can be found in Appendix C.

Geology

The Niagara Escarpment is considered Calumet County's most valuable geologic feature. It runs north to south along the eastern shore of Lake Winnebago. The topography in the county was formed by the glacier and consists of gently rolling land in the south and towards the east, flatter land in the north, and abrupt cliffs towards the edges of Lake Winnebago.

[24] https://www.wisconline.com/counties/calumet/index.html
[25] https://www.wisconline.com/wisconsin/geoprovinces/easternridges.html

The highest point in Calumet County is 1,128 feet above sea level and the lowest point is at 688 feet.

The rolling topography and landforms of the county are a product of glacial activity that deposited soil and rock materials over bedrock. Most of the county is underlain by limestone-like bedrock called Niagara dolomite. The western edge of this bedrock forms a steep, prominent slope and cliff face running through the county called the Niagara Escarpment. The Escarpment provides vital habitat for endangered and threatened plant and animal species. The Niagara dolomite is an important geologic layer in that it provides a drinking water supply for the majority of county residents. It is highly fractured and groundwater moves rapidly through it. The fractures are dissolved by water and grow with time. The growing fractures form karst features on the land surface, creating direct conduits for polluted surface runoff to enter groundwater. [26]

The following information was obtained from *The Niagara Escarpment, Inventory Findings 1999-2001 and Considerations for Management, Final Report*, 2002 as reported by the Wisconsin Department of Natural Resources, Bureau of Endangered Resources and is included in the Calumet County 2025 Comprehensive Plan. [27]

The Niagara Escarpment is the steep face of a 650-mile sickle-shaped cuesta (bedrock ridge) that runs from the northeastern United States south of Rochester, New York, across portions of southeastern Canada, and then southward north and west of Lake Michigan to southeastern Wisconsin. The primary bedrock type is dolomite. The Escarpment is made of rock that was originally deposited as sediment on an ancient sea floor that existed about 430 to 450 million years ago. The present-day cliffs were formed over millions of years through the differential erosion of rocks of different hardness and enhanced by the action of glaciers during the last ice age. In Wisconsin, the Escarpment extends for over 230 miles, from Rock Island, off the northern tip of the Door Peninsula, south to northern Waukesha and Milwaukee Counties. The Escarpment is discontinuous in Wisconsin and differs in elevation and amount of exposure from one end to the other. Niagara Escarpment outcrops in Calumet County are concentrated in the southwestern two-thirds of the county, especially along the east shore of Lake Winnebago, with scattered outcrops in the Northeast.

[26] Land & Water Resource Management Plan 2020-2029 https://www.calumetcounty.org/DocumentCenter/View/4538
[27] 2025 Comprehensive Plan https://www.calumetcounty.org/183/Comprehensive-Planning

The geology of the Escarpment greatly influences its ecological attributes. One example is the presence of karst, or solution features of the bedrock, that allow organic matter to accumulate. Cold air and sometimes water move through the fractured bedrock creating unique microhabitats. Many highly specialized species, such as rare terrestrial snails, are found in these microhabitats. The study also documented 241 occurrences of rare species and natural communities. Of these, 106 were animal occurrences, 99 were plants, and 36 were natural communities and other natural features. Nineteen were Class 1 occurrences, 28 were Class 2, and 194 were Class 3. Each of these occurrences relies strongly upon the unique features of the Escarpment in order to sustain itself, and they are generally not found in other areas of Wisconsin. In some cases, the elements are globally rare.

The Niagara Escarpment Report details a number of current threats that were identified during the inventory and from other reports. These threats are as follows:

- Land use issues, conflicts, problems, including land use plan and existing regulation conflicts.
- Development - Identified as one of the most pressing threats to the escarpment is residential development. The construction of homes and related infrastructure may fragment the sensitive habitats or destroy them.
- Road Construction - Higher capacity roads will likely result in increased development. Habitat may also be fragmented or destroyed.
- Mining, Quarrying - Can result in several impacts including direct habitat destruction or fragmentation, and alteration to hydrology and microclimate of the escarpment.
- Tower Areas - May effect bird populations and result in loss of scenic beauty of the area.
- Recreation - Increased visitation to the area can result in overuse of trails and development of unauthorized trails.
- Invasive/Exotic Species - As habitats become more fragmented and disrupted, invasive species can be introduced.
- Hydrologic Disruption - New construction or development can affect groundwater infiltration that helps support springs, sinkholes, caves, and other karst features.

- Groundwater Contamination - Groundwater is the key source for potable water and its contamination can affect water movement and habitats.
- Administrative Inconsistency - The escarpment is of regional significance and crosses many borders, making it difficult to manage effectively.

Topography

Wisconsin lies in the upper Midwest between Lake Superior, the upper peninsula of Michigan, Lake Michigan and the Mississippi and Saint Croix Rivers. Its greatest length is 320 miles and greatest width 295 miles for a total area 56,066 square miles. Glaciation has largely determined the topography and soils of the state, except for the 13,360 square miles of driftless area in southwestern Wisconsin. The various glaciations created rolling terrain with nearly 9,000 lakes and several areas of marshes and swamps. Elevations range from about 600 feet above sea level along the Lake Superior and Lake Michigan shores and in the Mississippi floodplain in southwestern Wisconsin to nearly 1,950 feet at Rib and Strawberry Hills.

The Northern Highlands, a plateau extending across northern Wisconsin, is an area of about 15,000 square miles with elevations from 1,000 to 1,800 feet. This area has many lakes and is the origin of most of the major streams in the state. The slope down to the narrow Lake Superior plain is quite steep. A comparatively flat, crescent-shaped lowland lies immediately south of the Northern Highlands and embodies nearly one-fourth of Wisconsin. The eastern ridges and lowlands to the southeast of the Central Plains are the most densely populated and have the highest concentration of industry and farms. The uplands of southwestern Wisconsin west of the ridges and lowlands and south of the Central Plains make up about one-fourth of the state. This is the roughest section of the state, rising 200 to 350 feet above the Central Plains and 100 to 200 feet above the Eastern Ridges and Lowlands. The Mississippi River bluffs rise 230 to 650 feet. [28]

The rolling topography and landforms of Calumet County are products of glacial activity over 10,000 years ago and the bedrock underneath. Most of the county is underlain by limestone-like bedrock, called Niagara dolomite. This bedrock layer slopes downward from west to east, toward

[28] https://www.wisconsin.edu/uwex/

Lake Michigan. Its western edge forms a steep, prominent escarpment called the Niagara Escarpment. It runs east of and roughly parallel to the shores of Lake Winnebago, from the southern county border to the Village of Sherwood. It curves off to the northeast at Sherwood. The Escarpment is discontinuous, is buried by soil in many places, and appears as a long, steep slope. The two highest locations of escarpment in the county are near the community of Quinney (333 feet above the base) and in High Cliff State Park (223 feet above the base). The exposed rock face within these areas is less than 100 feet in height. The dolomite can surface less prominently as small escarpments and bedrock exposures in other areas of the county. It also forms scattered high points and hills throughout the county which are overlain with soil.

Glacial activity played a dominant role in the land formations above the Niagara dolomite. The earliest glacial activity, the Cary substage of the Wisconsin Age of Glaciation, deposited glacial drift, till, and outwash on top of the bedrock. The glacial materials from the Cary substage can be recognized by their yellowish color. A later stage of glaciation, the Valders substage, buried the Cary substage materials in the northern two thirds of Calumet County with its own drift, till, and outwash. Materials from the Valders substage are reddish in color. Glacial drift and till are rock materials that are broken, rounded, and ground up and then transported and deposited by glacial ice. This material formed uneven, rolling landforms characterized by drumlins and moraines. Drumlins are long, cigar shaped hills of till and are found in the southern part of the county. Moraines are hills of soil and rock that were deposited by melting ice at the glaciers' edge. A prominent moraine parallels the Killsnake River in the center of the county.

Water from melting glacial ice created streams flowing on top, through, and underneath the glaciers; as well as on the land downstream of the glacier's edge. These streams carried, sorted, and deposited sands and gravels, called outwash, on top of drift, till, and bedrock.

Melted ice formed glacial lakes. Fine soil and rock particles settled to the lake bottoms resulting in lacustrine deposits. These fine-grained materials were exposed when the glacial lakes dried up and the materials later developed into clay textured soils. [29]

[29] Land & Water Resource Management Plan 2020-2029 https://www.calumetcounty.org/DocumentCenter/View/4538

Climate

The Wisconsin climate is typically continental with some modification by Lakes Michigan and Superior. Winters are generally cold and snowy and summers are warm. About two-thirds of the annual precipitation falls during the growing season; this is normally adequate for vegetation although there are occasional droughts. The climate favors dairy farming and the primary crops are corn, small grains, hay and vegetables. Storm tracks generally move from west to east and southwest to northeast.

The average annual temperature varies from 39°F in the north to about 50°F in the south with statewide extreme records of 114°F (Wisconsin Dells, 7/13/1936) and minus 55°F (Couderay, 2/2/1996 and 2/4/1996). During more than one-half of the winters, temperatures fall to minus 40°F or lower and almost every winter temperatures of minus 30°F or colder are reported from northern stations. Summer temperatures above 90°F average two to four days in northern counties and about 14 days in southern districts. During marked cool outbreaks in summer months, the central lowlands occasionally report freezing temperatures.

The freeze-free season ranges from around 80 days per year in the upper northeast and north-central lowlands to about 180 days in the Milwaukee area. The pronounced moderating effect of Lake Michigan is well-illustrated by the fact that the growing season of 140 to 150 days along the east-central coastal area is of the same duration as in the southwestern Wisconsin valleys. The short growing season in the central portion of the state is attributed to a number of factors, among them an inward cold air drainage and the low heat capacities of the peat and sandy soils. The average date of last spring freeze ranges from early May along the Lake Michigan coastal area and southern counties to early June in the northernmost counties. The first autumn freezes occur in late August and early September in the northern and central lowlands and in mid-October along the Lake Michigan coastline; however, a July freeze is not entirely unusual in the north and central Wisconsin lowlands.

The long-term mean annual precipitation ranges from 30 to 34 inches over most of the Western Uplands and Northern Highlands, then diminishes to about 28 inches along most of the Wisconsin Central Plain and Lake Superior Coastal area. The higher average annual precipitation coincides generally with the highest elevations, particularly the windward slopes of the Western Uplands and Northern Highlands. Thunderstorms average about 30 per year in northern Wisconsin to about 40 per year in

southern counties and occur mostly in the summer. Occasional hail, wind and lightning damage are also reported.

The average seasonal snowfall varies from about 30 inches at Beloit to well over 100 inches in northern Iron County along the steep western slope of the Gogebic Range. Greater average snowfall is recorded over the Western Uplands and Eastern Ridges than in the adjacent lowlands. The mean dates of first snowfall of consequence (an inch or more) vary from early November in northern localities to early December in southern Wisconsin counties. Average annual duration of snow cover ranges from 85 days in southernmost Wisconsin to more than 140 days along Lake Superior. The snow cover acts as protective insulation for grasses, autumn seeded grains, alfalfa and other vegetation.[30]

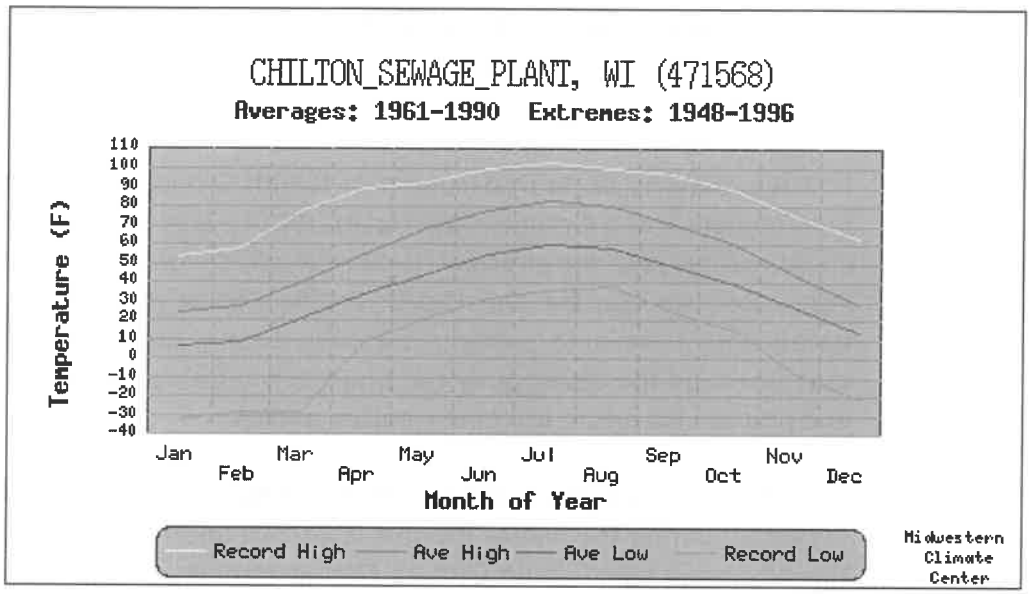
The average growing season is defined as the number of days following the last 32°F freeze in the spring through the beginning of fall. Calumet County's growing season averages 148 days. [31]

Climate Normals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Ave Daily High (F°)	23.6	27.4	39.5	54.7	68.2	77.3	82.3	79.1	70.5	59.2	43.0	28.6
Ave Daily Low (F°)	5.9	8.7	20.9	33.7	44.3	54.1	59.3	57.2	48.6	38.6	26.6	13.0
Growing Degree Days	0	1	24	131	324	508	628	574	379	179	30	3
Heating Degree Days	1556	1313	1079	624	302	75	11	28	175	499	906	1367
Cooling Degree Days	0	0	0	0	32	96	191	128	10	0	0	0
Ave Precipitation (")	1.31	1.19	2.20	2.79	3.22	3.65	3.34	3.76	3.92	2.55	2.26	1.69
Ave Snowfall (")	11.6	9.5	8.1	1.5	0.2	0.0	0.0	0.0	0.0	0.2	3.5	11.2

Data from the weather station at Chilton, latitude 44°02' N, longitude 88°09' W, elevation 840 ft.[32]

[30] https://www.wisconsin.edu/uwex/
[31] https://www.wisconline.com/counties/calumet/climate.html
[32] https://www.wisconline.com/counties/calumet/climate.html

Climate Normals and Growing Season Summary[33]



According to a report published by the Wisconsin Initiative on Climate Change Impacts,[34] Wisconsin's climate is changing. Precipitation and temperature data from the past 60 years indicate that overall, our state has become warmer and wetter. In the report, Wisconsin's Changing Climate: Impacts and Adaptations, University of Wisconsin climate scientists project that the statewide annual average temperature will increase by 6 – 7° F by the middle of the century. Average winter temperature will increase by about 8° F; more than other seasons. The number of summer days that exceed 90° F will increase statewide and the number of winter nights that are below 0° F will decrease significantly. The projections indicate that overall average precipitation will also increase by the middle of the century and more of the increase will be in the winter, spring, and fall. The frequency of large storm events will increase in the spring and fall. The amount of precipitation that falls as rain rather than snow in the winter will increase significantly, with increasing occurrences of freezing rain. These projected climate changes will impact our land and water resources and animal, plant, and human communities. They will also impact our land use and the conservation practices that we use to improve and protect our land and water resources. In the near future, the LWCD and its partners will need to begin developing adaptation strategies to address the negative impacts

[33] Data Provided by the Midwestern Regional Climate Center https://mrcc.illinois.edu
[34] https://wicci.wisc.edu/

of climate change on our natural resources, communities, and conservation practices. The LWCD will proactively educate county and local officials on the need for such strategies and on follow-up action to implement them, and actively participate in their development and implementation. [35]

In 2012, the Wisconsin Department of Health Services (DHS), Bureau of Environmental and Occupational Health (BEOH) was awarded a grant to study and prepare for anticipated climatic effects of the public's health. The Wisconsin Climate and Health Profile Report highlights evidence-based data related to extreme weather events, corresponding health outcomes and the development of projects and best practices to adapt to and prepare for future extreme weather events.

Over the past 60 years Wisconsin has become warmer and wetter, especially during the winter months. Evidence and research drawn from the Wisconsin Initiative on Climate Change Impacts (WICCI) suggest that climate-sensitive human health impacts will likely be affected by precipitation changes, heat extremes, drought, winter weather changes, disease vectors, surface water and groundwater. Those most vulnerable to these changes include the very young, elderly, persons with chronic disease (e.g., asthma), persons of low socio-economic status, persons with mental health issues and those who are socially isolated.

Possible impacts during the four seasons include:

- Spring - More frequent and intense rain events may lead to more flooding with health impacts such as stress and mental health disorders; foodborne and waterborne illnesses; injuries; drowning; and death.
- Summer - Southern Wisconsin may experience approximately 28 more days exceeding 90 degrees Fahrenheit. Health impacts can include heat stress, respiratory disease, allergic reactions and death.
- Fall - Extended periods of warming could cause more drought with health impacts including water and food insecurity; respiratory distress; allergic reactions; and death.

[35] Land & Water Resource Management Plan 2020-2029 https://www.calumetcounty.org/DocumentCenter/View/4538

- Winter - Warmer winters might cause more ice, sleet and rain. Health impacts may include traffic accidents, power outages, injuries and death.[36]

Hydrology

The land in Wisconsin drains into Lake Superior, Lake Michigan and the Mississippi River. The Mississippi and St. Croix Rivers form most of the western boundary. About one-half of the northwestern portion of the state is drained through the Chippewa River, while the remainder of this region drains directly into the Mississippi or St. Croix Rivers and into Lake Superior. The Wisconsin River has its source at a small lake nearly 1,600 feet above mean sea level on the Upper Michigan boundary and drains most of central Wisconsin. Most of its tributaries also spring from the many lakes in the north. Except for the Rock River, a Mississippi River tributary which flows through northern Illinois, eastern Wisconsin drains into Lake Michigan.

Most of the streams and lakes in the state are ice-covered from late November to late March. Snow covers the ground in practically all the winter months except in extreme southern areas. Flooding is most frequent and most serious in April due to the melting of snow and spring rains. During this period, flood conditions are often aggravated by ice jams which back up the flood waters. Excessive rains of the thunderstorm type sometimes produce tributary flooding or flash flooding along the smaller streams and creeks. [37]

Groundwater reservoirs are recharged by direct precipitation. Spring is a prime time for recharge because evapotranspiration is low and melting snow and rainfall infiltrate and percolate the water table on unfrozen ground. Fall is another prime time for high recharge. During the summer, groundwater levels drop because precipitation is lower causing losses to evaporation and transpiration to exceed precipitation. In addition, groundwater is lost to surface waters by discharge in the form of springs.[38] The winter period normally lacks infiltration because of frozen ground.

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[36] *Wisconsin Climate and Health Profile Report*, 2014, WI Department of Health Services, Bureau of Environmental and Occupational Health http://www.dhs.wisconsin.gov/publications/P0/P00709.pdf

[37] https://www.wisconsin.edu/uwex/

[38] DeVaul, 1967.

Land use decisions can have impacts on groundwater, as anything that is spilled or spread on the ground can impact the quality. As a result, pollution is a very real threat to the county's water supplies.

The majority of Calumet County residents rely on groundwater as their sole source of water. Farms, businesses and industries also rely on it. There are three major aquifers in Calumet County; the Silurian, Sand and Gravel, and Sandstone aquifers, with the majority of the wells drawing from the Silurian aquifer. This aquifer is made up of Niagara dolomite bedrock, which tends to be highly fractured. These fractures act like underground pipes and transmit water very rapidly. Water quality problems are common in the Silurian aquifer due to the proximity of the aquifer to the surface and the shallow depth (less than 200 feet) of many wells.

The Sand and Gravel aquifer is the surface aquifer covering the remainder of the county. Soil and glacial sediments make up this aquifer. This aquifer was historically the main source of water for homes and farms in the northern reaches of the county. However, it commonly has water quality problems because groundwater can become easily contaminated from land uses at the surface. Many households, farms and most municipalities in sand and gravel aquifer areas now choose to draw their water from a much deeper aquifer of sandstone bedrock.

The Sandstone aquifer underlies the entire county. It is separated from the surface aquifers by a layer of rock called the Maquoketa Shale, which protects it from most contamination from the surface. Water from the sandstone aquifer can be salty and mineral laden, especially along Lake Winnebago. These minerals can make the water aesthetically unpleasing and troublesome to plumbing. In very deep portions of the sandstone aquifer, radon and boron naturally leach from the sandstone and unsafe levels of them have been found in the groundwater. Declining water levels and high arsenic levels can also be problems.

Most streams and lakes and much of the groundwater in Calumet County are negatively impacted by polluted runoff and non-point pollution from various land uses. Polluted runoff is created by rain and snowmelt flowing across the land surface, picking up and carrying away natural and man-made pollutants. If the polluted runoff enters lakes, streams, wetlands or groundwater, it is called non-point source

pollution. Non-point source pollution differs from point pollution in that it does not come from a single point source.

Pollutants found in runoff come from a variety of land uses, both agricultural and urban. The pollutants can include soil particles from cropland and construction site erosion, fertilizers from cropland and lawn applications, animal waste from manure applications and pets, pesticides from cropland and lawn applications and other toxic materials. Soil particles cloud water and make it difficult for fish and aquatic life to find food and breathe. As the particles settle out, they bury habitat and breeding grounds for aquatic life. Fertilizers and animal wastes add excess nutrients to surface waters, creating algae blooms and excess plant growth. As the algae and plants die, the decomposition process depletes the oxygen levels in the water causing fish kills. Nitrogen and bacteria can make our groundwater unsafe to drink. Toxic materials in runoff may poison our surface waters and groundwater.

Groundwater can also become contaminated through direct conduits to groundwater from the land surface. A direct conduit to groundwater works like a pipe through which polluted surface runoff can reach groundwater without being filtered by soil. Karst features are prime examples of direct conduits to groundwater. Karst features include sinkholes and exposed bedrock. Polluted surface runoff enters these features, contaminating groundwater. Karst features are found in areas of Calumet County where the Niagara dolomite (Silurian aquifer) is present and near the surface. Poor groundwater quality is often found in these areas. Figure 13 identifies the areas susceptible to contamination. Old unused wells can also serve as direct conduits for polluted runoff to enter groundwater. As a result of the containments reaching the groundwater through these features, the water tested from private wells has shown the presence of unsafe levels of nitrates and bacteria. These unsafe levels are a concern in that high or elevated levels can cause illness and, in some cases, death.

Polluted runoff can be reduced or eliminated with conservation practices, such as conservation tillage to control soil erosion and nutrient management planning to control and reduce runoff of nutrients. The land use and type of pollutant determines which practices can and should be used. The use of these practices is promoted through education of and incentives for land users. Use of conservation practices may also be required by county ordinances.

More information regarding Calumet County's efforts to reduce polluted runoff and, in particular agricultural runoff, can be found in the Calumet County Land and Water Resource Management Plan. [39]

The federal Clean Water Act requires states to issue water quality status reports every two years for surface water bodies within their state boundaries. As part of these reports, each state must list water bodies that do not meet or are not expected to meet state water quality standards. These polluted or degraded waters are put on an impaired water list, otherwise known as a 303(d) list. All of the larger rivers and all of the lakes except Grass Lake in Calumet County are on the 303(d) list.

Some residents of Calumet County, as well as businesses and industries, rely on surface water as their source of water for drinking and other purposes. The Cities of Appleton and Menasha, the Village of Sherwood and a portion of the Village of Harrison use Lake Winnebago water for their water source. Some private residences along and near the Lake Winnebago shoreline use springs and small streams flowing out of the Niagara Escarpment for their water sources. The quality of water in Lake Winnebago is impacted by nonpoint pollution and must be filtered and treated before consumption and use. [40]

Ways to protect groundwater include:

- Wellhead Protection Plans and Ordinances: Wellhead protection plans are developed to achieve groundwater pollution prevention measures within public water supply wellhead areas. A wellhead protection plan uses public involvement to delineate the wellhead protection area, inventory potential groundwater contamination sources, and manage the wellhead protection area. All new municipal wells are required to have a wellhead protection plan. A wellhead protection ordinance is a zoning ordinance that implements the wellhead protection plan by controlling land uses in the wellhead protection area.

- Animal Waste Management Ordinances: Most Wisconsin counties have adopted an animal waste management ordinance

[39] Land & Water Resource Management Plan 2020-2029 https://www.calumetcounty.org/DocumentCenter/View/4538

[40] Calumet County Farmland Preservation Plan 2020-2030 https://www.calumetcounty.org/DocumentCenter/View/4688

that applies to all unincorporated areas of the county (areas outside of city and village boundaries). While the purposes of such ordinances vary among counties, a key purpose is often to protect the groundwater and surface water resources. This is accomplished by regulations such as:

- Permitting of animal waste storage facilities;
- Permitting of new and expanding feedlots;
- Nutrient management;
- Prohibiting:
  - Overflow of manure storage structures;
  - Unconfined manure stacking or piling within areas adjacent to stream banks, lakeshores, and in drainage channels;
  - Direct runoff from feedlots or stored manure to waters of the state;
  - Unlimited livestock access to waters of the state where high concentrations of animals prevent adequate sod cover maintenance.

- Nitrates - Aquifers that are close to the land surface have limited natural protection which makes them vulnerable to pollution.

  In 2006, the Wisconsin DNR and DATCP reported that NO_3-N is the most widespread groundwater contaminant in Wisconsin and that the nitrate problem is increasing both in extent and severity with 80% of nitrate inputs originate from manure spreading, agricultural fertilizers, and legume cropping systems. Septic systems can also be a significant nitrate source in densely populated areas, areas where fractured bedrock is near the surface, or areas with coarse-textured soils. Additionally, concentrations of NO_3-N in private wells frequently exceed the drinking water limit. For example, in 2005 11.6% of 48,818 private wells exceeded the nitrate limit.

  Land use affects nitrate concentrations in groundwater with a study of over 35,000 private well samples being three times more likely to be unsafe to drink due to high nitrate in agricultural areas, especially those with sandy areas/highly permeable soils, than in forested areas. Groundwater with high nitrate from agricultural lands is more also more likely to contain pesticides than groundwater with low nitrate levels.

- Pesticides - A pesticide is any substance used to kill, control or repel pests or to prevent the damage that pests may cause. Included in the broad term "pesticide" are herbicides to control weeds, insecticides to control insects, and fungicides to control fungi and molds. Pesticides are used by businesses and homeowners as well as by farmers, but figures for the amounts and specific types of pesticides used are not generally available on a county-by-county basis. A 2005 report indicates that approximately 13 million pounds of pesticides are applied to major agricultural crops in Wisconsin each year, including over 8.5 million pounds of herbicides, 315,000 pounds of insecticides, one million pounds of fungicides, and 3 million pounds of other chemicals (this last category applied mainly to potatoes). The report also shows that herbicides are used on 100% of carrots for processing, 99% of potatoes, 98% of cucumbers for processing, 98% of soybeans, 97% of field corn, 89% of snap beans for processing, 87% of sweet corn, and 84% of green peas for processing. Insecticides are used on 97% of potatoes, 96% of carrots, and 88% of apples. Fungicides are used on 99% of potatoes, 88% of carrots, and 89% of apples.

- Arsenic - Arsenic is an element that occurs naturally in some of Wisconsin's aquifers and may contaminate well water drawn from those aquifers. It is a particular problem in parts of the Fox River valley of northeastern Wisconsin. However, arsenic has been detected in wells in every county in Wisconsin, and arsenic concentrations greater than the drinking water limit of 10 µg/L (micrograms per liter, or parts per billion) have been documented in 51 of Wisconsin's 72 counties.

- Contaminated Groundwater and/or Soil - Properties that were or are contaminated with hazardous substances can be found using the WDNR's Bureau for Remediation and Redevelopment Tracking System (BRRTS).[41] Calumet County has three open leaking underground storage tank (LUST) sites which have contaminated soil and/or groundwater with petroleum, which includes toxic and cancer-causing substances. However, given time, petroleum contamination naturally breaks down in the environment. There are 22

[41] https://dnr.wi.gov/topic/Brownfields/botw.html

environmental repair (ERP) sites which are sites other than LUSTs that have contaminated soil and/or groundwater. Examples include industrial spills or dumping, buried containers of hazardous substances, and closed landfills that have caused contamination. There is also one open spill site.

- Concentrated Animal Feeding Operations (CAFO) - There are nine concentrated animal feeding operations (i.e., greater than 1,000 animal units) in Calumet County.[42] CAFOs are required under their Wisconsin Pollutant Discharge Elimination System (WPDES) permits to practice proper manure management and ensure that adverse impacts to water quality do not occur. Permit applicants must submit detailed information about the operation, a manure management plan, plans and specifications for all manure storage facilities, and a completed environmental analysis questionnaire. Once a WPDES CAFO permit is issued, operators must comply with the terms of the permit by following approved construction specifications and manure spreading plans, conducting a monitoring and inspection program, and providing annual reports. Other potential groundwater contaminants from agriculture include fertilizers and pesticides. Large amounts of nitrogen fertilizers are used when fields are planted continuously with corn, and they can leach into groundwater as nitrate.[43]

- Licensed Landfills and Superfund Sites – There are two licensed landfills and one Superfund site in Calumet County.[44] [45] In 1980, Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as the Superfund law. The Superfund law created a tax on the chemical and petroleum industries, which went into a trust fund to help pay for cleaning up abandoned or uncontrolled waste sites. The U.S. Environmental Protection Agency (EPA) administers the Superfund trust fund and works closely with state and local governments and tribal groups to remediate sites that may endanger public health or the environment. The contamination at many of these sites

[42] https://www.dnr.state.wi.us/topic/AgBusiness/data/CAFO/cafo_cty.asp?CountyChoice=Calumet&Submit=Submit
[43] https://dnr.wi.gov/topic/AgBusiness/CAFO/
[44] https://dnr.wi.gov/topic/waste/documents/faclists/WisLic_SWLandfills_byCnty_withWaste.pdf
[45] https://dnr.wi.gov/files/PDF/pubs/rr/RR005.pdf

was created years ago when environmental regulations were virtually nonexistent and companies dumped or emitted hazardous materials freely into the environment. Years later the threat to humans and the ecosystems remains so great that the sites need to be cleaned up.

Since much of this contamination was caused many years ago, it can be hard to find the parties responsible, or the parties responsible may be unwilling or unable to pay for the cleanup. In these cases, the Superfund trust fund can be used to pay for most of the cleanup process. States must pay for a portion of such cleanups. CERCLA also provides EPA with enforcement tools to compel those responsible for causing the contamination to pay for the cleanup, including the issuance of administrative orders. If the trust fund is used, then EPA and the state may go to court to recover their expenditures from those who are responsible.

- Cleanup -
  - Petroleum Environmental Cleanup Fund Award - The Petroleum Environmental Cleanup Fund Award (PECFA) program was created in response to enactment of federal regulations requiring release prevention from underground storage tanks and cleanup of existing contamination from those tanks. PECFA is a reimbursement program returning a portion of incurred remedial cleanup costs to owners of eligible petroleum product systems, including home heating oil systems. This program ended June 30, 2020; however, liability for clean-up did not end when the program expired. As of June 30, 2004, $11,030,065 has been reimbursed by the PECFA fund to clean up 87 petroleum-contaminated sites in Calumet County. [46]
  - Nitrate Removal Systems – No municipal water systems in Calumet County have spent money to reduce nitrate

46 https://docs.legis.wisconsin.gov/misc/lfb/informational_papers/january_2005/0059_petroleum_environmental_cleanup_fund_award_pecfa_program_informational_paper_59.pdf

levels. As of 2005, over 20 municipal water systems in Wisconsin have spent over $24 million reducing nitrate concentrations in municipal water systems.

WDNR's Outstanding and Exceptional Resource Waters Program provides a designation for Wisconsin's cleanest waters. An outstanding resource water is defined as a lake or stream that has excellent water quality, high recreational and aesthetic value, high quality fishing and is free from point source or non-point source pollution. An exceptional resource water is defined as a stream that exhibits the same high quality resource values as an outstanding resource water but that may be impacted by point source pollution or that may have the potential for future discharge from a small sewer community. There are no Outstanding or Exceptional Resource Waters in Calumet County. [47]

Ten watersheds are contained completely or partially within Calumet County and are explained in greater detail in the Flooding and Dam Failure chapter of this plan.

Soil Types

The Natural Resources Conservation Service (NRCS – formerly Soil Conservation Service) published the Soil Survey of Calumet and Manitowoc Counties in 1980. [48] There are seven major soil associations found in Calumet County that contain multiple soil types, grouped into associations that can be used to compare the suitability of large areas for general land uses. Soil associations are groupings of soils that share a distinctive pattern of soils, relief and drainage.[49]

Kewaunee-Manawa-Poygan
These soils are the most dominant in Calumet County. These soils were formed from glacial till and are nearly level to sloping, well drained to poorly drained, and have a dominantly clayey subsoil and substratum. These soils are well suited to cropland, however many

[47] http://dnr.wi.gov/topic/SurfaceWater/oerw/orwerw_county.pdf
[48] https://websoilsurvey.nrcs.usda.gov/app/
[49] Calumet County Farmland Preservation Plan 2020-2030 https://www.calumetcounty.org/DocumentCenter/View/4688

areas require surface drainage and/or subsurface drainage to produce high yields. Controlling water erosion, improving drainage, and maintaining tillage and fertility are the major management concerns. These soils are not well suited to development. Roads are subject to frost heaving during winter months. Percolation rates are slow and many areas are saturated with water at less than five feet during wet periods causing severe limitations for septic tank absorption fields.

Hochheim-Lamartine-Mayville
These soils were also formed from glacial till and are generally found in the southern and western areas of the County. These soils are the second most common in the County. They are characterized as being nearly level to moderately steep, well drained to somewhat poorly drained, and loamy throughout. This association is well suited to cropland. Erosion control practices are needed on the uplands and drainage is needed in the lower areas to produce high yields. The uplands of these soils are well suited to community development.

Granby-Oakville-Tedrow
These soils are only found in the extreme northwest corner of the County, primarily in the City of Menasha. Soils are identified as nearly level to sloping, well drained to poorly drained, and are dominantly sandy throughout. These soils have a poor potential for crops. Most of the soils are used as woodland and wildlife habitat. Controlling blowing soil, improving drainage, and maintaining fertility are the major management concerns for these soils.

Channohon-Whalan-Kolberg
These soils are located along the Lake Winnebago shoreline from the Village of Sherwood south to the Village of Stockbridge. These soils are gently sloping, well drained, loamy soils, with a dolomite substratum. They have fair to poor potential for cropland use and good potential for woodland use.

Wasepi-Plainfield-Boyer
These soils, similar to the Channohon-Whalan-Kolberg association, are also primarily located along the Lake Winnebago shoreline from the Village of Sherwood south to the Village of Stockbridge. A small portion of this soil type is also located in the northeast corner of the County. These soils are nearly level to moderately steep, excessively drained to somewhat poorly drained, and are sandy and loamy soils.

Houghton-Palms-Willette

These soils are generally found along the County's eastern and southern border. They're identified as being nearly level, very poorly drained organic soils. This association is not well suited to cropland. Wet soils and a short growing season caused by late spring and early fall frosts restrict the type of crops that

Pella-Mundelein-Shiocton
These soils are exclusively located along the western border of the City of Brillion. They are identified as nearly level and gently sloping, somewhat poorly to poorly drained, and are dominantly loamy throughout. These soils, if drained, have good potential for cultivated crops such as corn and hay. Some undrained soil is used for pasture or as wildlife habitat.

Suitable soils for agriculture vary greatly within each of these associations. Approximately 82% of the soil in Calumet County is Prime Farmland or Prime if Drained/Not Flooded. Prime farmland soils are the most critical to preserve. [50]

Many of the soils in the county were formed from material left by the glaciers. Time, climate, plants, animals, and landscape position acted on these "parent materials" to form different soils with unique properties. These properties determine the suitability of each soil for specific land uses and the associated resource concerns with each use.

Soil erosion is a natural process and is increased dramatically when land uses, such as farming and construction, leave the soil surface bare and unprotected. As erosion rates increase, more soil sediment is delivered to surface waters. Raindrops striking bare soil surfaces detach soil particles and a thin layer of runoff carries the particles downhill. The soil particles are deposited as sediment on adjacent land or may enter surface waters or groundwater. This type of erosion is called sheet and rill erosion. When runoff concentrates in the natural drainage ways of the land, soil erosion is more dramatic and is called gully erosion.

Some other forms of soil erosion include stream bank and lakeshore erosion. Stream bank and lakeshore erosion may occur when the vegetative cover along the banks of the stream or shore of the lake is removed or disturbed, or replaced with non-native vegetation. This

[50] Calumet County Farmland Preservation Plan 2020-2030 https://www.calumetcounty.org/DocumentCenter/View/4688

type of erosion often occurs on pasture areas, along urbanized stream channels, and on lakefront lots and building sites.

Soil erosion has impacts on and off of the site where it occurs. When excessive soil erosion occurs on cropland, decreases in the productivity of the soil for future crops may occur. If the resulting sediment ends up in road ditches, local governments must spend money to clean them out. When eroded soil particles reach surface waters, the result is muddy water and soil particles settling to the bottom as sediment, creating difficult conditions for fish and other aquatic life. If the particles reach groundwater, they can render the water undrinkable. [51]

Wetlands

According to the Wisconsin Department of Natural Resources, Calumet County has approximately 204,714 acres of wetlands (approximately 12.1% of its total area). This is 0.5% of the total statewide acreage of wetlands.[52]

It should be noted that the wetland average is based on 1978-1979 aerial photography. The Wisconsin Legislature authorized the DNR to update the inventory on a 10-year cycle. However, budget constraints and lack of staff have slowed this process to a 24-year cycle, at best. [53] The county's Land and Water Resource Management Plan 2020-2029 estimates that 13% of the county's total land surface is wetland.

From the sedge meadows of southern Wisconsin to the spruce bogs in the north, wetlands cover a wide array of landscapes. They share in common the ability to support aquatic or "water loving" plants, and provide habitat for more species of plants and animals than any other type of landscape in Wisconsin. Habitat is not their only functional value. Wetlands can also store water to prevent flooding, purify water, protect lake and stream shores from eroding and provide

[51] Land & Water Resource Management Plan 2020-2029 https://www.calumetcounty.org/DocumentCenter/View/4538
[52] https://dnr.wi.gov/topic/wetlands/acreage.html
[53] https://dnr.wi.gov/topic/wetlands/acreagefacts.html

recreational opportunities for wildlife watchers, anglers, hunters and boaters.[54]

In Calumet County, wetlands are regulated by the Wisconsin Department of Natural Resources and the Calumet County Land and Water Resources Department.

Because wetlands provide many benefits to the environment, several municipal, state and federal ordinances/regulations protect wetland areas. The basic concept associated with these laws is that wetland areas on any property cannot be disturbed without a permit. Wetlands store flood waters and filter water from precipitation before it enters lakes and streams. Some wetlands also recharge local groundwater aquifers. By slowing water movement, wetlands reduce the likelihood that heavy rainfall or spring snowmelt will cause erosion and flooding. Wetlands retain eroded soil and hold nutrients that would otherwise promote excessive weed growth and algae blooms in lakes and streams. These nutrients, when held in the wetlands, produce a heavy growth of vegetation that provides nesting sites, food and cover for waterfowl, small mammals and many other types of wildlife. Wetlands also provide recreational opportunities for humans (wildlife observation, hiking, hunting, etc.)

There are three basic factors in determining whether or not a property is a wetland:

- The presence of water at, near or above the surface (hydrology).
- Water present long enough to sustain aquatic plant life (hydrophytic vegetation).
- Soils indicative of wet conditions (hydric soils).

Figuring out what is or is not a wetland can be extremely confusing if you only associate "wetlands" with the presence of water. It is possible that a property could have standing water for a portion of the year and still not be a wetland and it is also possible that a true wetland with all three of the above characteristics may never have water present above the land surface.

Wetlands perform an important set of natural functions, which make them particularly valuable resources lending to overall environmental

[54] http://dnr.wi.gov/wetlands

health and diversity. Some wetlands provide seasonal groundwater recharge or discharge. Those wetlands that provide groundwater discharge often provide base flow to surface waters. Wetlands contribute to the maintenance of good water quality, except during unusual periods of high runoff following prolonged drought by serving as traps, which retain nutrients and sediments, thereby preventing them from reaching streams and lakes. They act to retain water during dry periods and hold it during flooding events, thus keeping the water table high and relatively stable. They provide essential breeding, nesting, resting, and feeding grounds and predator escape cover for many forms of fish and wildlife. These attributes have the net effect of improving general environmental health; providing recreational, research and educational opportunities; maintaining opportunities for hunting and fishing and adding to the aesthetics of an area.

Wetlands pose severe limitations for urban development. In general, these limitations are related to the high-water table and the high compressibility and instability, low bearing capacity and high shrink-swell potential of wetland soils. These limitations may result in flooding, wet basements, unstable foundations, failing pavements and failing sewer and water lines. Moreover, there are significant and costly onsite preparation and maintenance costs associated with the development of wetland soils, particularly in connection with roads, foundations and public utilities.

Recent studies indicate that Wisconsin's climate is changing. These changes may bring about warmer temperatures, increased precipitation, and more frequent large storm events. If the projected changes happen, they will impact land and water resources and animal, plant, and human communities. They will also impact how the land is used and what conservation practices are necessary. [55]

Land Use

According to the Calumet County Land and Water Resource Management Plan 2020-2029, the predominant land use in Calumet County is related to agriculture. According to a 2015 land use study completed by the East Central Regional Planning Commission, cropland and farm building sites accounted for 62% of total land use

[55] Land & Water Resource Management Plan 2020-2029 https://www.calumetcounty.org/DocumentCenter/View/4538

in the county. The next largest land use, woodlands, accounted for 13% of total land use. Many of these woodlands are located on DNR property such as the Brillion, Killsnake and Kiel Marsh Wildlife Areas or on private land along major rivers and streams. Residential, industrial, and commercial land uses, including roads and utilities, account for approximately 10% of total land use. Intensive or improper management practices with any of these land uses can negatively impact natural resources, especially soil, surface waters and groundwater. [56]

According to the USDA National Agricultural Statistics Service Census of Agriculture reports the number of farms was the only decrease seen in Calumet County between 2007 and 2017. These estimates state that Calumet County lost 48 farms or 6.6%. Similarly, the state also experienced a loss but at a much faster rate (17.4% loss). Farms that cease are typically purchased by other farms causing the average size of farms to increase. This is true for the state with an average farm size increase of 27 acres or 14% and Calumet County with an increase of 18 acres or 8.7%. An interesting shift for Calumet County compared to the state is the amount of land in farms which has increased by 2,199 acres or 1.4% in Calumet County but decreased by 872,174 acres or 5.7% state-wide. It may mean that marginal lands or natural areas are being converted to agricultural production. [57]

The Calumet County Land Division Ordinance (Chapter 62 of the Calumet County Code of Ordinances), which applies to the unincorporated areas of the County, includes residential density standards. The standards, as determined by each town, reflect the level of residential development identified in the community's comprehensive plan. This option is helpful in controlling development especially in communities that have not pursued farmland preservation zoning but value farmland preservation. It also directs growth to those areas where development is both appropriate and desired. Furthermore, the ordinance limits the number of unsewered lots in density management boundaries to nine per parent parcel. Unsewered lots located beyond the density management boundaries are limited to three lots every five years. This has been effective at slowing down growth. [58]

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[56] Land & Water Resource Management Plan 2020-2029 https://www.calumetcounty.org/DocumentCenter/View/4538

[57] Calumet County Farmland Preservation Plan 2020-2030 https://www.calumetcounty.org/DocumentCenter/View/4688

[58] Calumet County Farmland Preservation Plan 2020-2030 https://www.calumetcounty.org/DocumentCenter/View/4688

The Wisconsin Department of Natural Resources has identified two state natural areas within Calumet County.

High Cliff Escarpment [59]

High Cliff Escarpment features both shaded and exposed cliff habitats along the Niagara escarpment, talus slopes supporting wet-mesic forest, more than a mile of Lake Winnebago shoreline, and outstanding examples of conical and effigy mounds in the level woodland above the escarpment. High Cliff gets its name from the limestone cliff of the Niagara Escarpment, which parallels the eastern shore of Lake Winnebago. This ledge extends northeasterly to the Door County peninsula and on to Niagara Falls, New York. At the escarpment summit are vertical cliffs up to 25 feet high that contain fragile fern, bulblet fern, leaf cup, cliff stickseed, and long-beaked sedge. The talus slope below the cliff is composed chiefly of small, flat rocks, although some areas of large limestone boulders occur, and many seepages emanate from the rocks. The undisturbed forest on the slope is composed of sugar maple, basswood, white ash, green ash, elm, hackberry, and butternut. Closer to the lake, willows and cottonwood gradually appear. A rich herbaceous layer includes wild ginger, great water-leaf, false rue anemone, squirrel-corn, toothwort, and Canada violet. High Cliff Escarpment is owned by the DNR and was designated a State Natural Area in 1982.

Stockbridge Ledge Woods [60]

Stockbridge Ledge Woods features a mature forest situated on the top of the Niagara Escarpment. The forest is dominated by large sugar maple, American beech, and basswood along with white oak and contains numerous savanna grasses and forbs. Its position atop the escarpment affords a scenic view of Lake Winnebago. There is a good diversity of tree sizes and an equally diverse understory. The herbaceous layer includes wood anemone, blue cohosh, nodding trillium, trout-lily, may-apple, bellwort, early meadow-rue, Missouri goldenrod, Pennsylvania sedge, thimbleweed, shooting-star, and hepatica. Ephemeral ponds are present throughout the flat crest of the outcrop. Stockbridge Ledge

[59] https://dnr.wi.gov/topic/Lands/naturalareas/index.asp?SNA=176
[60] https://dnr.wi.gov/topic/Lands/naturalareas/index.asp?SNA=345

Woods is owned by the DNR and was designated a State Natural Area in 2002.

Vegetation

Sugar maple, basswood and elm trees can be found throughout the county. In the southwestern part of the county there is a small area of bluestem and composites. In the northern part are willows, soft maple and ash near Lake Winnebago's northern shore.[61]

[61] https://www.wisconline.com/counties/calumet/index.html

Demographics

Human Settlement Patterns

The first evidence of human settlement in the Mississippi River Region was approximately 11,000 years ago, following closely the withdrawal of the Wisconsin glacier. These earliest known "Paleo-Indians" were hunter-gatherers that traveled in small nomadic family groups. This Ice Age era was known geologically as the Pleistocene period.

The fertile region was chosen as the home of Brothertowns and Stockbridges. These men selected large tracts of land lying on the east bank of Lake Winnebago and there cut the first tree, erected the first cabin, made the first clearing and engaged in the first agricultural labors in the county. Their supplies were taken by boat up the lower Fox and then carried on men's backs to the places designated as the new homes. Many of those who made the venture remained to enjoy the fruits of their industry. The Brothertowns eventually outstripped the Stockbridges in the marsh improvement, being the first and most serious in their application for the rights of citizenship and otherwise indicating that they possessed at a very early day the true American spirit.

In the latter part of the eighteenth century the Farmington Indians were settled in the North Atlantic States. David Fowler, an educated Montauk Indian, then induced them, in company with remnants of Narragansetts, Mohegans, Pequoits and other tribes of former power to migrate further to the northwest and settle upon a tract of land granted by the Oneidas near Utica, New York. Here a union was formed and the nation became Brothertown and its people the Brothertowns. In 1822 they were removed to Green Bay and commenced the formation of Brothertown colony in Calumet County in 1833-34.

Upon their first settlement they seem also to have brought with them the instincts of land cultivation and the love of some fixed spot, however humble, to be called home. When the Brothertowns settled in their new Pequots York home, the Stockbridges had been torn by the Oneidas and the whites to a shred of their former power, and were living upon a small reservation only about five miles square,

which the former had granted them in Oneida County. They came to Wisconsin with the Brothertowns, and commenced to settle in the town of Stockbridge during the same year as the former, in 1833. A tract of land along Lake Winnebago had been obtained by the leaders of the two tribes in 1831 but the real settlement did not begin until two years later.

The first settlement formed by the Brothertowns was called Deansburg, in honor of their former Indian agent, Thomas Dean. It afterwards became "Ball's Corner." Soon after this settlement was formed a number of Stockbridges located near the shore of Lake Winnebago. The settlers were not citizens, and therefore could receive no organizing authority from the Legislature; but each tribe assumed substantially the town system of government and proceeded like other pioneers to clear the country of timber and erect their dwelling houses. The Brothertowns, after a three-year struggle with rough forest provender, employed Moody Mann to build them a mill.

By the time the grist-mill and a mission church were in good running order the military road from Green Bay to Prairie du Chien had been cut through Calumet County, taking in its route the only settlements - Brothertown and Stockbridge. Some of the workmen, soldiers from the Fort Howard garrison, remained to swell the population along the shore of Lake Winnebago. Calumet County was created from Brown County by Territorial act on December 7, 1836 but remained attached to it for political and judicial purposes until March 4, 1840. The county was legally organized on February 5, 1850, by Chapter 84 Laws of 1850. [62] [63] [64]

Population

In the 2010 U.S. Census, the county was home to 48,971 people and according to the 1 July 2019 U.S. Census Bureau estimate[65], there were 50,089 people residing in Calumet County for an increase of 2.3%.

[62] http://freepages.rootsweb.com/~calumet/genealogy/histry3.htm
[63] http://freepages.rootsweb.com/~calumet/genealogy/histry4.htm
[64] https://en.wikipedia.org/wiki/Calumet_County,_Wisconsin
[65] https://www.census.gov/quickfacts/fact/dashboard/calumetcountywisconsin,US/PST045219

According to the 2015-2019 U.S. census estimate, there were 19,807 households in Calumet County with an average of 2.51 people per household. The 2015-2019 U.S. census numbers indicate that the median household income was $75,814 and that the per capita income for the previous 12 months was $35,527. Approximately 5.4% of the people live below the poverty line. The 2019 census estimate also indicated that there were approximately 21,138 housing units within the county as of 1 July.

According to the U.S. Census report, the majority of people in Calumet County reported that they were white (94.7%) with 90.6% stating they were white alone. People of Hispanic or Latino origin were counted as a subcategory of those reporting that they were white. Those reporting as two or more races were 1.4%. American Indians account for 0.5% of the population of Calumet County. Black or African American alone was 0.8% and Asian alone was 2.4%. There are no Native American tribal lands located within Calumet County. However, the Stockbridge Munsee Tribal Cemetery is a 7.5-acre parcel on Moore Road in the Town of Stockbridge.

Other miscellaneous demographic information reported by the census bureau is detailed below. These figures identify potential needs for special consideration in a disaster response or in recovery operation planning and implementation.

- People under 5 years old: 5.2%
- People under 18 years old: 23.3%
- People over 65 years old: 15.7%
- Females: 49.6%
- Foreign born: 2.6%
- People with a disability, under 65 years old: 5.4%

The county contains the Cities of Appleton (partial), Brillion, Chilton, Kaukauna (partial), Kiel (partial), Menasha (partial) and New Holstein; and the Villages of Harrison, Hilbert, Potter, Sherwood and Stockbridge. There are also eight towns including Brillion, Brothertown, Charlestown, Chilton, New Holstein, Rantoul, Stockbridge and Woodville. The former Town of Harrison has now been incorporated into the Village of Harrison.

Transportation Network

Calumet County has a good transportation network that connects the county's inhabitants and visitors to commercial, recreational and educational sites. These roadways support the majority of the traffic movement within the county.

To help plan for current and future traffic conditions, it is useful to categorize roads based on their primary function. Functional classification is the process by which highways are grouped into classes according to the character of services they are intended to provide, ranging from a high degree of travel mobility to land access functions.[66] Calumet County roads and their classifications include: [67]

Rural principal arterials serve corridor movements having trip length and travel density characteristics of an interstate or interregional nature.

- U.S. Highway 10
- State Highway 32

Rural minor arterials, in conjunction with principal arterials, server moderate to large-sized places (cities, villages, towns and clusters of communities) and other traffic generators providing intra-regional and inter-area traffic movements.

- State Highway 55
- State Highway 67
- State Highway 114
- U.S. Highway 151

Rural major collectors provide service to smaller-to-moderate sized places and other intra-area traffic generators; and link those generators to nearby larger population centers (cities, villages and towns) to higher-function routes.

- County Road A
- County Road B
- County Road BB
- County Road CE

[66] https://wisconsindot.gov/Pages/projects/data-plan/plan-res/function.aspx

[67] ftp://ftp.dot.wi.gov/dtim/bop/functional/Rural-Areas-and-County-maps/Calumet.CO_approved-2016.08.11.pdf

- County Road D
- County Road E
- County Road F
- County Road G
- County Road GG
- County Road HH
- County Road HHH
- County Road HR
- County Road J
- County Road JJ
- County Road KK
- County Road M
- County Road PP
- County Road Q
- County Road W
- County Road X
- County Road XX
- County Road Y
- County Road Z

Rural minor collectors provide services to all remaining smaller places, link the locally important traffic generators with their rural hinterland and are spaced consistent with population density so as to collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road.

- County Road BB
- County Road E
- County Road EE
- County Road GG
- County Road H
- County Road HH
- County Road K
- County Road KK
- County Road Q
- County Road T
- County Road W
- County Road Z
- State Highway 32
- Breed Street
- County Line Road East

- Harbor Road
- Long Lake Road
- Man-Cal Road North
- National Avenue
- Sheboygan Road

All other rural roads not classified as arterials or collectors are referred to as local function roads.

A map in Appendix A shows the various roads in the county and their classifications.

The county has maintained these roads along with others to provide a safe and efficient transportation system. With continued maintenance, these roads will continue to serve the population effectively.

Calumet County is served by one airport. The New Holstein Airport has a paved runway of 3,600 feet and a turf runway of 3,000 feet. It does not offer commercial passenger service. At the present time, the airport has eighteen hangars leased for private planes, with additional lots available for new hangars. In 2013, the New Holstein Airport opened its state-of-the-art terminal which features a pilot's lounge, FBO office, four showers and a community room. [68]

The urbanized portion of Calumet County is served by Valley Transit. Based out of Appleton, Valley Transit's service area covers 117 square miles and serves a population of 216,154. They offer fixed-route service, para-transit and demand response services to a wide range of customers. [69]

Canadian National owns and operates the two rail lines in Calumet County that primarily move freight. The county's service comes from Menasha and/or the east and then runs south towards Kiel. [70]

[68] Calumet County Farmland Preservation Plan 2020-2030 https://www.calumetcounty.org/DocumentCenter/View/4688
[69] Calumet County Farmland Preservation Plan 2020-2030 https://www.calumetcounty.org/DocumentCenter/View/4688
[70] Calumet County Farmland Preservation Plan 2020-2030 https://www.calumetcounty.org/DocumentCenter/View/4688

Land Use and Development Trends

Calumet County is a mixed-use community in the east-central portion of the state. The county has some natural areas that will not be developed and some rural farming areas as well as suburban areas of higher development. As of the time of this plan, it is expected that growth trends will mirror the recovery of the general national, state and regional economy.

Current land use is variable and includes residential, commercial, industrial, agricultural, wetlands, woodlands and unused rural/open lands. The Wisconsin Department of Revenue (WDOR) tax assessment data classifies the land use in Calumet County as follows:

- *Agricultural (Includes WDOR categories of Forest, Agricultural Forest and Other)* - Lands devoted primarily to agriculture, small-scale agricultural forestation and lands that are producing, or are capable of producing, commercial forest products (as defined by State of Wisconsin Statute 70.05) and other supporting activities. Also includes lands containing dwelling units and related improvements associated with agricultural use. This category does not include forests or woods that are in parks or that are not being forested under WDOR definitions.
- *Residential* - Lands containing dwelling units and related improvements not associated with agricultural use.
- *Commercial* - Lands, including improvements, devoted primarily to commercial operations, including, but not limited to dining, lodging, and retail sales establishments.
- *Manufacturing* - Lands, including improvements, devoted primarily to manufacturing and industrial operations, including, but not limited to, assembling, processing, and fabricating.
- *Undeveloped* - Lands generally unfit for any of the aforementioned uses, including, but not limited to, parks, hunting grounds, wetlands, ponds, gravel pits, and road rights of way.

Land Uses Changes Based on 2019 WDOR Calumet County Tax Assessment Data[71]

Land Use Category	2018 Equalized Value	2019 Equalized Value	Percent Change
Agricultural	$24,888,600	$25,528,300	3%
Agricultural Forest	$15,612,000	$15,999,000	2%
Forest	$13,006,100	$13,883,300	7%
Residential	$3,223,364,600	$3,450,170,900	7%
Commercial	$558,714,400	$600,837,700	8%
Manufacturing	$121,344,500	$126,665,800	4%
Undeveloped	$13,589,500	$13,992,000	3%
Other	$188,569,200	$185,576,900	-2%
Total	**$4,159,088,900**	**$4,432,653,900**	**7%**

Public Safety Support

The Calumet County Dispatch Center is the 9-1-1 Public Safety Answering Point (PSAP) and Dispatch Center for Calumet County. The communications center is staffed with trained dispatchers and is managed as part of the Sheriff's Office.

The departments listed below provide ongoing training to their staff and participate in periodically scheduled disaster exercises with area hospitals, other emergency medical services, law enforcement, fire services and emergency management.

Medical

The Calumet County Office of Emergency Management, city and county emergency services responders, hospital emergency staff and various departments have developed medical and mass casualty plans. These plans will be used in the event of a disaster.

The following hospital serves Calumet County and its residents:

- Ascension Calumet Hospital

[71] https://www.revenue.wi.gov/Pages/EQU/2019-expeqv.aspx

In addition, the 17 area hospitals and immediate care centers in Brown, Fond du Lac, Manitowoc, Outagamie, Sheboygan and Winnebago Counties are accessible to Calumet County residents. These health care facilities can coordinate with responding agencies to ensure the best utilization of services and the least injury or loss of life from a disaster situation. It should also be noted that area hospitals have reciprocal verbal agreements for transferring critical patients during a disaster.

Ambulance Service

Calumet County relies on a mix of volunteer, paid-on-call and paid staff to provide pre-hospital emergency medical services (See EMS Zones Map in Appendix A for district boundary details). The following departments provide ambulance service in Calumet County: [72]

- **Brillion (Town of) First Responders -** License Level: Emergency Medical Responder
- **Calumet Medical Center Ambulance Service -** License Level: Paramedic
- **Gold Cross Ambulance Service, Inc. -** License Level: Advanced Emergency Medical Technician
- **Great Lakes EMS -** License Level: Advanced Emergency Medical Technician
- **Harrison First Responders** - License Level: Emergency Medical Responder
- **Hilbert/Potter First Responders -** License Level: Emergency Medical Responder
- **New Holstein First Responders –** License Level: Emergency Medical Responder
- **Stockbridge First Responders** – License Level: Emergency Medical Responder

Each of these departments provides monthly training to their staff and they participate in periodically scheduled disaster exercises with area hospitals, other emergency medical services, law enforcement, fire services and emergency management.

[72] https://www.dhs.wisconsin.gov/ems/provider/calumet.htm

Fire Service

There are nine fire departments that serve areas in Calumet County. [73] [74] The location of each of the fire stations and fire service areas can be found in Appendix A.

- Brillion Fire Department
- Chilton Fire Department
- Forest Junction Fire Department
- Harrison Fire and Rescue
- Hilbert Volunteer Fire Department
- New Holstein Fire Department
- Potter Fire Department
- St. Anna Fire Department
- Stockbridge Fire Department

Law Enforcement

The Sheriff is the chief law enforcement officer in the county and is responsible for the protection of life and property within the boundaries of Calumet County. The Sheriff's Office provides assistance on a 24-hour basis to unincorporated areas of the county and to those jurisdictions that do not maintain full-time police services. The Wisconsin State Patrol and Wisconsin Department of Natural Resources also provide law enforcement services within the county.

Law enforcement agencies are responsible for response to criminal incidents, traffic incidents and other requests for law enforcement services; investigation of criminal offenses and apprehension of the perpetrators; investigation for law violations; maintenance of a

[73] https://beta.firedepartment.net/directory/wisconsin/calumet-county/
[74] https://www.co.calumet.wi.us/445/MABAS-Division-122-Calumet-County

smooth, orderly and safe flow of traffic; and public information activities.

A number of local law enforcement departments are also responsible for protecting and serving the citizens of the municipalities within the county. Those departments include:

- Appleton Police Department
- Brillion Police Department
- Chilton Police Department
- Kiel Police Department
- New Holstein Police Department
- Menasha Police Department

The Wisconsin State Patrol provides limited coverage from their east-central region office in Fond du Lac.[75] See the Calumet County Law Enforcement District Map in Appendix A for district boundary details.

Special Teams

County fire departments are trained to the hazardous materials Operations level and can handle level B incidents. A hazardous materials response trailer is housed in Hilbert which has level B equipment. Class B foam banks are stored at various fire departments in the county. The City of Appleton Fire Department is capable of operations through a Type III level for hazardous materials entry teams. The team would not take over but would be available for mutual aid assistance as they bring a higher level of trained personnel and equipment.

Hazardous materials response is also performed by Type II and Type III Teams. [76] Wisconsin Emergency Management contracts and manages twenty-two Regional Hazardous Materials Response Teams. The teams are divided into Task Forces: Northeast Task Force, Northwest Task Force, Southeast Task Force and the Southwest Task

[75] http://wisconsindot.gov/Documents/about-wisdot/who-we-are/dsp/dsp-regions-map.pdf

[76] http://emergencymanagement.wi.gov/training/docs/Regional_Hazardous_Materials_Resp_Teams_Map.pdf

Force. These Task Forces are then divided into Type I, Type II and Type III teams, all with complimentary capabilities and training requirements.

The Wisconsin Hazardous Materials Response System may be activated for an incident involving a hazardous materials spill, leak, explosion, injury or the potential of immediate threat to life, the environment, or property. The Wisconsin Hazardous Materials Response system responds to the most serious of spills and releases requiring the highest level of skin and respiratory protective gear. This includes all chemical, biological, or radiological emergencies.

In addition, there are regional bomb squad teams, dive teams and special weapons and tactics (SWAT) teams available throughout the state as shown on maps found in Appendix A.

Archaeological and Historical Resources

The National Register of Historic Places includes a listing of locations in Calumet County.[77] As mitigation projects are considered, the county is committed to ensuring that archaeological and historical sites are preserved.

Historic Sites		
Historic Site Name	**Street Address**	**Municipality**
Aebischer Site	Address Restricted	City of Chilton
Calumet County Courthouse	206 Court Street	City of Chilton
Calumet County Park Group	Address Restricted	Hilbert
Chilton Post Office	57 E. Main Street	City of Chilton
Haese Memorial Village Historic District (Also known as F.G. Haese General Merchandise Store)	Milwaukee and Randolph Street	Forest Junction
High Cliff Mounds	Address Restricted	Sherwood
Ridge Group (Also known as Gasch Mound Group)	Address Restricted	Chilton

[77] https://nationalregisterofhistoricplaces.com/wi/calumet/state.html

Stockbridge Harbor	Address Restricted	Stockbridge
Stockridge Indian Cemetery	N of Stockridge off WI 55	Stockbridge
Timm, Herman C., House	1600 Main Street	New Holstein

The Wisconsin Historical Society maintains a list of archaeological sites and cemeteries known as the Archaeological Site Inventory Database (ASI); this list is available to governmental agencies upon request. These sites cover an extended period of time, which include campsites/villages/communities, cabins/homesteads, sugar mapling sites, cemetery/burial/ mounds, trading/fur posts, mill/sawmills and kilns.

All of these sites have been reported to the State Historical Society of Wisconsin and are protected sites. If there is concern that a mitigation project will impact one of these or any other identified or suspected archeological site, the county will work with the proper authorities to ensure that all applicable laws and regulations are followed.

Hazard Analysis and Previous Mitigation Projects

The following sections identify those hazards that have occurred or could occur in Calumet County. Each includes a description of a hazard and its frequency of occurrence. Also included is a section that describes the general vulnerabilities of the community and its infrastructure to each particular type of hazard. More detailed and specific analyses will be conducted as projects are identified for inclusion in grant applications. As part of the application process, the methodology of data collection and future development patterns will be addressed. Estimates of potential dollar losses and the methodology used to arrive at those estimates will also be described during this application process.

Wisconsin Emergency Management (WEM) completed and regularly updates the State Hazard Mitigation Plan, which was last revised in November, 2021. This plan describes the hazards that have occurred or are most likely to occur within the state and includes the frequency of occurrence, potential impacts and suggested actions to mitigate the hazard. This plan is the basis for the development of all emergency management plans and is distributed upon revision to county emergency government directors and other stakeholder agencies.

For this plan the Calumet County Hazard Mitigation Plan Workgroup reviewed the past events records and an internal workgroup consensus was reached on the anticipated probability of future events. This probability was designated as "very high," "high," "medium," "low" or "very low" by the workgroup based on their evaluation and experience with the data.

The workgroup understands that historical weather data provided by the National Weather Service does not include events which may adversely affect their communities but fall below the reporting thresholds. However, each weather event was analyzed for historic frequency and averages over the last 25 years and is noted within each section. Additionally, a table with this information is included in Appendix B Frequency of Occurrence.

Hazard	Likelihood of Occurrence*	Severity of Effects if It Does Happen*	Notes
Drought/Dust Storm	Low	People – Very Low Agriculture – Low	
Earthquake	Very Low	Very Low	
Flood – Flash Flood & River Flood	Flash Flood – Very High River Flood – Very High	Flash Flood – High River Flood - Low	VI & TN of Stockbridge – at bottom of hill for flash flood
Flood – Dam Break	Medium	Medium	Hayden Dam (TN Charlestown)
Wild Land Fire	Medium	High	Brillion Marsh higher; worse if in peat longer
Karst	High	Medium	
Severe Temperatures	Hot – Medium Cold – High	Hot – Medium Cold – High	Increasing over time.
Hail	High	Low	
Lightning	High - Very High	Low - Medium	
Thunderstorm	Very High	Low	
Tornado	Low	Very High	
Derecho (High Wind)	Medium	Very High	Would take out a lot of feeder lines
Winter Storm (Snow & Ice)	Very High	Medium	TN Brothertown gets ice shoves from Lake Winnebago
Utility Failure	Electric – Very High Natural Gas (winter) – Low Water – Medium Sewer – Medium	Electric – Very High Natural Gas – High Water – High Sewer – High Telecommunications -	

	Telecommunications – Medium	Low	

*5 point scale - Very Low (1), Low (2), Medium (3), High (4), Very High (5)

For the purposes of this document, "Frequency of Occurrence" section will use the following descriptors, as selected by the hazard mitigation planning workgroup when they evaluated the history and their experiences and expectations for the probability of future events. These descriptors are generally assigned the probabilities below, unless otherwise defined within the chapter's text.

Descriptor	Number	Definition
Very Low	1	0% - 20% chance of a damaging incident occurring annually
Low	2	20% - 40% chance of a damaging incident occurring annually
Medium	3	40% - 60% chance of a damaging incident occurring annually
High	4	60% - 80% chance of a damaging incident occurring annually
Very High	5	80% - 100% chance of a damaging incident occurring annually

The National Risk Index (NRI) is an online tool provided by the Federal Emergency Management Agency (FEMA) which uses the best available source data to help illustrate communities most at risk of natural hazards. It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience.

Although 18 natural hazards are part of this data, some have no value as they do not pose a risk to Calumet County; or are otherwise not specifically addressed in this plan. [78] Information for the remaining NRI hazards is included in the relevant chapters.

[78] Hazards from the NRI data that are not included in this plan: Avalanche, Coastal Flooding, Hurricane, Landslide,

It should be noted that the NRI information may not necessarily match the hazard ratings above and is only being included for reference. General county statistics are below. The data is current as of October 2020.

County Information

Population (2016)	48,971
Building Value ($)	5,654,954,000
Agricultural Value ($)	203,559,000
Area (square miles)	318

Ratings Summary

Risk Index	Very Low
Expected Annual Loss	Relatively Low
Social Vulnerability	Very Low
Community Resilience	Very High

Risk Index Overview

Rating	Very Low
Score	4.91
National Percentile	7.48
State Percentile	2.78

Expected Annual Loss

Rating	Relatively Low
Score	14.08
National Percentile	62.16
State Percentile	63.89

Total ($)	6,015,261
Building Value ($)	3,534,661
Population	0.28
Population Equiv. ($)	2,053,326
Agricultural Value ($)	427,275

Social Vulnerability

Rating	Very Low
Score	18.05
National Percentile	3.28
State Percentile	4.17
Source Value	-5.15

Community Resilience

Rating	Very High
Score	59.85
National Percentile	97.58
State Percentile	97.22
Source Value	2.99

The emphasis in the following sections is on mitigation activities for each hazard as a major component of overall emergency management. Mitigation or prevention activities reduce the degree of long-term risk to human life and property from natural and man-made hazards. The cooperation of government, academia, the private sector and volunteer agencies is essential in mitigation efforts. Calumet County Emergency Management is committed to working with municipalities and the private sector to ensure that county mitigation information is shared and it is incorporated into their planning as appropriate.

Each community will be given a copy of the plan to use as a reference during their own preparedness activities (i.e., planning, training, permitting, zoning). Communities that have their own comprehensive plan will reference this mitigation plan and its contents in the next

scheduled plan update. Municipalities that do not have comprehensive plans either are under the purview of and request assistance from Calumet County or have their own planning departments. Members of the County Planning and Zoning Department and municipal planning departments were included on the Hazard Mitigation Workgroup and are aware of the benefits and requirements to using this plan as they go about their preparedness activities.

Calumet County and its municipalities have a history of identifying, planning and completing hazard mitigation projects including these, which received supplemental funding. It was also noted by the workgroup that there are several opportunities for grant funding from various federal and state resources including:

Community Development Block Grant (CDBG) - The U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant-Disaster Recovery Assistance provides flexible grants to help cities, counties and states recover from Presidentially-declared disasters, especially in low-income areas, subject to availability of supplemental appropriations. In response to disasters, Congress may appropriate additional funding for the CDBG program as disaster recovery grants to rebuild the affected areas and provide crucial seed money to start the recovery process. Since CDBG Disaster Recovery assistance may fund a broad range of recovery activities, HUD can help communities and neighborhoods that otherwise might not recover due to limited resources. Disaster Recovery grants often supplement the disaster programs of FEMA, the SBA and the U.S. Army Corps of Engineers (i.e., these funds can be used for the local matching requirement of other federal grants).[79]

CDBG Emergency Assistance Program (EAP) Projects:

- EAP #11-01 Outagamie and Calumet Counties ($57,876) – Rehabilitate housing units in City of Kaukauna

It was noted by the workgroup that there are several opportunities for grant funding from various federal and state resources including:

- **HMGP** - The Hazard Mitigation Grant Program (HMGP) is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended. The key purpose of

[79] https://dma.wi.gov/DMA/divisions/wem/mitigation/docs/HazardMitigationPlan/Appendix_C-Mitigation_Grants2.pdf

HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. HMGP is available, when authorized under the Presidential major disaster declaration, in all areas of the state following a Presidential disaster declaration. [80]

Hazard Mitigation Grant Program (HMGP) Plans Funded in Calumet County

- 2011 DR-1933-WI: Calumet County plan update $47,322

- **PDM** - The Pre-Disaster Mitigation (PDM) program is authorized by Section 203 of the Stafford Act, 42 USC. 5133. The PDM program is designed to assist States, Territories, tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future major disaster declarations. [81]

  - PDM Projects Funded in the State
    - 2002 WEM All $15,520 Technical assistance Personnel, travel, and supplies
    - 2003 WEM All $32,834 Technical assistance Personnel, travel, and supplies
    - 2003C WEM All $176,812 Technical assistance Personnel, travel, and supplies
    - 2005C State of Wisconsin All $182,010 Development of structure inventory database
    - 2005C WEM All $88,480 Technical assistance Personnel, travel, and supplies
    - 2006C WEM All $22,141 Technical assistance Personnel, travel, and supplies
    - 2007C WEM All $70,092 Technical assistance Personnel, travel, and supplies

80 http://www.fema.gov/hazard-mitigation-grant-program
81 http://www.fema.gov/pre-disaster-mitigation-grant-program

- 2008C WEM All $23,897 Technical assistance Personnel, travel, and supplies
- 2008C WEM $18,906 Technical assistance LPDM; personnel, travel, and supplies
- 2009C WEM All $25,579 Technical assistance Personnel, travel, and supplies
- 2010C WEM All $47,859 Technical assistance Personnel, travel, and supplies

  - PDM Plans Funded in the State
    - 2003C Calumet County $30,000 – New plan approved
    - 2007C WEM All $402,574 Update Agreement with UW for HAZUS flood risk assessment

- **FMA** - The Flood Mitigation Assistance (FMA) program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). The Repetitive Flood Claims (RFC) program has the goal of reducing flood damages to individual properties for which one or more claim payments for losses have been made under flood insurance coverage and that will result in the greatest savings to the National Flood Insurance Fund (NFIF) in the shortest period of time. [82]

  - Flood Mitigation Assistance (FMA) Projects Funded in the State
    - 2003 WEM All $16,320 Technical support for applicants Personnel, travel, supplies
    - 2005 WEM All $11,464 Technical assistance to subgrantees Personnel, travel, supplies
    - 2007 WEM All $4,020 Technical assistance to subgrantees Personnel, travel, supplies
    - 2010 WEM All $8,994 Technical assistance to subgrantees Personnel, travel, supplies
    - 2012 WEM All $10,720 Technical assistance to subgrantees Personnel, travel, supplies

82 http://www.fema.gov/flood-mitigation-assistance-program

- 2013 WEM All $13,153 Technical assistance to subgrantees Personnel, travel, supplies
- 2014 WEM All $33,042 Technical assistance to subgrantees Personnel, travel, supplies
-

- **SRL** - The Severe Repetitive Loss (SRL) program is authorized by Section 1361A of the NFIA has the goal of reducing flood damages to residential properties that have experienced severe repetitive losses under flood insurance coverage and that will result in the greatest amount of savings to the NFIF in the shortest period of time.[83]

- **RFC** - The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Up to $10 million is available annually for the Federal Emergency Management Agency (FEMA) to provide RFC funds to assist states and communities to reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP). FEMA may contribute up to 100 percent of the total amount approved under the RFC grant award to implement approved activities, if the applicant has demonstrated that the proposed activities cannot be funded under the FFMA program. [84]

- **406 Mitigation** – The Public Assistance-Section 406 Mitigation Funding may be considered by FEMA in a federal disaster declaration to fund mitigation measures to a public facility damaged by the event that enhance the facility's ability to resist similar damage in future events. This funding is authorized under Section 406 of The Robert T. Stafford Disaster Relief and Emergency Assistance Act and provides discretionary authority to fund mitigation measures in conjunction with the repair of the disaster-damaged facilities, which usually present themselves during the repair efforts. The mitigation measures must be related to eligible disaster-related damages and must directly reduce the potential for future similar disaster damages to the eligible facility. This work is performed on the parts of the facility that

[83] http://www.fema.gov/severe-repetitive-loss-program
[84] http://www.fema.gov/repetitive-flood-claims-program

were actually damaged by the disaster and the mitigation provides protection from subsequent events. Mitigation measures must be determined to be cost-effective, technically feasible, and in compliance with statutory, regulatory, and executive order requirements. In addition, the measure cannot cause a negative impact to the facility's operation, surrounding areas, or susceptibility to damage from another hazard. [85]

- **Municipal Flood Control Grant Program** - This Wisconsin Department of Natural Resources (DNR) grant is available to all cities, villages, towns, tribes, and metropolitan sewerage districts. Assistance is provided with items such as the acquisition of property, vacant land, structure removal, flood proofing, administrative support, and others. [86]

- **Dam Removal Grant Program** - This Wisconsin DNR grant is available to all cities, villages, towns, tribes, and metropolitan sewerage districts and provides 100% of eligible project costs up to a maximum of $50,000 to remove a dam. Assistance is provided with items such as: the acquisition of property, vacant land, structure removal, flood-proofing, administrative support, and others. [87]

85 http://www.fema.gov/public-assistance-local-state-tribal-and-non-profit/hazard-mitigation-funding-under-section-406-0
86http://dnr.wi.gov/Aid/MunFloodControl.html
87 http://dnr.wi.gov/aid/damremoval.html

All Hazards

One of the bedrock principles of emergency management is to approach issues from an all-hazards perspective. This is generally very cost effective because it accomplishes preparedness and/or mitigation goals for many types of disasters with one resource. Some of the all-hazards mitigation projects that Calumet County would like to accomplish are detailed in the following sections.

The planning committee also used the all-hazards approach to identify mitigation goals for the county and all of its municipalities. The purpose of the hazard mitigation plan is to identify hazard areas, to assess the risks, to analyze the potential for mitigation and to recommend mitigation strategies where appropriate. Potential mitigation projects will be reviewed using criteria that stress the intrinsic value of the increased safety for people and property in relation to the monetary costs to achieve this (i.e., a cost-benefit analysis). With that in mind, the overall planning goals for the entire plan, as listed by the mitigation planning committee were:

- **Objective 1:** To preserve life and minimize the potential for injuries or death.
- **Objective 2:** To preserve and enhance the quality of life throughout Calumet County by identifying potential property damage risks and recommending appropriate mitigation strategies to minimize potential property damage.
- **Objective 3:** To promote countywide planning that avoids transferring the risk from one community to an adjacent community, where appropriate.
- **Objective 4:** To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.

Vulnerability

Perhaps the largest risk that falls under the all-hazards banner is the continuing challenge of securing funding to keep up with the rapid technological changes and advances in the public safety communications infrastructure. When departments cannot

communicate with each other, they cannot be effectively coordinated in a disaster which could cause potential delays in providing critical services to citizens in need.

Hazard Mitigation Strategies

In general, most of the projects that can be done with current budgetary dollars are not capital improvement projects and are not very expensive. Projects that require significant outlays of dollars are, for the most part, grant-dependent. Since the profile (e.g., economic, geographic) of an area may change between the identification of a project in this plan and the availability of grant funds, projects will be identified within the plan and be slated for detailed study and analysis at such time as grants become available. The detailed study will identify the types and numbers of existing and future structures, the potential dollar losses to vulnerable structures and the lead agency or department who will manage the project. At that point, grant-eligible projects will be evaluated using the appropriate grant criteria for factors such as:

- Overall benefit to the community
- Economic feasibility (i.e., a cost-benefit analysis)
- Compliance with environmental, social justice and other laws

The hazard mitigation strategies listed below are not "bricks and mortar" changes. Rather, they are enhancements to computer and radio equipment and plans that allow better communication with the public in times of crisis and therefore do not reduce effects for existing or future buildings and infrastructure.

During an emergency, the general public receives information by sirens, NOAA weather radio, local broadcast or printed media, door-to-door notification by emergency services personnel and a mobile public address system. It should be noted that the ability to use the NOAA weather radio system for an expanded list of emergency messages is a positive move that makes this alert and warning tool even more valuable. As a result, Calumet County will continue to promote use of these radios among the public.

Emergency Management will also distribute NOAA weather radios to all identified special facilities within the county. These facilities

include, but are not limited to, public and private schools, hospitals/medical facilities, CBRFs, adult day cares, nursing homes/assisted living, child care facilities, public/private response agencies and other large congregate facilities.

Other strategies include:

- Calumet County Emergency Management will continue to add/update Emergency Management Department links on the existing county web site (e.g., ARC, Homeland Security/FEMA, WEM) especially focusing on preparedness bulletins. Publicize the website to inform the community. This is an important way to provide community members with one location to find credible information and will be carried forward. Updates occur randomly as new "web-worthy" information is received.

- Assess how Calumet County implements warnings and determine how to enhance those capabilities and educate the public on the warning system. Calumet County replaced the existing emergency notification system with AlertSense in December, 2018. This new system allows the public to sign up for individual alerts in addition to receiving reverse 9-1-1 and IPAWS emergency notifications. In addition, the Calumet County Emergency Manager and Calumet County Sheriff's Office (CASO) personnel implements the annual Student Tools for Emergency Planning (STEP) program within the county schools. Public education is also provided thru regular social media activity

Drought and Dust Storms

Two types of drought occur in Wisconsin: agricultural and hydrologic. Agricultural drought is a dry period that reduces crop yields. Hydrologic drought is a dry period of sufficient length and intensity to affect lake and stream levels and the height of the groundwater table. These two types of drought may, but do not necessarily, occur together.

Agricultural drought in a Wisconsin corn field in 2012.

Dust storms result from a combination of high winds and dry, loose soil conditions. While high winds and periods of drought have each occurred in Calumet County, there has never been a recorded dust storm event. Since natural hazards that have occurred in the past are more likely to occur in the future, it is unlikely that a dust storm event will occur in Calumet County. While there are concerns about topsoil erosion and some mitigation activities may be planned that would reduce the effects of these types of events, they will not be a major focus of this plan.

Physical Characteristics

The understanding that a deficit of precipitation has different impacts on groundwater, reservoir storage, soil moisture, snowpack and stream flow led to the development of the Standardized Precipitation Index (SPI) in 1993. The SPI quantifies the precipitation deficit for multiple time scales. These time scales reflect the impact of drought on the availability of the different water resources. Soil moisture conditions respond to precipitation anomalies on a relatively short scale. Groundwater, streamflow, and reservoir storage reflect longer-

term precipitation anomalies. For these reasons, the SPI is calculated for 3-, 6-, 12-, 24- and 48- month time scales.

The SPI calculation for any location is based on the long-term precipitation record for a desired period. This long-term record is fitted to a probability distribution, which is then transformed into a normal distribution so that the mean SPI for the location and desired period is zero. Positive SPI values indicate greater than median precipitation and negative values indicate less than median precipitation. Because the SPI is normalized, wetter and drier climates can be represented in the same way and wet periods can also be monitored using the SPI.

The classification system shown in the SPI values table (below) defines drought intensities resulting from the SPI. The criteria for a drought event are also defined for any of the time scales. A drought event occurs any time the SPI is continuously negative and reaches an intensity of -1.0 or less. The event ends when the SPI becomes positive. Each drought event, therefore, has a duration defined by its beginning and end and an intensity value for each month that the event continues. The positive sum of the SPI for all the months within a drought event can be termed the drought's "magnitude." Current SPI maps for the United States can be found online.[88]

SPI Values[89]	
2.0+	Extremely wet
1.5 to 1.99	Very wet
1.0 to 1.49	Moderately wet
-0.99 to 0.99	Near normal
-1.0 to 1.49	Moderately dry
-1.5 to -1.99	Severely dry
-2.0 and less	Extremely dry

The Palmer Index is an older scale and is used more often by governmental organizations. It is effective in determining long-term drought (i.e., over several months) and is not as good with short-term forecasts (i.e., weeks.) It uses a zero as normal; drought is shown in terms of negative numbers and excess moisture is reflected by

[88] https://www.ncdc.noaa.gov/temp-and-precip/drought/nadm/indices/spi/div#select-form
[89] https://drought.unl.edu/ranchplan/DroughtBasics/WeatherandDrought/MeasuringDrought.aspx

positive figures. The future incidence of drought is highly unpredictable and may also be localized, making it difficult to determine probability with any accuracy.

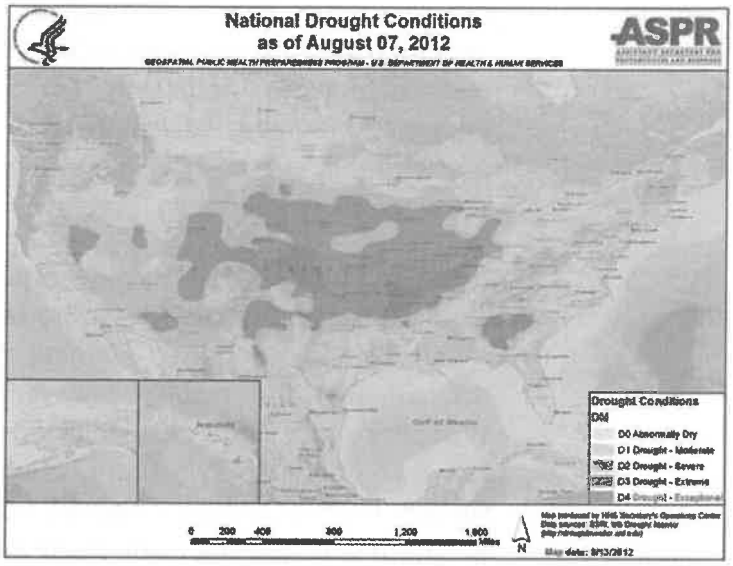
Drought conditions may vary from below-normal precipitation for a few weeks to a severe lack of normal precipitation for several months. Drought primarily affects agricultural areas because the amount and timing of rainfall has a significant impact on crop production. The severity of a drought cannot therefore be completely measured in terms of precipitation alone but must include crop yields.

Frequency of Occurrence

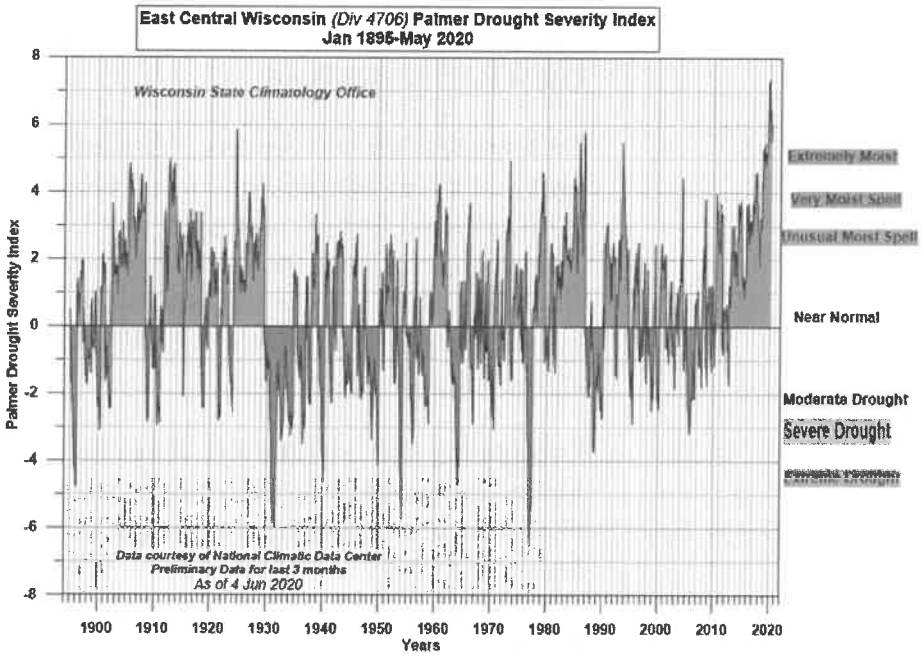
Drought is a relatively common phenomenon in Wisconsin and has occurred statewide in 1895, 1910, 1939, 1948, 1958, 1976, 1988, 1992, 2003, 2005 and 2012. The 1976 drought received a Presidential Emergency Declaration with damage to 64 Wisconsin counties, including Calumet. Estimated losses of $624 million primarily affected the agricultural sector. Reports show that Calumet County was as affected as the rest of the state in this drought. It should be noted that only 19% ($119,434,924) of this loss was compensated by any federal program.

The 2012 heat wave resulted in significant droughts across more the half the country as well as increases in heat related illnesses and deaths. Although July, 2019 was the hottest month in U.S. history, conditions in July, 2012 caused severe drought conditions that eclipsed the record set during the heart of the Dust Bowl in 1936. The worst of the heat was in the Midwest, the Plains and along the Eastern Seaboard. Most of the contiguous US had record and near-record warmth for the seven-month period, except the Pacific Northwest, which was near average. The August 7, 2012 Drought Monitor map shows 52.27% of the United States and Puerto Rico in moderate drought or worse with Calumet County in the D2 – Severe Drought category.[90]

[90] 2012 Heat & Drought Federal Report, HHS ESF 8, UPDATE #2, U.S. Department of Health and Human Services, Assistant Secretary for Preparedness and Response



The Palmer Index chart for the years between January 1895 and May 2020 in East Central Wisconsin, which includes Calumet County follows:[91]



As can be seen from the frequency table above, Calumet County regularly experiences drought to at least a moderate level two to three times every ten years. While drought is a regular occurrence, it is generally very difficult to predict with any accuracy but according to

[91] http://www.aos.wisc.edu/%7Esco/clim-watch/graphics/pdsi-ts-06-l.gif

the Wisconsin Hazard Mitigation Plan, "the NWS and National Integrated Drought Information System (NIDIS) are improving methodology to accurately forecast drought conditions. Both organizations use a combination of current and historical precipitation, stream flow, ground water, and crop data to perform short-term and long-term forecasts."[92]

Calumet County has only one reported drought period. Calumet, along with 23 other counties, reported a drought the entire month of March, 1999. No dollar estimate of damages is available. This drought was the result of a very dry month across northeast Wisconsin, with numerous small grass fires. Many locations received less than one quarter inch of precipitation for the month. Green Bay (Brown County) not only had its driest March on record with 0.15 inches, it was also the sixth driest month of all time. No measurable precipitation was recorded in Green Bay during the last 22 days of the month. Antigo in Langlade County reported just .11 inch and Wisconsin Rapids in Wood County recorded even less precipitation than Green Bay with .13 inch. It was also the second driest March on record at Oshkosh, in Winnebago County, according to a local newspaper (0.17 inch). Individual precipitation levels for Calumet County are not available.

On July 15, 2005, the Governor declared a drought emergency for the entire state of Wisconsin. This declaration, the first since August 2003, allowed farmers access to additional water for crop irrigation. The summer of 2012 was also extremely hot and dry across much of the United States, including Wisconsin. A table showing the drought events recorded by the National Weather Service for Calumet County can be found in Appendix B.

Considering past occurrences, it can be surmised that Calumet County has a low probability of drought occurrence in the future and the likelihood of damage due to drought is considered low for agricultural losses and very low for other types of losses. The probability of dust storm would be low and damages due to dust storms would be very low to low. Over the past 25 years a drought has occurred four times for an average of less than one time per year.

[92] State of Wisconsin Hazard Mitigation Plan, p. 3-100

As noted earlier in this plan, the National Risk Index (NRI) tool [93] has been made available by the Federal Emergency Management Agency (FEMA). It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience. Below is data relevant to the hazard discussed in this chapter. It should be noted that the NRI information may not necessarily match the hazard ratings reached by the county and is only being included for reference.

Number of Events	0
Annualized Frequency	0.00
Expo. - Agricultural Value ($)	0
Expo. - Total ($)	0
HLR - Agriculture	0.00
HLR - Overall Rating	No Rating
EAL - Agricultural Value ($)	0
EAL - Total ($)	0
EAL Score	0.00
EAL Rating	No Expected Annual Losses
Risk Score	0.00
Risk Rating	No Rating

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Vulnerability

Droughts and dust storms could impact Calumet County disproportionately because 62.3% of the land area is used for agricultural activities. [94] Drought generally impacts farm output by reducing crop yields and the health and product output (e.g., milk) of livestock. As a result, a drought will seriously impact the economy of the entire county. Dust storms impact farms in the long term by blowing away the top levels of soil, which are the richest. This could economically impact the county by reducing its long-term viability for

[93] https://hazards.geoplatform.gov/portal/apps/MapSeries/index.html?appid=ddf915a24fb24dc8863eed96bc3345f8
[94] Calumet County Farmland Preservation Plan 2020-2030 https://www.calumetcounty.org/DocumentCenter/View/4688

farming. The concern for agricultural losses due to drought is difficult to estimate because each incident will impact the county differently based on the length of the drought, when it occurs in the planting season and which crops were planted in various locations in that particular season but one can see, by looking at the agricultural statistics listed below, that this sector is an important part of the Calumet County economy and that the losses could be considerable:

- Average size of farms: 205 acres
- Average value of agricultural products sold per farm: $111,674
- Average value of crops sold per acre for harvested cropland: $123.97
- The value of livestock, poultry and their products as a percentage of the total market value of agricultural products sold: 81.79%
- Harvested cropland as a percentage of land in farms: 79.97%
- Average number of cattle and calves per 100 acres of all land in farms: 36.31
- Corn for grain: 29,509 harvested acres
- All wheat for grain: 8,634 harvested acres
- Soybeans for beans: 24,750 harvested acres
- Vegetables: 4,571 harvested acres
- Land in orchards: 66 acres[95]

Drought is also a major risk factor for wildfire and can reduce the amount of surface water available for recreational activities (e.g., boating, fishing, water skiing) and for wildlife. This is important because, for example, low water levels can lead to an outbreak of disease (e.g., botulism) in migratory bird pools.

Prolonged drought can also impact the groundwater reserves. This can reduce the ability of the municipal water services and rural individuals on wells to draw adequate fresh water. This may especially impact rural homeowners who tend to have wells that are not drilled as deeply as municipal wells. In Calumet County, the population that lives outside of the cities and villages are generally on well water. There could be a safety risk during dust storms if they are severe enough to reduce the visibility of the roadways for drivers.

[95] http://www.city-data.com/county/Calumet_County-WI.html

Hazard Mitigation Strategies

The goal of drought and dust storm mitigation activities is to reduce, in a cost-effective manner, the loss of lives and property due to these events.

The Calumet County Land and Water Conservation Department (LWCD) will work with residents to promote water conservation, planting of drought tolerant native vegetation and use of reduced tillage practices on cropland to reduce soil moisture losses. Watershed planning in flooding section includes strategies for reduced tillage and the use of cover crops. LWCD takes opportunities as they arise to work with the community on education around water management and to help improve these practices.

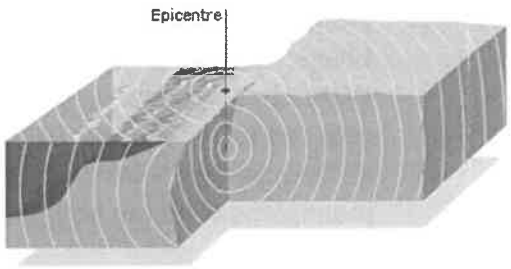
Residents should use mulch to retain moisture in the soil. Mulch also helps control weeds that compete with landscape plants for water. Mulch is used to maintain moisture in the soil during establishment, which helps reduce erosion.

Residents are urged to check their plumbing and wells to be certain they are not leaking and wasting water.

The hazard mitigation strategies listed above primarily involve providing information on water conservation measures to farmers and the public. Water conservation will ensure that the resource is available for critical residential, business and agricultural uses (drinking, food irrigation, manufacturing, firefighting) and good farming practices may help prevent erosion of the rich topsoil found in Calumet County. Since drought and dust storms are not hazards that affect buildings or traditional infrastructure (e.g., bridges, culverts) these strategies did not need to be designed to reduce damages to existing or future buildings and infrastructure.

Earthquakes

An earthquake is a shaking or sometimes violent trembling of the earth which results from the sudden shifting of rock beneath the earth's crust. This sudden shifting releases energy in the form of seismic waves (wave-like movement of the earth's surface.)[96]



Physical Characteristics

Earthquakes can strike without warning and may range in intensity from slight tremors to great shocks. They can last from a few seconds to over five minutes and they may also occur as a series of tremors over a period of several days. The actual movement of the ground during an earthquake is seldom the direct cause of injury or death. Casualties usually result from falling objects and debris because the shocks have shaken, damaged or demolished buildings and other structures. Movement may trigger fires, dam failures, landslides or releases of hazardous materials that compound an earthquake's disastrous effect.

Earthquakes are measured by two principal methods: seismographs and human judgment. The seismograph measures the magnitude of an earthquake and interprets the amount of energy released on the Richter Scale, a logarithmic scale with no upper limit. For example, an earthquake measuring 6.0 on the Richter Scale is ten times more powerful than a 5.0 and 100 times more powerful than a 4.0. This is a measure of the absolute size or strength of an earthquake and does not consider the effect at any specific location. The

[96] http://news.bbc.co.uk/2/shared/bsp/hi/pdfs/earthquake_guide.pdf

Modified Mercalli Intensity (MMI) Scale measures the strength of a shock at a particular location (i.e., intensity.)

A third less often used way of measuring an earthquake's severity involves comparing its acceleration to the normal acceleration caused by the force of gravity. The acceleration due to gravity, often noted "g," is equal to 9.8 meters per second. Peak Ground Acceleration (PGA) measures the rate of change of motion relative to the rate of acceleration due to gravity and is expressed as a percentage. These three scales can be roughly correlated, as expressed in the table that follows:[97]

Earthquake PGA, Magnitude and Intensity Comparison Table			
PGA [%g]	**Magnitude [Richter]**	**Intensity [MMI]**	**Description [MMI]**
<0.17	1.0 - 3.0	I	I. Not felt except by a very few under especially favorable conditions.
0.17 - 1.4	3.0 - 3.9	II - III	II. Felt only by a few persons at rest, especially on upper floors of buildings. III. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
1.4 - 9.2	4.0 - 4.9	IV - V	IV. Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing cars rock noticeably. V. Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
9.2 - 34	5.0 - 5.9	VI - VII	VI. Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. VII. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
34 - 124	6.0 - 6.9	VII - IX	VIII. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
>124	7.0 and higher	VIII or higher	X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. XI. Few, if any [masonry] structures remain standing. Bridges destroyed. Rails bent greatly. XII. Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Most of Wisconsin's occurrences have not been severe, with only one registering 5.1 on the Richter Scale.

[97] Wald, Quitoriano, Heaton and Kanamori, 1999

Frequency of Occurrence

Earthquakes that have affected Wisconsin from 1899 to 1987 are listed in the table that follows. The most severe earthquake in Wisconsin was the record earthquake of 1811, centered along the New Madrid Fault. Most earthquakes that do occur in Wisconsin are very low in intensity and can hardly be felt. These very minor earthquakes are fairly common, occurring every few years. Events of moderate magnitude have occurred in locations in Illinois and Michigan. Those and other stronger earthquakes centered in other parts of the country have been felt primarily in Southern Wisconsin.

Date	Location	Latitude North	Longitude West	Maximum Intensity	Magnitude
10/12/1899	Kenosha	42° 34′	87° 50′	II	3.0
3/13/1905	Marinette	45° 08′	87° 40′	V	3.8
4/22/1906	Shorewood	43° 03′	87° 55′	II	3.0
4/24/1906	Milwaukee	43° 03′	87° 55′	III	--
1/10/1907	Marinette	45° 08′	87° 40′	III	--
5/26/1909	Beloit	42° 30′	89° 00′	VII	5.1 (max)
10/7/1914	Madison	43° 05′	89° 23′	IV	3.8
5/31/1916	Madison	43° 05′	89° 21′	II	3.0
7/7/1922	Fond du Lac	43° 47′	88° 29′	V	3.6
10/18/1931	Madison	43° 05′	89° 23′	III	3.4
12/6/1933	Stoughton	42° 54′	89° 15′	IV	3.5
11/7/1938	Dubuque	42° 30′	90° 43′	II	3.0
11/7/1938	Dubuque	42° 30′	90° 43′	II	3.0
11/7/1938	Dubuque	42° 30′	90° 43′	II	3.0
2/9/1943	Thunder Mountain	45° 11′	88° 10′	III	3.2
5/6/1947	Milwaukee	43° 00′	87° 55′	V	4.0
1/15/1948	Lake Mendota	43° 09′	89° 41′	IV	3.8
7/18/1956	Oostburg	43° 37′	87°45′	IV	3.8
7/18/1956	Oostburg	43° 37′	87°45′	IV	3.8
10/13/1956	South Milwaukee	42° 55′	87°52′	IV	3.8
1/8/1957	Beaver Dam	42° 32′	98°48′	IV	3.6
2/28/1979	Bill Cross Rapids	45° 13′	89°46′	--	<1.0 MoLg
1/9/1981	Madison	43° 05′	87°55′	II	--
3/13/1981	Madison	43° 37′	87°45′	II	--
6/12/1981	Oxford	43° 52′	89°39′	IV-V	--
2/12/1987	Milwaukee	42° 95′	87°84′	IV-V	--
2/12/1987	Milwaukee	43° 19′	87°28′	IV-V	--
6/28/2004	Troy Grove, IL	41° 46′	88°91′	IV	4.2

Also in Wisconsin, 2012 article published in the Milwaukee Journal-Sentinel discussed an incident in Waupaca County that was not an earthquake as traditionally discussed and understood. This episode

is highlighted in this plan because it was widely reported in the state:[98]

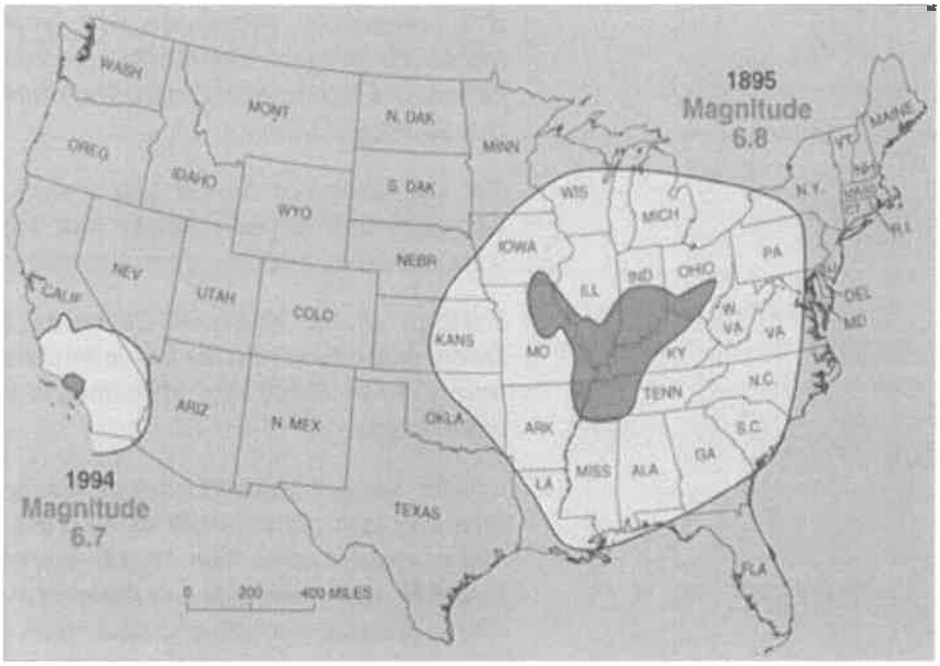
> *A 1.5-magnitude earthquake was recorded at 12:15 a.m. March 20 beneath Clintonville, according to the National Earthquake Information Center. The center is operated by the U.S. Geological Survey.*
>
> *The U.S. Geological Survey said several days of booms and vibrations that rattled windows and nerves last week likely were caused by a swarm of small earthquakes.*
>
> *Scientists at the Wisconsin Geological and Natural History Survey in Madison said the low-intensity seismic activity could have been produced by a phenomenon known as postglacial rebounding.*
>
> *Granite bedrock beneath eastern Waupaca County is slowly adjusting to a great weight being lifted off it when the last glacier melted more than 10,000 years ago. As the granite stretches, rising only a few millimeters a year, it can crack to relieve pressure, according to David Hart, a geophysicist at the Wisconsin Geological and Natural History Survey.*
>
> *As it cracks, one piece slides or shifts places, releasing enough energy to create a seismic wave that rises to the surface.*
>
> *There is no known geologic fault beneath central Wisconsin so the postglacial rebounding is the only thing stretching the bedrock crust in the state, Hart said.*

This phenomenon was widely reported in local, state and national news and drew interest from the public.

The nearest major active fault is the New Madrid Fault, stretching along the central Mississippi River Valley in Missouri. In recent years, considerable attention has focused on seismic activity in the New Madrid seismic zone that lies within the central Mississippi Valley, extending from northeast Arkansas through southeast Missouri, western Tennessee and western Kentucky to southern Illinois. Scientists at the Center for Earthquake Information have computed a set of probabilities that estimates the potential for different magnitude earthquakes to occur at the New Madrid Fault. Even an 8.3 magnitude earthquake at the New Madrid Fault, however, would cause only minor damage in the southeastern corner of Wisconsin.

[98] http://www.jsonline.com/news/wisconsin/rumbling-booming-resumes-in-clintonville-6e4p9o8-144653925.html

At this time, it is not possible to predict the exact date, duration or magnitude of an earthquake.



As seen on the map in Appendix A, the earthquake threat to Calumet County is considered very low (the 50-year acceleration probability is 2%.) Minor damage (e.g., cracked plaster, broken windows) from earthquakes has occurred in Wisconsin but most often the results have been only rattling windows and shaking ground. There is little risk except to structures that are badly constructed. Most of the felt earthquakes reported have been centered in other nearby states. The causes of these local quakes are poorly understood and are thought to have resulted from the still-occurring rebound of the earth's crust after the retreat of the last glacial ice. The likelihood of damage from an earthquake is also very low.

As noted earlier in this plan, the National Risk Index (NRI) tool [99] has been made available by the Federal Emergency Management Agency (FEMA). It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience. Below is data relevant to the hazard discussed in this chapter. It should be noted that the NRI information may not necessarily match the hazard ratings reached by the county and is only being included for reference.

Number of Events	0.00
Annualized Frequency	0.00
Expo. - Building Value ($)	5,654,954,000
Expo. - Population	48,971
Expo. - Population Equiv. ($)	362,385,400,000
Expo. - Total ($)	368,040,354,000
HLR - Buildings	0.01
HLR - Population	0.00
HLR - Overall Rating	Relatively Moderate
EAL - Building Value ($)	4,667
EAL - Population	0
EAL - Population Equiv. ($)	264
EAL - Total ($)	4,930
EAL Score	1.27
EAL Rating	Very Low
Risk Score	0.44
Risk Rating	Very Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Vulnerability

Any impact in the community from earthquake would likely be due to a few broken windows and personal effects that fell in the earthquake. The damage to critical infrastructure and buildings

[99] https://hazards.geoplatform.gov/portal/apps/MapSeries/index.html?appid=ddf915a24fb24dc8863eed96bc3345f8

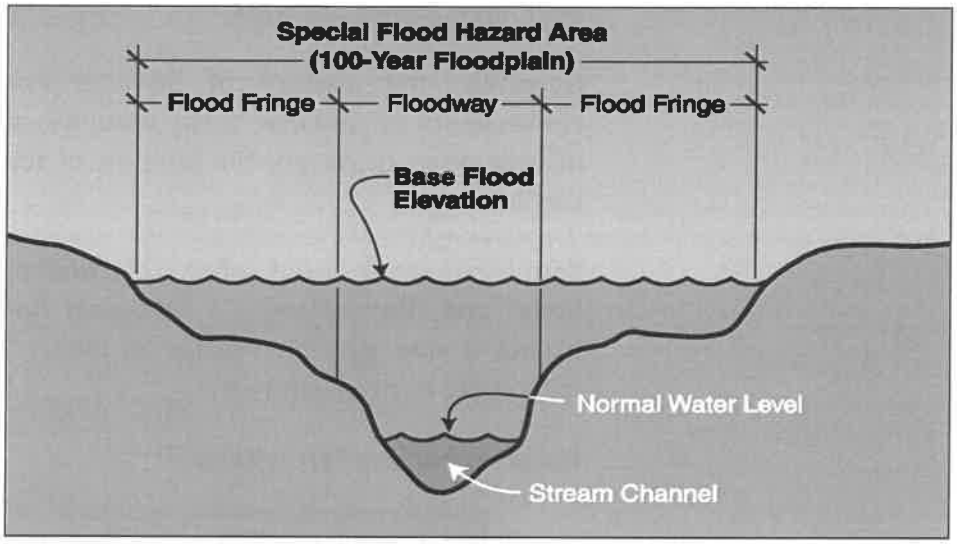
would be negligible although there could be indirect effects from any unlikely losses to the electrical grid, transportation routes/goods shipments and pipelines.

Hazard Mitigation Strategies

Since Calumet County is not likely to suffer directly from a severe earthquake and the community impacts are not considered significant, mitigation planning for this hazard is not necessary. If there is ever a need, obviously emergency resources will be mobilized but the goal for this section of the plan is therefore to educate on the very low risks of earthquake damage in Calumet County. Information on risk and safety measures will be provided upon request.

Flooding and Dam Failure

Flooding is defined as a general condition of partial or complete inundation of normally dry land (i.e., the floodplains) caused by the overflow of inland waters or the unusual and rapid accumulation or runoff of surface waters from any source. Floodplains are the lowlands next to a body of water that are susceptible to recurring floods.[100]



Floods are common in the United States, including Wisconsin, and are considered natural events that are hazardous only when adversely affecting people and property.

Physical Characteristics

Major floods in Wisconsin usually have been confined either to specific streams or to locations that receive intense rainfall in a short period of time.

Flooding that occurs in the spring due to snow melt or during a period of heavy rain is characterized by a slow buildup of flow and velocity in rivers and streams over a period of days. This buildup continues until the river or stream overflows its banks, for as long as a week or two, then slowly recedes. Generally, the timing and location of this type of

[100] FEMA, August 2001

flooding is fairly predictable and allows ample time for evacuation of people and property.

For prediction and warning purposes, floods are classified by the National Weather Service into two types: those that develop and crest over a period of approximately six hours or more and those that crest more quickly. The former is referred to as "floods" and the latter as "flash floods". Flash flooding occurs solely from surface run-off that results from intense rainfall. Flash flooding occurs less frequently in Wisconsin than flooding associated with spring snow melt but it is unpredictable.

Generally, the amount of damage from flooding is a direct consequence of land use. If the ground is already saturated, stripped of vegetation or paved, the amount of run-off increases, adding to the flooding.

Terms commonly used when referring to flooding are "100-year flood" and "flood plain." A "100-year flood" is defined as a flood having a one percent chance of being equaled or exceeded in magnitude in any given year.

Flood Probability Terms Table[101]

Flood Recurrence Intervals	Percent Chance of Occurrence Annually
10 years	10.0%
50 years	2.0%
100 years	1.0%
500 years	0.2%

The Wisconsin Department of Natural Resources (DNR), working with local zoning offices, has designated flood plain areas as those places where there is the greatest potential for flooding. Flooding may also occur due to a dam breach or overflow. Dams are barriers built across a waterway to store, control or divert water; a dam failure is a failure of the dam that causes downstream flooding. Failures may be caused by technological events (e.g., materials failure) or by natural events (e.g., landslide, earthquake) with flooding being the most common result.

[101] State of Wisconsin Hazard Mitigation Plan, 4-28.

According to the Wisconsin Department of Natural Resources (WDNR) Dam Safety Program there are approximately 3,800 dams in existence in the State of Wisconsin. Since the late 19th century, more than 700 dams have been built, then washed out or removed. Since 1967, approximately 100 dams have been removed. Almost 60% of the dams in Wisconsin are owned by a former company or private individual, 9% by the State of Wisconsin, 17% by a municipality such as a township or county government and 14% by other ownership types.

The federal government has jurisdiction over most large dams in Wisconsin that produce hydroelectricity - approximately 5% 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.

The Wisconsin DNR database lists the following small, uncontrolled dams included in Calumet County:[102]

Official Dam Name (Popular Name)	Dam Size	Latitude	Longitude	Owner	Waterway Name
CHILTON (STATE STREET)	LARGE	44.027480	-88.164200	CI OF CHILTON	SOUTH BRANCH MANITOWOC RIVER
HAYTON (OLD MILL)	LARGE	44.024713	-88.118319	TECUMSEH PRODUCTS CO	SOUTH BRANCH MANITOWOC RIVER
HIGH CLIFF STATE PARK	SMALL	44.168460	-88.293640	WI DNR	TRIB LAKE WINNEBAGO
GRAF, HUGO (WOODROW E WELBOURNE)	SMALL	43.909942	-88.118323		TRIB NORTH DITCH
CHILTON NO. 3	SMALL	44.029902	-88.158848	CI OF CHILTON	SOUTH BRANCH MANITOWOC RIVER
CHILTON NO. 2	SMALL	44.028256	-88.161716	CITY OF CHILTON	SOUTH BRANCH MANITOWOC RIVER
THIEL, R.A.	SMALL	44.052418	-88.249348	PRIVATE	TR MUD CREEK

[102] https://dnr.wi.gov/damsafety/damSearch.aspx

HECKRODT, WILLIAM	SMALL	44.179796	-88.298674		TRIB TO LAKE WINNEBAGO
HEPHNER	SMALL	44.058888	-88.137579	PRIVATE	KILLSNAKE RIVER
SCHNEIDER (HIGH CLIFF GOLF COURSE)	SMALL	44.171533	-88.281842	PALISADES POND LAKE DISTRICT	UNNAMED TRIB TO LAKE WINNEBAGO
BRILLION HACKER ROAD	LARGE	44.189563	-88.068591	CI OF BRILLION	STORM WATER MANAGEMENT
BRILLION RYAN STREET	LARGE	44.182304	-88.051301	CI OF BRILLION	TRIB TO SPRING CREEK
PAINE	SMALL	44.186407	-88.314591	PRIVATE	
PETRIE	SMALL	44.178513	-88.283554	VI OF SHERWOOD	UNNAMED TRIB TO LAKE WINNEBAGO
STATE PARK COURT	SMALL	44.241910	-88.297810	GARNERS CREEK STORM WATER UTILITY	TRIB TO GARNERS CREEK
LAKESHORE ESTATES		44.179780	-88.298680	LAKESHORE ESTATES LTD.	
JONEN, DAN	SMALL	44.219436	-88.384680	PRIVATE	UNNAMED TRIB TO LAKE WINNEBAGO
MEILKE	SMALL	44.186793	-88.312989	PRIVATE	TRIB TO LAKE WINNEBAGO
SANDERFOOT (HECKRODT POND)		44.183501	-88.309260	PRIVATE	UNNAMED TRIB TO LAKE WINNEBAGO
DEER RUN GOLF COURSE	SMALL	44.162954	-88.071829	DEER RUN GOLF COURSE	BLACK CREEK
NOE ROAD	SMALL				GARNERS CREEK

Most of these dams are small, mill-type dams under the jurisdiction of the DNR and are also privately owned. None of these dams could handle the volume of water generated by a 100- or 500-year flood without overtopping. These dams are inspected by the Wisconsin Department of Natural Resources (DNR) and the largest are required to have an Emergency Action Plan (EAP) and failure analysis on them. There are no dams in other counties that pose a significant flooding risk to the citizens of Calumet County.

The Wisconsin Department of Natural Resources assigns hazard ratings to large dams within the state. When assigning hazard ratings, two factors are considered: existing land use and land use controls (zoning) downstream of the dam. Dams are classified into three categories that identify potential hazards to life and property downstream should the dam fail. A high hazard indicates that a failure would most probably result in the loss of life. A significant hazard indicates a failure could result in appreciate property damage. A low hazard exists where failure would result in only minimal property damage and loss of life is unlikely.

For Calumet County, there are four dams that have a high hazard rating – Chilton (State Street), Brillion Hacker Road, Brillion Ryan Street and Hayton (Old Mill). The county will be bringing together a workgroup to review the high-hazards dam areas in the county to evaluate risk and discuss strategic planning.

The other dams in Calumet County are considered low-hazard. The only dam outside of the county that could affect the citizens of Calumet County is the Sheboygan Marsh Dam, which is roughly five miles south of the City of Kiel. While it does have the potential to affect the county there is no significant risk to citizens as there is nearly zero development in the dam failure shadow.

One potential effect of flooding is erosion. Erosion is defined as the removal of soil by the force of waves, currents and/or ice at a lakeshore or stream bank or by the power of wind or water on open land. Erosion is a natural process that can be accelerated by natural disasters (e.g., flooding, heavy rains, strong winds, drought) or by human activity (e.g., removal of plants/trees, tilling.) Because of the many waterways in Calumet County, there are issues and concerns with erosion and stabilization of shorelines along Lake Winnebago and other rivers and tributaries.

Watersheds

There are 10 watersheds in four river basins covering Calumet County, including the Lower Fox River Basin, the Upper Fox River Basin, the Manitowoc River Basin and the Sheboygan River Basin. Lake Winnebago is also its own watershed. For water resource planning purposes, each river basin is further divided into watersheds. Following is a brief description of each watershed:

Lower Fox River Basin

Plum and Kankapot Creeks (LF03) [103]

Historical data indicates water quality problems in the Plum Creek Watershed. Problems with low dissolved oxygen, high nutrient levels and sediment levels which were attributed primarily to nonpoint pollution. Poor land practices in the Plum Creek Watershed (84 square miles), cause nonpoint source pollution that degrades water quality in the upper reaches of the Plum Creek. The headwaters are intensively farmed and cropland erosion, streambank pasturing and barnyard runoff are common. The lower reaches have very steep banks which prohibit pasturing and cropping. In 1992 a watershed assessment was conducted by WDNR to determine the impacts of nonpoint source pollution on water quality. A predominately agricultural watershed, the Plum Creek Watershed was ranked "High" for streams. The watershed is now eligible for selection as a priority watershed under the Wisconsin Nonpoint Source Pollution Abatement Program. Refer to the 1994 Plum Creek Watershed Nonpoint Source Assessment Report by Mary Gansberg for more information. There is one municipal point source discharger and five industrial point source dischargers in the Plum Creek Watershed: Holland Town Sanitary District No. 1, Appleton Papers Inc Locksmill, Interlake papers, Kerwin Paper Co. Div. Riverside Corp., White Clover Dairy Co Inc. and White Clover Dairy Inc Sherwood.

Little Lake Butte des Morts (LF06) [104]

The Little Lake Butte des Morts (LLBDM) Watershed drains to the Fox River beginning at the outlet of Lake Winnebago (Neenah and Menasha dams) to where the Appleton dam is located, which holds back the Fox River to form the impoundment. The 44 square mile watershed includes many unnamed tributaries to the Fox River as well as one named stream, Neenah Slough. The Little Lake Butte des Morts Watershed was added to the Lower Fox River Basin in 1995 when the basin and watershed boundaries of the Upper and Lower Fox River basins were revised. Modifications were made to the boundaries to show correct drainage to Lake Winnebago and to the Lower Fox River Basin. The Little Lake Butte des Morts ranked as a high priority for streams under the Nonpoint Source Pollution Abatement Program basin plan ranking process. The watershed's land area is almost entirely within Winnebago County with the remaining

[103] https://dnr.wi.gov/water/watershedDetail.aspx?key=924658
[104] https://dnr.wi.gov/water/watershedDetail.aspx?key=924908

small percent in Calumet County. The watershed also includes the cities of Neenah, Menasha and the southern edge of Appleton. Many of the small, urbanized unnamed tributaries to LLBDM are severely impacted by stormwater runoff via storm sewers and direct runoff. Many industrial and municipal dischargers are located within the basin. Agriculture is the predominant land use in the outlying areas of the watershed. Many of the unnamed streams have been ditched and are heavily impacted by stormwater runoff. There are two municipal point source dischargers and 15 industrial point source dischargers in the Little Lake Butte des Morts Watershed: Grand Chute Menasha West, Neenah Menasha Sewerage Commission, American National Can Co. (2 facilities), Beloit Manhattan Inc., Galloway Co., James River Corp. (Fort-James) (2 facilities), Kimberly Clark Corp. (3 facilities), Mead Corp. Gilbert Paper Co., Menasha Electric & Water Utility, PH Glatfelter Co. Bergstrom Paper Div., US Papers Mills Menasha and Wis. Tissue Mills.

East River (LF01) [105]

The East River Watershed includes the 206 square mile (534 square kilometers) area of land extending inland from the Fox River and lower Bay of Green Bay, stretching from the town of Red Banks to the village of Wrightstown. Approximately 90 percent of the watershed is in Brown County and the remaining in Calumet and Manitowoc Counties. The watershed contains many small streams and several large rivers draining directly to the Fox River. The watershed was named for one of the larger river systems: East River in Brown and Calumet Counties. Principal streams in the watershed are the Fox River, Baird Creek, Bower Creek and the East River. Rural land uses are predominant in the watershed (152-square miles, 73 percent). Agricultural uses and related open space account for 80 percent of the rural areas. Woodlands and wetlands together cover about 15 percent of the watershed (WDNR 1991). Urban land uses (including developing areas) occupy about 57-square miles, or 27 percent of the watershed. The predominant urban uses are residential (35 percent), and parks and open undeveloped space (48 percent). Population and land use projections indicate that the population will increase between 5 and 10 percent over the next 20 years, resulting in an additional 8,700 acres of urban development (WDNR 1991).

Upper Fox River Basin

[105] https://dnr.wi.gov/water/watershedDetail.aspx?key=924887

Lake Winnebago – East (UF02) [106]

The Lake Winnebago-East watershed is located along the east and south shores of Lake Winnebago in Calumet and Fond du Lac counties. It is approximately 63,618 acres in size and contains 177 miles of streams and rivers, 252 acres of lakes and 1539 acres of wetlands. The watershed is dominated by agriculture (74%) and is ranked high for nonpoint source issues affecting streams and groundwater.

Lake Winnebago – North and West (UF01) [107]

The small watershed of Lake Winnebago -North and West, is located along the west shore of Lake Winnebago in Winnebago County and the north shore of the lake in Calumet County. The watershed is 14,549 acres in size and has only 14 miles of streams and rivers, 183 acres of lakes and 573 acres of wetlands. It is dominated by agriculture (58%) and sub urban land use (17%). The watershed is ranked high for nonpoint source issues affecting streams and groundwater.

Manitowoc River Basin

North Branch Manitowoc River (MA04) [108]

The North Branch Manitowoc River Watershed lies primarily in Calumet County but extends a bit into the western edge of Manitowoc County. The watershed is 49,263 acres in size and includes 130 miles of streams and rivers, 293 acres of lakes and 7389 acres of wetlands. The watershed is dominated by agriculture (78%) and is ranked high for nonpoint source issues affecting lakes and groundwater.

South Branch Manitowoc River (MA05) [109]

The South Branch Manitowoc River Watershed lies primarily in Calumet County but extends west into Manitowoc County and south to Fond du Lac County. The watershed is 121,021 acres in size and includes 228 miles of streams and rivers, 86 acres of lakes and 21,288 acres of wetlands. The watershed is dominated by agriculture (73%) and wetlands (18%) and is ranked high for nonpoint source issues affecting streams, lakes and groundwater.

[106] https://dnr.wi.gov/water/watershedDetail.aspx?key=924852
[107] https://dnr.wi.gov/water/watershedDetail.aspx?key=924746
[108] https://dnr.wi.gov/water/watershedDetail.aspx?key=924694
[109] https://dnr.wi.gov/water/watershedDetail.aspx?key=924832

Lower Manitowoc River (MA02) [110]

The Lower Manitowoc River watershed includes the 168 square mile (436 square kilometers) area of land that extends from the confluence of the North and South branches of the Manitowoc River for 36 miles before entering Lake Michigan at the city of Manitowoc. More than 90 percent of the watershed is within Manitowoc County; the remaining portions lie within Brown and Calumet counties. Land use is primarily agricultural, approximately 67 percent, and about 5 percent is in urban use. The rest is woodland and wetlands, which include the Liberty Swamp and Maple Grove Swamp, both characterized by lowland hardwood species. The watershed also includes the Collins Marsh Wildlife Area, an extremely important aquatic environment.

Sheboygan River Basin

Sheboygan River (SH03) [111]

The Sheboygan River Watershed is the largest and possibly the most diverse watershed in the basin, covering about 260 square miles. The Sheboygan River originates in east-central Fond du Lac County and flows generally southeastward into the City of Sheboygan where it enters Lake Michigan. The major tributaries to the Sheboygan River are the Onion and Mullet Rivers. Other named warm water tributaries to the Sheboygan River are Otter and Weedens Creeks. Millhome, Schuett and Feldner's Creeks are trout streams located in the Sheboygan River Basin. There are also ten dams in the Watershed: Sheboygan Marsh, Kiel, Rockville, Millhome, Franklin, Johnsonville, Sheboygan Falls, Waelderhaus, Riverbend and Mischo's. The Franklin dam was breached in 2000 and will be removed in 2001. Removal of the dam will restore this river reach to a free-flowing condition. The positive change in flow, temperature, and oxygen levels will result in habitat suitable for game fish species such as smallmouth bass, northern pike, and rock bass. Land use in the watershed is primarily agriculture, but the downstream most reaches are entirely urbanized.

Lake Winnebago

Lake Winnebago (WATE) [112]

[110] https://dnr.wi.gov/water/watershedDetail.aspx?key=924831
[111] https://dnr.wi.gov/water/watershedDetail.aspx?key=924713
[112] https://dnr.wi.gov/water/watershedDetail.aspx?key=924771

The Lake Winnebago Watershed is located in Fond du Lac, Winnebago and Calumet counties. It is 131,956 acres in size and contains 335 miles of streams and rivers, 131,607 acres of lake and 119 acres of wetlands. Ninety-nine percent of the watershed is open water.

Floodplain Regulations

Floodplain regulations have been in place in the cities, towns and villages of Calumet County for many years. The Department of Natural Resources requires that each municipality approve regulations that meet DNR guidelines. These regulations and guidelines result from the value of Wisconsin lakes and waterways and a desire to preserve them and to protect the people who reside near them. Unregulated development can lead to loss of lives and property during floods.

Chapter 614, Laws of Wisconsin 1965, requires counties to adopt regulations giving all lands within 300 feet of navigable rivers or streams protection from haphazard development. Under this legislation, Calumet County has adopted a zoning ordinance which gives a measure of protection to watersheds. The law protecting flood plains was created to meet the following objectives:

- Reduce the hazards to life and property from flooding.
- Protect flood plain occupants from a flood which is or may be caused by their own land use, which is or may be undertaken without full realization of the danger.
- Protect the public from the burden of extraordinary financial expenditures for flood control and relief.

Encroachment on flood plains, including structures or fill, reduces the flood-carrying capacity.

Frequency of Occurrence

Wisconsin has experienced several major floods during the last two decades. The 1973 and 1986 floods revealed that no flood plains or urban areas in Wisconsin can be considered safe from damages. Mill-

dams have developed leaks on occasion but have not caused any flooding problems.

Calumet County does have a history of flooding problems and has been included in two Presidential Disaster Declarations requests for flooding which are detailed below: [113]

- FEMA 1768-DR: On June 14, 2008, the President declared a major disaster as a result of severe storms, tornadoes and flooding that began on June 5. Calumet County was eligible for both Public and Individual Assistance as well as Hazard Mitigation.

- FEMA-DR-1933: On August 11, 2010, the President declared a major disaster as a result of severe storms, tornadoes and flooding that occurred July 20, 2010 to July 24, 2010. Calumet County was eligible for both Public and Individual Assistance as well as Hazard Mitigation.

Calumet County has had no repetitive loss properties reported by the National Flood Insurance Program. [114].

Tables showing the flood and flash flood events recorded by the National Weather Service can be found in Appendix B. A careful review of the geography and history of flooding in Calumet County leads to a belief that there is a very high probability of flooding in the future; a high probability of damage and losses due to flash flooding; and a low probability of damage and losses due to river flooding. This flooding could occur due to urban stream flooding, flash flooding or, less likely, due to a dam failure. It was also determined that there was a medium probability of a dam break in the county and a medium probability of damage and losses due to a dam break.

[113] https://www.fema.gov/disasters

[114] Although the FEMA database shows one repetitive loss property for the county, Wisconsin Emergency Management advised on May 13, 2020 that this property is actually in Outagamie County and they would contact FEMA to correct the database.

As noted earlier in this plan, the National Risk Index (NRI) tool [115] has been made available by the Federal Emergency Management Agency (FEMA). It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience. Below is data relevant to the hazard discussed in this chapter. It should be noted that the NRI information may not necessarily match the hazard ratings reached by the county and is only being included for reference.

Riverine Flooding

Number of Events	8
Annualized Frequency	0.36
Expo. - Building Value ($)	130,336,782
Expo. - Population	967
Expo. - Population Equiv. ($)	7,154,976,748
Expo. - Agricultural Value ($)	14,881,728
Expo. - Total ($)	7,300,195,259
HLR - Buildings	0.00
HLR - Population	0.00
HLR - Agriculture	0.02
HLR - Overall Rating	Very Low
EAL - Building Value ($)	44,577
EAL - Population	0
EAL - Population Equiv. ($)	23,289
EAL - Agricultural Value ($)	116,119
EAL - Total ($)	183,985
EAL Score	14.15
EAL Rating	Relatively Low
Risk Score	4.47
Risk Rating	Very Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

[115] https://hazards.geoplatform.gov/portal/apps/MapSeries/index.html?appid=ddf915a24fb24dc8863eed96bc3345f8

Vulnerability

After flooding, caused either by a storm or dam failure, there is often damage. Potential vulnerabilities due to flooding events can include flooded public facilities and schools, many of which are the community's shelters needed when individual housing is uninhabitable. Utilities are also vulnerable in floods, which can bring down electric lines/poles/transformers, telephone lines and can disrupt radio communications. The loss of communications can impact the effectiveness of first response agencies, which need to communicate via two-way radio to mount emergency response and recovery activities. The public media communications utilized by emergency managers to provide timely and adequate emergency public information can also be impacted.

Residential structures may suffer from flooded basements, damaged septic systems and damaged functionals (e.g., HVAC systems, clothes washers and dryers.) Homes may also be impacted by sewer back-up and, if the home is not properly cleaned after a flood, bacterial growth and mold may impact the home's air quality and cause illness among the occupants.

Businesses can suffer building and equipment damage similar to homes. Businesses may lose expensive product stored in basement or other low areas as well as the ability to operate from their facility. If the facility must close, its owners and employees will most likely suffer economic hardships beyond what their personal losses may have entailed. Agricultural business losses involve the loss of standing crops and harvests that are damaged by flooded storage facilities in the immediate time period. On a longer time scale, the erosion of rich topsoil by floodwaters can degrade the land and impact future crop yields.

Perhaps one of the most expensive types of flood damage is that to roadways, which are washed out, inundated and/or covered by debris, blocking access to emergency and general public traffic.

Appendix A contains maps depicting the floodplain and waterways. Appendix F contains excerpts from the Calumet County HAZUS report. HAZUS-MH uses state-of-the-art geographic information system (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. FEMA

HAZUS-MH data were used to estimate the number of structures located within the one-percent chance, or 100-year floodplain, based upon Flood Insurance Rate Maps (FIRMs) published by the Federal Emergency Management Agency (FEMA), the results of which are outlined in the report.

Due to the soil conditions in the County, the agricultural industry is affected by the floodwaters. Some fields lie inundated for weeks in Spring. In that 65.5% of Calumet County's land is used for farm and cropland purposes, the potential for flooding affects the majority of the county.

Flood conditions affect farmers in many ways. Delayed planting reduces growing seasons. Flooded fields prevent farmers from seeding for crops. Often times seed and agricultural chemicals are washed out of fields. If plants do take root, summer flooding often rots plants due to excess moisture. In late summer and early fall, some planted crops are left in the fields due to the inability of the farmer to access his crops because of excessive moisture on the field. Crops not reaching full maturity yield a smaller crop and less valuable.

The moisture also requires farmers to spend more money to try and negate the water problems that affect their fields. Crops which do not reach full maturity have a lower nutritional value. Reductions in quantity can result in loss of revenues in cash crops and increase expense for purchasing the needed livestock feed from outside sources. Additionally, reductions in crop quality results in lower prices received for cash crops and increased amounts spent for nutritional supplements to animal feed, which need to be added even in much of the purchased feed.

Economic losses to farmers can generate a ripple effect to the local community as well. Reduction in farm income will curtail the farmers' ability to purchase new equipment and make other improvements. Farmers will have less money to spend at farm dealers, farm supplies; building and hardware suppliers; fertilizer, feed and seed dealers; and other agribusiness and retail establishments. The State itself will have reduced tax. Farmers will have less money to save and invest and suffer still more increases in debt load. Although the crop and livestock industries are heavily affected by flooding, the one crop not affected is the forest products industry. The areas that are logged in Calumet County tend to be higher in topography and do not flood.

Hazard Mitigation Strategies

Calumet County is committed to remaining compliant with the requirements of the National Flood Insurance Program (NFIP) and all other state and federal laws. According to the NFIP, the following communities participate in the program.[116]

- Calumet County
- City of Chilton
- Village of Harrison
- Village of Hilbert
- City of Kiel
- City of Menasha
- City of New Holstein
- Village of Potter
- Village of Stockbridge

The following community has maps but has elected to not participate in the NFIP program: [117]

- Village of Sherwood

When queried regarding their election to not participate, it was reported that the Village Board believed that due to the lack of properties in floodplain areas and the historical lack of incidents to Sherwood properties that participation in the NFIP was not something that they wished to do at that time.

If a community chooses not to participate in the NFIP, property owners in that jurisdiction are unable to purchase federal flood insurance. In addition, federal grants, loans, disaster assistance and federal mortgage insurance are unavailable for the acquisition or construction of structures located in the floodplain as shown on the NFIP maps. Similarly, if a community chooses not to participate in the

[116] https://www.fema.gov/cis/WI.pdf
[117] https://www.fema.gov/cis/WI.pdf

NFIP, property owners are not subject to the federal flood insurance purchase requirements. However, a lender is still required to inspect any flood maps to determine flood hazard risk and provide notice of such risk. A lender may require a borrower to obtain flood insurance even in the absence of a federal purchase requirement. [118]

Communities are advised to review the Federal Emergency Management Agency's Flood Insurance Study for Calumet County and note areas identified as having flooding problems, and, follow flood protection measures identified. New FIRMS were available as of 2009, and all communities have them.

For those cities or villages that have experienced inundated sewer laterals, the Calumet County Planning Department will assist them with writing grants to repair such facilities. The USDA may be a funding source.

The Calumet County Emergency Management office will assist communities with grant applications necessary for dam maintenance; and will work with the responsible jurisdictions, in conjunction with the Wisconsin Department of Natural Resources (WDNR) to develop and maintain Emergency Action Plans (EAPs). Emergency Management will also continue to explore if residents express interest in flood mitigation measures (e.g., buyouts, elevations, floodproofing, etc.) county wide. FEMA's PDM & FMA grants are potential funding sources for buyout.

All municipalities with dams shall continue to inspect the dams or work with the WDNR to inspect them. Any maintenance issues shall be addressed. Calumet County does not "own" any dams as these structures are the responsibility of the municipalities and/or private land owners with general oversight from the WDNR.

To minimize flooding to new structures constructed in a floodplain, all communities with floodplain ordinances should continue to administer floodplain ordinances. It is encouraged that existing structures be brought into compliance with those ordinances. The County administers the program for townships and unincorporated areas. Incorporated areas have their own ordinances.

The Calumet County Land and Water Conservation Department employs an Erosion Control and Stormwater Specialist who

[118] https://www.fema.gov/homeowners-frequently-asked-questions

administers Erosion Control and Stormwater Ordinances in the unincorporated portions of the County. Ordinances aim to reduce sediment delivery from ground disturbing constructions sites and manage stormwater runoff from developed sites post-construction. The Erosion Control and Stormwater Specialist can also provide assistance in evaluating site specific flooding hazards impacting roads, bridges, culverts and cropland for municipalities and landowners needing assistance.

Calumet County Land and Water Conservation Department (LWCD) will work with the individual communities to minimize localized, road, bridge, culvert, and crop flooding. LWCD can help determine if and when individual community mitigation strategies can be implemented and is aware of some mitigation strategies that may be more effective as well as potential grant dollars and cost sharing that can aid in reducing the cost of such strategies.

LWCD will focus on watershed planning which focuses on water quality but will provide benefits in the reduction of sediment in local waterways and small-scale water retention when possible. Timeline: EPA 9 Key Element Watershed planning will aim to include all watersheds by 2030.

LWCD will work with the WDNR to develop an emergency plan to protect ground and surface waters from the hazards mentioned in this section (e.g., spring thaws). LWCD will work with the WDNR to implement NR 151 Agricultural and Erosion Control and Stormwater performance standards which will reduce pollution from the hazards mentioned in this section (e.g., spring thaws).

The LWCD would like to conduct a partial study or full engineering plan of the County Highway E watershed as related to the continual culvert right-of-way/driveway washouts. An additional partial study or full engineering plan of the County Highway E watershed may be necessary as a precursor to any physical mitigation work

The LWCD will create a watershed-wide stormwater management plan for the Upper Manitowoc River. A "9 Key Elements" plan is currently being worked on/almost completed. A full management plan could work off of this current effort, as well as the existing "Final Recommendations of the Upper Manitowoc River Watershed Task Force that was completed in January 2016)." A full management plan

would prioritize and address the comprehensive mitigation needs of this watershed.

Public information regarding flooding, flood insurance, flooding hazards and ways to minimize issues will be carried out by all county departments and municipalities through social media and other outreach events as they occur.

Additional proposed mitigation strategies/projects within Calumet County include:

County Highway Department

- Reinforce & strengthen the identified driveways/rights-of-way on County Highway E by Long Road with geosynthetics, create flood storage upstream of those culverts and road, and create flood routing to move potential overflows away from the road and gravel driveways. There are recurring flooding issues in a portion of Mud Creek that flows alongside County Road E that causes washouts of several culverts. These culverts have been repeatedly repaired by the Highway Department. Recently, the department replaced the culverts with larger twin culverts to meet the flow from a 10-year storm event. However, more frequent and more intense rain events continue to wash out driveways above the culverts. An additional partial study or full engineering plan of the County Highway E watershed may be necessary as a precursor to any physical mitigation work.
- CTH T, US 151 to Honeymoon Hill Rd – Pulverize and pave new surface.
- CTH N, US 10 to CTH KK – Right-of-way improvements, roundabout, sidewalk and bike path.
- CTH PP, Behnke Rd to Glenview Ave – Pulverize, rubberize and pave new surface.
- CTH N, STH 114 to US 10 – Pulverize and pave new surface.
- CTH T, Honeymoon Hill Rd to CTH X – Pulverize and pave new surface.
- CTH H, US 151 to CTH G – Pulverize and pave new surface.

City of Appleton

Each of these locations has flooded with heavy spring runoff about every five to ten years.

- Calumet Street – Kernan to Telulah - Raise Road Center line elevation 2.0".
- Horizon Drive, Regal to Calumet - Add parallel storm sewer.
- Harding Drive, Carpenter to Greenview - Increase storm sewer pipe size.
- Greenview St., Harding to Calumet - Increase storm sewer pipe size.
- Berry Dr, Roeland to Calumet - Increase storm sewer pipe size.
- Telulah Ave, Taft to Calumet - Increase storm sewer pipe size.
- Taft Ave, Walden to Telulah - Increase storm sewer pipe size.
- Harding Dr, Fountain to Telulah - Increase storm sewer pipe size.

City of Brillion

- Dredging, education, riprap, new bridge to control flooding (citywide tributaries, their floodplains and Main Street Bridge). All the tributaries in the city flood during heavy rains. The tributaries swell and about once every ten years the floodplains of all the tributaries flood. When the tributaries swell and flood, adjacent lawns are flooded. Flooding is particularly severe south of West Water Street. In 2004 water was so high in this tributary that it reached the bottom of the Main Street Bridge. Flooding at the bridges is common in Brillion and about five owners on either side of the bridges, along the subject tributaries, have flooding on their lawns at least once a year. The city is concerned about the property damage, and that additional flooding will infiltrate the storm and sewer systems, and, go over city roads resulting in potential traffic problems. In 1997 there was a dam built at Hacker Road at the north end of the city. The dam has helped alleviate some of the flooding that comes from the north; however, water still swells the tributaries due to the over saturation in the Brillion Marsh located southwest of the city. Apparently due to sedimentation of rivers, tributaries, and the marsh itself, water does not flow, and, the marsh cannot filter any water. The result is water flowing to the marsh actually backs up in the tributaries. Along those watercourses in the city where water is flowing south to get to the marsh, but the marsh is refusing the water, those tributaries are forced to absorb the water, and the result is routine flooding. City

officials believe that if the marsh were dredged, a lot of the area flooding would be resolved. Dredging the marsh would be an extremely expensive and difficult procedure. But dredging the marsh is only part of the problem. Contractors and developers need to control erosion on construction sites. Also, some of the area farmers need to be better educated about the effects of their farming practices and how those effects can be minimized. Specifically, they need to learn the ramification field erosion has on watercourse and wetland sedimentation. If farmers would leave grass buffers along streams rather than working the soil to water's edge, they could help minimize sedimentation. Also, placing riprap along the stream banks could prevent erosion which also adds to the sediment problem. Dredging existing ditches and tributaries could temporarily help lower water levels, but the reality is they would fill up again as the marsh rejects the water, and as water flows from other areas towards the marsh. Elevating the bridges may also help, but like dredging, the concern is this measure would also be temporary.

- CTH PP – New culvert and ditching due to undersized culvert. The creek that runs through Deer Run Golf Course annually floods per its 100-year floodplain boundaries. The flooding has resulted in property damage and loss of revenues to the golf course. The water attempts to go under County Highway PP and flow west to the Brillion Marsh. The culvert at CTH PP is undersized and needs to be enlarged to alleviate the flooding. In addition, the creek should be ditched to help retain the water within its banks and minimize the flooding.
- Kennedy Drive and Horn Street – New culverts and ditching due to undersized culverts. The area east of Kennedy Street and north of Horn Street floods annually with spring runoff. The tributary floods and four properties in the area are affected with the floodwaters. Larger culverts are needed at the two roads to help the water flow. In addition, ditching could help retain the water within the banks and minimize flooding. The homes in this area are newer, and have been built to floodplain specifications; however, due to the overall water problem in the city, the land experiences more flooding than anticipated. The flooding in this area has been severe enough to flood the basements of the homes. This area is now looking at becoming developed, so there will be some changes coming in the next couple of years.

- Black Creek – Dredge; flooding adjacent to residential property. Black Creek doesn't flow and floods that portion of Deer Run Estates Subdivision east of Golf View Drive. One of the homes adjacent to the creek always floods. The home is only three years old, and was built according to flood proofing specifications. However, due to the amount of water in the city's tributaries, the creek experiences more water than anticipated. The creek needs to be dredged out and its banks steepened so as to ensure the creek can hold more water. As the area develops, it is anticipated more runoff from the added impervious surfaces will only increase the amount of water entering Black Creek; therefore, it is also recommended homes be constructed above the required flood proofing standards to help minimize negative water problems associated with Black Creek.
- Hugho Pond – Enlarge to alleviate tributary flooding. The portion of the tributary south of West Water Street floods. If Hugho Pond in Horn Park (located just east of North Parkway Drive) were enlarged, it could retain more water and help minimize the amount of water entering the flooded tributary. There are some plans in place with Horn Park and part of this includes the creek running into Hugo Pond. This is part of the Brillion Iron Works project.
- Hacker Road – Clean ditch; obstruction floods local road. Approximately ½ mile east of the intersection of Hacker Road and USH 10, the drainage ditch which goes under Hacker Road floods about once every ten years. Water in the ditch gets high enough to flood the road. The ditch, which leads to this culvert, is located in the City of Brillion. To alleviate the flooding the city needs to clean their portion of the drainage ditch. New culvert was installed in 2020, will now monitor this situation to see if this continues to help alleviate the problem; more to come in the next few years.
- Monitor area north of Center Street for flooding. The area north of Center Street, west of St. Mary's church and east of Lee Avenue had experienced severe flooding in the past. To help drain the area, the city replaced all the storm sewers in that area two years ago. They ran the storm sewers to the city pond, which in turn go underground to the creek at Tesch Street and Glenview Avenue. This needs to be monitored to see if the culvert at Tesch and Glenview is effective at transporting the water. The culvert may have to be enlarged

and ditching occurs. Continuing to monitor. It has also become part of the dredging with Spring Creek.

- Explore opportunities to mitigate flooding at the Brillion Iron Works property. There is a history of flooding on the property and in this area of the watershed. The foundry is closed and the City is working with engineers to redevelop the property for new usages. In conjunction with the Town of Brillion.

City of Chilton

- Riverbank south of Main Street – Runoff diversion system, vegetation, rip-rap. The South Branch of the Manitowoc River runs through the City of Chilton, somewhat parallel to Main Street. On the south side of Main Street, between STH 57 and Park Street, the riverbank is very steep. The bank is 50-60' high, with a 2:1 slope. Runoff from the top of the bank, coupled with the flowing river, and any rain or snow melt, has caused severe bank erosion, resulting in a lot of sedimentation in the river. In the 1980's the city attempted to alleviate impervious surface runoff from the top of the bank by requiring landowners at the top of the bank to direct their runoff to pipes that went over the edge of the bank to the river below. The requirement helped; however, directing the salts, oils, etc. to the river isn't a good practice—especially in an area with water quality problems. The pipes are also rather unsightly in a downtown area. However, if the pipes are removed, there will be a severe erosion and sedimentation problem. If the pipes fail, possibly due to ice, there is the potential for more erosion. The pipes need to be run underground to a storm sewer, or to a pond or other detention area, like a rain garden. The city planted vegetation on the slope to help stabilize the bank. However, as trees grew and died, they fell into the river, creating blockage issues at the dam. The city also planted crown vetch to stabilize the soil, but is aware the Wisconsin Department of Natural Resources is informing people not to use this plant due to its invasive nature. However, it has been effective at stabilizing the bank. By redirecting the "pipe water" and other runoff, the crown vetch could flourish. Riprap at the base of the slope is also suggested to prevent any slumping or undermining of the base of the bank. In 1997 some small riprap was laid at the base of the bank between the third and fourth cofferdams.

Due to the size, kids were able to pick up the rock and throw the rocks into the water. That area is now facing erosion again. Larger rip-rap (big enough that a child cannot pick it up and throw it, possibly 15" stone) needs to be laid.

- M-B Lane – install concrete box culverts to alleviate frost damage. M-B Lane is the only road in the city that goes through a wetland. Currently there are corrugated culverts under the road to help the water flow under the road. These typically freeze up and heave with the frost. The heaving causes road damage, and some temporary water holding (potential for flooding). Concrete box culverts should be installed.
- Replace laterals citywide (sewer lateral infiltration). In 1978 there was a 7" rain in less than three hours. The rain infiltrated the sanitary sewer pipes and backed up sewer laterals throughout the northeast part of the city. Sewer backed up into basements as high as 4'. In 1983 the city replaced 5000' of pipe in this area, along with 14 manholes, and, replaced the old 15" sanitary pipeline with a 21" pipe. Since then, every time a street is redone, the sewer lines are upgraded prior to any street work. It is recommended the city continue their policy of replacing the laterals.
- Inspect and repair cofferdams – potential collapse. There are four cofferdams in the city: a large one at State Street, and three dams to the east, all on the South Branch of the Manitowoc River. All of the dams, except the State Street dam, are minor and are no longer used to hold back significant amounts of water. However, the State Street cofferdam is very functional at holding back the water. In the 1980's the State Street dam was rebuilt. Although the dam is in good condition now, there is the concern that if the dam is not maintained, it could collapse and the city experience flooding problems. This dam should periodically be inspected, and all measures taken to repair any signs of stress.
- State St (CTH F) Main to Breed – Increase size and amount of stormwater facilities. Area has flooded during large storm events.
- State St (CTH F) main to Breed – Replacement of sanitary. Sanitary sewer overflows have occurred many times over the past 5 years during storm events. Causes basement back-ups and untreated wastewater being released into the storm sewer.

- TIF #6 Industrial Park addition west of Irish Road and north of railroad tracks, stormwater management. Stormwater pond addition for industrial development.

City of New Holstein

- Calumet Drive – Enlarge storm sewer laterals to control flooding with minimal damage. At the intersection of Calumet Drive (State Highway 57) and Plymouth Street, and then north and south several hundred feet along Calumet Drive, the area suffers flooding during peak heavy rains. The area is naturally a low area and tends to collect the run-off from the surrounding area. The storm sewer along Calumet Drive is not adequately sized and therefore water backs up and floods. The storm sewer laterals along Calumet Drive should be enlarged. As a minimum, a temporary retainment/detainment pond could be created to handle the overflow of water.
- Illinois Avenue, Pleasant Avenue and Harrison Street – Enlarge culverts and new storm sewer laterals to control road flooding and minimize property damage. The land along Jordan Creek floods during peak heavy rain events. Water flows over the bank and inundates portions of adjacent residential lots, and, crosses Pleasant Avenue, Illinois Avenue and Harrison Street. The area which floods is from Jordan Creek northeast towards Illinois Avenue, then approximately 300 feet west of Harrison Street, as far as east Jefferson Street. In addition, the land northwest of this part of the city is at a higher elevation, adding more runoff to the vicinity. Larger culverts at Jefferson Street and Jackson Street will help the water flow to the north and leave the area sooner. New, larger storm sewer laterals will ensure the residential area drains quicker.
- Monitor high school property for flooding that causes property damage. Jordan Creek flows west of the high school and occasionally floods the area. The area is low and has soils which are easily saturated during heavy rains. This low area extends west to the northeast portion of the airport property. Between the high school and the airport land, there is a small manmade pond. The pond holds some of the area water, but it too floods on occasion. There are plans to improve the airport. Caution must be taken to ensure fill, etc. is not added to the airport site resulting in more run-off to the school property. The athletic fields are often saturated and more

water could mean they could be rendered useless at times. This is an area of concern which should be monitored for additional flooding and damage.

- Monitor Calumet Street (STH 57) for flooding that causes crop damage. At the northwest corner of the city limits the city created a TIF District. As the district developed, water was forced towards Calumet Street (State Highway 57) and onto neighboring town farm fields. Recently the city reduced the outflow capabilities of the retention pond. The corrective measure appears to have drastically minimized the flooding. As the TIF District continues to develop, this situation should be monitored to ensure the neighboring land does not flood again.
- Jordan Creek on Jefferson Street (1800 block) 300' to the west – Bank stabilization to control erosion.
- Jackson St, Hickory to Pleasant – resurface blacktop, repair storm sewer.
- CTH X, STH 32/57 to east city limits – Mill and pave new surface.

Village of Harrison

- Detention pond and larger culvert on Hoelzel Way to minimize property damage. Where Hoelzel Way crosses a creek three residential lots along the south side of the road are routinely flooded. A larger creek culvert, or possibly detention pond, should be installed to hold the water and not flood the lawns. The subject subdivision was developed prior to regulations requiring detention ponds. Added to this subdivision's problem, the subdivision to the south drains to the flooded area, thereby increasing the amount of water on these lots. In an attempt to try and stabilize erosion in the creek and slow down the water the town did riprap a quarter mile south of the subdivision to Skipper Lane. Although this effort wasn't successful at slowing the water, it did help stabilize the creek erosion that had been occurring. A larger creek culvert was installed and has aided in alleviating standing water from the residential properties. While this issue is considered mostly complete, the future plan is to urbanize the roads around Sunrise School and provide storm water detention for water quality treatment and peak flow reductions.

- Golden Way/Peral/Cameo/Coral Courts – Urbanize the road. Road deteriorating, localized drainage issues.
- Noe Rd., Urbanize/reconstruct road. Road deteriorating.

Village of Hilbert

- East of Milwaukee St. between 8th St. and 5th St. – replace existing 42" and 48" pipes with (2) 48" pipes. These storm sewer pipes were installed several years ago when the open ditch was enclosed. Due to deteriorating pipes, there are several areas where the ground above the pipes is beginning to fall into the storm sewer pipes. This can impede the flow of the pipes and can cause a hazard above the pipes. The pipes are also undersized to be able to handle the flow coming from the west on Milwaukee St. There have been instances of stormwater backing up in the area of Milwaukee St. and 8th St which can cause flooding and damage to area properties because the stormwater flowing from the west cannot flow through these undersized pipes and causes a bottleneck in this area. These deteriorating pipes need to be replaced and upsized in order to assist with the flow of stormwater from the west to flow more freely and eliminate the bottleneck in this area.
- East of Milwaukee St. at 5th St., 4th St. and 3rd St. – Upsize the culverts under the railroad tracks east of 5th St., at 4th St. and at 3rd St. The culverts under the railroad tracks east of 5th St., the culverts at 4th St. and at 3rd St. are undersized and impeding the flow of stormwater coming from the west. This project is tied to the replacement of the deteriorating stormwater pipes east of Milwaukee St. from 8th St. to 5th St. because if these are upsized, the culverts will be drastically undersized. There will be a need to incorporate both of these projects at the same time to ensure that the flow of stormwater is not impeded. If this area is not corrected, it could cause severe damage to several residential properties that are located near this area.
- Purchase and raze building on S. 5th St. between Calumet St. and Main St. (located in flood hazard area). There is a storage building that is located on S. 5th St. north of Calumet St. which has been flooded on several occasions over the last several years because it is located near a drainage ditch by the railroad tracks that has flooded in the past due to the

impeded flow of stormwater. This property was at one time used many years ago by GTE Telephone (now Frontier) until their current building was constructed on 8th St. The building is currently used for storage but when this area floods out, it can cause damage to the contents being stored in the building and also to the building itself. By purchasing the building and razing the building, it would mitigate the damage in the future.

- Build a berm in the farm field south of Calumet St. and 9th St. (stormwater runoff from the field causes flooding on S. 9th St., south of Calumet St.) In heavy rainfall events, stormwater overflow from the farm field goes to the north onto S. 9th St. and flows into the storm sewer on Calumet St. causing that storm sewer to become overloaded with stormwater. This causes flooding on S. 9th St. south of Calumet St. and on Calumet St. This flooding can cause damage to the properties and buildings in this area as water will flow to the area of least resistance. To prevent the overflow of water to this area, a berm would be built to hold the overflow water in the farm field until it can properly flow through the proper drainage ditch. This would mitigate the amount of damage as there are no buildings in this area.
- Clean ditches and creek and/or build a stormwater detention pond in the stormwater ditch north of Sargento Foods going east to the railroad tracks; creek along the driveway to the Hilbert WWP east of Irish Rd.; stormwater ditch on the SE side of the village. The drainage ditches and creek in these areas are full of debris which greatly impedes the flow of stormwater in these areas. The ditch north of Sargento Foods is owned by the State of Wisconsin. Calumet County maintains the ditch for the state but the state must authorize to have the work completed and to reimburse the county for the costs associated with cleaning out this ditch. The village has tried along with the county to get the state to approve the cleaning of this ditch but we have been unsuccessful in obtaining their approval. This impeded stormwater flow is creating a hazard to the neighboring property owners who are in danger of sustaining severe damage due to the potential flooding in this area because the flow of the stormwater is being impeded. The creek by the wastewater treatment plant and the ditch on the southeast side of the village should be cleaned out to help with the flow of stormwater. We could

also install a stormwater detention pond by the wastewater treatment plant which could help improve the flow of the creek along with cleaning it out.

Village of Potter

- Mitigate well contamination of municipal water supply on east half of village. The North Branch of the Manitowoc River runs through the eastern edge of the village and floods several hundred feet of land on either side of the river. In addition, the land to the west of the village is at a higher elevation, forcing water to run down slope across the entire village to the river. A portion of the east half of the village is periodically inundated and soils saturated. The village does not have a municipal water supply; rather all development is on private wells, most of which are very old. Well testing has revealed some problems with bacteria and nitrates in the well water supply. It is possible that when the area floods, or perhaps even due to heavy rains, contaminants are entering the water through the older wells. Sealing the wells could help; however, this method may prove to be too expensive for the age of the wells (not cost effective). A better alternative is to either drill a municipal well, or, connect to an adjacent municipal water supply.
- Ditching and bank stabilization on creek north of Main Street; bank stabilization at Center Street and creek crossing. The creek north of Main Street (County Highway PP), west of Center Street (County Highway Y), meanders north and then east. During heavy rain the water has bypassed its natural creek bed and flooded and eroded a new "path" over the lands to the east. The creek needs to be enhanced, possibly through ditching, to keep water flowing in its natural route, and, the bank stabilized. At the north end of Central Street, a creek crosses under the road. Just east of the crossing, on the south side of the creek, there was a concrete retaining wall. Water has undermined the wall and caused it to break and slump into the creek. The garage on the subject property is approximately 15' from the wall and the fear is the shore will now erode up to the garage, or at least significantly onto residential land. The wall needs to be removed and the bank stabilized, probably with riprap.

- New pipe at North Branch of the Manitowoc River. A sewer lateral lies under the riverbed, just north of the Main Street (County Highway PP) bridge. The lateral is bent and it is believed water is infiltrating the pipe causing undo use of the sewage treatment plant. The pipe needs to be replaced.
- Construct new plant or make enhancements at the Wastewater Treatment Plant. The sewage treatment plant was built in 1965. The plant is showing signs of age and needs some improvements. The plant was built in the floodplain of the North Branch of the Manitowoc River. Due to its location, the plant experiences periods of inundation. Also, due to heavy flooding in the Village, some of the sewer lines along the roads are infiltrated and some homes experience sewage backing up into their basements. The system is currently sized accordingly; however, the village is expected to triple in size over the next 20 years. It currently operates at 60% capacity.
- North end of Central St., blocked drainage stream. Floods most yards.
- North end of Central St., small bridge culvert. Floods most yards.
- Manitowoc River, stagnation/blockages. Issue every year. May be a DNR issue. In conjunction with Town of Rantoul.

Village of Sherwood

- Install storm sewers to alleviate ponding during heavy rain at Bridle Road and Black Cherry Road, south to Forest Lane and south along Palisades Trail. During heavy rains and during spring runoff, the area ponds. If power goes out in this area, basements flood because the sump pumps cannot pump the water. Storm sewers are needed to move the water to the sewer system.
- Acquire easements and ditch on Margaret Street south to Stumpf Avenue to alleviate drainage problems during peak rain events and spring runoff. There is a localized drainage problem during peak rain events and spring runoff. If the power goes out basements flood (because the sump pump can't operate). In addition, the ditches in the area flood. It is recommended the village secure easements and deepen the ditches. In the past there have no erosion problems associated with the ditches; therefore, the village believes no riprap or other stabilization techniques are needed for the ditches.

- Create cooperative agreements with private dam owners to identify who is responsible for maintenance and potential damages. There are six dams in the village. Two dams are under private management: the dam at Nature's Way, and the dam at Palisades Trail. All remaining dams are managed by the WDNR: Clifton Road, High Cliff creek crossing, Stommel Road and Mustang Drive. The two private dams are in poor to fair condition but the four public dams have all been installed within the past ten years and are in sound condition (three dams are concrete, one earthen). The village is concerned that if any of the dams fail, the village will experience flooding. Due to the condition of the private dams, it is recommended they be inspected and an agreement written between the private parties and the village identifying who is responsible for maintenance and potential damages.
- Expand plant and obtain generator for wastewater treatment plant on Kessler Road. The East Central Wisconsin Regional Plan Commission makes population projections for Calumet County and its communities. The village sized their wastewater treatment plant according to these projections. However, the village quickly surpassed the projected growth and now has an undersized system. The concern is that during sustained heavy rains the plant will not be able to treat all the water coming into the plant. A plant expansion would prevent the potential problem. There is also a concern that if the power goes out, the water will bypass the system and go to Lake Winnebago, thereby contaminating the lake. A generator is needed at the treatment plant.
- Funding for implementing study recommendations to manage stormwater. Study has been completed and recommendation is for 12-13 ponds on the northern shore of Lake Winnebago. Have identified acreage and need to buy and build.

Village of Stockbridge

- Evaluate the issues and propose potential solutions for flooding concerns on Highway 55 and County Road E.
- Ditch south from CTH E to Hickory Hills Road to minimize flooding. Water flows very rapidly down the west side of the Niagara Escarpment and causes a lot of flooding for the land lying down slope. Just east of the Village, along County Highway E, where an intermittent stream leading to Mud

Creek crosses the county highway, there was a lot of ponding. To help the water flow the county replaced a small culvert with a larger one. The new culvert helped water flow; however, water now flows very rapidly down the slope, along the south side of the county highway, towards the village. Once the water reaches the Village, the existing culverts and creeks cannot handle the water load, and the area suffers severe flooding. The water floods the back yards of the homes on the east side of State Highway 55 and occasionally extends past the residential properties and floods to the centerline of the state highway. The seven homes along State Highway 55, south of East Lake Street, seem to flood the worst. The village did contract to have a top-level study done to determine the best solution to the flooding (within the last 10 years). Robert E. Lee & Associates did a report which recommended a ditch/swale be installed on the east side of the residential lots located east of State Highway 55, and, that the ditch be dug south to Hickory Hills Road. Due to the amount of property damage as a result of the water, the village places this flooding issue as their top priority for resolution.

- Perform ditch maintenance at the sewage treatment plant on West Lake Street to minimize flooding and potential plant infiltration. The pond at the Sewage Treatment Plant is a man-made pond. The WDNR has ordered the pond to be filled in. The area is very low and filling the pond will displace water to the surrounding land and treatment plant. If the plant is flooded, there is the potential for system infiltration. There is a culvert near the pond that empties into an intermittent stream. Despite the fact that there is a culvert at the site, the area still floods. The nearby stream is full of silt and weeds and if the stream were cleaned out, water may flow more easily through the culvert. The village had worked previously with LWCD to clean the debris out of the stream, in anticipation that water will flow through the culvert. It is recommended a lengthy stretch of the stream be cleaned out and maintained to alleviate the flooding at and near the treatment plant.
- Larger culvert at creek crossing – STH 55, south of Enterprise Street. Water flows down the west side of the Niagara Escarpment and swells the creeks. At the north end of the village, where Mill Creek runs under Military Road (State Highway 55), there is a culvert. The existing culvert is not large enough to move the water coming from the east and

therefore water backs up and floods the area. Occasionally the water goes over the state highway. It is recommended that a larger culvert be installed at this location to help water flow under the highway, rather than backing up on the east side of the highway. Wisconsin DOT was contacted by the Village of Stockbridge before and after the road was updated in hopes that they would correct the flooding and the erosion of the bank near the public sidewalk. It was reported and the State has never replied with a response or update.

- Create and enact water management plan at Union Street and Davis Street. At the intersection of Davis Street and Union Street, Mill Creek crosses under the intersection. Currently there are two metal culverts at the location; however, the culverts are not large enough to accommodate the amount of water. The two culverts should be enlarged to allow water to flow under the roads. If the culvert near Enterprise Street is enlarged, more water will flow to these culverts, further requiring the culverts at Davis and Union to be enlarged. The Village believes that Mud Creek crossing the Church property needs to be dredged to accommodate more water flowage. The Village is unsure if ditching at that corner is the solution. Perhaps ditching/larger culvert after Davis and Union intersection located on E/West Lake St to the water plant to allow the water to flow. This may lead to potential flooding at the water plant.
- Ditch enhancement – South Military Road (STH 55) and Hickory Hills Road. An un-named creek crosses under South Military Road (State Highway 55) and Hickory Hills Road. In the past, there has been damage and a significant amount of flooding from water coming near the foundation of the home at the subject site. There are culverts at the crossing but the ditch needs to be enhanced to provide for a steeper bank, thereby eliminating the ability of water to creep the bank and flood the property. The Village still believes that there could be some ditching to increase water flowages in the area away from homes, yards and crops.
- Bank stabilization on Sunset Beach Road. The culvert under Sunset Beach Road was replaced approximately seven years ago with two culverts and some shore protection (rip-rap). It appears that the culverts are adequately handling water and the riprap is stabilizing the bank. At the west end of Sunset Beach Road, the creek bed is showing some signs of erosion.

As the creek meanders to the north, it tends to erode with sediments accumulating on one side, and erosion occurring on the other side of the bank. The creek bank should be stabilized with some type of shore protection, preferably riprap, to prevent further damage and sedimentation into the creek. The Village does not believe that stabilization of bank is needed. However, periodic cleaning out of the culvert before the private road would be maintained as needed.

- Ditching at the southwest corner of the intersection of West Lake Street and Lakeshore Drive. Near what is known as "Kidney Pond," the land to the north is very low and continually has standing water. There are two culverts in the area, one flowing east and one flowing south. However, the land is too flat to force the water to flow through the culverts. It is recommended ditches be installed to help the water drain from the surface and be forced through the culverts. The Village believes that some ditching should be completed jointly by the County and the Village in order to ease the flow of water in that area.
- Enlarge culvert at STH 55 and Davis Street. Currently there is a culvert at the intersection of Davis Street and Military Road (STH 55). Up until very recently, the culvert has been adequate and was able to handle runoff from the surrounding land uses. However, the school built an addition and the village is concerned that the added runoff from the added impervious surfaces will result in too much water flowing to the culvert. If flooding does result, it is recommended that the existing culvert be enlarged to handle the increased water load. The Village believes that this culvert existed at one time. Due to homes being landscaped over time, the Village does not believe that this is now carrying as much water as it originally did. This area needs to be reviewed by the Village.
- Re-study Stockbridge basin where water flows and collects, washing out Highway E. Study finding will lead to project recommendations The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project. In conjunction with the Town of Stockbridge.

Town of Brillion

- Raise Irish Road to alleviate flooding. Along Irish Road, just south of the old stone bridge, the area always floods and water goes over the road. The best way to solve the problem would be to raise the road.
- Center Road - Clean ditch. At Center Road, just west of Conservation Road, the drainage ditches verge together and go south under the road. Partially due to sedimentation in the Brillion Marsh, and sediment and weeds in the ditches, at this point water has a difficult time flowing south and tends to go over Center Road. One half mile south of the road the ditch is "clogged" and needs to be cleaned up from that point, and south one quarter mile. The farmer who owns the land around the ditch farms directly up to the edge of the ditch, thereby allowing eroded soil to flow directly into the ditch. If the farmer would leave a buffer strip along the waterway, it wouldn't get silted in as quick.
- Larger culvert and ditch cleaning at intersection of Church St and STH 57. Intersection of Church Street and Highway 57- water backs up on west side of Church Street because culvert under Highway 57 is too small and not low enough. Problem could be solved if the county installed bigger culvert was installed lower and the ditch on north and west side was cleaned out north several hundred feet.
- Clean ditch 200 feet south of STH 57 west of intersection with Church St. Culvert under Highway 57 west of intersection with Church Street - ditch that runs north and south on west edge of subdivision, which is on private property, needs to be cleaned out about 200 feet south of Highway 57.

Town of Brothertown

- Farmer education and cooperation to alleviate damage to road shoulder and crop damage caused by flooding on South Tower Road. On South Tower Road, almost one-half mile north of the intersection with Dick Road, there is significant flooding. The sedimentation washes off the fields to the east and flows west flooding the road and adjacent fields. The soils in the area do not quickly absorb the water. Water then goes over Tower Road washing the shoulder out, and continues on to the west damaging adjacent cropland. The town believes that grass buffers along the edges of the fields would help slow the flow allowing for some soil absorption.

- Mitigate flooding on the west side of the town where there is soil run off after heavy rains. Encourage farmer to plant more cover crops and more buffer strips to prevent ditches from filling up with soil and flooding roads.
- St. Charles Rd. – CTH H to Paradise Rd – measures to alleviate flooding during the Spring thaw.
- St Charles Rd. – Paradise Rd to CTH G, complete road reconstruction. Severe deterioration of road.

Town of Charlestown

- Raise roads, install culverts and possibly remove dam on Aesbischer and Lemke Roads to alleviate water on roads which create hazardous driving conditions and road damage. The Killsnake Wildlife Area is a large wetland that has the Killsnake River running through it. Aebischer and Lemke Roads cut through a portion of this marsh. The roads experience water coming over the road surface for a significant time in spring, about every other year. About ten years ago two culverts were installed (one on each road) so the roads wouldn't act as a dam. This helped somewhat, but the roads still flood. Raising the roads would prevent water from going over the road; more culverts would allow water to flow under the road. Removing the dam in Collins would also help so water doesn't back up into this area.
- Encourage WDNR to repair Stecker Lane to minimize road damage caused by flooding. Stecker Lane is an area where the WDNR created a water impoundment south of the road. Unfortunately, the WDNR went too far north with the impoundment and built it up to the road. Because the dike is too high and the soils used in the dike do not drain, water stays on the road deteriorating it and water in the culvert freezes heaving the culvert and road. The WDNR said that they plan on fixing the problem.
- Redirect the creek on Steiner Road and install bridges to alleviate flooding problems. Steiner Road has experienced many water-related problems. Water flows too rapidly through the Killsnake River and washes out the abutments. The result is the road sinks/ "drops down". About twenty years ago a bridge and two culverts were installed to help the water flow under the road. These measures did help, to an extent. However, there were still problems. About four years

ago, riprap and some concrete were laid to slow the water. Again, the help was limited and the problem still persists. Ideally the creek should be redirected to stay completely south of Steiner Road. In that this option likely cannot occur (due to WDNR regulations regarding altering a stream course), it is recommended two larger bridges be installed.

- Run sewer laterals and move/elevate the holding tank at Mill Pond. At the old mill in Hayton there is a residence (former restaurant). The sanitary waste disposal system is a holding tank. During high water, the tank repeatedly fills with water. The town fears that someday the waste in the tank is going to flow out of the tank. The town should work with the neighboring City of Chilton to run sewer laterals to serve that portion of the town and the tank be abandoned or the tank should be elevated or relocated to higher ground.

Town of Chilton

- Divert water on Killsnake Road. Approximately 1/8 mile west of the intersection of Killsnake Road with State Highway 32/57, just north of Killsnake Road, the ditch leading to the Killsnake River makes a sharp right turn to the west. Water flowing in the tributary cannot make the sharp angle and ends up flooding over onto the road. The angle needs to be minimized. A culvert, at a gentle angle, could help divert the water to the river.
- Dig a deeper ditch on Stonybrook Road to minimize flooding. Stonybrook Road crosses a tributary about one-quarter mile west of its intersection with US Highway 151. During the spring thaw the tributary overflows and water goes over the road. This creates a potentially dangerous driving situation. If the ditch were deeper, the water would be confined to the ditch. The ditch should be dug out, and steeper banks created.
- Address water at corner of County E and Twain Road. Add culvert. Clean waterway to assist with waterflow to stop washout of road. In conjunction with the Calumet County Highway Department.

Town of New Holstein

- Reconstruct Kiel Road to minimize damage to road caused by flooding. On Kiel Road, slightly more than one half mile west of the intersection with Irish Road, the shoulder of the road tends to wash out during heavy rains. The road needs to be reconstructed with wider, flatter shoulders.
- Monitor effectiveness of restrictor to control runoff on Highway 57 near the city TIF district. Consider a detention pond to control the adverse runoff. Along the east side of State Highway 32/57, near the City of New Holstein TIF District, the town experienced a lot of flooding since the TIF District was created. The flooding has resulted in a lot of crop damage. In the summer of 2004, the city put in a restrictor to control the runoff from the TIF District. If there is flooding in the future, a detention pond should be installed to control the adverse runoff. Detention Ponds have been installed; continue to monitor downstream at location on STR 57 as water floods resident backyard and continues to cause crop damage.

Town of Rantoul

- River View Road - Open dam, dredge, raise bridge and road to minimize flooding. In spring, about once every five years, at the "orange bridge" on Riverview Road, water flows across the road on the west side of the bridge. If the area freezes, the bridge and road become slippery. About once every twenty years ice piles up and over the road. If the dam were opened at Clarks Mills water would flow and help lower the water. In addition, dredging to the Village of Potter would help the water flow. However, the fear is this would cause major flooding for the small village. Another alternative is to raise the bridge and possibly part of the road leading to the bridge.
- East River Road and CTH JJ – Raise the road to minimize flooding. At the southwest corner of East River Road and County Highway JJ, the marsh area floods and goes onto the road to the centerline of East River Road. The shoulder of the road repeatedly washes out. In 2003 a truck hit the soft shoulder and rolled over. The road should be raised.
- Long Lake Road – Rebuild the road, possibly bridge to minimize flooding. At Long Lake Road, east of Becker Lake, there is annual flooding over the road. The creek feeds from Long Lake to the east, west to Becker Lake. There is a culvert

at the south end of the wet area (on the road) in a high spot. There were two more culverts but they keep sinking into the muck and therefore do not help the water flow. The soil type, coupled with the weight on the road, tends to cause the culverts to sink. The town is not quite sure how to solve the problem. It appears the real problem lies in that water doesn't leave Becker Lake fast enough and the marsh floods. Two suggestions are that the road be rebuilt or a long bridge be built.

- Schneider Road – Enlarge culvert to minimize flooding. On Schneider Road, west of Hilbert Road, there is water over the road approximately once every three years. The water also floods a nearby field resulting in seasonal crop damage. The existing culvert is undersized and cannot handle the volume of water and the water goes above the culvert and onto the road. A bigger culvert is needed.
- Irish Road – Enlarge culvert to minimize flooding. About once every five years water floods over Irish Road (south of Schneider Road). The existing culvert is undersized and therefore the water swells at the culvert and spills onto the road. A bigger culvert is needed.
- Hilbert Road – Dredge creeks to minimize flooding. On Hilbert Road, north of Dreier Road, there are two creeks that flood to the shoulder of the road. The creeks have filled with sedimentation and weeds. These obstructions inhibit flow. Both creeks need to be dredged back to the bridge on Schneider Road. Crop damage, as well as road shoulder damage, are a result of the flooding.
- Elevate Dreier Road to minimize flooding. North of Dreier Road, west of County Highway Y, the creek forks. About once every ten years Drier Road floods over. Due to the topography of the land and elevation of the road, the only reasonable solution to the flooding problem would be to elevate the road to allow more flowage.
- Railroad Trail, blocked/collapsed culvert. Flooding every year.

Town of Stockbridge

- Reroute ditch, riprap and create detention pond on Fairy Springs Road. Fairy Springs Road runs parallel to the east shore of Lake Winnebago. The road receives a lot of run off from the higher ground to the east. The water actually tends

to flow east to the lake in "sheets". Therefore, the road gets inundated with large quantities of water flowing rapidly toward the lake. The water floods the road and also floods the lawns between the road and the lake. There is a ditch on the east side of the road. Ideally a ditch should also be dug parallel to the road on the west side of the road (to try and hold some of the water). However, in that the road only has a 50' right-of-way, there is not room for a west side ditch. There is a public turnaround midway in the road. There is a culvert under the turnaround. The east side ditch should be pitched towards this culvert to divert any collected water through the culvert and further west to the lake. In addition, riprap should be installed in the ditch to help prevent erosion, and to slow the water so it goes to the culvert, and not over the culvert or the road. A detention pond midway down the road (on the east side of the road) should be installed to collect and hold the water until it can be dispersed through the culvert. Also, a ditch should run parallel to the lake immediately east of the homes, and then be directed to the lake. This ditch would require approval and cooperation of all landowners along Fairy Springs Road.

- Ditching, eventually reclaim quarry, provide education to farmers – Rockland Beach Road. Rockland Beach Road runs north and south along Lake Winnebago. Like Fairy Springs Road, the road gets inundated due to the volume of water flowing west to get to the lake. The town believed that if the culvert at the nearby creek were enlarged, it would help prevent the road from flooding. A few years back the culvert was enlarged. Although the culvert helped relieve some of the flooding, the road still is under water certain periods of the year. There are other culverts in the area to help get the water to the lake: culverts are at another nearby stream, about 400' from the south end of Rockway Beach Road, at the area public access, and at the north end of where the public road begins. These help water get to the lake, but do not prevent the road from flooding. There is a culvert in the middle of the road, and one at each end of the road. To help direct water away from the road surface and to these culverts, a ditch should be dug parallel to the road. There is a quarry east of the road. At one time there were ponds in the quarry and these ponds held the water so it did not flood the land and road to the west. The ponds were filled in, and that is

when the road experienced flooding. If the ponds were reconstructed, and if the quarry were reclaimed, vegetation would help slow the runoff and the road probably would not flood. It is anticipated that a pond would control about 90% of the runoff. As an alternative, if a properly developed subdivision were built at the quarry site, water could be managed to effectively flow at a slower place, and be redirected in various directions. The town also notes that when farmers plow fields on top the Niagara Escarpment in an east-west direction, they are encouraging water to flow west over the western side of the escarpment, flooding properties below the escarpment slope.

- Enlarge culvert on Mud Creek Road bridge to alleviate water on road. The box culvert under Mud Creek's bridge is undersized and needs to be enlarged. In addition, some of the sedimentation should be removed from the creek. Due to sedimentation, and coupled by the fact that the culvert is undersized, if there is 3" of rain, the water floods over the road approximately 100 yards in every direction. At the point the creek bends, the town did install shore protection four years ago. Although the riprap has helped prevent some erosion and sedimentation, the problem persists. In that Mud Creek Bridge has historic value to the county, the situation should be reevaluated to determine if other options are available. As an alternative, the town could explore the feasibility of replacing the culvert without destroying or harming the historic value of the bridge.
- Enlarge culvert on Artesian Road to alleviate water on the adjacent field. WDOT recently replaced the box culvert under State Highway 55 and Artesian Road. The new culvert, along with bank protection, has allowed water to flow faster towards the lake via Roberts Creek. The result is Roberts Creek now floods along Artesian Road and swells over onto adjacent fields. At the intersection of Lakeshore Drive and Artesian Road a larger culvert under Lakeshore Road would help minimize flooding.
- Ditching and culvert expansions in Quinney to minimize dangerous driving conditions. In Quinney there is a culvert under Lakeshore Road, two where the creek crosses by the Quinney Fishing Club and one by Harsch's Beach Road. All flood and run over the respective roads. It appears the flooding is due to sedimentation in the creeks/ditches, and,

possibly due to undersized culverts. Some ditches have had riprap installed along the bank to try to minimize erosion and sedimentation. All ditches should be looked at closer to determine if there is a need to remove sedimentation, install bank protection, or replace existing culverts with larger ones.

- Coordinate culverts/ditching on Ecker Lakeland Drive with the Town of Brothertown to alleviate flooding on both sides of the road. Ecker Lakeland Drive is the local road that separates the Town of Stockbridge from the Town of Brothertown. Currently water flows west off US Highway 151 along both sides of this local road, until it eventually reaches Lake Winnebago. There are two old 18" culverts midway down the road which should take the water from the north ditch and merge it to the south ditch. However, the culverts are ineffective in that the bottoms are rotted, and, the ditches are such that they don't direct water to the culvert, rather they force water to continue along the north side of the road. The ditches should all be cleaned out and the north ditch should direct water to the culverts. The culverts should then be replaced so they are capable of taking the water and bringing it to the south ditch.
- Follow flooding recommendations to keep culverts open on Faro and Fairy Springs Roads to prevent water from freezing and causing flooding issues. The culverts at Fairy Springs Road and Faro Springs Road (near the shore) routinely fill with water and freeze, preventing water flow and resulting in flooding. Currently the town tries to clean the ice out of the culverts with a backhoe. It is recommended the town continue their ice removal process, but also follow the recommendations of the FLOODING section above. If those recommendations are enacted upon, water should be less in the culverts.

Town of Woodville

- Marx Road - Address Brillion Marsh Flood problem. In spring, during the spring thaw, Marx Road is completely under water for days, sometimes weeks. There are five culverts within a few hundred feet of each other, but the culverts don't help the water flow. Due to the over saturation of the Brillion Marsh, water backs up in all nearby tributaries causing the water to flood ditches, culverts, roads, etc. In the Marx Road area water flows so slowly, that the road shoulder does not

even wash out. New or more culverts would not help. Raising the road is a very expensive option. However, with the over saturation of the marsh, there is concern the water would eventually reach and flood the elevated road anyway. The marsh and all waterways leading to the marsh need to be free of sedimentation to allow water to flow to the marsh and be filtered through the wetland.

- Elm Road - Address Brillion Marsh situation. On Elm Road, about one mile north of County Highway B, the water doesn't flow and actually backs up and floods the road. The town has tried to help the water flow by installing four culverts within a one-half mile stretch of the road and has raised the road. However, due to over saturation of the Brillion Marsh, the water backs up and stands still until it can be absorbed into the ground. The Brillion Marsh needs to be ditched or other measures taken, such as dredging the sedimentation. The water has been getting worse with the additional water load coming from the Michel's pit located in Sherwood and from the Sherwood ponds; and the lack of maintenance in the waterways leading to the Brillion Marsh.
- Schmidt Road - Ditch creek. There is a creek that runs north to Kaukauna. The creek crosses under Schmidt Road, west of Military Road. In spring the road floods and washes the shoulder of the road out. There is a culvert there to help the water flow; however, due to weeds and sedimentation in the creek north of the culvert, the water can't flow. The creek needs to be cleaned out.
- Harrison Road - Install larger culvert. On Harrison Road, one half mile west of Elm Road, the culvert floods about every other spring. The existing culvert is undersized and should be replaced with a larger one.
- County Highway B and State Highway 57 - Raise building, possible ditch. The northwest corner of the intersection of County Highway B and State Highway 57 floods every spring. Several acres of cropland flood, as well as an old tavern (now used for residential purposes). The water stays on the filed for several weeks. The area floods as a result of water backing up in the nearby Brillion Marsh. Dredging the Brillion Marsh would solve the long-term problem. In the short term, the building could be raised, and a ditch dug to help the water move away from the field and structure. Due to the age of the building, raising the building may not be possible.

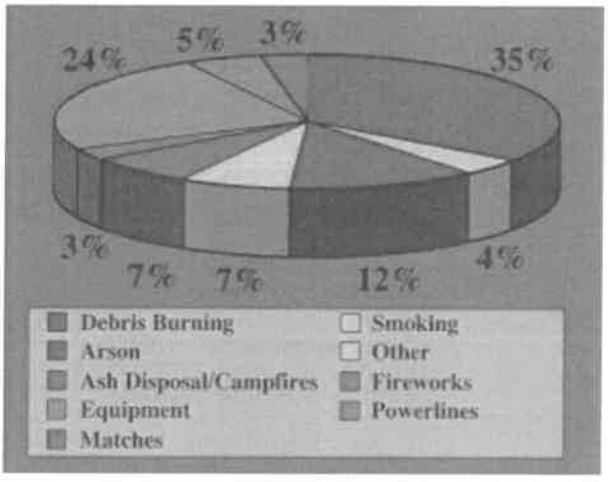
Wildland Fire

The wildfire season in Calumet County begins in March and continues through November, although fires can occur at any time during any month of the year. Generally speaking, however, fires are more likely to occur whenever vegetation is dry as a result of a winter with little snow or a summer with sparse rainfall.

The Wisconsin Department of Natural Resources (DNR) is responsible for forest fire protection on approximately 18 million acres of forest and wild land in Wisconsin. The U.S. Forest Service maintains forest fire protection on two million acres of this land while local fire departments retain responsibility for the remaining wooded acreage.

Physical Characteristics

The Wisconsin DNR has previously reported that approximately 1,500 fires annually burn over 5,000 acres of the land that they protect; over 90% of these fires are human-caused. It should be noted that these figures do not include areas of the state where a local fire department has primary responsibility for service.



Frequency of Occurrence

While the total number of open fires in Wisconsin has decreased over the years, the potential danger to lives and property remains due to the increased encroachment of development into previously open lands. Overall, the probability of a wildland fire is medium, due to the portion of forested lands in Calumet County. The probability of damage from these fires is considered high. Probabilities would be higher in the Brillion Marsh and impacts could be worse if the fire is in the peat for a longer period of time.

There has been one statewide wildfire event recorded since 1950 by the National Weather Service. This event occurred on 23 April 1994 and caused no injuries or deaths but did cause $500,000 in crop and property damage (each).

According to the Wisconsin DNR Fire Management Dashboards[119], there have been no large wildfire events recorded in Calumet County but there have been smaller, local fires. However, considering 14.5% of Calumet County's land is considered woodland, the potential for wildland fires increases.

As noted earlier in this plan, the National Risk Index (NRI) tool [120] has been made available by the Federal Emergency Management Agency (FEMA). It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience. Below is data relevant to the hazard discussed in this chapter. It should be noted that the NRI information may not necessarily match the hazard ratings reached by the county and is only being included for reference.

Number of Events	
Annualized Frequency	0.00
Expo. - Building Value ($)	31,973,075
Expo. - Population	239
Expo. - Population Equiv. ($)	1,767,928,100
Expo. - Total ($)	1,799,901,176

[119] Fire Management Dashboards (wi.gov)
[120] https://hazards.geoplatform.gov/portal/apps/MapSeries/index.html?appid=ddf915a24fb24dc8863eed96bc3345f8

HLR - Buildings	0.20
HLR - Population	0.00
HLR - Overall Rating	Relatively Low
EAL - Building Value ($)	291
EAL - Population	0
EAL - Population Equiv. ($)	43
EAL - Total ($)	333
EAL Score	1.61
EAL Rating	Very Low
Risk Score	0.65
Risk Rating	Very Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Vulnerability

Wildfires can impact the ecology of the open lands. Calumet County would be impacted by a wildfire since a disruption from fire could erase the usability of this habitat for wildlife and/or recreational purposes for many years.

In 2003, the National Association of State Foresters produced a Field Guidance for Identifying and Prioritizing Communities-at-Risk (CAR). The purpose of the guide was to provide states with a nationally consistent approach for assessing and displaying the risks to communities from wildfire. The DNR, in cooperation with its federal and tribal partners, began working on the statewide assessment of Communities-at-Risk in 2004.

Communities-at-Risk is a model to identify broad areas of the state that are at relatively high exposure to resource damage due to wildfire. Results of the model can then be used by local governments developing Community Wildfire Protection Plans (CWPP) and by the DNR to reduce local risks of wildland fire by prioritizing hazard mitigation and fire protection efforts.

The approach used in this risk assessment model is based on the "Methodology" section of the NASF Field Guidance document which recommends assessing and mapping four factors:

- Historic Fire Occurrence
- Hazard
- Values Protected
- Capabilities

Modifications to this methodology were made to fit the GIS mapping data layers available for Wisconsin. The Wisconsin DNR uses three factors to assess Communities-at-Risk to wildfire damage:

- Hazard – the relative likelihood that an ignited wildfire will achieve sufficient intensity to threaten life or property based on land cover type and historic fire regime.
- WUI (Values at Risk) – the relative vulnerability of each 2000 census block to wildfire damage based on housing density and spatial relationship with undeveloped vegetation based on housing density and proximity to vegetation (Wisconsin's Wildland-Urban Interface). Wisconsin's WUI was layered with a weighted vegetation layer to accentuate proximity to flammable vegetation.
- Ignition Risk – the relative likelihood of a wildfire ignition within a given 30-m pixel based on historic fire occurrence, population density and proximity to a potential ignition source.

Models were developed in GIS to create statewide grids representing each of the three weighted {Hazard (40%), WUI (30%) and Risk (30%)} inputs. This composite grid represents communities-at-risk (CAR) on a 0-9 scale of threat, with zero representing no threat and nine a very high threat. The data was then represented by municipal civil divisions (MCDs), which are city and village boundaries. Quantitative markers were assigned for five threat levels: very low, low, moderate, high, and very high and those MCD's determined to have a high or very high threat of wildfire were considered CARs. 337 communities met the requirements for being "at risk."

Communities in Wisconsin vary considerably in size. This is particularly evident in a north-south pattern, with larger more rural towns in northern Wisconsin and smaller, more urban towns in southern Wisconsin. Because of this variation in size, the potential for missing areas of high risk due to smoothing out by other parts of the town was greater for larger towns. For this reason, WI DNR incorporated a "Community-of-Concern" category to identify those towns that have portions of their town at a high risk of wildfire but were not otherwise included as a Community-at-Risk. A Community-of-Concern was determined to be an area of at least two contiguous square miles at high or very high risk; 237 communities were named as Communities of Concern.[121]

As can be seen on the map in Appendix A, in Calumet County, there are no communities that were identified as Communities-at-Risk (High or Very High) or Communities-of-Concern.[122]

Hazard Mitigation Strategies

Government at all levels is developing mitigation programs in fire control and firefighting tactics with the goal of protecting lives and property from loss due to forest and wildfire. Local fire departments attend regular trainings on fire-fighting tactics to keep their skills honed.

The Calumet County Emergency Management Program shall assist with writing grants to secure vehicles and equipment capable of reaching secluded areas where a woodland fire could occur. They will also work with the Wisconsin Department of Natural Resources and local fire officials to develop educational programming with the goal of minimizing wildfires.

Develop Firewise communities that do not plan residential developments adjacent to areas susceptible to woodland fires. Although aesthetically it is enjoyable to be adjacent to such amenities, building near them is putting homes and lives at risk. This is especially important in areas laden with ash species because they

[121] Wisconsin State Hazard Mitigation Plan.
[122] https://dnr.wi.gov/topic/forestFire/documents/communitiesAtRiskWildfire.pdf

are susceptible to the emerald ash borer beetle, which kills the tree and increases the fuel load for fires. The mechanism for change is through Smart Growth Planning.

Karst

A karst feature is an area or surficial geologic feature subject to bedrock dissolution so that it is likely to provide a conduit to groundwater, and may include areas with soils less than 60 inches thick over bedrock, caves, enlarged fractures, mine features, exposed bedrock surfaces, sinkholes, springs, seeps, swallets, and depressional areas with no surface drainage. [123]

Physical Characteristics

Sinkholes can form naturally in areas with karst geology (i.e., areas with limestone or other bedrock that can be dissolved by water). As the limestone rock under the soil dissolves over time from rainfall or flowing groundwater, a hollow area may form underground into which surface soil can sink. Sinkholes also can be caused by human activity such as collapsed, abandoned underground mines. Even though sinkholes have not been a factor in any natural disaster, identifying areas with karst conditions is important for not only public safety and protection of structures but because karst features provide direct conduits to groundwater. Areas with karst conditions are vulnerable to groundwater contaminants from pollutants entering a sinkhole, fissure or other karst feature.

Frequency of Occurrence

In Calumet County, the geology of the Niagara Escarpment greatly influences its ecological attributes. One example is the presence of karst, or solution features of the bedrock, that allow organic matter to accumulate. Cold air and sometimes water move through the fractured bedrock creating unique microhabitats. Many highly specialized species, such as rare terrestrial snails, are found in these microhabitats.

In Calumet County, acidic rain water dissolves the dolomite limestone and creates fissures, holes, caves, and other karst features. These features then act as a conduit, allowing rain and other matters to quickly reach the water table. Some of Calumet County's

[123] 2025 Comprehensive Plan https://www.calumetcounty.org/183/Comprehensive-Planning

groundwater problems such as high levels of nitrates and bacteria can be attributed to the fact that it has so many karst features, thereby allowing fertilizers, septic seepage, etc. to rapidly make contact with groundwater. Due to the features, coupled with areas of thin soils, many areas in the county are highly susceptible to groundwater contamination. [124]

The issues with karst geology, as generally experienced in Calumet County, are not usually due to a sinkhole quickly swallowing a structure but are usually more related to the slow leaching of contaminates to the aquifer without being filtered through the soil. As such, there are no major sinkhole events that have occurred in the last five years but there is the constant, ongoing leaching of contaminants. This hazard ranking regarding the future probability of karst-related issues is high and the probability of damage is medium.

Vulnerability

Karst geology, which has been identified in Calumet County, can lead to sinkholes under structures such as homes, businesses, roadways and railroads causing economic losses and possible injury to residents and the community. It is also important to note that the majority of citizens in Calumet County rely on private well water systems that can be contaminated by hazardous materials finding direct paths through the karst features into groundwater supplies.

It can be challenging to determine where all the features are located. Since such features tend to be covered with some amount of soil, the features are difficult to locate. In order to improve groundwater quality, wise land use choices on or near karst features is a must. New construction or development can affect groundwater infiltration that helps support springs, sinkholes, caves, and other karst features. [125]

Hazard Mitigation Strategies

Karst features should be considered in land use planning, stormwater management and hazardous materials planning to avoid possible damage to structures due to sinkholes or contamination of

[124] 2025 Comprehensive Plan https://www.calumetcounty.org/183/Comprehensive-Planning
[125] 2025 Comprehensive Plan https://www.calumetcounty.org/183/Comprehensive-Planning

groundwater. Calumet County will continue to work with its municipal partners to ensure that areas at risk of karst-related complications are identified and mitigation strategies are employed as appropriate. This will include evaluating areas with known karst geological features for new fissures and ensuring that direct access to the water table (i.e., without filtering through the soil) is not opened in a fissure.

This coordination and cooperation among the private sector and various state, county and municipal planning and zoning departments will reduce effects on existing and future buildings and infrastructure by ensuring that safety is regulated and engineered into them.

Run-off from fields often goes directly to the groundwater through Calumet County's Karst features

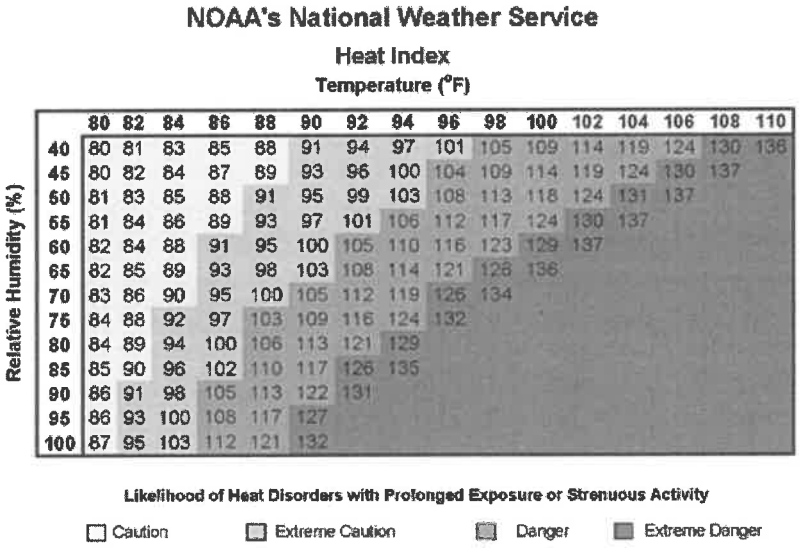
Severe Temperatures

Characteristics

Temperature extremes can cause disruption of normal activities for the population, property loss and even the loss of life, especially among the more vulnerable members of our population such as children and the elderly.

Physical Characteristics: Heat

Heat emergencies are a result of the combination of very high temperatures and very humid conditions.



The Heat Index estimates the relationship between these two conditions and reports them as a danger category, as can be seen in the following table.[126]

Heat Index and Disorders Table			
Danger Category		**Heat Disorders**	**Apparent Temperatures [°F]**
IV	Extreme Danger	Heatstroke or sunstroke imminent.	>130
III	Danger	Sunstroke, heat cramps, or heat	105-130

[126] FEMA, 1997; NWS, 1997

		exhaustion likely; heat stroke possible with prolonged exposure and physical activity.	
II	Extreme Caution	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and physical activity.	90-105
I	Caution	Fatigue possible with prolonged exposure and physical activity.	89-90

The major risks to people due to extreme heat are:

- Heatstroke – a potentially lethal medical emergency where the ability of a person to thermo-regulate is compromised resulting in the rise of the body's core temperature to above 105 degrees Fahrenheit.

- Heat Exhaustion – a less threatening medical condition where the victim complains of dizziness, weakness and/or fatigue. The victim may have a normal or slightly elevated temperature and usually can be successfully treated with fluids.

- Heat Syncope – a sudden "faint" or loss of consciousness usually brought on by exercising in warmer weather than one is accustomed to, usually no lasting effect.

- Heat Cramps – muscular cramping brought on by exercising in warmer weather than one is accustomed to, no lasting effect.

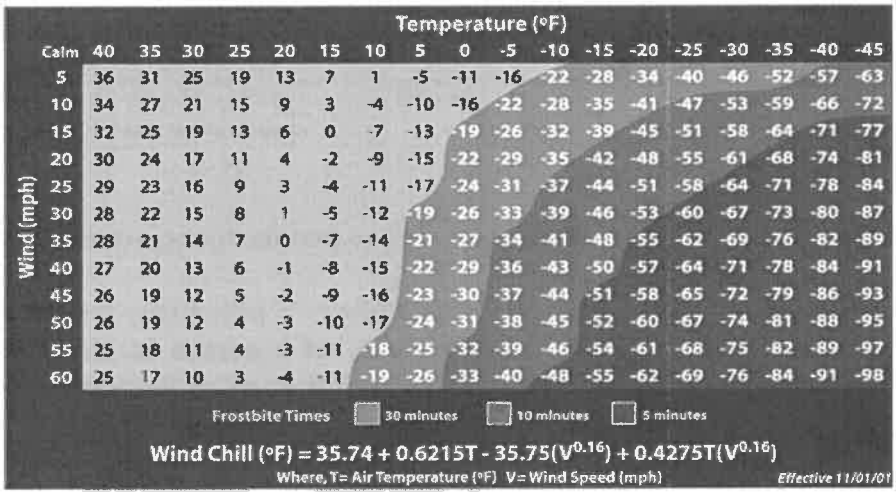
Extreme heat conditions may also affect pets and livestock, decreasing agricultural output by the latter. Crops may suffer reduced yield due to extremely hot conditions.

Physical Characteristics: Cold

Wind chill is a relationship between wind and cold that is based on the rate of heat loss from exposed skin. As the wind speed increases, heat is drawn from the body, driving down skin temperature and eventually core body temperature. The following table illustrates this relationship.[127]

[127] https://www.weather.gov/safety/cold-wind-chill-chart

Wind Chill Chart



Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

The major risks to people due to extreme cold are:

- Hypothermia – occurs when, due to exposure to cold, the body is unable to maintain its proper core temperature. It may occur in temperatures above freezing and may lead to death.

- Frostbite – describes local cooling, usually to an extremity, which occurs when exposure to cold air or liquid causes constriction of the blood vessels. There are three degrees of frostbite:

    - Frostnip – brought on by direct contact with a cold object or exposure to cold air or water. Tissue damage is minor and response to treatment is usually very good.

    - Superficial Frostbite – involves the skin and subcutaneous layers

    - Freezing – is deep frostbite in which the skin, subcutaneous layers and deeper structures (e.g., muscles, bone, deep blood vessels, organ membranes) of the body are affected and can become frozen.

- Chilblains - lesions that occur from repeated/chronic exposure of bare skin to temperatures of 60 degrees Fahrenheit or lower.

- Trench foot – a condition that occurs when the lower extremities remain in cool water for a prolonged period of time.

Frequency of Occurrence: Heat

Wisconsin has been affected by several bouts of extreme heat including during the Dust Bowl period from 1934-1936. Other heat events occurred in 1979, 1995, 2001, 2011, 2012 and 2019.

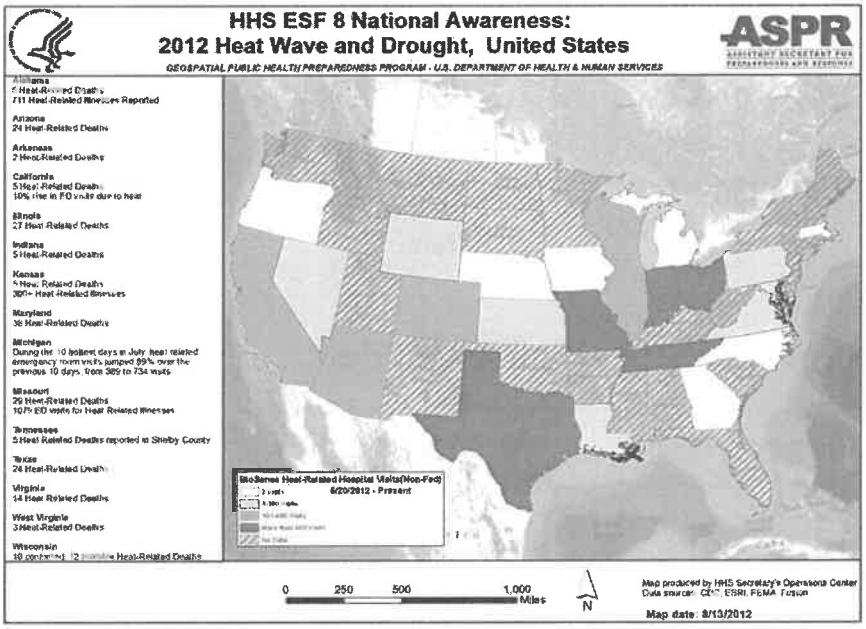
Tables showing the excessive heat and heat events recorded by the National Weather Service in Calumet County [128] can be found in Appendix B.

It should be noted that during the summer of 2012 much of the country, including Calumet County, experienced a heat wave, resulting in significant droughts across more the half the country as well as increases in heat related illnesses and deaths. July was the hottest month in US history, eclipsing the record set during the heart of the Dust Bowl in 1936. The worst of the heat was in the Midwest, the Plains and along the Eastern Seaboard. Most of the contiguous US had record and near-record warmth for the seven-month period, except the Pacific Northwest, which was near average.

With the increase in heat-related illnesses comes an increase in emergency department (ED) admission across the country. Dehydration, heat exhaustion and heat stroke were the most common cause for patients' heat-related ED admissions. Most heat-related visits occurred in patients between the ages of 19 and 70. In Wisconsin, there were ten confirmed and possibly 12 heat-related deaths.[129]

[128] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

[129] 2012 Heat & Drought Federal Report, HHS ESF 8, UPDATE #2, U.S. Department of Health and Human Services, Assistant Secretary for Preparedness and Response



According to the State of Wisconsin Hazard Mitigation Plan, extreme heat is the number-one weather killer in Wisconsin with most of the heat deaths attributed to major heat waves. As can be seen by the historical tables, Calumet County, like the rest of the state, is likely to experience extreme heat events every two to three years with extended, major heat waves occurring about every two decades.

The workgroup therefore felt that there was a medium likelihood of occurrence in any given year. The loss of life or injury to people has a medium likelihood of occurrence for the general population but the committee recognized that the likelihood increases for certain populations such as the elderly, chronically ill, children, those who work outdoors and those with limited financial resources (i.e., to pay for heating and air conditioning).

As noted earlier in this plan, the National Risk Index (NRI) tool [130] has been made available by the Federal Emergency Management Agency (FEMA). It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience. Below is data relevant to the hazard discussed in this chapter. It should be noted that the NRI information may not necessarily match the hazard ratings reached by the county and is only being included for reference.

[130] https://hazards.geoplatform.gov/portal/apps/MapSeries/index.html?appid=ddf915a24fb24dc8863eed96bc3345f8

Number of Events	6
Annualized Frequency	0.49
Expo. - Building Value ($)	5,654,953,588
Expo. - Population	48,971
Expo. - Population Equiv. ($)	362,385,384,690
Expo. - Total ($)	368,040,338,278
HLR - Buildings	0.00
HLR - Population	0.00
HLR - Overall Rating	Relatively High
EAL - Building Value ($)	1,180
EAL - Population	0
EAL - Population Equiv. ($)	563,734
EAL - Total ($)	564,914
EAL Score	19.52
EAL Rating	Relatively Moderate
Risk Score	5.72
Risk Rating	Relatively Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Frequency of Occurrence: Cold

Wisconsin regularly has extreme cold temperatures as part of its winter climate. Tables that outline extreme cold/wind chill and cold/wind chill events which have been recorded by the National Weather Service in Calumet County[131] can be found in Appendix B.

After examining this data, the workgroup believed that cold and/or extreme cold has a high likelihood of occurrence in any given year. They further believed that damages and loss of life or injury to people is also high. Because there are no crops out during the winter and most properties (homes, businesses, barns) are insulated for this climate, the impacts may be less. Individuals may suffer damage due

[49 & 131] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

to water main breaks and other such problems. The workgroup recognized that people who work outdoors, who have limited financial resources, the elderly, the young and the chronically ill have a higher risk profile.

As noted earlier in this plan, the National Risk Index (NRI) tool [132] has been made available by the Federal Emergency Management Agency (FEMA). It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience. Below is data relevant to the hazard discussed in this chapter. It should be noted that the NRI information may not necessarily match the hazard ratings reached by the county and is only being included for reference.

Number of Events	7
Annualized Frequency	0.58
Expo. - Building Value ($)	5,654,953,588
Expo. - Population	48,971
Expo. - Population Equiv. ($)	362,385,384,690
Expo. - Agricultural Value ($)	203,559,000.00
Expo. - Total ($)	368,243,897,278
HLR - Buildings	0.00
HLR - Population	0.00
HLR - Agriculture	0.00
HLR - Overall Rating	Very Low
EAL - Building Value ($)	170
EAL - Population	0
EAL - Population Equiv. ($)	196,890
EAL - Agricultural Value ($)	288,886.67
EAL - Total ($)	485,947
EAL Score	40.73
EAL Rating	Relatively High
Risk Score	14.48

[132] https://hazards.geoplatform.gov/portal/apps/MapSeries/index.html?appid=ddf915a24fb24dc8863eed96bc3345f8

Risk Rating	Relatively Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Vulnerability

There has been a trend toward higher temperatures that is expected to continue. As with drought, periods of high temperatures can cause decreased poultry and bovine production rates, which impacts the economy of the community's agricultural base.

More frequent and longer sub-zero stretches have been noted during the winter. These, coupled with concerns about utility failures, can disrupt agriculture, particularly with water supply disruption and with wind chill effects posing a risk to livestock and farmer health. Temperature extremes also pose significant problems for functional needs populations such as the elderly, the young, and the disabled. The primary general effects of extreme cold consist of water lines and mains freezing and breaking, disrupting water supply; shutting down of rural bus lines due to safety risks for children; and school closings, most often due to wind chill concerns.

Vulnerability to temperature extremes is generally assessed on an individual basis with the most vulnerable sections of our community's population having the greatest risk. These people may include the elderly, the very young and the chronically ill. People from economically disadvantaged backgrounds, especially those listed in the categories above, are even more vulnerable since they are least able to afford the cost of adequate heating or air conditioning systems.

The Calumet County social services agencies are aware of many of these people who reside in our communities and they, along with the public health department, have plans and access to economic assistance programs to help these people in times of concern.

Hazard Mitigation Strategies

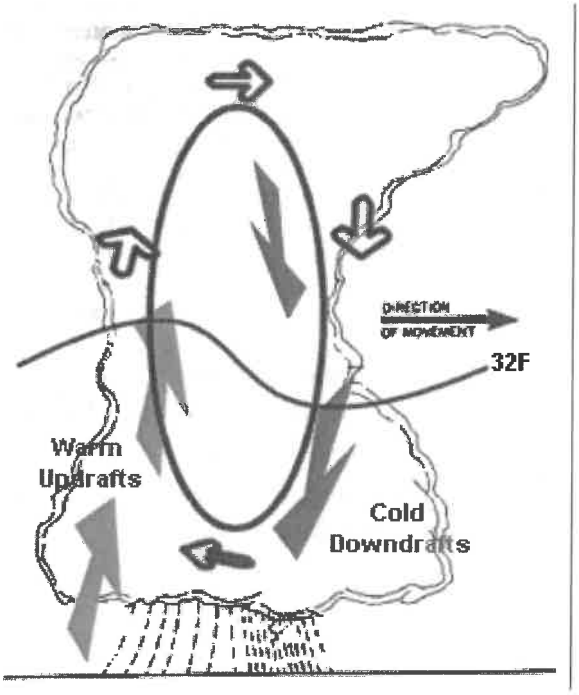
The goal of severe temperature mitigation activities is to reduce, in a cost-effective manner, the loss of lives and property due to these events. Temperature extremes are difficult for a community to

mitigate and the risks are to the health and safety of citizens, animals and crops. There are no strategies that need to be employed to reduce damages to buildings and infrastructure.

The Calumet County Emergency Management Office has developed severe weather safety information that it disseminates annually to the public in spring and fall, ahead of the severe temperature potentials in summer and winter. As needed, information is updated when dangerously hot and cold periods occur.

Storms: Hail

Studies of thunderstorms indicate that two conditions are required for hail to develop: sufficiently strong and persistent up-draft velocities and an accumulation of liquid water in a super-cooled state in the upper parts of the storm. Hailstones are formed as water vapor in the warm surface layer rises quickly into the cold upper atmosphere. The water vapor is frozen and begins to fall; as the water falls, it accumulates more water vapor. This cycle continues until there is too much weight for the updraft to support and the frozen water falls too quickly to the ground to melt along the way. The graphic below depicts hail formation:[133]



Injury and loss of life are rarely associated with hailstorms, however extensive property damage is possible, especially to crops.

[133] Source: NWS, January 10, 2003

Physical Characteristics

Hail may be spherical, conical or irregular in shape and ranges in size from barely visible particles to grapefruit-sized dimensions. Hailstones equal to or larger than a penny are considered severe.

Hail Size Estimates[134]	
Size	**Inches in Diameter**
Pea	1/4 inch
Marble/mothball	1/2 inch
Dime/Penny	3/4 inch
Nickel	7/8 inch
Quarter	1 inch
Ping-Pong Ball	1 1/2 inch
Golf Ball	1 3/4 inches
Tennis Ball	2 1/2 inches
Baseball	2 3/4 inches
Tea cup	3 inches
Grapefruit	4 inches
Softball	4 1/2 inches

Hail falls in swaths that can be from twenty to one hundred miles long and from five to thirty miles wide. A hail swath is not a large continuous path of hail but generally consists of a series of hail cells that are produced by individual thunderstorm clouds traveling in the same area.

Frequency of Occurrence

Hailstorms usually occur from May through August and Wisconsin averages two or three hail days per year. Calumet County has a high probability of hail occurrence in Wisconsin. The likelihood of damage due to hail is considered low. Over the past 25 years hail has occurred 72 times for an average of just under three times per year.

A July 1980 storm hit the Towns of Harrison, Woodville, and Rantoul; however, the communities between did not report hail. Likewise, a May 1998 storm only hit the cities of Brillion and New Holstein—two

[134] NWS, January 10, 2003

cities almost fifteen miles apart. In August 1998, the storm hit the Town and City of Brillion, south to Rantoul, and then "leap frogged" west to the Village of Sherwood. It is not uncommon to notice a pattern where hail hit, skipped miles and then hit again in a different location, all within minutes of each occurrence.

Most hail damage occurs in rural areas because maturing crops are particularly susceptible to bruising and other damage caused by hailstones. The four months of hailstorm activity correspond to the growing and harvesting seasons for most crops. A table showing the hail events recorded by the National Weather Service in Calumet County [135] can be found in Appendix B.

It should be noted that this table represents only the hail incidents reported to the National Weather Service. One limitation of the source data is that it showed no property or crop loss, death or injury while it is likely that there was some loss incurred. After a careful review of the data by the workgroup, it was believed that there has been more accurate record-keeping and recording since the 1990s but that the table also shows an increasing frequency in the occurrence of hailstorms.

As noted earlier in this plan, the National Risk Index (NRI) tool [136] has been made available by the Federal Emergency Management Agency (FEMA). It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience. Below is data relevant to the hazard discussed in this chapter. It should be noted that the NRI information may not necessarily match the hazard ratings reached by the county and is only being included for reference.

Number of Events	329
Annualized Frequency	10.30
Expo. - Building Value ($)	5,654,954,000
Expo. - Population	48,971
Expo. - Population Equiv. ($)	362,385,400,000
Expo. - Agricultural Value ($)	203,559,000

[135] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

[136] https://hazards.geoplatform.gov/portal/apps/MapSeries/index.html?appid=ddf915a24fb24dc8863eed96bc3345f8

Expo. - Total ($)	368,243,913,000
HLR - Buildings	0.00
HLR - Population	0.00
HLR - Agriculture	0.00
HLR - Overall Rating	Relatively Low
EAL - Building Value ($)	2,323,036
EAL - Population	0
EAL - Population Equiv. ($)	148,771
EAL - Agricultural Value ($)	8,240
EAL - Total ($)	2,480,047
EAL Score	23.34
EAL Rating	Relatively Moderate
Risk Score	8.69
Risk Rating	Relatively Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Vulnerability

Hail, typically occurring in conjunction with thunderstorms and lightning, can damage many types of infrastructure. Public and private vehicles (e.g., campers, boats, cars, trucks) are liable to have their windshields cracked, bodies dented and paint damaged as a result of hail. This damage can occur, depending on the size of the hail, whether the vehicle is moving through the storm or is stationary. Hail on the roadway can also cause vehicles to slide off the road. Vehicle damage and iced roadways are of particular concern when you consider the need for emergency vehicles such as

police cars, fire trucks and ambulances to quickly move to assist victims in a disaster.

Hail can also damage critical infrastructure such as street signs, electric lines/poles/transformers, telephone lines and radio communication equipment. These pieces of infrastructure are needed by both first response agencies and the general community to ensure safe transport; warm, safe homes and good internal and external communications abilities.

Residential and business properties are liable to receive damage to signs, siding, billboards, trees and windows. Manufactured housing is particularly vulnerable to damage due to its lower construction standards.

Hail can be particularly damaging to agricultural concerns, including farm buildings, standing crops and livestock. Hail is a localized phenomenon and it would be difficult to estimate losses.

Hazard Mitigation Strategies

The goal of mitigating for hail is to reduce the amount of financial loss due to these events. Insurance is the most widely used adjustment for crop and property damages due to hail. Hail crop insurance is available from two sources: commercial stock and mutual companies and the Federal Crop Insurance Corporation (FCIC). Farmers rarely purchase insurance coverage up to the full value of the losses that would result from a severe hailstorm.

Calumet County Emergency Management and the Sheriff's Department will educate the public (including school children) on the dangers of an approaching storm and steps to take that mitigate the danger. Information will detail how people, animals, and vehicles should be inside a stable structure. If in a camper or mobile home, seek shelter either in the camper or home or go to a designated storm shelter. If on the water and a storm is approaching, get off the water and seek shelter in a vehicle or building.

Communities and road crews should remove dead or dying trees and branches that could fall during a storm. Likewise, road signs should be inspected to be certain supports are of sound condition and the signs

securely fastened to their supports. If road signs are in poor condition, replace them.

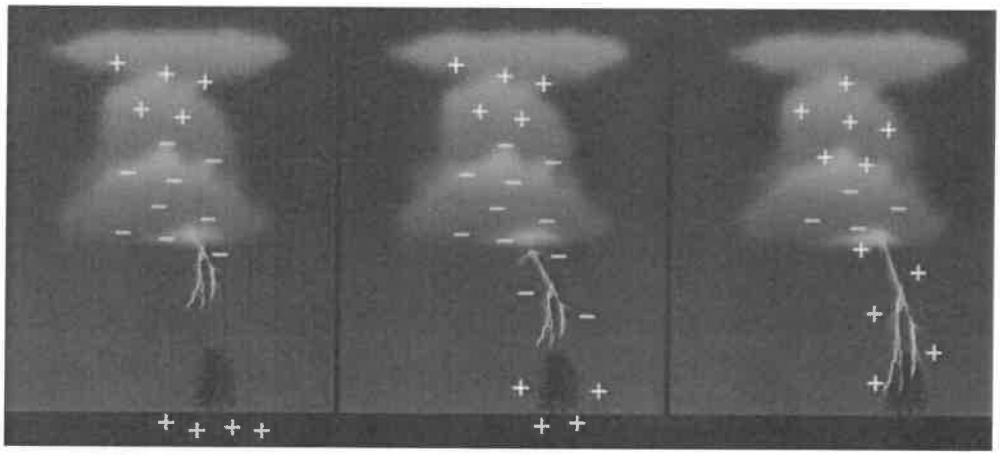
Individuals should maintain their buildings, if possible, to eliminate the potential for more damage. Broken or cracked windows should be replaced and dilapidated siding and shingles should be replaced with stronger, more weather resistant siding and shingles. If a low- or moderate-income household, contact the County Planning Department to determine if there are grant dollars available to help with such improvements. There are limited public programs, but the Northeast Wisconsin Housing Rehabilitation CDBG Program is administered on behalf of the region by the Brown County Planning Department.

These measures provide basic safety information but, since there is little one can do to prevent hail damage, these measures will do little to reduce damages to existing or future buildings and infrastructure but the recommended insurance may make recovery easier.

Storms: Lightning

Lightning is a phenomenon associated with thunderstorms: the action of rising and descending air separates and builds-up positive and negative charge areas. When the built-up energy is discharged between the two areas, lightning is the result.[137]

Formation of Lightning



Lightning may travel from cloud to cloud, cloud to ground, or if there are high structures involved, from ground to cloud.

Physical Characteristics

The temperatures in a lightning stroke rise to 50,000° (Fahrenheit). The sudden and violent discharge which occurs in the form of a lightning stroke is over in one millionth of a second.

Lightning damage occurs when humans and animals are electrocuted, fires are caused by a lightning stroke, materials are vaporized along the lightning path or sudden power surges cause damage to electrical or electronic equipment. Lightning, an underestimated hazard, kills more people in an average year than hurricanes or tornadoes.

[137] University Corporation for Atmospheric Research [UCAR]

Frequency of Occurrence

Nationwide, forty-five percent of the people killed by lightning have been outdoors, about sixteen percent were under trees, six percent were on heavy road equipment and thirty-three percent were at various unknown locations. Less than ten percent of the deaths involved individuals inside buildings; these deaths were primarily due to lightning-caused fires.

Wisconsin has a high frequency of property losses due to lightning. Insurance records show that annually one out of every fifty farms has been struck by lightning or had a fire which may have been caused by lightning. Generally, rural fires are more destructive than urban fires because of limited lightning protection devices, isolation, longer response times and inadequate water supplies. Calumet County has a high to very high probability of lightning occurrence; the likelihood of damage due to lightning is considered low to medium.

A table showing the lightning events recorded by the National Weather Service (NWS) in Calumet County[138] can be found in Appendix B. This table from the NWS is obviously not reporting all of the incidents of lightning strikes but those with notable/reportable losses from the past and can reasonably be inferred to show that there is exposure to potential future losses.

As noted earlier in this plan, the National Risk Index (NRI) tool [139] has been made available by the Federal Emergency Management Agency (FEMA). It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience. Below is data relevant to the hazard discussed in this chapter. It should be noted that the NRI information may not necessarily match the hazard ratings reached by the county and is only being included for reference.

Number of Events	801
Annualized Frequency	36.45
Expo. - Building Value ($)	5,654,954,000
Expo. - Population	48,971

[138] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

[139] https://hazards.geoplatform.gov/portal/apps/MapSeries/index.html?appid=ddf915a24fb24dc8863eed96bc3345f8

Expo. - Population Equiv. ($)	362,385,400,000
Expo. - Total ($)	368,040,354,000
HLR - Buildings	0.00
HLR - Population	0.00
HLR - Overall Rating	Very Low
EAL - Building Value ($)	5,847
EAL - Population	0
EAL - Population Equiv. ($)	78,744
EAL - Total ($)	84,591
EAL Score	19.79
EAL Rating	Relatively Low
Risk Score	5.53
Risk Rating	Very Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Vulnerability

Lightning, which often occurs in conjunction with thunderstorms and hail, can damage many types of infrastructure such as electric lines/poles/transformers, telephone lines and radio communication equipment. These pieces of infrastructure are needed by both first response agencies and the general community to ensure safe transport; warm, safe homes and good internal and external communications abilities.

Residential and business properties are liable to receive damage either as a result of a lightning strike causing a fire or other type of direct damage or by overloading electronic equipment (e.g., computers, televisions) that have not been properly connected to a surge protector. This latter concern is especially important to business and government, which in modern America rely on computers and other electronic equipment to manage the large amounts of data manipulated in our information-based economy.

Lightning can damage agricultural concerns including farm buildings, standing crops and livestock. It is also one of the major sources of ignition for forest and wildfires.

Hazard Mitigation Strategies

The goal of lightning mitigation activities is to reduce, in a cost-effective manner, the loss of lives and property due to these events. The two primary ways to effectively reduce lightning losses are modifying human behavior and protecting structures (e.g., using fire resistant materials in building construction). The use of fire-resistant materials will make existing buildings and future construction less likely to catch fire or will minimize fire damage and spread due to lightning strike. Surge protectors limit data losses.

The Calumet County Emergency Management Office has developed severe weather safety information that it disseminates annually to the public during Severe Awareness Week in April.

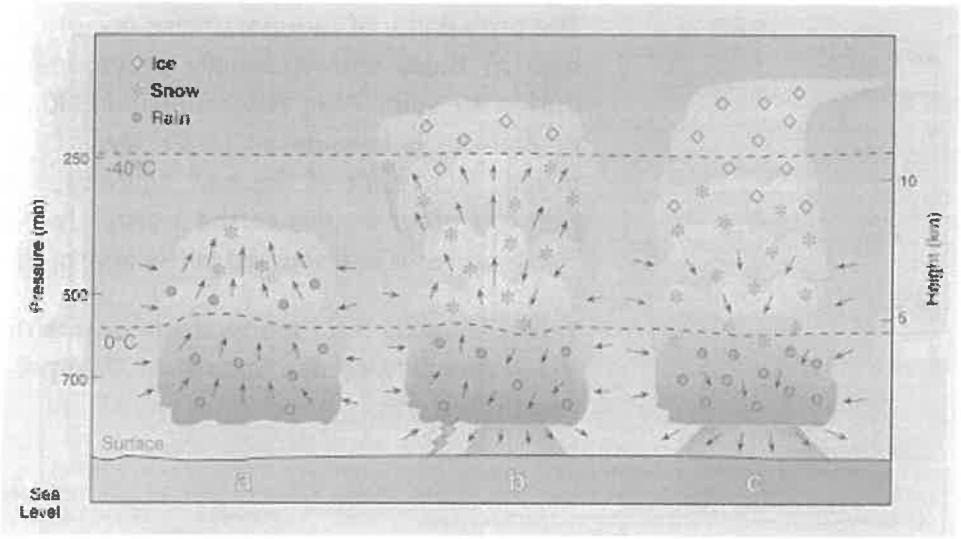
Storms: Thunderstorms

There are three distinct stages of development for thunderstorms (birth, growth, maturity) each of which can be seen in the following schematic. [140]

In the first stage of development, an updraft drives warm air up beyond condensation levels where clouds form.

The second stage of development occurs as levels of water vapor in the expanding cloud rise past saturation and the air cools sufficiently to form solid and liquid particles of water. At this point rain or snow begins to fall within the cloud.

A thunderstorm's mature stage is marked by a transition of wind direction within the storm cells. The prevailing updraft which initiated the cloud's growth is joined by a downdraft generated by precipitation. Lightning may occur soon after precipitation begins. Hail and tornadoes may also develop during this stage.



Physical Characteristics

A thunderstorm often is born, grows, reaches maturity and dies in a thirty-minute period. The individual thunderstorm cell often travels between thirty and fifty miles per hour. Strong frontal systems may

[140] National Weather Service - Flagstaff

create one squall line after another, each composed of many individual thunderstorm cells. These fronts can often be tracked across the state from west to east with a constant cycle of birth, growth, maturity and death of individual thunderstorm cells.

Frequency of Occurrence

Thunderstorm frequency is measured as the number of days per year with one or more incidents. There are approximately 100,000 thunderstorms in the United States every year and approximately 10% of those are considered severe (i.e., has at least ¾" hail, winds of at least 58 mph or a tornado). Most Wisconsin counties, including Calumet County, average between 30 and 40 thunderstorm days per year although a portion of southwestern and south-central Wisconsin average 40 to 50 thunderstorm days per year. In Calumet County there are typically several severe thunderstorms per year. Thunderstorms can occur throughout the year with the highest frequency during the months of May through September. The majority of storms occur between the hours of noon and midnight.

The probability of thunderstorms occurring in Calumet County is very high as these storms usually occur one or more times each year during the summer in Wisconsin and Calumet County. The probability of damage is considered to be low. Damage from thunderstorms usually is a result of the hail, lightning, winds and/or flash flooding that can occur as part of the storm. The likelihood of damage from these causes is in discussed in the appropriate chapters.

Tables showing the thunderstorm events that have been recorded by the National Weather Service in Calumet County can be found in Appendix B. [141]

[141] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

Vulnerability

Thunderstorms, which often produce hail and lightning and may occasionally spawn tornadoes, high wind storms or flash flooding, can damage many types of infrastructure. Calumet County's thunderstorm vulnerabilities due to associated hail, lightning, winds and flood waters are discussed in the other hazard chapters of this plan.

Hazard Mitigation Strategies

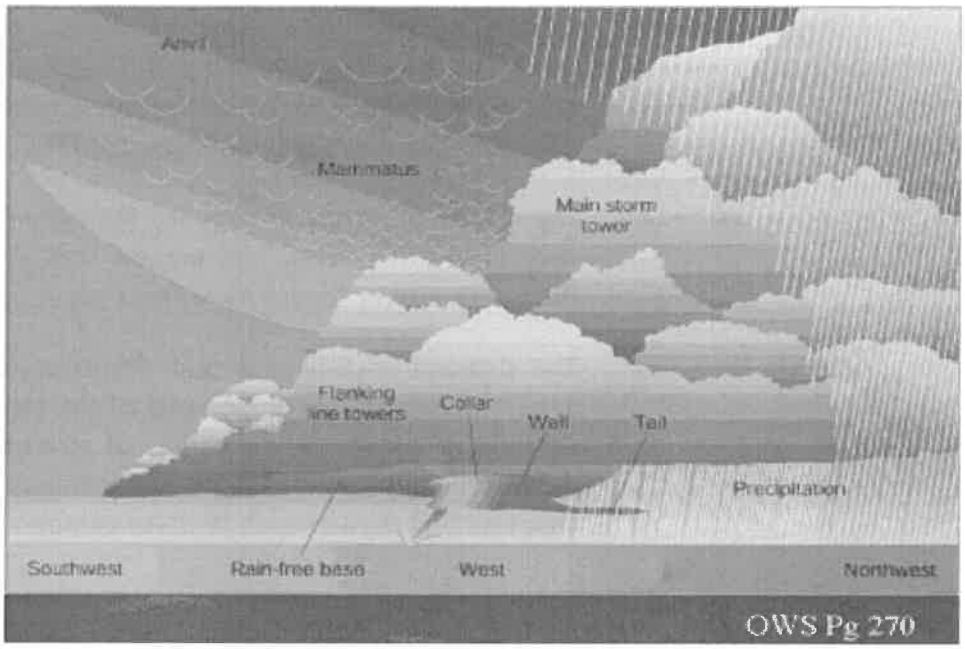
The goal of thunderstorm mitigation activities is to reduce, in a cost-effective manner, the loss of lives and property due to these events.

The Calumet County Emergency Management Office has developed severe weather safety information that it disseminates annually to the public during Severe Awareness Week in April.

The damage to buildings and infrastructure in a thunderstorm is generally caused by components of the storm such as hail, flooding, lightning or wind. A discussion of strategies to reduce effects on existing and future buildings and infrastructure is discussed in the chapters that discuss each of these components in detail.

Storms: Tornadoes and High Winds

A tornado is a violently rotating funnel-shaped column of air. The lower end of the column may or may not touch the ground. Average winds in the tornado are between 173 and 250 miles per hour but winds can exceed 300 miles per hour. It should also be noted that straight-line winds may reach the same speeds and achieve the same destructive force as a tornado.

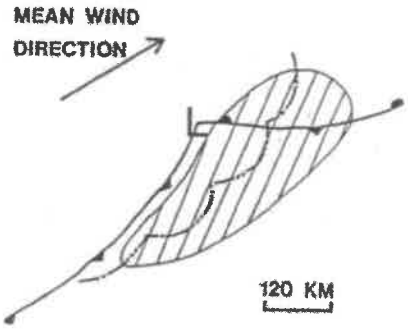


A derecho is a widespread, long-lived, violent, convectively-induced straight-line windstorm that is associated with a fast-moving band of severe thunderstorms usually taking the form of a bow echo. Derechos blow in the direction of movement of their associated storms; this is similar to a gust front except that the wind is sustained and generally increases in strength behind the "gust" front. A warm weather phenomenon, derechos occur mostly in summer, especially July, in the northern hemisphere. They can occur at any time of the year and occur as frequently at night as in the daylight hours.

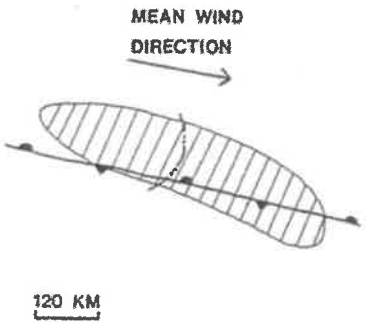
The traditional criteria that distinguish a derecho from a severe thunderstorm are *sustained* winds of 58 mph during the storm as opposed to gusts, high and/or rapidly increasing forward speed and geographic extent (typically 250 nautical miles in length). In addition, they have a distinctive appearance on radar (bow echo); several

unique features, such as the rear inflow notch and bookend vortex and usually manifest two or more downbursts. There are four types of derechos: [142]

- Serial: Multiple bow echoes embedded in a massive squall line typically around 250 miles long. This type of derecho is usually associated with a very deep low. Also because of embedded supercells, tornadoes can easily spin out of these types of derechos.
- Progressive: A small line of thunderstorms take the bow-shape and can travel for hundreds of miles.
- Hybrid: Has characteristics of a serial and progressive derechos. Hybrid derechos are associated with a deep low like serial derechos but are relatively small in size like progressive derechos.
- Low Dewpoint: Occurs in an environment of comparatively limited low-level moisture, with appreciable moisture confined to the mid-levels of the atmosphere.



Serial Derecho



Progressive Derecho

Physical Characteristics

Tornadoes are visible because low atmospheric pressure in the vortex leads to cooling of the air by expansion and to condensation and formation of water droplets. They are also visible as a result of the airborne debris and dust in its high winds. Wind and pressure

[142] http://en.wikipedia.org/wiki/Derecho

differential are believed to account for ninety percent of tornado damage in most cases. Because tornadoes are associated with storm systems, they usually are accompanied by hail, torrential rain and intense lightning.

Tornadoes typically produce damage in an area that does not exceed one-fourth mile in width or sixteen miles in length. Tornadoes with track lengths greater than 150 miles have been reported although such tornadoes are rare.

Tornado damage severity is measured by the Fujita Tornado Scale, which assigns an "F" ("Fujita") value from 0 – 5 to denote the wind speed.

The Fujita Tornado Scale[143]		
Category	**Wind Speed**	**Description of Damage**
F0	40-72 mph	Light damage. Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage to sign boards.
F1	73-112 mph	Moderate damage. The lower limit is the beginning of hurricane speed. Roof surfaces peeled off; mobile homes pushed off foundations or overturned; moving autos pushed off roads.
F2	113-157 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
F3	158-206 mph	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown.
F4	207-260 mph	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown off; cars thrown and large missiles generated.
F5	261-318 mph	Incredible damage. Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100-yards; trees debarked.

On 1 February 2007, the National Weather Service began rating tornadoes using the EF-scale. It is considerably more complicated than the F-scale and it will allow surveyors to create more precise assessments of tornado severity. Below is a comparison between the Fujita Scale and the EF Scale:

Fujita Scale			Derived EF Scale		Operational EF Scale	
F Number	**Fastest ¼ mile (mph)**	**3 Second Gust (mph)**	**EF Number**	**3 Second Gust (mph)**	**EF Number**	**3 Second Gust (mph)**
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

143 FEMA, 1997

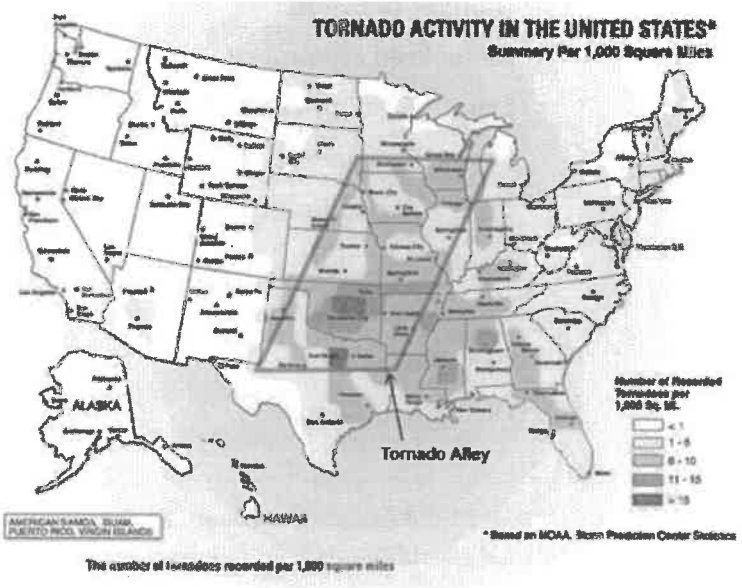
Downburst Characteristics

Downburst damage is often highly localized but resembles damage caused by a tornado. In some cases, even an experienced investigator cannot identify the nature of a storm without mapping the direction of the damaging winds over a large area. There are significant interactions between tornadoes and nearby downbursts.

A classic downburst example occurred on July 4, 1977 when a severe thunderstorm moved across Northern Wisconsin. Extensive areas of tree and property damage, somewhat like a tornado, were reported. After an aerial survey was completed, mapping both direction and F-scale intensity of the damaging winds, it was determined that no evidence of a tornado was found anywhere within the path of the damage swath, which was 166 miles long and 17 miles wide. The survey revealed that there were scattered local centers from which straight-line winds diverged outward. These local wind systems were identified as downbursts with at least 25 specific locations recognized by the low-flying aircraft.

Frequency of Occurrence

Wisconsin lies along the northern edge of the nation's tornado belt, which extends north-eastward from Oklahoma into Iowa and across to Michigan and Ohio. Winter, spring and fall tornadoes are more likely to occur in southern Wisconsin than in northern counties.



Wisconsin's tornado season runs from the beginning of April through September with the most severe tornadoes typically occurring in April, May and June. Tornadoes have, however, occurred in Wisconsin during every month except February. Many tornadoes strike in late afternoon or early evening but they do occur at other times. Deaths, injuries and personal property damage have occurred and will continue to occur in Wisconsin.

Tables showing the frequency of high winds, funnel clouds and tornadoes as reported by the National Weather Service can be found in Appendix B.[144] There have been 13 funnel clouds and 15 tornadoes reported for the county. The probability of Calumet County being struck by a tornado in the future is low and the likelihood of damage from future incidents is very high. The probability of Calumet County being struck by high winds in the future is medium and the likelihood of damage from future incidents is very high.

As noted earlier in this plan, the National Risk Index (NRI) tool [145] has been made available by the Federal Emergency Management Agency (FEMA). It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience. Below is data relevant to the hazard discussed in this chapter. It should be noted that the NRI information may not necessarily match the hazard ratings reached by the county and is only being included for reference.

Strong Wind

Number of Events	305
Annualized Frequency	9.55
Expo. - Building Value ($)	5,654,954,000
Expo. - Population	48,971
Expo. - Population Equiv. ($)	362,385,400,000
Expo. - Agricultural Value ($)	203,559,000
Expo. - Total ($)	368,243,913,000
HLR - Buildings	0.00
HLR - Population	0.00

[144] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

[145] https://hazards.geoplatform.gov/portal/apps/MapSeries/index.html?appid=ddf915a24fb24dc8863eed96bc3345f8

HLR - Agriculture	0.00
HLR - Overall Rating	Very Low
EAL - Building Value ($)	673,676
EAL - Population	0
EAL - Population Equiv. ($)	912,520
EAL - Agricultural Value ($)	14,029
EAL - Total ($)	1,600,225
EAL Score	28.13
EAL Rating	Relatively Moderate
Risk Score	7.75
Risk Rating	Very Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Tornado

Number of Events	9
Annualized Frequency	4.86
Expo. - Building Value ($)	10,997,306
Expo. - Population	95
Expo. - Population Equiv. ($)	704,738,362
Expo. - Total ($)	715,735,668
HLR - Buildings	0.01
HLR - Population	0.00
HLR - Overall Rating	Very Low
EAL - Building Value ($)	412,251
EAL - Population	0
EAL - Population Equiv. ($)	33,726
EAL - Total ($)	445,977
EAL Score	12.49
EAL Rating	Relatively Low
Risk Score	3.02
Risk Rating	Very Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Vulnerability

Injury to people is a primary concern in tornado and high wind events. Two of the highest risk places are mobile home parks and campgrounds; Calumet County has a few of each type of property. Both have high concentrations of people in a small area, generally have structures that provide less protection than standard construction homes and generally do not provide storm shelters. Other places of concern during these types of events include critical emergency facilities such as hospitals and public works/highway garages, police stations and fire departments, which contain equipment and services needed by the public after a tornado.

Mobile Home Parks [146][147]	
Park Name	**Location**
Brillion Mobile Home Park	Brillion
Country Aire Mobile Home Park	New Holstein
Forest Junction Mobile Home Park	Forest Junction
Hilbert Acres	Hilbert
Lakeview Estates	Chilton
Miller Mobile Home Park	Brillion

Campgrounds [148]	
Campground Name	**Location**
Calumet County Campgrounds	Chilton

146 https://www.mobilehome.net/mobile-home-park-directory/wisconsin/calumet-county
147 https://www.mhvillage.com/parks/wi/calumet-county
148 http://www.hikercentral.com/campcounty/Wisconsin_Calumet.html

Calumet County Park	Hilbert
High Cliff State Park	Sherwood
Lakeview RV Park and Cabins	Chilton

Schools, in addition to holding children, are the major type of structure used as community disaster shelters and their loss might therefore affect the community on several levels (e.g., the death or injury of children, the loss of a community housing shelter.) School gymnasiums are often the specific location of the community shelter but they are especially vulnerable in tornadoes because the large-span roof structure is often not adequately supported.

Community infrastructure such as power lines, telephone lines, radio towers and street signs are often vulnerable to damage from tornadoes and high winds and can be expensive to replace. The loss of radio towers that hold public safety communications repeaters can adversely impact the ability of first responders to mount an effective response and damage to towers that hold public media equipment may adversely impact the ability to distribute adequate public information.

Residential property is likely to have siding and roofing materials removed, windows broken from flying debris and garages blown down due to light construction techniques. Perhaps one of the largest types of loss on private property is due to tree damage, which is generally not covered by federal disaster assistance.

Business properties are at risk for having damage to infrastructure including signs, windows, siding and billboards. Agricultural buildings, such as barns and silos, are also generally not constructed in a manner that makes them wind resistant, which can lead to the loss of livestock and harvest. Standing crops are also at risk from high winds and tornadoes.

June 2001 high winds in Calumet County caused considerable damage to homes, barns, trees, and power lines. The storm was later declared a Presidential Disaster.

Hazard Mitigation Strategies

The goal of tornado and high wind mitigation activities is to reduce, in a cost-effective manner, the loss of lives and property due to these events. Calumet County has a history of damage due to tornadoes and high winds. Some strategies below will deal with public information while others will enable the community to make current and future buildings and infrastructure more disaster-resistant by enacting more "bricks and mortar" solutions.

Tornado sirens are municipally owned and maintained in Calumet County although some are activated by the county. Strategies identified relating to sirens include:

- Village of Potter - A sudden tornado would render residents of the Village helpless. The current tornado siren is approximately 40 years old. It has to be triggered manually by volunteer fire department personnel. It is believed a newer, automatic siren would be more effective at preventing property damage and loss of life. There are no current external funding sources for sirens. The community will determine if there is budget for purchase, installation, and maintenance.

- Town of Charlestown - A significant portion of the town cannot hear neighboring cities' tornado sirens. The town should consider installing a siren in an area where the siren's range would cover underserved areas. There are no current external funding sources for sirens. The community will determine if there is budget for purchase, installation, and maintenance.

- Town of New Holstein - Install tornado siren. There is no way to alarm resident of the Country Aire Mobile Home Park of high winds or tornado. They cannot hear the City of New Holstein siren at their location. The St. Anna Fire Department currently drives out there to warn the citizens but in the past, the truck was forced off the road in the storm and never made it to the park to warn of the storm. The park needs a tornado siren and/or a tornado shelter.

- Town of Rantoul - A significant portion of the town cannot hear neighboring city or village tornado sirens. The town should consider installing a siren in an area where the siren's range would cover underserved areas. There are no current external funding sources for sirens. The community will determine if there is budget for purchase, installation, and maintenance.

- Town of Woodville - The Town does not have a tornado siren. Residents hear the Sherwood, Harrison, Hollandtown or Hilbert sirens. The town should review the ranges of neighboring sirens to guarantee all residents are within hearing range of a siren. If it is found there is a lapse in coverage, a siren should be installed that adequately serves the needs of town residents. There are no current external funding sources for sirens. The community will determine if there is budget for purchase.

During the past several years, there has been a statewide Tornado Awareness Week in late March or April. Calumet County and many of the municipalities actively promote tornado safety public information as well as other summer severe weather public awareness and educational efforts, including applicable links on the county website. Calumet County Emergency Management will work with partners to teach the public what protective actions are recommended in a tornado.

The Calumet County Emergency Manager and Calumet County Sheriff's Office (CASO) personnel implements the annual Student Tools for Emergency Planning (STEP) program within the county schools. Public education for severe weather is also provided and promoted thru regular social media activity and in-person events.

Many communities expressed an interest in tornado shelters. The Calumet County Emergency Management office will work with communities to apply for grants to construct tornado shelters. The following list includes strategies related to shelters within the various communities:

- City of Chilton - Publicize shelter designation at City Hall. City Hall is deemed the official city tornado shelter because it has a basement, generator, and kitchen. However, some of the public is not aware the shelter is available. The city should make better attempts at notifying the public of the designation. Once people are aware of the designation, there should not be a problem getting to the shelter. City Hall is conveniently located within one or two blocks off the main roads: US Highway 151, State Highway 32/57, and County Highway F. The fact that there are two tornado sirens in the city will help alert residents of the need to seek shelter. The sirens are located southwest of the intersection of Court Road and Hiemann Street, and, northwest of the intersection of Clay Street and Vogt Lane. The sirens are more than adequate for the city because their wail actually overlaps their ranges.

- Village of Harrison - Designate and promote storm shelters in the Village. The northern part of Harrison tends to get hit with more hailstorms than other parts of the town. Thankfully, during severe storms residents are appropriately warned and can seek shelter from such severe storms and tornadoes. The No. 2 Harrison Fire Department at the west end of the town has a tornado siren. The Village of Sherwood, approximately in the middle of the town, has three sirens. These sirens, combined, provide ample range and warning to Harrison residents. Although siren coverage is good, there are no designated storm shelters. In the more populated part of the village, the Darboy area, homes are newer and most

have basements. However, homes in the lakeshore area only have crawls spaces. The new health club in Menasha (along County highway LP) could serve as a shelter, as well as Christ the Rock Church off Eisenhower Drive and US Highway 114. It should be discussed with the owners of these buildings to determine if these facilities could indeed be the designated shelters, and, the public made aware of such designations. The Harrison Fire Department is currently underway with a new plan for storm shelters and working with businesses and property owners to designate these areas.

- Village of Potter - Designate shelter and acquire generator. There is no designated storm shelter in the village. The Village Hall is an older, pole type building. It has no generator. The Village Hall would not be a desired shelter. The United Church of Christ worship building would be an ideal shelter. The building appears to be the strongest building in the village. However, there is no generator at the worship building. If designated the shelter, a generator should be installed. Funding sources will be sought.

- Village of Sherwood - Designate a shelter and provide generator. There are two tornado sirens in the village. Although the village has been proactive in providing sirens to warn of a tornado, they fail to provide a local emergency shelter. A building should be designated as the local storm shelter and a generator provided.

- Village and Town of Stockbridge - Designate an official emergency shelter within the Village and the Town. The village has a tornado siren which is well heard throughout the entire village. Although they have a siren, no provision was made for a designated tornado shelter. Currently the Village believes people use their private residences and/or taking shelter within their own homes or a neighboring home. However, there has not officially been a designated shelter within the Village. It has been talked about at Town and Joint Meetings for various locations, but no agreement has been made. The Town of Stockbridge shares a municipal meeting hall with the Village of Stockbridge. The town feels this hall should be designated as the town storm shelter. The town and village should

cooperate on designating a building as the official shelter, and, publicize such designation so the public is aware which building will be used for emergency purposes. Regardless of which place is designated the shelter, a generator should also be provided to ensure medical needs that require electricity, could be satisfied. The Village and the Town need to jointly agree and make plans towards resolving this. The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project. The communities are also seeking a new fire department and exploring options for making it dual purpose as a shelter.

- Town of Chilton - Designate a storm shelter. There is no designated storm shelter in the town. Some building should be erected or designated as the official emergency shelter. The building should be equipped with a generator to meet medical needs requiring power, and refrigeration needs for prolonged shelter stays. Will evaluate possible shelter options and seek grants if a generator is needed.

- Town of New Holstein - Designate storm shelter on CTH HH, 1/10 mile east of Meyer Road. There is an Amish School on the north side of County Highway Q, slightly more than one half mile west of County Highway A. The school has no basement for the students to go to in case of severe weather. A storm shelter (e.g., nearby basement) should be designated.

- Town of Rantoul - Designate an emergency shelter. There is a Lutheran School along Trinity Road. The school has no basement for the students to go to in case of severe weather. A storm shelter (e.g., nearby basement) should be designated as the official shelter. Grant funding will be sought.

- Town of Woodville - St. John's Church building (emergency shelter) - Educate public on shelter, install generator. The designated emergency shelter for town residents is the basement of St. John's parish building located at the southeast corner of the intersection of County Highways B and BB. The town should better publicize the shelter to residents so they are aware of where to go in the event of

a severe storm. Also, to accommodate individuals that need medical equipment, or the need for refrigeration, etc., a small generator should be installed.

Other possible activities include:

- The Calumet County Highway Department will keep trees and shrubbery trimmed. Make trees more wind resistant by removing diseased or damaged limbs, then strategically remove branches so that wind can blow through. Strong winds frequently break weak limbs and hurl them at great speed, causing damage or injury when they hit. Debris collection services may not be operating just before a storm, so it is best to do this well in advance of approaching storms.

- The Calumet County Planning Department will assist municipalities with drafting ordinances requiring that mobile homes be affixed to permanent foundations (or other measures) to minimize the potential for damages. Several municipalities have expressed a specific interest in this and are described in further detail in Appendix E.

Storms: Winter

Due to its position along the northern edge of the United States, Wisconsin, including Calumet County, is highly susceptible to a variety of winter weather storm phenomena.

Picture of snow drifts after the "Groundhog Day Blizzard" in 2011.

Physical Characteristics

The National Weather Service descriptions of winter storm elements are:

- Heavy snowfall - Accumulation of six or more inches of snow in a 12-hour period or eight or more inches in a 24-hour period.
- Blizzard - An occurrence of sustained wind speeds in excess of 35 miles per hour (mph) accompanied by heavy snowfall or large amounts of blowing or drifting snow.
- Ice storm - An occurrence when 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 - Effect of drizzle or rain freezing upon impact on objects with 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.

In Wisconsin, the winter storm season generally runs from November through March and Wisconsin residents are most familiar with heavy snowstorms, blizzards, sleet and ice storms. The majority of Wisconsin snowfalls are between one and three inches per occurrence, although heavy snowfalls that produce at least ten inches may occur four or five times per season. Northwestern Wisconsin encounters more blizzards than the southeastern portions of the state.

Damage from ice storms can occur when more than half of an inch of rain freezes on trees and utility wires, especially if the rain is accompanied by high winds. Another danger comes from an accumulation of frozen rain pellets on the ground during a sleet storm, which can make driving hazardous.

Frequency of Occurrence

Annual snowfall in Wisconsin varies between thirty inches in southern counties to one hundred inches in the north. Calumet County averages between 36 and 48 inches of snow annually. Storm tracks originating in the southern Rockies or Plains states that move northeastward produce the heaviest precipitation, usually six to twelve inches. Low-pressure systems originating in the northwest (Alberta) tend to produce only light snowfalls of two to four inches. Snowfalls associated with Alberta lows occur more frequently with colder weather.

Although massive blizzards are rare in Wisconsin, blizzard-like conditions often exist during heavy snowstorms when gusty winds cause blowing and drifting of snow. For example, near blizzard conditions existed in Wisconsin in February, 2011 when record snowfalls were recorded in many areas and very strong northeast winds were gusting from 45 to 60 mph for an extended period of time. It should be noted that there were two additional large snow storms that occurred in late February and late March of 2011.

Both ice and sleet storms can occur at any time throughout the winter season from November to April. Ice storms of disastrous proportions occurred in central Wisconsin in February 1922 and in southern Wisconsin in March 1976. A Presidential Disaster Declaration occurred as

a result of the 1976 storm. Utility crews from surrounding states were called in to restore power, which was off for up to ten days in some areas. Other storms of lesser magnitude caused power outages and treacherous highway conditions.

Tables showing winter storm statistics as reported by the National Weather Service can be found in Appendix B.[149] The tables show that there is little property damage but this does not take into account the public costs of managing the snow and ice as well as the costs of managing utility repair to power, telephone and water lines. There are six recorded blizzard events for the county.

The probability that there will be severe winter storms in Calumet County is very high and the likelihood that those storms will cause significant damage is medium.

As noted earlier in this plan, the National Risk Index (NRI) tool [150] has been made available by the Federal Emergency Management Agency (FEMA). It calculates a baseline relative risk measurement for 18 natural hazards based on expected annual loss, social vulnerability and community resilience. Below is data relevant to the hazard discussed in this chapter. It should be noted that the NRI information may not necessarily match the hazard ratings reached by the county and is only being included for reference.

Winter Weather

Number of Events	52
Annualized Frequency	4.28
Expo. - Building Value ($)	5,654,953,588
Expo. - Population	48,971
Expo. - Population Equiv. ($)	362,385,384,690
Expo. - Total ($)	368,040,338,278
HLR - Buildings	0.00
HLR - Population	0.00
HLR - Overall Rating	Very Low
EAL - Building Value ($)	11,436

[149] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

[150] https://hazards.geoplatform.gov/portal/apps/MapSeries/index.html?appid=ddf915a24fb24dc8863eed96bc3345f8

EAL - Population	0
EAL - Population Equiv. ($)	78,540
EAL - Total ($)	89,976
EAL Score	18.63
EAL Rating	Relatively Moderate
Risk Score	6.44
Risk Rating	Very Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Ice Storm

Number of Events	15
Annualized Frequency	0.23
Expo. - Building Value ($)	5,651,949,069
Expo. - Population	48,942
Expo. - Population Equiv. ($)	362,167,608,201
Expo. - Total ($)	367,819,557,269
HLR - Buildings	0.00
HLR - Population	0.00
HLR - Overall Rating	Very Low
EAL - Building Value ($)	2,955
EAL - Population	0
EAL - Population Equiv. ($)	1,007
EAL - Total ($)	3,961
EAL Score	6.93
EAL Rating	Very Low
Risk Score	1.70
Risk Rating	Very Low

"Expo." = Exposure / "HLR" = Historic Loss Ratio / "EAL" = Expected Annual Loss

Vulnerability

Winter storms present a serious threat to the health and safety of affected citizens and can result in significant damage to property. Heavy snow or accumulated ice can cause the structural collapse of homes, commercial buildings and agricultural structures; down power lines or isolate people from assistance or services by impeding transportation by the general public, emergency responders and public transportation resources.

The loss of electrical service and/or the blocking of transportation routes can adversely affect the ability of commercial enterprises to conduct business. This economic injury can affect both the business owner and employees unable to work during this period.

Hazard Mitigation Strategies

The goal of winter storm mitigation activities is to reduce, in a cost-effective manner, the loss of lives and property due to these events.

Winter safety information is prepared and distributed to the media and the public by the Calumet County Emergency Management Office and some of its municipal partners during Winter Awareness Week in November. Methods include traditional sources (newspaper, etc.), social media and other outreach and educational opportunities as they arise. Residents are encouraged to:

- Avoid travel during winter storms, icy conditions and blizzards to minimize accidents;
- Stay indoors during periods of extreme low temperatures; and
- Watch the weather reports so they can dress accordingly in layers of lightweight, warm clothes and be certain face, hands and feet are covered to avoid frostbite.

Drivers are also be educated on matters such as carrying a disaster supply kit in their vehicle; keeping their gas tank full to avoid freezing or running out if needed to keep warm; and what to do if your vehicle breaks down or gets stuck in snow.

The Calumet County Planning Department shall continue to apply for grants to help low- and moderate-income individuals with repairs that

will ensure their warmth and safety in their home. There are limited public programs, but the Northeast Wisconsin Housing Rehabilitation CDBG Program is administered on behalf of the region by the Brown County Planning Department.

Utilizing public information methods, the Village of Harrison will encourage homeowners along Lake Winnebago to have sound retaining walls and shore protection. At the north end of Lake Winnebago ice shoves are common. The shoves damage shorelines, and on occasion lawns and structures. Property owners need to better stabilize their shorelines with retaining walls or large riprap that can minimize the piling ice. While ice shoves have been noted throughout the years, there are no specific property owner complaints logged regarding their shorelines. The Village of Harrison encourages all riparian property owners to continue maintaining and reinforcing their shorelines to avoid property damage.

The City of Chilton will monitor flooding and erosion on the Center Street bridge. About 35 years ago the snow and ice in the South Branch of the Manitowoc River experienced a rapid thaw. At the Center Street Bridge, the water rose so high that it came up to the bottom of the bridge. Also, due to the amount of water, there was turbulence at the bank and the bank experienced some erosion. The bridge was eventually replaced with a higher bridge. There has not been a problem since. This area should be watched to make sure thaws are not creating turbulence that erodes away the bank. If the area does experience erosion, riprap will need to be placed at the bank to minimize potential problems.

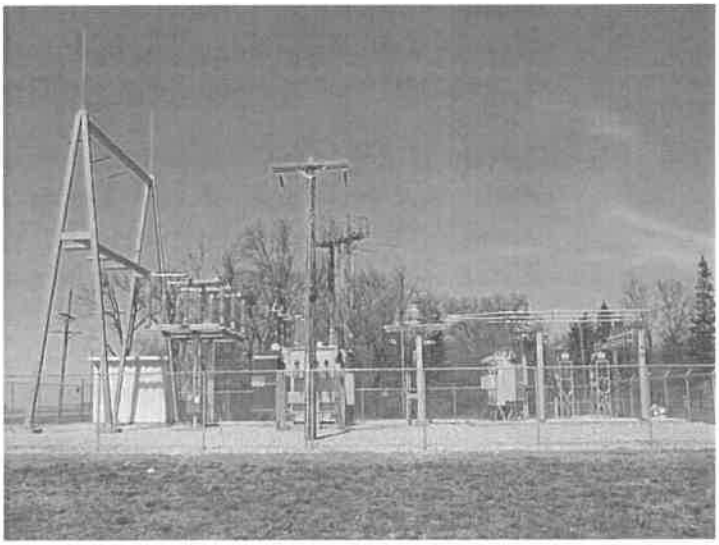
The City of Chilton will also monitor ice cover on the railroad trestle. The trestle was only one of two places the city has experienced ice damage/problems. Approximately 40 years ago the railroad trestle located between Breed and Center Streets experienced an accumulation of ice. That spring, as ice flowed down the South Branch of the Manitowoc River, ice built up at the trestle and made it impassable. There has not been a problem since. As run off in the city enters the river, and as weather conditions change, this situation should be monitored. The railroad that services the city and surrounding area is vital to many of the businesses. Without rail transportation the businesses would have to transport goods via trucks, which is a more expensive mode of transport for such goods. Both Irish Road Bridge and RR Bridge had ice build-up approximately 2-4 years ago. The Street Department uses Fyke poles and backhoe to dislodge ice at both locations.

Utility Failure

A utility emergency is a disruption to the building services, usually defined as electrical power, water, natural gas and/or sewage, that restricts the ability of people to safely occupy the facility. Electrical power or natural gas outages are often caused by a fuel shortage caused by an oil embargo, power failure or natural disaster. Disruptions to the water and sewage systems are often the direct result of a natural disaster (e.g., flooding) or are indirect losses due to another failure (e.g., a power outage disrupts the pumping of water and/or sewage).

Physical Characteristics

Modern society is very dependent on electrical power for normal living and is therefore quite disrupted by loss of power. Most power outages last about fifteen minutes to one hour. If longer, the utilities will inform the local news media of the anticipated duration of the outage. Wisconsin Electric, Wisconsin Public Services and New Holstein Electric Utility provide electrical services to most of Calumet County. Natural gas pipelines running through the county are owned by Wisconsin Public Service and WE Energies.



Electrical substation

Thunderstorms with lightning are a possible cause of power failure. Fuel shortages can be caused by localized imbalances in supply. Labor strikes, severe cold weather or snowstorms also can cause a local shortage.

Rural residents usually heat their homes with propane. During the winter of 2014 there was a propane shortage due to five factors:

1. An increase in the amount of propane used to dry corn due to a late crop harvest coinciding with heavy rains depleted supplies last fall.
2. From November 28 to December 18 a major pipeline supplying propane to Wisconsin, Minnesota and Iowa was temporarily closed for maintenance.
3. Colder-than-normal winter temperatures.
4. An increase in exports of propane.
5. Constrained rail service.

On January 25, 2014 the Governor declared a state of emergency in response to the shortage and the state provided and estimated $31.2 million in funding to residents of Burnett, Polk and Washburn Counties. During this period, suppliers were rationing propane forcing people to use alternative heat sources, which can cause carbon monoxide poisoning or may lead to fires.

All of the cities and villages in Calumet County have sanitary sewer service. There are also several areas where portions of towns are provided service which primarily include the Forest Junction area in the Town of Brillion and many portions of the Town of Harrison. The remaining portions of towns utilize private on-site wastewater treatment systems. Similar to sanitary sewer service, all cities and villages in the county are provided public water service except for the Village of Potter. Remaining portions of the county rely on private wells for water service.

Both municipal and individual systems are vulnerable to flooding, which can overwhelm the sewage systems and contaminate both municipal and private wells. Both types of systems are also vulnerable to electrical power loss because the electrical system powers the pumps and lift stations that move and treat the water and sewage.

Frequency of Occurrence

Calumet County has an estimated five short power outages (i.e., lasting less than six hours) per year but does not have a history of extended power outages. The possibility always exists that a man-made or natural disaster could affect the power system for an extended period of time.

Due to the mostly rural nature of Calumet County, brown-outs (i.e., times when, because of high power demand, areas are purposefully turned off of the power grid) are not a typical strategy used by the power companies that provide service.

The workgroup agreed that Calumet County has a very high likelihood of electric utility failures; a low likelihood of natural gas failure; and a medium likelihood of water utility, sewer utility and telecommunications failures. The likelihood of damage for electric service is very high; low for telecommunications services; and high for natural gas, water and sewer utility failures. Obviously, power outages are more likely to occur and the severity is greater in areas of higher human population (i.e., urban areas) but the loss of power to rural customers, while affecting fewer people, generally lasts longer and can be as life-threatening, especially if a person with functional and access needs (e.g., the elderly, the young, those on special medical equipment) is involved.

Vulnerability

The failure of a utility to function can have wide-ranging impact in Calumet County. People, especially functional and access needs populations, in residential properties may not be able to safely live in their homes because of inadequate heat, the inability to cook, etc. Businesses, including the utilities themselves, may lose money due to the inability to produce goods and services for which they can bill. Other utilities may also be non-operational due to damaged infrastructure, which can be very expensive to replace and/or repair. Critical infrastructure such as hospitals, schools and governmental facilities may not be able to operate or may have to operate at a reduced capacity due to the loss of utility services. Facilities with hazardous materials that are required to report under the Emergency Planning and Community Right-to-Know Act (EPCRA) may not be able to adequately control and contain their chemicals and there may be a release of hazardous materials that can impact people or the environment.

Agricultural assets may be impacted by the loss of utilities because animals require fresh water and to some extent, temperature control in shelters/barns. Extreme temperatures reduce the production volume of and products such as milk may not be able to be properly stored. Modern farms also require a large amount of automation for feeding, watering and managing the wastes of the facility.

Finally, transportation on roadways may become unsafe due to the loss of directional and street lights.

Hazard Mitigation Strategies

The goal of utility failure mitigation activities is to reduce, in a cost-effective manner, the loss of lives and property due to these events.

WE Energies, which provides electric service in the county, could upgrade the grid to alleviate unreliable power grid during storms. When there is a big storm, particularly an ice storm, the power goes out throughout the entire village. This occurrence is more pronounced in early winter or late spring when there tends to be more ice accumulating on the lines. The system is unreliable due to age and design. Most of the lines in the village are buried; however, the lines on the outskirts of the village are not. It is recommended WE Energies either bury all lines or update the grid. Loss of power for an extended period of time can mean a loss of heat during the winter months. Besides displacing people, other damage to property can occur including burst water pipes, and sanitary traps. Local public buildings are also frequently subjected to power outages and a loss of heat generating ability, thereby limiting the usefulness of public buildings as shelters during prolonged winter power outages.

The ANR Pipeline runs across the east edge of the Town of Rantoul and a fiber optic line runs buried along Irish Road. Most of the pipeline is buried but a portion of the line runs through a large wetland and cannot be buried and therefore it lies above ground. The town is concerned what exposure to the natural elements, frost and wildlife could do to the pipeline. In addition, there is concern that the portion above ground could be a target for terrorists whereby they could infiltrate the line and use it as an explosive or other weapon. The town should monitor this situation in case there is an opportunity to fill over the pipeline in the wetland. If such an opportunity should arise the town should work cooperatively with the gas provider to bury the line.

When there is a big storm, particularly an ice storm, the power goes out in the Village of Potter. This occurrence is more pronounced when there is more ice accumulating on the lines. It is recommended that Wisconsin Public Service, the electric provider, bury all overhead lines. Loss of power for an extended period of time can mean a loss of heat during the winter months. Besides displacing people, other damage to property can occur including burst water pipes and sanitary traps. Local public

buildings are also frequently subjected to power outages and a loss of heat generating ability, thereby limiting the usefulness of public buildings as shelters during prolonged winter power outages.

In the event of a prolonged power outage, Calumet County would need generators to power various operations and facilities. Many communities have a need for a generator(s). The following strategies have been identified:

- Village of Potter and Town of Rantoul - Acquire generator at fire department. The Fire Department is housed adjacent to the Village Hall. Neither the Department nor the Hall has a generator. The Fire Department has four manual doors, and two electric doors. One truck has a small, portable generator. In the event the power goes out, and there was an emergency warranting the services of the Fire Department, the village is concerned they would not be able to lift the heavy manual doors safely and efficiently. A generator should be installed at the Fire Department in case of emergency (the portable generator is insufficient). Grant funding will be sought. The neighboring town, Town of Rantoul, provides village road maintenance. The town garage is an older building with no generator. The Village is concerned that if there was no power, the truck batteries could freeze and render the vehicles inoperable, or, town staff may not be able to lift the doors to get any operable trucks out to do the service. Recommendation is to purchase and install a generator. Grant funding will be sought.

- Village of Sherwood - Provide generator for village garage on Clifton Road. During some storms the power at the village garage goes out and it is difficult to open the garage doors. The doors can be lifted manually; however, they are heavy and difficult to maneuver. A generator at the garage would allow service doors to be opened and road crew to exit and provide necessary services. Grant funding will be sought.

- Village of Sherwood - Provide generators for the lift stations at Stommel Road and Windswept Lane. There is a concern that if the power goes out, the lift stations at Stommel Road and Windswept Lane will not work and the water will back up and bypass to Lake Winnebago, thereby contaminating the lake. Generators are needed at the two lift stations. Will seek funding.

- Town of Brothertown - Install generator at town hall and garage. At the Town Hall and Garage there is no generator. There is concern in the event of storms there is no "safe place" for residents and a generator could help with this issue. It should be noted that the Town Hall is not large enough to accommodate many residents, and therefore should not be designated an official shelter. However, with a generator it could be a limited, or temporary, shelter for some residents. In addition, if power goes out, the snow removal vehicles would not be able to be charged, resulting in no winter road maintenance until the power was restored. Grant funding will be sought.

- Town of Charlestown - Install generator at town garage. There is concern that during an ice storm, or other severe storm, the power will go out at the Town Garage and the road crew will not be able to lift the heavy doors to get the road maintenance vehicles out to provide services. In addition, if the power remains out for an extended period of time in cold weather, the trucks might not start. A generator would not only guarantee the doors could be raised, but would also serve as a power source to get maintenance vehicles running and operable. Grant funding will be sought.

- Town of Chilton - Install a generator at the town hall. There is no designated emergency shelter in the town. Although the Town Hall would not be suitable as a tornado shelter, it could be used for other emergency purposes (e.g., evacuations). Some type of generator should be installed though to make sure medical needs requiring power can be accommodated. Grant funding will be sought.

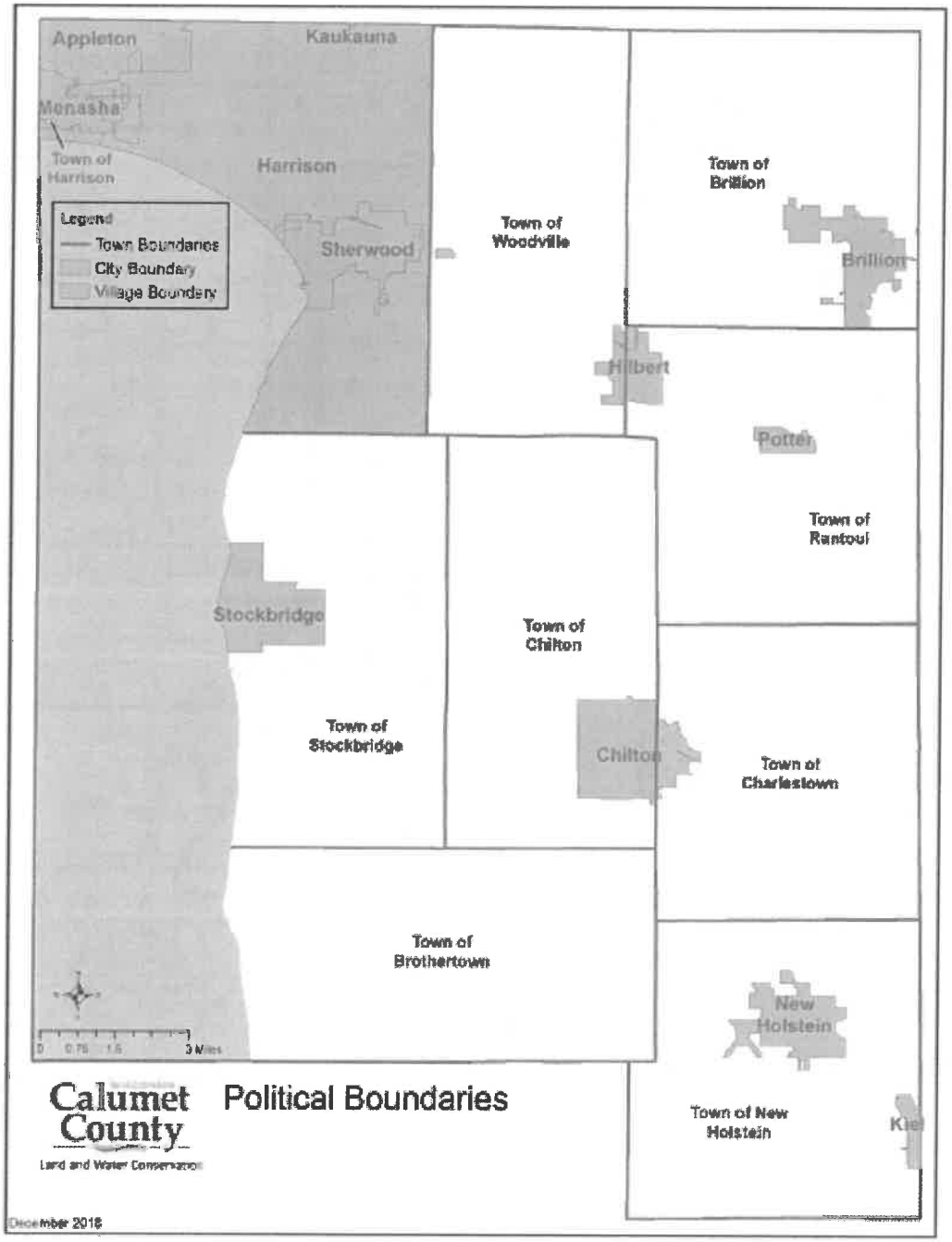
- Town of New Holstein - Install generator at town garage. In the event of a heavy ice storm, the power lines could snap and the power be lost at the town garage. Without power, the building will lose heat, and over a period of just a few hours, the trucks freeze. If the trucks cannot start, there is no way to provide road services, like snow removal or salting/sanding ice. A generator should be installed at the Town Garage. Grant funding will be sought.

- Town of Woodville - Install generator at Town Hall or town garage. Power in this area is provided by overhead lines. There is concern that during ice storms the power will go out and the road

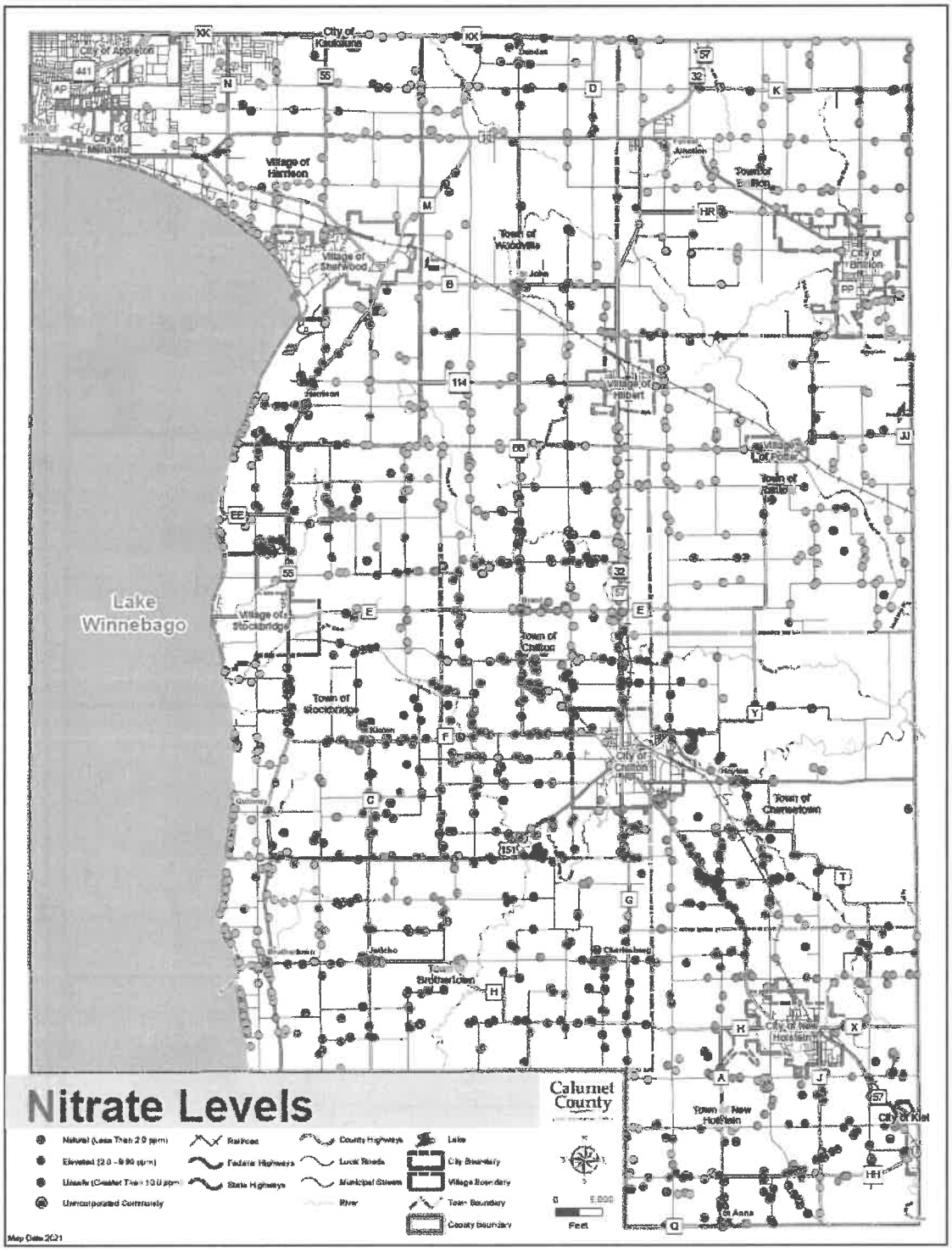
crew will not be able to manually lift the doors on the town garage. In addition, trucks will not be able to start and provide ice or snow removal. The town garage is an older building with heavy doors. A generator should be installed in the garage, or in the neighboring town hall and a line run to the garage, to guarantee trucks will start and be able to exit the garage. One door has been updated and could be lifted in case of an emergency. No generator at this time.

Appendix A: Maps Appendix A: Maps

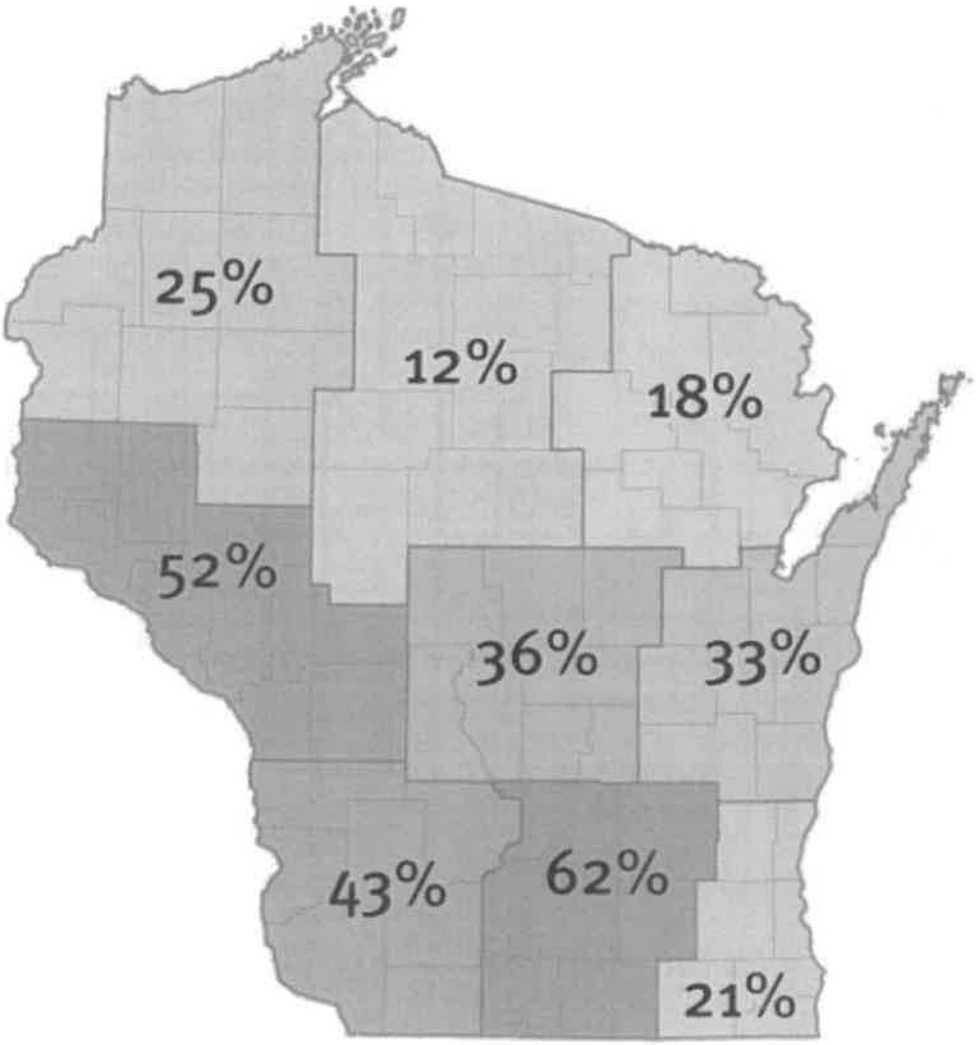
Calumet County Municipal Divisions



Calumet County Nitrate Levels



Percentage of Private Wells with Detectable Herbicides or Herbicide Metabolites (2001)[151]

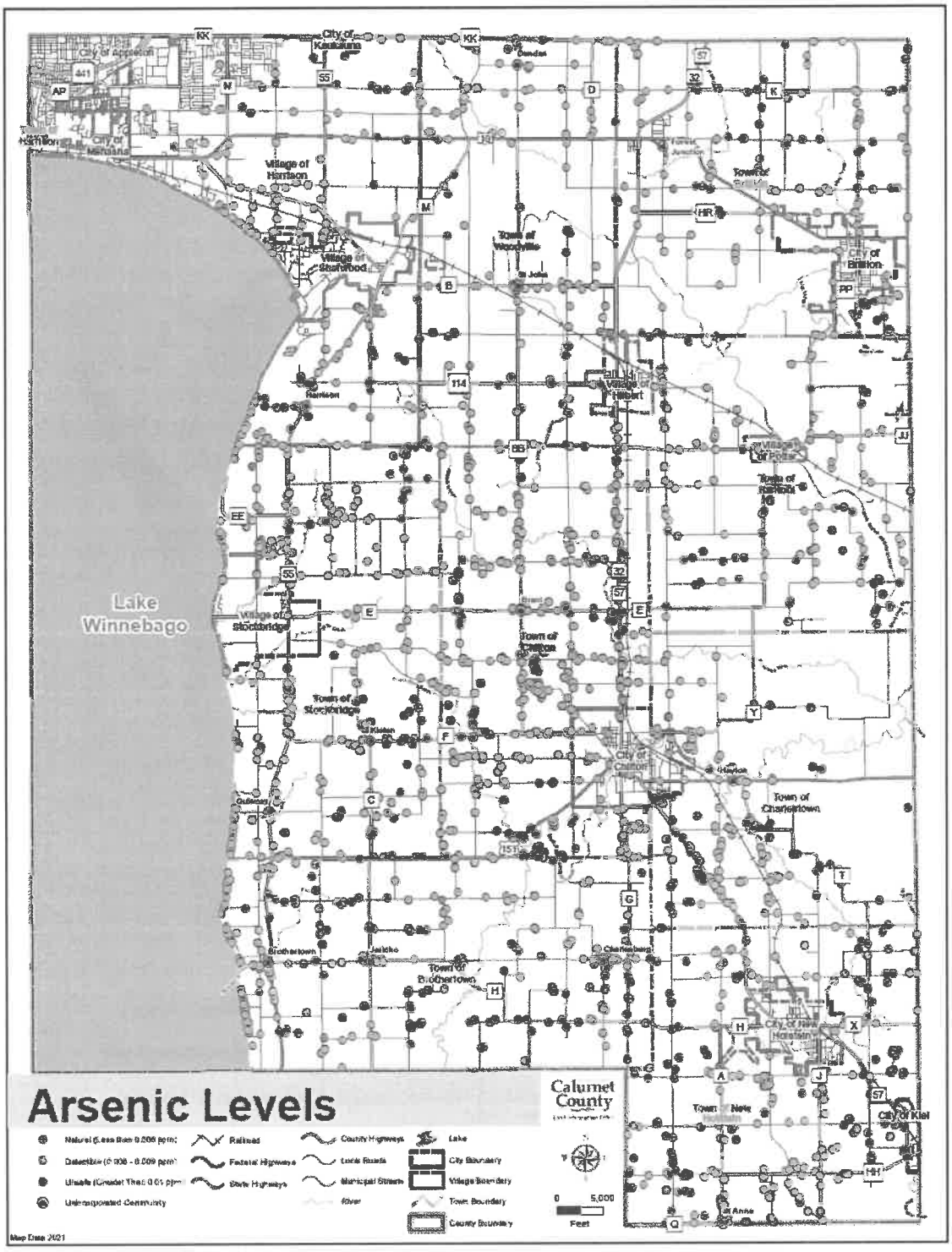


Herbicide data: Wisconsin Department of Agriculture, Trade and Consumer Protection, 2002, Agricultural chemicals in Wisconsin groundwater: final report, *http://www.datcp.state.wi.us/arm/agriculture/land-water/environ_quality/pdf/arm-pub-98.pdf*

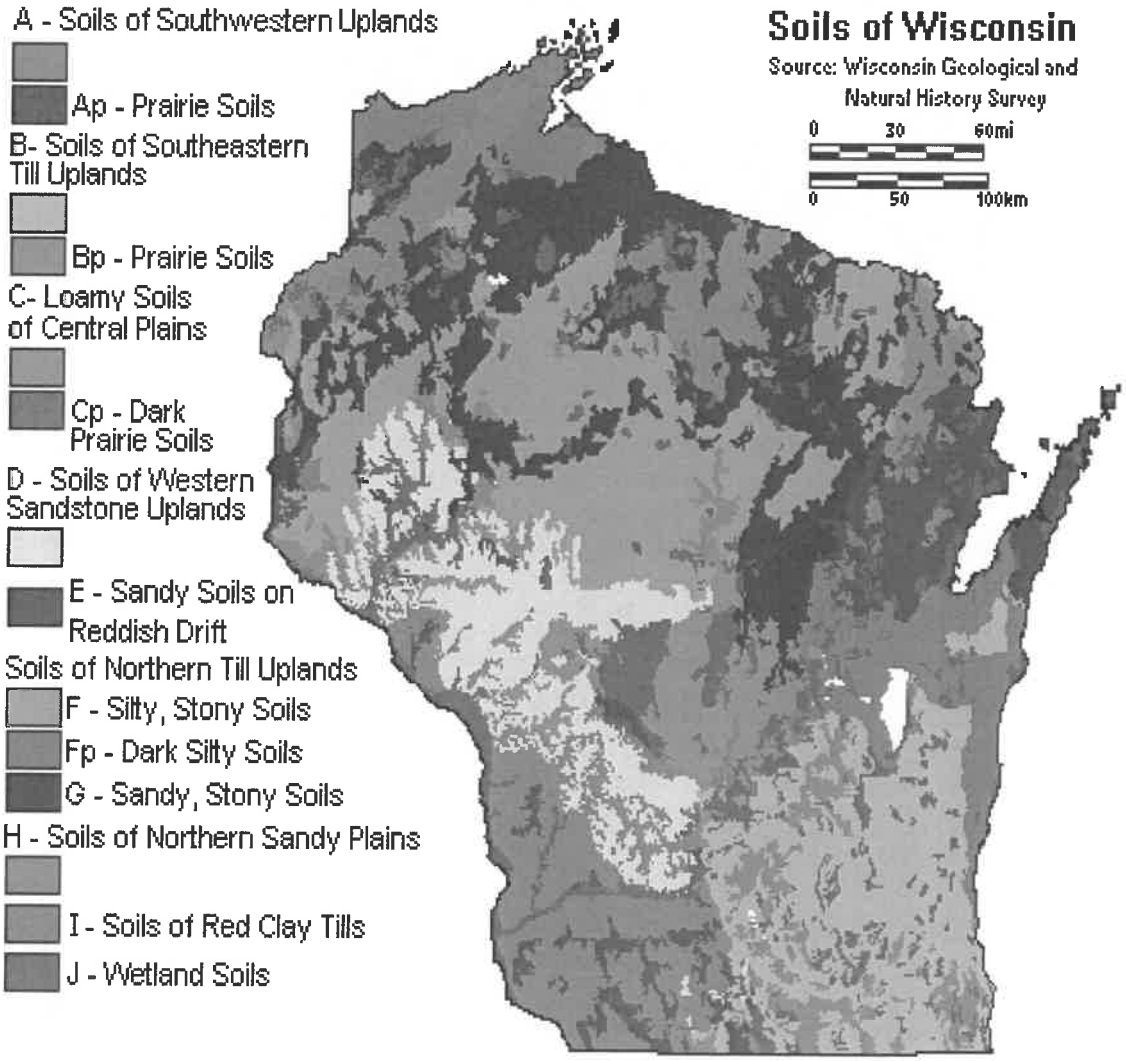
Figure created for the "Protecting Wisconsin's Groundwater Through Comprehensive Planning" web site, 2007. *http://wi.water.usgs.gov/gwcomp/*

[151] https://wi.water.usgs.gov/gwcomp/find/calumet/pesticidestate.html

Calumet County Arsenic Levels

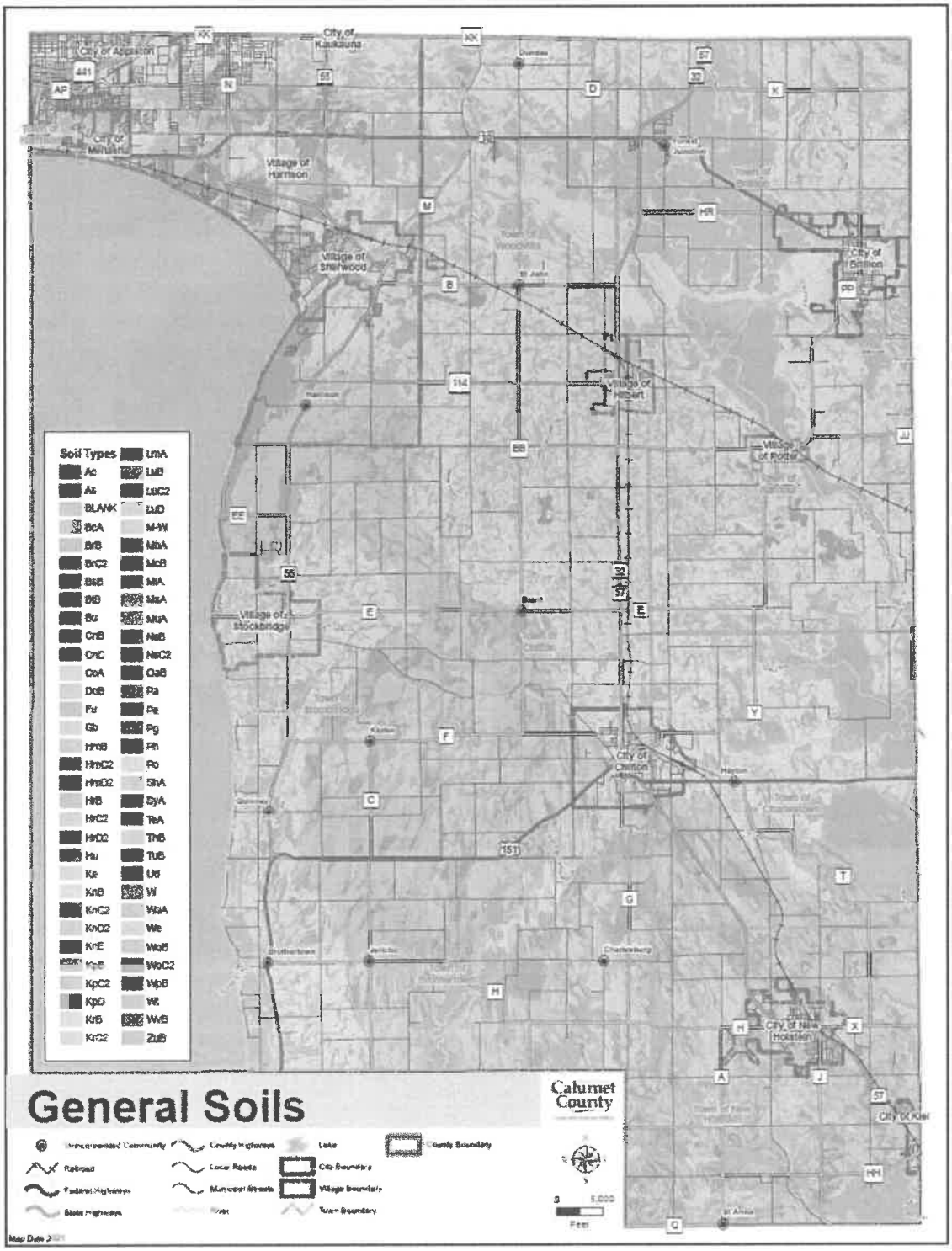


Soils Types [152]

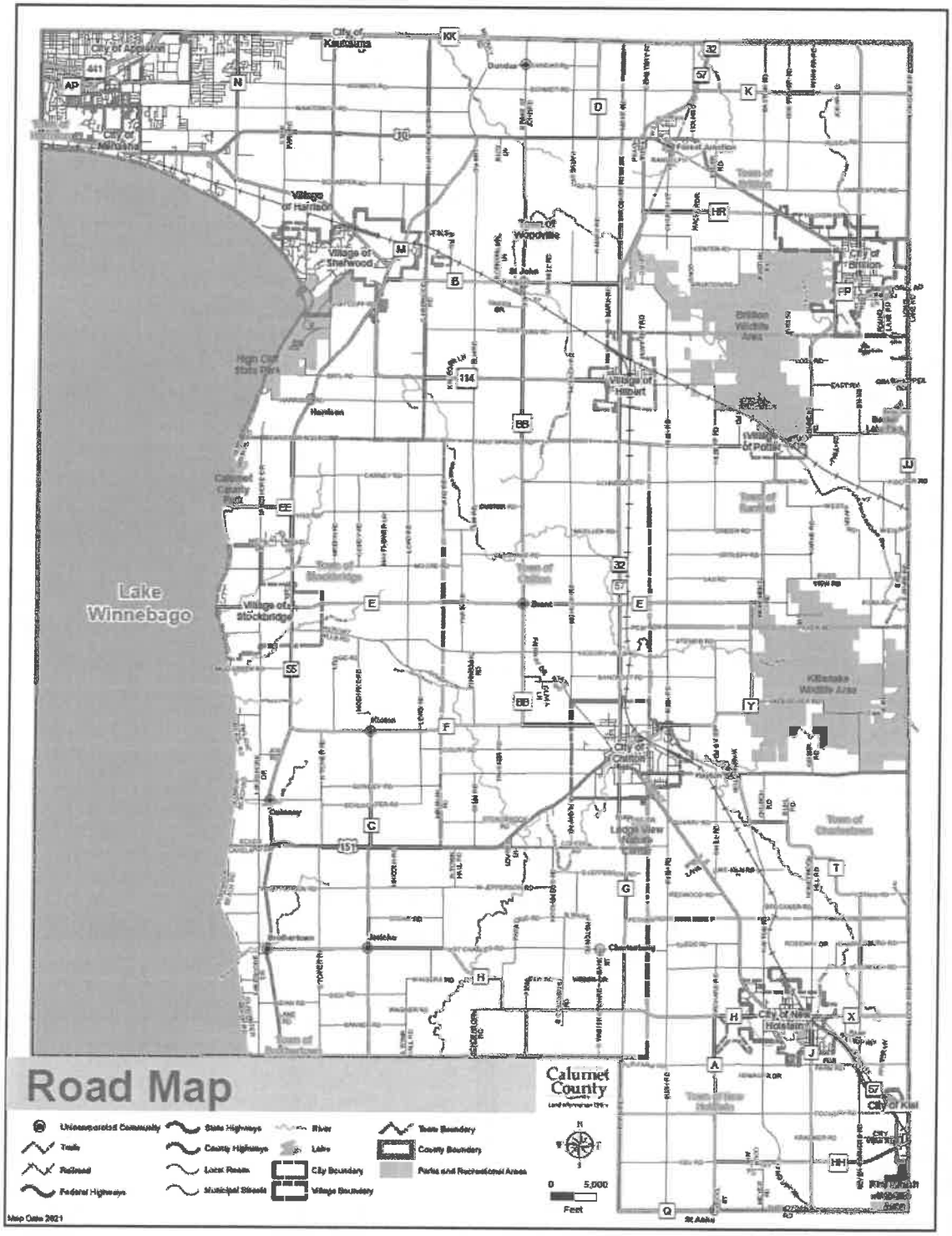


[152] Source: Soils of Wisconsin compiled by F. D. Hole, 1973; Wisconsin Geological and Natural History Survey Map, scale (approx.) 1: 3,150,000.

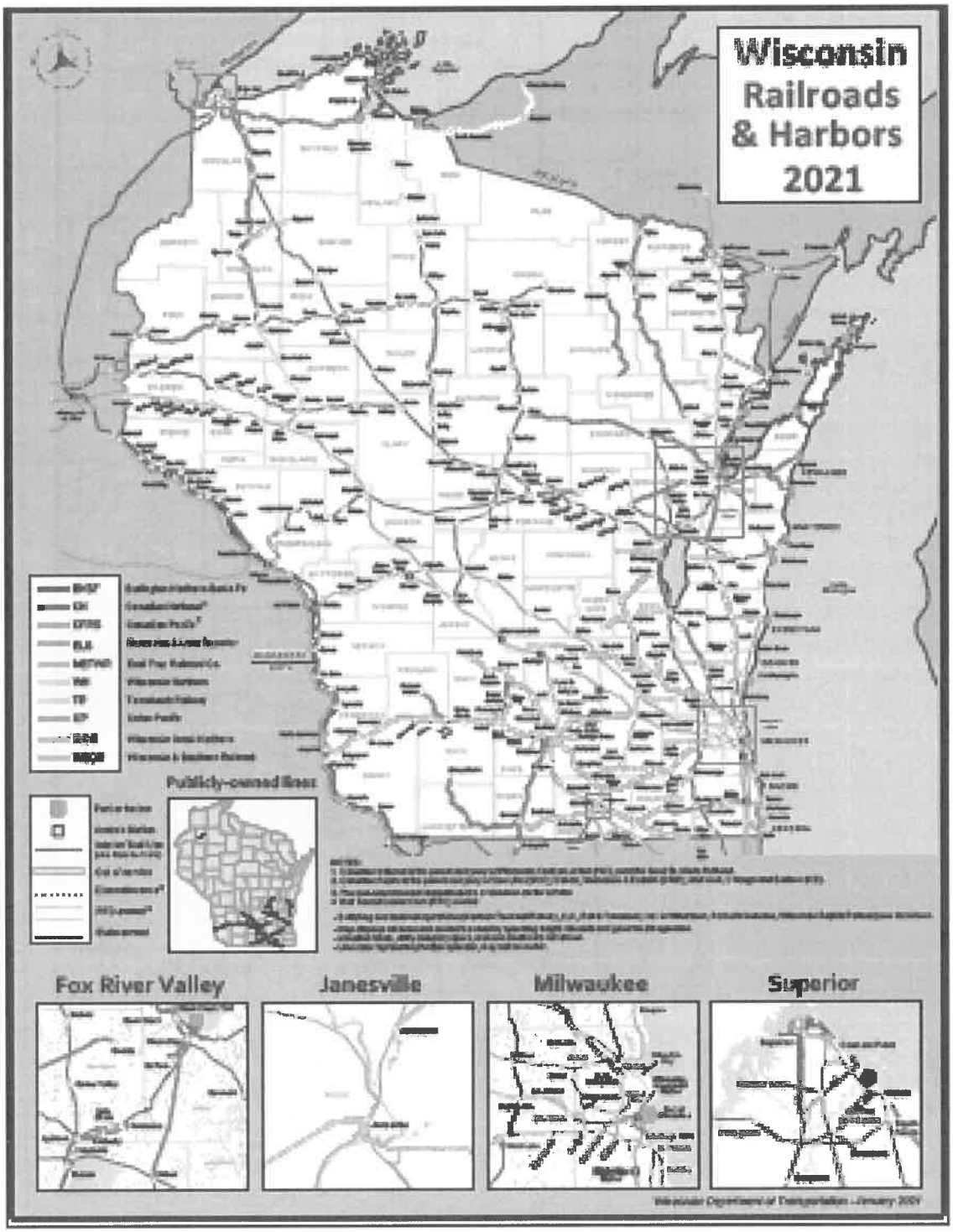
Calumet County Soils



Calumet County Road Network

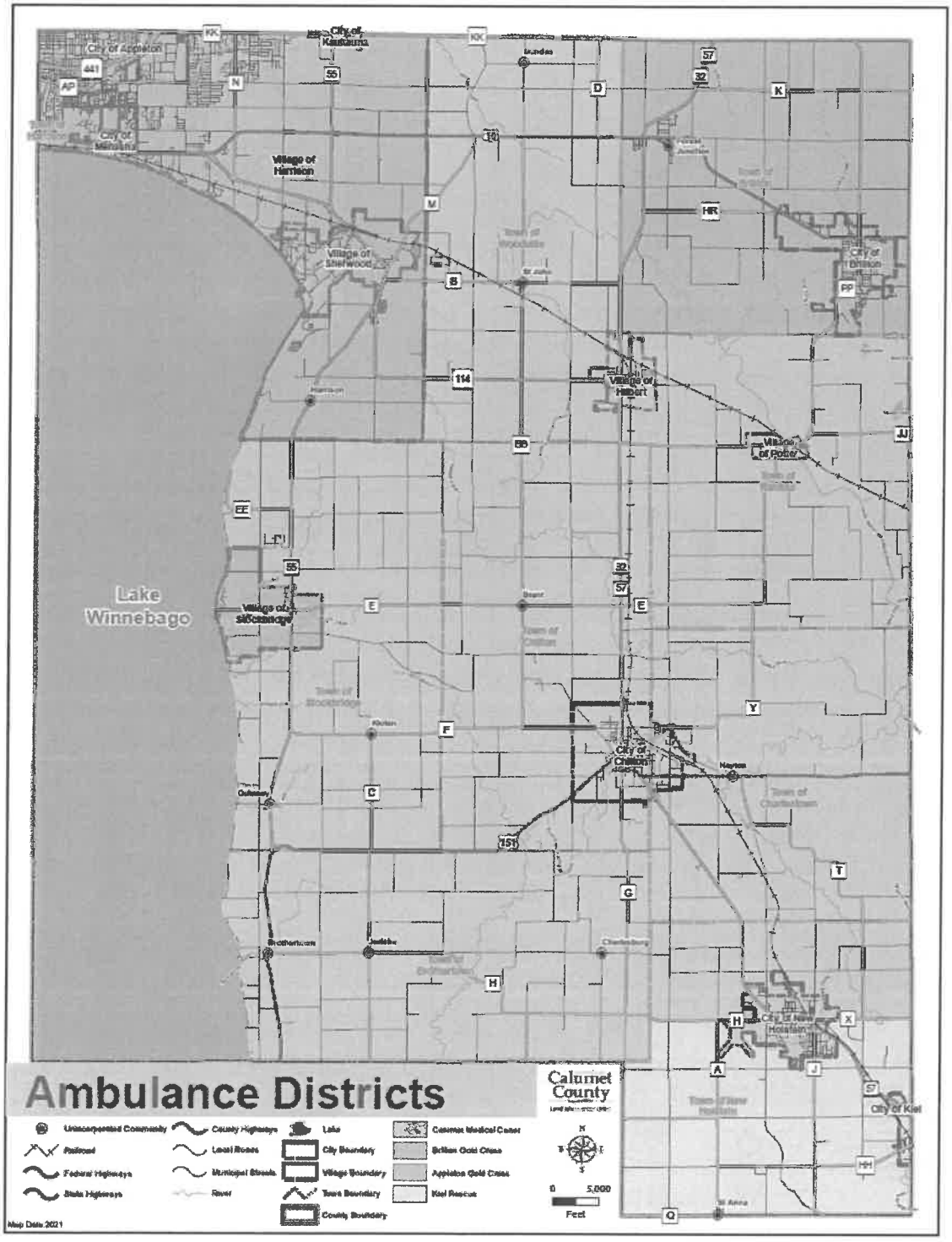


Wisconsin Railroads and Harbors [153]

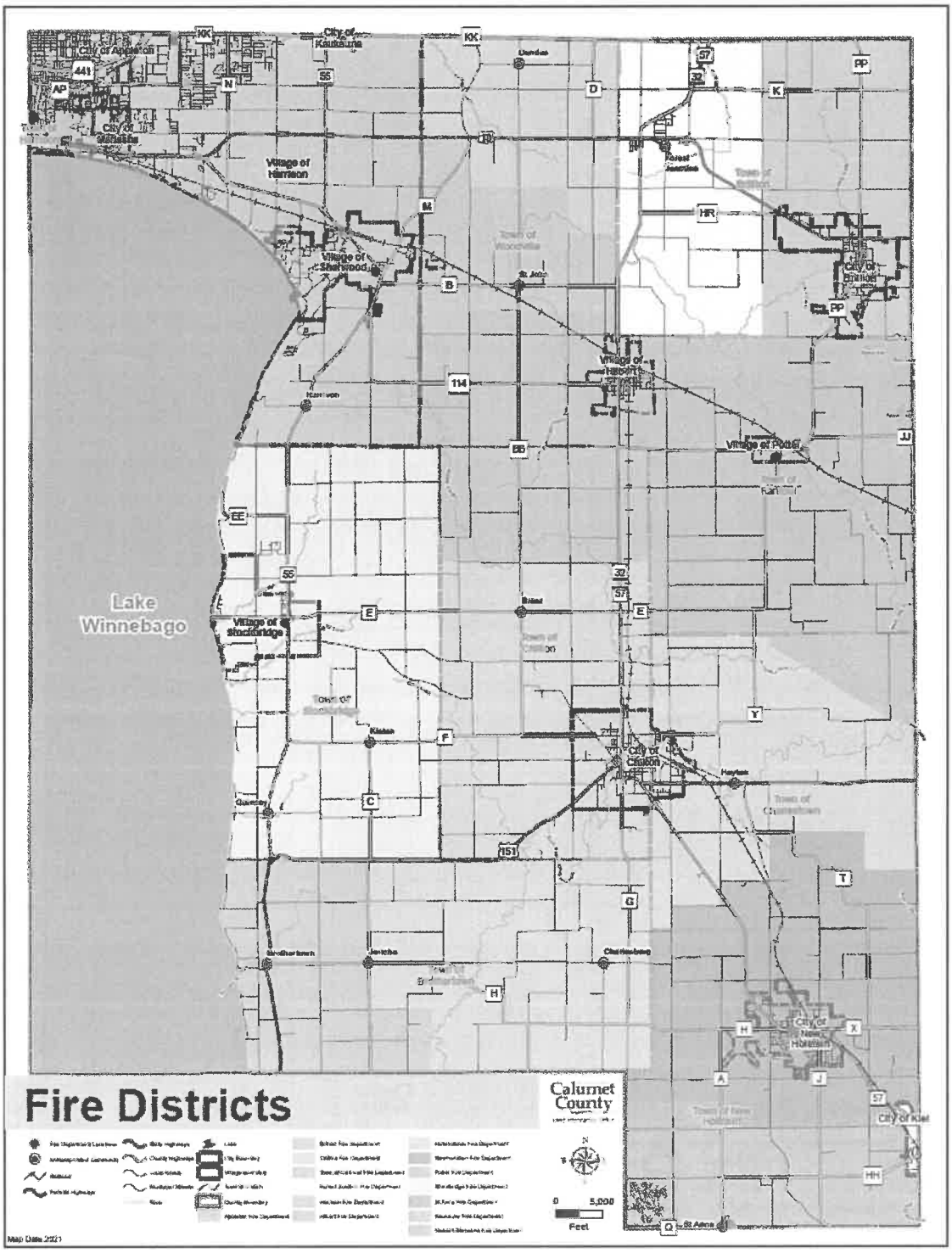


[153] https://wisconsindot.gov/Documents/travel/rail/railmap.pdf

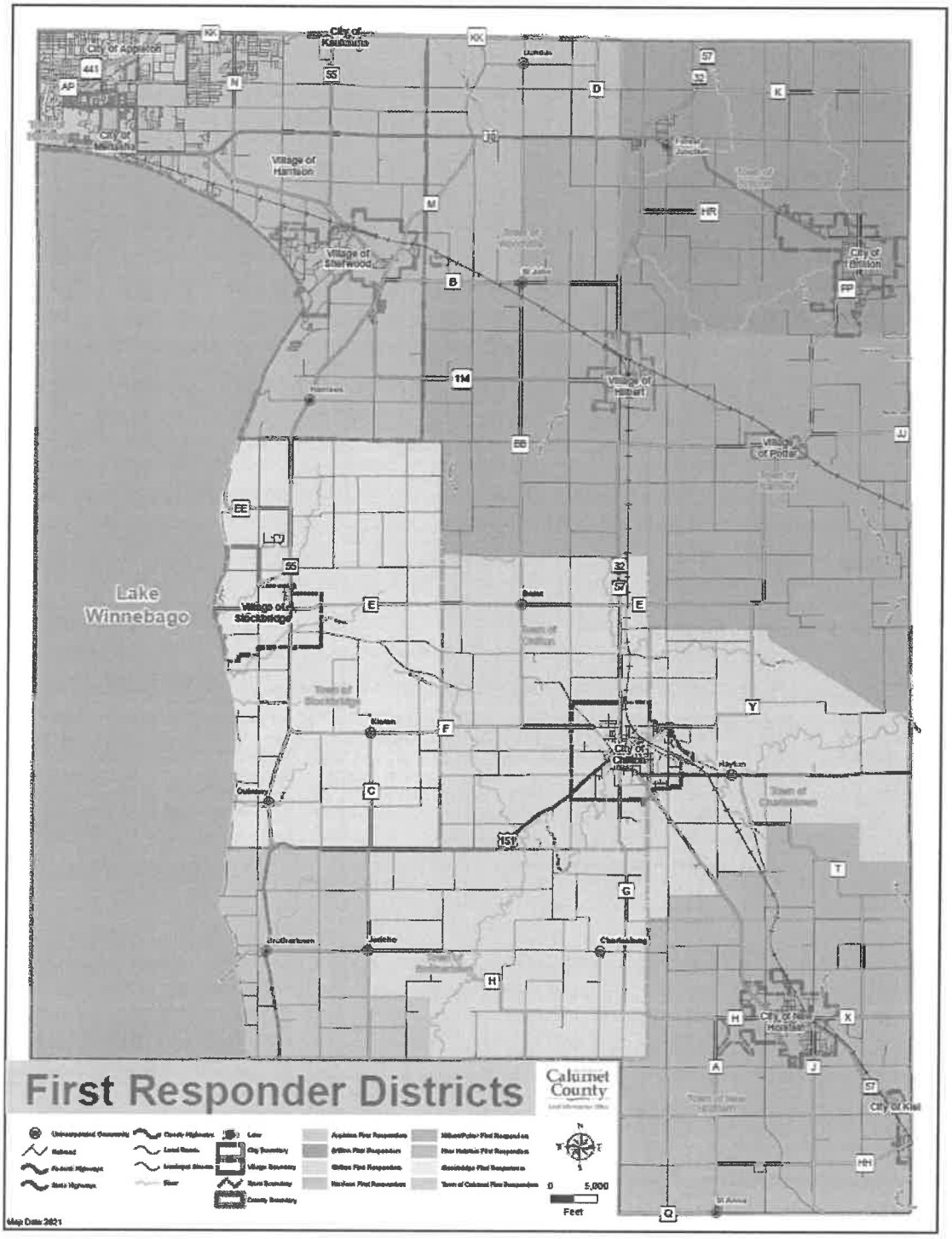
Calumet County Ambulance Providers



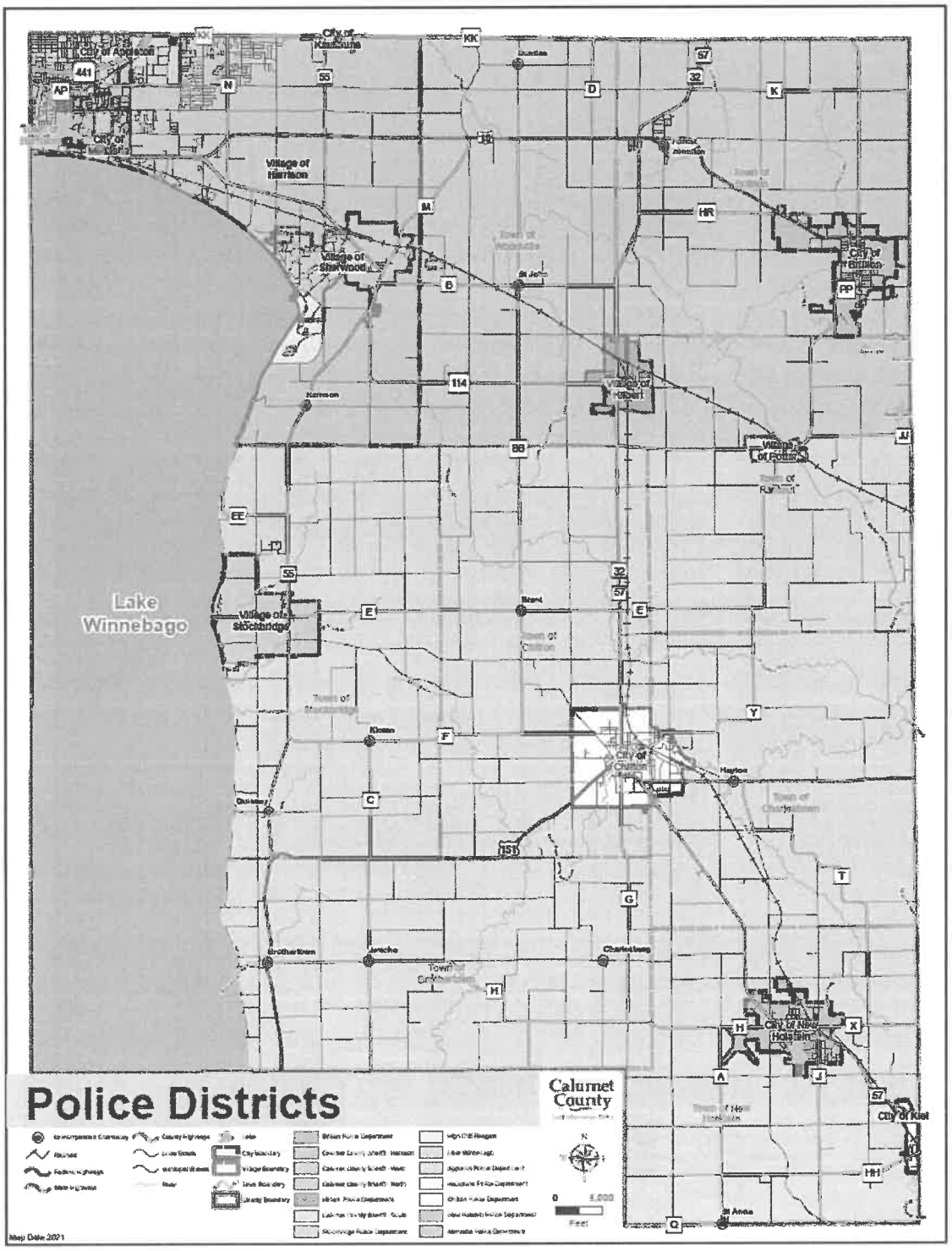
Calumet County Fire Departments



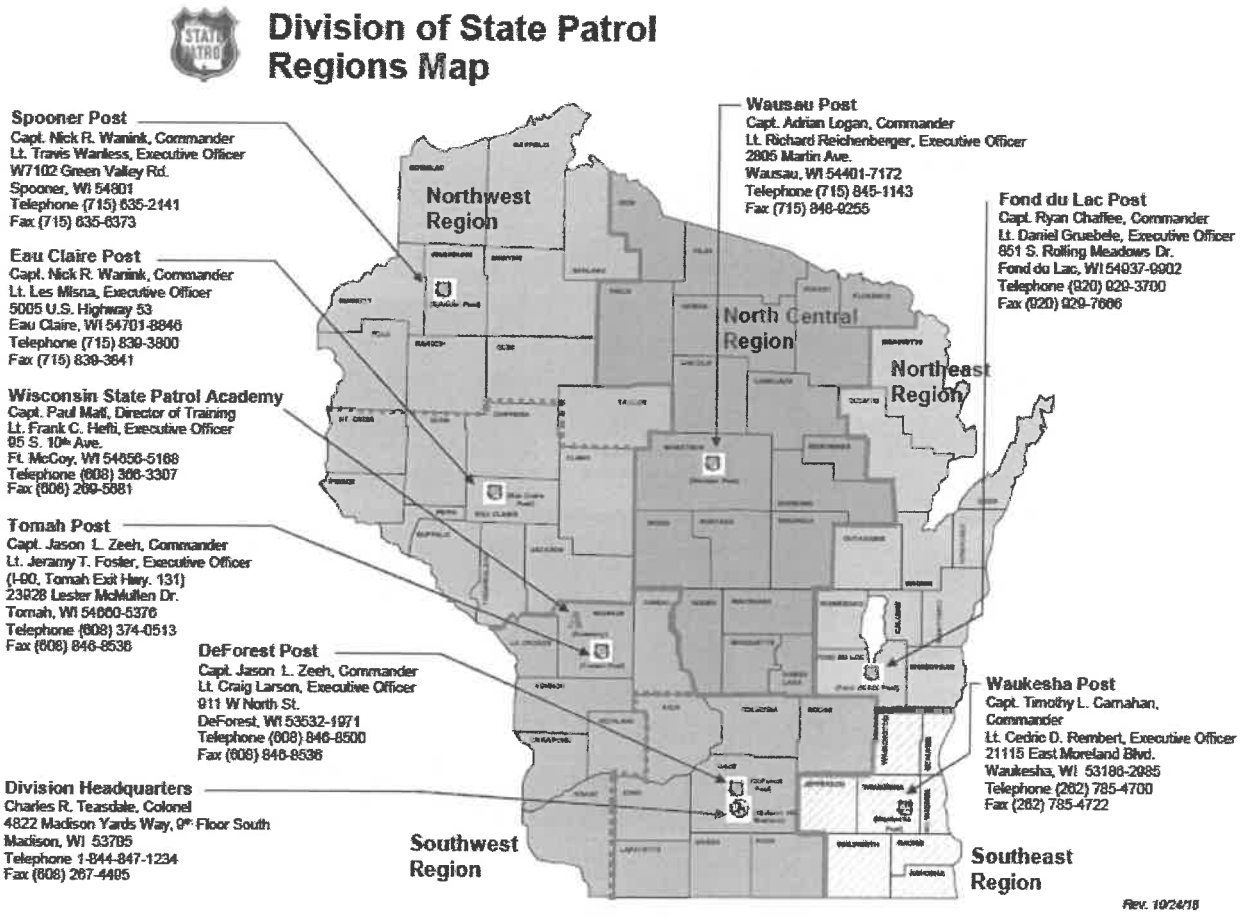
Calumet County First Responder Providers



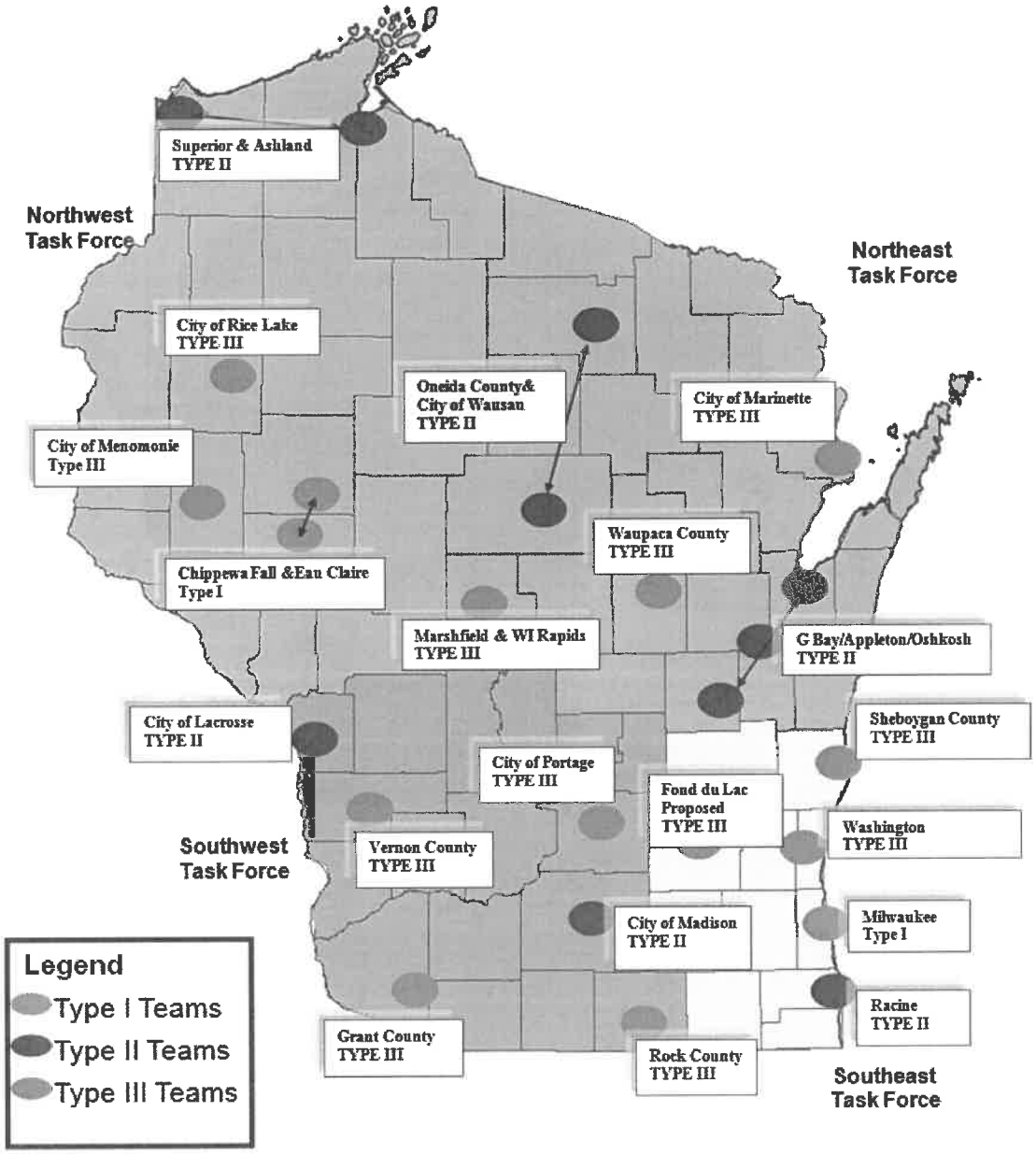
Calumet County Law Enforcement



Wisconsin State Patrol Regions

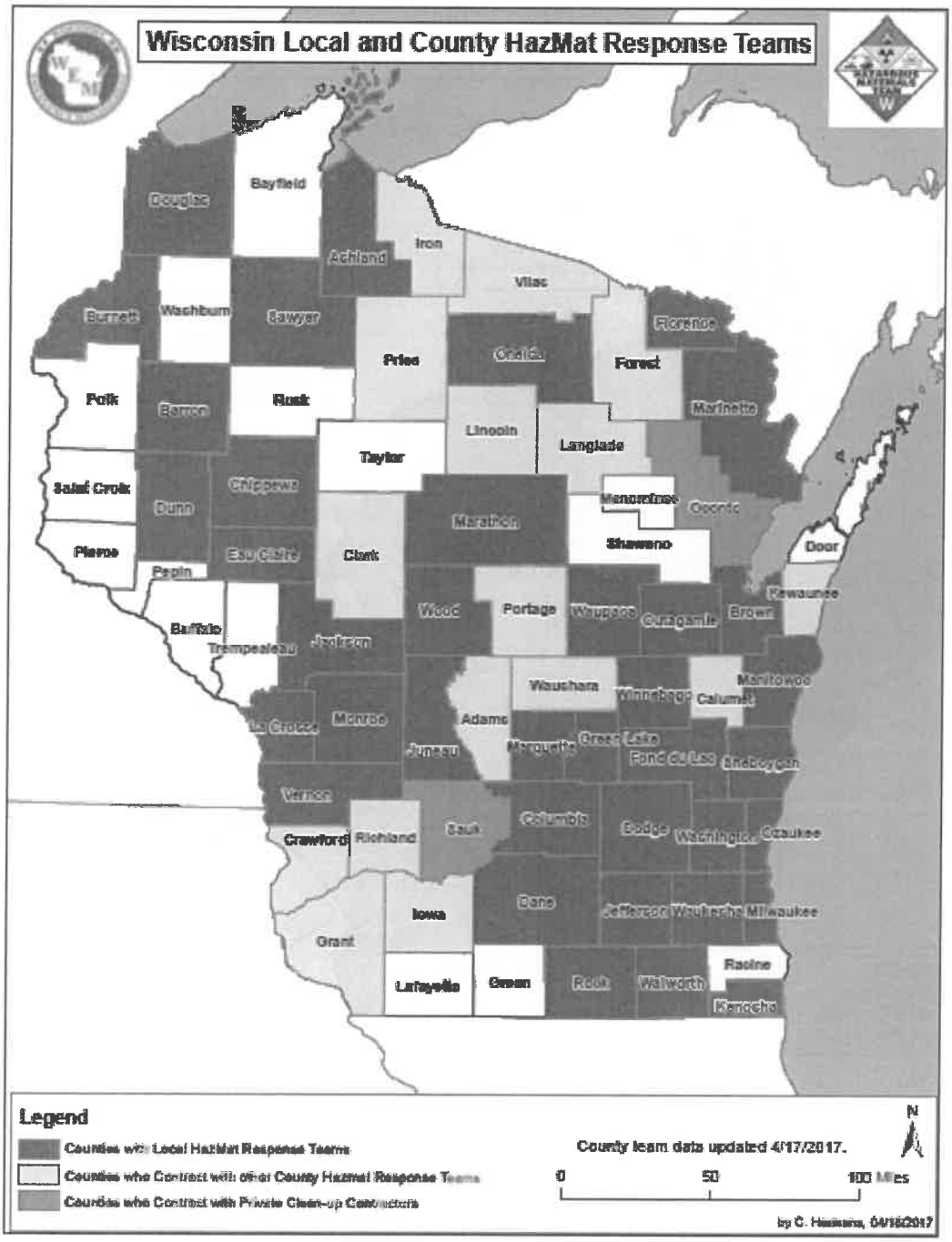


Wisconsin's Regional & County/Local HazMat Response Teams[154]



[154] http://www.wsfca.com/files/cache/c1e510bdc2d15a686a3e1793a4418804.jpg

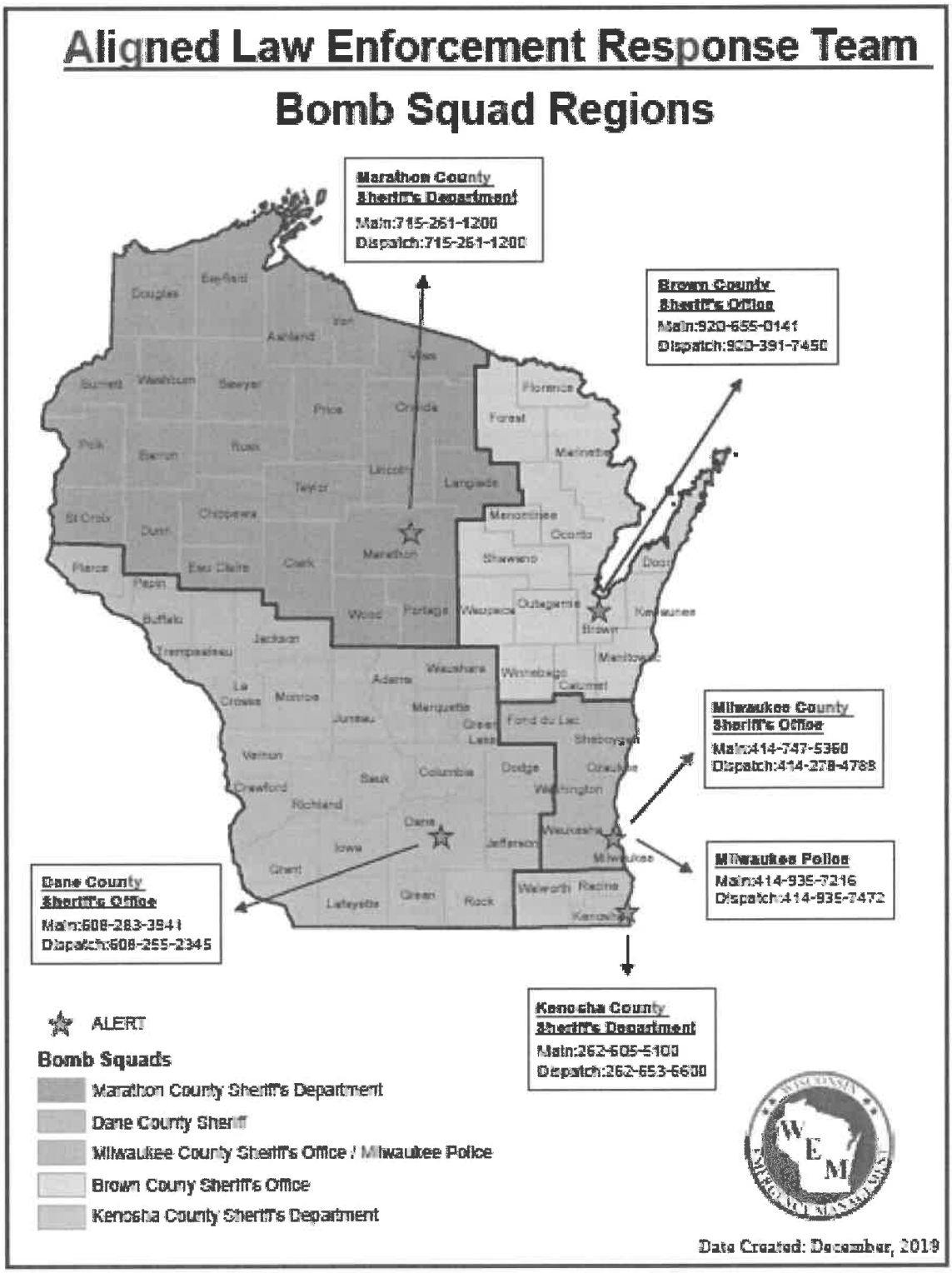
Wisconsin Hazardous Materials Response Teams[155]



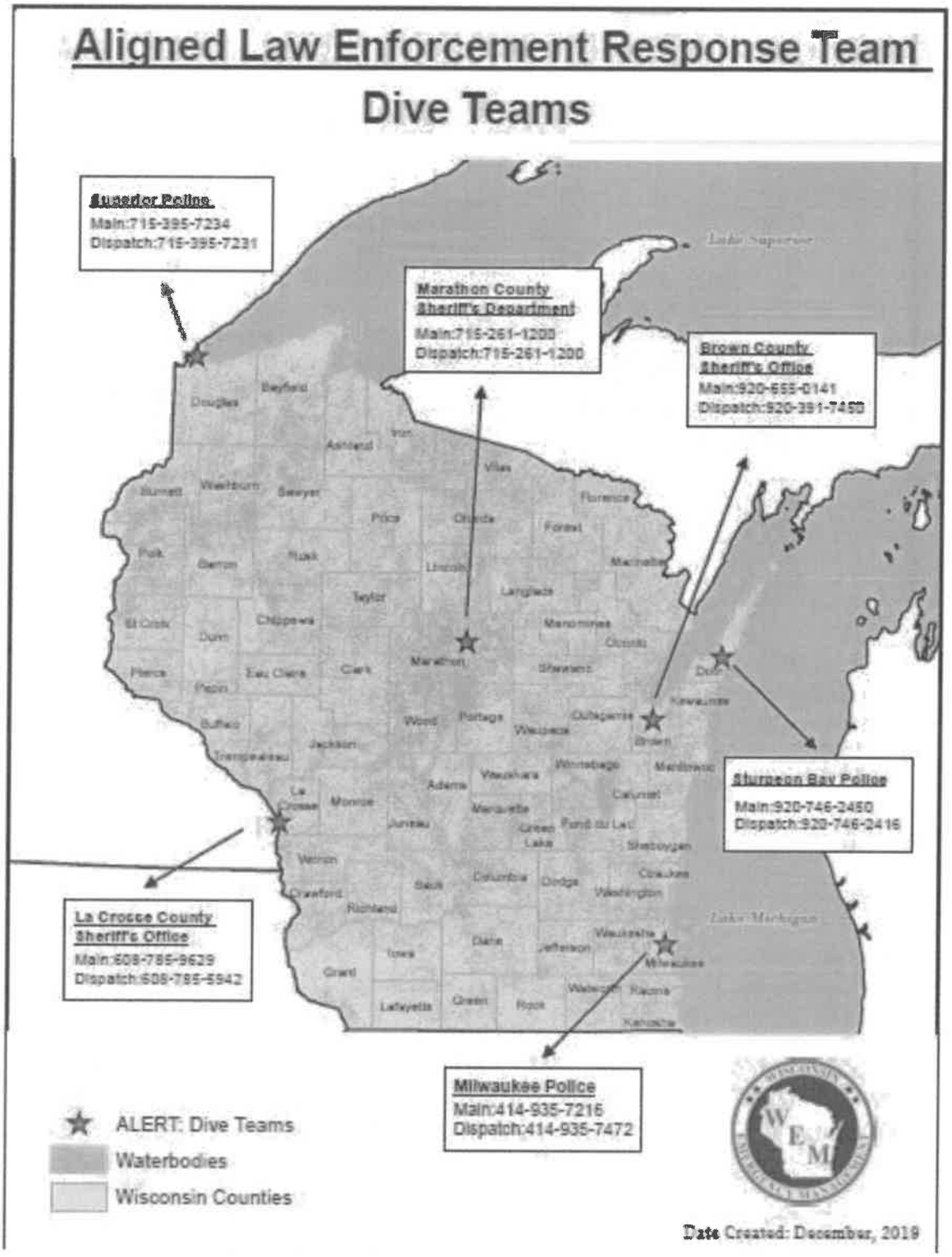
*Please note that Burnett Co. no longer has a local team.

[155] https://dma.wi.gov/DMA/divisions/wem/response/images/HazMat_County_Teams.pdf

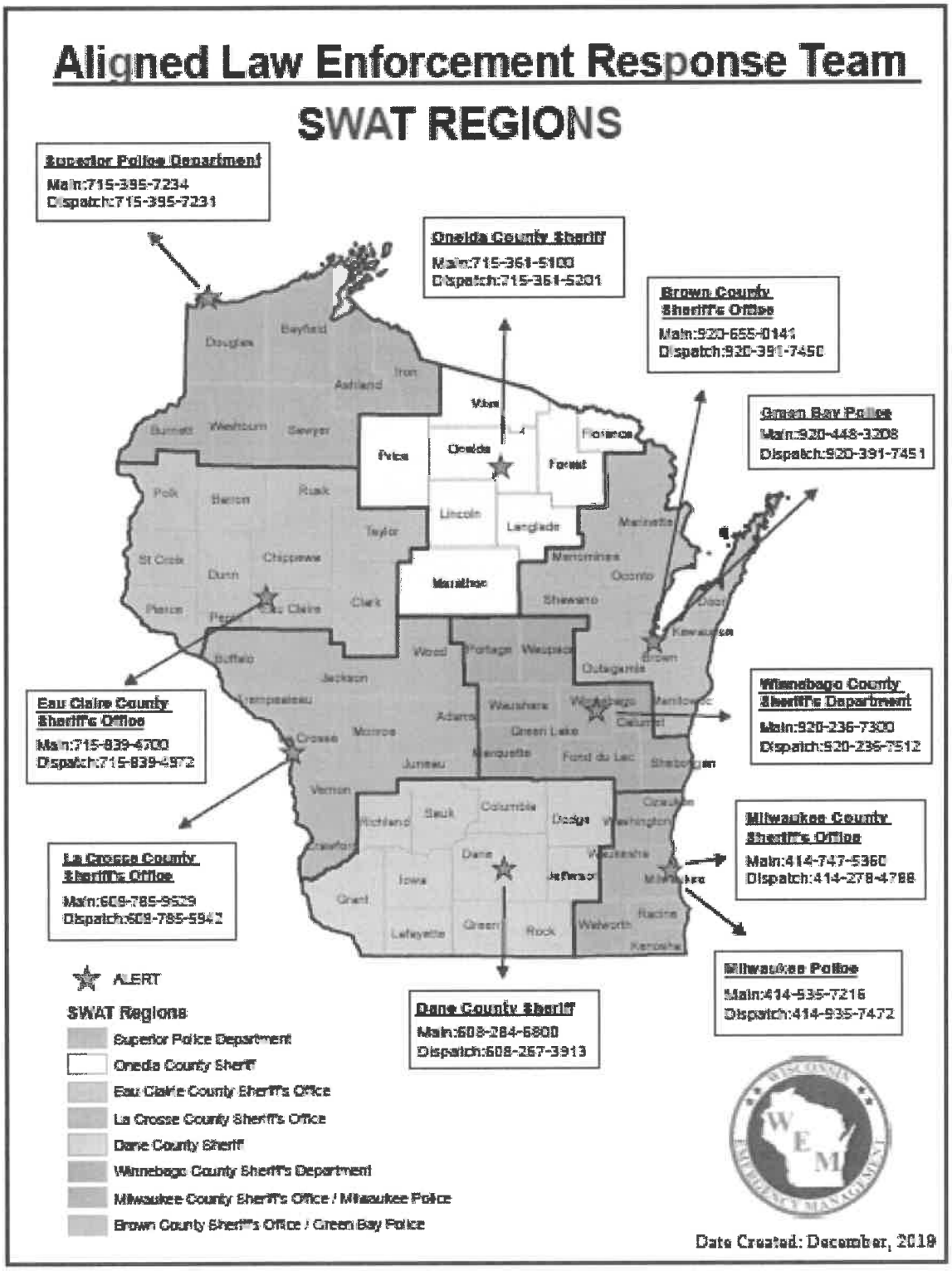
Wisconsin Bomb Squad Regions



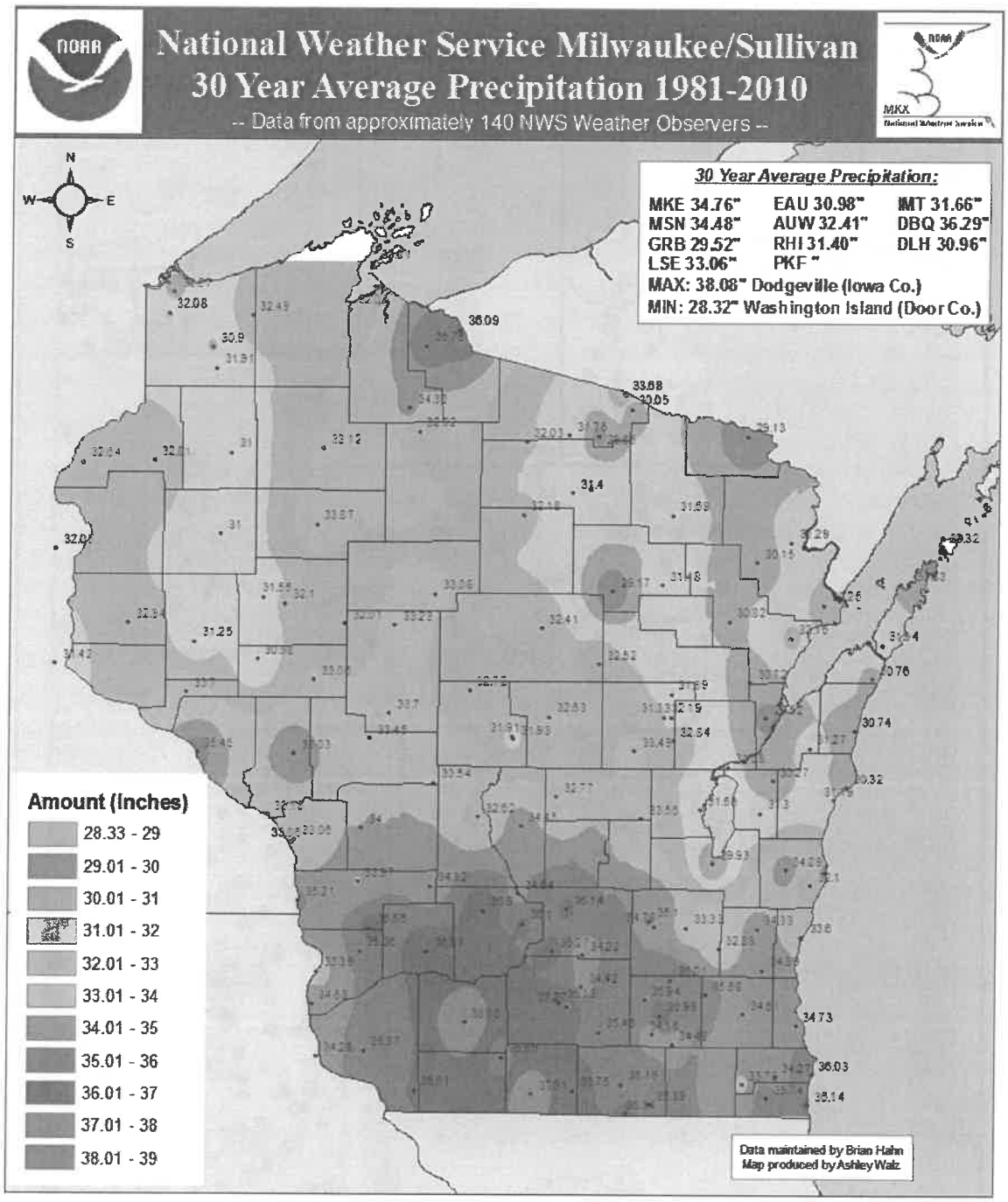
Wisconsin Dive Teams



Wisconsin SWAT Regions

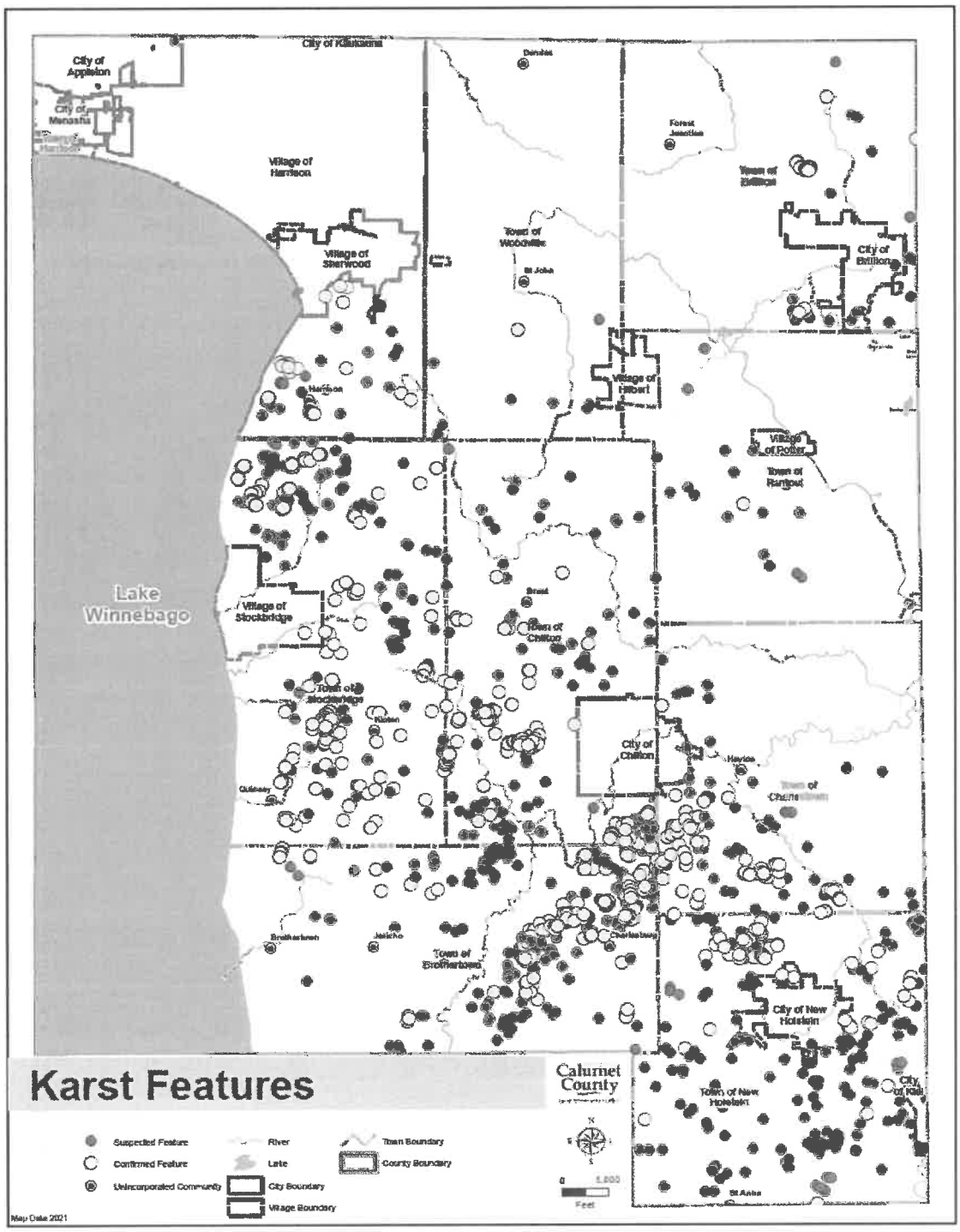


Wisconsin 30-Year Average Precipitation [156]

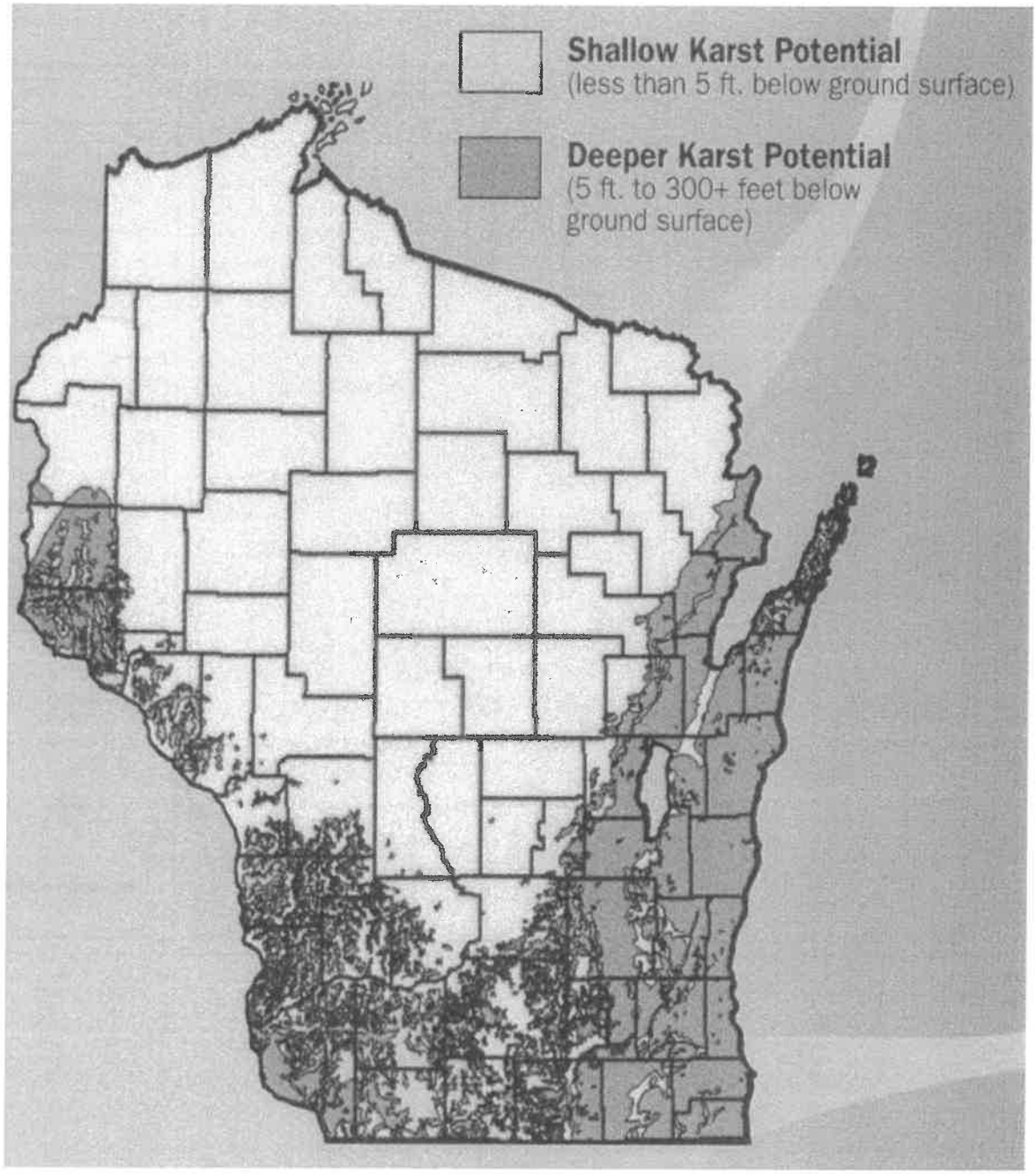


[156] http://www.crh.noaa.gov/images/mkx/climate/avg_30_year_precip.png

Calumet County Karst Features

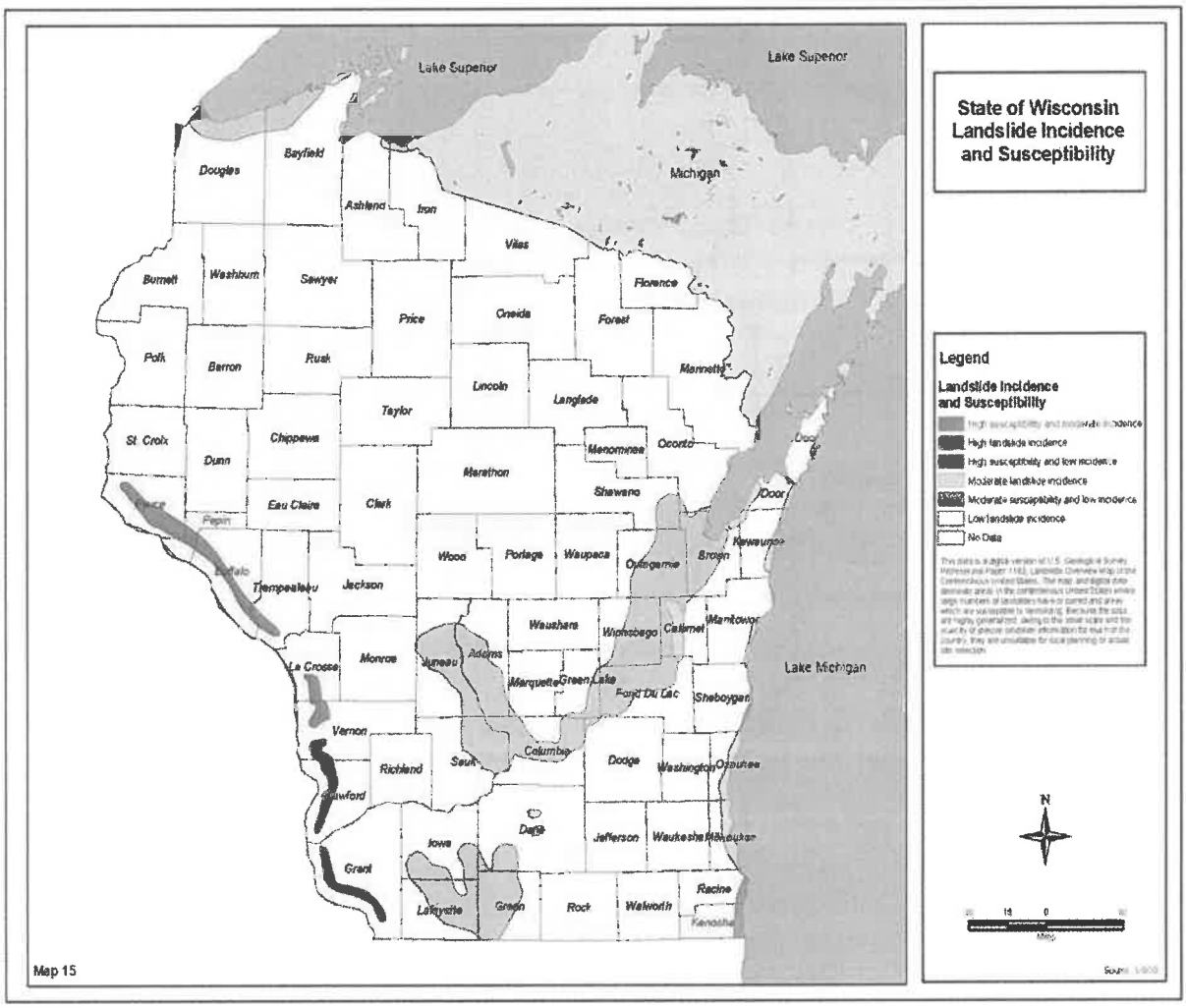


Wisconsin Karst Potential [157]



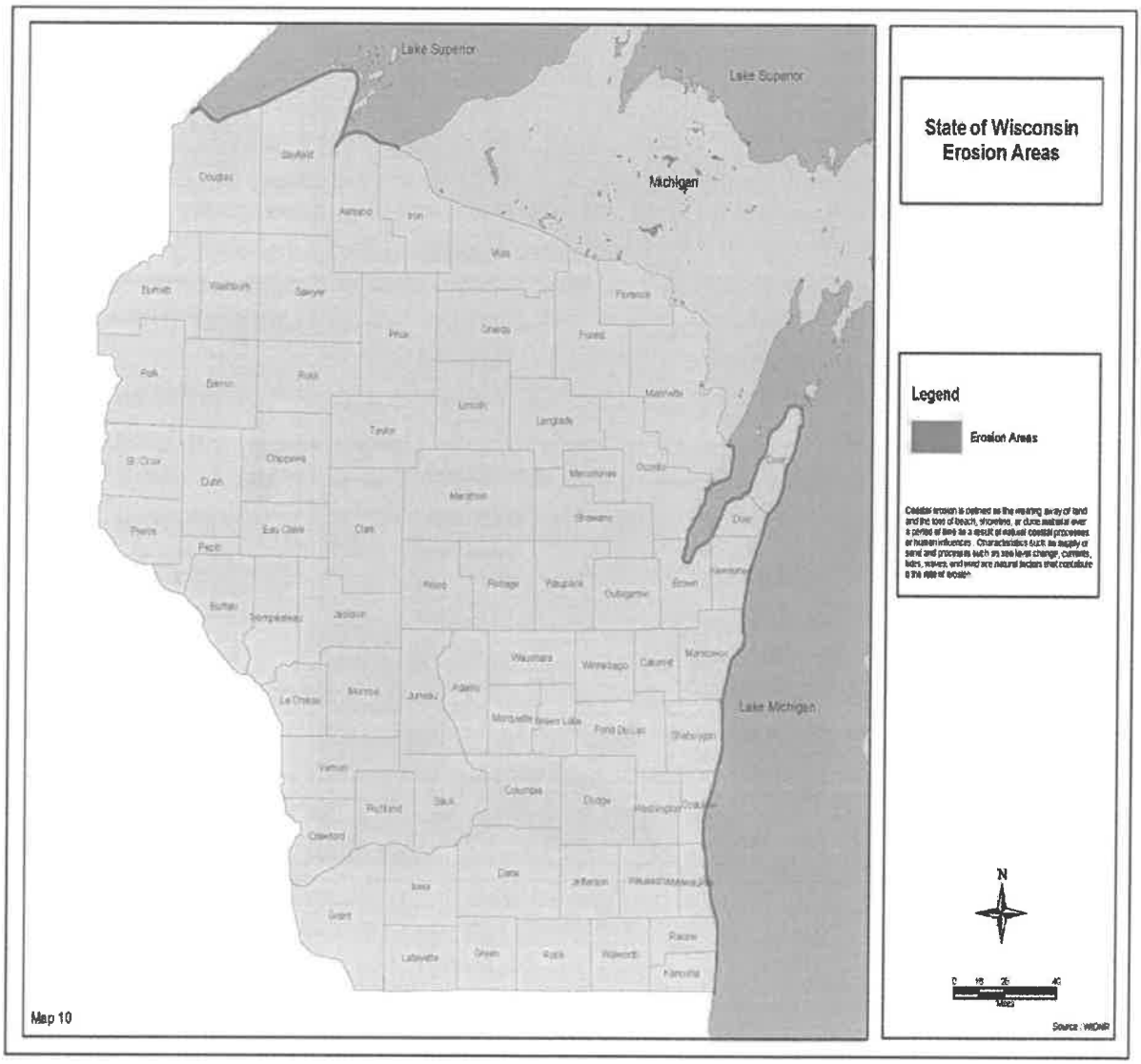
[157] Wisconsin State Hazard Mitigation Plan

Landslide Incidence and Susceptibility [158]



[158] Wisconsin State Hazard Mitigation Plan

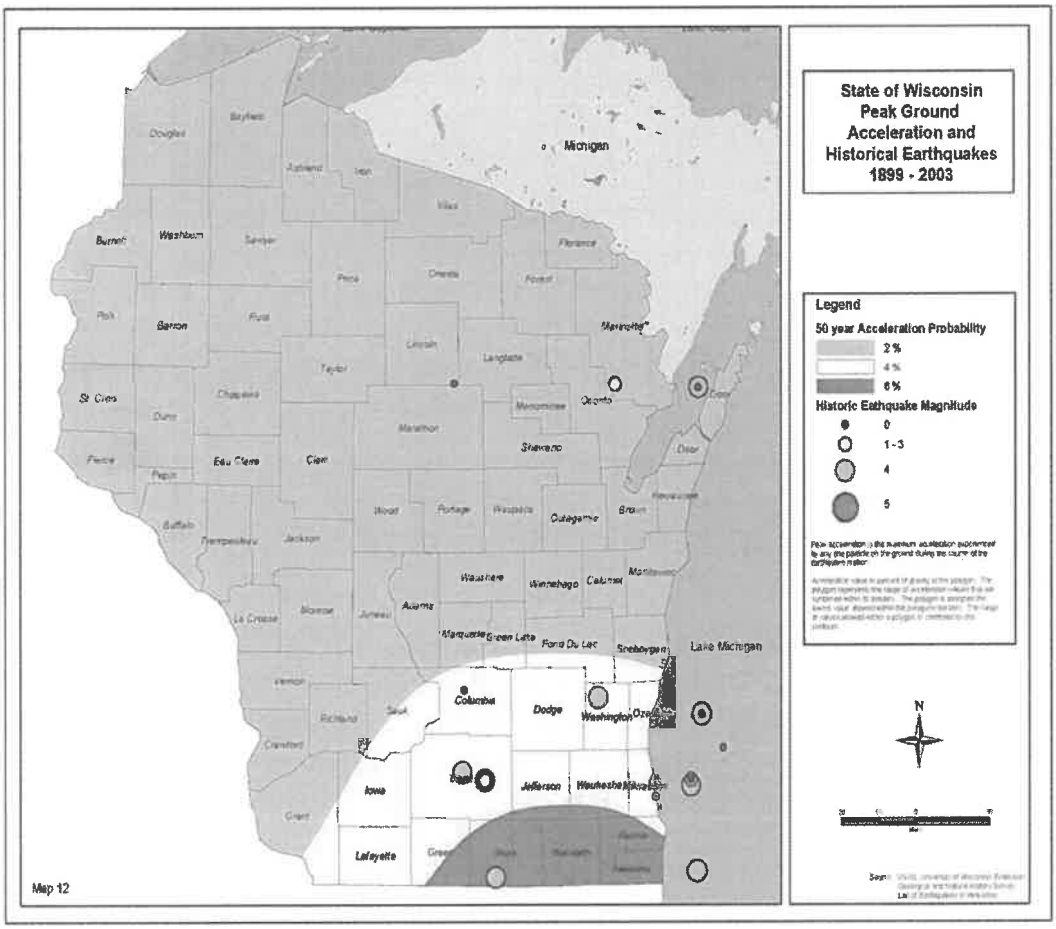
Erosion Areas in Wisconsin [159]



159 Wisconsin State Hazard Mitigation Plan

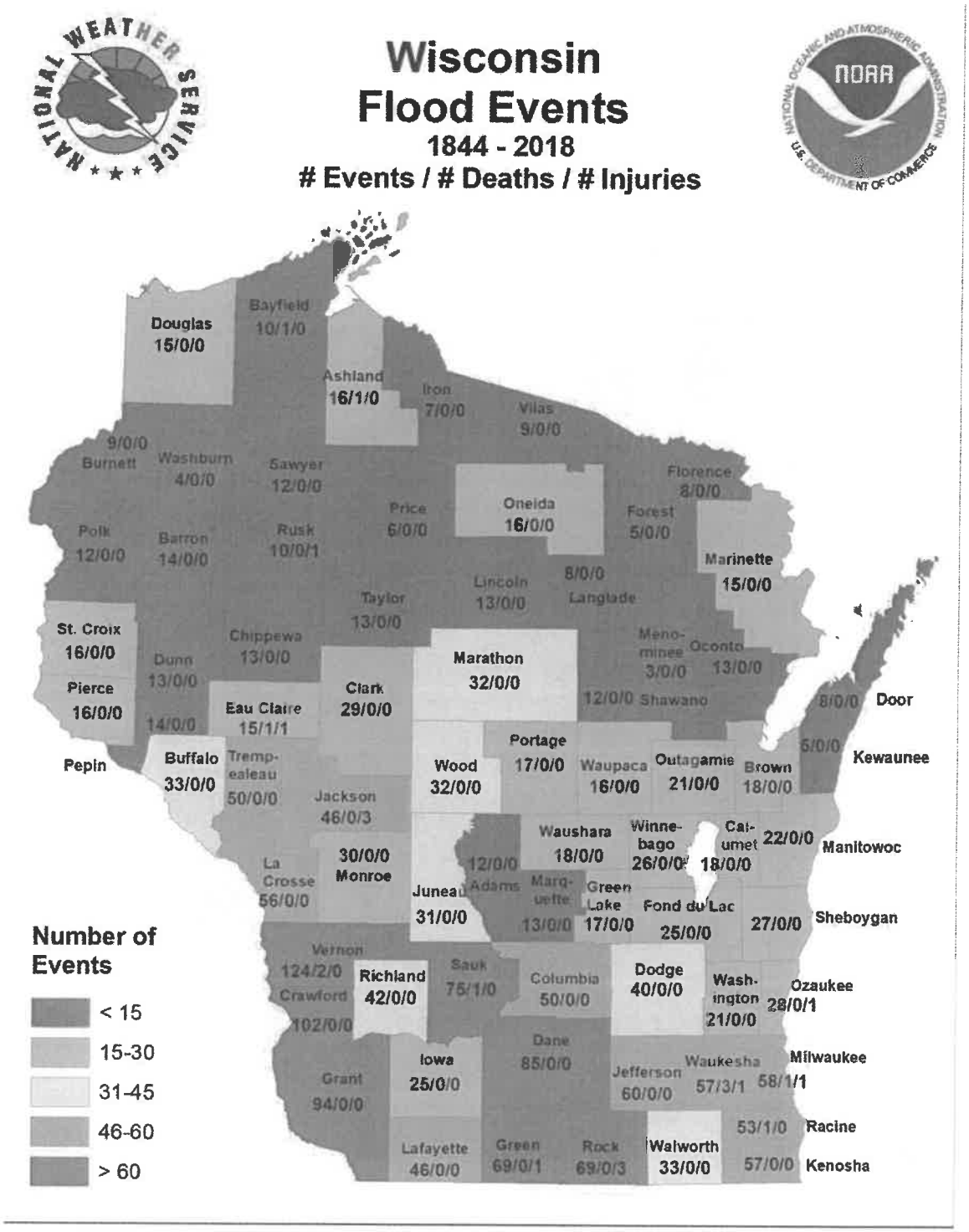
Earthquakes in Wisconsin [160]

Peak Ground Acceleration Contours and Historical Earthquakes in Wisconsin

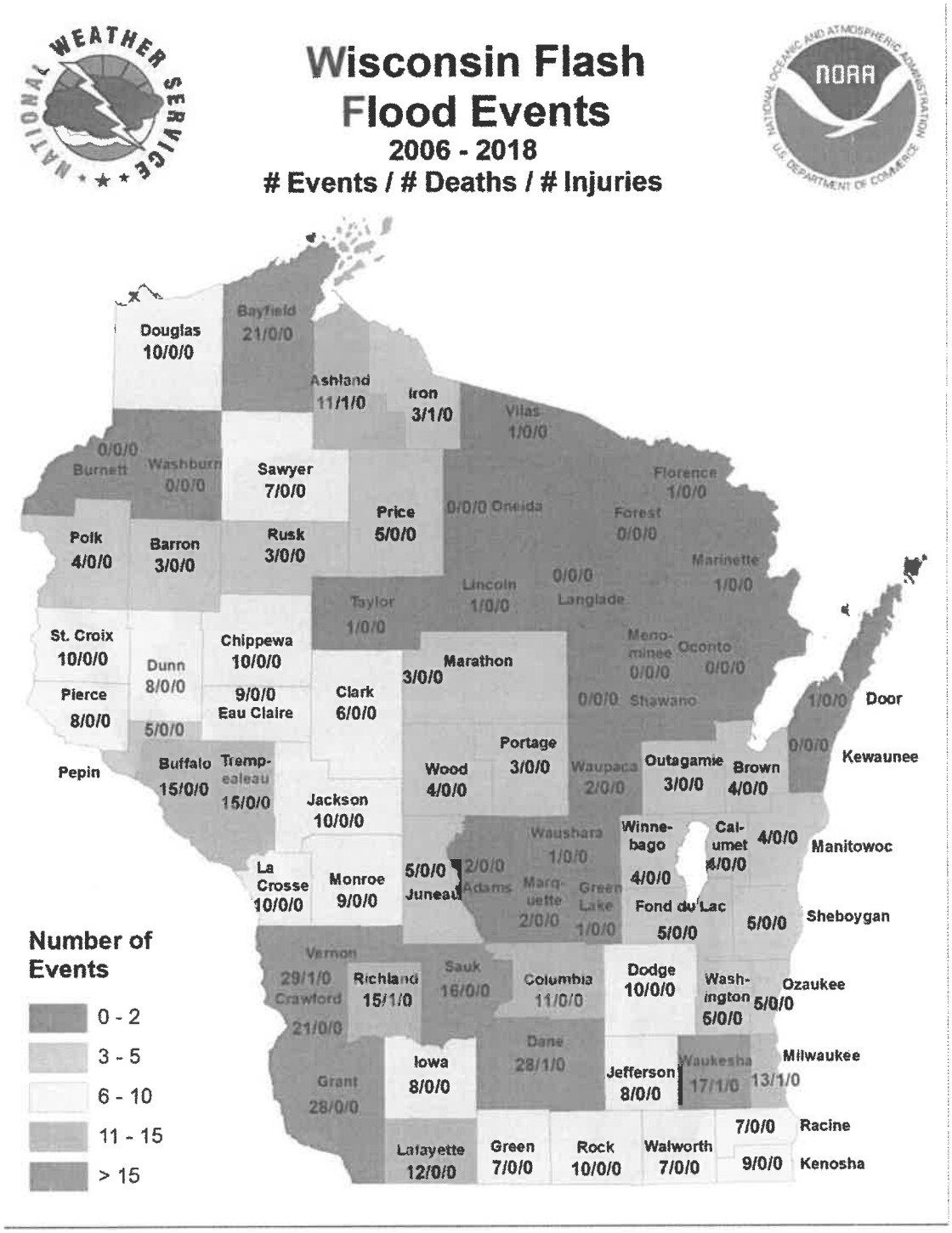


[160] Wisconsin State Hazard Mitigation Plan

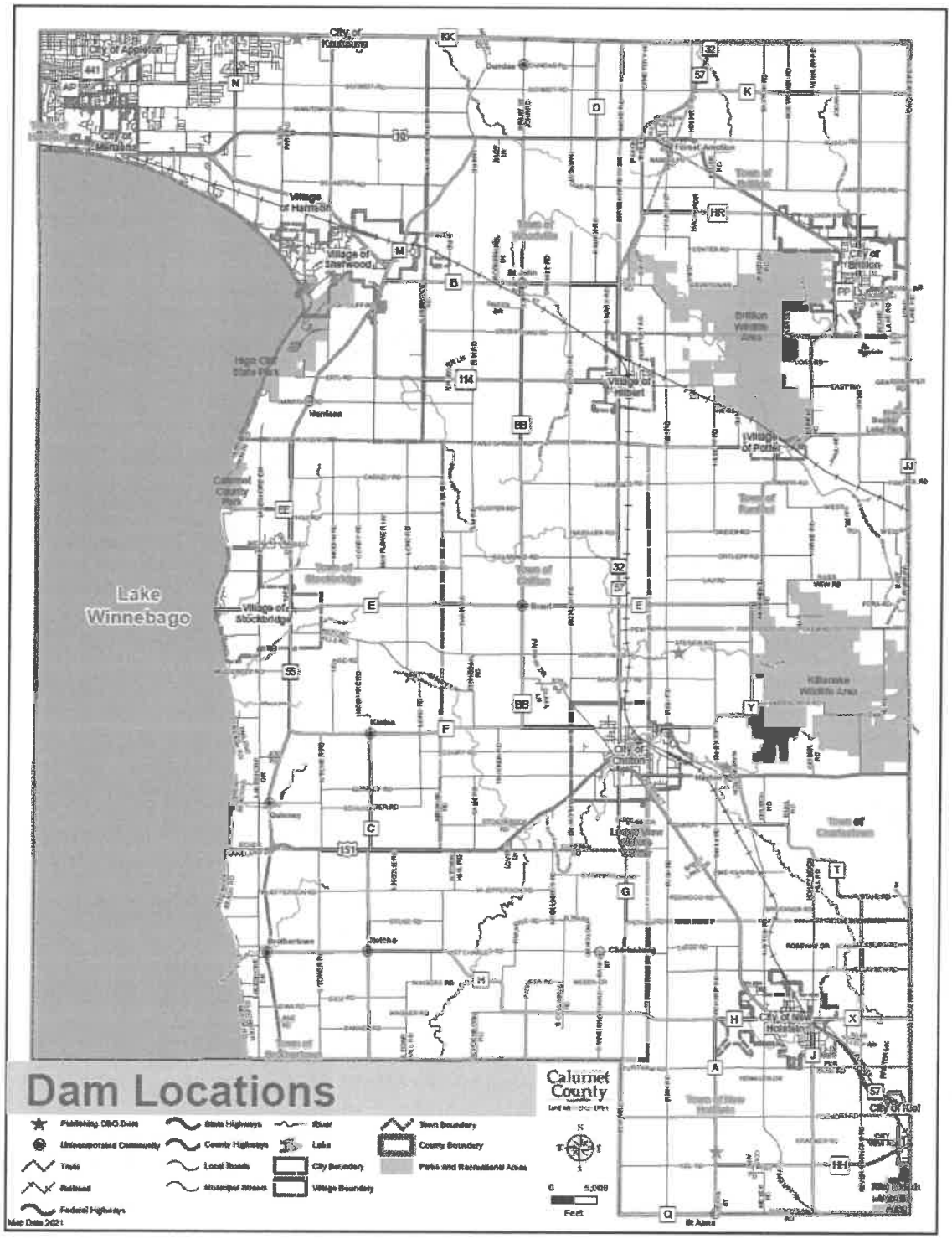
Wisconsin Total Flood Events



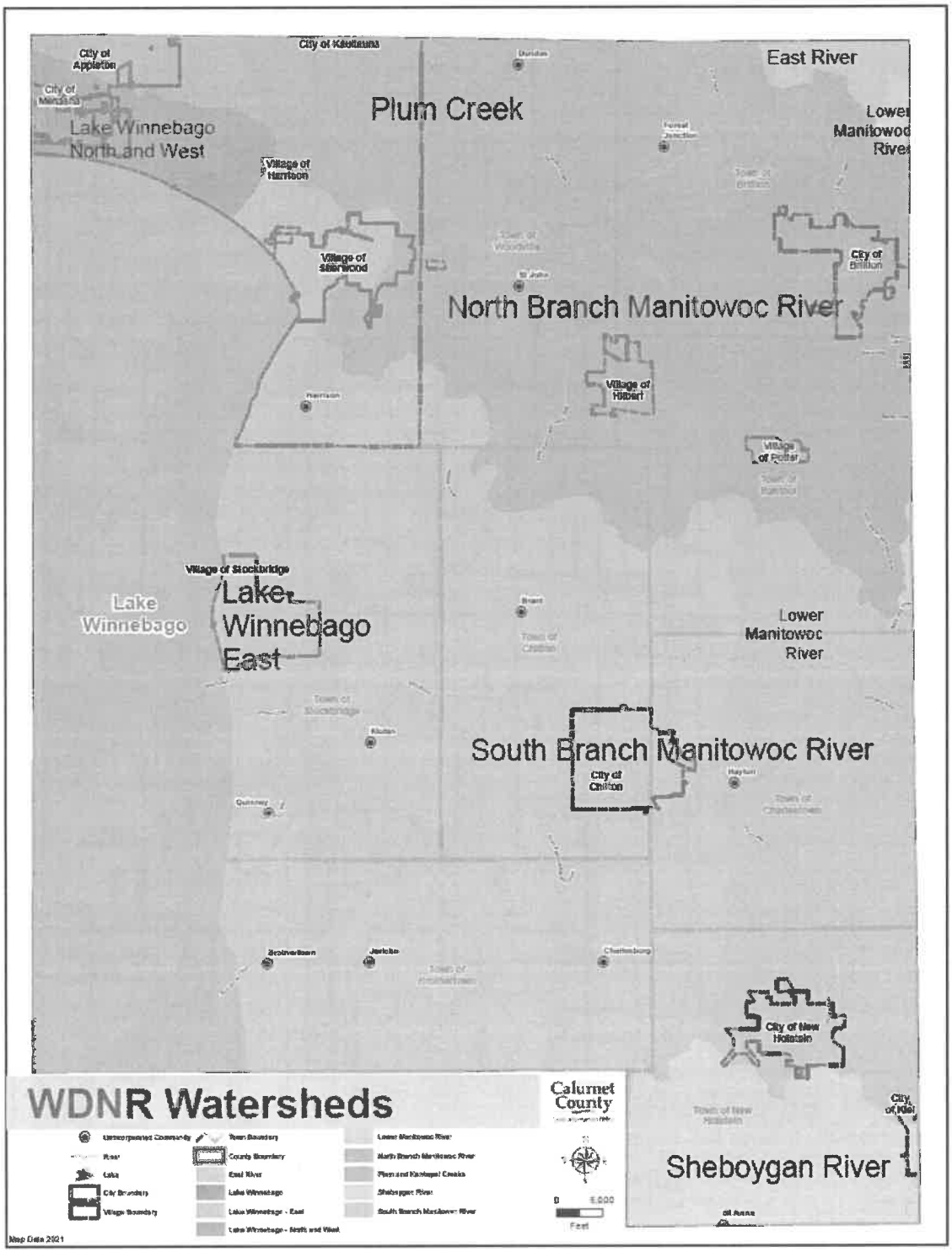
Wisconsin Flash Flood Events



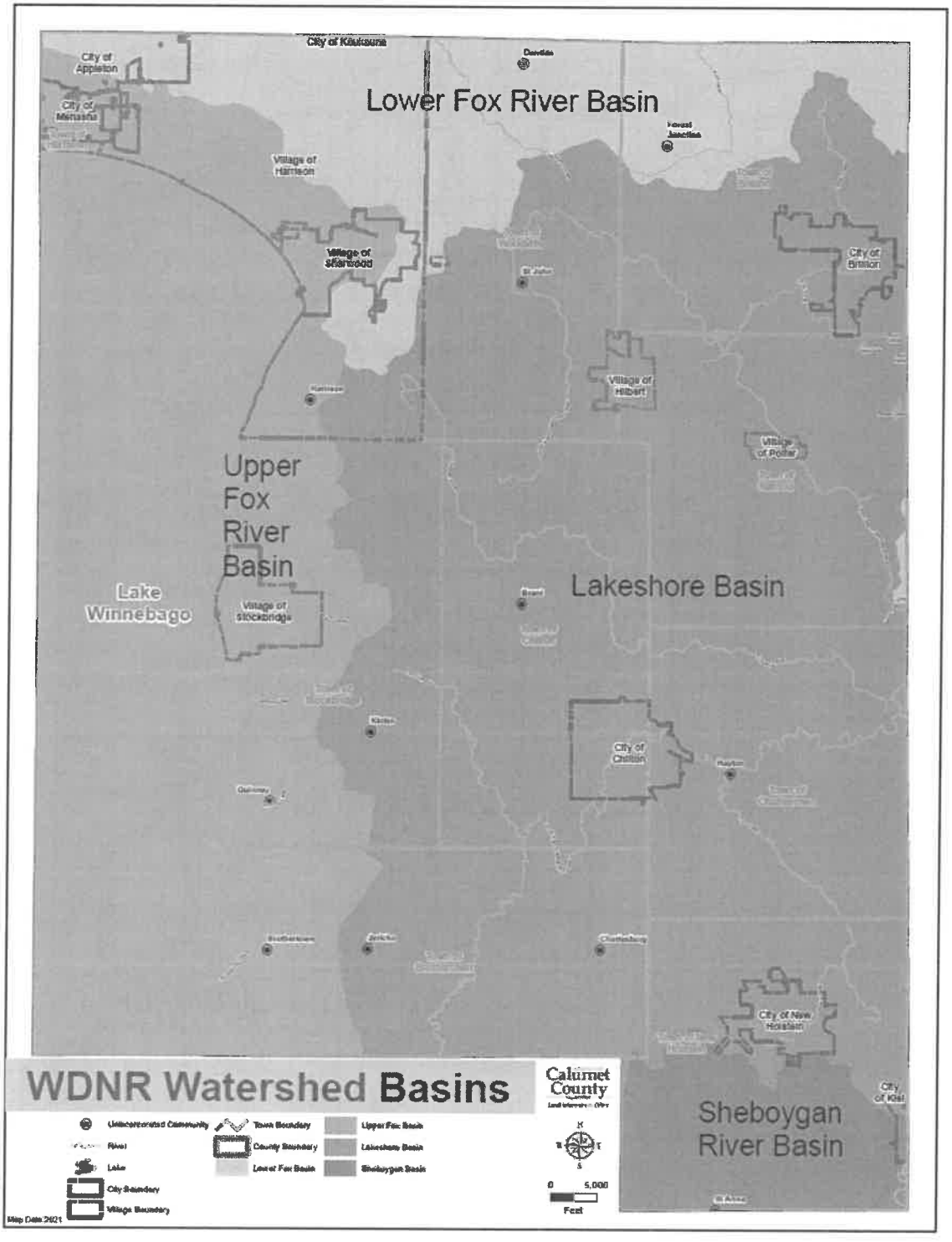
Calumet County Dams



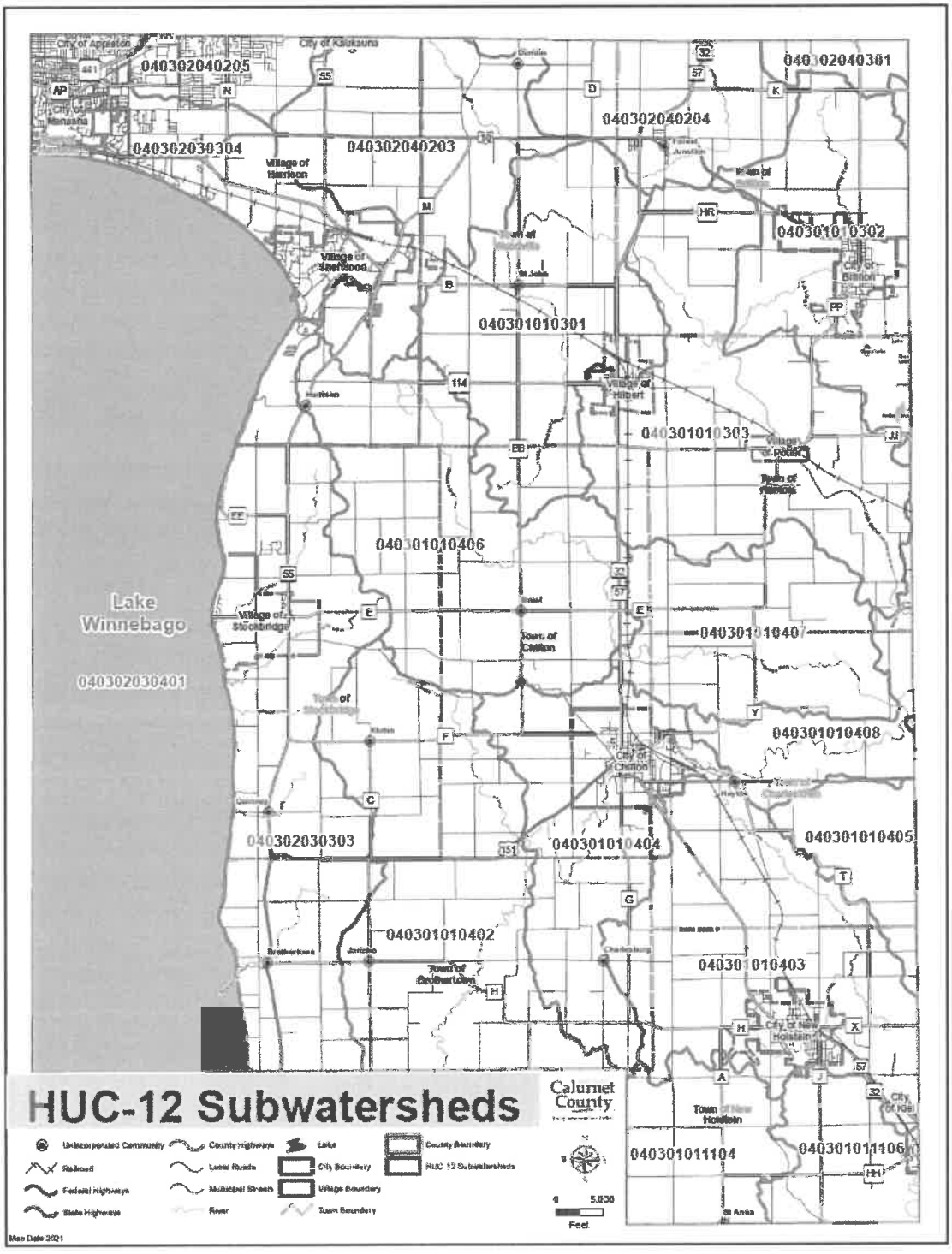
Calumet County Watersheds



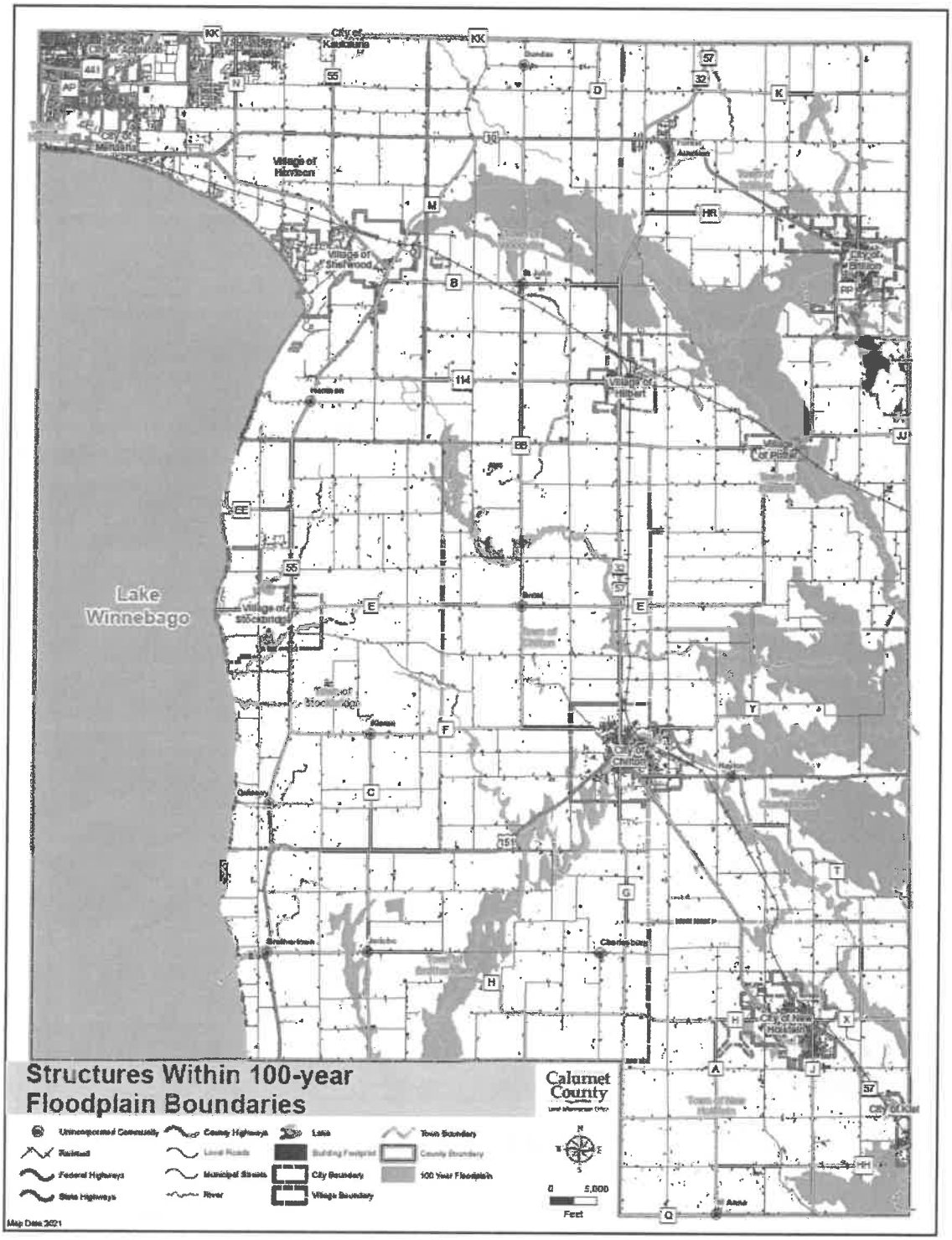
Calumet County DNR Sub-Basins



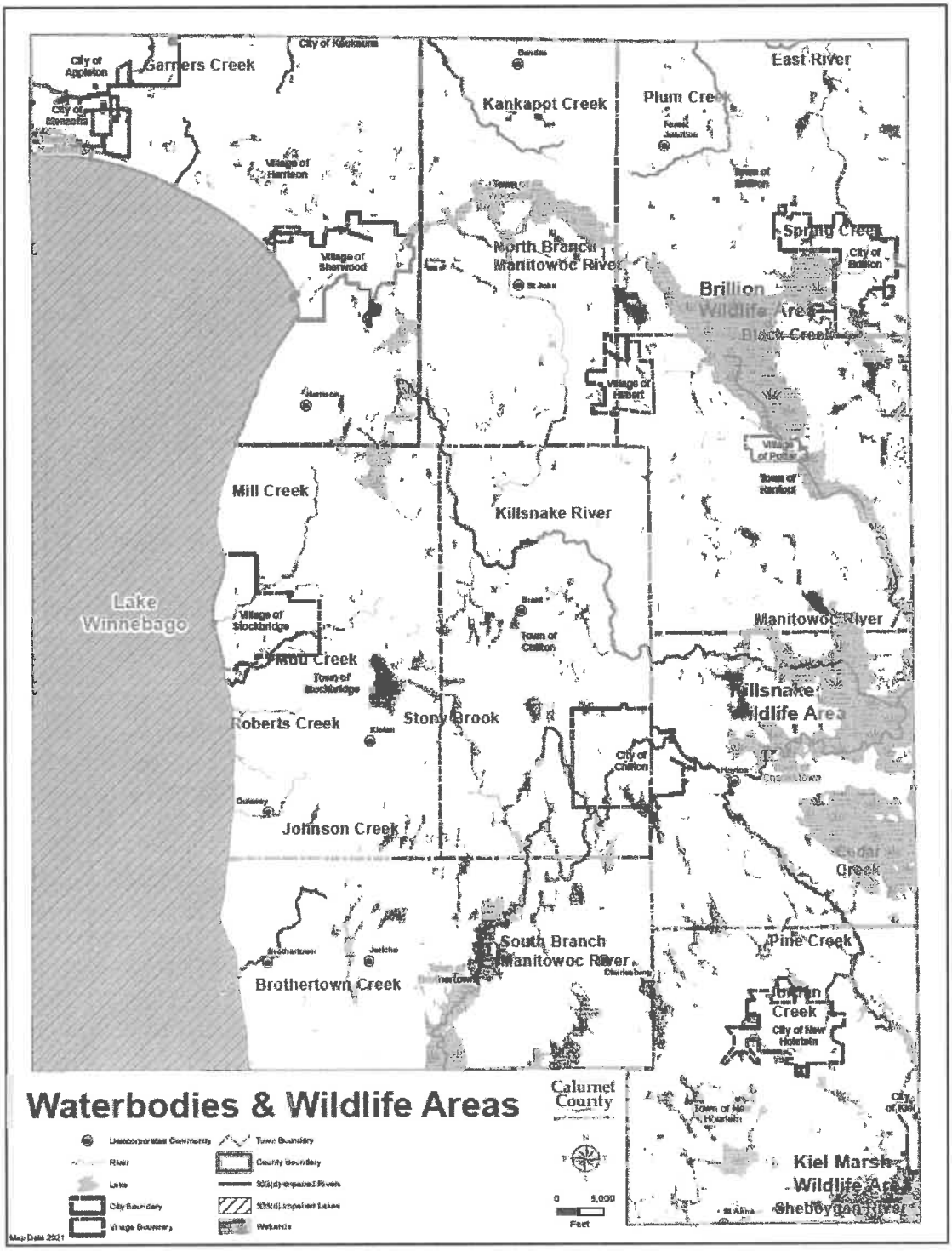
Calumet County Sub-Watersheds



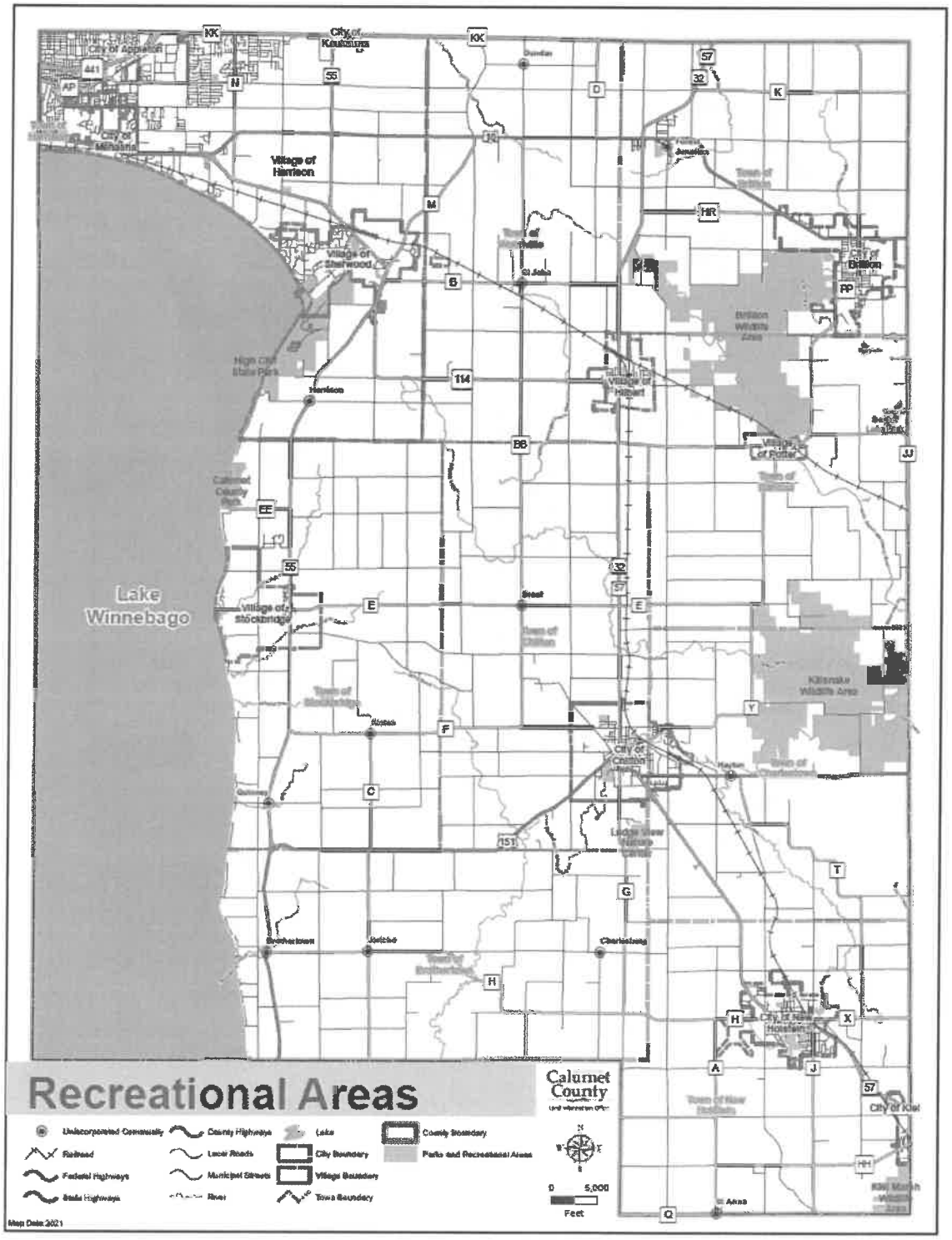
Calumet County Floodplain Map



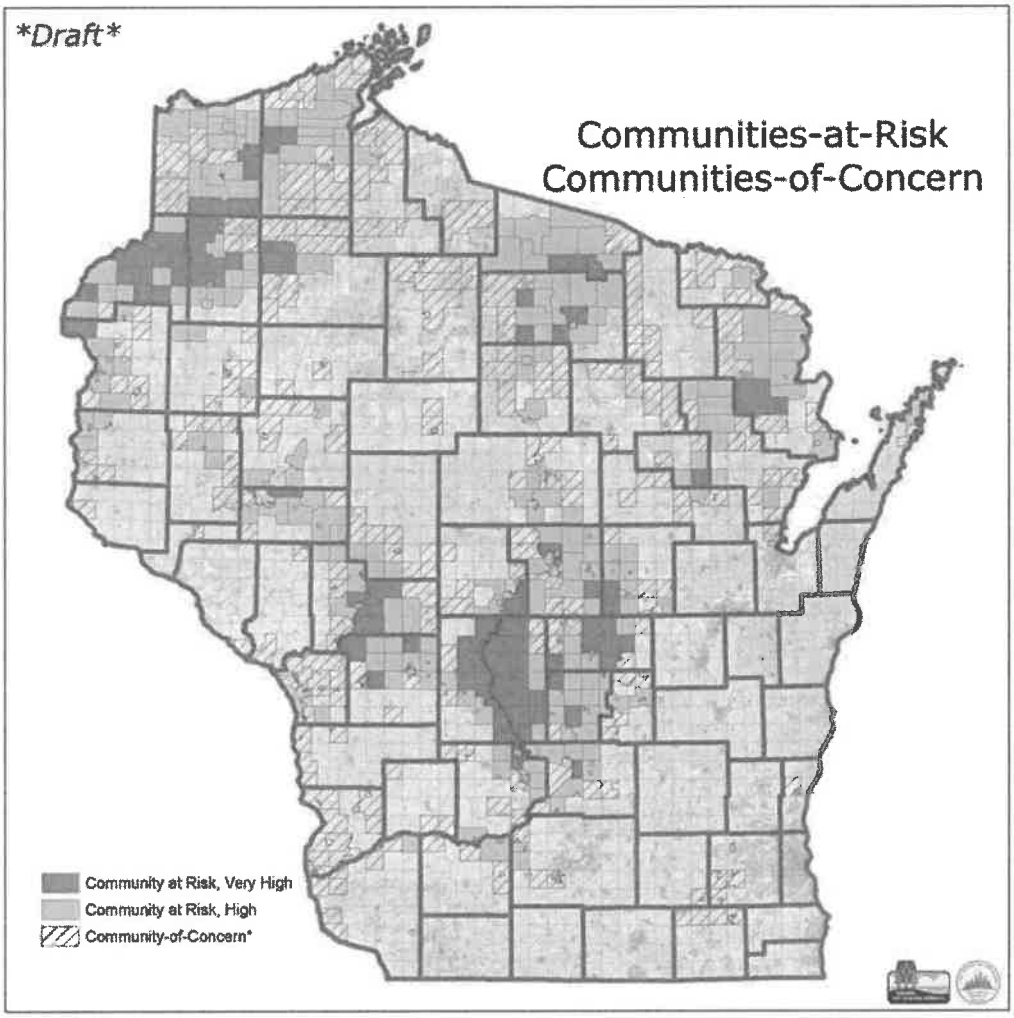
Calumet County Waterbodies and Wildlife Areas



Calumet County Recreational Areas



Wildfire Communities-at-Risk [161]



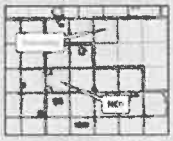
Introduction to Communities-at-Risk

The purpose of this model is to identify broad areas of the state that are at relatively high exposure to resource damage due to wildfire.

As mandated by the NASF, Wisconsin's Communities-At-Risk are divided into three categories:

1) Very High
2) High
3) Community of Concern*

Defining Community



For Wisconsin, Communities-at-Risk are reported at the MCD (municipal civil division) level* MCD was chosen due to its identifiable legal boundaries, ease in reporting, and usage in the development of Community Wildfire Protection Plans

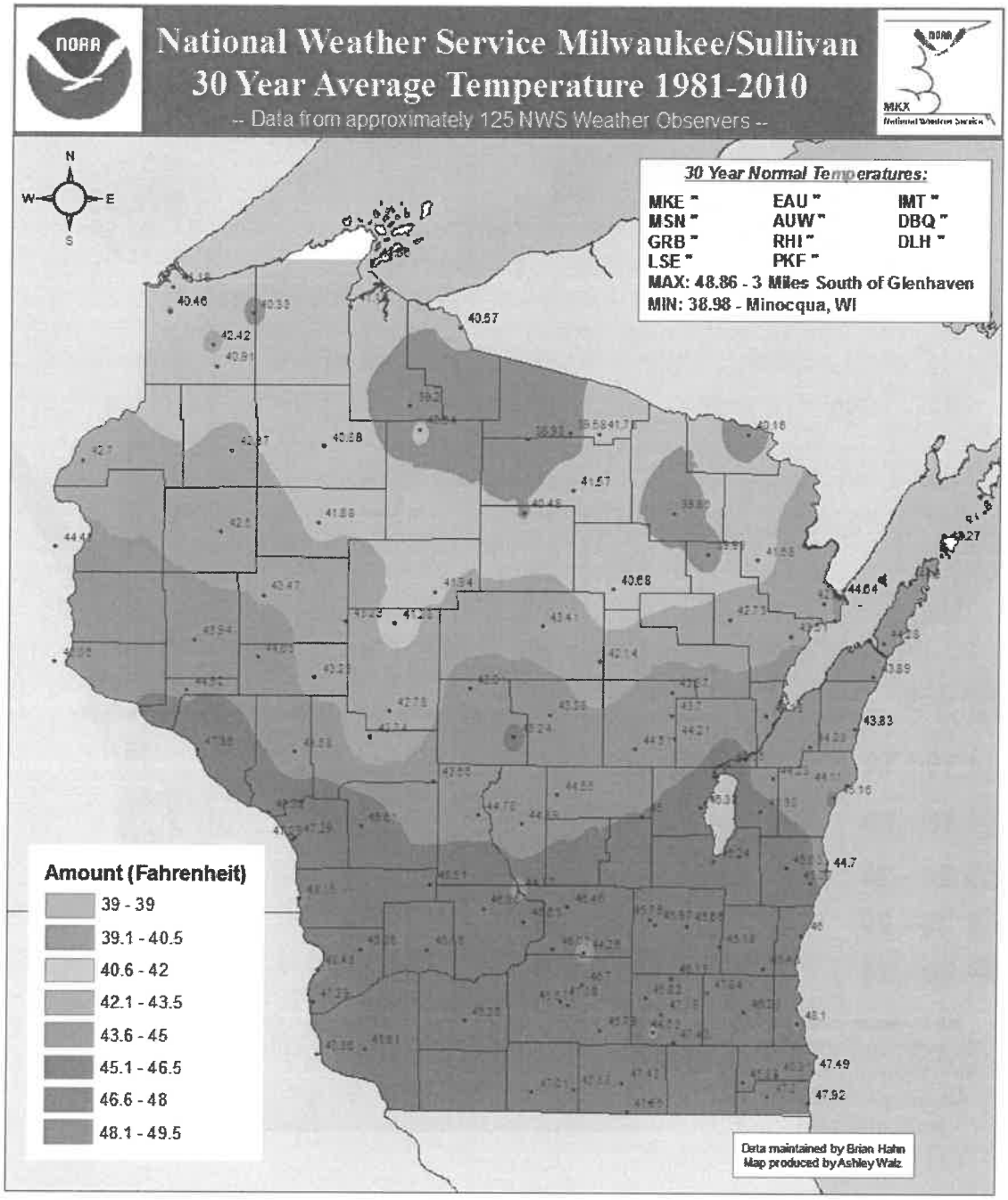
** Menominee County is an exception due to its lack of MCD's (civil townships). Therefore, Menominee county is reported by legal township.*

** A Community of Concern is a Wisconsin DNR concept whereby it is demonstrated that a significant portion of the community (more than 2 adjoining square miles) are at high or very high risk, but where the community as a whole falls below the Community-at-Risk threshold.*

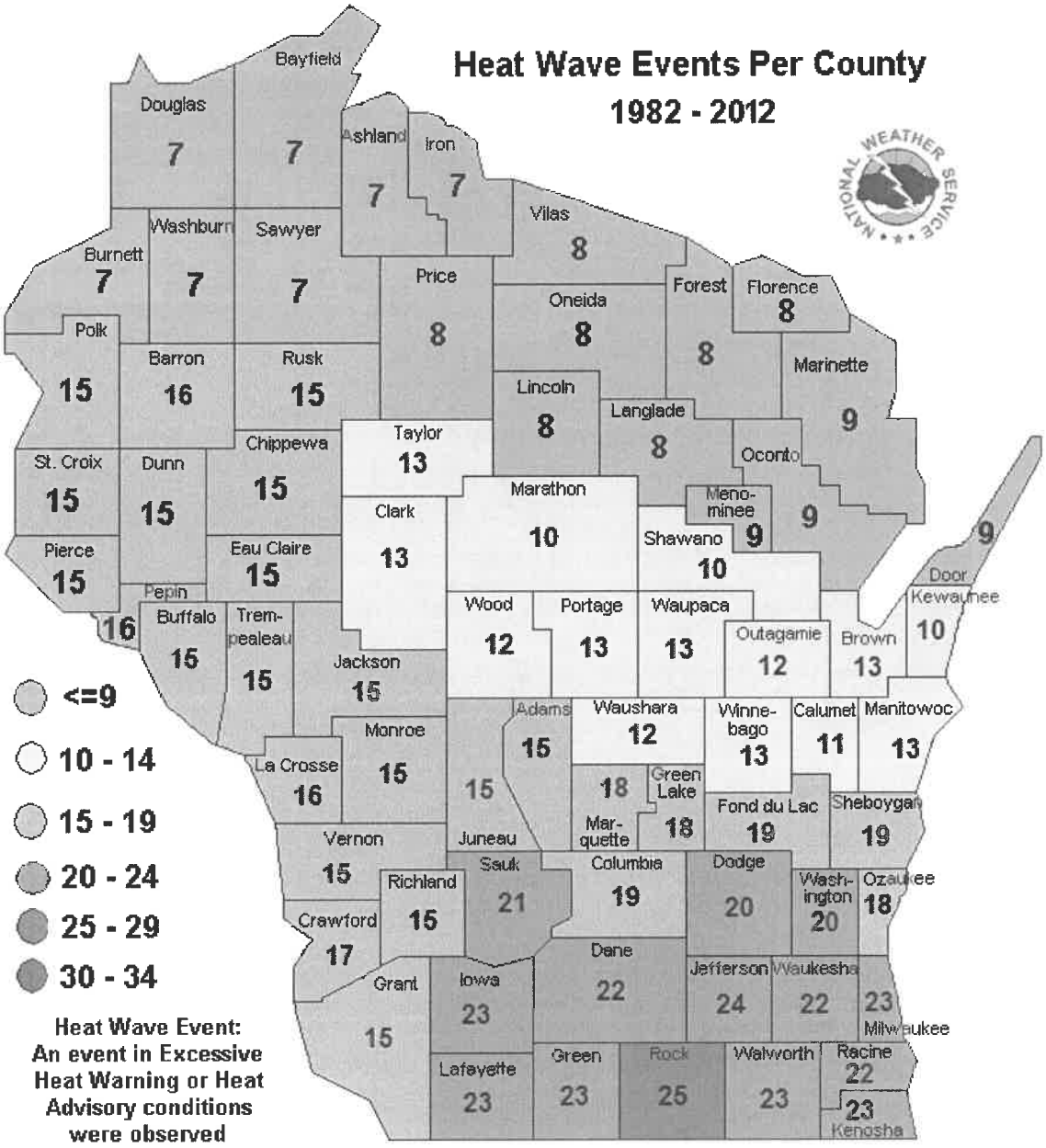
10/5/07

[161] Wisconsin Department of Natural Resources

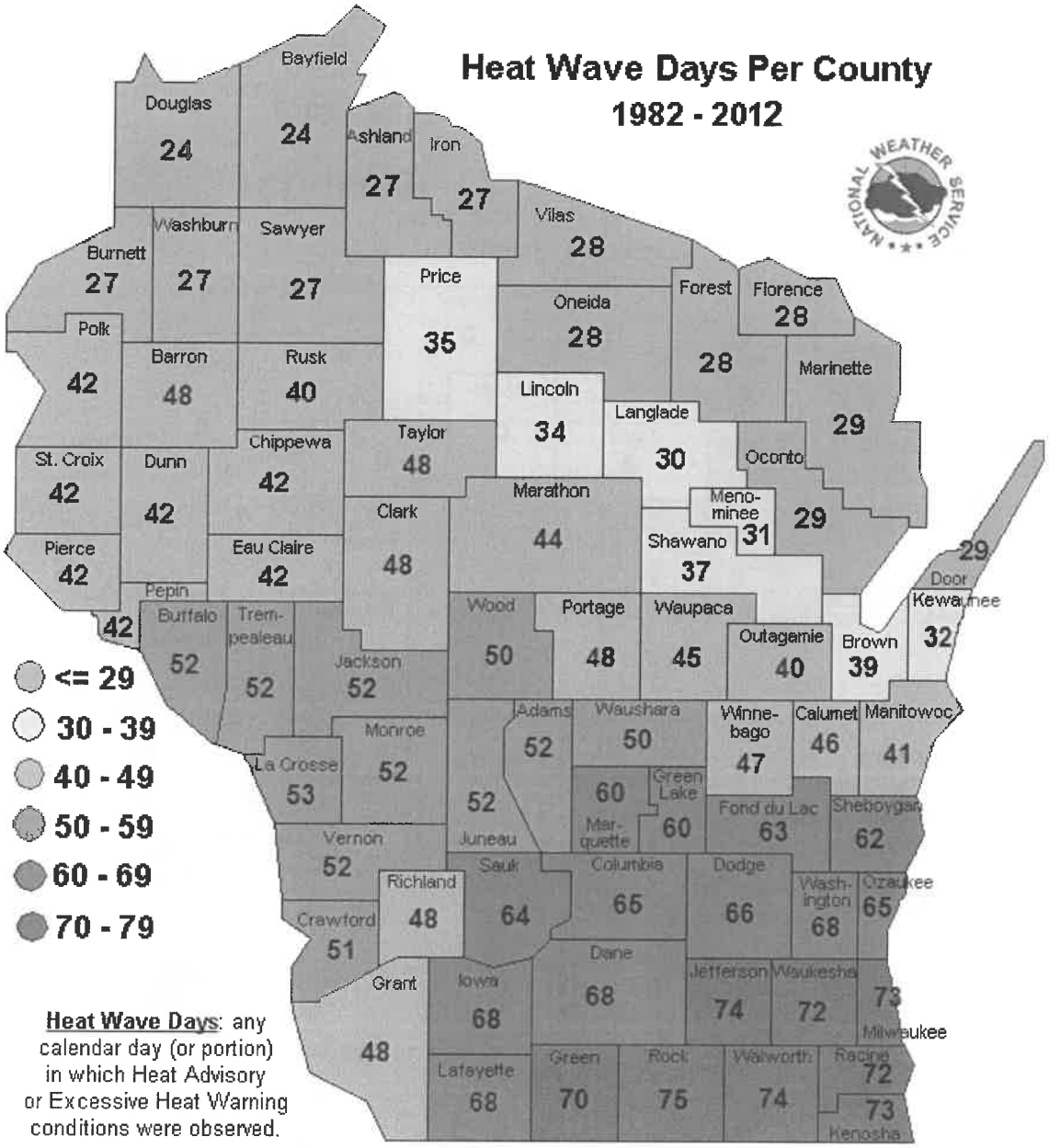
Wisconsin 30-Year Average Temperature



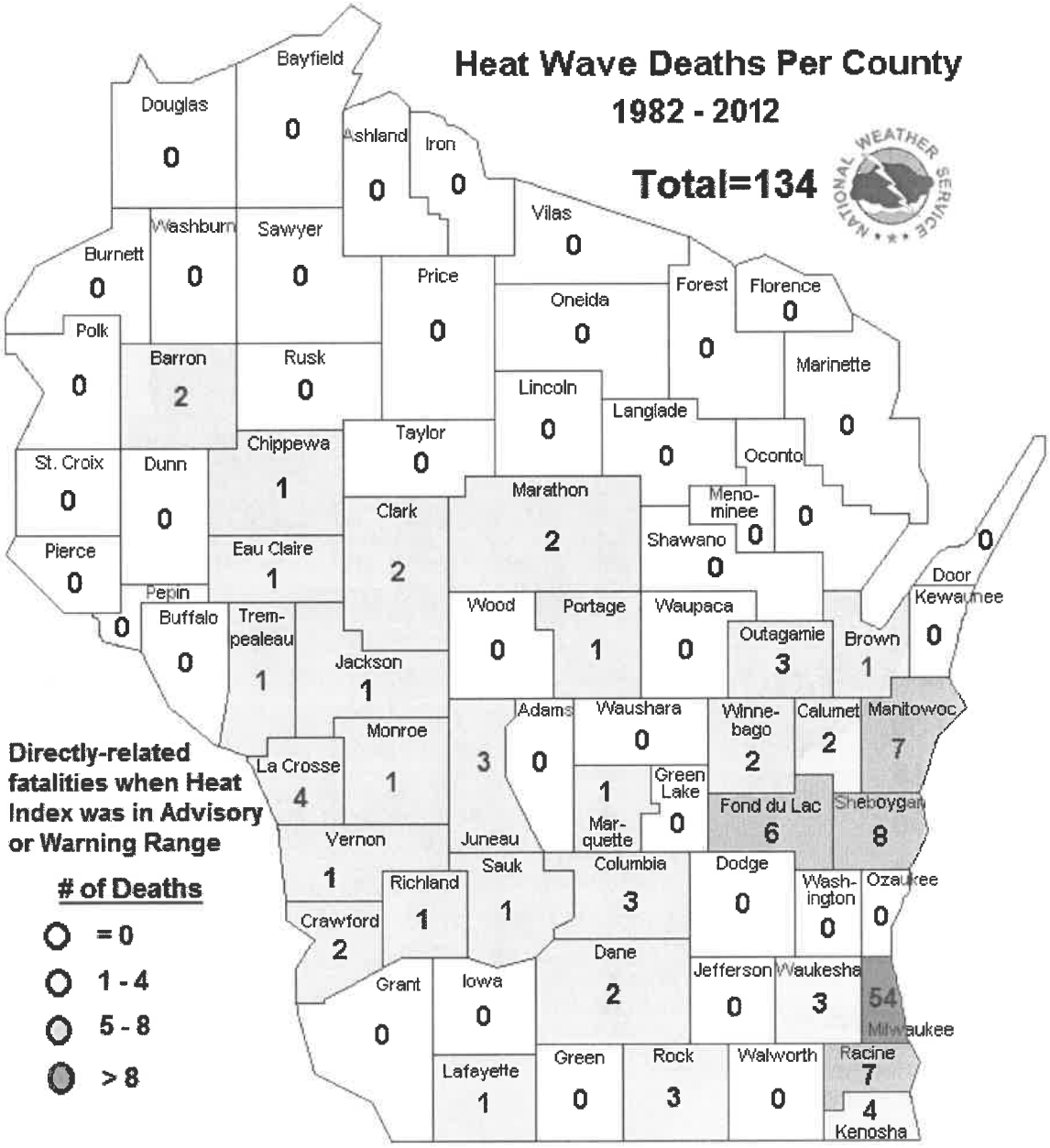
Wisconsin Heat Wave Events



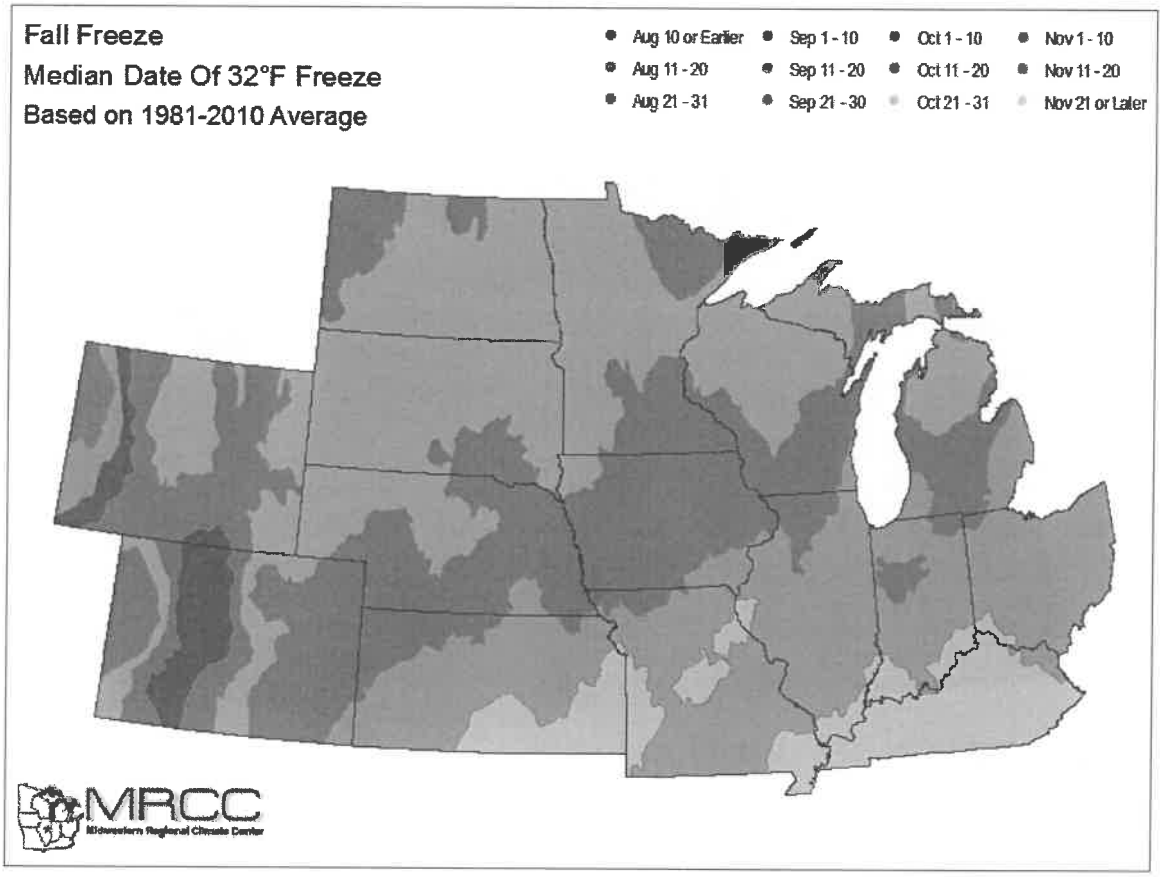
Wisconsin Heat Wave Days



Wisconsin Heat Wave Deaths

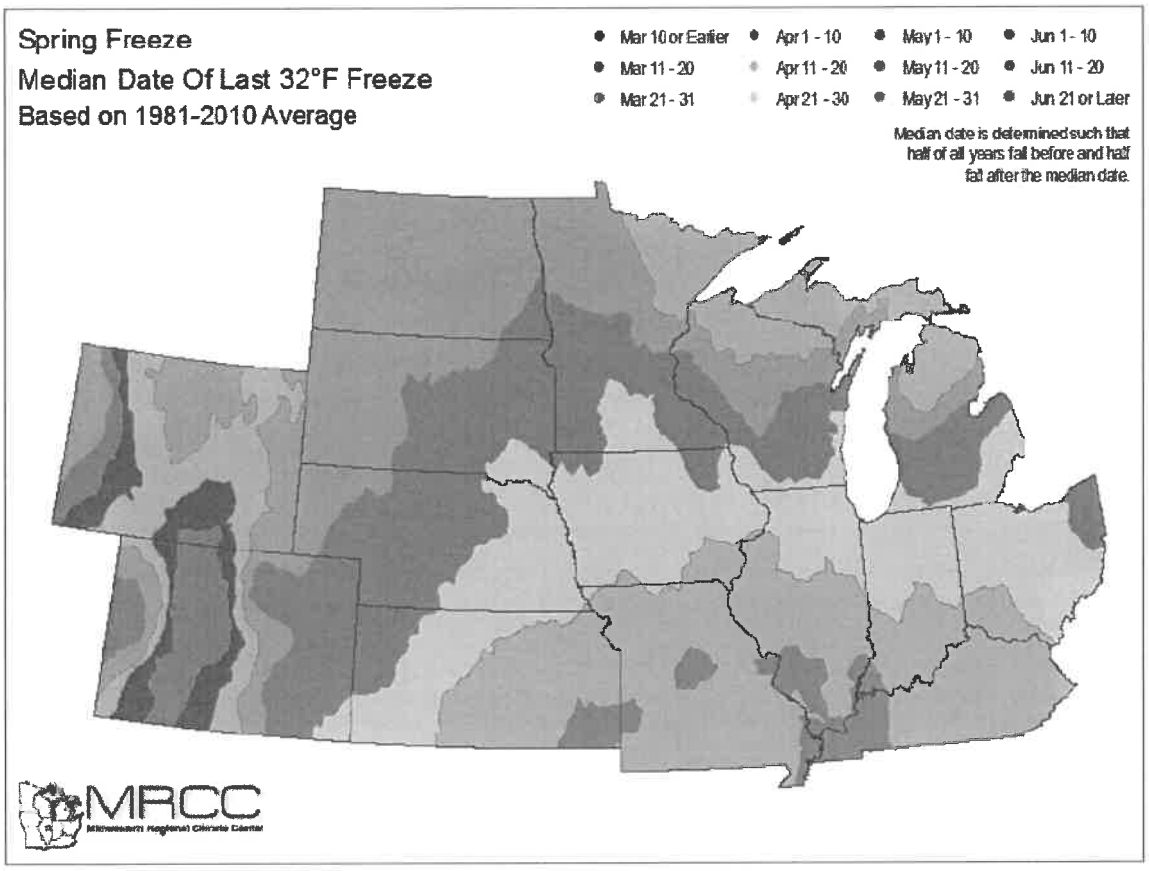


Median Date of First Freeze[162]



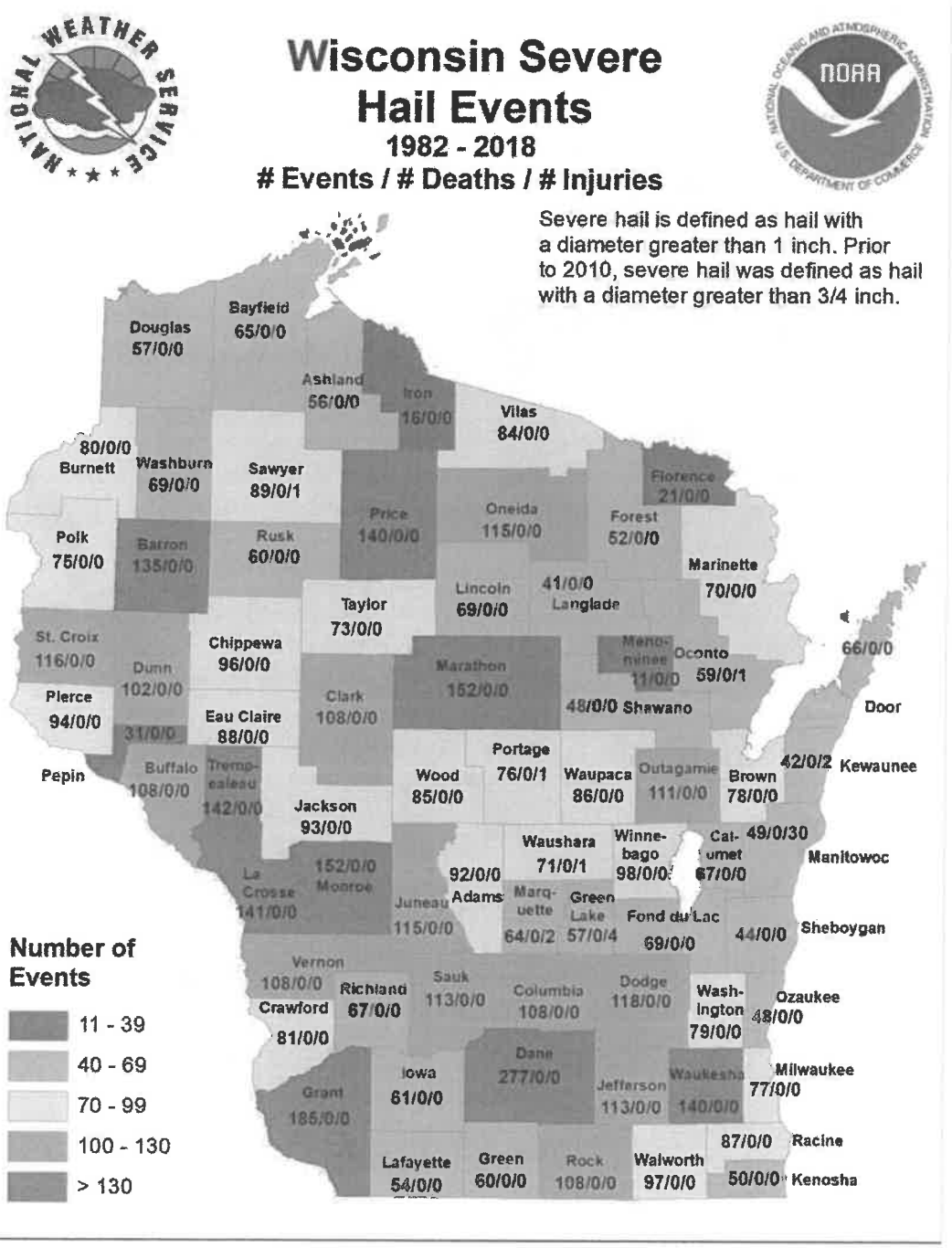
[162] http://www.crh.noaa.gov/images/mkx/climate/FallFirstFreeze.png

Median Date of Last Freeze[163]

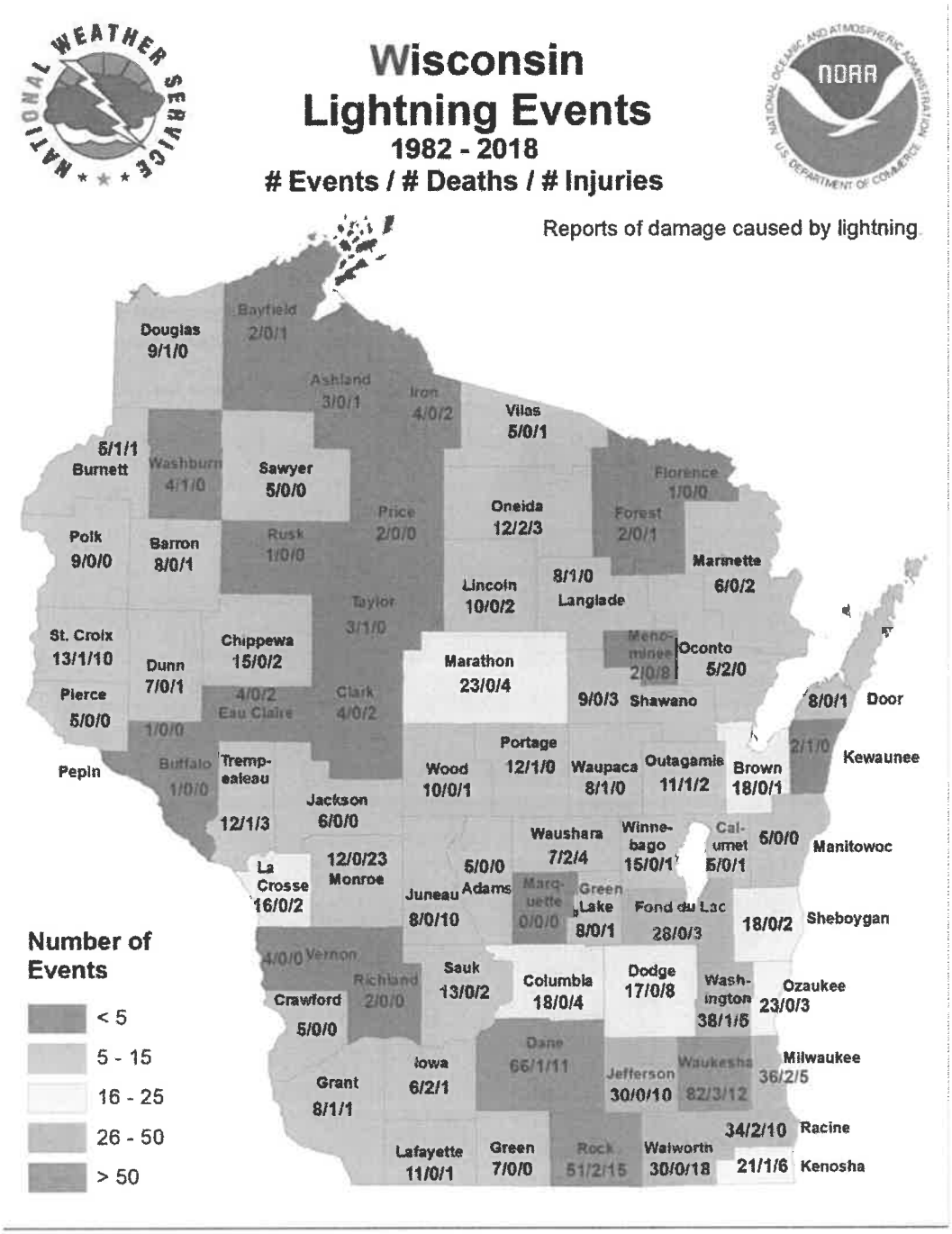


163 http://www.crh.noaa.gov/images/mkx/climate/springlastfreeze.png

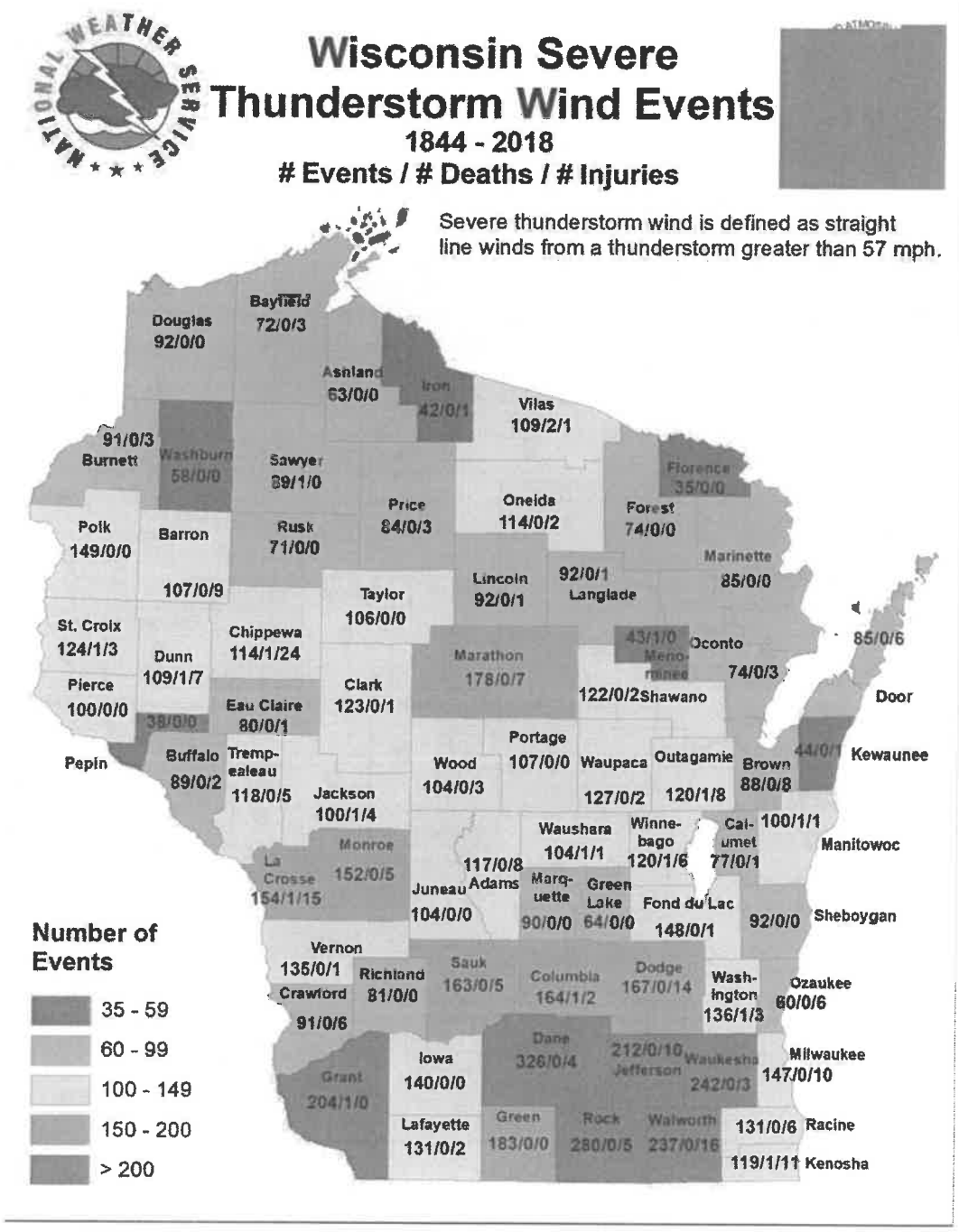
Wisconsin Hail Events



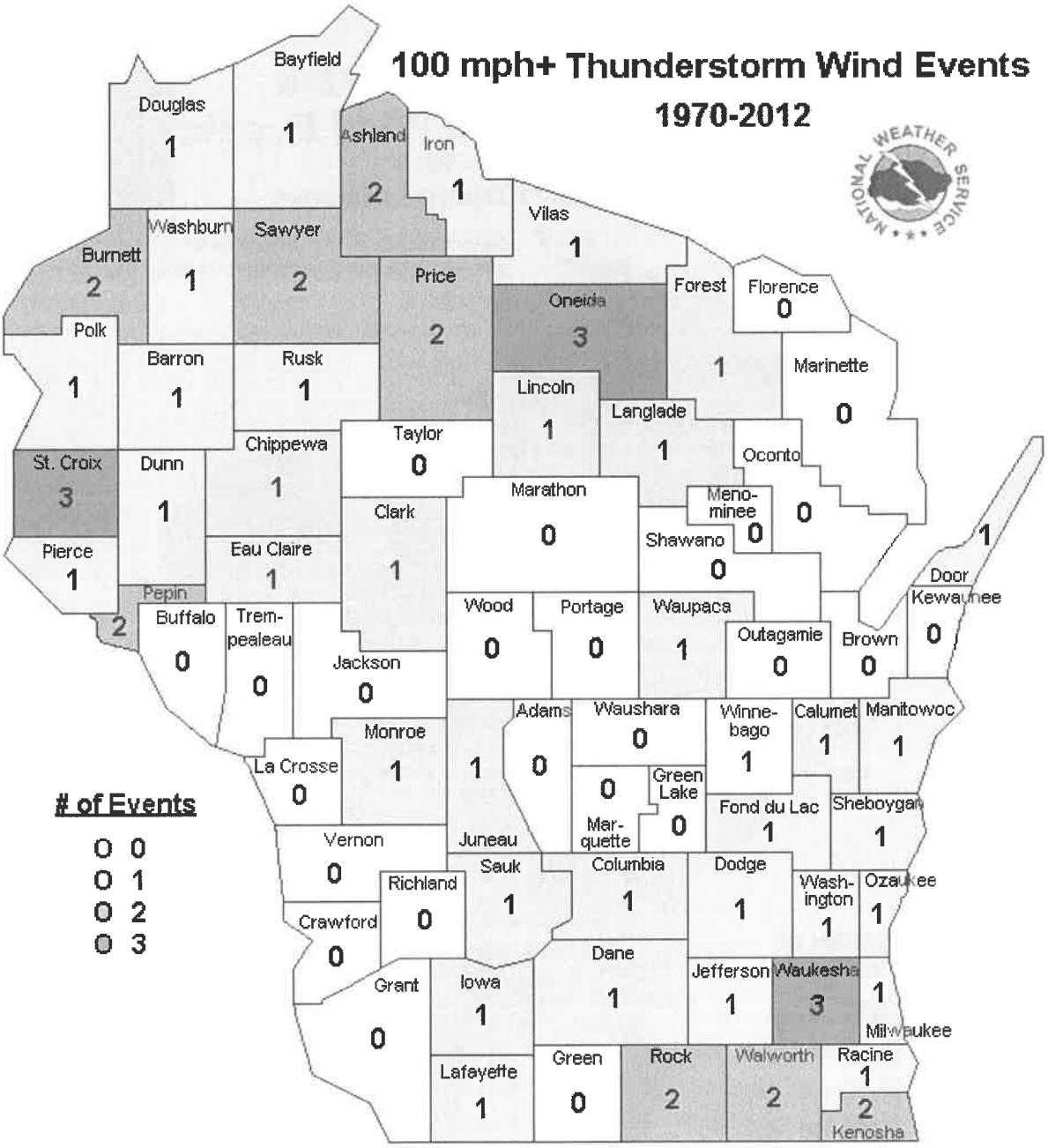
Wisconsin Lightning Events



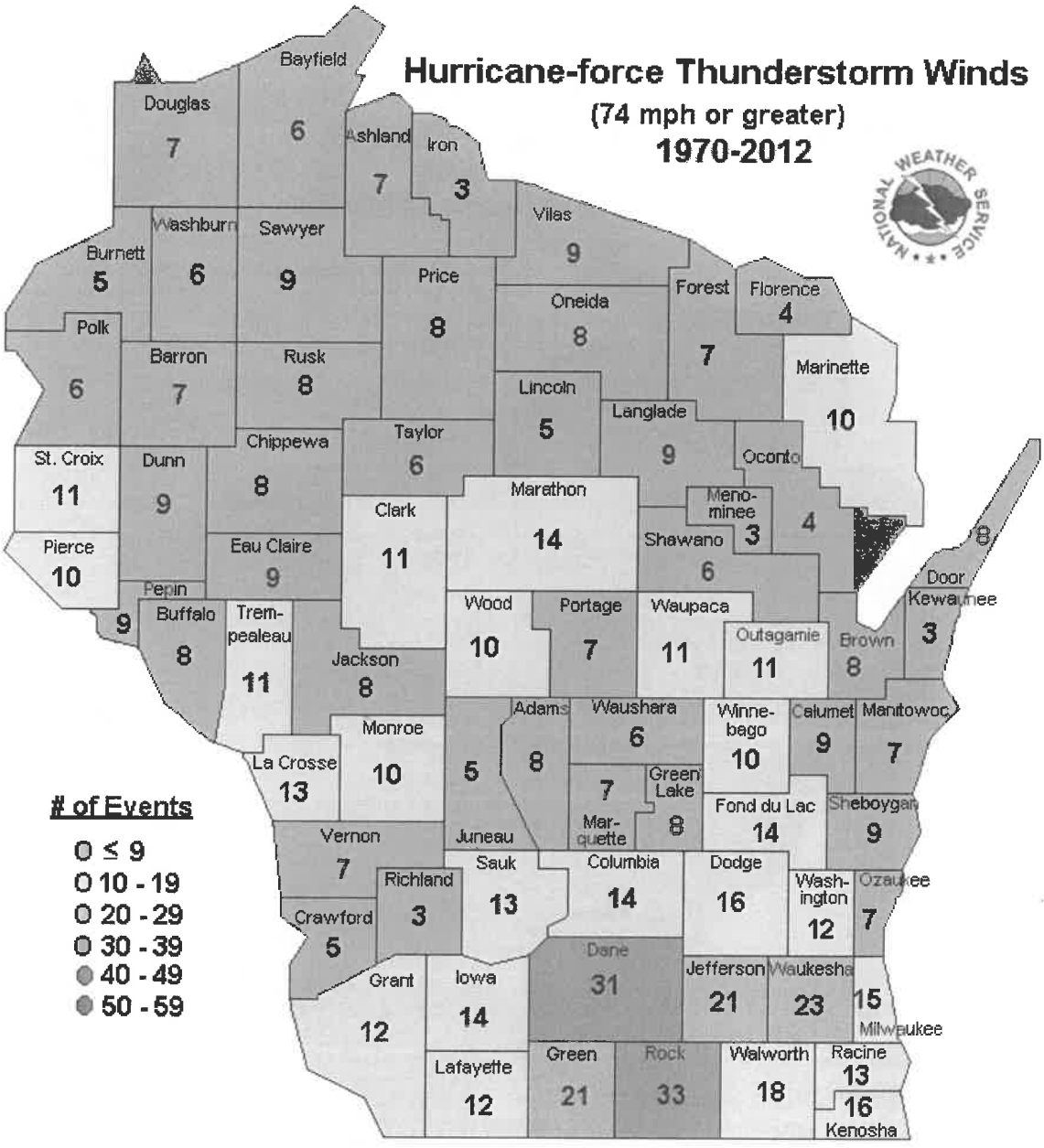
Wisconsin Severe Thunderstorm Winds



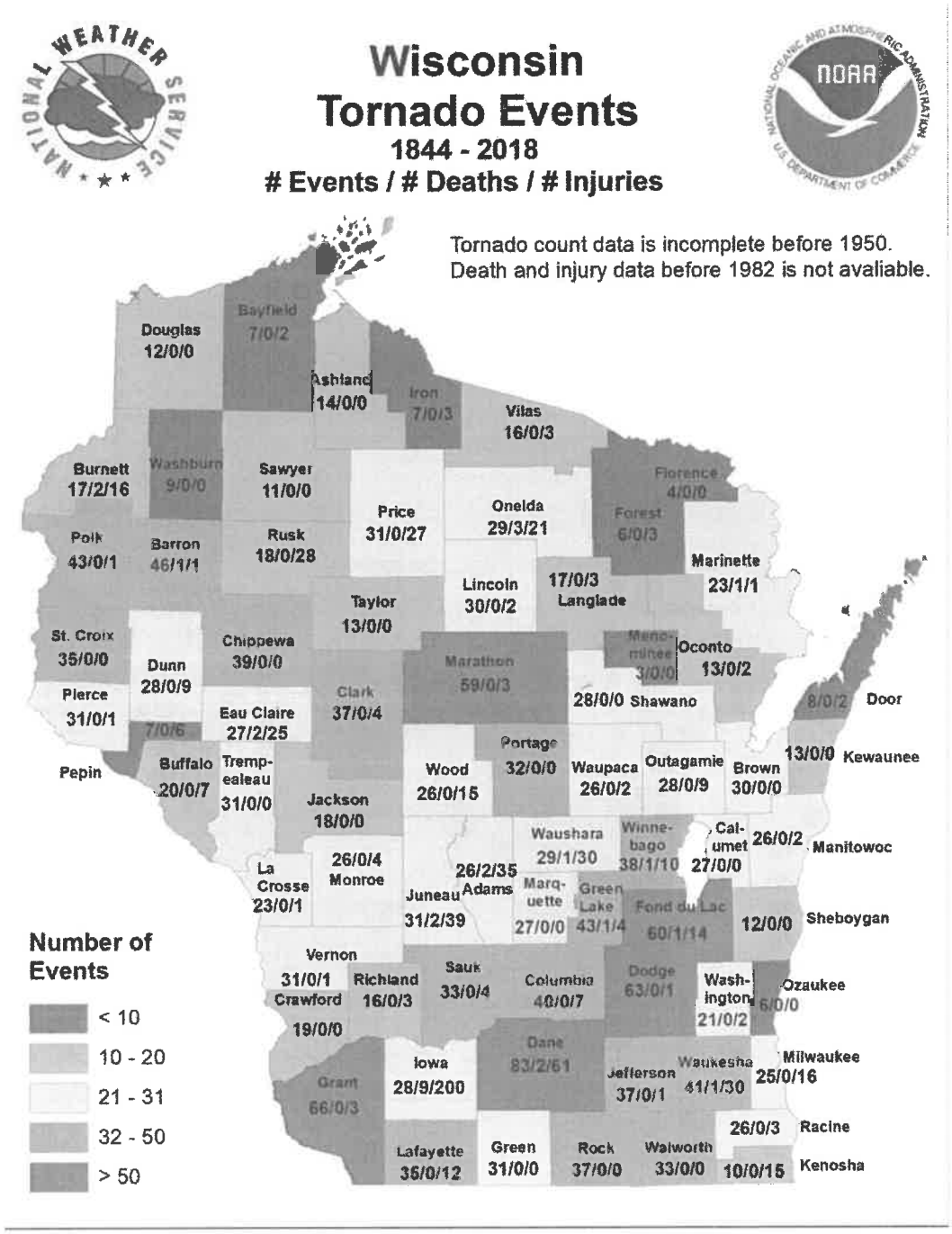
Wisconsin 100+ mph Thunderstorm Wind Events



Wisconsin Hurricane-force (74+ mph) Thunderstorm Winds

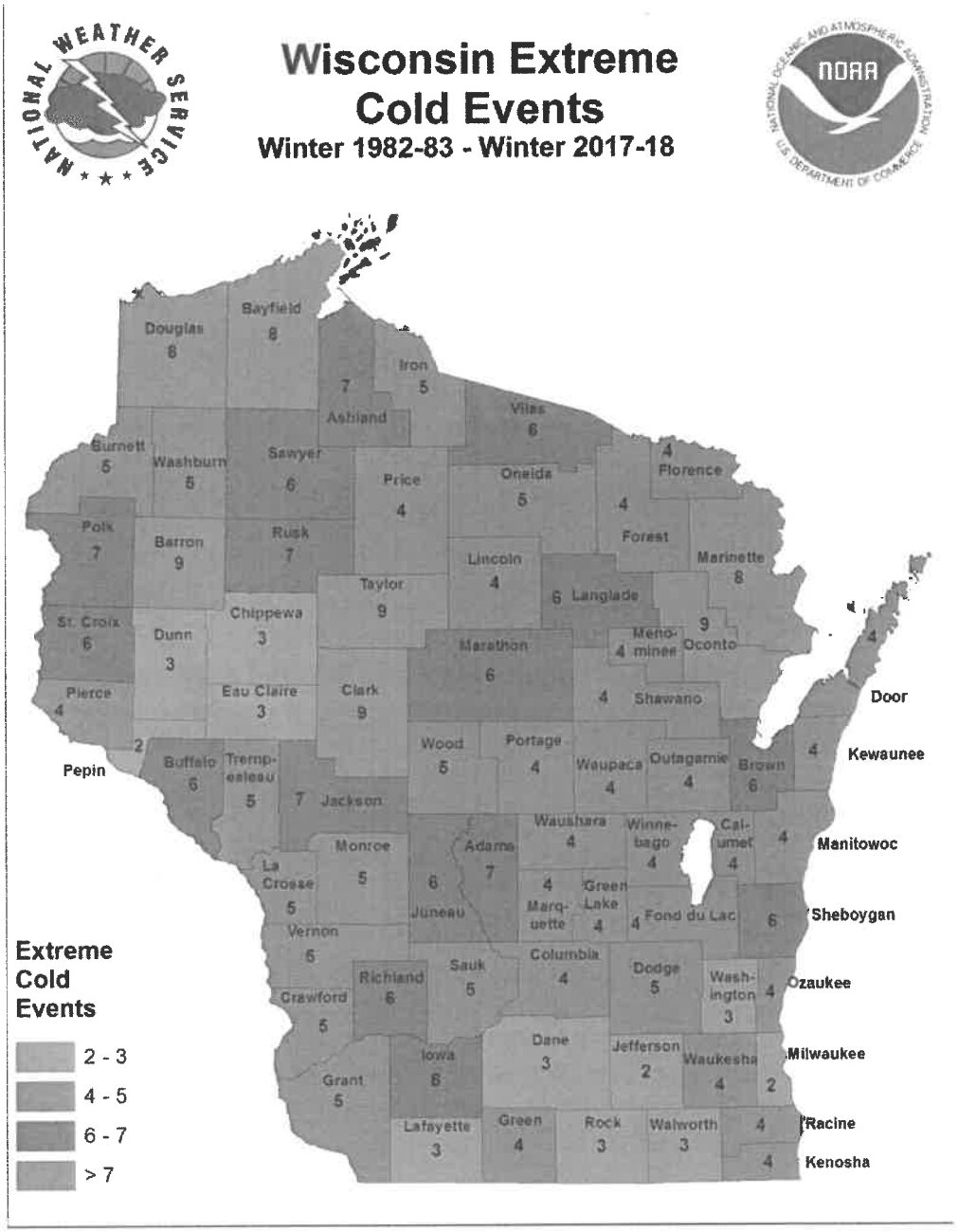


Wisconsin Tornado Events



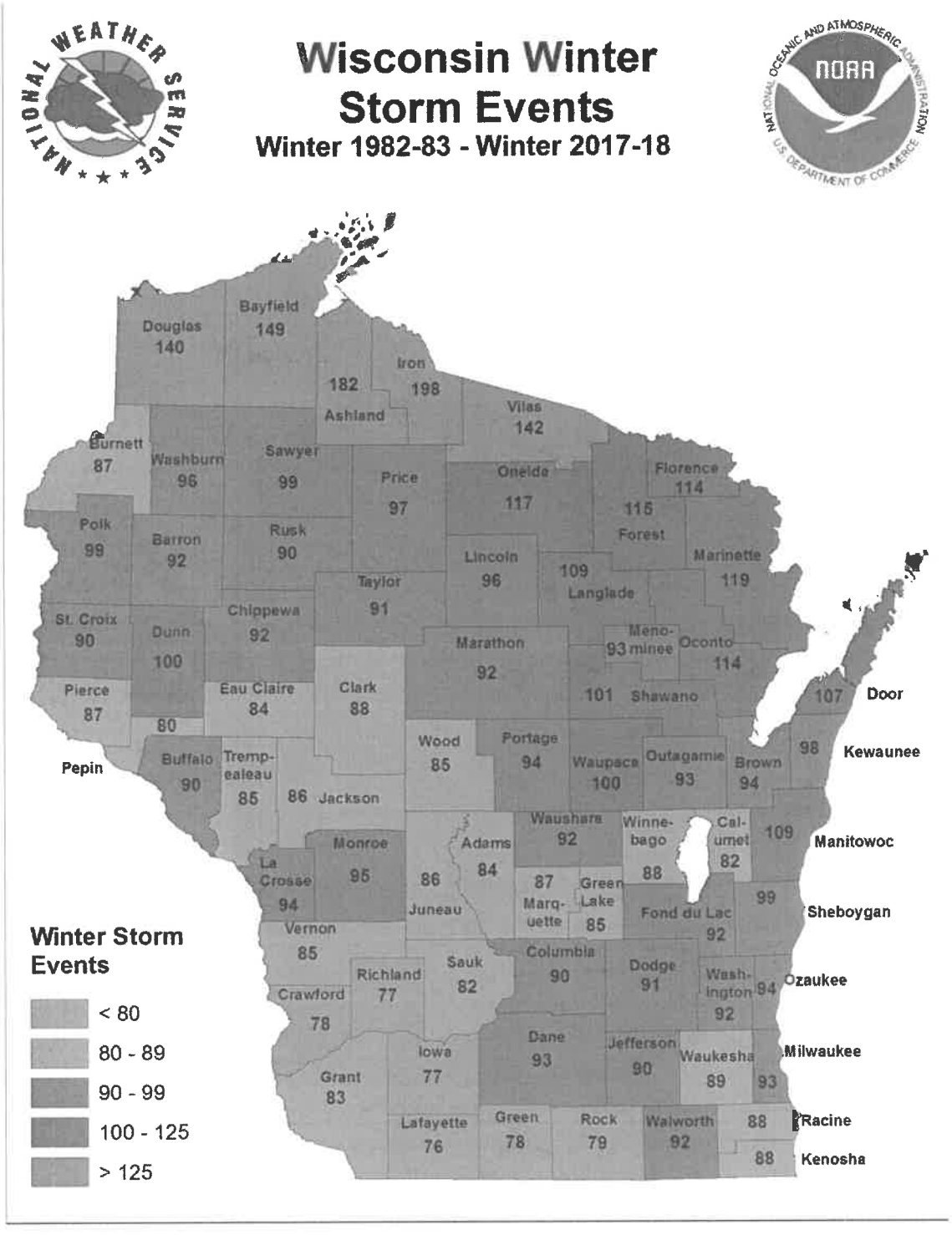
Wisconsin Blizzard Events

Wisconsin Extreme Cold Events

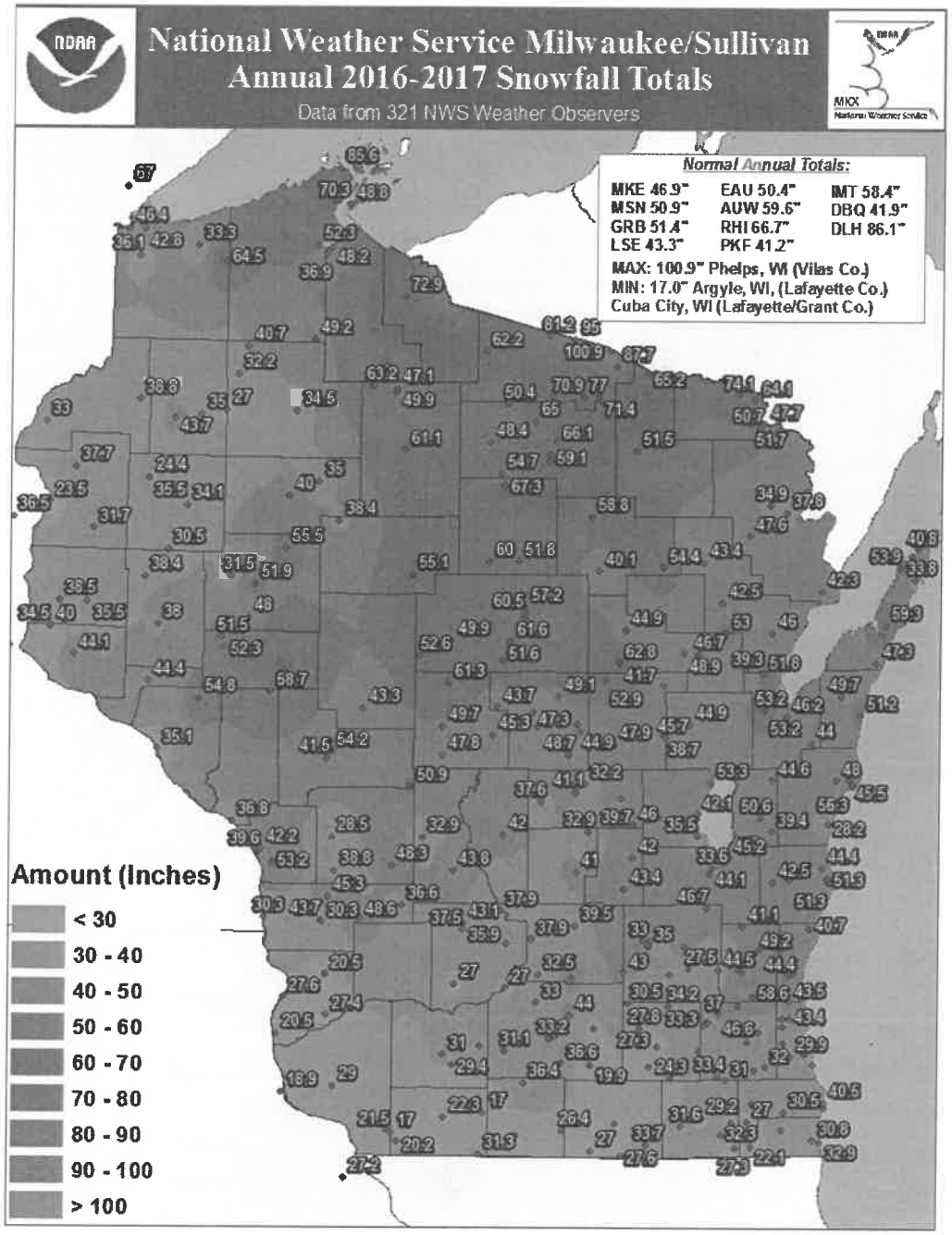


Wisconsin Ice Storm Events

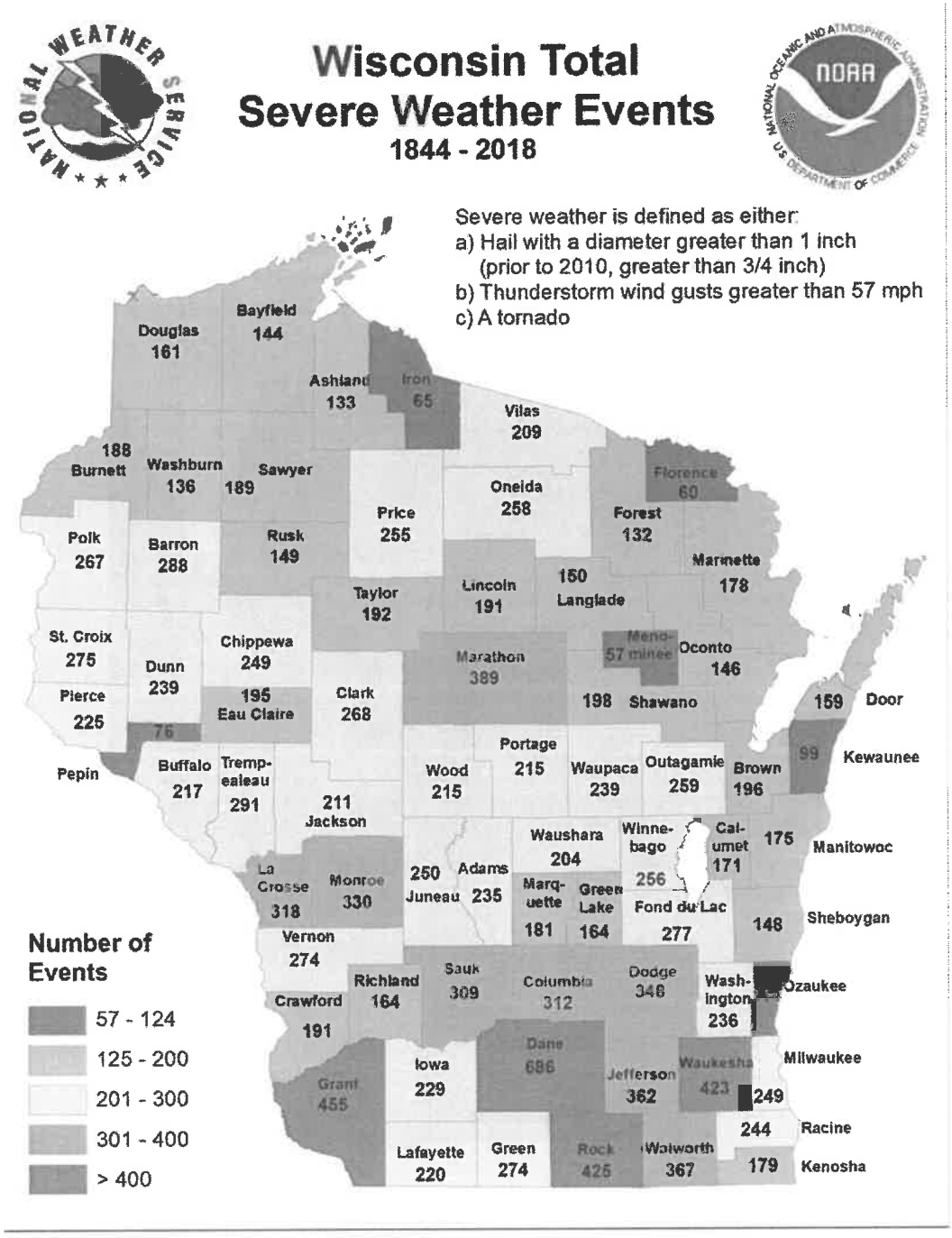
Wisconsin Winter Storm Events



Wisconsin Annual 2016-2017 Snowfall Totals



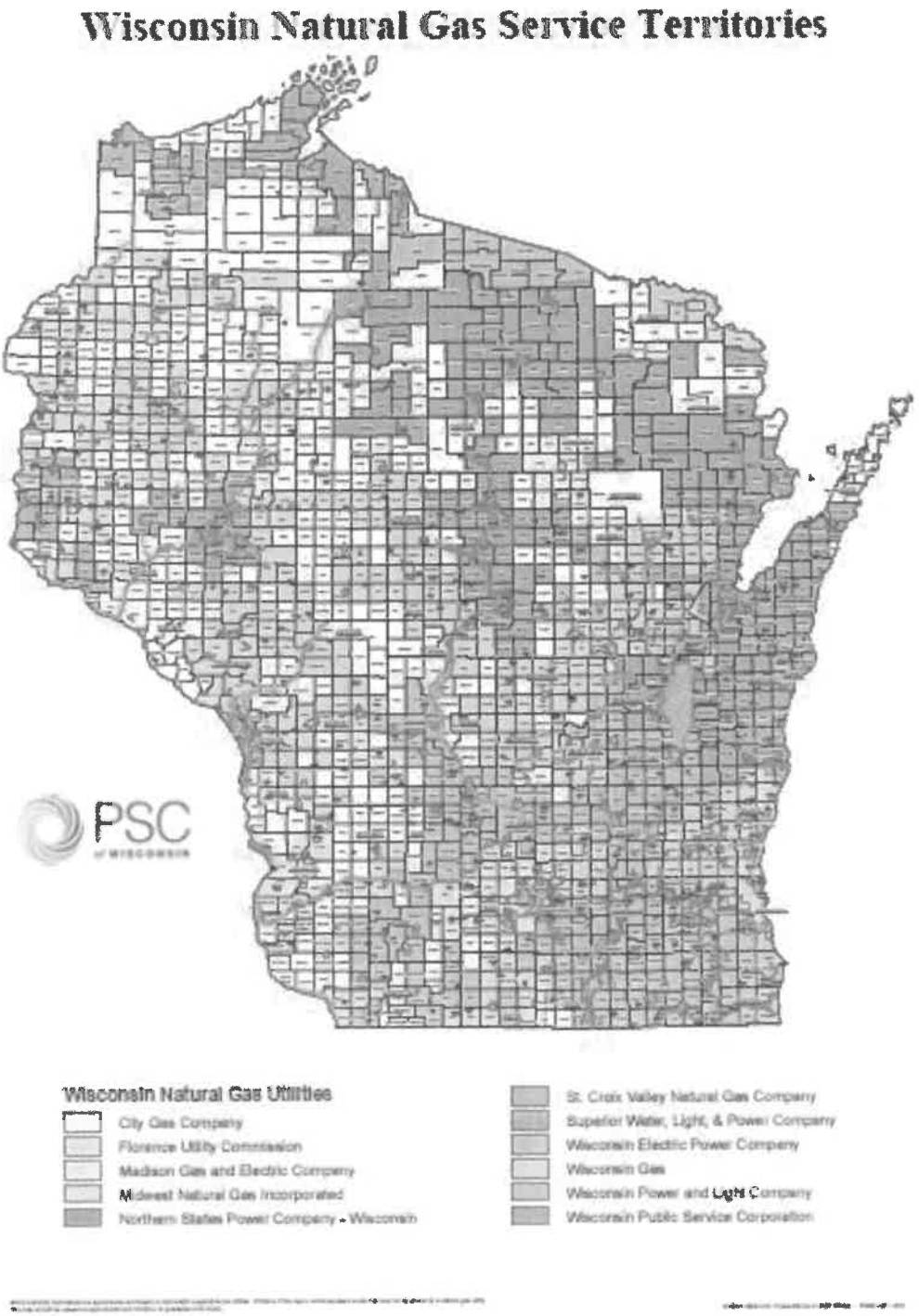
Wisconsin Total Severe Weather Events



Electric Service Territories [164]

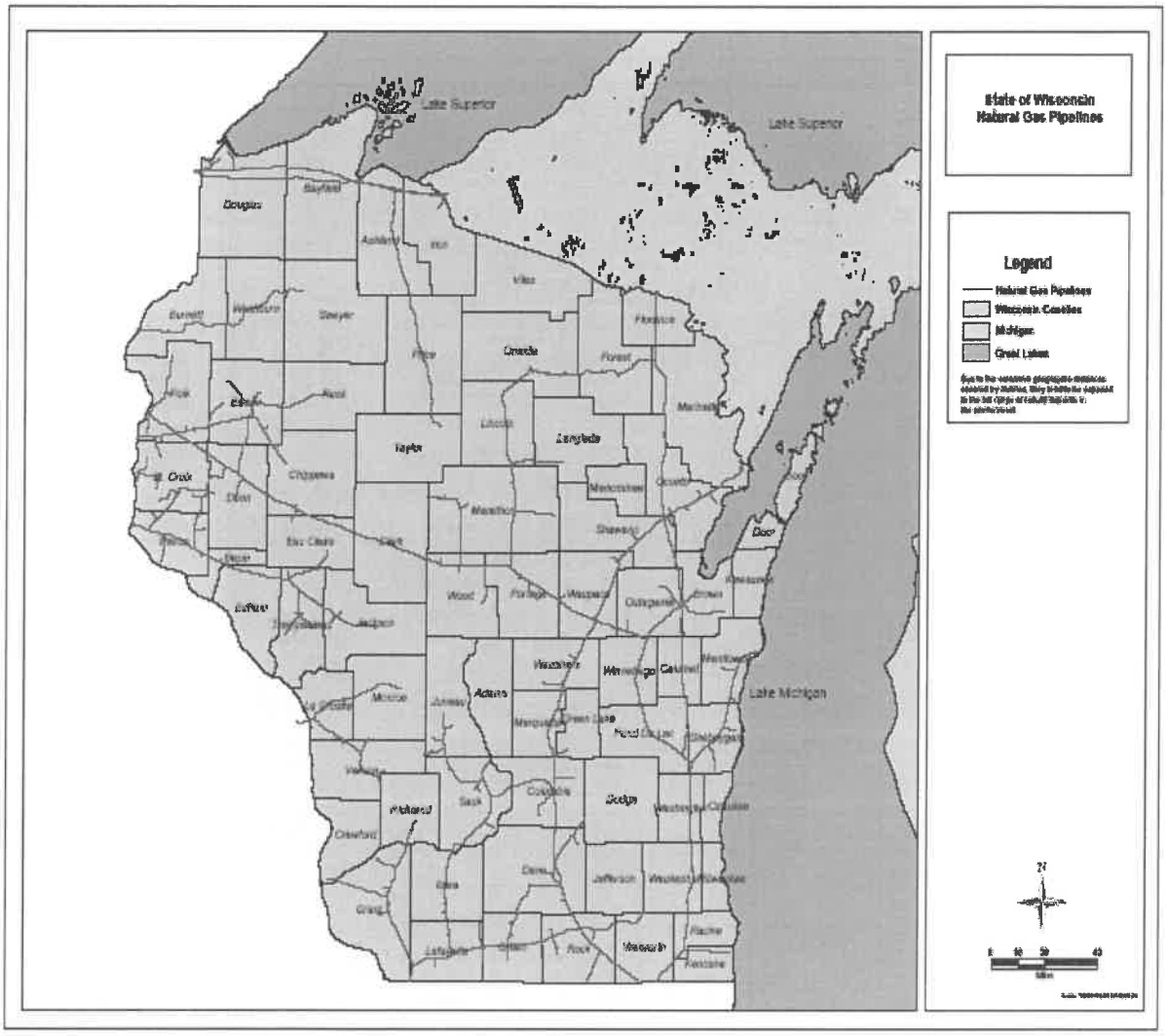
[164] https://psc.wi.gov/SiteAssets/Maps/Electric_Service_Territory_30x42_PUBLIC.pdf

Natural Gas Service Territories [165]



[165] https://psc.wi.gov/SiteAssets/Maps/Natural_Gas_30x42_PUBLIC.pdf

Natural Gas Pipelines



Wastewater Facilities [166]

[166] Wisconsin State Hazard Mitigation Plan

Appendix B: Frequency of Occurrence [167]

As noted earlier in this plan, the Calumet County Hazard Mitigation Plan Workgroup reviewed past events records and an internal workgroup consensus was reached on the anticipated probability of future events, as well as the severity of the effects of those events. The probabilities and severities were designated as "very high," "high," "medium," "low" or "very low" by the workgroup based on their evaluation and experience with the data. This is the main rating system used for this plan as it comes directly from those living in the area and reflects their current impressions, though they note that climate and weather systems are dynamic events.

The workgroup understands that historical weather data provided by the National Weather Service does not include events which may adversely affect their communities but fall below the reporting thresholds. Each weather event was analyzed for historic frequency and averages over the last 25 years (i.e., from 1 October 1995 through 1 October 2020) and is noted below with each hazard.

DROUGHT

*There were **4** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	03/10/1999	0	0	0	0
CALUMET COUNTY	07/19/2005	0	0	0	0
CALUMET COUNTY	08/01/2005	0	0	0	0
CALUMET COUNTY	07/24/2012	0	0	0	0

FLASH FLOOD

*There were **14** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
APPLETON	07/30/2003	0	0	0	0
APPLETON	08/02/2003	0	0	0	0
ST ANNA	06/12/2008	0	0	$480,000	$5M
HIGH CLIFF JCT	07/16/2008	0	0	0	0
STOCKBRIDGE	07/24/2010	0	0	$140,000	0
HARRISON	05/03/2012	0	0	$250,000	0
DARBOY	09/11/2019	0	0	$30,000	0

[167] https://www.ncdc.noaa.gov/stormevents/

FLOOD

*There were **5** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	06/16/1996	0	0	0	0
STOCKBRIDGE	06/27/1999	0	0	0	0
HIGH CLIFF JCT	05/03/2018	0	0	$300,000	0
DARBOY	08/28/2018	0	0	0	0
HIGH CLIFF JCT	03/14/2019	0	0	$55,000	0

HEAVY RAIN

*There were **30** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
STOCKBRIDGE	07/14/2010	0	0	$4,000	0
BRILLION	06/22/2012	0	0	0	0
DARBOY	07/17/2012	0	0	0	0
FOREST JCT	07/08/2013	0	0	0	0
HAYTON	06/01/2014	0	0	0	0
HAYTON	06/01/2014	0	0	0	0
STOCKBRIDGE	06/24/2014	0	0	$25,000	0
HIGH CLIFF	12/13/2015	0	0	0	0

EXCESSIVE HEAT

*There was **1** event reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	07/03/2012	0	0	0	0

HEAT

*There were **2** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CALUMET COUNTY	02/11/1999	0	0	0	0
CALUMET COUNTY	07/23/1999	1	0	0	0

EXTREME COLD/WINDCHILL

*There were **4** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CALUMET COUNTY	01/30/2008	0	0	0	0
CALUMET COUNTY	02/10/2008	0	0	0	0
CALUMET COUNTY	01/06/2014	0	0	0	0
CALUMET COUNTY	01/27/2014	0	0	0	0

COLD/WIND CHILL

*There were **5** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CALUMET COUNTY	01/30/1996	0	0	0	0
CALUMET COUNTY	02/01/1996	0	0	0	0
CALUMET COUNTY	02/17/2006	0	0	0	0
CALUMET COUNTY	01/02/2018	0	0	0	0
CALUMET COUNTY	01/29/2019	0	0	0	0

HAIL

*There were **72** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	Date	Diameter	Deaths	Injuries	Property Damage	Crop Damage
CHILTON	07/05/1994	2.75 in.	0	0	$500	$500
CHILTON	07/02/1996	0.75 in.	0	0	0	0
CHILTON	07/02/1996	1.50 in.	0	0	0	0
APPLETON	03/29/1998	1.75 in.	0	0	0	0
ST JOHN	03/29/1998	4.00 in.	0	0	0	0
NEW HOLSTEIN	05/28/1998	0.75 in.	0	0	0	0

BRILLION	05/28/1998	0.75 in.	0	0	0	0
APPLETON	08/14/1998	1.50 in.	0	0	0	0
SHERWOOD	08/14/1998	2.00 in.	0	0	0	0
FOREST JCT	08/23/1998	1.00 in.	0	0	0	0
BRILLION	08/23/1998	1.50 in.	0	0	0	0
APPLETON	08/23/1998	1.50 in.	0	0	0	0
SHERWOOD	08/23/1998	2.00 in.	0	0	0	0
HILBERT	08/23/1998	0.75 in.	0	0	0	0
SHERWOOD	08/12/1999	1.00 in.	0	0	0	0
STOCKBRIDGE	05/12/2000	2.00 in.	0	0	$32.2M	0
BRILLION	04/18/2002	0.75 in.	0	0	0	0
CHILTON	04/18/2002	0.88 in.	0	0	0	0
APPLETON	05/06/2002	1.75 in.	0	0	$4.9M	0
CHILTON	05/06/2002	1.00 in.	0	0	0	0
SHERWOOD	05/30/2002	0.75 in.	0	0	0	0
SHERWOOD	05/30/2002	1.25 in.	0	0	0	0
DARBOY	07/30/2003	0.75 in.	0	0	0	0
DARBOY	07/30/2003	0.75 in.	0	0	0	0
STOCKBRIDGE	08/02/2003	0.88 in.	0	0	0	0
NEW HOLSTEIN	06/08/2004	0.88 in.	0	0	0	0
FOREST JCT	07/13/2004	1.00 in.	0	0	0	0
CHILTON	07/13/2004	0.75 in.	0	0	0	0
POTTER	03/30/2005	0.75 in.	0	0	0	0
DARBOY	04/13/2006	1.00 in.	0	0	0	0
HILBERT	04/13/2006	1.25 in.	0	0	0	0
CHILTON	04/13/2006	0.88 in.	0	0	0	0
CHILTON	05/17/2006	0.75 in.	0	0	0	0
BRILLION	06/18/2006	1.00 in.	0	0	0	0
NEW HOLSTEIN	06/18/2006	0.75 in.	0	0	0	0
POTTER	07/01/2006	2.00 in.	0	0	$300,000	$20,000
APPLETON	07/30/2006	0.88 in.	0	0	0	0
BRILLION	10/02/2006	0.75 in.	0	0	0	0
STOCKBRIDGE	10/18/2007	1.50 in.	0	0	0	0
HILBERT	10/18/2007	1.00 in.	0	0	0	0
NEW HOLSTEIN	10/18/2007	0.88 in.	0	0	0	0
JERICHO	10/18/2007	1.00 in.	0	0	0	0
DARBOY	06/28/2008	0.88 in.	0	0	0	0
DARBOY	07/16/2008	0.88 in.	0	0	0	0
DARBOY	07/16/2008	1.75 in.	0	0	0	0
HIGH CLIFF JCT	07/16/2008	1.00 in.	0	0	0	0
HIGH CLIFF JCT	07/16/2008	2.00 in.	0	0	0	0
HIGH CLIFF JCT	07/16/2008	1.25 in.	0	0	0	0

HIGH CLIFF	07/16/2008	2.00 in.	0	0	$100,000	0
CHILTON	07/16/2008	0.75 in.	0	0	0	0
CHILTON	07/16/2008	1.75 in.	0	0	0	0
CHILTON	07/16/2008	2.50 in.	0	0	0	0
HAYTON	07/16/2008	1.75 in.	0	0	0	0
DARBOY	07/20/2010	1.25 in.	0	0	$300,000	0
HIGH CLIFF	07/20/2010	1.75 in.	0	0	0	0
STOCKBRIDGE	07/20/2010	1.00 in.	0	0	0	0
DARBOY	08/20/2010	0.88 in.	0	0	0	0
HIGH CLIFF JCT	05/22/2011	1.00 in.	0	0	0	0
HIGH CLIFF	05/22/2011	1.50 in.	0	0	0	0
FOREST JCT	08/23/2011	1.00 in.	0	0	0	0
DARBOY	06/18/2012	1.00 in.	0	0	0	0
DARBOY	06/18/2012	1.00 in.	0	0	0	0
DARBOY	07/02/2012	0.88 in.	0	0	0	0
DARBOY	07/17/2012	1.00 in.	0	0	0	0
DARBOY	07/17/2012	0.88 in.	0	0	0	0
HIGH CLIFF JCT	07/17/2012	1.50 in.	0	0	0	0
DARBOY	07/17/2012	0.88 in.	0	0	0	0
DARBOY	07/17/2012	0.75 in.	0	0	0	0
HIGH CLIFF JCT	06/17/2013	1.00 in.	0	0	0	0
HIGH CLIFF	09/20/2017	1.00 in.	0	0	0	0
DARBOY	09/20/2017	0.88 in.	0	0	0	0
HILBERT	08/07/2019	1.00 in.	0	0	0	0

LIGHTNING

*There were **4** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
NEW HOLSTEIN	06/21/1997	1	0	0	0
APPLETON	07/05/1999	0	0	$12,000	0
GRAVESVILLE	08/08/2009	0	0	$75,000	0
NEW HOLSTEIN	07/24/2016	0	0	$25,000	0

THUNDERSTORM WIND

*There were **88** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*KTS*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	08/01/1992		0	0	0	0
CHILTON	06/29/1996		0	0	$1,000	0
CHILTON	08/05/1996		0	0	$2,000	0
CHILTON	08/05/1996		0	0	$5,000	0
NEW HOLSTEIN	08/05/1996		0	0	$2,000	0
KIEL	06/24/1997		0	0	$2,000	0
SHERWOOD	06/24/1997		0	0	$1,000	0
SHERWOOD	07/16/1997		0	0	$5,000	0
NEW HOLSTEIN	07/16/1997		0	0	$2,000	0
STOCKBRIDGE	05/15/1998		0	0	$1,000	0
NEW HOLSTEIN	05/15/1998		0	0	$1,000	0
NEW HOLSTEIN	05/15/1998		0	0	$1,000	0
SHERWOOD	05/31/1998	75	0	0	$500,000	$20,000
CHILTON	05/31/1998	60	0	0	$5,000	0
NEW HOLSTEIN	05/31/1998	55	0	0	$10,000	0
BRILLION	08/23/1998	50	0	0	0	0
BRILLION	08/23/1998	52	0	0	0	0
CHILTON	06/06/1999	50	0	0	0	0
CHILTON	06/06/1999	50	0	0	0	0
CHILTON	07/08/1999	50	0	0	0	0
JERICHO	07/30/1999	50	0	0	0	0
CHILTON	07/30/1999	50	0	0	$1,500	0
CHILTON	06/11/2001	52	0	0	0	0
SHERWOOD	09/07/2001	50	0	0	0	0
CHILTON	09/07/2001	55	0	0	0	0
BROTHERTOWN	04/18/2002	50	0	0	$1,000	0
CHILTON	04/18/2002	55	0	0	$5,000	0
SHERWOOD	07/30/2002	57	0	0	0	0
CHILTON	09/02/2002	50	0	0	0	0
SHERWOOD	07/04/2003	58	0	0	0	0
STOCKBRIDGE	06/13/2005	55	0	0	0	0
HIGH CLIFF	07/25/2005	50	0	0	0	0
DARBOY	09/13/2005	66	0	0	0	0
NEW HOLSTEIN	09/13/2005	50	0	0	0	0
HILBERT	04/13/2006	85	0	0	$1M	0
CHILTON	04/13/2006	60	0	0	0	0

NEW HOLSTEIN	04/13/2006	70	0	0	0	0
CHILTON	06/24/2006	52	0	0	0	0
BROTHERTOWN	07/17/2006	52	0	0	$3,000	$15,000
HILBERT	07/17/2006	57	0	0	$10,000	0
STOCKBRIDGE	07/17/2006	50	0	0	$2,000	0
POTTER	07/17/2006	70	0	0	$25,000	0
BRILLION	07/30/2006	50	0	0	0	0
BRILLION	07/30/2006	50	0	0	0	0
STOCKBRIDGE	07/30/2006	50	0	0	0	0
POTTER	06/20/2007	56	0	0	0	0
NEW HOLSTEIN	07/26/2007	65	0	0	$15,000	0
HIGH CLIFF	06/12/2008	50	0	0	0	0
HARRISON	08/01/2008	52	0	0	0	0
HIGH CLIFF	07/20/2010	54	0	0	0	0
CHILTON	07/20/2010	61	0	0	0	0
DARBOY	07/20/2010	52	0	0	0	0
POTTER	08/08/2010	52	0	0	0	0
DARBOY	08/20/2010	52	0	0	0	0
BRILLION	04/10/2011	52	0	0	0	0
CHILTON	04/10/2011	56	0	0	0	0
CHILTON	07/17/2011	52	0	0	0	0
HIGH CLIFF	07/30/2011	61	0	0	0	0
HIGH CLIFF	09/02/2011	70	0	0	0	0
CHILTON	09/02/2011	55	0	0	$70,000	0
BRILLION	09/02/2011	50	0	0	0	0
DARBOY	06/18/2012	52	0	0	$5,000	0
DARBOY	07/17/2012	61	0	0	0	0
HIGH CLIFF	05/30/2013	61	0	0	0	0
DARBOY	08/06/2013	76	0	0	0	0
JERICHO	08/21/2013	52	0	0	0	0
CHILTON	08/21/2013	52	0	0	0	0
NEW HOLSTEIN	04/12/2014	56	0	0	$1,000	0
HIGH CLIFF	07/18/2015	56	0	0	0	0
ST JOHN	07/18/2015	56	0	0	$15,000	0
CHILTON	08/14/2015	52	0	0	$3,000	0
BRILLION	06/05/2016	52	0	0	0	0
CHILTON	05/17/2017	52	0	0	0	0
NEW HOLSTEIN	05/17/2017	52	0	0	0	0
NEW HOLSTEIN	05/17/2017	52	0	0	0	0
BRILLION	05/17/2017	52	0	0	0	0
NEW HOLSTEIN	06/12/2017	61	0	0	0	0
CHILTON	06/12/2017	50	0	0	0	0

DARBOY	06/14/2017	56	0	0	0	0
BRILLION	07/07/2017	52	0	0	0	0
CHILTON	08/27/2018	52	0	0	0	0
NEW HOLSTEIN	08/28/2018	61	0	0	0	0
NEW HOLSTEIN	08/28/2018	52	0	0	0	0
HIGH CLIFF	06/27/2019	50	0	0	0	0
STOCKBRIDGE	06/27/2019	52	0	0	0	0
HIGH CLIFF	07/20/2019	51	0	0	0	0
CHILTON	08/07/2019	52	0	0	0	0
HILBERT	04/20/2020	43	0	0	$2,000	0
CHILTON	06/02/2020	52	0	0	0	0

HIGH WIND

*There were **6** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*KTS*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	04/06/1997		0	0	$1,000	0
CALUMET COUNTY	03/09/1998		0	0	$1,000	0
CALUMET COUNTY	06/28/1998		0	0	$1,000	0
CALUMET COUNTY	11/10/1998		0	0	$50,000	0
CALUMET COUNTY	04/07/2001	50	0	0	0	0
CALUMET COUNTY	10/26/2010	69	0	0	0	0

STRONG WIND

*There were **16** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*KTS*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	10/30/1996		0	0	0	0
CALUMET COUNTY	03/17/1999		0	0	0	0
CALUMET COUNTY	12/26/1999		0	0	0	0
CALUMET COUNTY	03/25/2000		0	0	0	0
CALUMET COUNTY	04/05/2000		0	0	0	0
CALUMET COUNTY	04/20/2000		0	0	0	0
CALUMET COUNTY	06/21/2000		0	0	0	0
CALUMET COUNTY	10/25/2001		0	0	0	0
CALUMET COUNTY	12/05/2001		0	0	0	0
CALUMET COUNTY	02/11/2002		0	0	0	0
CALUMET COUNTY	03/09/2002		0	0	0	0
CALUMET COUNTY	05/09/2002		0	0	0	0

CALUMET COUNTY	10/14/2014	43	0	0	$10,000	0
CALUMET COUNTY	11/18/2016	43	0	0	$1,000	0
CALUMET COUNTY	11/18/2016	46	0	0	$2,500	0
CALUMET COUNTY	07/19/2017	43	0	0	$2,000	0

TORNADO

*There were **15** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Strength*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CHILTON	06/11/1996	F0	0	0	0	0
JERICHO	07/18/1996	F1	0	0	0	0
CHILTON	07/18/1996	F0	0	0	0	0
ST ANNA	07/18/1996	F0	0	0	0	0
STOCKBRIDGE	05/31/1998	F1	0	0	$300,000	0
BROTHERTOWN	06/08/2003	F0	0	0	0	0
POTTER	08/03/2003	F1	0	0	0	0
BROTHERTOWN	05/06/2005	F0	0	0	0	0
STOCKBRIDGE	06/09/2005	F0	0	0	0	0
SHERWOOD	06/24/2006	F0	0	0	0	0
QUINNEY	04/10/2011	EF1	0	0	$100,000	0
SHERWOOD	08/23/2011	EF0	0	0	$50,000	0
FOREST JCT	08/06/2013	EF1	0	0	$200,000	0
HARRISON	06/15/2016	EFU	0	0	0	0
NEW HOLSTEIN	08/28/2018	EF0	0	0	0	0

FUNNEL CLOUD

*There were **13** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
SHERWOOD	05/30/2002	0	0	0	0
CHILTON	08/03/2003	0	0	0	0
CHILTON	08/03/2003	0	0	0	0
POTTER	06/09/2005	0	0	0	0
CHILTON	06/10/2005	0	0	0	0
NEW HOLSTEIN	06/18/2006	0	0	0	0
ST ANNA	06/18/2006	0	0	0	0
BROTHERTOWN	07/30/2006	0	0	0	0
CHILTON	10/18/2007	0	0	0	0
NEW HOLSTEIN	08/13/2008	0	0	0	0

BROTHERTOWN	07/30/2009	0	0	0	0
CHILTON	08/08/2011	0	0	0	0
HARRISON	08/08/2011	0	0	0	0

WINTER WEATHER

*There were **9** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	01/16/1996	0	0	0	0
CALUMET COUNTY	02/06/1996	0	0	0	0
CALUMET COUNTY	02/07/1996	0	0	0	0
CALUMET COUNTY	02/25/1996	0	0	0	0
CALUMET COUNTY	04/03/1996	0	0	0	0
CALUMET COUNTY	12/27/1996	0	0	0	0
CALUMET COUNTY	01/01/1997	0	0	0	0
CALUMET COUNTY	10/26/1997	0	0	0	0
CALUMET COUNTY	01/22/1999	0	0	0	0

WINTER STORM

*There were **34** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	01/26/1996	0	0	0	0
CALUMET COUNTY	01/08/1998	0	0	0	0
CALUMET COUNTY	03/08/1998	0	0	0	0
CALUMET COUNTY	01/02/1999	0	0	0	0
CALUMET COUNTY	01/03/2000	0	0	0	0
CALUMET COUNTY	02/08/2001	0	0	0	0
CALUMET COUNTY	03/02/2002	0	0	0	0
CALUMET COUNTY	01/21/2005	0	0	0	0
CALUMET COUNTY	02/16/2006	0	0	0	0
CALUMET COUNTY	02/24/2007	0	0	0	0
CALUMET COUNTY	04/11/2007	0	0	0	0
CALUMET COUNTY	12/01/2007	0	0	0	0
CALUMET COUNTY	01/29/2008	0	0	0	0
CALUMET COUNTY	02/17/2008	0	0	0	0
CALUMET COUNTY	11/30/2008	0	0	0	0
CALUMET COUNTY	12/01/2008	0	0	0	0

CALUMET COUNTY	02/26/2009	0	0	0	0
CALUMET COUNTY	03/08/2009	0	0	0	0
CALUMET COUNTY	02/09/2010	0	0	0	0
CALUMET COUNTY	12/11/2010	0	0	0	0
CALUMET COUNTY	02/20/2011	0	0	0	0
CALUMET COUNTY	03/22/2011	0	0	0	0
CALUMET COUNTY	12/20/2012	0	0	0	0
CALUMET COUNTY	01/30/2013	0	0	0	0
CALUMET COUNTY	12/22/2013	0	0	0	0
CALUMET COUNTY	01/14/2014	0	0	0	0
CALUMET COUNTY	12/28/2015	0	0	0	0
CALUMET COUNTY	02/02/2016	0	0	0	0
CALUMET COUNTY	03/23/2016	0	0	0	0
CALUMET COUNTY	04/03/2018	0	0	0	0
CALUMET COUNTY	04/13/2018	0	0	0	0
CALUMET COUNTY	01/28/2019	0	0	0	0
CALUMET COUNTY	02/07/2019	0	0	0	0
CALUMET COUNTY	12/01/2019	0	0	0	0

HEAVY SNOW

*There were **20** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	01/23/1996	0	0	0	0
CALUMET COUNTY	01/25/1996	0	0	0	0
CALUMET COUNTY	12/23/1996	0	0	0	0
CALUMET COUNTY	02/04/1997	0	0	0	0
CALUMET COUNTY	03/13/1997	0	0	0	0
CALUMET COUNTY	04/12/1997	0	0	0	0
CALUMET COUNTY	01/12/2000	0	0	0	0
CALUMET COUNTY	01/31/2003	0	0	0	0
CALUMET COUNTY	02/05/2004	0	0	0	0
CALUMET COUNTY	02/20/2005	0	0	0	0
CALUMET COUNTY	02/14/2008	0	0	0	0
CALUMET COUNTY	12/08/2008	0	0	0	0
CALUMET COUNTY	12/19/2008	0	0	0	0
CALUMET COUNTY	04/19/2011	0	0	0	0
CALUMET COUNTY	03/02/2012	0	0	0	0
CALUMET COUNTY	12/28/2012	0	0	0	0

CALUMET COUNTY	02/17/2014	0	0	0	0
CALUMET COUNTY	12/16/2016	0	0	0	0
CALUMET COUNTY	01/23/2019	0	0	0	0
CALUMET COUNTY	02/12/2019	0	0	0	0
CALUMET COUNTY	02/09/2020	0	0	0	0

BLIZZARD

*There were **6** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	01/29/1996	0	0	0	0
CALUMET COUNTY	01/02/1999	0	0	0	0
CALUMET COUNTY	02/16/2006	0	0	0	0
CALUMET COUNTY	12/08/2009	0	0	0	0
CALUMET COUNTY	12/11/2010	0	0	0	0
CALUMET COUNTY	02/01/2011	0	0	0	0

ICE STORM

*There were **3** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	02/26/1996	0	0	0	0
CALUMET COUNTY	01/01/2005	0	0	0	0
CALUMET COUNTY	04/09/2013	0	0	0	0

DENSE FOG

*There were **12** events reported over the 25-year period from 10/1/95-10/1/20.*

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CALUMET COUNTY	01/17/1996	0	0	0	0
CALUMET COUNTY	03/18/1996	0	0	0	0
CALUMET COUNTY	05/09/1996	0	0	0	0
CALUMET COUNTY	06/10/1996	0	0	0	0
CALUMET COUNTY	09/06/1996	0	0	0	0
CALUMET COUNTY	09/21/1996	0	0	0	0
CALUMET COUNTY	10/16/1996	0	0	0	0
CALUMET COUNTY	10/21/1996	0	0	0	0

CALUMET COUNTY	01/02/1997	0	0	0	0
CALUMET COUNTY	12/13/1999	0	0	0	0
CALUMET COUNTY	01/09/2000	0	0	0	0
CALUMET COUNTY	02/24/2000	0	0	0	0

Appendix C: Plan Adoptions

This plan update was approved by both Wisconsin Emergency Management (WEM) and the Federal Emergency Management Agency (FEMA). The plan has been adopted by Calumet County and its major municipal bodies including the Cities of xxxx and the Villages of xxx. The Towns of xxx also adopted this plan. Scanned copies of those municipalities that adopted this plan follow.

STATE OF WISCONSIN

DEPARTMENT OF MILITARY AFFAIRS

DIVISION OF EMERGENCY MANAGEMENT

Greg Engle
Acting Administrator

Tony Evers
Governor

March 16, 2022

Mr. Bernie Sorenson, Coordinator
Calumet County Emergency Management
206 Court Street
Chilton, WI 53014-1127

Dear Bernie:

Wisconsin Emergency Management (WEM) has reviewed the *Hazard Mitigation Plan, Calumet County, Wisconsin.* The Federal Emergency Management Agency (FEMA) and WEM have signed a Program Administration by States operational agreement, dated October 29, 2018, allowing WEM to review local mitigation plans to ensure they meet the required criteria for a multi-jurisdiction hazard mitigation plan outlined in 44 CFR Part 201.

The county and participating jurisdictions *must now adopt* the plan to have a FEMA-approved hazard mitigation plan and be eligible for funding through the Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC) program, and the Flood Mitigation Assistance (FMA) program.

I have emailed a copy of both the FEMA Local Mitigation Plan Review Tool and "Katie's Plan Review Tool" for your records.

If you have any questions, please email me at emily.cohen@wisconsin.gov or Robyn Fennig at robyn.fennig@wisconsin.gov.

Sincerely,

Emily Cohen
Lead Planning Grant Manager
Wisconsin Emergency Management

Enclosure

Cc: Robyn Fennig, Hazard Mitigation Section Supervisor, WEM
Guen Drewes, State Hazard Mitigation Officer, WEM
Steve Fenske, East Central Region Director, WEM
Lenora Borchardt, Emergency Manager, EPTEC

Appendix D: Report on Previous Plan Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
All Hazards	Continue to promote the increased use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	*This is an ongoing strategy that is accomplished at public relations and community education events as they arise.*
	Continue to add/update Emergency Management Department links on the existing county web site (e.g., ARC, Homeland Security/FEMA, WEM) especially focusing on preparedness bulletins. Publicize the website to inform the community.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	*This is an important way to provide community members with one location to find credible information and will be carried forward. Updates occur randomly as new "web-worthy" information is received.*
	Assess how Calumet County implements warnings and determine how to enhance those capabilities and educate the public on the warning system.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	*Calumet County replaced the existing emergency notification system with AlertSense in December, 2018. This new system allows the public to sign up for individual alerts in addition to receiving reverse 9-1-1 and IPAWS emergency notifications. In addition, the Calumet County Emergency Manager and Calumet County Sheriff's Office (CASO) personnel implements the annual Student Tools for Emergency Planning (STEP) program within the county schools. Public education is also provided thru regular social media activity.* *Will carry forward, as this is an ongoing process.*

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Drought and Dust Storms	The Calumet County Land and Water Conservation Department will work with residents to promote water conservation, planting of drought tolerant native vegetation, and use of reduced tillage practices on cropland to reduce soil moisture losses.	Covered by annual budget	LWCD	Ongoing	Medium	Calumet County and all municipalities within	The Calumet County Land and Water Conservation Department will work with residents to promote water conservation, and use of reduced tillage practices on cropland to reduce soil moisture losses. Watershed planning in flooding section includes strategies for reduced tillage and the use of cover crops. *Calumet Co. LWCD takes opportunities as they arise to work with the community on education around water management and to help improve these practices.*
	The Land and Water Conservation Department will encourage businesses and farmers to install irrigation devices that are the most water efficient for each use. Micro and drip irrigation and soaker hoses are examples of efficient devices.	Covered by annual budget	LWCD	2006 and ongoing	Very Low	Calumet County and all municipalities within	*Not much work has occurred with drought as there have not been many incidents of such since the last plan update.* *Will be removed, as this is not very relevant to Calumet County. Any irrigation that takes place in the county is used in order to better manage wastewater and not due to the need to irrigate crops due to drought.*
	Citizens are encouraged to plant native and/or drought-tolerant grasses, ground covers, shrubs and trees. Once established, they do not need water as frequently and usually will survive a dry period without watering. They also require less fertilizer or herbicides. Landscape with plants that are heat and drought tolerant and that do not require much water to	Covered by annual budget	EM	Ongoing	Very Low	Calumet County and all municipalities within	*Not much work has occurred with drought as there has not been many incidents of such since the last plan update.* *Will be removed, per LWCD, as promoting the planting of drought-tolerant plants in the area may not be feasible unless the trend of heavier rain events changes drastically.*

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	live. Small plants require less water to become established. Group plants together based on similar water needs.						
	Residents should use mulch to retain moisture in the soil. (Help preserve native cypress forests by selecting other types of mulch such as treated melaleuca). Mulch also helps control weeds that compete with landscape plants for water.	Covered by annual budget	EM	Ongoing	Low	Calumet County and all municipalities within	*Not much work has occurred with drought as there have not been many incidents of such since the last plan update.* *Per LWCD, mulch is actually used to maintain moisture in the soil during establishment, which helps reduce erosion.* *Will be carried forward, with the responsible department being changed to LWCD. Will also remove "Help preserve native cypress forests by selecting other types of mulch such as treated* melaleuca."
	Residents are urged to check their plumbing and wells to be certain they are not leaking and wasting water.	Covered by annual budget	EM	Ongoing	Low	Calumet County and all municipalities within	*Not much work has occurred with drought as there has not been many incidents of such since the last plan update. Will be carried forward, with the responsible department being changed to LWCD and UW-Extension.*
Earthquakes	Provide public information as requested regarding the extremely low risk of earthquakes and earthquake damage in Calumet County.	Covered by annual budget	EM	Ongoing	Very Low	Calumet County and all municipalities within	*The risk of earthquakes is extremely low in Calumet County. Information on the risk and safety measures will be provided upon request. Will carry forward.*
Woodland Fires	The Calumet County Emergency Management Program shall assist with writing grants to secure vehicles and equipment capable of reaching secluded	Covered by annual budget	EM	As requested	Medium	Calumet County and all municipalities within	*EM will assist as requested. Will carry forward.*

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	areas where a woodland fire could occur.						
	The Calumet County Emergency Management Program will work with the WDNR and local fire officials to develop educational programming with the goal of minimizing wildfires.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	*EM will assist as requested. Will carry forward.*
	Develop Firewise communities that do not plan residential developments adjacent to areas susceptible to woodland fires.	Covered by annual budget	LWCD	Ongoing	High	Calumet County and all municipalities within	Although aesthetically it is enjoyable to be adjacent to such amenities, building near them is putting homes and lives at risk. This is especially important in areas laden with ash species because they are susceptible to the emerald ash borer beetle, which kills the tree and increases the fuel load for fires. The mechanism for change is through Smart Growth Planning. *This is an ongoing project that occurs randomly as opportunities arise and will be carried forward.*
	To minimize damage to homes and businesses, builders and landscape professionals are encouraged to use fire resistant or non-combustible materials on the roof and exterior structure of buildings. Or, treat wood or combustible material used in roofs, siding, decking, or trim with UL-approved fire-retardant chemicals. Landscapers should plant fire-resistant shrubs and trees (for example, hardwood trees are less flammable than pine, evergreen, eucalyptus or fir trees),	Covered by annual budget		Ongoing		Calumet County and all municipalities within	*General information is provided upon request from fire agencies as well as planning and zoning but there is no current mechanism to enact this as a strategy. Information will continue to be provided but the strategy will be removed.*

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	and, select materials and plants that can help contain fire rather than fuel it.						
Flooding and Dam Failure	Communities are advised to review the Federal Emergency Management Agency's Flood Insurance Study for Calumet County and note areas identified as having flooding problems, and, follow flood protection measures identified.	Covered by annual budget	EM	Ongoing	High	Calumet County and all municipalities within	*New FIRMS were available as of 2009, and all communities have them. Will continue to carry forward.*
	To minimize flooding to new structures constructed in a floodplain, all communities with floodplain ordinances shall continue to administer floodplain ordinances. It is encouraged existing structures be brought into compliance with those ordinances.	Covered by annual budget	EM, all municipal officials	Ongoing	Very High	Calumet County and all municipalities within	The County administers the program for townships and unincorporated areas. Incorporated areas have their own ordinances. The Calumet County Land and Water Conservation Department employs an Erosion Control and Stormwater Specialist who administers Erosion Control and Stormwater Ordinances in the unincorporated portions of the County. Ordinances aim to reduce sediment delivery from ground disturbing constructions sites and manage stormwater runoff from developed sites post-construction. The Erosion Control and Stormwater Specialist can also provide assistance in evaluating site specific flooding hazards impacting roads, bridges, culverts and cropland for municipalities and landowners needing assistance. *Will carry forward.*
	Calumet County LWCD will work with the	Covered	Calumet Co	2030	High	Calumet County and all	LWCD can help determine if and when

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	individual communities to minimize localized, road, bridge, culvert, and crop flooding.	by annual budget	LWCD, Highway, and EM			municipalities within	individual community mitigation strategies can be implemented and is aware of some mitigation strategies that may be more effective as well as potential grant dollars and cost sharing that can aid in reducing the cost of such strategies. LWCD will focus on watershed planning which focuses on water quality but will provide benefits in the reduction of sediment in local waterways and small-scale water retention when possible. Timeline: EPA 9 Key Element Watershed planning will aim to include all watersheds by 2030. *The LWCD continues to work with local governmental units with their stormwater management program personnel and applicable watershed studies. Watershed planning has taken place in The Plum/Kankapot (2015), North Branch Manitowoc (2019) and East Winnebago (2020) watersheds.* *Will carry forward.*
	Develop an emergency plan to protect ground and surface waters from the hazards mentioned in this section (e.g., spring thaws).	Covered by annual budget	LWCD, WDNR	Ongoing	High	Calumet County and all municipalities within	LWCD will work with the WDNR to implement NR 151 Agricultural and Erosion Control and Stormwater performance standards which will reduce pollution from the hazards mentioned in this section (e.g., spring thaws). *Work in this area is ongoing. In 2015-2016, Calumet County, the WDNR and*

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							local governmental units created a task force and developed a series of recommendations to address the long-term stormwater and flooding issues in the Upper Manitowoc River Watershed region. Will carry forward.
	For those cities or villages that have experienced inundated sewer laterals, the Calumet County Planning Department will assist them with writing grants to repair such facilities.	Covered by annual budget	EM	Ongoing as requested	Medium	Calumet County and all municipalities within	*There are very few available grants for this purpose. The USDA may be a funding source. Will carry forward.*
	All municipalities with dams shall continue to inspect the dams or work with the WDNR to inspect them. Any maintenance issues shall be addressed.	Covered by annual budget	All affected municipalities	Ongoing	Medium	Calumet County and all municipalities within	Calumet County does not "own" any dams as these structures are the responsibility of the municipalities and/or private land owners with general oversight from the WDNR. *Will be carried forward.*
	Assist communities with grant applications necessary for dam maintenance.	Covered by annual budget	EM	Ongoing as requested	Low	Calumet County and all municipalities within	*No requests have been made to the Calumet County EM for this task.* *Will be carried forward.*
	Work with the responsible jurisdiction to develop and maintain Emergency Action Plans (EAPs).	Covered by annual budget	EM, WDNR	Ongoing as requested	Medium	Calumet County and all municipalities within	*The City of Kiel requested assistance with their plan update and participation with their associated tabletop exercise on 12/13/2018.* *Will be carried forward.*
	Ditch south from CTH E to Hickory Hills Road to minimize flooding	Cost TBD	Village officials	2026	Medium	VI Stockbridge	Significant flooding occurs in areas of the village. A new culvert helped with flow but continues to cause flooding issues. A report was done previously which recommended a ditch/swale be

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							installed on the east side of the residential lots located east of State Highway 55 and that the ditch be dug south to Hickory Hills Road. *The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project. Will be carried forward.*
	Perform ditch maintenance at the sewage treatment plant on West Lake Street to minimize flooding and potential plant infiltration	Cost TBD	Village officials	2026	Medium	VI Stockbridge	The pond at the Sewage Treatment Plant is a man-made pond which the WDNR has ordered to be filled in. Water is then displaced and there is potential for system infiltration. Thoroughly cleaning a lengthy stretch of the stream may alleviate flooding issues. *The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project. Will be carried forward.*
	Larger culvert at creek crossing – STH 55, south of Enterprise Street	Cost TBD	Village officials	2026	High	VI Stockbridge	The culvert at the north end of the village is not large enough to move the water coming from the east and causes flooding, which occasionally goes over the state highway. *Wisconsin DOT was contacted by the Village of Stockbridge before and after the road was updated in hopes that they would correct the flooding and the erosion of the bank near the public sidewalk. It was reported and the State has never replied with a response or*

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							update. *The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project. Will be carried forward.*
	Create and enact water management plan at Union Street and Davis Street	Cost TBD	Village officials	2026	High	VI Stockbridge	Currently two metal culverts that are not large enough to accommodate the amount of water; they should be enlarged. Mud Creek crossing the Church property needs to be dredged to accommodate more water flowage. Ditching at the corner may not be the solution. Ditching/larger culvert may lead to potential flooding at the water plant. *The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project. Will be carried forward.*
	Larger culverts, ditching, tiling – Village Hall driveway area west of STH 55, south of West Lake Street		Village officials	By 2020	High	VI Stockbridge	There is an unnamed waterway that flows east to west in the area of the Village Hall and Fire Station. There are two culverts associated with this waterway to help the water flow. One culvert is located under State Highway 55, the other along the driveway leading into the Village Hall and Fire Station. The culverts carry the water under the driveway towards the pavilion in the neighborhood park (located on land owned and managed by the Village of Stockbridge). As

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							expected, the playground area suffers a significant amount of flooding. There is a dry well at the western edge of the playground and the tile runs from the park to the dry well. The tile isn't adequate to remove all the water. This area is very wet and prevents the park from being used to its full potential. Despite the fact that there are two culverts, the area by the driveway and park still flood. The culverts need to be replaced and enlarged to allow for a better flow of water. A deeper ditch in the vicinity of the culverts could hold water and slow its flow allowing for better absorption. Also, better and expanded tiling could prevent flooding at the neighborhood park. *COMPLETED. The Village did dig the North/South Ditch between the Park driveway and the parking lot to the south of the Fire Station. The culvert going underneath the driveway was also cleaned out. This has improved the flooding going through. Will be removed.*
	Ditch enhancement – South Military Road (STH 55) and Hickory Hills Road	Cost TBD	Village officials	2026	High	VI Stockbridge	An un-named creek crosses under South Military Road (State Highway 55) and Hickory Hills Road. In the past, there has been a crop damage and a significant amount of flooding from water coming near the foundation of the home at the subject site. There are culverts at the

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							crossing but the ditch needs to be enhanced to provide for a steeper bank, thereby eliminating the ability of water to creep the bank and flood the property. Village still believes that there could be some ditching to increase water flowages in the area away from homes, yards and crops. *The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project. Will be carried forward.*
	Bank stabilization on Sunset Beach Road	Cost TBD	Village officials	2026	High	VI Stockbridge	The culvert was replaced several years ago with two culverts and rip rap; it appears to be adequately handling water and the rip rap is stabilizing the bank. However, the west end of the road is showing some signs of erosion. The creek bank should be stabilized to prevent further damage and sedimentation into the creek. Periodic cleaning of the culvert before the private road would be maintained as needed. *The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project. Will be carried forward.*
	Reposition existing culverts on West Lake		Village officials			VI Stockbridge	Where West Lake Street crosses Mill

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	Street, crossing over Mill Creek						Creek, there are two culverts. The two culverts are not in line with the flow of the creek; therefore, water does not flow through the creeks, rather it creates turbulence and erodes the bank at that point by the culverts. The culverts should be repositioned to align with the creek to eliminate any turbulence and threat of erosion. *The Village is not aware of an existing problem in this area. Will be removed.*
	Ditching at the southwest corner of the intersection of West Lake Street and Lakeshore Drive	Cost TBD	Village officials	2026	High	VI Stockbridge	Near what is known as "Kidney Pond," the land to the north is very low and continually has standing water. There are two culverts in the area, one flowing east and one flowing south. However, the land is too flat to force the water to flow through the culverts. It is recommended ditches be installed to help the water drain from the surface *and be forced through the culverts.* *The Village believes that some ditching should be completed jointly by the County and the Village in order to ease the flow of water in that area. The* *The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project. Will be carried forward.*
	Culvert enlargement – Lakeshore Drive, approximately 1,900 feet south of		Village officials	2019		VI Stockbridge	The culvert, which runs under Lakeshore Drive, is very small and allows water to

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	intersection with St. Catherine's Bay Road						flood and go over the road. The culvert should be enlarged to keep the water below the road and flowing through the culvert. *This work was completed by a third party in 2019 and will be removed.*
	Riprap or retaining wall on the bank north of Stockbridge Harbor		Village officials			VI Stockbridge	Along the east side of Lake Winnebago, just north of Stockbridge Harbor, the bank is very steep and susceptible to erosion. During severe storms, erosion does occur. It is recommended that either riprap or retaining wall be installed to help stabilize the bank and prevent further erosion. As an alternative, the village should consider some type of vegetative stabilization. *The Village believes that this is a shoreline issue and should be addressed by the WDNR. Will be removed.*
	Enlarge culvert at STH 55 and Davis Street	TBD	Village officials	2026	High	VI Stockbridge	The culvert has been adequate until recently. However, the school built an addition and there is concern that the added runoff from the added impervious surfaces may result in too much water flowing to the culvert. This may cause flooding and enlarging the existing culvert would allow it to handle the increased water load. *The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a*

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							project. Will be carried forward.
	Enlarge culvert at north end of village		Village officials			VI Stockbridge	Mapleview Heights Subdivision is located north of the village, east of Lakeshore Drive. As the subdivision is developed, there is the potential for an increase in water runoff. The runoff currently does not go to the lake, rather, it flows south to the village. The village is concerned the increased water flowing to the village will create flooding problems. Currently there is a culvert under Lakeshore Drive. The culvert is small and will not be able to accommodate the added water. A larger culvert is necessary. *The Village does not believe this to be an issue at this time. Will be removed.*
	Enlarge culvert at St. Catherine's Bay Road		Village officials			VI Stockbridge	The portion of St. Catherine's Bay Road that runs parallel to Lake Winnebago has a culvert under it. The culvert was recently installed. As the area develops, there is concern the culvert will not be able to adequately move the water out to the lake. A larger culvert may be required. *Village believes this to be a home owner's responsibility and has had many discussions with those owners. Will be removed.*
	Raise Irish Road to alleviate flooding	TBD	Town officials	2026	Low	TN Brillion	Along Irish Road, just south of the old stone bridge, the area always floods and

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							water goes over the road. The best way to solve the problem would be to raise the road. *Nothing has been done as there is no long-term plan for that bridge and road. Budget and timetable to be determined. Will carry forward.*
	Clean ditch on Center Road to reduce shoulder damage	Covered by annual budget	Town officials			TN Brillion	During heavy rains Center Road, just east of Conservation Road, experiences water over the road. The creek swells with water forcing water to go over the road. When the water goes over the road, the shoulder washes out. The best way to prevent the shoulder from washing out would be to clean out the drainage ditch that runs south into the marsh. This would allow water to flow and not swell in ditches. The town did clean a portion of the ditch, but more sections of the ditch, especially near the marsh, should still be cleaned free of weeds and sediment. *COMPLETED. Cleaned out north side of ditch on Center from Bestian Rd. west 40 acres. Two new field driveways were put in by landowners. Other than that, nothing has been done because the land is owned by the DNR and the land is too flat to drain. Will be removed*
	Center Road - Clean ditch and educate farmers	TBD	Town officials	2026	Low	TN Brillion	Water has a difficult time flowing south due to drainage ditches verging together

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							at Center Road just south of Conservation Road. This is partially due to sedimentation in the Brillion Marsh and sediment/weeds in the ditches. The ditch gets clogged one-half miles south and needs to be cleaned. The farmer who owns the land around the ditch farms directly up to the ditch, allowing eroded soil to flow directly into the ditch. *The town has discussed with the landowner about cleaning out the waterway and not farming through it. Will be carried forward, dropping the item about educating farmers. Will be carried forward.*
	Monitor effectiveness of larger culvert on Center Road	Covered by annual budget	Town officials	2005		TN Brillion	A low area on Center Road (1/4 mile west of the intersection of Center Road and Bastian Road, north side) had a culvert. The culvert wasn't functioning properly and the area would flood property and flood right up to the house north of the culvert. The flooding would also go west along Center Road about one quarter mile. The culvert was replaced with a larger culvert in fall of 2004 and should relieve a lot of the flooding problems. *COMPLETED. Ditch was cleaned out in 2005. Will be removed.*
	Clean North Branch of the Manitowoc River	Covered by annual budget	Town officials	2019	High	TN Brillion	Over time the Brillion Marsh has expanded its wetland borders. Due to a lack of drainage, apparently as a result of

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							sedimentation in the marsh and ditches/streams leading to the wetland, the marsh cannot continue to absorb added water. With no way to absorb the additional water, the marsh displaces the water to the outskirts of the marsh, hence giving the appearance that the marsh is growing or "creeping". The creeping marsh problem goes over Center Road and routinely floods the road and all neighboring properties. Past farming practices caused a lot of sedimentation to go into the river. The North Branch of the Manitowoc River needs to be cleaned out (sediment removed) so water can flow. The marshlands are now owned by the WDNR and it seems the problem has worsened since the WDNR took ownership. Also, where the steel bridge now exists in the Town of Rockland, Manitowoc County, there was an old bridge the WDNR took down (approximately 15-20 years ago). Due to cost, the WDNR left the bridge in the river. The extra matter in the river seemed to make the water flow issue worse. The WDNR needs to remove the matter. All these problems contribute to the marsh flooding, which in turn floods Center Road and heaves the road. The seven cross culverts (under Center Road) do not help the situation. Ice also

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							heaves the culverts making dangerous bumps in the road. Raising the road will not solve the problem because the road never dries out (land below is always saturated). Relocating the road is not an option in that too many people use the road for access. Lack of drainage into the Brillion Marsh is cited as the town's top flooding related issue. *COMPLETED. The Swamp Devil was brought in fall of 2019 to open certain channels. Will be removed.*
	Extend ditch on Center Road		Town officials			TN Brillion	In the City of Brillion there is a man-made ditch which runs by an industry (Ariens Company), which then goes under US Highway 10, south to Center Road, and then 200' south. The ditch then terminates. To prevent flooding, and to aid water flow, the ditch needs to be extended further into the marsh. Flooding is causing a lot of property damage and crop damage (depending on the year). *Nothing has been done because the land is owned by the DNR and there is nowhere for the water to go because it is too flat. The city has been taking care of this area since 2018. Will be removed.*
	Round Lake Road – Drain wetland, relocate road		Town officials			TN Brillion	Along the north side of Round Lake is a partially blacktopped road known as

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							Round Lake Road. The wetland along the north side of the lake used to drain to the southeast and go through some culverts under Long Lake Road. The Town of Rockland in Manitowoc County had jurisdiction over the culverts and removed them about 30 years ago. With the culverts removed, the water has nowhere to go to, so it backs up and floods the land along the north side of the lake, and floods over the road. The best solution to minimizing the water coming over the road would be to put culverts under Long Lake Road again. However, because the area is now considered a wetland, the WDNR will not allow the area to be drained. Round Lake Road is blacktopped up to and beyond the portion of the road that has severe flooding. That part of the road is gravel (approximately a 500' length). Because the road floods, the gravel on the road washes out and annually the town brings in gravel and puts it on the portion of the road that is gravel. Blacktopping the entire length of the road would be a waste of money because the blacktop would heave from the constant presence of water under the road surface. Relocating the road to the north would solve the problem. The town closes the road in winter. Those who live along the road use a different road during the winter months. Of all the

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							flooding issues in the town, the town considers this problem to be the second worst of all their flooding problems. *COMPLETED. A culvert was put under the gravel part of the road to allow water from the north to go into the lake, so less goes over the road. There are no plans to raise or relocate the road. Will be removed.*
	Clean ditch on Hacker Road to alleviate flooding		Town officials	2020		TN Brillion	About every ten years, Hacker Road floods approximately one-half mile east of the intersection of Hacker Road and US Highway 10. The road floods because the drainage ditch to the culvert is full of weeds and sedimentation, resulting in the ditch flooding. The ditch, which leads to this culvert, is located in the City of Brillion. To alleviate the flooding the city needs to clean their portion of the drainage ditch. *COMPLETED. A new culvert was put in place of old cement culvert (August 2020). North side of Hacker ditch was cleaned out from Hwy 10 east past new culvert (2018). Will be removed.*
	Monitor effectiveness of replacement culverts on Harvestore Road	Covered by annual budget	Town officials	2013		TN Brillion	The field by the drainage ditch east of the intersection of Harvestore Road and Bastian Road used to flood with heavy rains. The town replaced the culverts about ten years ago. The new culverts appear to have solved the flooding problem; however, this should be

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							monitored to be certain the culverts are effective and minimizing flooding. *COMPLETED. This was completed in 2013 and will be removed.*
	Monitor effectiveness of culvert and riprap on CTH KK	Covered by annual budget	Co. Highway Dept.			TN Brillion	Along County Highway KK, 1100' west of the intersection of Highway KK and Bastian Road, the drainage ditch floods and water used to go over Highway KK washing the shoulder of the road out. The County Highway Department recently put in a new culvert and riprap. The repair seems to have solved the flooding and road damage. This should be monitored for effectiveness. *COMPLETED. This was completed by the county and will be removed.*
	Monitor effectiveness of culvert on Long Lake Road	Covered by annual budget	Town officials	2014		TN Brillion	A drainage way which crosses under the north end of Long Lake Road, about three- quarter mile south of the north border of the town, used to flood the nearby field and Long Lake Road. In 1996 a bigger culvert was installed which solved the flooding problem. This should be monitored to assure the larger culvert is of sufficient size for the amount of water passing through the drainage way. *COMPLETED. This was completed in 2014 and will be removed.*
	Monitor effectiveness of Long Lake Road being raised 3 feet	Covered by annual budget	Town officials	1996		TN Brillion	At the north end of Long Lake Road, 750' south of the north border of the town, the road would periodically flood. In 1996

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							the road was raised 3' and there has not been a water problem since. This situation should be monitored for continued effectiveness. *COMPLETED. This was completed in 1996 and will be removed.*
	Monitor effectiveness of larger culvert and raising of road on Man-Cal Road	Covered by annual budget	Town officials	2000		TN Brillion	Man-Cal Road, 2200' east of its intersection with State Highway 32/57, used to have a flooding problem. In 2000 a bigger culvert was installed and the road raised. The flooding problem appears to have been solved. As area ditches fill in with sedimentation, this should be watched to make sure efforts are still successful at minimizing water problems. *COMPLETED. This was completed in 2000 and will be removed.*
	Monitor effectiveness of larger culvert on Man-Cal Road	Covered by annual budget	Town officials	2011		TN Brillion	Man-Cal Road, 5500' west of its intersection with State Highway 32/57, there were severe water problems. The culvert at that location was too small to accommodate the amount of water trying to flow under the road. A bigger culvert was installed and the road raised. Monitor for effectiveness. *COMPLETED. This was completed in 2011 and will be removed.*
	Cemetery Road – Ditch enhancements, larger culverts, raise road		Town officials	2012		TN Brillion	Ranked as the town's third priority for addressing are the water issues located along Cemetery Road. On this road, 2900'

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							south of the north town line, the existing culvert is too short and the ditch too flat. Therefore, there is a severe flooding problem. A bigger culvert needs to be installed, the ditch needs more pitch, and riprap should be laid to stabilize the bank. Also along Cemetery Road is occasional flooding due to the flat topography of the land and low elevation of the road. The town has been trying to eliminate all the problems they can; however, it is difficult with no pitch to the land. *COMPLETED. Larger culvert was installed and ditches were cleaned in 2012. Will be removed.*
	Highways 10 and 32/57 – Inspect culvert size, ditch, building modifications		Town officials			TN Brillion	The land at the southwest intersection of US Highway 10 and State Highway 32/57 floods during heavy rains and the spring thaw. The land is too low to allow the water to run in a different direction. An auto body repair shop at this site suffers from water entering the building during heavy rain. In addition, the driveway to the business is pitched in the wrong direction thereby allowing rain to run into the garage. During heavy rain the site floods and water goes directly up to the shoulder of STH 32/57. The highway was raised, new culverts installed, and riprap laid, but the problem still persists. The nearby mobile home park experiences some flooding as a result of

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							the water problem. The size of the culvert should be examined and a larger one installed if deemed necessary. Deeper ditches may also help. The auto body repair building should be elevated and a new driveway installed. Running a drain tile/ditch around the building to the back of the property may also help, but this approach might just displace more water to the mobile home park. The ditch along USH 10 seems to be okay. *When the roundabout was put in, culverts under Highway 10 were made bigger and the ditch north of Highway 10 and west of Highway 57 was cleaned out north to Cemetery Road and two bigger culverts were put under Cemetery Road. This project was completed by the state, date unknown. Will be removed.*
	Enlarge culverts on Center Road		Town officials	2014		TN Brillion	Where Center Road nears the state highway there was a bad flooding problem. The WDOT redid the intersection, which helped. However, during heavy rain the shoulder washes out. The culvert should've been bigger. *COMPLETED. More ditching was done on the north side of Center Road, east of the old railroad grade. Completed in 2014 and will be removed.*
	Drawdown quarry east of Brillion		MCC, CI Brillion, TN Brillion			CI Brillion, TN Brillion	The quarry at the northeast end of the City of Brillion has quarried below the water table. Therefore, water continually

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							rushes into the quarry, and said water must be pumped out so they can quarry deeper. When they pump, area wells suffer by seeing a reduction in their water levels. The quarrying activity should be limited. It is suggested perhaps they quarry horizontally, rather than vertically. This agreement would take cooperation between the quarry operator, neighbors, City of Brillion, Town of Brillion, and the County of Calumet. *MCC and CI Brillion should be doing this. Will be removed.*
	Mitigate well contamination of municipal water supply on east half of village	TBD	Village officials	2026	High	VI Potter	A portion of the east half of the village is periodically inundated and soils saturated due to the North Branch of the Manitowoc River. The land to the west of the village is at a higher elevation and forces water to run down the slope across the entire village to the river. The village does not have a municipal water supply. All development is on private wells which are mostly very old. Well testing has revealed problems with bacteria and nitrates in the well water supply. Contaminants may be entering the water supply through the older wells after floods and heavy rains. Sealing the wells could help but it not cost effective. Drilling a municipal well or connecting to an adjacent municipal water supply may help.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							Very expensive and there are budgetary restraints. Will be carried forward.
	Ditching and bank stabilization on creek north of Main Street	TBD	Village officials	2026	High	VI Potter	The creek north of Main Street (County Highway PP), west of Center Street (County Highway Y), meanders north and then east. During heavy rain the water has bypassed its natural creek bed and flooded and eroded a new "path" over the lands to the east. The creek needs to be enhanced, possibly through ditching, to keep water flowing in its natural route, and, the bank stabilized. *Some ditch cleaning at the bridge on the north end of Central Street has been done by property owners. Will work with county and homeowners in next two years to clean out more and possibly clean out river mouth, depending on costs. This specific strategy will be removed and combined with the one below moving forward.*
	Bank stabilization at Center Street and creek crossing	TBD	Village officials	2026	High	VI Potter	At the north end of Central Street, a creek crosses under the road. Just east of the crossing, on the south side of the creek, there was a concrete retaining wall. Water has undermined the wall and caused it to break and slump into the creek. The garage on the subject property is approximately 15' from the wall and the fear is the shore will now erode up to the garage, or at least significantly onto residential land. The

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							wall needs to be removed and the bank stabilized, probably with riprap. *Part of future plan with item above. Will carry forward, adding the mitigation measure above.*
	New pipe at North Branch of the Manitowoc River	TBD	Village officials	2026	Medium	VI Potter	A sewer lateral lies under the riverbed, just north of the Main Street (County Highway PP) bridge. The lateral is bent and it is believed water is infiltrating the pipe causing undo use of the sewage treatment plant. The pipe needs to be replaced. *TV camera online showed no damage but dip in line. Will carry forward.*
	Raise field at Fireman's Park Athletic Field		Village officials	2020		VI Potter	The Fireman's Park is located north of Main Street in a floodplain, and partially in a wetland. The athletic field is routinely inundated with water. Generally, the first few months of summer the field is rendered useless. In a small community, the revenue generated by the use of the field is very important to the local economy. The field should be raised so that is not flooded half the summer athletic season. Also, the adjacent parking lot is in the floodplain. It is also located lower than surrounding land and has experienced some erosion damage. It is recommended the parking lot be improved, either with black top or packed stone, and, a diversion berm built along the west edge of the parking lot.

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							The diversion berm would help divert runoff away from the edge of the lot, thereby eliminating any potential for parking lot erosion. The berm would also help divert runoff away from the creek and to an area where chemicals can be filtered out prior to reaching the creek. *COMPLETED. Recent replacement of culverts under railroad tracks requested of CN Railroad have improved drainage at park and land along railroad tracks. Will be removed.*
	Construct new plant or make enhancements at the Wastewater Treatment Plan	TBD	Village officials	2026	Very High	VI Potter	The sewage treatment plant was built in 1965. The plant is showing signs of age and needs some improvements. The plant was built in the floodplain of the North Branch of the Manitowoc River. Due to its location, the plant experiences periods of inundation. Also, due to heavy flooding in the Village, some of the sewer lines along the roads are infiltrated and some homes experience sewage backing up into their basements. The system is currently sized accordingly; however, the village is expected to triple in size over the next 20 years. It currently operates at 60% capacity. *Replacement may occur over the next 20 years with grant assistance but with approximately $60K annual sanitary budget, it is a very difficult task. Will carry forward.*

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	Ditching and raise tracks on the land east of the Manitowoc River, south of Main Street		Village officials			VI Potter	It is believed the dam at Clark Mills in neighboring Manitowoc County is the cause for some of the flooding in the village. When the dam is closed, the village experiences more flooding. This, coupled with the fact that the Brillion Marsh Wildlife Area has limited routes to effectively drain, cause the North Branch of the Manitowoc River to flood. Flooding is typically confined to the floodplain area. Most of the flooding occurs east of the river, and continues east over the railroad tracks. This involves a local tavern being flooded, and the tracks to be under water. When the tracks are wet, the electric motors on the train wheels ground out and the train can't run. This slows the transport of crops and service to the local agricultural cooperative. In an area with a stressed economy, any delay in the transport of crops is deemed critical. Changes at the dam, possible ditching, or elevating the tracks, are all cited as possible solutions to the flooding. *COMPLETED. Recent culvert replacements by the railroad company have helped. Will be removed.*
	Reconstruct Kiel Road to minimize damage to road caused by flooding	TBD	Town officials	2026	High	TN New Holstein	On Kiel Road, slightly more than one half mile west of the intersection with Irish Road, the shoulder of the road tends to wash out during heavy rains. The road needs to be reconstructed with wider,

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							flatter shoulders *Will be carried forward.*
	Stabilize bank and repair footing of Hayton Road bridge		Town officials	2019		TN New Holstein	The Hayton Road Bridge experiences high water. Although the water has not gotten high enough to go over the road, the high water has damaged a portion of the bridge. Specifically, the southeast bridge footing is leaning and should be repaired before more high water further deteriorates the support. Stabilizing the bank where it meets the footing would help minimize future damage. *COMPLETED. Summer 2019 and will be removed.*
	Cease pumping or build ditches in the marsh west of Irish Road to alleviate crop damage		Town officials			TN New Holstein	West of Irish Road is a large marsh. This marsh serves as the area collector for the spring run-off. The portion of the marsh south of County Highway H is partially drained in spring (the owner drains it almost every spring). The water is then pumped onto adjacent farm fields. The pumped water has caused significant crop damage. It is recommended the party pumping the marsh either stop draining the wetland, or, pump the drained water to ditches (yet to be created) to avoid flooding the adjacent fields. *COMPLETED. Pumping stopped about 5-10 years ago. Will be removed.*

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	Monitor effectiveness of restrictor to control runoff on Highway 57 near the city TIF district. Consider a detention pond to control the adverse runoff	TBD	Town officials	2026	Medium	TN New Holstein	Along the east side of State Highway 32/57, near the City of New Holstein TIF District, the town experienced a lot of flooding since the TIF District was created. The flooding has resulted in a lot of crop damage. In the summer of 2004, the city put in a restrictor to control the runoff from the TIF District. If there is flooding in the future, a detention pond should be installed to control the adverse runoff. *Detention Ponds have been installed; continue to monitor downstream at location on STR 57 as water floods resident backyard and continues to cause crop damage. Will carry forward.*
	Dredging, education, riprap, new bridge to control flooding (citywide tributaries, their floodplains and Main Street Bridge)	TBD	City officials	Ongoing	High	CI Brillion	All the tributaries in the city flood during heavy rains. The tributaries swell and about every ten years the floodplains of the tributaries flood. Flooding is particularly severe south of West Water Street, at times reaching the bottom of the Main Street Bridge. The City is concerned about property damage and that additional flooding will infiltrate the storm and sewer system; and over city roads, resulting in potential traffic problems. A dam built at Hacker Road on the north end of the city in 1997 alleviates some flooding that comes from the north; however, water still swells the

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							tributaries. The marsh cannot filter any water and results in the tributaries backing up. The city believes that dredging the marsh may resolve this. Contractors and developers need to control erosion on construction sites. Farmers need to be better educated about the effects of their farming practices. Placing rip rap along the stream banks would prevent erosion, which also adds to the sediment problem. Dredging existing ditches and tributaries could temporarily help lower water levels but would fill up again as the marsh rejects the water. Elevating the bridge may help but would likely only be a temporary solution. *Dredging has started and should be completed in 2021. There was also some done in 2019. Will also be looking at the bridges in the next several years. Will be carried forward.*
	CTH PP – New culvert and ditching due to undersized culvert	TBD	City officials	Ongoing	High	CI Brillion	The creek that runs through Deer Run Golf Course annually floods per its 100-year floodplain boundaries. The flooding has resulted in property damage and loss of revenues to the golf course. The water attempts to go under County Highway PP and flow west to the Brillion Marsh. The culvert at CTH PP is undersized and needs to be enlarged to alleviate the flooding. In addition, the creek should be ditched to help retain the water within its banks

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							and minimize the flooding. *There will be dredging done to help alleviate this in 2021. Will carry forward.*
	Kennedy Drive and Horn Street – New culverts and ditching due to undersized culverts	TBD	City officials	2026	High	CI Brillion	The area east of Kennedy Street and north of Horn Street floods annually with spring runoff. The tributary floods and four properties in the area are affected with the floodwaters. Larger culverts are needed at the two roads to help the water flow. In addition, ditching could help retain the water within the banks and minimize flooding. The homes in this area are newer, and have been built to floodplain specifications; however, due to the overall water problem in the city, the land experiences more flooding than anticipated. The flooding in this area has been severe enough to flood the basements of the homes. *This area is now looking at becoming developed, so there will be some changes coming in the next couple of years. Will carry forward.*
	Black Creek – Dredge; flooding adjacent to residential property	TBD	City officials	Ongoing	High	CI Brillion	Black Creek doesn't flow and floods that portion of Deer Run Estates Subdivision east of Golf View Drive. One of the homes adjacent to the creek always floods. The home is only three years old, and was built according to flood proofing specifications. However, due to the amount of water in the city's tributaries, the creek experiences more water than

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							anticipated. The creek needs to be dredged out and its banks steepened so as to ensure the creek can hold more water. As the area develops, it is anticipated more runoff from the added impervious surfaces will only increase the amount of water entering Black Creek; therefore, it is also recommended homes be constructed above the required flood proofing standards to help minimize negative water problems associated with Black Creek. *There will be dredging done to help alleviate this in 2021. Will carry forward.*
	Hugho Pond – Enlarge to alleviate tributary flooding	TBD	City officials	2026	High	CI Brillion	The portion of the tributary south of West Water Street floods. If Hugho Pond in Horn Park (located just east of North Parkway Drive) were enlarged, it could retain more water and help minimize the amount of water entering the flooded tributary. *There are some plans in place with Horn Park and part of this includes the creek running into Hugo Pond. This is part of the Brillion Iron Works project. Will carry forward.*
	Hacker Road – Clean ditch; obstruction floods local road	TBD	City officials	2020	High	CI Brillion	Approximately ½ mile east of the intersection of Hacker Road and USH 10, the drainage ditch which goes under Hacker Road floods about once every ten years. Water in the ditch gets high enough to flood the road. The ditch,

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							which leads to this culvert, is located in the City of Brillion. To alleviate the flooding the city needs to clean their portion of the drainage ditch. *New culvert was installed in 2020, will now monitor this situation to see if this continues to help alleviate the problem; more to come in the next few years. Will carry forward.*
	Monitor area north of Center Street for flooding	Covered by annual budget	City officials	Ongoing	High	CI Brillion	The area north of Center Street, west of St. Mary's church and east of Lee Avenue had experienced severe flooding in the past. To help drain the area, the city replaced all the storm sewers in that area two years ago. They ran the storm sewers to the city pond, which in turn go underground to the creek at Tesch Street and Glenview Avenue. This needs to be monitored to see if the culvert at Tesch and Glenview is effective at transporting the water. The culvert may have to be enlarged and ditching occurs. *Continuing to monitor. It has also become part of the dredging with Spring Creek. Will carry forward.*
	Monitor effectiveness of cleaning out the ditch on the south side of Faro Springs Road	Covered by annual budget	Town officials	2019		TN Chilton	About one quarter mile west of State Highway 32/57, on the south side of Faro Springs Road, water used to swell in the ditch and spill over onto adjacent land. As the water rose it washed out the shoulder of the road. In 2003 the town cleaned out the ditch. Now water stays

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							within the ditch and doesn't flood over the ditch bank. This should be monitored to be certain the ditch doesn't fill with sedimentation and weeds, resulting in flooding once again. *COMPLETED in October 2019. Will be removed.*
	Monitor effectiveness of cleaning out the tributary that runs under Faro Springs Road	Covered by annual budget	Town officials	2020		TN Chilton	The tributary that runs under Faro Springs Road, just west of the intersection with State Highway 32/57, was full of sedimentation and debris. As a result, the water would spill out of the tributary bank onto adjacent land. There was minimal crop damage, but the town was concerned the water covered area would increase. In 2005 the tributary was cleaned out. This ditch should be monitored to make certain the flooding problem has been resolved, and, to be certain the tributary doesn't fill in with sedimentation and weeds again. *COMPLETED in March 2020. Will be removed.*
	Divert water on Killsnake Road	TBD	Town officials	2026	High	TN Chilton	Approximately 1/8 mile west of the intersection of Killsnake Road with State Highway 32/57, just north of Killsnake Road, the ditch leading to the Killsnake River makes a sharp right turn to the west. Water flowing in the tributary cannot make the sharp angle and ends up flooding over onto the road. The angle needs to be minimized. A culvert, at a

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							gentle angle, could help divert the water to the river. *Continuing to monitor and seek funding. Will carry forward.*
	Dig a deeper ditch on Stonybrook Road to minimize flooding	TBD	Town officials	2026	High	TN Chilton	Stonybrook Road crosses a tributary about one-quarter mile west of its intersection with US Highway 151. During the spring thaw the tributary overflows and water goes over the road. This creates a potentially dangerous driving situation. If the ditch were deeper, the water would be confined to the ditch. The ditch should be dug out, and steeper banks created. *Continuing to monitor and seek funding. Will carry forward.*
	Riverbank south of Main Street – Runoff diversion system, vegetation, rip-rap	TBD	Town officials	2026	High	CI Chilton	On the south side of Main Street between STH 57 and Park Street, the riverbank is very steep. Runoff from the top of the bank, coupled with the flowing river and any rain/snow melt, has caused severe bank erosion resulting in a lot of sediment in the river. A 1980s requirement for landowners at the top of the bank to direct their runoff to pipes that went over the bank to the river below helped but this is not a good practice in an area with water quality problems. The pipes are rather unsightly but if removed, there will be severe erosion and sedimentation problems. If the pipes fail there is potential for more

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							erosion. The pipes need to be run underground to a storm sewer or to a pond or detention area. Vegetation was planted on the slope to help stabilize the bank. However, as the trees grew and died, they fell into the river and caused blockage issues at the dam. Crown vetch was planted to stabilize the soil but the WDNR is not recommending this due to its invasive nature. However, it has been effective at stabilizing the bank. By redirecting the pipe water and other runoff, the crown vetch could flourish. Riprap at the base of the slope is also suggested to prevent any slumping or undermining of the base of the bank. Small riprap was laid at the base of the bank in 1997 but many of the rocks were thrown into the water, causing the area to face erosion again. Larger riprap needs to be laid. *Continuing to monitor and seek funding. Will carry forward.*
	M-B Lane – install concrete box culverts to alleviate frost damage	TBD	City officials	2026	High	CI Chilton	M-B Lane is the only road in the city that goes through a wetland. Currently there are corrugated culverts under the road to help the water flow under the road. These typically freeze up and heave with the frost. The heaving causes road damage, and some temporary water holding (potential for flooding). Concrete

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							box culverts should be installed. *Will carry forward.*
	Replace laterals citywide (sewer lateral infiltration)	TBD	City officials	Ongoing	High	CI Chilton	In 1978 there was a 7" rain in less than three hours. The rain infiltrated the sanitary sewer pipes and backed up sewer laterals throughout the northeast part of the city. Sewer backed up into basements as high as 4'. In 1983 the city replaced 5000' of pipe in this area, along with 14 manholes, and, replaced the old 15" sanitary pipeline with a 21" pipe. Since then, every time a street is redone, the sewer lines are upgraded prior to any street work. It is recommended the city continue their policy of replacing the laterals. *This is ongoing and will be carried forward.*
	Inspect and repair cofferdams – potential collapse	TBD	City officials	2026	High	CI Chilton	There are four cofferdams in the city: a large one at State Street, and three dams to the east, all on the South Branch of the Manitowoc River. All of the dams, except the State Street dam, are minor and are no longer used to hold back significant amounts of water. However, the State Street cofferdam is very functional at holding back the water. In the 1980's the State Street dam was rebuilt. Although the dam is in good condition now, there is the concern that if the dam is not maintained, it could collapse and the city experience flooding problems. This dam

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							should periodically be inspected, and all measures taken to repair any signs of stress. *Will carry forward.*
	Rip rap or other shore protection off North Shore Road along Lake Winnebago to minimize erosion and property damage		City officials			VI Harrison	There is a tributary at the end of the private road that extends east of North Shore Road (along Lake Winnebago). A lot of water flows through the tributary trying to reach the lake. Due to the volume of water flowing to the lake, the tributary floods, and, where the mouth of the tributary meets the lake there is severe erosion. There is a culvert in the tributary which helps direct the water to the lake. To protect neighboring properties, and to prevent the severe shore erosion, riprap or other shore protection should be installed where the two water bodies meet, and slightly northward up the tributary to the existing culvert. *COMPLETED. A mini-storm pipe has been installed to collect sump pump discharges in this vicinity, and the area has been riprapped. This issue is considered closed and will be removed.*
	Detention pond and larger culvert on Hoelzel Way to minimize property damage	TBD	Village officials	2026	Low	VI Harrison	Where Hoelzel Way crosses a creek three residential lots along the south side of the road are routinely flooded. A larger creek culvert, or possibly detention pond, should be installed to hold the water and not flood the lawns. The subject

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							subdivision was developed prior to regulations requiring detention ponds. Added to this subdivision's problem, the subdivision to the south drains to the flooded area, thereby increasing the amount of water on these lots. In an attempt to try and stabilize erosion in the creek and slow down the water the town did riprap a quarter mile south of the subdivision to Skipper Lane. Although this effort wasn't successful at slowing the water, it did help stabilize the creek erosion that had been occurring. *A larger creek culvert was installed and has aided in alleviating standing water from the residential properties. While this issue is considered mostly complete, the future plan is to urbanize the roads around Sunrise School and provide storm water detention for water quality treatment and peak flow reductions. Will be carried forward.*
	Enlarge storm sewer lateral and monitor in the Mackey Drive area to minimize property damage		Village officials			VI Harrison	Beginning at Mackey Drive and heading south to the cul de sac on Marquart, and east to Handel Drive, water tends to pond and flood residential lawns. The village is currently in the process of having a larger storm sewer lateral engineered to divert the water west to Turtle Creek. Once engineered, the lateral should be installed and monitored to be certain the lateral effectively solves the flooding problem.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							COMPLETED. The aforementioned larger storm sewer pipe was installed to Turtle Creek. No known issues have been noted since the project was completed, thus considering this drainage concern being closed. Will be removed.
	Ditch and protect on Coop Road to eliminate dangerous driving conditions		Village officials			VI Harrison	There is a box culvert under County Highway KK, just east of the intersection with North Coop Road. The culvert has filled with sedimentation and weeds, and therefore water entering the culvert floods the area, and floods up and over the county highway. Due to the fact that this area has an average traffic volume of 15,000 vehicles per day (2000 WDOT data), water on the road can pose a safety hazard, especially during seasons where the water could freeze. The culvert needs to be cleaned out, but the town is having difficulty securing permission from the WDNR. Also, the ditch which carries water to the culvert should be cleaned out and have shore protection along its banks to prevent it from eroding and adding sediment to the creek and culvert, resulting in the flooding. The ditch should be cleaned and riprap laid a distance of 600'. *COMPLETED. While maintenance and vegetation and material removal does need to be completed within the creek, there have been no complaints received or flooding noted on at least the past 10*

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							years on Coop Road. Will be removed
	Raise Kesler Road to prevent inundation of water/flooding		Village officials	2019	High	VI Harrison	Kesler Road was built through a wetland area and is under water many times during the year. All municipalities, which share this road, have all cited the same problem: the road is too low, there is always water on the road, and it needs to be raised. This common problem was specified not only by the Village of Harrison, but also by the Town of Woodville and Village of Sherwood as well. Per Harrison, the worst inundation tends to be about 1000' west of County Highway M, and where Kesler Road bends to the north. Harrison reports the road is a whopping 3-5' under water during any rain event. Harrison's recommendation is the road be raised, and, the tributary be dredged north 1000' to allow water to flow a direct path. *COMPLETED. New culverts were installed in 2019 under Kesler Road by Harrison to aid in drainage and the road was ground, repaved and slightly elevated by Sherwood, but periods of standing water have still been noted after the repairs. Any additional filling for this road will require a cooperative effort between municipalities, and the Village of Sherwood has not shown any interest in participating in such a project beyond what was completed last year. Will be*

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							removed.
	Install culvert and raise roadbed on Fire Lane 8 to minimize property damage		Village officials			VI Harrison	Along Fire Lane 8, from the creek and then 400' east of the creek, there is significant flooding. It appears the road is holding back water, and, there are not enough culverts to help the water flow to the lake. Within that 400' there are five residential lots, 3 of which flood. Another culvert is needed at the creek to help water flow, and, the roadbed needs to be raised so it doesn't impede water flow. *COMPLETED. Additional culverts were installed and upsized to allow for sufficient flow to Lake Winnebago. The road does still require repairs and potentially reconstruction in the future. Lakeview Pond was constructed upstream of this area for flood control and water quality treatment, so has significantly alleviated any downstream flooding issues that had previously been experienced. This issue is considered complete. Will be removed.*
	Cooperate with neighboring city to install detention pond in Manitowoc Road Area		Village officials			VI Harrison	North of Manitowoc Road, in the Kernan Avenue vicinity, there is a lot of flooding onto residential properties. Water coming from the City of Appleton to the north flows south towards Lake Winnebago. As the water nears the lake it encounters the City of Menasha. Menasha is very flat and is developed such that it cannot get the water to the lake, so everything "backs up" to the

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							north, into the Kernan Avenue area. The village tried to get the water off the residential properties by ditching a quarter mile north and south (they also added some rip-rap). They also added a culvert under Manitowoc Road to help this "ditched" water flow south under the road and towards Menasha and the lake. Due to Menasha's topography, the water didn't flow, it somewhat stagnates and floods. Ideally a detention pond should be built to the north, in the City of Appleton. This will hold water flowing south and slow it so it can be absorbed. Flooding in the subject area is not uncommon. The topography of the town is such that all water east of State Park Road goes north, water south of US Highway 114 goes south, and from County Highway N water goes north and south along the Schmidt Road/Midway Road corridor. This results in more flooding in the area mentioned above. *COMPLETED. There has been no regional flooding noted within this area noted; it is strictly localized to backyards in the Cottonwood Creek Subdivision near Kernan and Hazelnut. A mini-storm project was completed between 5 and 10 years ago that removed sump pump discharges into the roadside ditches and has alleviated standing water concerns. Additional culverts were added and the*

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							dry pond constructed for flood control in this subdivision was cleaned out. Will be removed.
	Ditch, flatten creek bottom, riprap on Andrew Drive to minimize bank erosion		Village officials			VI Harrison	The Ridge Point Subdivision pond is located adjacent to Andrew Drive. There is a 300' drainage easement along the east side of Andrew leading into the pond. The easement and pond fill and the sod in the easement continually gets torn out (erosion). The town has replaced the sod three times in the past four years. They have also used matting in the ditch, with mixed grass, but turbulence tears it out. For that part of the ditch between Cameron Drive and Paige Way, the ditch needs to be dug out, the bottom flattened, and large riprap laid. This should prevent further erosion. *COMPLETED. A mini-storm project was completed on Andrew Drive to collect sump pump discharges, the ditches were regraded and no known issues have been present since. Will be removed.*
	Monitor effectiveness of larger culvert on Fire Lane 12	Paid by Land Owner	Village officials			VI Harrison	As you traverse Fire Lane 12 to the east, the road crosses a creek. The culvert was undersized and caused water to back up and flood the road, resulting in erosion to the road shoulder and adjacent land. The small culvert was replaced in 2003 with a 36" storm sewer culvert and they laid riprap 20' into the basin. The riprap helped slow the water before it went through the culvert. The culvert appears

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							to be effectively managing the flow. Monitor the situation for continued effectiveness. *COMPLETED. The property owner that purchased this property beyond the right of way filled in approximately 5-10' of the ravine. They were instructed to have a culvert pipe sized by an engineer and have the work permitted as they had not originally. A 60" pipe was sized by an engineering firm and all appropriate permits applied for by the private owner. The only current visible concerns are some bank erosion where the ravine is open that require repair, but no flooding concerns exist. Will be removed.*
	Install detention pond at Woodland Trails Subdivision to minimize water on road		Village officials			VI Harrison	Woodland Trails Subdivision is a new subdivision. When created, the developer created a pond and installed 6 pipes going out of the pond and 4 risers. This means only 2 pipes can drain water. As for the other four pipes, water has to reach a certain elevation before they will drain. This works well for protecting homes, but not the road. It means water is sent to Woodland Road, flooding the road. This is a traditional detention pond outlet structure that is intended to hold water back to detain it in the pond after rain events. If revisions are made as noted, the subdivision will not meet their WDNR post-construction storm water

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							requirements and flooding will be increased downstream. *COMPLETED. No issues have ever been noted on Woodland Road with standing water or flooding. Will be removed.*
	Clean ditch, enlarge/realign culvert on Harbor Road to alleviate water on road and property damage		Town officials	2005		TN Brothertown	Where the creek crosses under Harbor Road there is often flooding over the Road. The neighboring property also suffers a lot of flooding. In addition, due to the turbulence created by the flowing water, there is water-induced erosion on the north side of the road at the base of the bridge. The bigger culvert to the east, under Lakeshore Drive, allows the water to flow rapidly to the west. As the water goes west, it encounters a lot of sedimentation in the creek, forcing the water to go beyond the banks of the creek. There are two culverts under Harbor Road, but they can't handle the water being directed to them. The ditch needs to be cleaned out, and the culverts enlarged to handle the water. Additionally, the culverts need to be redirected the same angle of the stream. The town considers this issue to be their worst flooding problem demanding remediation. Engineering on this assessment is to be completed in fall of 2005 and bid late fall, early winter, 2005. *COMPLETED in 2005 and will be removed.*

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	Detention pond, riprap and educate farmers on Lakeshore Drive		Town officials	2005		TN Brothertown	The State DOT enlarged the culvert under US Highway 151, just north of Indian Road. This allowed water to flow faster through the adjacent creek. The culvert at Lakeshore Drive can't handle the added flow and therefore floods over the road. Even a 2" rain results in flooding over the road. From the rushing water, Lakeshore Road's shoulder is also eroding. A larger culvert would help, but the town believes this would then result in flooding on Maple Heights Road (a private road). A detention pond between Highway 151 and Lakeshore Road might help slow the flow of water. Riprap will also help, but the important thing is to slow/reduce the flow; therefore, rock should not just be placed to stabilize the banks, but strategically placed to hinder the water flow. Farming practices would also help keep the water from flowing. Specifically, the direction the fields are plowed could help redirect water away from the area. In addition, grass buffers along the fields and the creek could help filter water and sedimentation. The town considers this the second largest flooding issue facingBrothertown. *COMPLETED in 2005 and will be removed.*
	Farmer education and cooperation to alleviate damage to road shoulder and crop damage caused by flooding on South	Covered by annual budget	Town officials	2025	High	TN Brothertown	On South Tower Road, almost one-half mile north of the intersection with Dick Road, there is significant flooding. The sedimentation washes off the fields to

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	Tower Road						the east and flows west flooding the road and adjacent fields. The soils in the area do not quickly absorb the water. Water then goes over Tower Road washing the shoulder out, and continues on to the west damaging adjacent cropland. The town believes that grass buffers along the edges of the fields would help slow the flow allowing for some soil absorption. *Will be carried forward with costs TBD and completion date of 2025.*
	North of West Main Street, the entire area west of 10th street (the area encompassing a mobile home park) – Reroute water to the north, lower sewer laterals, raise road or install pond.		Village officials	2018	High	VI Hilbert	Area experiences heavy flooding as a result of spring run-off and heavy rains. All land to the west of subject site runs east (toward the Brillion marsh) thereby flooding the mobile home park area. *COMPLETED. A stormwater detention pond was installed as part of the industrial development to the west and this has provided some relief in this area. We also worked cooperatively with the mobile home park owners to have their private sewer system televised and inspected. Repairs were made to their private sewer system to help alleviate the amount of infiltration. The ideal solution would be to reroute the stormwater to the north to prevent it from coming though the mobile home park and running throughout the village which could cause issues of property damage throughout the village. To accomplish*

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							this, we need to install a culvert to limit the flow of stormwater into the village in a wooded area and divert the remainder of the stormwater to north of the village and preventing it from running throughout the village. We also need to clean out the ditch that runs along the west side of the mobile home park. This will allow stormwater to flow along this ditch to the north which would help prevent the stormwater from flowing through the mobile home park. Will be removed.
	Southeast 80 acres of village and connected waterways – deeper ditches, larger culverts and bridge, shore protection or ditch east side of village		Village officials	2015		VI Hilbert	The large area in question is farmland. It is a low area and therefore it collects runoff from the area to the south. The flooded area needs to get to the north, to the Brillion Marsh, which serves as the area collector. It flows north through a narrow waterway which is not large enough to accommodate the water. Water flows over the bank and floods adjacent residential land. A larger bridge under East Main Street, and, a larger culvert under Lynwood Drive would help the water flow to the north. In addition, a deeper ditch would help prevent the water from going onto adjacent land. Some erosion has occurred along the waterway, north of East Main Street. The WDNR did allow a portion of the ditch to be protected with riprap; however, the village has not been able to secure permission to continue the shore

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							protection north along the waterway. Where the waterway bends to the east, directly north of North Creek Street, a pond has been installed. The village is concerned the flooding and waterway erosion will cause the pond to overflow and fail. Also, where the waterway bends east, at Calumet Street, it hauls natural debris and occasionally clogs the culvert **(5)** at that location resulting in West Calumet Street being flooded. Due to flooding the sewer laterals get infiltrated and back up. The village has replaced all sewer laterals in the area, up to the property lines. The property owners are responsible for replacing the laterals from the road (property line) to the home. In that not all property owners have replaced their laterals, the system is still getting infiltrated. To further prevent infiltration, the village has installed chimney seals (a seal around the top of the manhole covers). A deeper ditch south of the culvert may aid in preventing debris from flowing at surface level. Ditching the entire east side of the village would help the low farmland area to flow north and not flood the areas sited. Although this would help the village with their flooding problems, they are concerned the water problem will simply be displaced onto neighboring farm and residential land

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							north and northeast of the village. *COMPLETED. The Village worked cooperatively with the Town of Rantoul to increase the size of the culvert on Irish Road which was impeding the flow of stormwater. This completion of this project has helped with the backups since it drains the water faster so that it is out of the village and prevents residences from flooding. Will be removed.*
	Area north of telephone utility, west side of STH 57 – deeper ditch, larger culvert		Village officials	2017		VI Hilbert	At the south end of the village, west of State Highway 57, the waterway occasionally floods over the bank during heavy rains. A deeper ditch may help contain the water, or, a bigger culvert be installed under the highway permitting more water to flow to the northeast. Due to other flooding concerns to the northeast, the village prefers the area be ditched, rather than a larger culvert installed (which would permit more water to intensify the existing water problem elsewhere in the village). *COMPLETED. The ditch was rerouted which helped with flow and prevented stormwater backup. Will be removed.*
	School property west of South 11th Street - Pond maintenance	School District	Village officials			VI Hilbert	There is a detention pond on the school district's property west of the school located west of South 11th Street. The pond was rebuilt in 1995 and serves as a detention pond.

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							Currently the pond is holding water but the village is concerned that a lack of pond maintenance could result in flooding and damage to an infiltration of the sewer laterals in the immediate area. It is recommended the village have an agreement with the district to assure the pond will be maintained. *This is owned by the School District. We are not aware of any work being completed by the school district for maintenance. Will be removed.*
	Calumet Drive – Enlarge storm sewer laterals to control flooding with minimal damage	TBD	CI officials	2026	High	CI New Holstein	At the intersection of Calumet Drive (State Highway 57) and Plymouth Street, and then north and south several hundred feet along Calumet Drive, the area suffers flooding during peak heavy rains. The area is naturally a low area and tends to collect the run-off from the surrounding area. The storm sewer along Calumet Drive is not adequately sized and therefore water backs up and floods. The storm sewer laterals along Calumet Drive should be enlarged. As a minimum, a temporary retainment/detainment pond could be created to handle the overflow of water. *Will seek funding and carry forward.*
	Illinois Avenue, Pleasant Avenue and Harrison Street – Enlarge culverts and new storm sewer laterals to control road	TBD	CI officials	2026	High	CI New Holstein	The land along Jordan Creek floods during peak heavy rain events. Water flows over the bank and inundates portions of adjacent residential lots, and,

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	flooding and minimize property damage						crosses Pleasant Avenue, Illinois Avenue and Harrison Street. The area which floods is from Jordan Creek northeast towards Illinois Avenue, then approximately 300 feet west of Harrison Street, as far as east Jefferson Street. In addition, the land northwest of this part of the city is at a higher elevation, adding more run-off to the vicinity. Larger culverts at Jefferson Street and Jackson Street will help the water flow to the north and leave the area sooner. New, larger storm sewer laterals will ensure the residential area drains quicker. *Will seek funding and carry forward.*
	Jordan Creek between Wisconsin and Taft Avenues – Bank stabilization to control erosion		CI officials			CI New Holstein	Jordan Creek flows to the north. As it moves towards the northeast portion of the city, the water flows faster and causes damage to the bank. The result is sedimentation, resulting in higher water levels and some flooding of the land adjacent to the creek. The bank needs to be stabilized. Riprap would best stabilize the bank and be low maintenance. *This strategy has been revised and will be included in Appendix E. This item will not be carried forward.*
	Monitor high school property for flooding that causes property damage	TBD	CI officials	2026	High	CI New Holstein	Jordan Creek flows west of the high school and occasionally floods the area. The area is low and has soils which are easily saturated during heavy rains. This low area extends west to the northeast

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							portion of the airport property. Between the high school and the airport land, there is a small manmade pond. The pond holds some of the area water, but it too floods on occasion. There are plans to improve the airport. Caution must be taken to ensure fill, etc. is not added to the airport site resulting in more run-off to the school property. The athletic fields are often saturated and more water could mean they could be rendered useless at times. This is an area of concern which should be monitored for additional flooding and damage. *Will seek funding and carry forward.*
	Monitor Calumet Street (STH 57) for flooding that causes crop damage	Covered by annual budget	CI officials	Ongoing	Low	CI New Holstein	At the northwest corner of the city limits the city created a TIF District. As the district developed, water was forced towards Calumet Street (State Highway 57) and onto neighboring town farm fields. Recently the city reduced the outflow capabilities of the retention pond. The corrective measure appears to have drastically minimized the flooding. As the TIF District continues to develop, this situation should be monitored to ensure the neighboring land does not flood again. *Will seek funding and carry forward.*
	Install storm sewers to alleviate ponding during heavy rain at Bridle Road and Black Cherry Road, south to Forest Lane and	TBD	Village officials	2026	Medium	VI Sherwood	During heavy rains and during spring runoff, the area ponds. If power goes out in this area, basements flood because the

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	south along Palisades Trail						sump pumps cannot pump the water. Storm sewers are needed to move the water to the sewer system. *Will seek funding and carry forward.*
	Acquire easements and ditch on Margaret Street south to Stumpf Avenue to alleviate drainage problems during peak rain events and spring runoff	TBD	Village officials	2026	Medium	VI Sherwood	There is a localized drainage problem during peak rain events and spring runoff. If the power goes out basements flood (because the sump pump can't operate). In addition, the ditches in the area flood. It is recommended the village secure easements and deepen the ditches. In the past there have no erosion problems associated with the ditches; therefore, the village believes no riprap or other stabilization techniques are needed for the ditches. *Will seek funding and carry forward.*
	Create cooperative agreements with private dam owners to identify who is responsible for maintenance and potential damages	TBD	Village officials	2026	High	VI Sherwood	There are six dams in the village. Two dams are under private management: the dam at Nature's Way, and the dam at Palisades Trail. All remaining dams are managed by the WDNR: Clifton Road, High Cliff creek crossing, Stommel Road and Mustang Drive. The two private dams are in poor to fair condition but the four public dams have all been installed within the past ten years and are in sound condition (three dams are concrete, one earthen). The village is concerned that if any of the dams fail, the village will experience flooding. Due to the condition of the private dams, it is

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							recommended they be inspected and an agreement written between the private parties and the village identifying who is responsible for maintenance and potential damages. *Will seek funding and carry forward.*
	Expand plant and obtain generator for wastewater treatment plant on Kessler Road	TBD	Village officials	2026	High	VI Sherwood	The East Central Wisconsin Regional Plan Commission makes population projections for Calumet County and its communities. The village sized their wastewater treatment plant according to these projections. However, the village quickly surpassed the projected growth and now has an undersized system. The concern is that during sustained heavy rains the plant will not be able to treat all the water coming into the plant. A plant expansion would prevent the potential problem. There is also a concern that if the power goes out, the water will bypass the system and go to Lake Winnebago, thereby contaminating the lake. A generator is needed at the treatment plant. *Will seek funding and carry forward.*
	Raise roads, install culverts and possibly remove dam on Aesbischer and Lemke Roads to alleviate water on roads which create hazardous driving conditions and road damage	TBD	Town officials	2026	High	TN Charlestown	The Killsnake Wildlife Area is a large wetland that has the Killsnake River running through it. Aebischer and Lemke Roads cut through a portion of this marsh. The roads experience water coming over the road surface for a significant time in spring, about every

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							other year. About ten years ago two culverts were installed (one on each road) so the roads wouldn't act as a dam. This helped somewhat, but the roads still flood. Raising the roads would prevent water from going over the road; more culverts would allow water to flow under the road. Removing the dam in Collins would also help so water doesn't back up into this area. *Will seek funding and carry forward.*
	Encourage WDNR to repair Stecker Lane to minimize road damage caused by flooding	Covered by annual budget	Town officials	2026	High	TN Charlestown	Stecker Lane is an area where the WDNR created a water impoundment south of the road. Unfortunately, the WDNR went too far north with the impoundment and built it up to the road. Because the dike is too high and the soils used in the dike do not drain, water stays on the road deteriorating it and water in the culvert freezes heaving the culvert and road. The WDNR said that they plan on fixing the problem. *Will seek funding and carry forward.*
	Redirect the creek on Steiner Road and install bridges to alleviate flooding problems	TBD	Town officials	2026	High	TN Charlestown	Steiner Road has experienced many water-related problems. Water flows too rapidly through the Killsnake River and washes out the abutments. The result is the road sinks/ "drops down". About twenty years ago a bridge and two culverts were installed to help the water flow under the road. These measures did help, to an extent. However, there were

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							still problems. About four years ago, riprap and some concrete were laid to slow the water. Again, the help was limited and the problem still persists. Ideally the creek should be redirected to stay completely south of Steiner Road. In that this option likely cannot occur (due to WDNR regulations regarding altering a stream course), it is recommended two larger bridges be installed. *Will seek funding and carry forward.*
	Run sewer laterals and move/elevate the holding tank at Mill Pond	TBD	Town officials	2026	Medium	TN Charlestown	At the old mill in Hayton there is a residence (former restaurant). The sanitary waste disposal system is a holding tank. During high water, the tank repeatedly fills with water. The town fears that someday the waste in the tank is going to flow out of the tank. The town should work with the neighboring City of Chilton to run sewer laterals to serve that portion of the town and the tank be abandoned or the tank should be elevated or relocated to higher ground. *Will seek funding and carry forward.*
	River View Road - Open dam, dredge, raise bridge and road to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	In spring, about once every five years, at the "orange bridge" on Riverview Road, water flows across the road on the west side of the bridge. If the area freezes, the bridge and road become slippery. About once every twenty years ice piles up and over the road. If the dam were opened at Clarks Mills water would flow and help

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							lower the water. In addition, dredging to the Village of Potter would help the water flow. However, the fear is this would cause major flooding for the small village. Another alternative is to raise the bridge and possibly part of the road leading to the bridge. *Will seek funding and carry forward.*
	East River Road and CTH JJ – Raise the road to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	At the southwest corner of East River Road and County Highway JJ, the marsh area floods and goes onto the road to the centerline of East River Road. The shoulder of the road repeatedly washes out. In 2003 a truck hit the soft shoulder and rolled over. The road should be raised. *Will seek funding and carry forward.*
	Long Lake Road – Rebuild the road, possibly bridge to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	At Long Lake Road, east of Becker Lake, there is annual flooding over the road. The creek feeds from Long Lake to the east, west to Becker Lake. There is a culvert at the south end of the wet area (on the road) in a high spot. There were two more culverts but they keep sinking into the muck and therefore do not help the water flow. The soil type, coupled with the weight on the road, tends to cause the culverts to sink. The town is not quite sure how to solve the problem. It appears the real problem lies in that water doesn't leave Becker

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							Lake fast enough and the marsh floods. Two suggestions are that the road be rebuilt or a long bridge be built. *Will seek funding and carry forward.*
	Schneider Road – Enlarge culvert to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	On Schneider Road, west of Hilbert Road, there is water over the road approximately once every three years. The water also floods a nearby field resulting in seasonal crop damage. The existing culvert is undersized and cannot handle the volume of water and the water goes above the culvert and onto the road. A bigger culvert is needed. *Will seek funding and carry forward.*
	Irish Road – Enlarge culvert to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	About once every five years water floods over Irish Road (south of Schneider Road). The existing culvert is undersized and therefore the water swells at the culvert and spills onto the road. A bigger culvert is needed. *Will seek funding and carry forward.*
	Hilbert Road – Dredge creeks to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	On Hilbert Road, north of Dreier Road, there are two creeks that flood to the shoulder of the road. The creeks have filled with sedimentation and weeds. These obstructions inhibit flow. Both creeks need to be dredged back to the bridge on Schneider Road. Crop damage, as well as road shoulder damage, are a result of the flooding.

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							Will seek funding and carry forward.
	Elevate Dreier Road to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	North of Dreier Road, west of County Highway Y, the creek forks. About once every ten years Drier Road floods over. Due to the topography of the land and elevation of the road, the only reasonable solution to the flooding problem would be to elevate the road to allow more flowage. *Will seek funding and carry forward.*
	Monitor effectiveness of culvert at CTH E and Irish Road	Covered by annual budget	Town officials	2004	Low	TN Rantoul	The road floods over the county highway just south of the intersection of County Highway E and Irish Road. In 2004 the County Highway Department installed a new culvert. The new culvert should resolve the flooding problem. This should be monitored to be certain the corrective measure has worked. *COMPLETED and will remove.*
	Reroute ditch, riprap and create detention pond on Fairy Springs Road	TBD	Town officials	2026	Medium	TN Stockbridge	The road received a lot of runoff from the higher ground to the east and tends to flow to the lake in sheets. The road (and lawns between the road and the lake) gets inundated with water which flows rapidly toward the lake. There is a ditch on the east side of the road but another ditch should be dug parallel to the road on the west side to try and hold some of the water. However, there is only a 50-foot right-of-way on that side and not room for a ditch. There is also a culvert

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							under a public turnaround midway in the road. The east side ditch should be pitched towards this culvert to divert collected water through the culvert and further west to the lake. Riprap should be installed in the ditch to help prevent erosion and to show the water. A detention pond midway down the road on the east side should be installed to collect and hold water until it can be dispersed through the culvert. Also, a ditch should run parallel to the lake immediately east of the homes and the be directed to the lake. This ditch would require approval of and cooperation from all landowners along this road. *Will seek funding and carry forward.*
	Ditching, eventually reclaim quarry, provide education to farmers – Rockland Beach Road	TBD	Town officials	2026	Medium	TN Stockbridge	This road runs north and south along Lake Winnebago and gets inundated due to the volume of water flowing west to get to the lake. If the culvert at the nearby creek were enlarged it would help prevent the road from flooding. It was enlarged a few years back and did relieve some of the flooding but the road is still under water during certain times of the year. Other culverts in the area help get water to the lake but do not prevent the road from flooding. To help direct water away from the road surface and to these culverts, a ditch should be dug parallel to the road. A quarry east of the road once had ponds

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							which held the water so it did not flood the land and road to the west. The ponds were filled in and the road experienced flooding. Reconstruction of the ponds and reclaiming the quarry would help slow the runoff and it is anticipated that this would control about 90% of the runoff. Alternatively, a properly developed subdivision built at the quarry site could be managed to effectively flow at a slower pace and be redirected. When farmers plow field on top of the Niagara Escarpment in an east-west direction, water is encouraged to flow west over the western side of the escarpment and floods properties below the slope. *Will seek funding and carry forward.*
	Enlarge culvert on Mud Creek Road bridge to alleviate water on road	TBD	Town officials	2026	Medium	TN Stockbridge	The box culvert under Mud Creek's bridge is undersized and needs to be enlarged. In addition, some of the sedimentation should be removed from the creek. Due to sedimentation, and coupled by the fact that the culvert is undersized, if there is 3" of rain, the water floods over the road approximately 100 yards in every direction. At the point the creek bends, the town did install shore protection four years ago. Although the riprap has helped prevent some erosion and sedimentation, the problem persists. In that Mud Creek Bridge has historic value to the county,

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							the situation should be reevaluated to determine if other options are available. As an alternative, the town could explore the feasibility of replacing the culvert without destroying or harming the historic value of the bridge. *Will seek funding and carry forward.*
	Enlarge culvert on Artesian Road to alleviate water on the adjacent field	TBD	Town officials	2026	Medium	TN Stockbridge	WDOT recently replaced the box culvert under State Highway 55 and Artesian Road. The new culvert, along with bank protection, has allowed water to flow faster towards the lake via Roberts Creek. The result is Roberts Creek now floods along Artesian Road and swells over onto adjacent fields. At the intersection of Lakeshore Drive and Artesian Road a larger culvert under Lakeshore Road would help minimize flooding. *Will seek funding and carry forward.*
	Ditching and culvert expansions in Quinney to minimize dangerous driving conditions	TBD	Town officials	2026	Medium	TN Stockbridge	In Quinney there is a culvert under Lakeshore Road, two where the creek crosses by the Quinney Fishing Club and one by Harsch's Beach Road. All flood and run over the respective roads. It appears the flooding is due to sedimentation in the creeks/ditches, and, possibly due to undersized culverts. Some ditches have had riprap installed along the bank to try to minimize erosion and sedimentation. All ditches should be looked at closer to determine if there is a need to remove sedimentation, install

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							bank protection, or replace existing culverts with larger ones. *Will seek funding and carry forward.*
	Coordinate culverts/ditching on Ecker Lakeland Drive with the Town of Brothertown to alleviate flooding on both sides of the road	TBD	Town officials	2026	Medium	TN Stockbridge	Ecker Lakeland Drive is the local road that separates the Town of Stockbridge from the Town of Brothertown. Currently water flows west off US Highway 151 along both sides of this local road, until it eventually reaches Lake Winnebago. There are two old 18" culverts midway down the road which should take the water from the north ditch and merge it to the south ditch. However, the culverts are ineffective in that the bottoms are rotted, and, the ditches are such that they don't direct water to the culvert, rather they force water to continue along the north side of the road. The ditches should all be cleaned out and the north ditch should direct water to the culverts. The culverts should then be replaced so they are capable of taking the water and bringing it to the south ditch. *Will seek funding and carry forward.*
	Monitor effectiveness of larger culvert on North Tower Road	Covered by annual budget	Town officials	2005	Low	TN Stockbridge	At the southern end of the town is North Tower Road. This road has historically had flooding as a result of an undersized culvert under the US highway. The state reconstructed the highway in summer of 2005. The state replaced the existing culvert with a larger culvert. This culvert should be monitored to be certain the

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							culvert effectively manages water. *COMPLETED and will remove.*
	Monitor effectiveness of enlarged ditch along Faro Springs Road	Covered by annual budget	Town officials			TN Stockbridge	Due to the slope of the land around Faro Springs Road, the road accumulates water and traditionally floods. The Town of Stockbridge, in cooperation with the Town of Harrison, recently enlarged the ditch along the road and placed riprap. It appears the bigger ditch has been successful at holding the water and bringing it to the lake. This should be monitored for effectiveness. *COMPLETED and will remove.*
	Monitor effectiveness of two culverts on Hickory Hills Road to minimize flooding on nearby properties	Covered by annual budget	Town officials			TN Stockbridge	In 1993 there was heavy flooding along Hickory Hills Road, west of the intersection with Moehrke Road. The installation of two culverts near the village-town border, along with a pond installed by the hunting club, helped drain the area and alleviate some of the flooding. Flooding in this area is no longer perceived to be a problem but should be monitored during heavy rains. *COMPLETED and will remove.*
	Follow flooding recommendations to keep culverts open on Faro and Fairy Springs Roads to prevent water from freezing and causing flooding issues		Town officials			TN Stockbridge	The culverts at Fairy Springs Road and Faro Springs Road (near the shore) routinely fill with water and freeze, preventing water flow and resulting in flooding. Currently the town tries to clean the ice out of the culverts with a backhoe. It is recommended the town

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							continue their ice removal process, but also follow the recommendations of the *FLOODING* section above. If those recommendations are enacted upon, water should be less in the culverts. *This strategy is connected to one listed previously. They will be combined going forward.*
	Schmidt Road – Add a culvert.		Town officials			TN Woodville	About once a year, during heavy rain, water goes over Schmidt Road, about 500' west of Micke Road. The water washes out the shoulder of Schmidt Road. Currently there is a 3' x 4' culvert with a flat bottom. An additional culvert would help the water flow and not back up over the road. *COMPLETED and will remove.*
	Micke Road - Lower culvert, clean ditch, stabilize ditch.		Town officials			TN Woodville	Once every few years, in spring, a portion of Micke Road gets flooded and the shoulder washes out. There are two culverts under the road; however, one of the culverts is too high and obstructed with sedimentation. The water can't get into the culvert to flow so the water backs up and floods the road. The sedimentation needs to be removed, the culvert lowered, and the bank stabilized to prevent further sedimentation. *COMPLETED and will remove.*
	Harvestore Road- Install larger culverts.		Town officials			TN Woodville	On Harvestore Road, 1000' west of Marx Road, the road gets flooded. About once

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							every other year the flooding occurs and takes the shoulder out of the road. There are two culverts there, but they are undersized and can't handle the water during heavy rains. *COMPLETED and will remove.*
	Marx Road - Address Brillion Marsh Flood problem.	TBD	Town officials	2026	Medium	TN Woodville	In spring, during the spring thaw, Marx Road is completely under water for days, sometimes weeks. There are five culverts within a few hundred feet of each other, but the culverts don't help the water flow. Due to the over saturation of the Brillion Marsh, water backs up in all nearby tributaries causing the water to flood ditches, culverts, roads, etc. In the Marx Road area water flows so slowly, that the road shoulder does not even wash out. New or more culverts would not help. Raising the road is a very expensive option. However, with the over saturation of the marsh, there is concern the water would eventually reach and flood the elevated road anyway. The marsh and all waterways leading to the marsh need to be free of sedimentation to allow water to flow to the marsh and be filtered through the wetland. *Will seek funding and carry forward.*
	Stephen Avenue - Ditch creek and swamp. West of St. John is Stephen Avenue.		Town officials			TN Woodville	When the nearby creek backs up the whole road is under water. The creek needs to be dug out to the swamp to the

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							east. The area that floods does not affect houses or lawns, but does flood fields. *COMPLETED and will remove.*
	County Highway BB - Ditch to swamp.		Town officials			TN Woodville	On County Highway BB, north of County Highway B, there are four culverts and a bridge. Every spring, and during heavy rains, the water goes over the road. All the water backs up in the area because it can't flow due to the Brillion Marsh being so inundated. The road was raised, but it still floods. The ditch leading to the marsh should be cleaned out and made deeper. However, due to the saturation of the marsh, it is feared the efforts still would not help the water flow. *COMPLETED when the county resurfaced the road and will be removed.*
	Elm Road - Address Brillion Marsh situation.	TBD	Town officials	2026	High	TN Woodville	On Elm Road, about one mile north of County Highway B, the water doesn't flow and actually backs up and floods the road. The town has tried to help the water flow by installing four culverts within a one-half mile stretch of the road and has raised the road. However, due to over saturation of the Brillion Marsh, the water backs up and stands still until it can be absorbed into the ground. The Brillion Marsh needs to be ditched or other measures taken, such as dredging the sedimentation. *The water has been getting worse with*

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							the additional water load coming from the Michel's pit located in Sherwood and from the Sherwood ponds; and the lack of maintenance in the waterways leading to the Brillion Marsh. *Will seek funding and carry forward.*
	Schmidt Road - Ditch creek.	TBD	Town officials	2026	Medium	TN Woodville	There is a creek that runs north to Kaukauna. The creek crosses under Schmidt Road, west of Military Road. In spring the road floods and washes the shoulder of the road out. There is a culvert there to help the water flow; however, due to weeds and sedimentation in the creek north of the culvert, the water can't flow. The creek needs to be cleaned out. *Will seek funding and carry forward.*
	Kesler Road - Raise the road.		Town officials			TN Woodville	Kesler Road is usually under water because it is in a swamp. The road was built too low. The whole road needs to be rebuilt at a higher elevation. Both the Town of Harrison and the Village of Sherwood have identified the Kesler Road flooding problem as a hazard needing attention. *This part of the road belongs to VI Harrison and will be removed.*
	Crosstown Road - Monitor.		Town officials			TN Woodville	Under Crosstown Road, just west of County Highway B, there's a very large culvert. Water flows rapidly through this culvert. About ten years ago water was

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							flowing so fast that a strong turbulence was created and the water washed the culvert out and the road collapsed. The Town replaced the culvert and the road. In addition, they placed riprap along the bank to help prevent undermining by the current. This site should be periodically evaluated to be certain there isn't an undermining leading to potential road collapse. *COMPLETED and will be removed.*
	Crosstown Road - Clean and stabilize ditch, plant buffers.		Town officials			TN Woodville	Every few years or during heavy rain, the section of Crosstown Road just west of Elm Road always floods. There are two culverts to help the water flow under the road, but the ditch and culverts fill in with sedimentation. Flooding is worse at the southwest corner of the intersection (has already flooded a basement near the intersection). The ditch needs to be cleaned out and the banks stabilized to prevent further sedimentation. To be done properly, the ditch should be cleaned out for approximately one mile north, and one mile south. In addition, grass buffers should be planted along the banks to try and filter out farm field sedimentation. However, the town is concerned that by solving this flooding problem they will actually be allowing more water to reach St. John and intensify the flooding problem near Stephen Avenue.

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							COMPLETED and will be removed.
	Crosstown Road - Clean and stabilize ditch, plant buffers		Town officials			TN Woodville	There is a bridge on Crosstown Road, about 200' west of the intersection with McHugh Road. The bridge floods every spring and occasionally goes over the road. The residential yard at the southwest corner of the intersection gets flooded (the lawn is under water for several days). Raising the bridge would help prevent water from going over the road, but wouldn't help prevent the yard from being flooded. The ditch going north of this bridge is full of sedimentation and should be cleaned out. To assure proper water flow, the ditch should be cleaned out all the way to St. John. To help guarantee the ditch won't fill in with sedimentation again, a grass buffer should be planted along the ditch to help filter erosion and sediments. *COMPLETED and will be removed.*
	McHugh Road - Install bridge		Town officials			TN Woodville	There is a huge culvert on McHugh Road that fills with water every spring. Water flows from south to north here and fills up the culvert. The result is the excess water goes over the road. A bridge should be built to help prevent the water from going over the road and to accommodate the great amount of water trying to get through the culvert.

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							COMPLETED and will be removed.
	McHugh Road - Install a third culvert		Town officials			TN Woodville	On McHugh Road, south of State Highway 114, the road floods every spring. There are two small culverts that can't handle the amount of water. Although it would be ideal to build a bridge and go over the water, the area is too flat for a bridge. A third culvert should be installed. *COMPLETED and will be removed.*
	Harrison Road - Install larger culvert	TBD	Town officials	2026	Medium	TN Woodville	On Harrison Road, one half mile west of Elm Road, the culvert floods about every other spring. The existing culvert is undersized and should be replaced with a larger one. *Will seek funding and carry forward.*
	County Highway B and State Highway 57 - Raise building, possible ditch	TBD	Town officials	2026	Medium	TN Woodville	The northwest corner of the intersection of County Highway B and State Highway 57 floods every spring. Several acres of cropland flood, as well as an old tavern (now used for residential purposes). The water stays on the filed for several weeks. The area floods as a result of water backing up in the nearby Brillion Marsh. Dredging the Brillion Marsh would solve the long-term problem. In the short term, the building could be raised, and a ditch dug to help the water move away from the field and structure. Due to the age of the building, raising the building may not be possible.

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							Will seek funding and carry forward.
Severe Temperatures	Continue public information campaigns about severe weather on the website and during Winter and Heat Awareness Weeks.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	Public information campaigns occur annually in spring and fall ahead of the severe temperature potentials in summer and winter. As needed, information is updated when dangerously hot and cold periods occur. *Project is ongoing and will be carried forward.*
Storms: Hail	Educate the public (including school children) on the dangers of an approaching storm and steps to take that mitigate the danger.	Covered by annual budget	EM	Ongoing	Low	Calumet County and all municipalities within	Information will detail how people, animals, and vehicles should be inside a stable structure. If in a camper or mobile home, seek shelter either in the camper or home or go to a designated storm shelter. If on the water and a storm is approaching, get off the water and seek shelter in a vehicle or building. *Ongoing by emergency manager and CASO thru social media and in-person community and/or school presentations (STEP).* *Will carry forward.*
	Communities and road crews should remove dead or dying trees and branches that could fall during a storm. Likewise, road signs should be inspected to be certain supports are of sound condition and the signs securely fastened to their supports. If road signs are in poor condition, replace them.	Covered by annual budget	Highway Dept. and local jurisdictions	Ongoing	High	Calumet County and all municipalities within	*This is an ongoing maintenance items and will be carried forward.*

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	Individuals should maintain their buildings, if possible, to eliminate the potential for more damage.	Covered by annual budget	County, municipalities and residents	Ongoing	Low	Calumet County and all municipalities within	Broken or cracked windows should be replaced, and dilapidated siding and shingles should be replaced with stronger, more weather resistant siding and shingles. If a low- or moderate-income household, contact the County Planning Department to determine if there are grant dollars available to help with such improvements. *There are limited public programs, but the Northeast Wisconsin Housing Rehabilitation CDBG Program is administered on behalf of the region by the Brown County Planning Department. Will carry forward.*
	Support creation of a state building code to minimize damage to buildings caused by high winds and hail.	Covered by annual budget	County and municipalities	As proposed by the state or lobbyists	Low	Calumet County and all municipalities within	*Building inspectors and administrators of building codes are within local governmental unit. Calumet County does not administer building code regulations. This strategy would be suitable for elimination from the new plan. Will not be carried forward.*
Storms: Lightning	Place lightning safety materials on the website and distribute during severe weather week.	Covered by annual budget	EM	Ongoing	Low	Calumet County and all municipalities within	This is done annually in April in conjunction with spring's Severe Weather Week. *Will be carried forward.*
Storms: Thunderstorm	Place thunderstorm safety materials on the website and distributed during severe weather week.	Covered by annual budget	EM	Ongoing	Low	Calumet County and all municipalities within	This is done annually in April in conjunction with spring's Severe Weather Week. *Will be carried forward.*

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Storms: Tornadoes and High Winds	The Calumet County Emergency Management Program will work with communities to ensure tornado sirens are effective and covering the range intended.	Covered by annual budget	EM	2006-2009	Low	Calumet County and all municipalities within	EM will also help municipalities complete grant applications or other necessary paperwork to erect, replace, or repair new and existing sirens. *The Calumet County Emergency Management Program has shifted its limited resources to promoting NOAA weather radios and other electronic means of emergency notification as the primary means of public severe weather notification.* *Will not be carried forward.*
	Calumet County will work with partners to teach the public what protective actions are recommended in a tornado.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	*The Calumet County Emergency Manager and Calumet County Sheriff's Office (CASO) personnel implements the annual Student Tools for Emergency Planning (STEP) program within the county schools. Public education for severe weather is also provided and promoted thru regular social media activity and in-person events.* *Will carry forward.*
	Assist municipalities with drafting ordinances requiring that mobile homes be affixed to permanent foundations (or other measures) to minimize the potential for damages.	Covered by annual budget	Planning	Ongoing	Medium	Calumet County and all municipalities within	*Since the last plan update, the county planning department has assisted the Village of Potter and other townships without zoning with these types of activities.* *Will carry forward.*
	Work with communities to apply for grants to construct tornado shelters.	Covered by annual	EM	As requested	Medium	Calumet County and all municipalities within	*Thus far, this discussion has only occurred as part of individual discussions with our*

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		budget					*local partners (e.g., Town of Brothertown) in order to create useful mitigation strategies for this plan.* *Will carry forward.*
	Conduct a regular tree maintenance program.	Covered by annual budget	Highway Dept.	Ongoing	Medium	Calumet County and all municipalities within	Keep trees and shrubbery trimmed. Make trees more wind resistant by removing diseased or damaged limbs, then strategically remove branches so that wind can blow through. Strong winds frequently break weak limbs and hurl them at great speed, causing damage or injury when they hit. Debris collection services may not be operating just before a storm, so it is best to do this well in advance of approaching storms. *This is an ongoing responsibility for the Calumet County Highway Department. Will carry forward.*
	Remove any debris or loose items in your yard. Branches and firewood may become missiles in strong winds.		County residents	Ongoing		Calumet County and all municipalities within	*This is an individual effort and is not under the purview of the planning partners.* *Will not be carried forward.*
	Support creation of a state building code to minimize damage to buildings caused by tornadoes and high winds.	Covered by annual budget	State legislators	As proposed by the state or lobbyists.	Low	Calumet County and all municipalities within	*Building inspectors and administrators of building codes are within local governmental unit. Calumet County does not administer building code regulations.* *Will not be carried forward.*
	Consider installing permanent shutters to cover windows. Shutters can be closed quickly and provide the safest protection	Varies	County residents	Ongoing		Calumet County and all municipalities within	*This is an individual effort and is not under the purview of the planning partners.*

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	for windows.						*Will not be carried forward.*
	Strengthen garage doors. Garage doors are often damaged or destroyed by flying debris, allowing strong winds to enter. As winds apply pressure to the walls, the roof can be lifted off, and the rest of the house can easily follow.	Varies	County residents	Ongoing	Low	Calumet County and all municipalities within	*This is an individual effort and is not under the purview of the planning partners.* *Will not be carried forward.*
	Designate official emergency shelter within the Village and the Town.	Covered by annual budget	Village and town officials	2026	Medium	VI Stockbridge, TN Stockbridge	The village has a tornado siren which is well heard throughout the entire village. Although they have a siren, no provision was made for a designated tornado shelter. *Currently the Village believes people use their private residences and/or taking shelter within their own homes or a neighboring home. However, there has not officially been a designated shelter within the Village. It has been talked about at Town and Joint Meetings for various locations, but no agreement has been made.* *The Town of Stockbridge shares a municipal meeting hall with the Village of Stockbridge. The town feels this hall should be designated as the town storm shelter. The town and village should cooperate on designating a building as the official shelter, and, publicize such designation so the public is aware which building will be used for emergency*

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							purposes. Regardless of which place is designated the shelter, a generator should also be provided to ensure medical needs that require electricity, could be satisfied. The Village and the Town need to jointly agree and make plans towards resolving this. *The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project. Will be carried forward.*
	Adopt ordinance requiring mobile homes to be affixed to slabs with metal tie straps	Covered by annual budget	Village officials			VI Stockbridge	The village does occasionally suffer high wind and hail damage. In 2003, there was significant roof, vehicle, and structural damage to buildings. Although the village cannot control the hail or wind, they can take measures to prevent further damage to structures such as mobile homes. The village currently requires all mobile homes to be affixed to a permanent foundation. It is recommended the village enhance the ordinance thereby requiring mobile homes to also be affixed to slabs with metal tie straps. In addition, the ordinance could encourage structures used for human habitation to be surfaced with a non-dent siding. *The Village does not currently have a mobile home park. Will be removed.*
	Install siren		Town officials			TN Brillion	There is no tornado siren in the town. There is one in the nearby City of Brillion,

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							but people in Forest Junction (which has a mobile home park and many modular homes without basements) can't hear the siren. A town siren, placed in the Forest Junction area, is desired. *No plans to put siren in, not in the budget. Will be removed.*
	Adopt ordinance to require all mobile homes to be affixed to a permanent foundation	Covered by annual budget	Town officials			TN Brillion	To protect lives and buildings, there needs to be a provision for high winds, like tie down straps. The town should adopt an ordinance requiring all mobile homes to be affixed to a permanent foundation with some type of securing device, like a tie strap. *County takes care of zoning. Will be removed.*
	New siren(s)	TBD	Village officials	2026	Medium	VI Potter	A sudden tornado would render residents of the Village helpless. The current tornado siren is approximately 40 years old. It has to be triggered manually by volunteer fire department personnel. It is believed a newer, automatic siren would be more effective at preventing property damage and loss of life. *There are no current external funding sources for sirens. The community will determine if there is budget for purchase, installation, and maintenance. Will be carried forward.*
	Designate shelter and acquire generator	Covered by annual	Village officials	2026	Medium	VI Potter	There is no designated storm shelter in the village. The Village Hall is an older,

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		budget					pole type building. It has no generator. The Village Hall would not be a desired shelter. The United Church of Christ worship building would be an ideal shelter. The building appears to be the strongest building in the village. However, there is no generator at the worship building. If designated the shelter, a generator should be installed. *Funding sources will be sought and item will be carried forward.*
	New windows at Village Hall		Village officials			VI Potter	The Village Hall is an older, pole type building, on slab. The windows are similar to those installed in older mobile homes. They were installed in 1965 and have shown signs of deterioration. The windows are highly energy inefficient. The fear is high wind will blow the windows out or loose. New windows are needed. *COMPLETED by replacing several years ago. Will be removed.*
	Adopt ordinance, install tornado siren and build shelter south of STH 149	Covered by annual budget	Town officials	2026	Medium	TN New Holstein	At the Country Aire Mobile Home Park on the south side of State Highway 149, there needs to be provision for high winds, like tie down straps. The town should adopt an ordinance requiring all mobile homes to be affixed to a permanent foundation with some type of securing device, like a tie strap. More importantly, there is no way to alarm these residents of high winds or tornado.

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Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							They cannot hear the City of New Holstein siren at their location. The St. Anna Fire Department currently drives out there to warn the citizens, but, last year the truck was forced off the road in the storm and never made it to the park to warn of the storm. The park needs a tornado siren and/or a tornado shelter. *Continue to monitor. Will carry forward.*
	Publicize shelter designation at City Hall	Covered by annual budget	City officials	2026	Low	CI Chilton	City Hall is deemed the official city tornado shelter because it has a basement, generator, and kitchen. However, some of the public is not aware the shelter is available. The city should make better attempts at notifying the public of the designation. Once people are aware of the designation, there should not be a problem getting to the shelter. City Hall is conveniently located within one or two blocks off the main roads: US Highway 151, State Highway 32/57, and County Highway F. The fact that there are two tornado sirens in the city will help alert residents of the need to seek shelter. The sirens are located southwest of the intersection of Court Road and State Street, and, northwest of the intersection of Clay Street and Vogt Lane. The sirens are more than adequate for the city because their wail actually overlaps their ranges. *Will carry forward, changing the*

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							intersection of Court Rd. and State St. to Court Rd and Hiemann St.
	Create ordinance to protect any future mobile homes/mobile home parks	Covered by annual budget	City officials	2026	Medium	CI Chilton	As of the writing of this plan, there are no mobile home parks in the City of Chilton. Only one mobile home exists in the city. To protect any future mobile homes or mobile home parks, and their property and residents, it is recommended the city pass an ordinance requiring such structures be affixed to a permanent foundation with a metal tie- strap/device that can withstand high winds. *East Main St. and Water St. Will carry forward.*
	Adopt ordinance requiring mobile homes to be affixed to a permanent foundation	Covered by annual budget	Village officials			VI Harrison	There is a mobile home park along Ertl Road. The park has seven mobile homes, all of which sit atop block supports. There is also an old masonry building (former service station) on the site. Currently the town has no ordinance requiring mobile homes to be affixed to a permanent foundation with some type of tie strap or other securing device. The town should adopt an ordinance requiring all mobile homes to be affixed to a permanent foundation with some type of securing device, like a tie strap. This would help minimize property damage. Also, the masonry building should be designated the park storm shelter. The masonry building may be strong enough to protect lives from storm damage.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							The mobile home park on Ertl Road no longer exists. There are no other mobile homes located in the Village of Harrison nor are future mobile homes allowed to be constructed. Will be removed.
	Designate and promote storm shelters in the Village	Covered by annual budget	Village officials	2026	Medium	VI Harrison	The northern part of Harrison tends to get hit with more hailstorms than other parts of the town. Thankfully, during severe storms residents are appropriately warned and can seek shelter from such severe storms and tornadoes. The No. 2 Harrison Fire Department at the west end of the town has a tornado siren. The Village of Sherwood, approximately in the middle of the town, has three sirens. These sirens, combined, provide ample range and warning to Harrison residents. Although siren coverage is good, there are no designated storm shelters. In the more populated part of the village, the Darboy area, homes are newer and most have basements. However, homes in the lakeshore area only have crawls spaces. The new health club in Menasha (along County highway LP) could serve as a shelter, as well as Christ the Rock Church off Eisenhower Drive and US Highway 114. It should be discussed with the owners of these buildings to determine if these facilities could indeed be the designated shelters, and, the public made aware of such designations.

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							The Harrison Fire Department is currently underway with a new plan for storm shelters and working with businesses and property owners to designate these areas. Will be carried forward.
	Amend ordinance to require future mobile homes, mobile home parks, and their property and residents, be affixed to a permanent foundation	Covered by annual budget	Town officials			TN Brothertown	To protect any future mobile homes or mobile home parks, and their property and residents, it is recommended the town amend their existing zoning ordinance requiring such structures be affixed to a permanent foundation with a metal tie-strap/device that can withstand high winds. *Not able to be completed and will not be carried forward.*
	Build storm shelter for mobile home park residents		Town officials			TN Brothertown	Tornado sirens are clearly heard throughout the town. The lakeshore residents hear the siren by the Fishing Club on US Highway 151; others hear the City of Chilton sirens. If the sirens blare most residents would have time to seek shelter. However, residents in the mobile home park have no basements or designated shelter. A severe storm shelter should be built at the mobile home park to guarantee residents have a safe shelter. *Was not feasible and will not be carried forward.*
	Officially designate shelter and install generator at the Forest Junction		Town Officials			TN Brillion	The old school in Forest Junction now serves as the area's community center. It

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Community Center						is a strong building located very close to a mobile home park and modular home development. The building is currently considered the area storm shelter. This designation should be better publicized so residents are aware of the building's availability. In addition, a generator should be installed in the event someone in the shelter needs electricity for medical purposes. The new Town Hall is also a very strong building. It is made of block but has no basement. The town should consider designating two buildings as available for storm shelters, and, equip both with generators. *No plans to do this. Will be removed.*
	Designate storm shelter on CTH Q	Covered by annual budget	Town Officials	2026	Low	TN New Holstein	There is an Amish School on the north side of County Highway Q, slightly more than one half mile west of County Highway A. The school has no basement for the students to go to in case of severe weather. A storm shelter (e.g., nearby basement) should be designated. *This has moved to a new location on CTH HH, 1/10 mile east of Meyer Road. Will carry forward in the event that the Amish community requests assistance.*
	Designate a storm shelter	TBD	Town Officials	2026	High	TN Chilton	There is no designated storm shelter in the town. Some building should be

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							erected or designated as the official emergency shelter. The building should be equipped with a generator to meet medical needs requiring power, and refrigeration needs for prolonged shelter stays. *Will evaluate possible shelter options. Will also seek grants if a generator is needed. Will carry forward.*
	Designate an emergency shelter	TBD	Town Officials	2026	High	TN Rantoul	There is a Lutheran School along Trinity Road. The school has no basement for the students to go to in case of severe weather. A storm shelter (e.g., nearby basement) should be designated as the official shelter. *Funding was unavailable. Strategy will be carried forward and grant funding sought.*
	Mobile Home Park north of West Main Street - Homes be affixed to a permanent foundation	TBD	Village officials, residents	Ongoing	Medium	VI Hilbert	The mobile homes in the mobile home park are not required to be affixed to a permanent foundation, nor are they required to be secured to a slab with a secure device, such as a metal tie strap. In the event of a tornado or high winds, the mobile homes could be severely damaged and lives threatened. It is recommended the village adopt an ordinance requiring all mobile homes to be secured to a permanent foundation (either a poured foundation or secured to

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							a slab with a strap). *As mobile homes are being replaced, they are installing the concrete pads that allow the mobile homes to be better secured. This project is ongoing at this time and will be carried forward.*
	Amend ordinance requiring mobile homes to be affixed to a permanent foundation with a tie strap or similar device.	Covered by annual budget	City officials			CI New Holstein	The city has not had any tornadoes, nor have they been hit by high winds. There are two newer tornado sirens in the city, and, the city is considering a third siren to guarantee all portions of the city are within siren range. Sirens are located at New Holstein High School (1715 Plymouth St.), Mason Street (Honeymoon Hill) (2200 Mason St.) and NH Community Center at Kiwanis Park (1725 Silver Moon Ln.) Mobile homes are permitted in the city; however, the city does not have an ordinance requiring mobile homes be affixed to a permanent foundation with a tie strap or similar device. It is recommended the city amend their existing ordinance to require tie straps to avoid potential wind damage to these homes. *Was not feasible and will not be carried forward.*
	Designate emergency storm shelter	Covered by annual budget	City officials			CI New Holstein	The city does not have an officially designated storm shelter. In that City Hall is the only municipal building with a

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							generator, it is suggested City Hall be officially designated the storm shelter. (The fire department does have a generator; however, it is on a truck and would not be sufficient for a shelter. Also, the generator is needed for off-site emergencies.) *COMPLETED. New Holstein City Hall, New Holstein Fire Department and New Holstein High School are equipped with a natural gas generator and can be used as a storm shelter and/or EOC. Will be removed.*
	Designate a shelter and provide generator	TBD	Village officials	2026	Medium	VI Sherwood	There are two tornado sirens in the village. Although the village has been proactive in providing sirens to warn of a tornado, they fail to provide a local emergency shelter. A building should be designated as the local storm shelter and a generator provided. *Will seek funding and carry Item forward.*
	Adopt ordinance to require structures such as mobile homes be affixed to a permanent foundation	Covered by annual budget	Village officials	2026	Medium	VI Sherwood	The village sits at the northeast corner of Lake Winnebago, the state's largest inland lake. Due to the size of the lake, winds become very strong as they blow northeast. The Niagara Escarpment, a dolomite geological formation, buffers the east side of the lake thereby forcing more wind to go north. The result is high winds at the outlet, that part of the lake where the escarpment diminishes in presence. Some buildings in the village

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							have been damaged due to the high wind. Although there are no mobile homes in the village, the village seeks to be proactive in assuring such structures would not be completely destroyed by the high wind. It is recommended the village adopt an ordinance requiring all structures intended for human habitation to be affixed to a permanent foundation, and, encourage the external walls of all buildings be surfaced with a non-metal or other easily dented siding. *Will carry forward.*
	Install tornado siren	TBD	Town officials	2026	Medium	TN Charlestown	A significant portion of the town cannot hear neighboring cities' tornado sirens. The town should consider installing a siren in an area where the siren's range would cover underserved areas. *There are no current external funding sources for sirens. The community will determine if there is budget for purchase, installation, and maintenance. Will be carried forward.*
	Install tornado siren	TBD	Town officials	2026	Medium	TN Rantoul	A significant portion of the town cannot hear neighboring city or village tornado sirens. The town should consider installing a siren in an area where the siren's range would cover underserved areas. *There are no current external funding sources for sirens. The community will*

Report on Previous Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							determine if there is budget for purchase, installation, and maintenance. Will be carried forward.
	Create ordinance that requires mobile homes to be affixed to a permanent foundation	Covered by annual budget	Town officials	2026	Medium	TN Rantoul	Currently there is no ordinance in the town requiring mobile homes to be affixed to a permanent foundation with a tie-strap or other securing device. It is recommended the town adopt an ordinance requiring all structures intended for human habitation to be affixed to a permanent foundation in the manner mentioned. Per the 2000 census, there are twelve mobile homes in Rantoul. *Will carry forward.*
	Designate emergency storm shelter and install generator at the Town/Village Hall	TBD	Town officials	2026	Medium	TN Stockbridge	The Town of Stockbridge shares a municipal meeting hall with the Village of Stockbridge. The town feels this hall should be designated as the town storm shelter. However, currently people in the village use the daycare in the old St. Mary's School or the basement of the associated church as a tornado shelter. The town and village should cooperate on designating a building as the official shelter, and, publicize such designation so the public is aware which building will be used for emergency purposes. Regardless of which building is designated an area shelter, a generator should be provided to insure medical/refrigeration needs can be satisfied in the event power goes out in

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Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							the area. *Will seek funding and carry Item forward.*
	Create ordinance to require mobile homes be affixed to a permanent foundation	Covered by annual budget	Town officials	2026	Medium	TN Stockbridge	Currently there is no ordinance in the town requiring mobile homes to be affixed to a permanent foundation with a tie-strap or other securing device. It is recommended the town adopt an ordinance requiring all structures intended for human habitation to be affixed to a permanent foundation in the manner mentioned. *Will carry forward.*
	St. John's Church building (emergency shelter) - Educate public on shelter, install generator	TBD	Town officials	2026	Medium	TN Woodville	The designated emergency shelter for town residents is the basement of St. John's parish building located at the southeast corner of the intersection of County Highways B and BB. The town should better publicize the shelter to residents so they are aware of where to go in the event of a severe storm. Also, to accommodate individuals that need medical equipment, or the need for refrigeration, etc., a small generator should be installed. *Will seek funding and carry Item forward.*
	Monitor tornado siren	Covered by annual budget	Town officials	2026	Medium	TN Woodville	The Town of Woodville does not have a tornado siren. Residents hear the Sherwood, Harrison, Hollandtown or Hilbert sirens. The town should review the ranges of neighboring sirens to guarantee all residents are within hearing

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							range of a siren. If it is found there is a lapse in coverage, a siren should be installed that adequately serves the needs of town residents. *There are no current external funding sources for sirens. The community will determine if there is budget for purchase, installation, and maintenance. Will be carried forward.*
	Amend ordinance facts / mobile homes and wind damage	Covered by annual budget	Town officials			TN Woodville	The town has a mobile home ordinance. That ordinance requires mobile homes to be on a solid foundation. The town should amend their existing ordinance to include language requiring the mobile homes be affixed to that permanent foundation with a tie strap or other device which helps prevent wind/home damage. *County Zoning has addressed this issue. Will be removed.*
Storms: Winter	To minimize accidents during icy conditions or blizzards, residents are encouraged to avoid travel during winter storms.	Covered by annual budget	EM	Ongoing	Low	Calumet County and all municipalities within	*Promoted through county social media and other outreach education at least annually during November's Winter Weather Awareness Week. Will carry forward in combination with the next three strategies.*
	During periods of extreme low temperatures, stay indoors, if possible.	Covered by annual budget	EM	Ongoing		Calumet County and all municipalities within	*Promoted through county social media and other outreach education. Will carry forward be deleted as a separate strategy.*
	Residents are encouraged to watch the	Covered	EM	Ongoing		Calumet County and all	*Promoted through county social media*

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	weather reports so they can dress accordingly. Dress in layers of lightweight warm clothes. Be certain your face, hands, and feet are covered to help avoid frostbite.	by annual budget				municipalities within	*and other outreach education. Will carry forward be deleted as a separate strategy.*
	The Calumet County Planning Department will ask the UW-Extension Office to educate drivers on matters such as carrying a disaster supply kit in their car, keeping the gas tank full to avoid freezing or running out if needed to keep warm, and what to do if your car breaks down or gets stuck in snow.	Covered by annual budget	Planning	2006-2008 and ongoing		Calumet County and all municipalities within	*County planning staff has promoted this strategy on a limited basis, but it is primarily done thru the Calumet Co. Emergency Management Program, and the EM will continue to be the primary lead on this task into the future. Will be carried forward, with Emergency Management being the responsible department.* *Promoted through county social media and other outreach education. Will carry forward be deleted as a separate strategy.*
	The Calumet County Planning Department shall continue to apply for grants to help low- and moderate-income individuals with repairs that will ensure their warmth and safety in their home.	Covered by annual budget	Planning	Ongoing	Low	Calumet County and all municipalities within	*There are limited public programs, but the Northeast Wisconsin Housing Rehabilitation CDBG Program is administered on behalf of the region by the Brown County Planning Department.* *Will be carried forward.*
	Monitor ice cover on railroad trestle	Covered in annual budget	Street Department	Ongoing	Low	CI Chilton	The trestle was only one of two places the city has experienced ice damage/problems. Approximately 40 years ago the railroad trestle located between Breed and Center Streets experienced an accumulation of ice. That spring, as ice flowed down the South

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							Branch of the Manitowoc River, ice built up at the trestle and made it impassable. There has not been a problem since. As run off in the city enters the river, and as weather conditions change, this situation should be monitored. The railroad that services the city and surrounding area is vital to many of the businesses. Without rail transportation the businesses would have to transport goods via trucks, which is a more expensive mode of transport for such goods. *Both Irish Road Bridge and RR Bridge had ice build-up approximately 2-4 years ago. The Street Department used Fyke poles and backhoe to dislodge ice at both locations.* *Will carry forward.*
	Monitor flooding and erosion on Center Street bridge	Covered by annual budget	City officials	Ongoing	Low	CI Chilton	About 35 years ago the snow and ice in the South Branch of the Manitowoc River experienced a rapid thaw. At the Center Street Bridge, the water rose so high that it came up to the bottom of the bridge. Also, due to the amount of water, there was turbulence at the bank and the bank experienced some erosion. The bridge was eventually replaced with a higher bridge. There has not been a problem since. This area should be watched to make sure thaws are not creating turbulence that erodes away the bank. If the area does experience erosion, riprap

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							will need to be placed at the bank to minimize potential problems. *Will carry forward.*
	Encourage homeowners along Lake Winnebago to have sound retaining walls and shore protection	Covered in annual budget	Village officials	Ongoing	Low	VI Harrison	At the north end of Lake Winnebago ice shoves are common. The shoves damage shorelines, and on occasion lawns and structures. Property owners need to better stabilize their shorelines with retaining walls or large riprap that can minimize the piling ice. *While ice shoves have been noted throughout the years, there are no specific property owner complaints logged regarding their shorelines. The Village of Harrison encourages all riparian property owners to continue maintaining and reinforcing their shorelines to avoid property damage.* *Will carry forward as a public information strategy.*
	Install non-skid surface on USH 151 bridge to alleviate slipperiness during periods of frost		Town officials			TN Charlestown	The US Highway 151 Bridge over Pine Creek becomes very slippery during periods of frost. The bridge should be resurfaced with some type of material which makes the bridge surface less slippery. *This is a US Highway and the responsibility of the federal government.* *Will be removed.*
Utility Failure	Install arrestors to minimize power					TN New Holstein	Lightning storms routinely take

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	outages						transformers out of service. In 2003 there was a storm that took out 4 transformers in one area. The power company should install lightening arresters on the transformers to prevent them from being struck by lightning. *The electric utilities in the township continue to monitor locations where lightning/storms are a concern and address those locations on a site-by-site basis. Will be removed.*
	Bury electrical lines in the village	TBD	WPS	2026	Medium	VI Potter	When there is a big storm, particularly an ice storm, the power goes out in the village. This occurrence is more pronounced when there tends to be more ice accumulating on the lines. It is recommended WPS, the electric provider, bury all overhead lines. Loss of power for an extended period of time can mean a loss of heat during the winter months. Besides displacing people, other damage to property can occur including burst water pipes, and sanitary traps. Local public buildings are also frequently subjected to power outages and a loss of heat generating ability, thereby limiting the usefulness of public buildings as shelters during prolonged winter power outages. *Will be carried forward.*

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	Install larger generator at Village garage, west of STH 55, south of West Lake Street		Village Officials			VI Stockbridge	During electrical and ice storms, the power goes out at the Village Garage leaving no method to raise the garage doors for service vehicles to exit and provide service. Currently the Village Garage does use a small household generator for emergencies; however, the generator is not of adequate size. A larger generator should be supplied to meet the needs of the Village Garage and any other emergency needs for the village. *The Village does not currently have a Village Garage. Will be removed.*
	Utility companies typically inspect their facilities to be certain wires, cables, etc. are not slack or down. If you notice the cover is off a utility box, a problem with a transformer, a downed line, or other unusual condition, call the respective company so they can attend to the problem before a storm approaches and makes a dangerous situation worse.	Covered by annual budget	Utility Companies	Ongoing	High	Calumet County and all municipalities within	*This is regularly completed by the private utilities and will be removed from this plan going forward.*
	Generator at Community Center and Elementary School		Village officials	2013		VI Hilbert	The area has not been hit by tornado, nor has there been many severe storms. The village does have a tornado siren. It is located east of the village hall and is in sound, working condition. Its range covers the entire village and outlying areas. The elementary school east of State Highway 57 has been designated

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							the official shelter. However, although wired for a generator, there is no generator to meet emergency electrical needs. It is recommended a generator be installed at the elementary school. Although not officially designated as a shelter, the village uses the Community Center as a shelter. It has a generator to meet electrical needs. The village shop, adjacent to the village hall, does not have a generator but employees are capable of lifting the overhead doors to allow road maintenance trucks to exit. No generator is needed at the shop. *COMPLETED. The school district built a new elementary school attached to their high school building. The old elementary school east of Highway 57 was razed. We attempted to have a generator installed as part of the new elementary school but they made the decision not to include this with the project. We do have full generator power at the village hall that was included when we constructed a new well at the village hall location. The generator is capable to power up most of the building. This was completed in 2012-2013 and will be removed.*
	Install generator at Town Hall or Garage	TBD	Town officials	2026	Medium	TN Woodville	Power in this area is provided by overhead lines. There is concern that during ice storms the power will go out and the road crew will not be able to manually lift the doors on the town

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							garage. In addition, trucks will not be able to start and provide ice or snow removal. The town garage is an older building with heavy doors. A generator should be installed in the garage, or in the neighboring town hall and a line run to the garage, to guarantee trucks will start and be able to exit the garage. *One door has been updated and could be lifted in case of an emergency. No generator at this time.* *Will seek funding and carry forward.*
	Install generator at Town garage		Town Officials			TN Brillion	The new Town Hall/Garage has remote control doors. In the event of a power outage, doors would have to be lifted manually. Due to size and weight, this would be very difficult. A generator would help get the doors open faster. In addition, if the power remains out for an extended period of time in cold weather, the trucks might not start. A generator would not only guarantee the doors could be raised, but would also serve as a power source to get maintenance vehicles running and operable. *No plans to do this. Will be removed.*
	Acquire generator at fire department	TBD	Town Officials	2026	High	VI Potter	The Fire Department is housed adjacent to the Village Hall. Neither the Department nor the Hall has a generator. The Fire Department has four manual doors, and two electric doors. One truck

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							has a small, portable generator. In the event the power goes out, and there was an emergency warranting the services of the Fire Department, the village is concerned they would not be able to lift the heavy manual doors safely and efficiently. A generator should be installed at the Fire Department in case of emergency (the portable generator is insufficient). *Funding was unavailable. Strategy will be carried forward and grant funding sought.*
	Acquire generator for Town of Rantoul garage	TBD	Village and Town Officials	2026	High	VI Potter, TN Rantoul	The neighboring town, Town of Rantoul, provides village road maintenance. The Town Garage is an older building with no generator. The Village is concerned that if there was no power, the truck batteries could freeze and render the vehicles inoperable, or, town staff may not be able to lift the doors to get any operable trucks out to do the service. Recommendation is to purchase and install a generator. *Funding was unavailable. Strategy will be carried forward and grant funding sought.*
	Install generator at town garage	TBD	Town Officials	2026	High	TN New Holstein	In the event of a heavy ice storm, the power lines could snap and the power be lost at the Town Garage. Without power, the building will lose heat, and over a

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							period of just a few hours, the trucks freeze. If the trucks can't start, there is no way to provide road services, like snow removal or salting/sanding ice. A generator should be installed at the Town Garage. *Funding was unavailable. Strategy will be carried forward and grant funding sought.*
	Install a generator at the town hall	TBD	Town Officials	2026	High	TN Chilton	There is no designated emergency shelter in the town. Although the Town Hall would not be suitable as a tornado shelter, it could be used for other emergency purposes (e.g., evacuation). Some type of generator should be installed though to make sure medical needs requiring power can be accommodated. *Funding was unavailable. Strategy will be carried forward and grant funding sought.*
	Install generator at the village garage		Village Officials			VI Harrison	The town is very concerned about how they would provide road maintenance services in the event of a power outage. The doors on the Town Garage are very heavy. Without electricity they would need five men to lift the doors. It is recommended a generator be installed so road crews can provide services during outages. The village thinks they would need a 40,000k generator.

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							COMPLETED. The Village of Harrison currently has a fuel generator onsite to operate the Municipal Building in the case of a power outage. It is not mounted but would easily be able to be connected when needed. The municipal building has also been updated and expanded, so accessibility of equipment in case of an emergency would no longer be an issue. Will be removed.
	Install generator at town hall and garage	TBD	Town Officials	2026	High	TN Brothertown	At the Town Hall and Garage there is no generator. There is concern in the event of storms there is no "safe place" for residents and a generator could help with this issue. It should be noted that the Town Hall is not large enough to accommodate many residents, and therefore should not be designated an official shelter. However, with a generator it could be a limited, or temporary, shelter for some residents. In addition, if power goes out, the snow removal vehicles would not be able to be charged, resulting in no winter road maintenance until the power was restored. *Funding was unavailable. Strategy will be carried forward and grant funding sought.*
	Install generator and rebuild roof at town hall	Unknown	Town Officials	Winter 2006	High	TN Brothertown	The roof on the Town Hall is flat. Snow builds up on the roof. A heating cable has been installed to melt the snow so the

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Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							roof doesn't leak. This is inefficient, and, if the heater fails, the roof will leak. A gable roof or façade should be installed. Additionally, in the event a new roof or façade cannot be built, a generator should be installed to guarantee the roof is heated (to melt the snow). The roof is scheduled for insulating winter of 2005-2006. *COMPLETED. This was completed in the Winter of 2005-2006 and will be removed.*
	Provide generator for village garage on Clifton Road	TBD	Village Officials	2026	High	VI Sherwood	During some storms the power at the village garage goes out and it is difficult to open the garage doors. The doors can be lifted manually; however, they are heavy and difficult to maneuver. A generator at the garage would allow service doors to be opened and road crew to exit and provide necessary services. *Funding was unavailable. Strategy will be carried forward and grant funding sought.*
	Install generator at town garage	TBD	Town Officials	2026	High	TN Charlestown	There is concern that during an ice storm, or other severe storm, the power will go out at the Town Garage and the road crew will not be able to lift the heavy doors to get the road maintenance vehicles out to provide services. In addition, if the power remains out for an

Report on Previous Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							extended period of time in cold weather, the trucks might not start. A generator would not only guarantee the doors could be raised, but would also serve as a power source to get maintenance vehicles running and operable. *Funding was unavailable. Strategy will be carried forward and grant funding sought.*
	Install generator at town garage	TBD	Town Officials	2026	High	TN Rantoul	During some storms the power at the Town Garage goes out and it is difficult to open the garage doors. The doors can be lifted manually; however, they are heavy and difficult to maneuver. A generator at the garage would allow service doors to be opened and road crew to exit and provide necessary services. Since the town also provides road maintenance services to the neighboring Village of Potter, being able to open the doors and provide service is very important. Also, in the event of a heavy ice storm, the power lines could snap and the power be lost at the Town Garage. Without power, the building will lose heat, and over a period of just a few hours, the trucks freeze. If the trucks can't start, there is no way to provide road services, like snow removal or salting/sanding ice. Again, a generator should be installed at the Town Garage. *Funding was unavailable. Strategy will be*

Report on Previous Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							carried forward and grant funding sought.
	Upgrade grid to alleviate unreliable power grid during storms	TBD	WE Energies	2026	Medium	VI Sherwood	When there is a big storm, particularly an ice storm, the power goes out throughout the entire village. This occurrence is more pronounced in early winter or late spring when there tends to be more ice accumulating on the lines. The system is unreliable due to age and design. Most of the lines in the village are buried; however, the lines on the outskirts of the village are not. It is recommended WE Energies, the electric provider, either bury all lines, or update the grid. Loss of power for an extended period of time can mean a loss of heat during the winter months. Besides displacing people, other damage to property can occur including burst water pipes, and sanitary traps. Local public buildings are also frequently subjected to power outages and a loss of heat generating ability, thereby limiting the usefulness of public buildings as shelters during prolonged winter power outages. *Will be carried forward.*
	Provide generators for the lift stations at Stommel Road and Windswept Lane	TBD	VI Sherwood officials	2026	Medium	VI Sherwood	There is a concern that if the power goes out, the lift stations at Stommel Road and Windswept Lane will not work and the water will back up and bypass to Lake Winnebago, thereby contaminating the lake. Generators are needed at the two lift stations.

Report on Previous Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							Will seek funding and carry forward.
	Monitor exposure of ANR pipeline	TBD	ANR Pipeline	2026	Medium	TN Rantoul	The Town of Rantoul is unique in that it has some high technology infrastructure. The ANR Pipeline runs across the east edge of the Town, and a fiber optic line runs buried along Irish Road. Most of the pipeline is buried, but a portion of the line runs through a large wetland and can't be buried and therefore it lies above ground. The town is concerned what exposure to the natural elements, frost, and wildlife could do to the pipeline. In addition, there is concern that the portion above ground could be a target for terrorists whereby they could infiltrate the line and use it as an explosive or other weapon. The town should monitor this situation in case there is an opportunity to fill over the pipeline in the wetland. If such an opportunity should arise, the town should work cooperatively with the gas provider to bury the line. *Will be carried forward.*

Appendix E: Summary of Mitigation Strategies

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
All Hazards	Continue to promote the increased use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	This is an ongoing strategy that is accomplished at public relations and community education events as they arise.
	Continue to add/update Emergency Management Department links on the existing county web site (e.g., ARC, Homeland Security/FEMA, WEM) especially focusing on preparedness bulletins. Publicize the website to inform the community.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	This is an important way to provide community members with one location to find credible information and will be carried forward. Updates occur randomly as new "web-worthy" information is received.
	Assess how Calumet County implements warnings and determine how to enhance those capabilities and educate the public on the warning system.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	Calumet County replaced the existing emergency notification system with AlertSense in December, 2018. This new system allows the public to sign up for individual alerts in addition to receiving reverse 9-1-1 and IPAWS emergency notifications. In addition, the Calumet County Emergency Manager and Calumet County Sheriff's Office (CASO) personnel implements the annual Student Tools for Emergency Planning (STEP) program within the county schools. Public education is also provided thru regular social media activity.

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	Obtain and distribute NOAA All-Hazards Weather Radios to all identified "special facilities" within the county.	$5,000	EM	2021-2023	High	Calumet County and all municipalities within	Identified "special facilities" include, but are not limited to, public & private schools, hospitals/medical facilities, CBRFs, adult cay cares, nursing homes/assisted living, child care facilities, public/private response agencies and other large congregate facilities.
Drought and Dust Storms	The Calumet County Land and Water Conservation Department will work with residents to promote water conservation, planting of drought tolerant native vegetation, and use of reduced tillage practices on cropland to reduce soil moisture losses.	Covered by annual budget	LWCD	Ongoing	Medium	Calumet County and all municipalities within	The Calumet County Land and Water Conservation Department will work with residents to promote water conservation, and use of reduced tillage practices on cropland to reduce soil moisture losses. Watershed planning in flooding section includes strategies for reduced tillage and the use of cover crops. Calumet Co. LWCD takes opportunities as they arise to work with the community on education around water management and to help improve these practices.
	Residents should use mulch to retain moisture in the soil. Mulch also helps control weeds that compete with landscape plants for water.	Covered by annual budget	LWCD	Ongoing	Low	Calumet County and all municipalities within	Mulch is used to maintain moisture in the soil during establishment, which helps reduce erosion.
	Residents are urged to check their plumbing and wells to be certain they are not leaking and wasting water.	Covered by annual budget	LWCD and UW-Extension	Ongoing	Low	Calumet County and all municipalities within	

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
Earthquakes	Provide public information as requested regarding the extremely low risk of earthquakes and earthquake damage in Calumet County.	Covered by annual budget	EM	Ongoing	Very Low	Calumet County and all municipalities within	Information on the risk and safety measures will be provided upon request.
Woodland Fires	The Calumet County Emergency Management Program shall assist with writing grants to secure vehicles and equipment capable of reaching secluded areas where a woodland fire could occur.	Covered by annual budget	EM	As requested	Medium	Calumet County and all municipalities within	
	The Calumet County Emergency Management Program will work with the WDNR and local fire officials to develop educational programming with the goal of minimizing wildfires.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	
	Develop Firewise communities that do not plan residential developments adjacent to areas susceptible to woodland fires.	Covered by annual budget	LWCD	Ongoing	High	Calumet County and all municipalities within	Although aesthetically it is enjoyable to be adjacent to such amenities, building near them is putting homes and lives at risk. This is especially important in areas laden with ash species because they are susceptible to the emerald ash borer beetle, which kills the tree and increases the fuel load for fires. The mechanism for change is through Smart Growth Planning.
Flooding and Dam Failure	Communities are advised to review the Federal Emergency Management Agency's Flood Insurance Study for Calumet County and note areas identified as having flooding problems, and, follow flood protection measures identified.	Covered by annual budget	EM	Ongoing	High	Calumet County and all municipalities within	New FIRMS were available as of 2009, and all communities have them.

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	To minimize flooding to new structures constructed in a floodplain, all communities with floodplain ordinances shall continue to administer floodplain ordinances. It is encouraged existing structures be brought into compliance with those ordinances.	Covered by annual budget	EM, all municipal officials	Ongoing	Very High	Calumet County and all municipalities within	The County administers the program for townships and unincorporated areas. Incorporated areas have their own ordinances. The Calumet County Land and Water Conservation Department employs an Erosion Control and Stormwater Specialist who administers Erosion Control and Stormwater Ordinances in the unincorporated portions of the County. Ordinances aim to reduce sediment delivery from ground disturbing constructions sites and manage stormwater runoff from developed sites post-construction. The Erosion Control and Stormwater Specialist can also provide assistance in evaluating site specific flooding hazards impacting roads, bridges, culverts and cropland for municipalities and landowners needing assistance.
	Calumet County LWCD will work with the individual communities to minimize localized, road, bridge, culvert, and crop flooding.	Covered by annual budget	LWCD, Highway, and EM	2030	High	Calumet County and all municipalities within	LWCD can help determine if and when individual community mitigation strategies can be implemented and is aware of some mitigation strategies that may be more effective as well as potential grant dollars and cost sharing that can aid in reducing the cost of such strategies. LWCD will focus on watershed planning which focuses on water quality but will provide benefits in the reduction of

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							sediment in local waterways and small-scale water retention when possible. Timeline: EPA 9 Key Element Watershed planning will aim to include all watersheds by 2030.
	Develop an emergency plan to protect ground and surface waters from the hazards mentioned in this section (e.g., spring thaws).	Covered by annual budget	LWCD, WDNR	Ongoing	High	Calumet County and all municipalities within	LWCD will work with the WDNR to implement NR 151 Agricultural and Erosion Control and Stormwater performance standards which will reduce pollution from the hazards mentioned in this section (e.g., spring thaws).
	For those cities or villages that have experienced inundated sewer laterals, the Calumet County Planning Department will assist them with writing grants to repair such facilities.	Covered by annual budget	EM	Ongoing as requested	Medium	Calumet County and all municipalities within	The USDA may be a funding source.
	All municipalities with dams shall continue to inspect the dams or work with the WDNR to inspect them. Any maintenance issues shall be addressed.	Covered by annual budget	All affected municipalities	Ongoing	Medium	Calumet County and all municipalities within	Calumet County does not "own" any dams as these structures are the responsibility of the municipalities and/or private land owners with general oversight from the WDNR.
	Assist communities with grant applications necessary for dam maintenance.	Covered by annual budget	EM	Ongoing as requested	Low	Calumet County and all municipalities within	
	Work with the responsible jurisdiction to develop and maintain Emergency Action Plans (EAPs).	Covered by annual	EM, WDNR	Ongoing as requested	Medium	Calumet County and all municipalities within	

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
		budget					
	Ditch south from CTH E to Hickory Hills Road to minimize flooding	TBD	Village officials	2026	Medium	VI Stockbridge	Significant flooding occurs in areas of the village. A new culvert helped with flow but continues to cause flooding issues. A report was done previously which recommended a ditch/swale be installed on the east side of the residential lots located east of State Highway 55 and that the ditch be dug south to Hickory Hills Road. The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project.
	Perform ditch maintenance at the sewage treatment plant on West Lake Street to minimize flooding and potential plant infiltration	TBD	Village officials	2026	Medium	VI Stockbridge	The pond at the Sewage Treatment Plant is a man-made pond which the WDNR has ordered to be filled in. Water is then displaced and there is potential for system infiltration. Thoroughly cleaning a lengthy stretch of the stream may alleviate flooding issues. The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project.
	Larger culvert at creek crossing – STH 55, south of Enterprise Street	TBD	Village officials	2026	High	VI Stockbridge	The culvert at the north end of the village is not large enough to move the water coming from the east and causes flooding, which occasionally goes over the state highway. Wisconsin DOT was contacted by the

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							Village of Stockbridge before and after the road was updated in hopes that they would correct the flooding and the erosion of the bank near the public sidewalk. It was reported and the State has never replied with a response or update. The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project.
	Create and enact water management plan at Union Street and Davis Street	TBD	Village officials	2026	High	VI Stockbridge	Currently two metal culverts that are not large enough to accommodate the amount of water; they should be enlarged. Mud Creek crossing the Church property needs to be dredged to accommodate more water flowage. Ditching at the corner may not be the solution. Ditching/larger culvert may lead to potential flooding at the water plant. The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project.
	Ditch enhancement – South Military Road (STH 55) and Hickory Hills Road	TBD	Village officials	2026	High	VI Stockbridge	An un-named creek crosses under South Military Road (State Highway 55) and Hickory Hills Road. In the past, there has been a crop damage and a significant amount of flooding from water coming near the foundation of the home at the subject site. There are culverts at the crossing but the ditch needs to be

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							enhanced to provide for a steeper bank, thereby eliminating the ability of water to creep the bank and flood the property. Village still believes that there could be some ditching to increase water flowages in the area away from homes, yards and crops. The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project.
	Bank stabilization on Sunset Beach Road	TBD	Village officials	2026	High	VI Stockbridge	The culvert was replaced several years ago with two culverts and rip rap; it appears to be adequately handling water and the rip rap is stabilizing the bank. However, the west end of the road is showing some signs of erosion. The creek bank should be stabilized to prevent further damage and sedimentation into the creek. Periodic cleaning of the culvert before the private road would be maintained as needed. The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project.
	Ditching at the southwest corner of the	TBD	Village	2026	High	VI Stockbridge	Near what is known as "Kidney Pond,"

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	intersection of West Lake Street and Lakeshore Drive		officials				the land to the north is very low and continually has standing water. There are two culverts in the area, one flowing east and one flowing south. However, the land is too flat to force the water to flow through the culverts. It is recommended ditches be installed to help the water drain from the surface *and be forced through the culverts.* The Village believes that some ditching should be completed jointly by the County and the Village in order to ease the flow of water in that area. The The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project.
	Enlarge culvert at STH 55 and Davis Street	TBD	Village officials	2026	High	VI Stockbridge	The culvert has been adequate until recently. However, the school built an addition and there is concern that the added runoff from the added impervious surfaces may result in too much water flowing to the culvert. This may cause flooding and enlarging the existing culvert would allow it to handle the increased water load. The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project.
	Raise Irish Road to alleviate flooding	TBD	Town officials	2026	Low	TN Brillion	Along Irish Road, just south of the old

Summary of Mitigation Strategies

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							stone bridge, the area always floods and water goes over the road. The best way to solve the problem would be to raise the road.
	Center Road - Clean ditch	TBD	Town officials	2026	Low	TN Brillion	Water has a difficult time flowing south due to drainage ditches verging together at Center Road just south of Conservation Road. This is partially due to sedimentation in the Brillion Marsh and sediment/weeds in the ditches. The ditch gets clogged one-half miles south and needs to be cleaned. The farmer who owns the land around the ditch farms directly up to the ditch, allowing eroded soil to flow directly into the ditch.
	Mitigate well contamination of municipal water supply on east half of village	TBD	Village officials	2026	High	VI Potter	A portion of the east half of the village is periodically inundated and soils saturated due to the North Branch of the Manitowoc River. The land to the west of the village is at a higher elevation and forces water to run down the slope across the entire village to the river. The village does not have a municipal water supply. All development is on private wells which are mostly very old. Well testing has revealed problems with bacteria and nitrates in the well water supply. Contaminants may be entering the water supply through the older wells after floods and heavy rains. Sealing the wells could help but it not cost effective.

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							Drilling a municipal well or connecting to an adjacent municipal water supply may help. Very expensive and there are budgetary restraints.
	Ditching and bank stabilization on creek north of Main Street; bank stabilization at Center Street and creek crossing	TBD	Village officials	2026	High	VI Potter	The creek north of Main Street (County Highway PP), west of Center Street (County Highway Y), meanders north and then east. During heavy rain the water has bypassed its natural creek bed and flooded and eroded a new "path" over the lands to the east. The creek needs to be enhanced, possibly through ditching, to keep water flowing in its natural route, and, the bank stabilized. At the north end of Central Street, a creek crosses under the road. Just east of the crossing, on the south side of the creek, there was a concrete retaining wall. Water has undermined the wall and caused it to break and slump into the creek. The garage on the subject property is approximately 15' from the wall and the fear is the shore will now erode up to the garage, or at least significantly onto residential land. The wall needs to be removed and the bank stabilized, probably with riprap.
	New pipe at North Branch of the Manitowoc River	TBD	Village officials	2026	Medium	VI Potter	A sewer lateral lies under the riverbed, just north of the Main Street (County Highway PP) bridge. The lateral is bent and it is believed water is infiltrating the

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							pipe causing undo use of the sewage treatment plant. The pipe needs to be replaced.
	Construct new plant or make enhancements at the Wastewater Treatment Plan	TBD	Village officials	2026	Very High	VI Potter	The sewage treatment plant was built in 1965. The plant is showing signs of age and needs some improvements. The plant was built in the floodplain of the North Branch of the Manitowoc River. Due to its location, the plant experiences periods of inundation. Also, due to heavy flooding in the Village, some of the sewer lines along the roads are infiltrated and some homes experience sewage backing up into their basements. The system is currently sized accordingly; however, the village is expected to triple in size over the next 20 years. It currently operates at 60% capacity. Replacement may occur over the next 20 years with grant assistance but with approximately $60K annual sanitary budget, it is a very difficult task.
	Reconstruct Kiel Road to minimize damage to road caused by flooding	TBD	Town officials	2026	High	TN New Holstein	On Kiel Road, slightly more than one half mile west of the intersection with Irish Road, the shoulder of the road tends to wash out during heavy rains. The road needs to be reconstructed with wider, flatter shoulders
	Monitor effectiveness of restrictor to control runoff on Highway 57 near the city TIF district. Consider a detention	TBD	Town officials	2026	Medium	TN New Holstein	Along the east side of State Highway 32/57, near the City of New Holstein TIF District, the town experienced a lot of

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	pond to control the adverse runoff						flooding since the TIF District was created. The flooding has resulted in a lot of crop damage. In the summer of 2004, the city put in a restrictor to control the runoff from the TIF District. If there is flooding in the future, a detention pond should be installed to control the adverse runoff. Detention Ponds have been installed; continue to monitor downstream at location on STR 57 as water floods resident backyard and continues to cause crop damage.
	Dredging, education, riprap, new bridge to control flooding (citywide tributaries, their floodplains and Main Street Bridge)	TBD	City officials	Ongoing	High	CI Brillion	All the tributaries in the city flood during heavy rains. The tributaries swell and about every ten years the floodplains of the tributaries flood. Flooding is particularly severe south of West Water Street, at times reaching the bottom of the Main Street Bridge. The City is concerned about property damage and that additional flooding will infiltrate the storm and sewer system; and over city roads, resulting in potential traffic problems. A dam built at Hacker Road on the north end of the city in 1997 alleviates some flooding that comes from the north; however, water still swells the tributaries. The marsh cannot filter any water and results in the tributaries backing up. The city believes that dredging the marsh may resolve this.

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							Contractors and developers need to control erosion on construction sites. Farmers need to be better educated about the effects of their farming practices. Placing rip rap along the stream banks would prevent erosion, which also adds to the sediment problem. Dredging existing ditches and tributaries could temporarily help lower water levels but would fill up again as the marsh rejects the water. Elevating the bridge may help but would likely only be a temporary solution. Will be looking at the bridges in the next several years.
	CTH PP – New culvert and ditching due to undersized culvert	TBD	City officials	Ongoing	High	CI Brillion	The creek that runs through Deer Run Golf Course annually floods per its 100-year floodplain boundaries. The flooding has resulted in property damage and loss of revenues to the golf course. The water attempts to go under County Highway PP and flow west to the Brillion Marsh. The culvert at CTH PP is undersized and needs to be enlarged to alleviate the flooding. In addition, the creek should be ditched to help retain the water within its banks and minimize the flooding.
	Kennedy Drive and Horn Street – New culverts and ditching due to undersized culverts	TBD	City officials	2026	High	CI Brillion	The area east of Kennedy Street and north of Horn Street floods annually with spring runoff. The tributary floods and four properties in the area are affected with the floodwaters. Larger culverts are

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							needed at the two roads to help the water flow. In addition, ditching could help retain the water within the banks and minimize flooding. The homes in this area are newer, and have been built to floodplain specifications; however, due to the overall water problem in the city, the land experiences more flooding than anticipated. The flooding in this area has been severe enough to flood the basements of the homes. This area is now looking at becoming developed, so there will be some changes coming in the next couple of years.
	Black Creek – Dredge; flooding adjacent to residential property	TBD	City officials	Ongoing	High	CI Brillion	Black Creek doesn't flow and floods that portion of Deer Run Estates Subdivision east of Golf View Drive. One of the homes adjacent to the creek always floods. The home is only three years old, and was built according to flood proofing specifications. However, due to the amount of water in the city's tributaries, the creek experiences more water than anticipated. The creek needs to be dredged out and its banks steepened so as to ensure the creek can hold more water. As the area develops, it is anticipated more runoff from the added impervious surfaces will only increase the amount of water entering Black Creek; therefore, it is also recommended homes be constructed above the

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							required flood proofing standards to help minimize negative water problems associated with Black Creek.
	Hugho Pond – Enlarge to alleviate tributary flooding	TBD	City officials	2026	High	CI Brillion	The portion of the tributary south of West Water Street floods. If Hugho Pond in Horn Park (located just east of North Parkway Drive) were enlarged, it could retain more water and help minimize the amount of water entering the flooded tributary. There are some plans in place with Horn Park and part of this includes the creek running into Hugo Pond. This is part of the Brillion Iron Works project.
	Hacker Road – Clean ditch; obstruction floods local road	TBD	City officials	2020	High	CI Brillion	Approximately ½ mile east of the intersection of Hacker Road and USH 10, the drainage ditch which goes under Hacker Road floods about once every ten years. Water in the ditch gets high enough to flood the road. The ditch, which leads to this culvert, is located in the City of Brillion. To alleviate the flooding the city needs to clean their portion of the drainage ditch. New culvert was installed in 2020, will now monitor this situation to see if this continues to help alleviate the problem; more to come in the next few years.
	Monitor area north of Center Street for flooding	Covered by annual	City officials	Ongoing	High	CI Brillion	The area north of Center Street, west of St. Mary's church and east of Lee Avenue had experienced severe flooding

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
		budget					in the past. To help drain the area, the city replaced all the storm sewers in that area two years ago. They ran the storm sewers to the city pond, which in turn go underground to the creek at Tesch Street and Glenview Avenue. This needs to be monitored to see if the culvert at Tesch and Glenview is effective at transporting the water. The culvert may have to be enlarged and ditching occurs. Continuing to monitor. It has also become part of the dredging with Spring Creek.
	Divert water on Killsnake Road	TBD	Town officials	2026	High	TN Chilton	Approximately 1/8 mile west of the intersection of Killsnake Road with State Highway 32/57, just north of Killsnake Road, the ditch leading to the Killsnake River makes a sharp right turn to the west. Water flowing in the tributary cannot make the sharp angle and ends up flooding over onto the road. The angle needs to be minimized. A culvert, at a gentle angle, could help divert the water to the river. Continuing to monitor and seek funding.
	Dig a deeper ditch on Stonybrook Road to minimize flooding	TBD	Town officials	2026	High	TN Chilton	Stonybrook Road crosses a tributary about one-quarter mile west of its intersection with US Highway 151. During the spring thaw the tributary overflows and water goes over the road. This creates a potentially dangerous driving situation. If the ditch were

Summary of Mitigation Strategies

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							deeper, the water would be confined to the ditch. The ditch should be dug out, and steeper banks created. Continuing to monitor and seek funding.
	Riverbank south of Main Street – Runoff diversion system, vegetation, rip-rap	TBD	Town officials	2026	High	CI Chilton	On the south side of Main Street between STH 57 and Park Street, the riverbank is very steep. Runoff from the top of the bank, coupled with the flowing river and any rain/snow melt, has caused severe bank erosion resulting in a lot of sediment in the river. A 1980s requirement for landowners at the top of the bank to direct their runoff to pipes that went over the bank to the river below helped but this is not a good practice in an area with water quality problems. The pipes are rather unsightly but if removed, there will be severe erosion and sedimentation problems. If the pipes fail there is potential for more erosion. The pipes need to be run underground to a storm sewer or to a pond or detention area. Vegetation was planted on the slope to help stabilize the bank. However, as the trees grew and died, they fell into the river and caused blockage issues at the dam. Crown vetch was planted to stabilize the soil but the WDNR is not recommending this due to its invasive nature. However, it has been effective at stabilizing the bank. By redirecting the pipe water and other runoff, the

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							crown vetch could flourish. Riprap at the base of the slope is also suggested to prevent any slumping or undermining of the base of the bank. Small riprap was laid at the base of the bank in 1997 but many of the rocks were thrown into the water, causing the area to face erosion again. Larger riprap needs to be laid. Continuing to monitor and seek funding.
	M-B Lane – install concrete box culverts to alleviate frost damage	TBD	City officials	2026	High	CI Chilton	M-B Lane is the only road in the city that goes through a wetland. Currently there are corrugated culverts under the road to help the water flow under the road. These typically freeze up and heave with the frost. The heaving causes road damage, and some temporary water holding (potential for flooding). Concrete box culverts should be installed.
	Replace laterals citywide (sewer lateral infiltration)	TBD	City officials	Ongoing	High	CI Chilton	In 1978 there was a 7" rain in less than three hours. The rain infiltrated the sanitary sewer pipes and backed up sewer laterals throughout the northeast part of the city. Sewer backed up into basements as high as 4'. In 1983 the city replaced 5000' of pipe in this area, along with 14 manholes, and, replaced the old 15" sanitary pipeline with a 21" pipe. Since then, every time a street is redone, the sewer lines are upgraded prior to any street work. It is recommended the city continue their policy of replacing the

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							laterals.
	Inspect and repair cofferdams – potential collapse	TBD	City officials	2026	High	CI Chilton	There are four cofferdams in the city: a large one at State Street, and three dams to the east, all on the South Branch of the Manitowoc River. All of the dams, except the State Street dam, are minor and are no longer used to hold back significant amounts of water. However, the State Street cofferdam is very functional at holding back the water. In the 1980's the State Street dam was rebuilt. Although the dam is in good condition now, there is the concern that if the dam is not maintained, it could collapse and the city experience flooding problems. This dam should periodically be inspected, and all measures taken to repair any signs of stress.
	Detention pond and larger culvert on Hoelzel Way to minimize property damage	TBD	Village officials	2026	Low	VI Harrison	Where Hoelzel Way crosses a creek three residential lots along the south side of the road are routinely flooded. A larger creek culvert, or possibly detention pond, should be installed to hold the water and not flood the lawns. The subject subdivision was developed prior to regulations requiring detention ponds. Added to this subdivision's problem, the subdivision to the south drains to the flooded area, thereby increasing the amount of water on these lots. In an attempt to try and stabilize erosion in the creek and slow down the

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							water the town did riprap a quarter mile south of the subdivision to Skipper Lane. Although this effort wasn't successful at slowing the water, it did help stabilize the creek erosion that had been occurring. A larger creek culvert was installed and has aided in alleviating standing water from the residential properties. While this issue is considered mostly complete, the future plan is to urbanize the roads around Sunrise School and provide storm water detention for water quality treatment and peak flow reductions.
	Farmer education and cooperation to alleviate damage to road shoulder and crop damage caused by flooding on South Tower Road	TBD	Town officials	2025	High	TN Brothertown	On South Tower Road, almost one-half mile north of the intersection with Dick Road, there is significant flooding. The sedimentation washes off the fields to the east and flows west flooding the road and adjacent fields. The soils in the area do not quickly absorb the water. Water then goes over Tower Road washing the shoulder out, and continues on to the west damaging adjacent cropland. The town believes that grass buffers along the edges of the fields would help slow the flow allowing for some soil absorption.
	Calumet Drive – Enlarge storm sewer laterals to control flooding with minimal damage	TBD	City officials	2026	High	CI New Holstein	At the intersection of Calumet Drive (State Highway 57) and Plymouth Street, and then north and south several hundred feet along Calumet Drive, the area suffers flooding during peak heavy

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							rains. The area is naturally a low area and tends to collect the run-off from the surrounding area. The storm sewer along Calumet Drive is not adequately sized and therefore water backs up and floods. The storm sewer laterals along Calumet Drive should be enlarged. As a minimum, a temporary retainment/detainment pond could be created to handle the overflow of water. Will seek funding.
	Illinois Avenue, Pleasant Avenue and Harrison Street – Enlarge culverts and new storm sewer laterals to control road flooding and minimize property damage	TBD	City officials	2026	High	CI New Holstein	The land along Jordan Creek floods during peak heavy rain events. Water flows over the bank and inundates portions of adjacent residential lots, and, crosses Pleasant Avenue, Illinois Avenue and Harrison Street. The area which floods is from Jordan Creek northeast towards Illinois Avenue, then approximately 300 feet west of Harrison Street, as far as east Jefferson Street. In addition, the land northwest of this part of the city is at a higher elevation, adding more run-off to the vicinity. Larger culverts at Jefferson Street and Jackson Street will help the water flow to the north and leave the area sooner. New, larger storm sewer laterals will ensure the residential area drains quicker. Will seek funding.
	Monitor high school property for flooding	TBD	City officials	2026	High	CI New Holstein	Jordan Creek flows west of the high school and occasionally floods the area.

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	that causes property damage						The area is low and has soils which are easily saturated during heavy rains. This low area extends west to the northeast portion of the airport property. Between the high school and the airport land, there is a small manmade pond. The pond holds some of the area water, but it too floods on occasion. There are plans to improve the airport. Caution must be taken to ensure fill, etc. is not added to the airport site resulting in more run-off to the school property. The athletic fields are often saturated and more water could mean they could be rendered useless at times. This is an area of concern which should be monitored for additional flooding and damage. Will seek funding.
	Monitor Calumet Street (STH 57) for flooding that causes crop damage	TBD	City officials	Ongoing	Low	CI New Holstein	At the northwest corner of the city limits the city created a TIF District. As the district developed, water was forced towards Calumet Street (State Highway 57) and onto neighboring town farm fields. Recently the city reduced the outflow capabilities of the retention pond. The corrective measure appears to have drastically minimized the flooding. As the TIF District continues to develop, this situation should be monitored to ensure the neighboring land does not flood again. Will seek funding.
	Install storm sewers to alleviate ponding	TBD	Village	2026	Medium	VI Sherwood	During heavy rains and during spring

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	during heavy rain at Bridle Road and Black Cherry Road, south to Forest Lane and south along Palisades Trail		officials				runoff, the area ponds. If power goes out in this area, basements flood because the sump pumps cannot pump the water. Storm sewers are needed to move the water to the sewer system. Will seek funding.
	Acquire easements and ditch on Margaret Street south to Stumpf Avenue to alleviate drainage problems during peak rain events and spring runoff	TBD	Village officials	2026	Medium	VI Sherwood	There is a localized drainage problem during peak rain events and spring runoff. If the power goes out basements flood (because the sump pump can't operate). In addition, the ditches in the area flood. It is recommended the village secure easements and deepen the ditches. In the past there have no erosion problems associated with the ditches; therefore, the village believes no riprap or other stabilization techniques are needed for the ditches. Will seek funding.
	Create cooperative agreements with private dam owners to identify who is responsible for maintenance and potential damages	TBD	Village officials	2026	High	VI Sherwood	There are six dams in the village. Two dams are under private management: the dam at Nature's Way, and the dam at Palisades Trail. All remaining dams are managed by the WDNR: Clifton Road, High Cliff creek crossing, Stommel Road and Mustang Drive. The two private dams are in poor to fair condition but the four public dams have all been installed within the past ten years and are in sound condition (three dams are concrete, one earthen). The village is concerned that if any of the dams fail, the village will experience flooding. Due

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							to the condition of the private dams, it is recommended they be inspected and an agreement written between the private parties and the village identifying who is responsible for maintenance and potential damages. Will seek funding.
	Expand plant and obtain generator for wastewater treatment plant on Kessler Road	TBD	Village officials	2026	High	VI Sherwood	The East Central Wisconsin Regional Plan Commission makes population projections for Calumet County and its communities. The village sized their wastewater treatment plant according to these projections. However, the village quickly surpassed the projected growth and now has an undersized system. The concern is that during sustained heavy rains the plant will not be able to treat all the water coming into the plant. A plant expansion would prevent the potential problem. There is also a concern that if the power goes out, the water will bypass the system and go to Lake Winnebago, thereby contaminating the lake. A generator is needed at the treatment plant. Will seek funding.
	Raise roads, install culverts and possibly remove dam on Aesbischer and Lemke Roads to alleviate water on roads which create hazardous driving conditions and road damage	TBD	Town officials	2026	High	TN Charlestown	The Killsnake Wildlife Area is a large wetland that has the Killsnake River running through it. Aebischer and Lemke Roads cut through a portion of this marsh. The roads experience water coming over the road surface for a significant time in spring, about every other year. About ten years ago two

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							culverts were installed (one on each road) so the roads would not act as a dam. This helped somewhat, but the roads still flood. Raising the roads would prevent water from going over the road; more culverts would allow water to flow under the road. Removing the dam in Collins would also help so water doesn't back up into this area. Will seek funding.
	Encourage WDNR to repair Stecker Lane to minimize road damage caused by flooding	Covered by annual budget	Town officials	2026	High	TN Charlestown	Stecker Lane is an area where the WDNR created a water impoundment south of the road. Unfortunately, the WDNR went too far north with the impoundment and built it up to the road. Because the dike is too high and the soils used in the dike do not drain, water stays on the road deteriorating it and water in the culvert freezes heaving the culvert and road. The WDNR said that they plan on fixing the problem. Will seek funding.
	Redirect the creek on Steiner Road and install bridges to alleviate flooding problems	TBD	Town officials	2026	High	TN Charlestown	Steiner Road has experienced many water-related problems. Water flows too rapidly through the Killsnake River and washes out the abutments. The result is the road sinks/ "drops down". About twenty years ago a bridge and two culverts were installed to help the water flow under the road. These measures did help, to an extent. However, there were still problems. About four years ago riprap and some concrete were laid to slow the water. Again, the help was

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							limited and the problem still persists. Ideally the creek should be redirected to stay completely south of Steiner Road. In that this option likely cannot occur (due to WDNR regulations regarding altering a stream course), it is recommended two larger bridges be installed. Will seek funding.
	Run sewer laterals and move/elevate the holding tank at Mill Pond	TBD	Town officials	2026	Medium	TN Charlestown	At the old mill in Hayton there is a residence (former restaurant). The sanitary waste disposal system is a holding tank. During high water, the tank repeatedly fills with water. The town fears that someday the waste in the tank is going to flow out of the tank. The town should work with the neighboring City of Chilton to run sewer laterals to serve that portion of the town and the tank be abandoned or the tank should be elevated or relocated to higher ground. Will seek funding.
	River View Road - Open dam, dredge, raise bridge and road to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	In spring, about once every five years, at the "orange bridge" on Riverview Road, water flows across the road on the west side of the bridge. If the area freezes, the bridge and road become slippery. About once every twenty years ice piles up and over the road. If the dam were opened at Clarks Mills water would flow and help lower the water. In addition, dredging to the Village of Potter would help the water flow. However, the fear is this would cause major flooding for the

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							small village. Another alternative is to raise the bridge and possibly part of the road leading to the bridge. Will seek funding.
	East River Road and CTH JJ – Raise the road to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	At the southwest corner of East River Road and County Highway JJ, the marsh area floods and goes onto the road to the centerline of East River Road. The shoulder of the road repeatedly washes out. In 2003 a truck hit the soft shoulder and rolled over. The road should be raised. Will seek funding.
	Long Lake Road – Rebuild the road, possibly bridge to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	At Long Lake Road, east of Becker Lake, there is annual flooding over the road. The creek feeds from Long Lake to the east, west to Becker Lake. There is a culvert at the south end of the wet area (on the road) in a high spot. There were two more culverts but they keep sinking into the muck and therefore do not help the water flow. The soil type, coupled with the weight on the road, tends to cause the culverts to sink. The town is not quite sure how to solve the problem. It appears the real problem lies in that water doesn't leave Becker Lake fast enough and the marsh floods. Two suggestions are that the road be rebuilt or a long bridge be built. Will seek funding.
	Schneider Road – Enlarge culvert to	TBD	Town officials	2026	Medium	TN Rantoul	On Schneider Road, west of Hilbert Road, there is water over the road

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	minimize flooding						approximately once every three years. The water also floods a nearby field resulting in seasonal crop damage. The existing culvert is undersized and cannot handle the volume of water and the water goes above the culvert and onto the road. A bigger culvert is needed. Will seek funding.
	Irish Road – Enlarge culvert to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	About once every five years water floods over Irish Road (south of Schneider Road). The existing culvert is undersized and therefore the water swells at the culvert and spills onto the road. A bigger culvert is needed. Will seek funding.
	Hilbert Road – Dredge creeks to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	On Hilbert Road, north of Dreier Road, there are two creeks that flood to the shoulder of the road. The creeks have filled with sedimentation and weeds. These obstructions inhibit flow. Both creeks need to be dredged back to the bridge on Schneider Road. Crop damage, as well as road shoulder damage, are a result of the flooding. Will seek funding.
	Elevate Dreier Road to minimize flooding	TBD	Town officials	2026	Medium	TN Rantoul	North of Dreier Road, west of County Highway Y, the creek forks. About once every ten years Drier Road floods over. Due to the topography of the land and elevation of the road, the only reasonable solution to the flooding problem would be to elevate the road to allow more flowage. Will seek funding.

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	Reroute ditch, riprap and create detention pond on Fairy Springs Road	TBD	Town officials	2026	Medium	TN Stockbridge	The road received a lot of runoff from the higher ground to the east and tends to flow to the lake in sheets. The road (and lawns between the road and the lake) gets inundated with water which flows rapidly toward the lake. There is a ditch on the east side of the road but another ditch should be dug parallel to the road on the west side to try and hold some of the water. However, there is only a 50-foot right-of-way on that side and not room for a ditch. There is also a culvert under a public turnaround midway in the road. The east side ditch should be pitched towards this culvert to divert collected water through the culvert and further west to the lake. Riprap should be installed in the ditch to help prevent erosion and to show the water. A detention pond midway down the road on the east side should be installed to collect and hold water until it can be dispersed through the culvert. Also, a ditch should run parallel to the lake immediately east of the homes and then be directed to the lake. This ditch would require approval of and cooperation from all landowners along this road. Will seek funding.
	Ditching, eventually reclaim quarry, provide education to farmers – Rockland Beach Road	TBD	Town officials	2026	Medium	TN Stockbridge	This road runs north and south along Lake Winnebago and gets inundated due to the volume of water flowing west to get to the lake. If the culvert at the

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							nearby creek were enlarged it would help prevent the road from flooding. It was enlarged a few years back and did relieve some of the flooding but the road is still under water during certain times of the year. Other culverts in the area help get water to the lake but do not prevent the road from flooding. To help direct water away from the road surface and to these culverts, a ditch should be dug parallel to the road. A quarry east of the road once had ponds which held the water so it did not flood the land and road to the west. The ponds were filled in and the road experienced flooding. Reconstruction of the ponds and reclaiming the quarry would help slow the runoff and it is anticipated that this would control about 90% of the runoff. Alternatively, a properly developed subdivision built at the quarry site could be managed to effectively flow at a slower pace and be redirected. When farmers plow field on top of the Niagara Escarpment in an east-west direction, water is encouraged to flow west over the western side of the escarpment and floods properties below the slope. Will seek funding.
	Enlarge culvert on Mud Creek Road bridge to alleviate water on road	TBD	Town officials	2026	Medium	TN Stockbridge	The box culvert under Mud Creek's bridge is undersized and needs to be enlarged. In addition, some of the sedimentation should be removed from

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							the creek. Due to sedimentation, and coupled by the fact that the culvert is undersized, if there is 3" of rain, the water floods over the road approximately 100 yards in every direction. At the point the creek bends, the town did install shore protection four years ago. Although the riprap has helped prevent some erosion and sedimentation, the problem persists. In that Mud Creek Bridge has historic value to the county, the situation should be reevaluated to determine if other options are available. As an alternative, the town could explore the feasibility of replacing the culvert without destroying or harming the historic value of the bridge. Will seek funding.
	Enlarge culvert on Artesian Road to alleviate water on the adjacent field	TBD	Town officials	2026	Medium	TN Stockbridge	WDOT recently replaced the box culvert under State Highway 55 and Artesian Road. The new culvert, along with bank protection, has allowed water to flow faster towards the lake via Roberts Creek. The result is Roberts Creek now floods along Artesian Road and swells over onto adjacent fields. At the intersection of Lakeshore Drive and Artesian Road a larger culvert under Lakeshore Road would help minimize flooding. Will seek funding.
	Ditching and culvert expansions in Quinney to minimize dangerous driving conditions	TBD	Town officials	2026	Medium	TN Stockbridge	In Quinney there is a culvert under Lakeshore Road, two where the creek crosses by the Quinney Fishing Club and

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							one by Harsch's Beach Road. All flood and run over the respective roads. It appears the flooding is due to sedimentation in the creeks/ditches, and, possibly due to undersized culverts. Some ditches have had riprap installed along the bank to try to minimize erosion and sedimentation. All ditches should be looked at closer to determine if there is a need to remove sedimentation, install bank protection, or replace existing culverts with larger ones. Will seek funding.
	Coordinate culverts/ditching on Ecker Lakeland Drive with the Town of Brothertown to alleviate flooding on both sides of the road	TBD	Town officials	2026	Medium	TN Stockbridge	Ecker Lakeland Drive is the local road that separates the Town of Stockbridge from the Town of Brothertown. Currently water flows west off US Highway 151 along both sides of this local road, until it eventually reaches Lake Winnebago. There are two old 18" culverts midway down the road which should take the water from the north ditch and merge it to the south ditch. However, the culverts are ineffective in that the bottoms are rotted, and, the ditches are such that they don't direct water to the culvert, rather they force water to continue along the north side of the road. The ditches should all be cleaned out and the north ditch should direct water to the culverts. The culverts should then be replaced so they are capable of taking the water and bringing it to the south ditch. Will seek funding.

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	Follow flooding recommendations to keep culverts open on Faro and Fairy Springs Roads to prevent water from freezing and causing flooding issues	TBD	Town officials	2026	Medium	TN Stockbridge	The culverts at Fairy Springs Road and Faro Springs Road (near the shore) routinely fill with water and freeze, preventing water flow and resulting in flooding. Currently the town tries to clean the ice out of the culverts with a backhoe. It is recommended the town continue their ice removal process, but also follow the recommendations of the *FLOODING* section above. If those recommendations are enacted upon, water should be less in the culverts.
	Marx Road - Address Brillion Marsh Flood problem.	TBD	Town officials	2026	Medium	TN Woodville	In spring, during the spring thaw, Marx Road is completely under water for days, sometimes weeks. There are five culverts within a few hundred feet of each other, but the culverts don't help the water flow. Due to the over saturation of the Brillion Marsh, water backs up in all nearby tributaries causing the water to flood ditches, culverts, roads, etc. In the Marx Road area water flows so slowly, that the road shoulder does not even wash out. New or more culverts would not help. Raising the road is a very expensive option. However, with the over saturation of the marsh, there is concern the water would eventually reach and flood the elevated road anyway. The marsh and all waterways leading to the marsh need to be free of sedimentation to allow water to flow to the marsh and be filtered

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							through the wetland. Will seek funding.
	Elm Road - Address Brillion Marsh situation.	TBD	Town officials	2026	High	TN Woodville	On Elm Road, about one mile north of County Highway B, the water doesn't flow and actually backs up and floods the road. The town has tried to help the water flow by installing four culverts within a one-half mile stretch of the road and has raised the road. However, due to over saturation of the Brillion Marsh, the water backs up and stands still until it can be absorbed into the ground. The Brillion Marsh needs to be ditched or other measures taken, such as dredging the sedimentation. The water has been getting worse with the additional water load coming from the Michel's pit located in Sherwood and from the Sherwood ponds; and the lack of maintenance in the waterways leading to the Brillion Marsh. Will seek funding.
	Schmidt Road - Ditch creek.	TBD	Town officials	2026	Medium	TN Woodville	There is a creek that runs north to Kaukauna. The creek crosses under Schmidt Road, west of Military Road. In spring the road floods and washes the shoulder of the road out. There is a culvert there to help the water flow; however, due to weeds and sedimentation in the creek north of the culvert, the water can't flow. The creek needs to be cleaned out. Will seek funding.

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	Harrison Road - Install larger culvert	TBD	Town officials	2026	Medium	TN Woodville	On Harrison Road, one half mile west of Elm Road, the culvert floods about every other spring. The existing culvert is undersized and should be replaced with a larger one. Will seek funding.
	County Highway B and State Highway 57 - Raise building, possible ditch	TBD	Town officials	2026	Medium	TN Woodville	The northwest corner of the intersection of County Highway B and State Highway 57 floods every spring. Several acres of cropland flood, as well as an old tavern (now used for residential purposes). The water stays on the filed for several weeks. The area floods as a result of water backing up in the nearby Brillion Marsh. Dredging the Brillion Marsh would solve the long-term problem. In the short term, the building could be raised, and a ditch dug to help the water move away from the field and structure. Due to the age of the building, raising the building may not be possible. Will seek funding.
	Reinforce & strengthen the identified driveways/rights-of-way on County Highway E by Long Road with geosynthetics, create flood storage upstream of those culverts and road, and create flood routing to move potential overflows away from the road and gravel driveways.	TBD	Highway	2023-2025	High	Calumet County, Town of Stockbridge, Village of Stockbridge	There are recurring flooding issues in a portion of Mud Creek that flows alongside County Road E that causes washouts of several culverts. These culverts have been repeatedly repaired by the Highway Department. Recently, the department replaced the culverts with larger twin culverts to meet the flow from a 10-year storm event. However, more frequent and more intense rain events continue to wash out driveways above the culverts. An

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							additional partial study or full engineering plan of the County Highway E watershed may be necessary as a precursor to any physical mitigation work.
	Conduct a partial study or full engineering plan of the County Highway E watershed as related to the continual culvert right-of-way/driveway washouts.	$8,000-$15,000	LWCD	2022-2025	High	Calumet County, Town of Stockbridge, Village of Stockbridge	An additional partial study or full engineering plan of the County Highway E watershed may be necessary as a precursor to any physical mitigation work.
	Create a watershed-wide stormwater management plan for the Upper Manitowoc River.	TBD	LWCD	2022-2025	High	Calumet County, Town of Brillion, City of Brillion, Village of Potter, WDNR	A "9 Key Elements" plan is currently being worked on/almost completed. A full management plan could work off of this current effort, as well as the existing "Final Recommendations of the Upper Manitowoc River Watershed Task Force that was completed in January 2016)." A full management plan would prioritize and address the comprehensive mitigation needs of this watershed.
	Explore opportunities to mitigate flooding at the Brillion Iron Works property.	TBD	CI and TN of Brillion officials	2026	Medium	CI Brillion, TN Brillion	There is a history of flooding on the property and in this area of the watershed. The foundry is closed and the City is working with engineers to redevelop the property for new usages.
	Larger culvert and ditch cleaning at intersection of Church St and STH 57	TBD	TN Brillion, WI DOT	2026	Medium	TN Brillion	Intersection of Church Street and Highway 57- water backs up on west side of Church Street because culvert under Highway 57 is too small and not low enough. Problem could be solved if the county installed bigger culvert was installed lower and the ditch on north

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							and west side was cleaned out north several hundred feet.
	Clean ditch 200 feet south of STH 57 west of intersection with Church St.	TBD	TN Brillion, WI DOT	2026	Medium	TN Brillion	Culvert under Highway 57 west of intersection with Church Street - ditch that runs north and south on west edge of subdivision, which is on private property, needs to be cleaned out about 200 feet south of Highway 57.
	East of Milwaukee St. between 8th St. and 5th St. – replace existing 42" and 48" pipes with (2) 48" pipes	TBD	VI Hilbert	2025	High	VI Hilbert	These storm sewer pipes were installed several years ago when the open ditch was enclosed. Due to deteriorating pipes, there are several areas where the ground above the pipes is beginning to fall into the storm sewer pipes. This can impede the flow of the pipes and can cause a hazard above the pipes. The pipes are also undersized to be able to handle the flow coming from the west on Milwaukee St. There have been instances of stormwater backing up in the area of Milwaukee St. and 8th St which can cause flooding and damage to area properties because the stormwater flowing from the west cannot flow through these undersized pipes and causes a bottleneck in this area. These deteriorating pipes need to be replaced and upsized in order to assist with the flow of stormwater from the west to flow more freely and eliminate the bottleneck in this area.
	East of Milwaukee St. at 5th St., 4th St. and 3rd St. – Upsize the culverts under the	TBD	VI Hilbert	2025	High	VI Hilbert	The culverts under the railroad tracks east of 5th St., the culverts at 4th St. and

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	railroad tracks east of 5th St., at 4th St. and at 3rd St.						at 3rd St. are undersized and impeding the flow of stormwater coming from the west. This project is tied to the replacement of the deteriorating stormwater pipes east of Milwaukee St. from 8th St. to 5th St. because if these are upsized, the culverts will be drastically undersized. There will be a need to incorporate both of these projects at the same time to ensure that the flow of stormwater is not impeded. If this area is not corrected, it could cause severe damage to several residential properties that are located near this area.
	Purchase and raze building on S. 5th St. between Calumet St. and Main St. (located in flood hazard area)	TBD	VI Hilbert	2025	High	VI Hilbert	There is a storage building that is located on S. 5th St. north of Calumet St. which has been flooded on several occasions over the last several years because it is located near a drainage ditch by the railroad tracks that has flooded in the past due to the impeded flow of stormwater. This property was at one time used many years ago by GTE Telephone (now Frontier) until their current building was constructed on 8th St. The building is currently used for storage but when this area floods out, it can cause damage to the contents being stored in the building and also to the building itself. By purchasing the building and razing the building, it would mitigate the damage in the future.
	Build a berm in the farm field south of	TBD	VI Hilbert	2025	High	VI Hilbert	In heavy rainfall events, stormwater

Summary of Mitigation Strategies

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Calumet St. and 9th St. (stormwater runoff from the field causes flooding on S. 9th St., south of Calumet St.						overflow from the farm field goes to the north onto S. 9th St. and flows into the storm sewer on Calumet St. causing that storm sewer to become overloaded with stormwater. This causes flooding on S. 9th St. south of Calumet St. and on Calumet St. This flooding can cause damage to the properties and buildings in this area as water will flow to the area of least resistance. To prevent the overflow of water to this area, a berm would be built to hold the overflow water in the farm field until it can properly flow through the proper drainage ditch. This would mitigate the amount of damage as there are no buildings in this area.
	Clean ditches and creek and/or build a stormwater detention pond in the stormwater ditch north of Sargento Foods going east to the railroad tracks; creek along the driveway to the Hilbert WWP east of Irish Rd.; stormwater ditch on the SE side of the village	TBD	VI Hilbert	2025	High	VI Hilbert	The drainage ditches and creek in these areas are full of debris which greatly impedes the flow of stormwater in these areas. The ditch north of Sargento Foods is owned by the State of Wisconsin. Calumet County maintains the ditch for the state but the state must authorize to have the work completed and to reimburse the county for the costs associated with cleaning out this ditch. The village has tried along with the county to get the state to approve the cleaning of this ditch but we have been unsuccessful in obtaining their approval. This impeded stormwater flow is creating a hazard to the neighboring property owners who are in

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							danger of sustaining severe damage due to the potential flooding in this area because the flow of the stormwater is being impeded. The creek by the wastewater treatment plant and the ditch on the southeast side of the village should be cleaned out to help with the flow of stormwater. We could also install a stormwater detention pond by the wastewater treatment plant which could help improve the flow of the creek along with cleaning it out.
	Address water on Stony Brook Road	$10K	TN Chilton	2020	High	TN Chilton	Increase culvert to handle water.
	Address water at corner of County E and Twain Road	$20K	CO Highway, TN Chilton	2021	Medium	TN Chilton	Add culvert. Clean waterway to assist with waterflow to stop washout of road.
	Mitigate flooding on the west side of the town where there is soil run off after heavy rains.	TBD	TN Brothertown	Ongoing	Medium	TN Brothertown	Encourage farmer to plant more cover crops and more buffer strips to prevent ditches from filling up with soil and flooding roads
	Jordan Creek on Jefferson Street (1800 block) 300' to the west – Bank stabilization to control erosion	TBD	CI New Holstein	2026	High	CI New Holstein	
	Funding for implementing study recommendations to manage stormwater	TBD	VI Sherwood	2025	Very High	VI Sherwood	Study has been completed and recommendation is for 12-13 ponds on the northern shore of Lake Winnebago. Have identified acreage and need to buy and build.
	Restudy Stockbridge basin where water flows down and collects, washing out	TBD	Joint TN & VI of Stockbridge	2025	Very High	VI & TN Stockbridge	Study finding will lead to project recommendations

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Highway E.		with support of County				
	*Will continue to explore if residents express interest in flood mitigation measures (e.g., buyouts, elevations, floodproofing, etc.) county wide.	Annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	FEMA's PDM & FMA grants are potential funding sources for buyout
	State St (CTH F) Main to Breed – Increase size and amount of stormwater facilities	$100K	City officials	2020	High	CI Chilton	Area has flooded during large storm events.
	State St (CTH F) main to Breed – Replacement of sanitary	$150K	City officials	2020	High	CI Chilton	Sanitary sewer overflows have occurred many times over the past 5 years during storm events. Causes basement back-ups and untreated wastewater being released into the storm sewer.
	TIF #6 Industrial Park addition west of Irish Road and north of railroad tracks, stormwater management	$50K	City officials	2021	Medium	CI Chilton	Stormwater pond addition for industrial development.
	Jackson St, Hickory to Pleasant – resurface blacktop, repair storm sewer,	$73K	City officials	2020	Medium	CI New Holstein	
	Jackson St, Pleasant to Illinois	$73K	City officials	2020	Medium	CI New Holstein	
	CTH T, US 151 to Honeymoon Hill Rd – Pulverize and pave new surface	$690K	Co Highway	2021	High	Calumet County and all municipalities within	
	CTH X, STH 32/57 to east city limits – Mill and pave new surface	$120K	CI New Holstein	2021	High	Calumet County and all municipalities within	
	CTH N, US 10 to CTH KK – Right-of-way improvements, roundabout, sidewalk and	$2M	Co Highway	2021	High	Calumet County and all municipalities within	

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	bike path						
	CTH PP, Behnke Rd to Glenview Ave – Pulverize, rubberize and pave new surface	$1.025M	Co Highway	2021	High	Calumet County and all municipalities within	
	CTH N, STH 114 to US 10 – Pulverize and pave new surface	$800K	Co Highway	2022	High	Calumet County and all municipalities within	
	CTH T, Honeymoon Hill Rd to CTH X – Pulverize and pave new surface	$950K	Co Highway	2022	High	Calumet County and all municipalities within	
	CTH H, US 151 to CTH G – Pulverize and pave new surface	$1.9M	Co Highway	2022	High	Calumet County and all municipalities within	
	St. Charles Rd – CTH H to Paradise Rd – measures to alleviate flooding during the Spring thaw	$389K	Town officials	2020	High	TN Brothertown	Floods over the road during Spring thaw
	St Charles Rd – Paradise Rd to CTH G, complete road reconstruction	$581K	Town officials	2021	High	TN Brothertown	Severe deterioration of road
	Fairy Springs Rd – Reroute ditch, riprap, detention pond	$150K	Town officials	2020 (Partial)	Medium	TN Stockbridge	Has flooded with damage to homes along the east side of the road.
	Rockland Beach Rd – Ditching	$150K	Town officials	2024	Medium	TN Stockbridge	The road gets inundated due to the volume of water flowing west to get to the lake. The town believed that if the culvert at the nearby creek were enlarged, it would help prevent the road from flooding.
	Artesian Rd – Enlarge culvert	$30K	Town officials	2023	High	TN Stockbridge	

Summary of Mitigation Strategies

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Golden Way/Peral/Cameo/Coral Courts – Urbanize the road	$1.3M	Village officials	2021	Low	VI Harrison	Road deteriorating, localized drainage issues.
	Noe Rd., Urbanize/reconstruct road	$1.5M	Village officials	2022	Medium	VI Harrison	Road deteriorating
	North end of Central St., blocked drainage stream	$100K	Village officials	2020	High	VI Potter	Floods most yards
	North end of Central St., small bridge culvert	$100K	Village officials	2030	Medium/High	VI Potter	Floods most yards
	Railroad Trail, blocked/collapsed culvert, none to village	TBD	TN officials	2020	Medium/High	TN Rantoul	Flooding every year
	Manitowoc River, stagnation/blockages	TBD	Village and Town officials; DNR	2030	High	VI Potter & TN Rantoul	Issue every year. May be a DNR issue.
	Calumet Street –Kernan to Telulah - Raise Road Center line elevation 2.0"	$104K	City officials	2030	Medium	CI Appleton	Has flooded with heavy spring runoff about every 5-10 years
	Horizon Drive, Regal to Calumet - Add parallel storm sewer	$47K	City officials	2030	Medium	CI Appleton	Has flooded with heavy spring runoff about every 5-10 years
	Harding Drive, Carpenter to Greenview - Increase storm sewer pipe size	$127K	City officials	2030	Medium	CI Appleton	Has flooded with heavy spring runoff about every 5-10 years
	Greenview St, Harding to Calumet - Increase storm sewer pipe size	$99K	City officials	2030	Medium	CI Appleton	Has flooded with heavy spring runoff about every 5-10 years
	Berry Dr, Roeland to Calumet - Increase storm sewer pipe size	$318K	City officials	2030	Low	CI Appleton	Has flooded with heavy spring runoff about every 5-10 years

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	Telulah Ave, Taft to Calumet - Increase storm sewer pipe size	$189K	City officials	2030	Medium	CI Appleton	Has flooded with heavy spring runoff about every 5-10 years
	Taft Ave, Walden to Telulah - Increase storm sewer pipe size	$67K	City officials	2030	Low	CI Appleton	Has flooded with heavy spring runoff about every 5-10 years
	Harding Dr, Fountain to Telulah - Increase storm sewer pipe size	$38K	City officials	2030	Low	CI Appleton	Has flooded with heavy spring runoff about every 5-10 years
Severe Temperatures	Continue public information campaigns about severe weather on the website and during Winter and Heat Awareness Weeks.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	Public information campaigns occur annually in spring and fall ahead of the severe temperature potentials in summer and winter. As needed, information is updated when dangerously hot and cold periods occur.
Storms: Hail	Educate the public (including school children) on the dangers of an approaching storm and steps to take that mitigate the danger.	Covered by annual budget	EM, Sheriff's Dept.	Ongoing	Low	Calumet County and all municipalities within	Information will detail how people, animals, and vehicles should be inside a stable structure. If in a camper or mobile home, seek shelter either in the camper or home or go to a designated storm shelter. If on the water and a storm is approaching, get off the water and seek shelter in a vehicle or building.
	Communities and road crews should remove dead or dying trees and branches that could fall during a storm. Likewise, road signs should be inspected to be certain supports are of sound condition and the signs securely fastened to their supports. If road signs are in poor condition, replace them.	Covered by annual budget	Highway Dept. and local jurisdictions	Ongoing	High	Calumet County and all municipalities within	

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	Individuals should maintain their buildings, if possible, to eliminate the potential for more damage.	Covered by annual budget	County, municipalities and residents	Ongoing	Low	Calumet County and all municipalities within	Broken or cracked windows should be replaced, and dilapidated siding and shingles should be replaced with stronger, more weather resistant siding and shingles. If a low- or moderate-income household, contact the County Planning Department to determine if there are grant dollars available to help with such improvements. There are limited public programs, but the Northeast Wisconsin Housing Rehabilitation CDBG Program is administered on behalf of the region by the Brown County Planning Department.
Storms: Lightning	Place lightning safety materials on the website and distribute during severe weather week.	Covered by annual budget	EM	Ongoing	Low	Calumet County and all municipalities within	This is done annually in April in conjunction with spring's Severe Weather Week.
Storms: Thunderstorm	Place thunderstorm safety materials on the website and distributed during severe weather week.	Covered by annual budget	EM	Ongoing	Low	Calumet County and all municipalities within	This is done annually in April in conjunction with spring's Severe Weather Week.
Storms: Tornadoes and High Winds	Calumet County will work with partners to teach the public what protective actions are recommended in a tornado.	Covered by annual budget	EM	Ongoing	Medium	Calumet County and all municipalities within	The Calumet County Emergency Manager and Calumet County Sheriff's Office (CASO) personnel implements the annual Student Tools for Emergency Planning (STEP) program within the county schools. Public education for severe weather is also provided and promoted thru regular social media activity and in-person events.

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	Assist municipalities with drafting ordinances requiring that mobile homes be affixed to permanent foundations (or other measures) to minimize the potential for damages.	Covered by annual budget	Planning	Ongoing	Medium	Calumet County and all municipalities within	
	Work with communities to apply for grants to construct tornado shelters.	Covered by annual budget	EM	As requested	Medium	Calumet County and all municipalities within	
	Conduct a regular tree maintenance program.	Covered by annual budget	Highway Dept.	Ongoing	Medium	Calumet County and all municipalities within	Keep trees and shrubbery trimmed. Make trees more wind resistant by removing diseased or damaged limbs, then strategically remove branches so that wind can blow through. Strong winds frequently break weak limbs and hurl them at great speed, causing damage or injury when they hit. Debris collection services may not be operating just before a storm, so it is best to do this well in advance of approaching storms.
	Designate official emergency shelter within the Village and the Town.	Covered by annual budget	Village and town officials	2026	Medium	VI Stockbridge, TN Stockbridge	The village has a tornado siren which is well heard throughout the entire village. Although they have a siren, no provision was made for a designated tornado shelter. Currently the Village believes people use their private residences and/or taking shelter within their own homes or a neighboring home. However, there has

Summary of Mitigation Strategies

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							not officially been a designated shelter within the Village. It has been talked about at Town and Joint Meetings for various locations, but no agreement has been made. The Town of Stockbridge shares a municipal meeting hall with the Village of Stockbridge. The town feels this hall should be designated as the town storm shelter. The town and village should cooperate on designating a building as the official shelter, and, publicize such designation so the public is aware which building will be used for emergency purposes. Regardless of which place is designated the shelter, a generator should also be provided to ensure medical needs that require electricity, could be satisfied. The Village and the Town need to jointly agree and make plans towards resolving this. The Village will require assistance (e.g., engineering studies, personnel resources) from the county to plan and execute a project.
	New siren(s)	TBD	Village officials	2026	Medium	VI Potter	A sudden tornado would render residents of the Village helpless. The current tornado siren is approximately 40 years old. It has to be triggered manually by volunteer fire department personnel. It is believed a newer, automatic siren would be more effective

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Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							at preventing property damage and loss of life. There are no current external funding sources for sirens. The community will determine if there is budget for purchase, installation, and maintenance.
	Designate shelter and acquire generator	Covered by annual budget	Village officials	2026	Medium	VI Potter	There is no designated storm shelter in the village. The Village Hall is an older, pole type building. It has no generator. The Village Hall would not be a desired shelter. The United Church of Christ worship building would be an ideal shelter. The building appears to be the strongest building in the village. However, there is no generator at the worship building. If designated the shelter, a generator should be installed. Funding sources will be sought.
	Adopt ordinance, install tornado siren and build shelter south of STH 149	Covered by annual budget	Town officials	2026	Medium	TN New Holstein	At the Country Aire Mobile Home Park on the south side of State Highway 149, there needs to be provision for high winds, like tie down straps. The town should adopt an ordinance requiring all mobile homes to be affixed to a permanent foundation with some type of securing device, like a tie strap. More importantly, there is no way to alarm these residents of high winds or tornado. They cannot hear the City of New Holstein siren at their location. The St. Anna Fire Department currently drives out there to warn the citizens, but, last year the truck was forced off the road in

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Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							the storm and never made it to the park to warn of the storm. The park needs a tornado siren and/or a tornado shelter.
	Publicize shelter designation at City Hall	Covered by annual budget	City officials	2026	Low	CI Chilton	City Hall is deemed the official city tornado shelter because it has a basement, generator, and kitchen. However, some of the public is not aware the shelter is available. The city should make better attempts at notifying the public of the designation. Once people are aware of the designation, there should not be a problem getting to the shelter. City Hall is conveniently located within one or two blocks off the main roads: US Highway 151, State Highway 32/57, and County Highway F. The fact that there are two tornado sirens in the city will help alert residents of the need to seek shelter. The sirens are located southwest of the intersection of Court Road and Hiemann Street, and, northwest of the intersection of Clay Street and Vogt Lane. The sirens are more than adequate for the city because their wail actually overlaps their ranges.
	Create ordinance to protect any future mobile homes/mobile home parks	Covered by annual budget	City officials	2026	Medium	CI Chilton	As of the writing of this plan, there are no mobile home parks in the City of Chilton. Only one mobile home exists in the city. To protect any future mobile homes or mobile home parks, and their property and residents, it is

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Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							recommended the city pass an ordinance requiring such structures be affixed to a permanent foundation with a metal tie- strap/device that can withstand high winds. East Main St. and Water St.
	Designate and promote storm shelters in the Village	Covered by annual budget	Village officials	2026	Medium	VI Harrison	The northern part of Harrison tends to get hit with more hailstorms than other parts of the town. Thankfully, during severe storms residents are appropriately warned and can seek shelter from such severe storms and tornadoes. The No. 2 Harrison Fire Department at the west end of the town has a tornado siren. The Village of Sherwood, approximately in the middle of the town, has three sirens. These sirens, combined, provide ample range and warning to Harrison residents. Although siren coverage is good, there are no designated storm shelters. In the more populated part of the village, the Darboy area, homes are newer and most have basements. However, homes in the lakeshore area only have crawls spaces. The new health club in Menasha (along County highway LP) could serve as a shelter, as well as Christ the Rock Church off Eisenhower Drive and US Highway 114. It should be discussed with the owners of these buildings to determine if these facilities could indeed be the designated shelters, and, the public

Summary of Mitigation Strategies

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							made aware of such designations. The Harrison Fire Department is currently underway with a new plan for storm shelters and working with businesses and property owners to designate these areas.
	Designate storm shelter on CTH HH, 1/10 mile east of Meyer Rd.	Covered by annual budget	Town Officials	2026	Low	TN New Holstein	There is an Amish School on the north side of County Highway Q, slightly more than one half mile west of County Highway A. The school has no basement for the students to go to in case of severe weather. A storm shelter (e.g., nearby basement) should be designated.
	Designate a storm shelter	TBD	Town Officials	2026	High	TN Chilton	There is no designated storm shelter in the town. Some building should be erected or designated as the official emergency shelter. The building should be equipped with a generator to meet medical needs requiring power, and refrigeration needs for prolonged shelter stays. Will evaluate possible shelter options. Will also seek grants if a generator is needed.
	Designate an emergency shelter	TBD	Town Officials	2026	High	TN Rantoul	There is a Lutheran School along Trinity Road. The school has no basement for the students to go to in case of severe weather. A storm shelter (e.g., nearby basement) should be designated as the official shelter. Grant funding will be sought.
	Mobile Home Park north of West Main	TBD	Village	Ongoing	Medium	VI Hilbert	The mobile homes in the mobile home

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Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	Street - Homes be affixed to a permanent foundation		officials, residents				park are not required to be affixed to a permanent foundation, nor are they required to be secured to a slab with a secure device, such as a metal tie strap. In the event of a tornado or high winds, the mobile homes could be severely damaged and lives threatened. It is recommended the village adopt an ordinance requiring all mobile homes to be secured to a permanent foundation (either a poured foundation or secured to a slab with a strap). As mobile homes are being replaced, they are installing the concrete pads that allow the mobile homes to be better secured. .
	Designate a shelter and provide generator	TBD	Village officials	2026	Medium	VI Sherwood	There are two tornado sirens in the village. Although the village has been proactive in providing sirens to warn of a tornado, they fail to provide a local emergency shelter. A building should be designated as the local storm shelter and a generator provided. Will seek funding.
	Adopt ordinance to require structures such as mobile homes be affixed to a permanent foundation	Covered by annual budget	Village officials	2026	Medium	VI Sherwood	The village sits at the northeast corner of Lake Winnebago, the state's largest inland lake. Due to the size of the lake, winds become very strong as they blow northeast. The Niagara Escarpment, a dolomite geological formation, buffers the east side of the lake thereby forcing more wind to go north. The result is high winds at the outlet, that part of the lake where the escarpment diminishes in

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							presence. Some buildings in the village have been damaged due to the high wind. Although there are no mobile homes in the village, the village seeks to be proactive in assuring such structures would not be completely destroyed by the high wind. It is recommended the village adopt an ordinance requiring all structures intended for human habitation to be affixed to a permanent foundation, and, encourage the external walls of all buildings be surfaced with a non-metal or other easily dented siding.
	Install tornado siren	TBD	Town officials	2026	Medium	TN Charlestown	A significant portion of the town cannot hear neighboring cities' tornado sirens. The town should consider installing a siren in an area where the siren's range would cover underserved areas. There are no current external funding sources for sirens. The community will determine if there is budget for purchase, installation, and maintenance.
	Install tornado siren	TBD	Town officials	2026	Medium	TN Rantoul	A significant portion of the town cannot hear neighboring city or village tornado sirens. The town should consider installing a siren in an area where the siren's range would cover underserved areas. There are no current external funding sources for sirens. The community will determine if there is budget for purchase, installation, and maintenance.

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	Create ordinance that requires mobile homes to be affixed to a permanent foundation	Covered by annual budget	Town officials	2026	Medium	TN Rantoul	Currently there is no ordinance in the town requiring mobile homes to be affixed to a permanent foundation with a tie-strap or other securing device. It is recommended the town adopt an ordinance requiring all structures intended for human habitation to be affixed to a permanent foundation in the manner mentioned. Per the 2000 census, there are twelve mobile homes in Rantoul.
	Designate emergency storm shelter and install generator at the Town/Village Hall	TBD	Town officials	2026	Medium	TN Stockbridge	The Town of Stockbridge shares a municipal meeting hall with the Village of Stockbridge. The town feels this hall should be designated as the town storm shelter. However, currently people in the village use the daycare in the old St. Mary's School or the basement of the associated church as a tornado shelter. The town and village should cooperate on designating a building as the official shelter, and, publicize such designation so the public is aware which building will be used for emergency purposes. Regardless of which building is designated an area shelter, a generator should be provided to insure medical/refrigeration needs can be satisfied in the event power goes out in the area. Will seek funding.
	Create ordinance to require mobile homes be affixed to a permanent foundation	Covered by annual	Town officials	2026	Medium	TN Stockbridge	Currently there is no ordinance in the town requiring mobile homes to be affixed to a permanent foundation with

Summary of Mitigation Strategies

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
		budget					a tie-strap or other securing device. It is recommended the town adopt an ordinance requiring all structures intended for human habitation to be affixed to a permanent foundation in the manner mentioned.
	St. John's Church building (emergency shelter) - Educate public on shelter, install generator	TBD	Town officials	2026	Medium	TN Woodville	The designated emergency shelter for town residents is the basement of St. John's parish building located at the southeast corner of the intersection of County Highways B and BB. The town should better publicize the shelter to residents so they are aware of where to go in the event of a severe storm. Also, to accommodate individuals that need medical equipment, or the need for refrigeration, etc., a small generator should be installed. Will seek funding.
	Monitor tornado siren	Covered by annual budget	Town officials	2026	Medium	TN Woodville	The Town of Woodville does not have a tornado siren. Residents hear the Sherwood, Harrison, Hollandtown or Hilbert sirens. The town should review the ranges of neighboring sirens to guarantee all residents are within hearing range of a siren. If it is found there is a lapse in coverage, a siren should be installed that adequately serves the needs of town residents. There are no current external funding sources for sirens. The community will determine if there is budget for purchase, installation, and maintenance.

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Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	The communities will be seeking a new fire department and exploring options for making it dual purpose as a shelter.	TBD	Municipal officials	2026	High	VI & TN Stockbridge	
Storms: Winter	The county will utilize social media and other outreach educational opportunities at least annually during November's Winter Weather Awareness Week to promote information such as encouraging residents to: • Avoid travel during winter storms, icy conditions and blizzards to minimize accidents; • Stay indoors during periods of extreme low temperatures; and • Watch the weather reports so they can dress accordingly in layers of lightweight, warm clothes and be certain face, hands and feet are covered to avoid frostbite. Drivers will also be educated on matters such as carrying a disaster supply kit in their vehicle; keeping their gas tank full to avoid freezing or running out if needed to keep warm; and what to do if your vehicle breaks down or gets stuck in snow.	Covered by annual budget	EM	Ongoing	Low	Calumet County and all municipalities within	
	The Calumet County Planning Department shall continue to apply for grants to help low- and moderate-income individuals	Covered by annual	Planning	Ongoing	Low	Calumet County and all municipalities within	There are limited public programs, but the Northeast Wisconsin Housing Rehabilitation CDBG Program is

Summary of Mitigation Strategies

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	with repairs that will ensure their warmth and safety in their home.	budget					administered on behalf of the region by the Brown County Planning Department.
	Monitor ice cover on railroad trestle	Covered in annual budget	Street Department	Ongoing	Low	CI Chilton	The trestle was only one of two places the city has experienced ice damage/problems. Approximately 40 years ago the railroad trestle located between Breed and Center Streets experienced an accumulation of ice. That spring, as ice flowed down the South Branch of the Manitowoc River, ice built up at the trestle and made it impassable. There has not been a problem since. As run off in the city enters the river, and as weather conditions change, this situation should be monitored. The railroad that services the city and surrounding area is vital to many of the businesses. Without rail transportation the businesses would have to transport goods via trucks, which is a more expensive mode of transport for such goods. Both Irish Road Bridge and RR Bridge had ice build-up approximately 2-4 years ago. The Street Department uses Fyke poles and backhoe to dislodge ice at both locations.
	Monitor flooding and erosion on Center Street bridge	Covered by annual budget	City officials	Ongoing	Low	CI Chilton	About 35 years ago the snow and ice in the South Branch of the Manitowoc River experienced a rapid thaw. At the Center Street Bridge the water rose so

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							high that it came up to the bottom of the bridge. Also, due to the amount of water, there was turbulence at the bank and the bank experienced some erosion. The bridge was eventually replaced with a higher bridge. There has not been a problem since. This area should be watched to make sure thaws are not creating turbulence that erodes away the bank. If the area does experience erosion, riprap will need to be placed at the bank to minimize potential problems.
	Using public information methods, encourage homeowners along Lake Winnebago to have sound retaining walls and shore protection	Covered in annual budget	Village officials	Ongoing	Low	VI Harrison	At the north end of Lake Winnebago ice shoves are common. The shoves damage shorelines, and on occasion lawns and structures. Property owners need to better stabilize their shorelines with retaining walls or large riprap that can minimize the piling ice. While ice shoves have been noted throughout the years, there are no specific property owner complaints logged regarding their shorelines. The Village of Harrison encourages all riparian property owners to continue maintaining and reinforcing their shorelines to avoid property damage.
Utility Failure	Bury electrical lines in the village	TBD	WPS	2026	Medium	VI Potter	When there is a big storm, particularly an ice storm, the power goes out in the village. This occurrence is more pronounced when there tends to be more ice accumulating on the lines. It is

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							recommended WPS, the electric provider, bury all overhead lines. Loss of power for an extended period of time can mean a loss of heat during the winter months. Besides displacing people, other damage to property can occur including burst water pipes, and sanitary traps. Local public buildings are also frequently subjected to power outages and a loss of heat generating ability, thereby limiting the usefulness of public buildings as shelters during prolonged winter power outages.
	Install generator at Town Hall or Garage	TBD	Town officials	2026	Medium	TN Woodville	Power in this area is provided by overhead lines. There is concern that during ice storms the power will go out and the road crew will not be able to manually lift the doors on the town garage. In addition, trucks will not be able to start and provide ice or snow removal. The town garage is an older building with heavy doors. A generator should be installed in the garage, or in the neighboring town hall and a line run to the garage, to guarantee trucks will start and be able to exit the garage. One door has been updated and could be lifted in case of an emergency. No generator at this time.
	Acquire generator at fire department	TBD	Town Officials	2026	High	VI Potter	The Fire Department is housed adjacent to the Village Hall. Neither the

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							Department nor the Hall has a generator. The Fire Department has four manual doors, and two electric doors. One truck has a small, portable generator. In the event the power goes out, and there was an emergency warranting the services of the Fire Department, the village is concerned they would not be able to lift the heavy manual doors safely and efficiently. A generator should be installed at the Fire Department in case of emergency (the portable generator is insufficient). Grant funding will be sought.
	Acquire generator for Town of Rantoul garage	TBD	Village and Town Officials	2026	High	Vl Potter, TN Rantoul	The neighboring town, Town of Rantoul, provides village road maintenance. The Town Garage is an older building with no generator. The Village is concerned that if there was no power, the truck batteries could freeze and render the vehicles inoperable, or, town staff may not be able to lift the doors to get any operable trucks out to do the service. Recommendation is to purchase and install a generator. Grant funding will be sought.
	Install generator at town garage	TBD	Town Officials	2026	High	TN New Holstein	In the event of a heavy ice storm, the power lines could snap and the power be lost at the Town Garage. Without power, the building will lose heat, and over a period of just a few hours, the trucks freeze. If the trucks can't start, there is no way to provide road services,

Summary of Mitigation Strategies

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							like snow removal or salting/sanding ice. A generator should be installed at the Town Garage. Grant funding will be sought.
	Install a generator at the town hall	TBD	Town Officials	2026	High	TN Chilton	There is no designated emergency shelter in the town. Although the Town Hall would not be suitable as a tornado shelter, it could be used for other emergency purposes (e.g., evacuations). Some type of generator should be installed though to make sure medical needs requiring power can be accommodated. Grant funding will be sought.
	Install generator at town hall and garage	TBD	Town Officials	2026	High	TN Brothertown	At the Town Hall and Garage there is no generator. There is concern in the event of storms there is no "safe place" for residents and a generator could help with this issue. It should be noted that the Town Hall is not large enough to accommodate many residents, and therefore should not be designated an official shelter. However, with a generator it could be a limited, or temporary, shelter for some residents. In addition, if power goes out, the snow removal vehicles would not be able to be charged, resulting in no winter road maintenance until the power was restored. Grant funding will be sought.
	Provide generator for village garage on Clifton Road	TBD	Village Officials	2026	High	VI Sherwood	During some storms the power at the village garage goes out and it is difficult to open the garage doors. The doors can

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							be lifted manually; however, they are heavy and difficult to maneuver. A generator at the garage would allow service doors to be opened and road crew to exit and provide necessary services. Grant funding will be sought.
	Install generator at town garage	TBD	Town Officials	2026	High	TN Charlestown	There is concern that during an ice storm, or other severe storm, the power will go out at the Town Garage and the road crew will not be able to lift the heavy doors to get the road maintenance vehicles out to provide services. In addition, if the power remains out for an extended period of time in cold weather, the trucks might not start. A generator would not only guarantee the doors could be raised, but would also serve as a power source to get maintenance vehicles running and operable. Grant funding will be sought.
	Install generator at town garage	TBD	Town Officials	2026	High	TN Rantoul	During some storms the power at the Town Garage goes out and it is difficult to open the garage doors. The doors can be lifted manually; however, they are heavy and difficult to maneuver. A generator at the garage would allow service doors to be opened and road crew to exit and provide necessary services. Since the town also provides road maintenance services to the neighboring Village of Potter, being able to open the doors and provide service is very important.

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
							Also, in the event of a heavy ice storm, the power lines could snap and the power be lost at the Town Garage. Without power, the building will lose heat, and over a period of just a few hours, the trucks freeze. If the trucks can't start, there is no way to provide road services, like snow removal or salting/sanding ice. Again, a generator should be installed at the Town Garage. Grant funding will be sought.
	Upgrade grid to alleviate unreliable power grid during storms	TBD	WE Energies	2026	Medium	VI Sherwood	When there is a big storm, particularly an ice storm, the power goes out throughout the entire village. This occurrence is more pronounced in early winter or late spring when there tends to be more ice accumulating on the lines. The system is unreliable due to age and design. Most of the lines in the village are buried; however, the lines on the outskirts of the village are not. It is recommended WE Energies, the electric provider, either bury all lines, or update the grid. Loss of power for an extended period of time can mean a loss of heat during the winter months. Besides displacing people, other damage to property can occur including burst water pipes, and sanitary traps. Local public buildings are also frequently subjected to power outages and a loss of heat generating ability, thereby limiting the usefulness of public buildings as shelters during prolonged winter power outages.

Summary of Mitigation Strategies							
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Comments**
	Provide generators for the lift stations at Stommel Road and Windswept Lane	TBD	VI Sherwood officials	2026	Medium	VI Sherwood	There is a concern that if the power goes out, the lift stations at Stommel Road and Windswept Lane will not work and the water will back up and bypass to Lake Winnebago, thereby contaminating the lake. Generators are needed at the two lift stations. Will seek funding.
	Monitor exposure of ANR pipeline	TBD	ANR Pipeline	2026	Medium	TN Rantoul	The Town of Rantoul is unique in that it has some high technology infrastructure. The ANR Pipeline runs across the east edge of the Town and a fiber optic line runs buried along Irish Road. Most of the pipeline is buried but a portion of the line runs through a large wetland and cannot be buried and therefore it lies above ground. The town is concerned what exposure to the natural elements, frost and wildlife could do to the pipeline. In addition, there is concern that the portion above ground could be a target for terrorists whereby they could infiltrate the line and use it as an explosive or other weapon. The town should monitor this situation in case there is an opportunity to fill over the pipeline in the wetland. If such an opportunity should arise the town should work cooperatively with the gas provider to bury the line.

Appendix F: HAZUS

Hazard: Flooding and Runoff Hazard Analysis

Major floods in Calumet County tend to occur either in spring when melting snow adds to normal runoff or in summer or early fall after intense rainfalls. Flooding which occurs in the spring due to snowmelt and/or a prolonged period of heavy rain is characterized by a period of days. This buildup continues until areas are flooded or a river or stream overflows its banks, for as long as a week or two, and then slowly recedes inch by inch. The timing and location of this type of flooding is fairly predictable and allows ample time for evacuation of people and protection of property. Flooding is the most significant hazard in Calumet County, particularly because of all the rivers and streams.

Floodplains exist along the rivers and the tributaries that feed into them. These floodplains are narrow along tributaries and lakes but extensive throughout the County. Floodplains are shown on individual maps for each community, and identify where and how many structures are located in those floodplains. In addition, each community's assessment identifies all areas of flooding concerns.

Calumet County has been participating in a National Flood Program since May 3, 1982. The maps used to determine flood analysis for the County are dated May 3, 1982. The following are the list of communities participating in the Program, their date of entry, and the effective date of the map they use for flood determinations.

Community	Date Entered Program	Effective Date of Map
Appleton, City of	04/06/73	04/09/82
Brillion, City of	06/15/81	06/15/81
Chilton, City of	03/16/81	10/15/82
Hilbert, Village of	04/15/85	Rescinded*
Kiel, City of	01/03/85	07/03/85
New Holstein, City of	07/02/81	07/02/81
Potter, Village of	07/30/96	06/15/83
Stockbridge, Village of	05/03/82	05/03/82

*FEMA rescinded the Village of Hilbert maps on 4/15/85 because there were no flood hazard areas within the Village.

According to some community's officials, the Brillion Marsh appears to be responsible for a lot of the flooding in its neighboring cities, villages and towns. As one reviews the individual assessments, it is evident the Brillion Marsh is recognized as the principal source of flooding in the Towns of Brillion, Woodville, and Rantoul;

the city of Brillion; and in the Villages of Hilbert and Potter. It appears that the Marsh is over saturated and unable to absorb all water leading to the Marsh. Because the Marsh cannot absorb the water, water tends to back into existing rivers, streams, and ditches.

There is another type of flooding that is a major concern for the county. This is the potential damage to groundwater associated with snowmelt in spring. As mentioned in the second chapter of this plan, the county has many dairy cattle. Dairy producers with no manure storage facilities must haul their manure daily. The result is manure is spread on fields all year, including the winter months when the ground is frozen. If the county experiences an unusually warm day in winter or early spring, there could be an immediate thaw resulting in the manure flowing off the frozen ground, and directly into ditches. Because Calumet County is made up of Karst features (sinkholes, crevices, fractured bedrock), this runoff goes directly through the Karst features and into the groundwater, which is then consumed by residents. Also, since the ground is frozen, there is no groundwater recharge, and a sudden thaw would act as a "flush", elevating the levels of e-coli, coliform, and several other contaminants. This potential, along with the county's severe groundwater nitrate and bacteria problem (discussed in Chapter Two) could have catastrophic damages to the county's water supply.

Run-off from fields often goes directly to the groundwater through Calumet County's Karst features

Runoff to surface water is another concern in the county because it carries nutrients, animal waste, and sediment to the county's surface water resources. This runoff can cause algae blooms, excessive aquatic weed growth, and fish kills. Runoff events are more likely to occur after heavy rains or spring thaws. Documented fish kills have occurred in Calumet County due to the runoff events. Known fish kills

have occurred in The South Branch of the Manitowoc River, the Killsnake River, and some creeks along Lake Winnebago.

History of Flooding in Calumet County

The NCDC does not list individual flooding occurrences for Calumet County. However, through individual community interviews, it is evident flooding is Calumet County's most reoccurring hazard. According to the National FIRM maps for those communities participating the All-Hazards Mitigation Plan, there are 868 structures located in the 100- year flood zone. With such a large number of buildings in this zone, it is obvious why the county has flooding problems.

The NCDC does list the amount of property damage for the state as a whole, all due to flooding. They report that from 1954 to 2004, there was $56 million in damages.

Because the NCDC does not list all specific flooding events for Calumet County, the potential for reoccurrence is not accurate. Based on the events NCDC listed, Calumet County's annual potential for flooding is 2% (one event listed from 1954-2004).

However, based on the Presidential Declarations, we know there have been many more flooding occurrences than listed by NCDC.

A Presidential Disaster Declaration for flooding was approved for Calumet County in 1990, 1993, 2001 and 2004. In May of 2004 all reported flooding indicated the majority of the flooding occurred in the northeast area of the County, particularly around the Brillion Marsh. There was limited flooding south of the City of Chilton. The only other area which showed significant flooding was in the Brothertown community. Please see *Map I* for details of reported May 2004 flooding activity.

Deer Run Golf Course Flooding 2004

City of Brillion Flooding 2004

As indicated above, some believe the added sediment to the Brillion Marsh could be responsible for some of the county's flooding. However, one of the functions of a marsh is to store floodwaters and filter runoff. This function sometimes results in extra water being stored in areas lower in topography or areas with wetland soils. At first glance, aerial photography tends to support the idea that the Marsh has been filling with sedimentation and displacing water onto adjacent areas. Photography from 1938, compared to 2001 photography, illustrates a significant change in marsh boundaries (*Map J*). Caution should be taken in relying on the photography though because land use and climate may affect photo interpretation. The City of Brillion, which borders the Marsh, has spent several thousands of dollars trying to resolve water related problems linked to the Brillion Marsh issue.

Specifically, the city spent $4000 in 1999 on a *Storm Water Management Plan* to evaluate storm water drainage along the existing drainage channels and provide options to alleviate drainage problems; $168,000 on construction and engineering and $225,000 on land acquisition for detention structures, all in 1996 and 1997, the purpose of which was to reduce damage from flooding in the city and reduce quantity of flow in Spring Creek (leads to the Marsh); and unspecified amounts on a 1997 *Storm Water Management Plan Comprehensive Storm Water Drainage Study*, and, a 1996 *Alternative Analysis for Spring Creek Flood Control* study. Despite all these studies, flooding still persists.

As for sudden spring thaws and their effect on groundwater, it is difficult to document annual occurrences (one would have to monitor each field). Other than some residents reporting brown well water during the spring thaw, there is no detailed documented evidence in Calumet County. County staff and the WDNR are aware of the problem and know of other areas in the state where such damage has taken place. Since Calumet County does not get their groundwater from neighboring counties, should such a disaster occur, the county would know the contamination came from within its own borders.

A sudden spring thaw can flush manure or other substances directly into groundwater

Vulnerability Assessment

Flooding is Calumet County's most significant natural hazard. Annually there is some flooding and resulting damage to property. Flood events in Calumet County have caused substantial property and infrastructure damage in the past, and have the potential to cause future damage. Looking at past events, the following have been significantly impacted by flooding:

- Roadways-washouts
- Inundated roadways
- Bridges-inundated bridges
- Undermining supports
- Agricultural-inundated cropland
- Business-limited damage to business
- Residential-flooded basements
- Infrastructure-infiltration of sewer laterals

In order to assess the vulnerability of the Calumet County area to flooding hazards, applicable basic inventory asset data described in Chapter Two must be analyzed. For this purpose, special consideration should be given to transportation routes, cropland, and structures.

The Calumet County Flood Insurance Study is one of the few sources of scientific data available to determine the County's vulnerability to flood events. The Flood Insurance Study was used to determine the vulnerability of structures in the County. The following describes the methodology:

- Calumet County Land Information Office digitized (electronically traced) the individual FEMA FIRM Floodplain Maps into one GIS coverage for the County.
- The Floodplain GIS coverage then became an overlay over the Quadrangular GIS Coverage for Calumet County. Since the U.S. GIS coverage shows the location of manmade structures, buildings identified within the floodplain boundary were determined "vulnerable" to flooding.
- Those identified structures recognized as vulnerable were then verified/rectified on the digital aerial photos.

Map K illustrates the location of all structures in the 100-year floodplain boundaries within Calumet County. As mentioned above, there were a total of 868 structures in the designated floodplain boundaries for all of Calumet County. These structures were located on 536 parcels of land. The average value of these structures is $82,108. Be advised this average is skewed due to the fact that a few high valued industrial buildings are located in the boundary.

Many communities in Calumet County are located where there is a poorly defined drainage network. During periods of extended rainfall and/or snowmelt, there is a lot of flooding beyond the floodplain limits. During this time, roads, bridges, and cropland suffer considerable damage. Damage to public roads tends to be most significant along

the shoulders. Shoulders tend to wash out during heavy rains. In addition, undersized culverts and standing water tend to erode many of these shoulders. Bridges are just as affected in that the flooding waters often undermine supports. The monetary impact to roads is unknown. (To better understand which areas in the county are most vulnerable to road and bridge damage as a result of flooding, please refer to the individual community assessments.)

Due to the soil conditions in the County, the agricultural industry is affected by the floodwaters. Some fields lie inundated for weeks in spring. In that 65.5% of Calumet County's land is used for farm and cropland purposes, the potential for flooding affects the majority of the county.

Flood conditions affect farmers in many ways. Delayed planting reduces growing seasons. Flooded fields prevent farmers from seeding for crops. Often times seed and agricultural chemicals are washed out of fields. If plants do take root, summer flooding often rots plants due to excess moisture. In late summer and early fall, some planted crops are left in the fields due to the inability of the farmer to access his crops due to excessive moisture on the field. Crops not reaching full maturity yield a smaller crop and less valuable. The moisture also requires farmers to spend more money to try and negate the water problems that affect their fields. Crops, which do not reach full maturity, have a lower nutritional value.

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

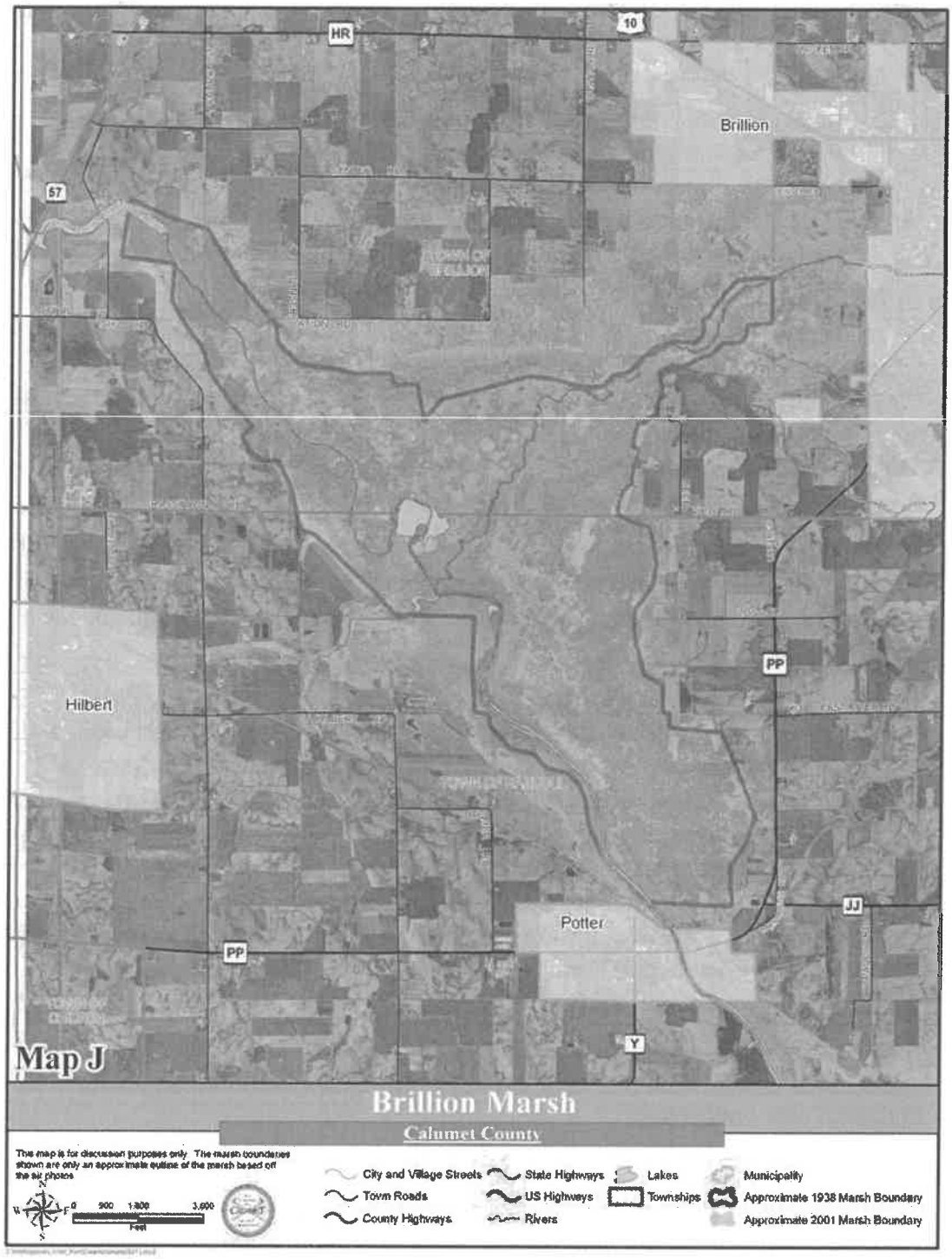
The saturated soil conditions responsible for these woes are general throughout the County. Although many areas are well suited for growing crops and have good, draining soils, there are also areas well suited for growing crops, but with poor drainage. Those fields which tend to flood either have a clay type of soil, or are so overly saturated they tend not to drain the water quickly. The lack of slope in the northeast portion of Calumet County adds to the inability of these areas to properly drain.

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

Although the crop and livestock industries are heavily affected by flooding, the one crop not affected is the forest products industry. The areas that are logged in Calumet County tend to be higher in topography and do not flood.

As for the vulnerability of the county to a quick winter/spring thaw after the application of manure on fields and its potential for catastrophic pollution to groundwater, such chances are possible every year, and only intensify as the planet warms. In recent decades we have seen unseasonable temperatures throughout the year, adding to this horrible threat. In that 130,164.5 acres of Calumet County is used for crop purposes, the maximum amount of actual land surface affected by the thaw is 64% of the county (those portions where manure could be spread), but the devastating effects of where the contaminated water could reach could be a countywide disaster.

Map Severe Flooding in Calumet County May 2004



Map J History of the Brillion Marsh

Mitigation Goals and Strategies

Goals:

1. Have an educated Calumet County citizenry regarding existing flooding conditions, potential hazards and mitigation strategies.
2. Minimize, and where possible, eliminate the potential for groundwater and surface water contamination.
3. Minimize all dangerous road conditions due to flooding.
4. Minimize all residential and commercial flooding.

*Strategies (*Indicates a Priority Strategy):*

*Communities are advised to review the Federal Emergency Management Agency's Flood Insurance Study for Calumet County and note areas identified as having flooding problems, and, follow flood protection measures identified. *Timeline:* Year 2006 and on-going.

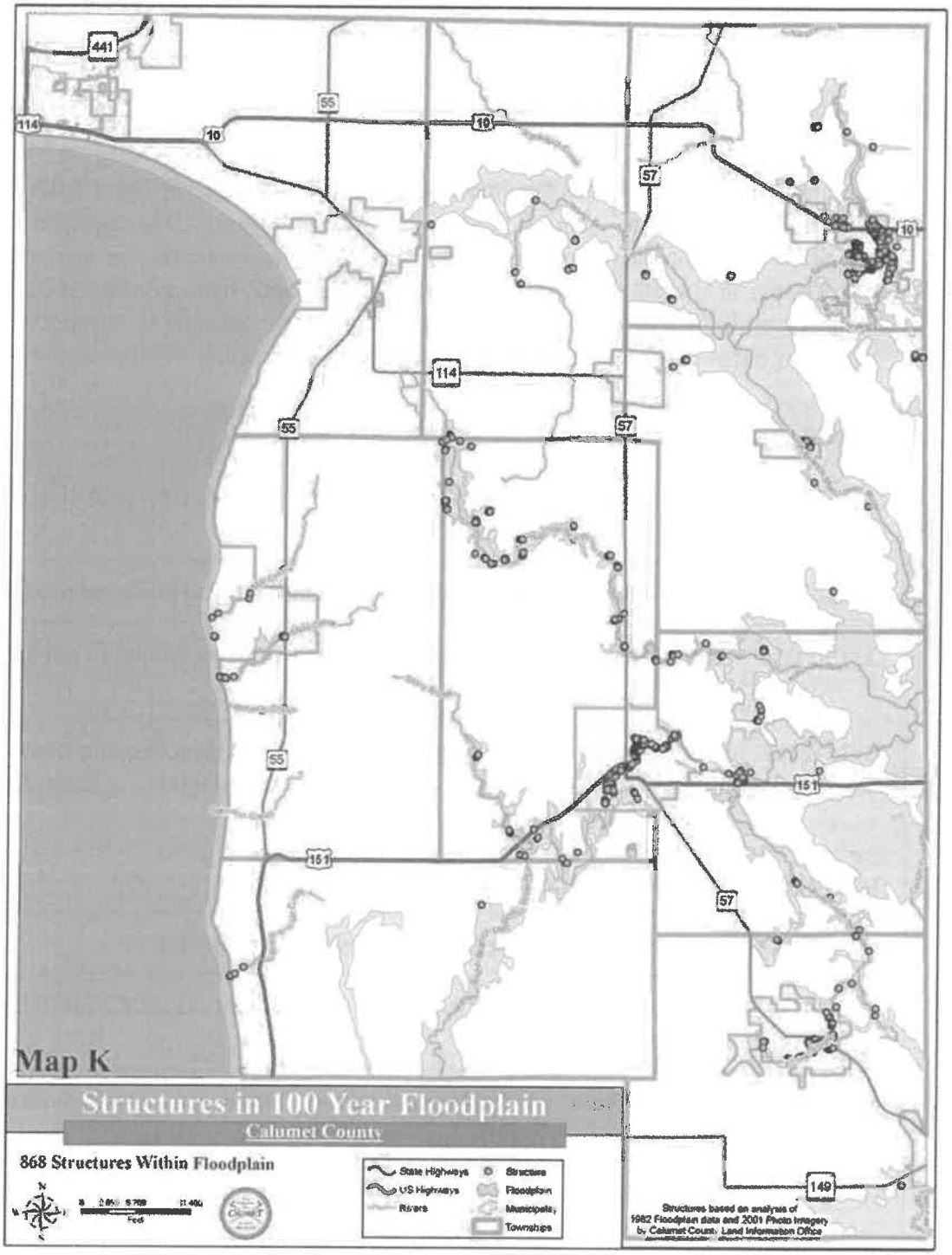
*To minimize flooding to new structures constructed in a floodplain, all communities with floodplain ordinances shall continue to administer floodplain ordinances. It is encouraged existing structures be brought into compliance with those ordinances.

Timeline: Year 2006 and on-going.

*The Calumet County Land and Water Conservation Department will work with the individual communities to minimize localized, road, bridge, culvert, and crop flooding. The Department can help determine if and when individual community mitigation strategies can be implemented. Also, the Department is aware of some mitigation strategies that may be more effective, and, is aware of potential grant dollars and cost sharing that can aid in reducing the cost of such strategies. *Timeline:* Begin a complete analysis of hazards identified by the individual communities in Year 2007 with resolution by 2017, where practical.

*The Land and Water Conservation Department will work with the Wisconsin Department of Natural Resources to develop an emergency plan to protect ground and surface waters from the hazards mentioned in this section (i.e., spring thaws). *Timeline:* Year 2006-2009.

*For those cities or villages that have experienced inundated sewer laterals, the Calumet County Planning Department will assist them in writing grants to repair such facilities. *Timeline:* As requested by individual communities.



Map K
Location of Structures Within 100-Year Floodplain Boundaries

Appendix G: Community Input

Calumet County believes in the importance of gathering public input from interested parties in the community. To achieve this goal, the Emergency Management Office took every opportunity available to utilize various methods to publicize the opportunity for people to participate in the planning process and to gather input from interested parties. The table that follows outlines the major opportunities that were created to discuss the plan. The table includes dates of workgroup meetings, meetings with public officials and media opportunities.

DATE	SUMMARY OF OPPORTUNITY
11/12/2019	Hazards survey sent to each town, village and city with the request that they discuss it and return the data.
11/12/2019	Press release inviting people to participate in the planning process
11/12/2019	Invitation to each town, village and city elected official to participate in the process.
11/14/2019	Introduce the hazard mitigation plan update process, the plan and discuss mitigation strategies with the Calumet County/Municipality Intergovernmental group
1/16/2020	Invitation to workgroup planning meeting
1/27/2020	Telephone meeting with EM, Highway, and Contractor
N/A	Workgroup meeting scheduled for 2/19/2020 - CANCELLED DUE TO COVID-19
Need date	Message sent to contiguous county emergency management directors inviting them to review and comment on the draft plan.
Need date	Press release notifying the public of the end of the plan and the open comment period. Printed in several community papers (see scans following).
Need date	Public notice released notifying the public of the open comment period on the draft plan.
Need date	Adoption meetings at municipalities, which per the WI Open Meetings Law, are noticed to the public with an agenda, prior to the meetings. Meetings are open to the public and minutes are posted in public afterwards. See samples of agendas and minutes following. Adoptions are in Appendix C.

12 November 2019 - Hazards survey sent to each municipality

Calumet County

Emergency Management

Emile Sorensen, Emergency Manager
208 Court Street, Chilton, WI 53014
Office: (920) 849-1475
Toll Free: (855) 420-2783
Cell: (920) 418-4407 | Fax: (920) 849-1472
Email: Emile.sorensen@calumetcounty.org

Date: November 12, 2019

To: Town, Village, City Leaders & County Departmental Managers

From: Emile Sorensen, Emergency Manager

Re: *Hazard Mitigation Plan Update*

Calumet County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. Wisconsin has incurred disaster-related damages totaling nearly $3 billion in the last three decades, with almost half of that occuring in the 1990s alone. These losses can be reduced through mitigation activities. A 2017 study estimated that for every dollar spent on mitigation, $6 in future damages can be avoided. Hazard mitigation breaks the cycle of damage and repair.

Mitigation actions reduce or eliminate the long-term risk to human life and property from hazards. These preventative actions can be simple such as elevating a furnace in a basement that sometimes has water on the floor. Mitigation can also have a comprehensive approach such as relocating buildings out of the floodplain or strengthening critical facilities to prevent wind damage and provide stronger shelter.

In an effort to better prepare Calumet County to manage its vulnerability to disaster Calumet County Emergency Management applied for and received a hazard mitigation planning update grant. This goal of this grant is to complete an approved and updated plan which will serve as a roadmap outlining potential cost-effective hazard mitigation activities, some of which might be available for future grant funding. The plan is designed to look at the risks and vulnerabilities the county faces from natural disasters, and to highlight mitigation strategies that might reduce future losses to life and property.

As part of this planning process, I need your help. ***The first step is asking that you place an agenda item at your next municipal meeting to complete the attached survey.*** This short survey will help us to identify specific concerns within your municipality, and to capture ideas that you have for making your community safer and more disaster resistant. Please return your completed surveys to me by December 20th.

After receiving your surveys, the information will be incorporated into the draft plan which will be guided by a workgroup of interested agencies and public members. *I would like to extend an offer for anyone from your leadership council, your municipal staff or your general community to contact me if they would like to join the workgroup.*

Finally, after the workgroup has completed the final draft plan, we will be sending copies of it to each of you for final review and adoption. It is important to note the following:

- Adoption of this plan will NOT cost your community anything. You will not be committing to completing any of the projects listed, instead it is a list of things known that can be accomplished should the funding and will to complete them become available.
- If you do not adopt the final plan, your community will NOT be eligible to apply for and receive mitigation project funding in the future.

Let me thank you in advance for the valuable assistance you are providing. The small investment of your time will help make us a safer, healthier and more disaster-resistant community for years to come.

If you are interested in more information about the plan, or would like to join the plan workgroup, please feel free to contact me at (920) 849-1473 or by email at [redacted].

12 November 2019 - Press release inviting people to participate in the planning process

WISCONSIN
Calumet County
Emergency Management

Bernie Sorenson, Emergency Manager
306 Court Street, Chilton, WI 53014
Office: (920) 849-1473
Toll Free: (888) 620-2730
Cell: (920) 418-4407 | Fax: (920) 849-1472
Email: bernie.sorenson@calumetcounty.org

12 November 2019

For More Information, Contact Bernie Sorenson (920-849-1473)

For Immediate Release

Calumet County Receives a Hazard Mitigation Planning Update Grant

(Chilton, WI) Calumet County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. Wisconsin has incurred disaster-related damages totaling nearly $3 billion in the last three decades, with almost half of that occurring in the 1990s alone. These losses can be reduced through mitigation activities. A 2017 study estimated that for every dollar spent on mitigation, $6 in future damages can be avoided. Hazard mitigation breaks the cycle of damage and repair.

Mitigation actions reduce or eliminate the long-term risk to human life and property from hazards. These preventative actions can be simple such as elevating a furnace in a basement that sometimes has water on the floor. Mitigation can also have a comprehensive approach such as relocating buildings out of the floodplain or strengthening critical facilities to prevent wind damage and provide stronger shelter.

In an effort to better prepare Calumet County to manage its vulnerability to disaster, Bernie Sorenson, Calumet County Emergency Manager, applied for and received a hazard mitigation planning update grant. The goal of this grant is to update an approvable plan, which will serve as a roadmap that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding.

The plan is designed to look at the risks and vulnerabilities that the county faces from natural disaster and to highlight mitigation strategies that might reduce future losses. As part of this planning process, Sorenson is assembling a workgroup to review and guide the planning activities. This workgroup will review initial background information about Calumet County and identify strategies that might help.

Sorenson stated, "I am very excited about this part of the planning process. The input from the workgroup can have long-lasting impacts, making Calumet County safer and more disaster resistant."

FEMA has recognized the importance of having members of the community involved in the process and Sorenson would like to ensure that all interested members of the community have an opportunity to provide input into the plan. If you are interested in more information about the plan or would like to provide input into the plan, please contact Bernie Sorenson at 920-849-1473.

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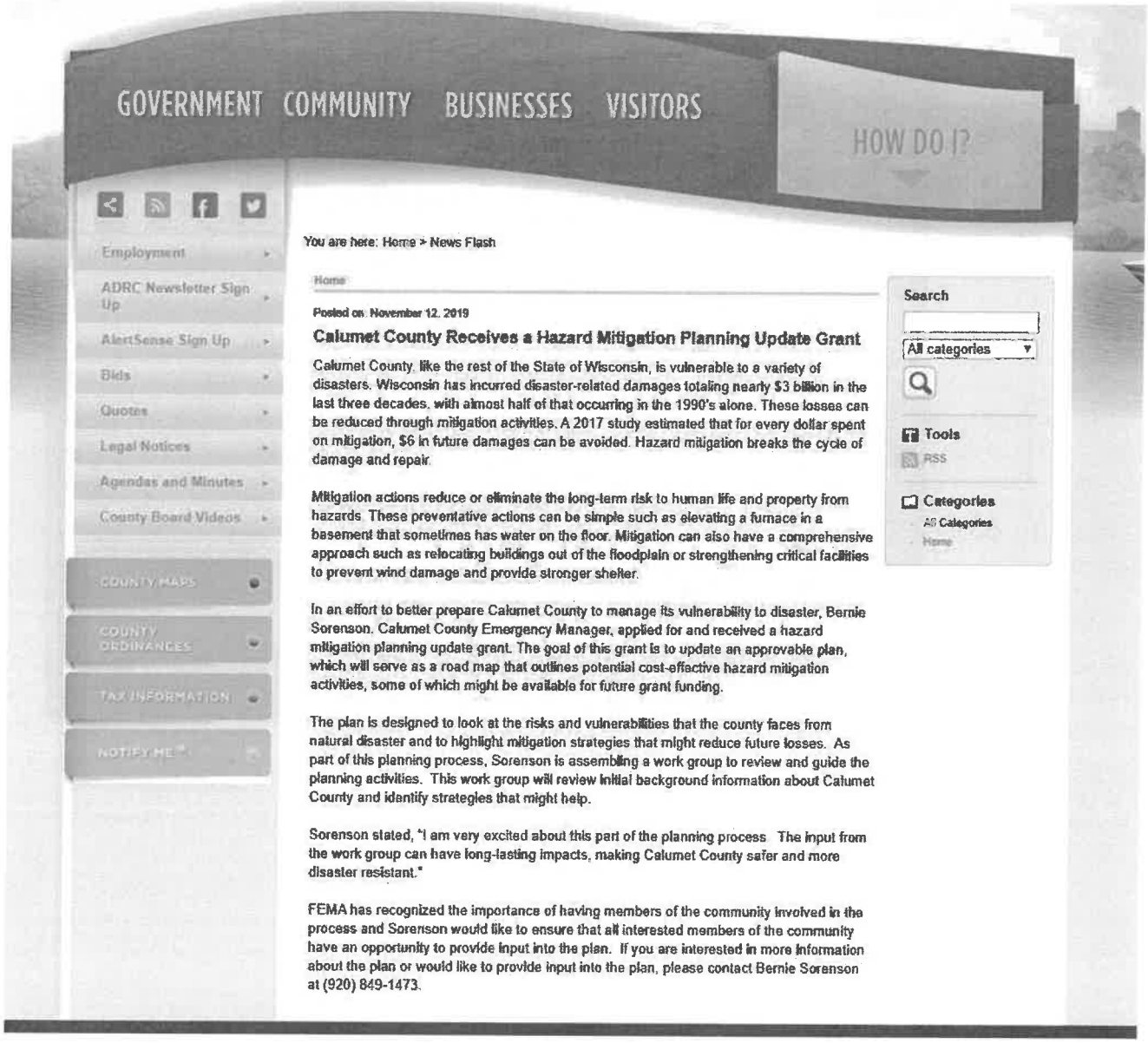
Media contact list used to send press release

Name: Media Contact: FULL LIST Updated 2019-12-3

Name	E-mail
Andrew Beckett - WEM PIO	andrew.beckett@wisconsin.gov
Appleton Post Crescent	pcnews@postcrescent.com
Appleton Post Crescent (daily)	edward.bertmaume@gannettwisconsin.com
FDL Reporter	news@fdlreporter.com
Fox 11 News	fox11news@wluk.com
Fox 11 News - WLUK-TV	GreenBay-WLUK-Fox11N@sbgtv.com
Gannett	APC-PublicSafetydg@gannett.com
HTR News	htrnews@htrnews.com
Times Villager (Wed. & Sat.)	editor@timesvillager.com
Tri-County News Mark Sherry (weekly)	marks@deltapublications.com
United Way 2-1-1 Lisa Smith	lisa.smith@unitedwayfoxcities.org
Valders Journa (weekly)	editor@valdersjournal.com
WBAY-TV Channel 2	news@wbay.com
WFRV - Channel 5	tips@wearegreenbay.com
WGBA-NBC - Channel 26	news@nbc26.com
Zander Brillion Darcy	publications@zanderpressinc.com
Zander Brillion Ed Byrne	edbyrne@zanderpressinc.com
Zander Brillion News (weekly)	bneditor@thebrillionnews.com

Posting of press release to county's website



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Posted on: November 12, 2019

Calumet County Receives a Hazard Mitigation Planning Update Grant

Calumet County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. Wisconsin has incurred disaster-related damages totaling nearly $3 billion in the last three decades, with almost half of that occurring in the 1990's alone. These losses can be reduced through mitigation activities. A 2017 study estimated that for every dollar spent on mitigation, $6 in future damages can be avoided. Hazard mitigation breaks the cycle of damage and repair.

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In an effort to better prepare Calumet County to manage its vulnerability to disaster, Bernie Sorenson, Calumet County Emergency Manager, applied for and received a hazard mitigation planning update grant. The goal of this grant is to update an approvable plan, which will serve as a road map that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding.

The plan is designed to look at the risks and vulnerabilities that the county faces from natural disaster and to highlight mitigation strategies that might reduce future losses. As part of this planning process, Sorenson is assembling a work group to review and guide the planning activities. This work group will review initial background information about Calumet County and identify strategies that might help.

Sorenson stated, "I am very excited about this part of the planning process. The input from the work group can have long-lasting impacts, making Calumet County safer and more disaster resistant."

FEMA has recognized the importance of having members of the community involved in the process and Sorenson would like to ensure that all interested members of the community have an opportunity to provide input into the plan. If you are interested in more information about the plan or would like to provide input into the plan, please contact Bernie Sorenson at (920) 849-1473.

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14 November 2019 - Article in the Brillion News

Calumet County Receives a Hazard Mitigation Planning Update Grant

The Brillion News

CHILTON – Calumet County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. Wisconsin has incurred disaster-related damages totaling nearly $1 billion in the last three decades, with almost half of that occurring in the 1990s alone. These losses can be reduced through mitigation activities. A 2017 study estimated that for every dollar spent on mitigation, $6 in future damages can be avoided. Hazard mitigation breaks the cycle of damage and repair.

Mitigation actions reduce or eliminate the long-term risk to human life and property from hazards. These preventative actions can be simple such as elevating a furnace in a basement that sometimes has water on the floor. Mitigation can also have a comprehensive approach such as educating buildings out of the floodplain or strengthening critical facilities to prevent wind damage and provide stronger shelter.

In an effort to better prepare Calumet County to manage its vulnerability to disaster, Denise Swenson, Calumet County Emergency Manager, applied for and received a hazard mitigation planning update grant. The goal of this grant is to update an approvable plan, which will serve as a roadmap that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding.

The plan is designed to look at the risks and vulnerabilities that the county faces from natural disaster and to highlight mitigation strategies that might reduce future losses. As part of this planning process, Swenson is assembling a workgroup to review and guide the planning activities. This workgroup will review initial background information about Calumet County and identify strategies that might help.

Swenson stated, "I am very excited about this part of the planning process. The input from the workgroup can have long-lasting impacts making Calumet County safer and more disaster resistant."

FEMA has recognized the importance of having members of the community involved in the process and Swenson would like to ensure that all interested members of the community have an opportunity to provide input into the plan. If you are interested in more information about the plan or would like to provide input into the plan, please contact Denise Swenson at 920-849-1473.

Lakeland program takes on student debt issue

The Brillion News

EAST TROY – Lakeland University (LU) on Monday announced a new program to tackle student debt.

The program has certain criteria to qualify.

Beginning the fall of 2020, the Lakeland Promise will provide qualifying students with the opportunity to work part- and full-time jobs at co-op partner companies. LU students could earn money to their co-op jobs to pay for other school-related costs and bank what they earn.

The Lakeland Promise will allow students who have through the Wisconsin Tuition Grant, Federal Pell Grant and other Lakeland funding.

Wages from co-op jobs, along with federal loans and outside scholarships that a person has, while also providing ways for students to earn wages and credits at employer partners in the region.

Those are qualifying requirements.

The Lakeland Promise is for students who have high financial need, as determined by the FAFSA and by in good standing with Wisconsin state agencies for state grant eligibility.

Additional details are available at

To participate in the program, students must remain in academic and financial good standing, while continuously enrolled at LU. Students will not be penalized for earning [illegible] through [illegible]

[illegible] from by earning a college education."

Lakeland is in the third year of offering cooperative education across all its academic majors. In its first two years, more than 400 students have [illegible]

"One of the great misconceptions is that a private liberal arts education

14 November 2019 – Agenda and sign-in sheet from County/Municipality Intergovernmental Meeting

WISCONSIN
Calumet County
Department of Administration

Todd M. [redacted], County Administrator
206 Court Street, Chilton, WI 53014
Office: (920) 849-1668
Toll Free: (833) 620-2730
Fax: (920) 849-1475
E-mail: county.admin@calumetcounty.org

October 9, 2019

COUNTY / MUNICIPAL INTERGOVERNMENTAL MEETING AGENDA

DATE: Thurs., November 14, 2019
TIME: 9:30 a.m. – 11:00 a.m.
PLACE: Optimist Chalet Building
Optimist Park
2200 Mason St.
New Holstein, WI 53061

1) Welcome and Introductions

2) Introduction of Greg Brittnacher, Calumet County Veterans Service Officer

3) Bernie Sorenson, Emergency Management Coordinator
   - Calumet County Hazard Mitigation Plan update process
   - County-wide damage assessment & reporting
   - Cost/benefit of using volunteers during disasters
   - Senior Officials Workshop for All-Hazards Preparedness

4) 2020 Calumet County Budget

5) Round Robin

6) Schedule Next Meeting and Suggestions for Agenda Topics
   - Tentative date for next meeting: Thurs., May 14, 2020

Members of your staff, board or council are also welcome to attend this meeting.

Please RSVP by November 7, 2019 to patricia.winkler@calumetcounty.org, or call 920/849-1448, or toll-free 1-833-620-2730.

SIGN-IN SHEET

Meeting County/Municipal Intergovernmental
Date November 14
Location City of New Holstein

Name	Title/Municipality
Chuck Schneider	Town of Brothertown
GARY WINKLER	TOWN OF NEW HOLSTEIN
Mary Kohrell	Calumet County
Brian Rudy	City of NEW Holstein
GARY L DE TUK	CITY BRILLION
Roger Koos	Sherwood
Greg Zickuhr	Village Stockbridge
Darin Ruse	City of New Holstein
BERNIE SWENSON	CALUMET COUNTY EMERGENCY MANAGER
Greg Bretthauer	Calumet Cty
Todd Romenesko	Calumet Cty
Tim Hanna	City of Appleton
Jamie Aulik	City of Kiel
Gary Lemke	VILLAGE POTTER
Todd M Romenesko	Calumet County
Patricia Winkler	Calumet County

16 January 2020 - Invitation to planning meeting on 19 February 2020 [168]

WISCONSIN
Calumet County
Emergency Management

Bernie Sorenson, Emergency Manager
206 Court Street, Chilton, WI 53014
Office: (920) 849-1473
Toll Free: (833) 629-2730
Cell: (920) 418-4407 | Fax: (920) 849-1472
Email: Bernie.sorenson@calumetcounty.org

January 16, 2020

Dear Municipal Official:

As you already know, the Calumet County Emergency Management Office has received a grant from the Federal Emergency Management Agency (FEMA) and Wisconsin Emergency Management (WEM) to complete an update of the county Hazard Mitigation Plan. As with any plan, it needs to be regularly evaluated and updated to outline progress and to set a roadmap for future mitigation efforts.

The plan reviews the risks for various natural disasters within Calumet County and creates a strategy for addressing these risks in a cost-effective way. Calumet County has received several federal disaster declarations in recent history and we are at continued risk for future events such as flooding, high winds and tornados; this planning effort is intended to help reduce, or "mitigate," potential future losses. Also, the federal government requires that communities adopt a current hazard mitigation plan as one criterion for grant eligibility.

In order for your municipality to be eligible for future FEMA mitigation funding, you must contribute at least one (1) representative to participate with our upcoming planning team sessions. This person will be needed for 2-3 meetings over the next 12 months. *Each local team member must have sufficient knowledge to provide the contractor with the unique information needed to complete the plan.* To assist with this task, we are providing you with the strategies collected from our previous plan iteration. At our first meeting you will need to "report out" on your existing projects. Specifically, we will need you to provide the following kinds of detail:

1. Was the identified project completed?
2. If yes, the project description (when it happened, what happened, how much did it cost).
3. If not, why not (e.g., no funding, leadership change, hazard was mitigated differently)?
4. What you want to do with the identified project. Options include:
    a. Carry the project forward with the plan/hope to do it in the next five years.
    b. Do the project in an alternative way/scope.
    c. Drop the project from the plan.
5. Finally, to describe any local mitigation projects (if any) listed on your recently submitted survey, and/or identify other projects which may reduce or eliminate the harmful effects of future disasters that may affect your community.

Our first team meeting is scheduled for February 19, 2020 from 1PM – 3PM in Room 017 in the lower level of the Calumet County Courthouse. I look forward to your municipality's participation in this process so that we may keep your community eligible for future hazard mitigation grant funding. Please feel free to contact me with any questions at (920) 920-849-1473.

Sincerely,

Bernie Sorenson

[168] The February 19, 2020 meeting was cancelled due to COVID-19

18 January 2020 - Email sent with reminder of planning meeting on 19 February 2020 [169]

——— Forwarded message ———
From: **Bernie Sorenson** <Bernie.Sorenson@calumetcounty.org>
Date: Sat, Jan 18, 2020 at 4:38 PM
Subject: Calumet Co. Hazard Mitigation Plan - Info Required!
To: City of Appleton Clerk <Kami.Lynch@appleton.org>, City of Appleton Mayor <tim.hanna@appleton.org>, City of Brillion <admin@ci.brillion.wi.us>, City of Brillion Mayor <mayor.gdiefer@hotmail.com>, City of Chilton <chiltonclk@chiltonwi.com>, City of Chilton Mayor <chiltonmayor@chiltonwi.com>, City of Kiel Administrator <jamie.aulik@kielwi.gov>, City of Kiel Mayor <mike.steinbardt@frontier.com>, City of Menasha Clerk <dgaleazz@ci.menasha.wi.us>, City of Menasha Mayor <merkes@ci.menasha.wi.us>, City of New Holstein Clerk <clangenfeld@wppienergy.org>, City of New Holstein Mayor <dreese@wppienergy.org>, Town of Brillion Chair <kwish@live.com>, Town of Brillion Clerk <clerk@townofbrillion.com>, Town of Brothertown Chair <cjsejs2@gmail.com>, Town of Brothertown Clerk <townofbrothertown@gmail.com>, Town of Charlestown Chair <chairman@townofcharlestown.com>, Town of Charlestown Clerk <davalent@frontier.com>, Town of Chilton Chair <jwschwarz7@yahoo.com>, Town of Chilton Clerk <sheilakoclerk@gmail.com>, Town of Harrison - JW <jweyenberg@townofharrison.org>, Town of NH Chair <chairman.tnh@gmail.com>, Town of NH Clerk <townclerkheller@gmail.com>, Town of Rantoul <clerk@townofrantoul.com>, Town of Rantoul Chair <mertz3338@hotmail.com>, Town of Stockbridge Clerk <stockbridgeclerk@gmail.com>, Town of Stockbridge Ken Schaefer <chairmanken@tds.net>, Town of Woodville <townofwoodville@yahoo.com>, Town of Woodville Chair <woodvilletownchair@gmail.com>, Village of Harrison Administrator <jparish@harrison-wi.org>, Village of Harrison President <kevinhietpas@hotmail.com>, Village of Hilbert <hilbertclerk@villageofhilbert.com>, Village of Hilbert President <markbreckheimer@gmail.com>, Village of Potter - Gary Lemke <lemke5@charter.net>, Village of Potter Clerk/Treasurer <nmg@tds.net>, Village of Sherwood Administrator-Clerk <administrator.sherwood@villageofsherwood.org>, Village of Sherwood Finance-Utilities <utilities@villageofsherwood.org>, Village of Stockbridge Clerk/Treasurer <villageofstockbridge@tds.net>, Village of Stockbridge President <azahringer@m-bco.com>
Cc: Lenora Borchardt <lenorab@eptechnc.com>

Good Afternoon.

As many of you are aware, Calumet County is currently updating its existing Hazard Mitigation Plan. As part of this important process we must form a planning group to meet 2-3 times over the next few months. Our initial meeting will be held at the Calumet County Courthouse on ***February 19th from 1-3 PM in lower basement Room 017.***

Unless your municipality is included within a separate county's or other jurisdictional mitigation plan, please know that cities and villages MUST participate with this planning process if they wish to adopt Calumet County's plan. Doing so will make the organization eligible for future federal hazard mitigation grant funding.

Attached you will find a letter further describing this process. The individual selected to represent your organization should have sufficient knowledge to "report out" on the five (5) items detailed within it. Most often this person is a lead administrator from the public works and/or streets department.

Prior to next Friday, January 24th, please email me the name and email address of your selected municipal representative. In turn, I will email this person the hazard "strategies" last identified by your municipality from the previous plan.

[169] The February 19, 2020 meeting was cancelled due to COVID-19

CALUMET COUNTY NATURAL HAZARDS
PREPAREDNESS AND MITIGATION QUESTIONNAIRE

1. Please check the correct box for EACH natural disaster that your municipality has/has not experienced. Note that you are indicating the most recent occurrence for each disaster event.

Event/Occurrence	*Most Recent Occurrence:*				
	Within past year	*1-5 years ago*	*5-15 years ago*	*More than 15 years ago*	*Never*
Drought		VI Potter	Co EM Co P, Z & L TN Brothertown TN Rantoul VI Hilbert	C Chilton TN Brillion TN Chilton TN New Holstein TN Woodville VI Harrison	C Appleton C Brillion C New Holstein TN Stockbridge VI Sherwood VI Stockbridge
Dust Storm				Co EM TN New Holstein	C Appleton C Brillion C Chilton C New Holstein Co P, Z & L TN Brillion TN Brothertown TN Chilton TN Rantoul TN Stockbridge TN Woodville VI Harrison VI Hilbert VI Potter VI Sherwood VI Stockbridge
Earthquake					C Appleton C Brillion C Chilton C New Holstein Co EM Co P, Z & L TN Brillion TN Brothertown TN Chilton TN New Holstein TN Rantoul TN Stockbridge TN Woodville VI Harrison VI Hilbert

					VI Potter VI Sherwood VI Stockbridge
Flood	C Brillion C Chilton Co EM Co P, Z & L TN Brothertown TN New Holstein TN Rantoul TN Woodville VI Stockbridge	C Appleton C Brillion C New Holstein Co Highway TN Brillion TN Stockbridge VI Potter	C Appleton C Brillion VI Harrison VI Hilbert	C Appleton C Brillion	TN Chilton VI Sherwood
Lakeshore Erosion	Co P, Z & L	C Chilton Co EM TN Brothertown	VI Harrison		C Appleton C New Holstein TN Brillion TN Chilton TN New Holstein TN Stockbridge TN Woodville VI Hilbert VI Potter VI Sherwood VI Stockbridge
Landslide/ Debris Flow		C Chilton		Co EM	C Appleton C Brillion C New Holstein Co P, Z & L TN Brillion TN Brothertown TN Chilton TN New Holstein TN Rantoul TN Stockbridge TN Woodville VI Harrison VI Hilbert VI Potter VI Sherwood VI Stockbridge
Wildfire			Co P, Z & L	VI Harrison	C Appleton C Brillion C Chilton C New Holstein TN Brillion TN Brothertown TN Chilton TN New Holstein TN Rantoul TN Stockbridge TN Woodville VI Hilbert

					VI Potter VI Sherwood VI Stockbridge
Windstorm/ Tornado	C Appleton C Brillion Co P, Z & L VI Sherwood	C Appleton C Brillion C Chilton C New Holstein Co EM TN New Holstein TN Rantoul TN Stockbridge TN Woodville VI Stockbridge	C Brillion TN Brillion TN Brothertown VI Harrison VI Hilbert	C Brillion VI Potter	TN Chilton
Severe Winter Storm	C Appleton C Brillion C Chilton Co Highway Co P, Z & L TN Brillion TN Brothertown VI Stockbridge	C Appleton C Brillion C New Holstein Co EM TN Rantoul TN Woodville VI Hilbert VI Sherwood	C Brillion VI Harrison VI Potter	C Brillion TN New Holstein TN Stockbridge	
Creek Erosion	C Brillion				
Natural Hazard Resulting in Extended Power Outage	Co EM				
Extreme Cold/Heat	Co P, Z & L				
Ice Shoves	Co P, Z & L				
Hail Storm				TN Brothertown	

2. Rate your community's risk for EACH natural hazard in the table listed below.

Event/L.O.C.	*Extremely Concerned*	*Very Concerned*	*Concerned*	*Somewhat Concerned*	*Not Concerned*
Earthquake				Co EM VI Potter	C Appleton C Brillion C Chilton C New Holstein Co EM Co P, Z & L TN Brillion TN Brothertown TN Chilton TN New Holstein TN Rantoul TN Stockbridge TN Woodville VI Harrison VI Hilbert

					VI Sherwood VI Stockbridge
Flood	C Brillion C Chilton Co EM VI Potter VI Stockbridge	Co Highway Co P, Z & L TN Brillion TN Rantoul TN Stockbridge	TN New Holstein VI Harrison	C Appleton C New Holstein TN Brothertown TN Chilton TN Woodville VI Hilbert VI Sherwood	
Erosion	C Brillion TN Brothertown	C Chilton TN Brillion	Co P, Z & L TN Stockbridge VI Harrison VI Stockbridge	C New Holstein Co EM TN Rantoul TN Woodville VI Potter VI Sherwood	C Appleton TN Chilton TN New Holstein VI Hilbert
Landslide/ Debris Flow		C Chilton TN Brillion		Co EM TN Brothertown	C Appleton C Brillion Co P, Z & L TN Chilton TN New Holstein TN Rantoul TN Stockbridge TN Woodville VI Harrison VI Hilbert VI Potter VI Sherwood VI Stockbridge
Wildfire			C Brillion Co EM	Co P, Z & L TN Brillion TN Brothertown VI Harrison	C Appleton C Chilton TN Chilton TN New Holstein TN Rantoul TN Stockbridge TN Woodville VI Hilbert VI Potter VI Sherwood VI Stockbridge
Windstorm/ Tornado	C Brillion C Chilton Co EM Co P, Z & L VI Potter	C Appleton C New Holstein TN Stockbridge	Co Highway TN Brillion TN New Holstein TN Rantoul VI Harrison VI Sherwood VI Stockbridge	TN Brothertown TN Woodville VI Hilbert	TN Chilton
Severe Winter Storm/ Ice Storm	C Chilton Co EM Co P, Z & L TN Brothertown	C Appleton C Brillion C New Holstein	Co Highway TN Brillion TN New Holstein TN Rantoul	TN Stockbridge TN Woodville	TN Chilton

	VI Potter VI Stockbridge		VI Harrison VI Hilbert VI Sherwood		
Drought		TN Brothertown	C Brillion C Chilton Co EM Co P, Z & L TN Brillion TN New Holstein TN Rantoul VI Potter VI Stockbridge	C New Holstein TN Chilton	C Appleton TN Stockbridge TN Woodville VI Harrison VI Hilbert VI Sherwood
Dust Storm			TN Brillion	Co EM TN Brothertown	C Appleton C Brillion C Chilton C New Holstein Co P, Z & L TN Chilton TN New Holstein TN Rantoul TN Stockbridge TN Woodville VI Harrison VI Hilbert VI Potter VI Sherwood VI Stockbridge
Natural Hazard Resulting in Extended Power Outage	Co EM				
Heavy Fog			Co EM	Co EM	
Extreme Heat/Cold		Co P, Z & L			
Ice Shoves/Lake Ice Damage			Co P, Z & L TN Stockbridge		
Hail Storm				TN Brothertown	
Manure Runoff	VI Stockbridge				

3. Has your community had damage to facilities or infrastructure? If yes, please describe the damage and approximate date of occurrence (e.g., roads, public buildings, utilities).

- C Appleton: June 2017, a tornado caused damage to park buildings and traffic signals. July 2019, a windstorm caused damage to traffic signals and trees.

- C Brillion: Roads and utilities – washouts from flooding.
- C Chilton: March 2019-Culvert flooded, bank washed away, road damaged (Hwy. 57, north of Breed St.); March 2019-Road flooding (CTH Y, east of Irish Rd., water treatment plan driveway washed out from slow melt; August 2019 – tree down, communications antenna damaged at wellhouse #7, power outage and wind storm.
- Co EM: Most recent damages have been confined to roads and other similar infrastructure due to flood events (Flooding on 5/3/2018, wind/tornado event on 8/28/2019, extreme cold/power outages on 1/31/2019, spring thaw/flooding on 3/14/2019 and 3/15/2019, severe storms/power outages on 7/19/2019, significant rain event on 9/11/2019 and significant rain event on 10/2/2019).
- Co Highway: Our county has only had damages to a few roads due to heavy rains. As far as winter storms, we have had a number of them but have been able to take care of each event. The cost of repairs due to the flooding is a major concern; and the cost of our winter maintenance activities.
- Co P, Z & L: This question applies more to Highway and Parks. I'm sure Highway has experienced damage to county roads. Parks may have experienced damage to launch facilities and other infrastructure.
- TN Brillion: Cemetery Road culvert washed out in 2012.
- TN Brothertown: Flooding on S. Tower Road one or two times per year, eroding shoulders and culverts.
- TN Stockbridge: 6/27/2019 Thunderstorm winds downed trees and damaged buildings.
    a. 5/13/2018 Flooding with erosion of culverts and shouldering.
    b. 6/24/14 Thunderstorms produced heavy rain in parts of central Calumet County. 3.38" of rair fell near Stockbridge in less than 3 hours. The rain caused fields to flood and washed-out culverts of several area roads. Several houses had water in their basements.
    c. 7/14/2014 Heavy rain washed out a section of Mapleview lane and the shoulder along County Highway E about 2 miles east of town. One basement sustained water damage. Calumet EM reported rainfall total of 3.45"
    d. 7/20/2010 Severe Thunderstorm developed across northeast Wisconsin as a week surface boundary encountered an unstable air mass. The storms produced winds estimated as high as 100mph and hail to golf ball size. Causing millions of dollars in damage and injuring 1 person.
    e. 7/24/2010 4.4" of rain fell causing erosion and collapse of drainage ditch which leads into Mud Creek. Several other roads suffered damage from the fast-moving water and a home experienced damage as water rushed into a basement.

- VI Harrison: The only instances of road damage or infrastructure have been minor due to natural disaster. Edges of road slightly washing out in large/high volume rainfalls (2008 flood) and minor culvert damage. Warranted repairs were minimal.
- VI Potter: Roads, bridge, home flooding, hail, storm damage.
- VI Sherwood: Roadway ditching and drainage ways; culverts undermined along/at stream crossing; roadway undermined along/at stream crossing.
- VI Stockbridge: Washout/erosion of road sides/shoulders, storm sewers. Creek erosion, mainly due to flooding.

4. What facilities or infrastructure in your community do you think are especially vulnerable to damage during a natural disaster?

- C Appleton: Facilities/infrastructure in the Calumet County area of the City of Appleton that is vulnerable to damage during a natural disaster include trees, water treatment plant, lake station, electrical lines, traffic signals, park buildings, school buildings, life stations, telecommunications (Spectrum) and transmission lines (WE Energies).
- C Chilton: Storm sewer, wastewater treatment plant, communication antenna, road culverts, sanitary sewer collection system.
- C New Holstein: Public utility assets – treatment plant, water towers, electric substations.
- Co EM: Roads and similar infrastructure; power/utilities and related infrastructure; large MHPs (severe wind event); Chilton High School football stadium/attendee population (severe wind event).
- Co Highway: When having a natural disaster everything is at risk or vulnerable.
- Co P, Z & L: Roads, park facilities, other county structures such as courthouse, highway shops, etc.
- TN Brillion: Town hall, roads, water tower.
- TN Brothertown: Most roads that are west of the escarpment, along S. Tower Road.
- TN New Holstein: Homes of all residents, livestock housing facilities, industrial and commercial business facilities.
- TN Stockbridge: The biggest impact from a natural disaster from storms is our roads, with the Town of Stockbridge being partially on the bottom side of the escarpment, heavy rain runoff has occurred and drainage areas have been tested. Lake Winnebago water levels have been increasing in the winter, thus the concern for ice shoves is becoming more and more popular.
- TN Woodville: Roads.
- VI Harrison: There are two fire stations where impacts would be detrimental. Harrison is largely a residential community, so damage would be mainly affecting single family residential homes. Shoreline failure on the northern end of Lake Winnebago could occur under severe circumstances and would affect single family homes. Utilities would be the most vulnerable infrastructure – sanitary, water, storm, electric and gas.
- VI Potter: Storm sewers, sanitary plant/sewers, streets, bridge and homes.
- VI Sherwood: Public power affecting electrical services and municipal and personal properties.
- VI Stockbridge: Sewer plant, water plan, fire station, village office.

5. How important do you feel each of the following projects are in mitigating (i.e., lessening the impacts of) a natural disaster in your community?

Project/Importance	*Very Important*	*Somewhat Important*	*Neutral*	*Not Very Important*	*Not Important*
Protecting private property	C Appleton C Brillion C New Holstein Co Highway TN Brothertown TN New Holstein TN Stockbridge VI Harrison VI Potter VI Stockbridge	C Chilton Co EM Co P, Z & L TN Chilton TN Rantoul VI Hilbert	TN Brillion TN Woodville VI Sherwood		
Protecting critical facilities (hospitals, fire stations, etc.)	C Appleton C Brillion C Chilton C New Holstein Co EM Co Highway Co P, Z & L TN Brillion TN New Holstein TN Woodville VI Harrison VI Hilbert VI Sherwood VI Stockbridge	TN Brothertown TN Chilton TN Rantoul TN Stockbridge VI Potter			
Preventing development in hazard areas	C Brillion Co EM Co Highway Co P, Z & L TN Brothertown VI Hilbert VI Sherwood VI Stockbridge	C Chilton TN Brillion TN Stockbridge VI Potter	TN Rantoul	C New Holstein TN Chilton TN New Holstein	C Appleton VI Harrison
Enhancing the function of natural features (streams, wetlands)	C Brillion Co EM Co Highway Co P, Z & L TN Brothertown TN Stockbridge VI Harrison VI Potter VI Stockbridge	C Chilton TN Brillion TN Chilton TN Rantoul TN Woodville VI Hilbert VI Sherwood	C Appleton C New Holstein TN New Holstein		
Protecting historical & cultural landmarks	Co Highway TN Brothertown VI Hilbert	C Appleton C Brillion C Chilton Co P, Z & L	C New Holstein TN Brillion TN Chilton	Co EM TN Woodville	VI Harrison

		TN New Holstein TN Stockbridge VI Sherwood	TN Rantoul VI Potter VI Stockbridge		
Promoting cooperation among public agencies, citizens, non-profits & businesses	C Appleton C Brillion C Chilton C New Holstein Co EM Co Highway TN Brothertown TN New Holstein TN Stockbridge VI Harrison VI Stockbridge	Co P, Z & L TN Brillion TN Chilton TN Rantoul TN Woodville VI Hilbert VI Potter VI Sherwood			
Protecting and reducing damage to utilities	C Appleton C Brillion C Chilton C New Holstein Co EM Co Highway Co P, Z & L TN Brillion TN Brothertown TN New Holstein TN Stockbridge VI Harrison VI Hilbert VI Potter VI Sherwood VI Stockbridge	TN Chilton TN Rantoul TN Woodville			
Strengthening emergency services	C Appleton C Brillion C Chilton C New Holstein Co EM Co Highway Co P, Z & L TN Brillion TN Brothertown TN New Holstein TN Stockbridge VI Harrison VI Hilbert VI Potter VI Stockbridge	TN Chilton TN Rantoul TN Woodville VI Sherwood			

6. Do you have any community building projects (e.g., subdivisions, office/industrial parks, roads) slated to be built in the near future? If so, please describe it (e.g., project name, location, type, size)?
   - C Appleton: Southpoint Commerce Park project (*https://www.appleton.org/home/showdocument?id=712)*. The area west of Eisenhower Drive has infrastructure in place and is "ready to build" for development. The area east of Eisenhower Drive is future development. Limited subdivision development, only in-fill areas available. Community trail development.
   - C Brillion: In the process of looking into rebuilding a new Emergency Services building, housing police, fire and ambulance.
   - C Chilton: TIF #6, Industrial Park addition west of Irish Road and north of railroad tracks.
   - Co EM: Calumet County courthouse expansion project – ongoing through summer 2021.
   - Co P, Z & L: These projects are located in cities and villages, under their jurisdictions. They will have more information.
   - TN Brothertown: Complete reconstruction of St. Charles Road, especially through the swamp.
   - TN Stockbridge: We have just been approached about a project called Project Lakeside, this is a gated community that is being developed on the village and town line on the south side of Stockbridge, just north of Mud Creek. This project will cover around estimate 90 acres, including 20 new homes, solar farm and several outbuildings. This will have some impact on Mud Creek Road and also the drainage for the area into Mud Creek. We also have a project coming to build onto the Town of Stockbridge Garage. Several road projects are in the future with Long Road and Faro Springs Road being completed this year. Town and Village Fire station expansion, with the expansion adding an electric generator tc create an Emergency Shelter in the west side of the county.
   - VI Harrison: **Subdivisions** (Southtowne Place, construction beginning May 2020, 31 lots; Hidden Pines, construction completion June 2020, 11 lots; Creekside Estates, construction completion June 2020, 40 lots; Kimberly Heights, construction completion May 2020, 37 lots; Kambura Acres, construction completion November 2019, 43 lots). Construction windows are for public infrastructure, private lots currently being constructed. **Multi-Family** (Friendship Dr., construction beginning June 2020, 19 acres; Lexington Homes, construction beginning July 2020, 18 acres; Driscoll Development, construction beginning June 2020, 11 acres). **Bills Custom Conveying** – Commercial/warehouse storage – January 2020 start, 5 acres. **Tillman** – Cell tower, June 2020 start.
   - VI Hilbert: We currently have two residential subdivisions being installed. Village Meadows is a 14-lot subdivision (Phase 1) and is part of a 50-acre parcel for residential housing. This first phase involves the construction of a new stormwater detention pond which is designed to handle this entire first phase and beyond. We have a schematic buyout of the entire area and have addressed stormwater planning for this. It will be adjusted accordingly as this area continues to develop. This subdivision is located on the southeast side of the village. Fachs Trails is the final phase for this subdivision with 12 lots. The stormwater system was analyzed for this last section and the current stormwater pond is adequate to handle this.
   - VI Sherwood: **Pond View Estates** (private), 35-lot subdivision between Pigeon Rd. and Stommel Rd. **High Cliff Golf Course** (private), 22 building/44-unit residences of owner-occupied duplexes. **Condon Rd. extension**, extending roadway between Clifton Rd. and STH 55 and CTH B, $1.8M.
   - VI Stockbridge: Possible sewer plant expansion due to phosphorus regulations.

7. What ideas do you have for your community to mitigate natural disasters? Please provide details as to specific projects and their locations within your community.
   - C Appleton: Ideas for mitigation strategies for the Calumet County region (only the water line is a current expected project in 2020): a second water line for the water treatment plan is in the discussion phase currently; associated discussion is where redundancy in utilities would be beneficial in general. Burying utility lines throughout the city. Mutual aid agreements for equipment during times of disaster is another mitigation strategy for the city. Investing in additional equipment for emergency storm clean-up. Strengthening and redundant emergency communication projects.
   - C Brillion: Working with DNR to improve water flow through the Brillion Marsh to prevent flooding in the City of Brillion.
   - C Chilton: Larger, portable pumps to handle storm water and sanitary sewer overflow; emergency stockpile of sand and sand bags to be filled if need arises; emergency power generators for critical infrastructure (i.e., city wells, sewer lift pumps, communication services).
   - Co EM: I will defer most specifics to the local township and county department survey responses, they have more history and experience with their jurisdictions. It is my opinion, however, that storm sheltering structures would be beneficial in certain locations (Hilbert MHP, Chilton High School football stadium). These two areas have large, vulnerable populations that have little or no access to safety during severe weather events. Also, a large supply of NOAA weather radios for community distribution would be very beneficial.
   - Co Highway: The only way to mitigate natural disasters is to be properly trained and to realize that if something happens, we will be understaffed to take care of the situation.
   - Co P, Z & L: Planning, floodplain ordinance administration and other ordinances related to land use such as wetland/shoreland zoning and general zoning.
   - TN Brothertown: Change farm field landscape west of Niagara Escarpment.
   - TN New Holstein: Depending on the disaster will determine what our reaction will be and which government emergency agencies will need to get involved.
   - TN Stockbridge: The Town of Stockbridge continues to replace or repair its 43 miles of road, keeping in mind the flood damaged areas. The expansion of the Fire Station to make an Emergency Shelter that is needed on the west side of Calumet County. The other big factor in handling natural Disasters is the radio communication system for the county, this should be upgraded so everyone is on the same system using the same channels.
   - TN Woodville: Attempt to clean out waterways in the low marshland areas.
   - VI Harrison: Ensure all culverts, ditches and areas of flow remain unobstructed and clear for stormwater conveyance. Many regional detention facilities have been installed to aid in flood control and meet WDNR MS4 requirements. Fire Department is in the process of updating their emergency management and response plan for disasters. No specific projects are planned at this time other than some ditch regarding work and repairing minor failures on detention basins.
   - VI Hilbert: To continue on the several improvements to the drainage system that has been completed over the last 10 years. Continue with stormwater projects that will enhance drainage including but not limited to stormwater improvements, additional stormwater detention ponds as necessary and cleaning out the ditch system so stormwater flows more efficiently.
   - VI Potter: Dredge and clean out navigable stream that runs through village; repair bridge (larger) that is on the north end of Central St.; have railroad replace culverts under railroad line to encourage drainage; dredge and remove debris in Manitowoc River to reduce stagnation which is encouraging

flooding.

- VI Sherwood: More stormwater retention facilities per MS-4 guideline (Wis DNR) to slow erosion toward Lake Winnebago; Palisades Pond dam replacement.
- VI Stockbridge: Stormwater management, emergency management plan.

Appendix G: Community Input

GOVERNMENTAL & PUBLIC INPUT

Planning creates a way to solicit and consider input from diverse interests. Successful community mitigation begins with a commitment from government officials throughout the county.

Involving stakeholders is essential to building community-wide support for the plan. In addition to emergency managers, the planning process involves other government agencies (e.g., zoning, floodplain management, public works, community and economic development), businesses, civic groups, environmental groups and schools. Vital information provided by these groups helps insure that the plan is workable within the framework of the community's priorities.

ADOPTION OF THE PLAN

Local units of government participating in a multi-jurisdictional planning process must adopt the final plan for the municipality to be eligible for future mitigation funds including grants available through FEMA. Local units (i.e., towns, villages, cities) that do not participate would be ineligible to receive such funds until such time that they meet these requirements and adopt a plan.

HISTORY

Floods and storms have killed over 2,000 people in the U.S. in the last decade. Hundreds of disasters have occurred in the past 25 years, costing the country millions of dollars every week.

MITIGATION PLANNING FACTS

- A 2017 study has shown that mitigation saves society an average of $6 for every $1 spent through federal agency grant programs.
- The rigorous building standards adopted by 20,000 communities across the country are saving the nation more than $1.1 billion a year in prevented flood damages.
- Hazard mitigation plans and projects reduce overall risks to the population and structures while also reducing reliance on funding from actual disaster declarations.
- According to the National Oceanographic and Atmospheric Administration, 2017 was the costliest year ever for weather and climate disasters in the United States, totaling $215 billion in disasters. That's $5.9 million dollars every week!

NOTES: _____

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For further information please contact:

Calumet County
Emergency Management
206 Court Street
Chilton, WI 53014
(920) 849-1473

WISCONSIN
Calumet County
Emergency Management

Pre-Disaster Mitigation Planning

Creating Safe, Sustainable Communities

Prepared by:
Calumet County Emergency Management

What is Hazard Mitigation?

Hazard mitigation is sustained action taken to reduce or eliminate long-term risk to people and their property from hazards.

Floods, ice storms, tornadoes and forest/wild fires – these are all functions of the natural environment and only become hazardous when they threaten our "built" environment with destruction. These hazards will occur one day. When this happens, the results can be appreciably different from past outcomes if our community takes action today.

Risk Reduction

The goal of risk reduction is to reduce the risk to life and property, which includes existing structures and future construction, in the pre- and post-disaster environments. This is achieved through regulations, local ordinances, land use and building practices and mitigation projects that reduce or eliminate long-term risk from hazards and their effects.

Why Develop A Plan?

Mitigation plans form the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction and repeated damage. The planning process is as important as the plan itself. It creates a framework for risk-based decision-making to reduce damages to lives, property and the economy from future disasters.

State, tribal and local governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance. The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000, provides the legal basis for state, local and tribal governments to undertake a risk-based approach to reducing risks from natural hazards through mitigation planning.

Like many other people, the residents of Merkel, Texas didn't think much about flooding. Besides, it had not flooded in Merkel for 45 years. It wasn't until the heavy summer rains came that residents realized flooding can hit anyone, at any time. After the flooding finally subsided, officials knew they had to do something: mitigate.

Required Information

- Flood maps
- Identification of potential hazards
- History of occurrences
- Hazard impact projections
- Location of critical facilities
- Identification of high-risk facilities (schools, fire station, nursing homes, etc.)
- Location of repetitive loss structures
- Development & prioritization of mitigation projects
- Other materials as identified

Hazard Mitigation Planning Process

1. Organize Resources- From the start, communities should focus the resources needed for a successful mitigation planning process. Essential steps include identifying and organizing interested members of the community, particularly those with the technical expertise required during the planning process.

2. Assess Risks- Communities next need to identify the characteristics and potential consequences of natural hazards. It is important to understand how much of the community can be affected by specific hazards and what the likely impacts would be for important community assets.

3. Develop a Mitigation Plan- Armed with an understanding of the risks posed by natural hazards, communities need to determine what their priorities should be and then look at possible ways to avoid or minimize the undesired effects. The result is a natural hazard mitigation plan and strategy for implementation.

4. Implement the Plan & Monitor Progress- Communities can bring the plan to life in a variety of ways ranging from implementing specific mitigation projects to changes in the day-to-day operation of the local government. To ensure the success of an on-going program, it is critical that the plan remains effective. Thus, it is important to conduct periodic evaluations and make revisions as needed.

Appendix H: Inter-Revision Updates

This plan will undergo major revisions every five years per the FEMA requirements. Calumet County has recognized that there may be information that should be added to the plan between the five-year updates but that the costs of continuous updates, printing and distribution can be excessive. This section is designed to hold that information that is gathered between the five-year updates. It is felt that only having to reproduce and distribute one section between updates will lessen the costs to the county.